INFLUENCE OF SUPPLY CHAIN AMBIDEXTERITY ON PERFORMANCE OF ACCREDITED HOSPITALS IN KENYA

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Influence of Supply Chain Ambidexterity on Performance of Accredited Hospitals in Kenya

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DECLARATION

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

Signature…… Date…….……..……..

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This thesis has been submitted for examination with our approval as University Supervisors.

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DEDICATION

This research thesis is dedicated to my family who gave me the needed encouragement and support.

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LIST OF ACYRONYMS AND ABBREVIATIONS

AIR	Association of Institution Research
AVE	Average Variance Extracted
BCP	Business Continuity Plans
CM	Crisis Management
DEA	Data Envelopment Analysis
DMR	Data Management Resources
DV	Dependent Variable
EACC	Ethics and Anti-corruption Commission
ERP	Enterprise Resource Planning
FBO	Faith Based Organizations
HRM	Human Resource Management
ICT	Information Communication Technology
IT	Information Technology
IV	Independent Variable
JIT	Just In Time
KHF	Kenya Healthcare Sector
KHSSP	Kenya Healthcare Sector Strategic Plan
KMO	Kaiser- Meyer Olkins
KTDA	Kenya Tea Development Authority
NACOSTI	National Comission for Science,Technology and Innovation
NHIF	National Hospital Insurance Fund

NHS	National Health Service
OLS	Ordinary Least Square
Ph.D	Doctor of philosophy
PMR	Performance Management Resources
R&D	Research and design
RCT	Relational Competency Theory
ROA	Return on Asset
ROK	Republic of Kenya
SC	Supply Chain
SCA	Supply Chain Analytics
SCD	Supply Chain Design
SCI	Supply Chain Integration
SCM	Supply Chain Management
SCMI	Supply Chain Management Integration
SCO	Supply Chain Orientation
SCX	Supply Chain Ambidexterity
SME	Small and Medium Enterprise
SSC	Service Supply Chain
UK	United Kingdom
US	United States
VHC	Village Health Committee
VIF	Variance Inflation Factors

OPERATIONAL DEFINITIONS OF TERMS

Accredited Hospital: It is defined as a whole or part of a public or private institution, building or place, whether for profit or not, that is licensed to operate or designed to provide in-patient or out-patient treatment, diagnostic or therapeutic interventions, nursing, rehabilitative, palliative, convalescent, preventative or other health services (RoK, 2017).

Lean Supply Chain: It refers to a set of organizations directly linked by upstream and downstream flows of products, services, finances and information that collaboratively work to reduce cost and waste by efficiently and effectively pulling what is needed to meet the needs of the individual customer (Kovac, 2013).

Performance: It is defined as the process that involves the quantifying the effectiveness and efficiency of coordination and integration of all the entities among the various supply chain partners (Lenin, 2014).

Supply Chain Ambidexterity: It alludes to organization's ability to concurrently demonstrate alignment and adaptability, exploitation and exploration, efficiency and flexibility or incremental change and revolutionary change across supply chain partners (Hafkesbrink & Schroll, 2014).

Supply Chain Analytics (SCA): It is defined as the use of data, quantitative tools and techniques, statistical analysis, explanatory, predictive and prescriptive models to improve operational and supply chain performance (Chae, Olson, & Sheu, 2014).

Supply Chain Integration: It refers to collaboration of functional departments, suppliers and customers to link and coordinate information flow and processes so that the supply chain is able to achieve accurate and on-time delivery (Stadtler, 2015).

Supply Chain Management (SCM): It is defined as a management philosophy that requires a systematic approach to viewing the supply chain as a whole versus a divided set of entities (Tinney, 2012).

Supply Chain Orientation: It alludes to recognition by a company of the systematic, strategic, implications of the activities and processes involved in managing the various flows in a supply chain (Shanmugan & Kabiraj, 2012).

Supply Chain Resilience: It refers to the ability to survive and thrive in crises and turbulences through establishing better short-term contingency measures through higher operational flexibility and better long-term strategies through business continuity plans, along with growth strategies via market penetration, diversification and transformational initiatives. (Fisher, 2017).

ABSTRACT

The study sought to establish the influence of application of supply chain ambidexterity on performance of accredited hospitals in Kenya. To achieve this aim, the study assessed the ambidextrous application of five supply chain practices and their influence on performance of level three to level six accredited hospitals in Kenya. The specific objectives were to assess the influence of supply chain orientation on performance of accredited hospitals in Kenya, to examine the influence of lean supply chain on performance of accredited hospitals in Kenya, to examine the influence of supply chain analytics on performance of accredited hospitals in Kenya, to assess the influence of supply chain integration on performance of accredited hospitals in Kenya, to evaluate the influence of supply chain resilience on performance of accredited hospitals in Kenya and to evaluate the mediating effect of hospital size in promoting performance of accredited hospitals in Kenya. The target population was all 773 accredited hospitals offering both inpatient and outpatient services in Kenya as listed by NHIF. The sample size was 264 hospitals derived using simplified Yamane formula. The sampling technique was stratified random sampling. The study used self administered questionnaires to collect data. The descriptive statistics, reliability and validity tests of the constructs, correlation, factor and regression analysis models were used to analyze the collected data. Data was presented in tables and charts as was deemed appropriate in the study. The study findings indicated that private hospitals had a higher Data Envelopment Analysis score compared to the public and faith based hospitals. The findings implied that private hospitals were generally efficient than other type of hospitals. Further, the study determined that supply chain orientation, supply chain resilience and supply chain integration had a positive significant influence on performance. However, lean supply chain and supply chain analytics did not have a significant influence on performance. The study also found an R^2 value of 0.935 which implied that 93.5% of the variation in performance of hospitals in Kenya could be attributed to supply chain orientation, supply chain resilience, supply chain integration and hospital size. The study concluded that supply chain ambidexterity is a key antecedent of hospital performance. The study also concluded that hospital size had a positive mediating effect of hospital size on the relationship between supply chain ambidexterity and performance of hospitals. Further, the study concluded that simultaneous application of supply chain resilience, supply chain integration and supply chain orientation improved hospital performance more than implementing the individual strategies separately. The study recommended that hospitals need to simultaneously adopt the three supply chain ambidexterity strategies by investing in spare capacity, multiple payment platforms, integrative systems such as supply chain management systems and cultivating a culture of trust, credibility and commitment for all employees and across the supply chain partners.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The main purpose of this study was to examine the influence of supply chain ambidexterity on performance of accredited hospitals in Kenya. To achieve this aim, the study assessed the ambidextrous application of five supply chain practices and their effect on performance of accredited hospitals in Kenya. In this chapter, the study looked at the general tenets of the study, illustrated the problem of the study and identified the general and specific objectives of the study, research hypothesis, justification of the study as well as provided scope and limitation of the study. Supply chain ambidexterity (SCX) is an area that provides structural solutions on how to organize and simultaneously apply explorative and exploitative strategies in organizations (Cantarello, Martini, & Nosella, 2012). SCX is an area that has in the recent past captured attention of scholars due to its direct link on the performance and outcomes of organizations (Perdomo, Farrow, Trienekens, & Omta, 2016).

1.1.1 Supply Chain Ambidexterity Concept

Supply chain ambidexterity (SCX) is the ability of a networks of organization to strategically leverage existing resources through simultaneously implementing and integrating exploitation and exploration practices for the benefit of survival (Krishnan & Pertheban, 2017). SCX consists of two main components; exploitation and exploration components. Supply chain (SC) exploitation refers to the practices aimed at leveraging current SC competencies with SC partners (Chandrasekaran, Linderman, & Schroeder, 2012).

Exploitative strategies are aimed at improving efficiency of supply chain. Among the supply chain practices that are exploitative in nature include lean supply chain, agile supply chain and supply chain integration (Borrel, 2013; Gligor & Holcomb, 2012). In contrast, SC exploration relates to the practices aimed at seeking new knowledge and ideas to develop new SC competencies with SC partners (Chandrasekaran, Linderman,

& Schroeder, 2012). Explorative strategies are radical, innovative and revolutionary or aimed at enhancing flexibility of the supply chains. Among the supply chain practices that are explorative in nature include supply chain orientation, supply chain resilience and supply chain analytics (Tucker, 2011; Krishnan & Pertheban, 2017; Annan, Boso, Mensah, & Eliza, 2016).

The study explores ambidexterity concept in service supply chain (SSC) and specifically healthcare SCM. Historically, SCM focused on product based industries such as manufacturing and retail. However SC theories with specific considerations of industry and operating environment such as SSC has been developing (Chen, Preston, & Xia, 2013). Hospital SC like other SSC are unique and different from the typical SC. For instance, Hospital SC are characterized by customer-supplier duality, a concept where the customer (patient) is also a supplier (Mehrparvar, Shahin, & Karbasian, 2014). Also hospital SC operational and inventory decisions are often driven by physician preference and patient needs in contrast to manufacturing and retail industries where supply selections are largely driven by production/sales forecasts and cost considerations (Chen, Preston, & Xia, 2013).

Scholars have not agreed whether it's possible for service organizations to pursue both explorative and exploitative strategies. One school of thought is of the view that it's possible for service organizations to be ambidextrous (Marabelli, Frigerio, & Rajola, 2012). However another school of thought argue that service firms lean more towards incremental innovations as opposed to radical innovations (Cefis & Marsili, 2012). However all scholars agree to the fact that ambidexterity is critical in industries operating in turbulent environments and where technology is rapidly changing (O'Reilly & Tushman, 2013). Healthcare supplies are diverse as a result of rapid technology and medical innovations which make hospital SCM uniquely complex, turbulent and knowledge intensive than ordinary SC (Chen, Preston, & Xia, 2013).

Geerts, Blindenbach-Driessen and Gemmel (2011) postulated that service organizations that balance their explorative and exploitative innovation efforts to be effective in the short run and to survive in the long run outperform organizations that are not able to achieve this balance. Service organizations focus their innovation on processes due to the fact that most of their tangible products are easily replicable by

competitors while the result of process innovations are hidden and difficult to imitate (Marabelli, Frigerio, & Rajola, 2012).

Process innovation can be radical if it involves implementation of a completely new process, and incremental if it improves the efficiency of an existing process (Marabelli, Frigerio, & Rajola, 2012). The research will therefore assess the level of hospital incremental and radical innovations through implementation of efficiency as a gauge on the level of exploitation and implementation of effective innovations as a measure of explorative competences in the organization.

1.1.2 Performance of Accredited Hospitals in Kenya

The fundamental success of SCM involves the effective coordination and integration of all the entities among the various supply chain partners (Lenin, 2014). In hospital SC, the principal participants are the manufacturers of pharmaceutical, medical equipment, medical supplies, medical schools and patients as suppliers; distributors, insurance companies, medical service providers, government regulators, government agencies, non governmental organizations and patients as other SC partners (Elmuti, Khoury, Omran, & Abou-Zaid, 2013).

However, SCM in healthcare is more complex than the traditional SC. The precision rate in healthcare SC is very high as the cost of error maybe someone's life (Kritchanchai, 2012). Also, hospital supply chain has no control on the utilization of resources as they are dependent on a particular service provider's preference and training (Chen, Preston, & Xia, 2013). The need to ensure that hospitals and their healthcare partners balances the two core but conflicting objectives of ensuring quality and affordable care is achieved has elevated the importance of SC performance measurement in healthcare sector and more so in hospitals (Mayer, 2013). Performance of hospitals therefore can be gauged by the extent to which the facility balances the two main objectives; cost and quality.

Cost is an important factor of overall healthcare management performance. Historically, the focus has been on cost containment to lower the price of supplies as opposed to lowering the total delivered cost (Shou, 2013). Further, inventory management in hospital SC is not just about reducing inventory levels but to accurately

provide the optimal levels at the correct time and place (Mayer, 2013). Therefore the cost metrics that may be used to measure performance of hospital supply chain are percentage of supply cost as percentage of revenue (efficiency), percentage of holding costs,shipment metric ratio, on time delivery, cash to cash cycle time, fill rate and lead time (Al Ayoubi, 2015).This research will adopt the efficiency metrics to measure hospital performance.

Quality of service in hospitals can be expressed as the focus on patient safety and clinical outcomes (Schwarting, Bitar, Arya, & Pfeiffer, 2011). SCM can assist in the achievement of quality by ensuring achievement of clinical outcomes by facilitating reliability, flexibility and responsiveness of hospital operations (Lenin, 2014). Also, the need to detect and prevent problems as early as possible improves the value of SCM (Smith, 2011). Supply chain analytics, resilience and integration helps in achievement of quality of care in hospitals. The quality metrics that may be used include the rate of return of patients (with the same condition), the number of complaints received, the average waiting time, the number of misdiagnosis and number of fatalities (NHS Trust, 2016).

The Kenyan healthcare system can be split into three subsystems; the Public Sector, Commercial Private Sector and Faith Based Organizations (KHF, 2016). The private sector is the largest in terms of the number of healthcare facilities, followed by public sector and then faith based organizations (FBO) (NHIF, 2017). Kenya health care system is classified into four tiers (KHSSP, 2012). The lowest tier is community or level one units that comprise of community based organizations (CBO) and village health committees (VHC) whose primary role is to mobilize individuals, households and communities to participate in government healthcare programs as well as identify cases that need to be managed by higher levels of care (RoK, 2017).

Tier two health facilities comprise of the primary level facilities namely the dispensaries and private clinics (Level two), health centers and nursing homes (Level three). The primary level is the most basic and first point of contact for majority of patients. They are mainly responsible for health promotion and prevention, basic outpatient and emergency services awaiting referral (Mohajan, 2014).There are

currently a total of 3,356 dispensaries, 1,941 clinics, 721 heath centers and 155 nursing homes in Kenya (Luoma, et al., 2010).

Tier three comprise of county level hospitals (previously referred to as level 4 or district and sub-district hospitals), private hospitals, mission and FBO hospitals. The tier three public hospitals provide specialized care and coordinate all health activities in the Sub County and county level (KHF, 2016).The other private and FBO hospitals supplement the services of public hospitals as well as provide specialized diagnostic and curative services. By 2010 there were a total of 439 hospitals (public, private and FBO) in Kenya (Luoma, et al., 2010).

Tier four is the highest level of healthcare in Kenya and comprise of county referral hospitals (Level 5) and National referral hospitals (Level 6). They are centers of excellence, providing sophisticated diagnostic, therapeutic and rehabilitative services. They also have the highest skilled medical personnel and most complex medical technology (Mohajan, 2014). In Kenya there are two public national referral hospitals namely Kenyatta National Hospital in Nairobi and Moi Referral and Teaching Hospital in Eldoret. The private referral hospitals are Nairobi Hospital and Aga Khan Hospital in Nairobi (Mohajan, 2014). By 2010, there were a total of ten county referral hospitals in Kenya (Luoma, et al., 2010).

This study aimed at examining the influence of supply chain ambidexterity on performance of accredited hospitals in Kenya. To fulfil this research aim, the study collected data from level three to level six hospitals as they offered both specialized outpatient and inpatient services and operated under some level of autonomy in that they generated their own expenditure plans and budget requirements. They were therefore capable of implementing strategies with very little interference from government and regulators (Mohajan, 2014).

1.2 Statement of the Problem

Healthcare system in Kenya is still a national challenge, five decades after independence. For instance, Kenya has very few doctors compared to developed countries. Kenya with a total population of 46 million citizens, currently has 0.2 physicians per 1000 population. Comparatively, Sweden with a population of only 8

million citizens, has a physician density of 3.93 physicians per 1000 population (CIA, 2016). Consequently, Kenya has high morbidity and mortality rates affecting the population of all ages, especially children under five years. The infant mortality rate is about 58.1 per 1,000 live births, maternal mortality rate is about 414 per 1,000 and the overall under five child mortality rate is about 121 per 1,000 live births, which are all double of the global average (ROK, 2014).

Though a significant proportion of this morbidity and mortality can be attributed to spread of infectious conditions, poverty and chronic diseases, hospital management factors such as poor supply chain and human resource management have a significant effect on the quality and affordability of healthcare service (Mohajan, 2014). Accountability and transparency on the utilization of health resources is also a major issue in Kenya. Ministry of health is the second most corrupt ministry in Kenya and the health department in the county governments is the department most perceived to be prone to corruption (EACC, 2015). Lack of basic infrastructure, poor health care policies and prevalent misappropriation of public funds has compromised the quality of health care in public healthcare sectors (Kenyanya, 2015).

The study postulates that improvements in hospital SCM through application of supply chain ambidexterity may directly improve performance of accredited hospitals in Kenya. Since 45% of the hospital operating budget is allocated to supply chain, improvements and innovations in supply chain management may provide significant impact on cost and quality of heathcare (Chen, Preston, & Xia, 2013). The study therefore sought to examine the influence of supply chain ambidexterity on performance of accredited hospitals in Kenya.

1.3 Objectives of the study

1.3.1 General objective

The main objective of the study was to exa mine the influence of supply chain ambidexterity on performance of accredited hospitals in Kenya.

1.3.2 Specific objectives

The study was guided by the following specific objectives;

1. To assess the influence of supply chain orientation on performance of accredited hospitals in Kenya.
2. To examine the influence of lean supply chain on performance of accredited hospitals in Kenya.
3. To examine the influence of supply chain analytics on performance of accredited hospitals in Kenya.
4. To assess the influence of supply chain integration on performance of accredited hospitals in Kenya.
5. To evaluate the influence of supply chain resilience on performance of accredited hospitals in Kenya.
6. To evaluate the mediating effect of hospital size in promoting performance of accredited hospitals in Kenya.

1.4 Research Hypotheses

The following research hypotheses will guide the study.

1. H_a: There is a significant and positive influence between supply chain orientation and performance of hospitals.
2. H_a: There is a significant and positive influence between lean supply chain and performance of hospitals.
3. H_a: There is a significant and positive influence between supply chain analytics and performance of hospitals.
4. H_a: There is a significant and positive influence between supply chain integration and performance of hospitals.
5. H_a: There is a significant and positive influence between supply chain resilience and performance of hospitals.
6. H_a: Hospital size mediates the relationship between supply chain ambidexterity and performance of hospitals.

1.5 Justification of the Study

The study will be important to various stakeholders in the field of supply chain who include the government, suppliers, health institutions, patients, students, scholars, service and manufacturing industries. The section was organized into major themes of health institutions, other institutions and contribution to body of knowledge. The significance in each theme was discussed in detail to show the contribution of the study in the theme. Each of the beneficiaries have been discussed separately highlighting the specific benefits to each of them beginning with health institutions, other institutions and body of knowledge.

1.5.1 Health Institutions

The study will provide valuable findings to hospitals and other health institutions on the importance of promoting ambidexterity in SC as a means of enhancing institutional performance. The study will also be instrumental to the policy makers such as the government, regulatory authority, professional bodies and advocacy groups in health sector as they will be able to use the research findings to improve regulatory and management policies of the hospitals.

1.5.2 Other Institutions

The findings of this study will provide a baseline information on the application of SC ambidexterity in the management of organization as well as provide a link between supply chain ambidexterity and performance of organizations. The findings will therefore be influential in the development of SCM in diverse sectors, both service and manufacturing. The service sector will use the findings to improve their services, processes and offerings while the manufacturing sector can use the findings to improve on the product supply chain.

1.5.3 Body of Knowledge

The study will significantly contribute to the body of knowledge. The study will improve the knowledge on SCM, organizational learning and development of ambidextrous SC as a precursor to organizational performance. Social scientists,

scholars and students will use the findings of this research for educational purposes as well as in future research that aims at establishing the relationship between ambidextrous SC and organizational performance. The research will therefore enrich and contribute to the development of SCM as a distinct field of management science.

1.6 Scope of the Study

The study focused on the role that ambidextrous SC plays in enhancing hospital performance. In order to fulfil this aim, the study analyzed the effects of SC orientation, lean SC, SC analytics, SC integration and SC resilience, on performance of hospitals. The study also analyzed the mediating effect of hospital size on the relationship between supply chain ambidexterity and performance of hospitals. The study further focused on service sectors as opposed to manufacturing sector, specifically the hospital institutions in Kenya only. The study was done between 2016 and 2018.

1.7 Limitations of the study

The contextual aim of the study was to investigate the influence of SCX on performance of accredited hospitals in Kenya. The study therefore limited its research findings to hospital institutions that offered both in-patient as well as out-patient services and were categorized as level three to level six accredited hospitals in Kenya. The reason behind this choice was due to logistical and time constraints. However, given the fundamental identity and standardization of hospital operations across the world, the findings of this research can therefore be inferred to other hospitals with similar size and services all over the world.

The study also was limited by failure of the respondents to provide information on time, failure to cooperate effectively and missing responses. These limitations were mitigated by ensuring that the researcher used research assistants to reach a bigger response, respondents were assured of data confidentiality by illustrating researcher's willingness to sign confidentiality forms provided by the respondents and always ensuring that the research assistants went out of their way to accommodate the tight schedules of the respondents.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed the empirical and theoretical literatures on supply chain ambidexterity strategy and its influence on performance of accredited hospitals. The chapter also demonstrated how the hypothesized variables formed a conceptual framework indicating a schematic influence between the independent and dependent variables of the study. The chapter is organized into theoretical review, conceptual framework, empirical review, critique of existing literature, research gaps and summary of literature reviewed.

2.2 Theoretical Review

A theory can be defined as a broad and natural explanation for a wide range of phenomena and facts (Bradford, 2015). This section therefore discussed and explained major theoretical constructs underpinning the study and related the theories to the variables mentioned in chapter one. The main theories identified and discussed include the ambidexterity strategy theory, boundary spanning theory, contingency theory, relational competency theory and supply chain theory. The supply chain theory and the ambidexterity strategy theory were the main theories informing all the study variables while boundary spanning theory, contingency theory and relational competency theory supported the main theories.

2.2.1 Ambidexterity Theory

The origin of ambidexterity theory can be traced to Duncan (1976) and Tushman and O'Reilly (1996) who advanced the notion that ambidexterity, can help to unite two apparently contradicting objectives or capabilities for improved firm performance (Mehdi & Ahmed, 2016). Originally, 'ambidexterity' concept was applied in the area of organizational learning and organization adaptation and design (O'Reilly & Tushman, 2013). Later scholars would refine the term 'ambidexterity' to include it in other disciplines such as supply chain, organizational theory, networks, innovation,

and inter-organizational relationships(Im & Rai, 2008). Organizational ambidexterity has since been defined as an organization's ability to concurrently demonstrate alignment and adaptability, exploitation and exploration, efficiency and flexibility or incremental change and revolutionary change (Lavie, Stettner, & Tushman, 2010).

Furthering that idea O'Reilly and Tushman (2013) suggested that for long-term survival, organizations need to accommodate both exploitation and exploration strategy to be ambidextrous. Im and Rai (2008) formally defined exploitation as "the use and refinement of existing knowledge" and exploration as "the pursuit of new knowledge and opportunities" in the long-term inter-organizational relationships. Exploitation meant efficiency, control, certainty, and variance reduction while exploration involved searching, discovery and innovation of new processes, ideas and products. Exploratory innovations therefore are radical innovations and are designed to meet the needs of emerging customers or markets. Exploitative innovations, however, are incremental innovations to meet the needs of existing customers. They broaden existing knowledge, improve existing designs, expand existing products and services and improve the efficiency of the distribution (Benner & Tushman, 2003).

Duncan (1976) in his seminal paper suggested that organizations achieved ambidexterity in a sequential fashion by shifting structures over time and aligning the structure with the firm's strategy in line to changes in the environment. However, Tushman and O'Reilly (1996) argued that in the face of rapid change, sequential ambidexterity might be ineffective and organizations needed to explore and exploit in a simultaneous fashion. They suggested that this could be accomplished by establishing autonomous explore and exploit subunits that were structurally separated, each with its own alignment of people, structure, processes and culturesbut with targeted integration to ensure the use of resources and capabilities.

Gibson and Birkinshaw (2004) consequently contended that organizations could be ambidextrous by designing organization structures that allowed employees to choose between exploratory and exploitative activities depending on the contextual situation of the organization. According to them, contextual ambidexterity was better than both sequential and simultaneous ambidexterity as it provided employees make their own

judgements on how to balance between the conflicting demand for exploitation and exploration. This is the major theory underpinning the study.

2.2.2 Boundary spanning theory

Boundary spanning theory expanded the theory of the firm by acknowledging the interaction of the firm with its environment. The theory uses boundary spanners and objects to emphasize the communication, coordination, and collaboration across organization boundaries (Carlile, 2002). Boundary spanners are individuals such as top management that support information sharing across supply chain (Tortoriello, Reagans, & McEvily, 2011). Boundary objects are dynamic capabilities and systems such as IT capabilities that facilitate the development of competences across the supply chain (Levina & Vaast, 2005).

The theory fortifies that successful organizations collaborate and interact with other supply chain partners drawing expertise, competences and knowledge from diverse organizations in the supply chain (Levina & Vaast, 2005). According to the theory, organizations therefore need to overcome the barriers imposed by lack of dynamic capabilities and expand their boundaries across supply chain partners by investing in business analytics (Tortoriello, Reagans, & McEvily, 2011). The boundary spanners should possess supply chain competences that would facilitate communication, coordination, and collaboration between Supply chain partners in Supply chain management (Wei, Ke, Liu, Wei, & Hua, 2013). Boundary objects should support boundary spanners by providing dynamic capabilities that are robust and standard across the supply chain while at the same time flexible to local variations (Star & Griesemer, 1989).

Overall, the boundary-spanning theory encompasses an integrated foundation of marketing, customer value creating processes, networks and stakeholders (Clarkson, 1995). Hult (2011), elaborated that marketing activities included integrated logistics, channel management, and marketing communication while boundary customer value-creating processes include product development management, supply chain management and customer relationship management. Networks were either internal, to reduce hierarchy and open up the organization to the environment; vertical, to

maximize productivity of dependent functions; inter-market, to leverage synergies across markets and opportunistic, to respond to customer needs and market opportunities (Clarkson, 1995).

The theory also emphasizes on use of multiple actors, both primary and secondary stakeholders. Primary actors are those that are critical to the organization survival and include customers, employees, suppliers, shareholders, communities, and regulators while secondary actors are not vital for the organization survival but can still mobilize public opinion in favor of or against an organization such as media and interest groups (Hult, 2011). Following the works of Carlile (2002); Tortoriello, Reagans, and McEvily (2011) and Levina and Vaast (2005) the study will look into the importance of supply chain orientation, dynamic capabilities, supply chain competences and business analytics in the development of ambidextrous supply chains and their effects on performance of the organizations.

2.2.3 Contingency theory

Contingency theory is an organization theory that rejected classical management theory that there is one best way of structuring and managing an organization (Donaldson, 2001). Instead it's argued that the most suitable structure is contingent on a number of factors such as complexity of the environment, the strategic positioning of the firm, or the technology it is using (Holmes, 2013) Among the principal contingency variables identified are environmental complexity, organization strategy, technology and organization size (Lawrence & Lorsch, 1967; Woodward, 1965; Hickson, Pugh& Pheysey, 1969). The contingencies dictate the explicit structure, activities and management style of an organization. In the event there is a mismatch between the contingent variables and the organization structure, the organization will achieve lower performance and must undergo structural adjustments to achieve the structure– strategy fit (Hicks, McGovern, & Earl, 2001).

Managers must therefore always assess the changes in the environment and determine the appropriate decisions that promote efficient and effective organization performance. The research will look at three key contingencies and their relationship in developing ambidextrous supply chain and their consequent effect on performance.

These contingencies are environment, strategy and technology. These contingencies are viewed as the most important for this study as they also relate to boundary spanning theory and ambidexterity theory discussed earlier. The study also assumes that the main driver for switching between the ambidexterity principles of exploration and exploitation as alternative modes of learning is environmental change (Auh & Menguc, 2005).

However, the relationship between technology and structure has also been challenged. Hickson, Pugh and Pheysey (1969) among others argued that the relationship between technology and structure disappeared with change in size though Comstock and Scott (1977) reported a significant relationship at the unit level. Due to the limitations highlighted above, recent scholars have modified the theory to include knowledge management as a contingent factor and shown that knowledge characteristics and organization structures are related to performance (Birkinshaw, Nobel, & Ridderstrale, 2002). Following on the works of contemporary gurus, the research will look deeper on the relationship between knowledge management (business analytics), organization size and organization performance.

2.2.4 Relational competence theory (RCT)

Relational competence theory (RCT) developed by protagonists Hamel and Prahalad, (1994) and Sanchez, Heene and Thomas (1996) among others is an improvement of the theory of the firm and resource based view and attempts to explain performance differences among organizations. According to RTC, an organization can only be successful if it can make use of the available resources more efficiently or effectively than the other organizations. This is achieved by developing and effectively or /and efficiently utilizing competences that cannot be quickly imitated or substituted by rivals. RCT defines competence as drivers of a single firm's heterogeneity and are heterogeneous by themselves. Competences are capabilities that build resources through asset refinement processes and utilize these resources to achieve competitive advantages (Sanchez, 2001).

According to RCT assets are homogeneous external or internal factors, serving the firm as input for value-added processes which when developed becomes resources

capable of producing sustainable heterogeneity of the owning firm in competition and enabling the firm to withstand competitive forces. Competences are organizational, learning-based abilities that are capable of sustaining a coordinated deployment of assets and resources thereby enabling the firm to attain its goals and preserve the state of competitiveness. Competences can therefore be regarded as the root of organization's survival, competitiveness, and performance (Freiling, 2004).This definition of assets is a diversion from the definition in economics.

RCT also developed the notion that competencies are interpersonal patterns of action which results in division of work and support goal oriented social interaction of persons in a non-random manner. Development of competency requires a specific or organizational environment which fosters assets refinement process. Organization is one solution to this problem. An organization is created if a group of individuals agree that working together would improve their economic situation and if there is no better alternative. RCT is in line with isolating mechanisms theory by Dierickx and Cool (1989) which explains how firms can 'outpace' their rivals by active behavior (i.e. by accumulating R&D knowledge via a well-aligned interplay of different researchers for many projects, triggering off synergies although having idiosyncratic backgrounds while also 'protecting' themselves in case of competitors' attacks by accumulate resources (i.e., reputation, brand equity, customer base) faster than the first-moving firm in order to catch up with this supplier. Following this theory the study will assess the role of supply chain integration and resilience in promoting performance.

2.2.5 Supply Chain Management theory

The term supply chain management (SCM) was originally introduced by consultants in the early 1980's as a practice of achieving sufficient integration of organization's network of business relationships beyond the company's frontier to all organizations in the value chain (Cooper, Lambert, & Pagh, 1997). Fawcett, Magnan and McCarter (2008) suggest that companies that are able to work in close association with partners for project development and for the management of processes that involve the entire supply chain will succeed.

SCM theory borrows heavily from a number of fields such as purchasing and supply, logistics and transportation, operations management, marketing, organizational theory, management information systems, and strategic management. However, orthodox of supply chain management, is in danger of collapsing into a discredited management fad unless a reliable conceptual base is developed clearly defining the constructs and differentiating SCM from other related fields such as materials managements, logistics management or distribution management (New, 1996).

SCM theory is grounded on a paradigm of strategic management theory that advocate the development of collaborative advantage through strategic collaboration within a network of interdependent relationships with a goal of achieving mutual benefits (Dyer, 2000). The theory is also complementary to the competency theory where the emphasis is on the relational view of inter organizational competitive advantage as opposed to individual organization as advocated by competency theory (Barney, 1991).

Research in SCM from the manufacturing industry perspective is more common as compared to SCM in service industry (Habib, 2010). SSC has unique characteristics not found in manufacturing. SCM and SSC are both centered on supply management, planning, logistics and management objectives are both to meet established service levels, minimize the total system cost. Conversely, service processes are different from manufacturing processes in six essential characteristics: customer- supplier duality, intangibility, indivisibility, heterogeneity, perishability and labor-intensive (Wu, 2011).

The theory identifies key drivers that plays critical role in fostering dyadic buyer-supplier relationship. Supply chain orientation, lean supply chain, supply chain analytics, supply chain integration and supply chain resilience have been mentioned as key antecedents to successful supply chain management (Tucker, 2011; Borrel, 2013; Gligor & Holcomb, 2012; Krishnan & Pertheban, 2017; Annan, Boso, Mensah, & Eliza, 2016). The study objectives were linked to the exiating theoretical foundation. Ambidexterity theory and SCM theory were the main theories underpinning the study that guided all the objectives. The boundary spanning theory assessed the importance of supply chain orientation and business analytics in the development of SCX.

Contigency theory supported the influence of business anaytics and organizational size on perfromance of hospitals. RCT reinforced the role of supply chain integration and resilience in promoting performance.

2.3 Conceptual Framework

Robson & McCartan (2016) defined a conceptual framework as a system of concepts, assumptions, expectations that supports and directs research. The framework is a schematic illustration of the key concepts of the study. The study aims at investigating the relationship between supply chain ambidexterity and performance of hospitals. In this regard, supply chain performance will be the dependent variable for the study while the independent variables shall be the antecedents of supply chain ambidexterity.

Following the findings of the past research, the study will adopt supply chain orientation, lean supply chain and agile supply chain as exploitative antecedents of ambidextrous supply chain and supply chain resilience and supply chain integration as explorative facet of supply chain ambidexterity (Tucker, 2011; Borrel, 2013; Gligor & Holcomb, 2012; Krishnan & Pertheban, 2017; Annan, Boso, Mensah, & Eliza, 2016). The study also assessed the mediating role of hospital size in promoting the aspect of supply chain ambidexterity and ensuring high performance.

Figure 2.1 shows the relationship between supply chain ambidexterity and performance of hospitals. The diagram also shows the mediating role of size in the relationship between supply chain ambidexterity and performance of hospitals. Supply chain ambidexterity will be characterized by orientation, lean, agile, integration and resilient strategies while the mediating role of size will be assessed by bed capacity. Performance of hospitals will be measured by the level of efficiency as indicated by the level of output verses input, level of quality healthcare measured by the level of mortality rate.

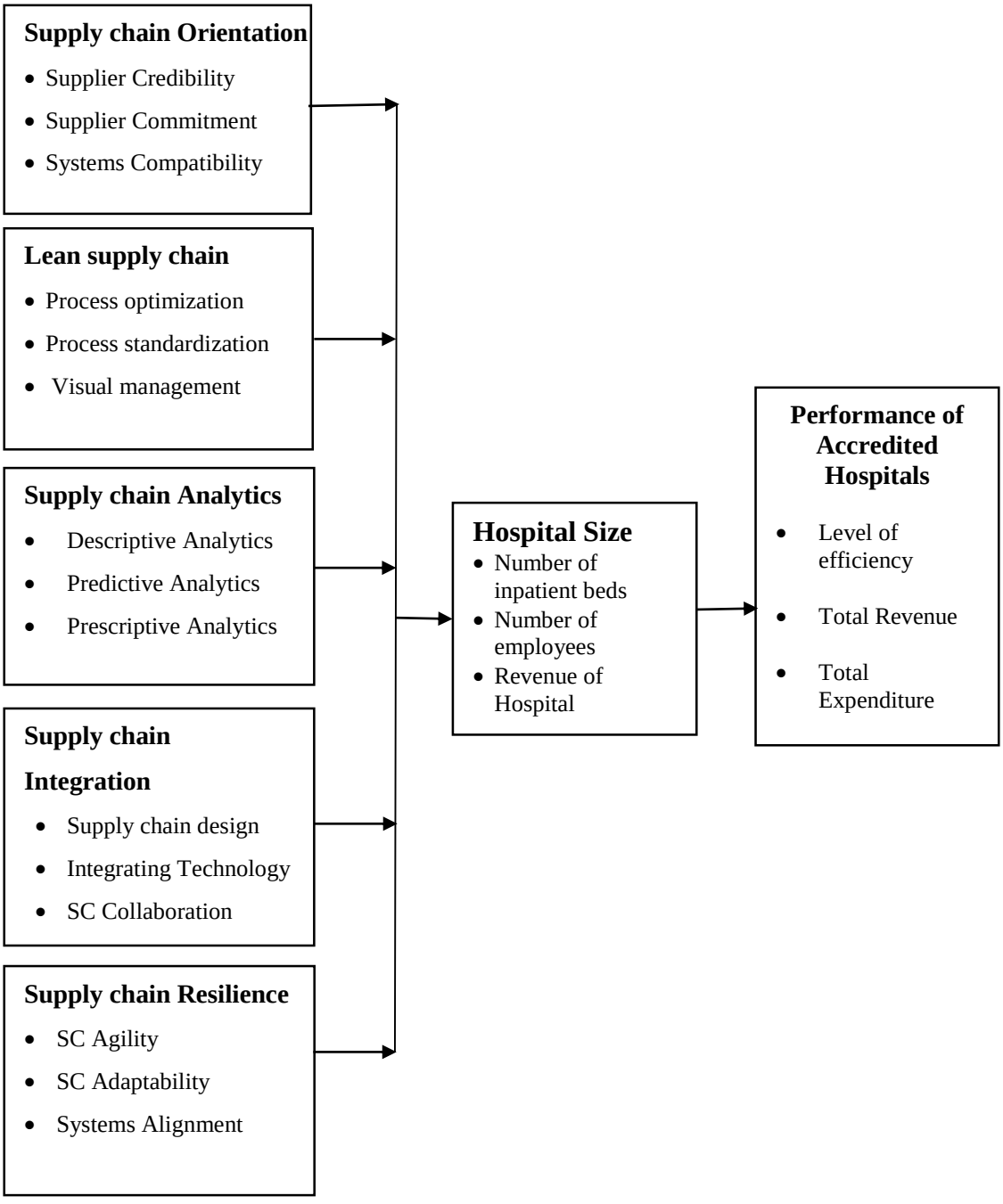

Figure 2.1 Conceptual Framework

2.3.1 Supply chain orientation

The relationship between supply chain orientation (SCO) and supply chain management (SCM) is a topic that is of interest to many firms who have adopted a supply chain management model within their operations (Tinney, 2012). Supply Chain Orientation is defined as the recognition by a company of the systematic, strategic, implications of the activities and processes involved in managing the various flows in a supply chain (Shanmugan & Kabiraj, 2012). However, SCM is defined as a management philosophy that requires a systematic approach to viewing the supply chain as a whole versus a divided set of entities (Tinney, 2012). The critical difference is that supply chain orientation is the processes utilized "within a firm" and supply chain management is the processes utilized "across firms within a supply chain (Tinney, 2012).

Tucker (2011) postulated that organization may be predisposed to either view their supply chain as an integrated entity (SCO view) or hold an atomic view of the supply chain. A company with an atomic view of the supply chain would view its suppliers and customers as strictly 'suppliers' and 'customers' and not as business partners. Organizations that possess a SCO view have an effective SCM and consequently perform better than organizations with an atomic view of their suppliers and customers. SCO is therefore the foundation upon which SCM is built (Tinney, 2012). This suggests that organizations possessing a SCO approach SCM differently than firms that are less inclined to view SCM strategically (Esper, Defee, & Mentzer, 2010).

SCO directly influences firm performance through the development and sustainment of behavior elements that allow a firm to build trustful relationships with their supply chain partners. These SCO behavioral elements are; credibility, benevolence, commitment, cooperative norms and organizational compatibility (Tinney, 2012). Credibility is defined as the degree to which customers perceive that the supplier has required skills and knowledge to supply the product (Laeequddin, Sahay, Sahay, & Abdul Waheed, 2010).

Benevolence is the belief that supply chain partners are involved in and responsible for actions necessary for creation of successful organization (Sridharan & Simatupang,

2013). Commitment is the willingness to exert effort, provide resources and make short term sacrifices on behalf of the organization (Bingham, Mitchell, Bishop, & Allen, 2013). Cooperative norm is the reflection of expectations between two parties when working together to achieve mutual and individual goals jointly (Sridharan & Simatupang, 2013) and Organizational compatibility is defined as the possession of similar goals, culture, operational and management techniques among supply chain partners (Tinney, 2012).

2.3.2 Lean supply chain

Many organizations are trying to apply the waste elimination philosophy of Lean operations into the innovation and product development processes (Biazzo, Panizzolo, & De Crescenzo, 2016). A key lean principle is that each step in production must produce value for the customer and that all sources of waste should be eliminated (Rechel, Wright, Barlow, & McKee, 2010). Although lean principles were developed for production systems, studies have shown that they are equally applied in service systems and have led to improved performance (Cano, Kourouklis, & Drummond, 2014; Middleton & Joyce, 2012). Lean principles can equally be applied in healthcare. The concept of waste in healthcare processes is far-reaching, and includes unnecessary inventory, waiting, mistakes, unplanned re-admissions and inappropriate procedures or processes (Rechel, Wright, Barlow, & McKee, 2010). Lean helps to marry the two conflicting hospital objectives of cost and quality of care.

Lean adds value for patients by reducing wasteful activities through process optimization. Lean processes lead to less mistakes and higher quality, a better use of resources, and hence improved financial performance (Rock, Horlyck, Dammand, Jacobsen, & Rainer, 2014). Typically, most hospital processes are designed around specialties and departments rather than around the needs of patients. The consequence is that the flow of patients is always inefficient, dislocated and disorganized leading to patient dissatisfaction and ineffective utilization of resources (Rechel, Wright, Barlow, & McKee, 2010).

The application of lean through continous improvement in hospitals can be attained by adopting three key process management techniques; process optimization and

automation, process or data visualization and process standardization. Process optimization involves reveraging technology to drive efficiency by implementing process specific information technologies, ensuring that there is role clarification, minimal role duplication, goal cascading, skill alignment, team governance, vertical and horizontal communication and organization delayering (KPMG, 2012).

Process visualization is a visual presentation of the processes, methods, means and elements that must be known by everyone for the purposes of successfully completing a given task. Process visualization also involve visual control that facilitate the decisions in case of deviation from the normal situation (Mizgaciu, 2013). Process visualization thereby give readers insightful information and enable the end user to become an active participant in the process (Lau & Pan, 2015).

Process standardization is the process of defining key processes so as to ensure that the processes are visible, understood and standardized across the entire institution (Francis, 2014). Standardization can be applied in healthcare by standardizing and formalizing common and predictable processes such as procurement processes, treatment procedures and treatment regimens. The standardizing of hospital processess helps to eliminate bottlenecks such as semi autonomous departments and focusing on similar clinical conditions rather than on similar processes (Rechel, Wright, Barlow, & McKee, 2010).

Essentially, the lean thinking philosophy focuses on increasing efficiency within organizations and along the value stream of products (Francis, 2014). Since exploitative innovative activities are associated with increasing efficiency within products and organizational processes, it can be stated that lean thinking hospitals would focus on innovating exploitative activities. However successful lean implementation leads to increasing efficiency within hospital that results in more financial resources available for explorative innovation (Borrel, 2013).

2.3.3 Supply chain Analytics

Supply chains are rapidly evolving from linear arrangements to real-time, customer facing networks (Stefanovic, Stefanovic, & Radenkovic, 2011). Supply chain analytics (SCA) refers to the use of data and quantitative tools and techniques to improve

operational performance (Chae, Olson, & Sheu, 2014). Supply Chain Analytics aims to improve operational efficiency and effectiveness by enabling data-driven decisions at strategic, operational and tactical levels (Capgemini Consulting, 2013). In today's business world, information has replaced hard assets as the fulcrum for decision making. However many times organizations confuse deep analytical capability with the ability to pull and report on data from their SCM and ERP systems. This is because SCM/ERP systems reflect only what has already happened instead of what is happening or will happen (SAS, 2010).

Aberdeen (2015) discussed SCA in three levels; Descriptive Analytics, which use data aggregation and data mining to provide insight into the past and essentially answer to the question 'What has happened?'; Predictive Analytics, which use statistical models and forecasts techniques to understand the future responding to 'What could happen?'; and Prescriptive Analytics, which use optimization and simulation algorithms to advice on possible outcomes and responding to 'What should we do?'.

Descriptive analytics uses techniques such as data modeling, visualization and regression analysis to analyze historical data and identify patterns as well as identify areas of under and over performance. Predictive analytics on the other hand uses techniques such as data mining, forecasting and predictive modeling to predict future probabilities and trends and find relationships that are not apparent with traditional or descriptive analysis. Finally prescriptive analytics uses optimization tools to evaluate and determine new ways to operate, target business objectives and balance all constraints to better optimize the outcome in terms of cost and service (Aberdeen, 2015).

Chae, Olson and Sheu (2014) further defined SCA as integration of three sets of capabilities; data management capability, analytical supply chain process capability, and supply chain performance management capability. Data management is the key building block of SCA. Organizations use data warehouses (often found in ERP system) for querying, reporting and analysis. The capability for managing data positively influences organizational performance (Chae & Olson, 2013). Analytical capabilities such as predictive and prescriptive analytical techniques analyze the data to find useful information such as predicting customer behavior, sales and changing

taste and preferences. SC performance capability is a crucial analytics that monitors, reports and corrects information across the supply chain (Chae, Olson, & Sheu, 2014).

Hospitals are slowly embracing analytics as a way of improving data gathering, storage and sharing, financial management, clinical analytics, and collaboration across industry value chain to improve operational and performance outcomes (Fuloria, 2013). However compared to other sectors, healthcare industry still lags behind in adopting supply chain innovative practices as emphasis is usually on natural sciences innovations and improvements as opposed to social and management science. However the fierce rate of growth of healthcare costs has caused a substantial increase of healthcare IT expenditures and adoption of analytics in healthcare supply chains (Chen, Preston, & Xia, 2013).

2.4.4 Supply chain integration

Integration of processes and activities within and without organizations has been the fundamental concept of SCM. Supply chain integration (SCI) is based on the documented evidence that business waste is as a result of disjointed supply chains (Sweeney, 2011). SCI therefore unifies supply chain processes and create a seamless flow of materials, services and information to all supply chain partners with the objective to maximize competitive advantage (Himanshu, Moharana, Murty, Senapati, & Khuntia, 2012). SCI within the service sector can be operationalized by examining three critical constructs; supply chain collaboration, supply chain design and integrative technologies.

Supply chain collaboration has been defined as working together towards a common objective (Kang & Moon, 2016). Collaboration therefore implies process integration, professionals working together or team work approach that results in joint decisions and activities (Himanshu, Moharana, Murty, Senapati, & Khuntia, 2012). Collaborative supply chain is characterized by voluntary sharing of resources (capital, training, consulting), joint ventures, strategic alliances, cooperative organizational relationship, outsourcing, long term contractual relationships, high levels of information sharing and trust (Weaver, 2012). Inter-professional collaboration is a

concept in healthcare that advocates for collaboration among healthcare professionals for the purpose of comprehensive and integrated care (Rubino & Chassiakos, 2010).

Supply chain design (SCD) is an important component of supply integration. Effective SCD promotes SCI and by extension supply chain performance (Badenhorst-Weiss & Nel, 2011). Appropriate SCD cultivates collaborative trust among supply chain partners, a critical condition for ambidexterity. SCD capable for promoting ambidexterity should possess organization structures that have both centralized and highly participative capabilities. Centralized in the sense that they integrate activities across the supply chain and participatory in that they involve employees and partners whose work is affected by decisions (Adler & Heckscher, 2013). Effective SCD is also characterized by supply base management or rationalization. Effective and frequent supply base rationalization assist to develop synergistic long term relationships thereby promoting exploitation strategies while at the same time encouraging new supplier relationships that would promote exploration strategies (Epping, 2014).

Technology integration is the application of technologies to organize and improve learning process in such a way that customers and consumers become active users of information as opposed to being passive recipient of information (Lau & Pan, 2015).Technology integration concept in hospitals is based on premise that they are the best approach to address issues of quality and cost. Technology integration in healthcare provides higher quality and more patient-centric care at lower costs (Hwang, Chang, LaClair, & Paz, 2013). The use of integrated technology improves performance of hospitals by enabling healthcare professionals innovatively and collaboratively organize their curative and preventive procedures and regimen in a cost efficient way (Fuloria, 2013).

2.3.5 Supply Chain Resilience

Resilience is the ability of a system to return to its original state or move to a new, more desirable state after being disturbed (Lenort & Wicher, 2012). Resilience, in an organizational sense has been defined as the ability to survive and thrive in crises and turbulences (Fisher, 2017). Pal (2013) noted that SC resilience is associated with established activities like crisis management (CM) and business continuity plans

(BCP) by establishing better short-term CM through higher operational flexibility and better long-term strategies through BCP, along with growth strategies via market penetration, diversification and transformational initiatives.

Academic and practitioner interest in resilience was largely driven by escalating business vulnerabilities and disruptions by both external factors such as legislative and environmental vulnerabilities and internal factors such as financial and internal business-process vulnerabilities (Krishnan & Pertheban, 2017). Point to note therefore is that the key driving force of resilience is disruption. The disruptions in a supply chain can be classified as either internal to the firm (process and control risks), external to the firm but internal to the supply chain network (demand and supply risks) and external to the network (environmental risks) (Pal, 2013).

Organizations cope with disruptions either reactively or proactively. Reactive strategy implies that the supply chain adjusts ex-post to changes, and supply chains adopting this strategy are usually referred to as agile supply chains (Durach, Wieland, & Machuca, 2014). Proactive strategy on the other hand implies that the supply chain implements ex-ante measures to cope with turbulence, with no adaptation needed during times of change. Supply chains that adopts this strategy are usually referred to as robust supply chains (Vlajic, van der Vorst, & Haijema, 2012). Supply chain resilience balances both reactive and proactive strategies such that a resilient SC is both adaptable and robust (Saenz & Revilla, 2014). Agility and robustness are therefore dimensions of resilience (Wieland & Wallenburg, 2012).

The other face of resilience is alignment. Ishaq, Khaliq, Hussain and Waqas (2012) termed the three resilient dimensions as triple A strategies of supply chain excellence. Alignment refers to a combination of internal resources, technologies and processes to fit institution to better deal with existing and upcoming environmental issues (Rodrigues, Vivan, & Storopoli, 2016). Aligned SC partners take care to align the interests of all the firms in their supply chain with their own. If any company's interests differ from those of the other organizations in the supply chain, its actions will not maximize the chain's performance (Sakka, Millet, & Botta-Genoulaz, 2011). Organizations excel in alignment by implementing three strategies; Alignment of information so that all SC partners have equal access to forecasts, sales data, and plans;

Alignment of identity by clearly defining the role and responsibilities of the partners; Alignment of incentives through creation of risk cost and reward sharing scheme (Ishaq, Khaliq, Hussain, & Waqas, 2012).

The association between SC resiliency and SC ambidexterity as a dynamic capability, which reduce the negative impact in SC instability, has yet to be comprehensively explicated. However Krishnan and Pertheban (2017) noted that resiliency provided a dynamic capability that made supply chain more ambidextrous thus effectively dealing with the negative impact of supply chain disruption. Eltantawy (2016) postulated that resilience is a multi-faceted dynamic capability meaning that resilience acts as the dynamic capability by which firms integrate, build and reconfigure internal and external competences that can sustain firm performance.

2.3.6 Size of Accredited Hospitals

Studies on the effect of firm size on organizational performance have been varied. Vijayakumar and Tamizhselvan (2010) reported a positive relationship between the size of an organization and its profitability while Pervan and Visic (2012) indicated a weak positive relationship. McDermott and Prajogo (2012) however claimed that size on its own has no relationship with performance but rather it is a moderating factor in innovation and performance. The same thought was held by Jimenez-Jimenez and Sanz-Valle (2011). All the scholars have measured the size of the firm in terms of total assets and total sales generated by the organization.

While organizations in other sectors are categorized by the number of employees and amount of assets they control, a review of international practice found that bed capacity continues to be the preferred unit for planning hospital care meaning that bed occupancy and the ratio of beds per population remain predominant metrics in hospital capacity planning (Rechel, Wright, Barlow, & McKee, 2010). In Kenya, Hospitals are also categorized by bed capacity. Level three hospitals have a bed capacity of not more than 24, while level four has bed capacity of between 25- 400 beds and level five and six has a bed capacity of above 400 (RoK, 2017).

Besides bed capacity, accredited hospitals in Kenya are also categorized by the services offered. Tier one facilities only offer outpatient services while tier two offer

both outpatient and inpatient services. These two levels are mainly responsible for health promotion and prevention and emergency services awaiting referral (Mohajan, 2014). Tier three hospitals offers specialized diagnostic and curative services at the county level while tier four which is the highest level of accredited hospitals in Kenya comprise of county and national referral hospitals. Tier four hospitals are centers of excellence, providing sophisticated diagnostic, therapeutic and rehabilitative services across the country (Luoma, et al., 2010). This study will adopt the same measure of bed capacity and service levels to categorize hospitals.

2.3.7 Performance of Accredited Hospitals

Similar to other service organizations, productivity and performance of hospitals has been difficult to measure due to the complex nature of the services provided as well as the special nature of relationship between consumer and service provider (Chansky, Garner, & Raichoudhary, 2013). The international practice is to measure performance of hospitals based on the two main objectives of costs and quality of care (Mayer, 2013). Comparatively, measuring quality performance of hospitals is more difficult than cost (efficiency) measures (Ozcan, 2014).

Quality measures is a way of measuring changes in patient's health over time. Despite appreciation of the importance of this measure as a comparison of performance across hospitals, many healthcare institutions are unable to capture this data other than the rate of mortality (Chansky, Garner, & Raichoudhary, 2013). Also while these measures often incorporate patient-reported information on how satisfied patients are with the health care services they've received, these measures do not assess the full extent of the patient experience (Lenin, 2014). Due to these serious limitations, the study will only adopt the efficiency measures of hospital performance as opposed to quality measures.

Costs as a measure can be operationalized by the level of productivity or efficiency of services provided in the hospital. Measure of productivity of hospitals take into consideration the input and output measures and their relationships (Chansky, Garner, & Raichoudhary, 2013). Health care productivity is defined as the nominal expenditures on health care by service providers (hospitals, physicians, etc.) deflated

by a price index for healthcare (Sheiner & Malinovskaya, 2016). DEA (Data Envelopment Analysis) model is the most common technique used to measure efficiency and optimum performance of hospital (Caballer-Tarazona, Moya-Clemente, Vivas-Consuelo, & Barrachina-Martinez, 2010). DEA is simply calculated as the total weighted output divided by the total weighted input (Ozcan, 2014).

The output measure of productivity can be either based on volume of service offered or the hospital revenues. Services output is the total number of outpatient and inpatient visits in a given time period while revenue is the total cash inflows of the hospital within that given time period (Chansky, Garner, & Raichoudhary, 2013). The input measure of hospital productivity include the resources used such as labor hours (total number of staff hours) and medical supplies (Ozcan, 2014). The study used DEA as the measure of efficiency of hospitals.

2.4 Empirical Review

This section looked at the past research that had been conducted in the area of supply chain orientation, lean supply chain, supply chain analytics, supply chain integration and supply chain resilience. The study similarly reviewed the past research on the mediating effect of hospital size. The empirical review also identified the literature gaps that the study intended to fill. The review was done based on the funnel approach where global studies were reviewed first, followed by the African context and then the Kenyan context. The review has also been done based on the objectives of the study.

2.4.1 Supply Chain Orientation

Tinney (2012) investigated the relationship between supply chain orientation, supply chain management, collaboration and the effects of those concepts on firm performance. The study used primary data and intervewed a total of forty five (45) executive-level logistics and supply chain management professionals employed by U.S. based organizations. The study found that supply chain orientation and collaboration was linked to firm performance.

Tucker (2011) sought to refine the notion of supply chain orientation by determining additional SCO factors beyond those already in existence. The study adopted an

exploratory research design and data was collected from nine supply chain experts in different manufacturing industries in Canada. The study found that trust, internal supply chain management focus and supply chain partner reliability are three key SCO factors that support enhancement of supply chain operation performance.

Defee (2010) developed a framework for supply chain orientation using a theoretical review approach. The study aimed at differentiating the concept of SCM from that of SCO. The study proposed that SCO is concerned with achieving a level of alignment or fit SC strategy and SC structure. While SC strategy is concerned with holistic view of supply chain and supply chain emphasis across departments, supply chain structure is made up of organization design, human resource, information technology and organizational measurement.

Shanmugan and Kabiraj (2012) in an exploratory study aimed at developing a comprehensive measure to evaluate supply chain orientation in pharmaceutical firms, collected data from 100 executives working in pharmaceutical firms in India. The study sought to measure SCO using five dimensions; Market Orientation, Personal Selling Orientation, Research and Development Orientation, Production Orientation and Purchase Orientation. The study found that SCO can be effectively measured by analyzing the effects of the following capabilities; supply chain policy, sales persons knowledge and expertise, learning orientation, information sharing, customer orientation, relationship building, flexibility, collaboration, trust, inter functional cooperation and self development.

Chen, Preston and Xia (2013) sought to delineate the factors that influence hospital supply chain performance. The study adopted trust, knowledge exchange, IT integration between the hospital and its suppliers, and hospital–supplier integration as key factors that influence supply chain performance of hospitals. The study collected data from a sample of 117 supply chain executives from United State hospitals. The study found that trust and IT integration directly affected knowledge exchange. Knowledge exchange and IT integration directly affected hospital- supplier integration.

2.4.2 Lean Supply Chain

Drotz and Poksinska (2014) analyzed three cases studies of healthcare organizations that were regarded as successful examples of lean applications in the healthcare context in Sweden. The purpose was to contribute toward a deeper understanding of the new roles, responsibilities, and job characteristics of employees in lean healthcare organizations. Data were collected through the use of interviews, observations and document studies. The study found that healthcare adopted process improvement and teamwork as lean practices and had a positive effect on the organizational's working environment, staff development and organizational performance.

Borrel (2013) studied the effects of lean management on the tensions between exploration and exploitation in small and medium enterprises (SMEs). The study interviewed five SMEs across the Nertherlands. The study found that SMEs that were willing to become lean thinking would first pursue a focused innovation strategy on exploitation to help the SME increase efficiency within the organization and along the value stream(s) of it product(s). Lean practices would then increase SMEs turnover and profit, increasing resources availability if reinvested back into the organization. This increase in resources availability will give the SME the opportunity to transition its focused innovation strategy on exploitation towards a balanced innovation strategy in the form of contextual ambidexterity. The study therefore advocated for lean practices as an antecedent for ambidexterity. However the sample size was too small and therefore the findings need to be assessed from a large sample.

Leite and Vieira (2015) reviewed more than 70 literature on lean thinking with focus on service sector. The aim was to evaluate principles of lean service as well as best practices and tools for implementing lean in service sector. The study found that despite lack of a standard set for which, when and where to use a lean tool in services, application of lean lean manufacturing practices in the service sector can generate large economic and financial results, as well as in the behavior of people. The study aslo found that most service firms used value stream mapping, JIT, standardization and 5S as tools of implementing lean processes.

Wachuma and Shalle (2016) while studying the effect of lean supply chain management practices on organizational performance in government ministries in Kenya, the study collected data from seventy five supply chain staff in the children's department of the Ministry of Labor, Social Security and Services. The study used the entire population as the sample. The study used questionnaire as the primary source to collect data. The study found out that information communication and technology (ICT) integration was an important component of lean SC which necessitated organization performance.

2.4.3 Supply Chain Analytics

Chae, Olson, & Sheu (2014) studied the impact of supply chain analytics on operational performance. The study collected data from 537 manufacturing plants where hypotheses exploring the relationship between resources; data management resources (DMR), IT-enabled planning resources and performance management resources (PMR), supply chain planning satisfaction, and operational performance. DMR was found to be a stronger predictor of PMR than IT planning resources. However all three sets of resources were found to be related to supply chain planning satisfaction and operational performance.

Bichsel (2012) studied on the benefits, barriers and progress of analytics in higher education sector. The study collected data from 356 members of EDUCAUSE and Associasion of institutional research (AIR). The study found that most institutions of higher learning view analytics as important however data use at most institutions is still limited to reporting. The study also found that analytics program are most successful when various constituents or departments, functional leaders and executives work in partnership.

Trkman, McCormack, Valadares de Oliveira and Ladeira (2010) studied the impact of business analytics on supply chain performance. The study investigated the relationship between analytical capabilities in the plan, source, make and deliver areas of the supply chain and its performance using information system support and business process orientation as moderators. A sample of 310 companies from different industries in USA, Europe, Canada, Brazil and China was used to test the hypotheses.

The study found existence of a statistically significant relationship between analytical capabilities and performance. The moderation effect of information systems support was found to be considerably stronger than the effect of business process orientation.

Moturi and Emurugat (2015) sought to determine the gaps between university top decision makers in a public university in Kenya and IT personnel in accessing, analyzing and reporting data. The study aimed at determining an easier and quicker way to analyze data, design and implement a solution to turn analysis into a report with little or no help from IT department. The study found that it was possible to turn ordinary spreadsheets into a flexible, powerful, and inexpensive business intelligence system that gives users significant power and flexibility with minimal intervention from IT department.

2.4.4 Supply Chain Integration

Hwang, Chang, LaClair and Paz (2013) performed a systematic review of current literature with an aim of assessing the association between integrated healthcare delivery systems and changes in costs and quality. The study reviewed 21 peer-reviewed articles from United States between years 2000 and 2001 related to integrated delivery systems, costs and quality in healthcare. Majority of the studies indicated that integrated delivery systems have positive effectson quality of care. However none of these studies measured cost reduction directly but used reduction in utilization of services instead, indicating decrease in the utilization of service with increases in integration.

Msimangira and Venkatraman (2014) investigated the emerging concept of SCM integration (SCMI) with an aim of identifying SCMI problems and possible solutions. The study applied an exploratory design where data was collected using open discussions and brainstorming among supply chain personnel in New Zealand. The study found that SCMI required a holistic approach; two-way communication; written service level agreements; relationship management; use of new technologies and integrated software systems; strategic alliances and trust; integrated processes; effective partnership; and predictive cost/benefit analysis of SCM. The study

recommended investment in SC analytics to facillitate information and knowledge management and enhancement of SC integration.

Wright (2016) also investigated the relationship between supply chain integration and overall firm's performance in Romania. The study used secondary data of 202 manufacturing firms in Romania. The study used logical regression method to determine if vertical integration increased the probability of superior performance. The study found a strong relationship between high operating margins and superior performance of firms in Malaysia. The study proved that it was valuable for companies to develop competences through vertical integration so as to protect it from turbulent environment. The study therefore supports development of competences as a basis for improving organizational performance. However it is important to assess if the findings still apply in Kenya as well as in the educational SC.

Cheruiyot (2013) examined the impact of integrated supply chain on the supply chain performance in KTDA. The study used primary data and collected data from 199 employees from purchasing and supplies sections drawn from 65 KTDA managed factories in Kenya. The findings indicated that the supply chain integration (both upstream and downstream) was positively associated with supply chain performance (raw material purchasing cost, transport cost, distribution cost, asset turnover and inventory holding cost).

Njagi and Ogutu (2014) studied the impact of supply chain integration on supply chain performance in State Corporations in Kenya. A census study was conducted where a total of fifteeen (15) corporations were studied in order to assess the level of upstream and downstream integration and the relationship between integration and performance of state corporations. The study findings revealed a positive and significant correlation between supply chain integration and performance of the State Corporations studied in Kenya.

2.4.5 Supply Chain Resilience

Krishnan and Pertheban (2017) investigated the influences of supply chain resilience strategies on supply chain ambidexterity as a dynamic capability. In detail, the study sought to investigate how firms' SC ambidexterity was developed through a dynamic

capability-building process and how ambidexterity can mitigate the negative impact of SC disruptions and improve business performance. The study collected data from a sample of 164 medium manufacturing SMEs operating in Malaysia. The study found that a dynamic SC resilience capability-building process is an antecedent of SC of ambidexterity. The study identified inventory management, visibility, predefined decision plan and diversification as dynamic SC resilience capabilities.

Rodrigues, Vivan and Storopoli (2016) researched on the ways to model higher education institutions to enhance their attractiveness and withstand global environment. The study used a theoretical framework approach. The study aimed at analyzing ways of creating resilience as a way of backing up ambidexterity to generate institutional attractiveness. The study found that institutional attractiveness can be build through resilience by internally aligning resources, capacities and processes.

Todo, Nakajima and Matous (2015) examined how supply chain networks affected the resilience of firms to the Great East Japan Earthquake, particularly looking at the effects on the time period before resuming operations after the earthquake and sales growth from the pre- to the post-earthquake period. The results indicated that the expansion of supply chain networks had two opposing effects on the resilience of firms to disasters. On the one hand, when firms were connected with more firms through supply chain networks, they were more likely to experience disruptions in supply and demand, which delayed recovery. On the other hand, firms benefited from diversified networks with suppliers and clients because they would substitute the surviving firms in the network for the damaged partners and receive support from them. The study indicated that the latter positive effect on recovery exceeded the former's negative effect for many types of network, implying that diversified supply chain networks led to the resilience of firms to natural disasters.

Aigbogun, Ghazali and Razali (2014) sought to develop a framework to enhance supply chain resilience. The study aimed at investigating the vulnerabilities and the capabilities of the Malaysian pharmaceutical manufacturing supply chain by interviewing key supply chain personnel of seven Pharmaceutical companies with large manufacturing capacities in Malaysia. The study developed a framework with 4 dimensions of supply chain vulnerabilities (Turbulence, external pressures, sensitivity

and connectivity) and 6 dimensions of supply chain capabilities (flexibility, visibility, adaptability, collaboration, reserve capacity and supplier dispersity)

Wieland and Wallenburg (2012) analyzed data collected from 270 manufacturing managers to identify the effect of robustness and agility strategies on business performance. They found that robustness has a direct, strong positive effect on business performance, whereas only an indirect effect of agility could be shown. The study recommended that organizations need to consider robustness and agility due to their primary importance to withstand everyday risks and exceptions.

Wasike (2014) examined the relationship between information systems and supply chain agility in service industry. The study adopted a case study design and collected data from 96 top, middle and lower level staff of the technical university of Kenya. The study found that information system was critical on improvement of supply chain agility. The study recommended that resources (people, machines and the necessary application software) must be available to promote supply chain agility. Also, investment in training and development of staff as well as incorporation of modern IT processes such as cloud computing will greatly improve university supply chain agility.

2.4.6 Size of Accredited Hospitals

Pervan and Visic (2012) researched on the relationship between firm size and performance. The study analyzed secondary data for the years 2002-2010 obtained from the web site of Croatian Financial Agency and from Amadeus database. A total of 18,492 firms were analyzed by this study. The study used the natural logarithm of firm's assets and number of employees to measure firm size. The study found a weak positive relationship between firm size and performance of the organization. The study postulated that the reason for the weak relationship was due to the fact that as organizations become large, the control shifts from owners to managers and the focus therefore changes from profit maximization to maximization of managerial utility.

McDermott and Prajogo (2012) similarly investigated the relationship between organization size, innovation and performance of service firms. The data was drawn from 180 managers from Australian service organisations. The study found that service

SMEs organizations are best served by simultaneous pursuit of exploitive and exploratory innovation. The pursuit of ambidexterity is moderated by the size of the organization. The study however did not find a direct relationship between organizational size and its performance.

Jimenez-Jimenez and Sanz-Valle (2011) examined the relationship between innovation, organization learning, size, age, environmental turbulence and performance of organization. The study collected data from 451 Spanish firms. The research found that both organization learning and innovation positively correlated with performance. However, size, age and environmental turbulence moderated the relationship between organization learning, innovation and performance.

Foster and Zrull (2013) analyzed performance differences of hospitals based on size and teaching status. The study analyzed secondary data from top 100 hospitals in US as enlisted by the American medical association 2013. Though the study found that different hospitals depicted different performances, no consistent pattern of performance differences among hospitals of different sizes was found and no one size category was found to be superior in all metrics. The study concluded that size of the hospital was not correlated with performance.

John and Adebayo (2013) also investigated the effect of firm's size on profitability of Nigerian manufacturing organizations. The study used audited annual reports of the selected manufacturing firms listed in the Stock Exchange for the periods between 2005-2012. Return on assets (ROA) was used as a proxy for profitability while log of total assets and log of turnover were used as proxies for firm size. The results of the study revealed that firm size, both in terms of total assets and in terms of total sales, has a positive effect on the profitability of Nigerian manufacturing companies.

2.4.7 Performance of Accredited Hospitals

Pham (2011) examined the efficiency and productivity of hospitals during the health reform process in Vietnam. Data of 101 hospitals was extracted from ministry of health databases in Vietnam from the years 1998 to 2006. Data envelopment analysis method was used to calculate the relative efficiency of the hospitals. The study found that there was improvement in relative efficiency of hospitals from 65% in 1998 to 76% in 2006.

The improvement was attributed to technical reforms in the hospital sector during those years. The study showed that improvements in technical aspects through encouragement of innovation in hospital operations would improve efficiency of hospitals.

Nayar, Ozcan, Yu and Nguyen (2013) similarly analyzed hospital performance in terms of both technical efficiency and quality. The study collected data from a sample of 371 urban acute care hospitals. The data was analyzed using data envelopment analysis method where the technical inputs were the total number of beds occupied, number of staff and operating expenses. The technical output was the number of outpatient visits and adjusted patient days. The quality measures were survival rates of selected conditions. The study found that only less than 20% of the sample hospitals were optimally performing in both quality and efficiency. The study also found that public, small, teaching hospitals had higher DEA efficiency and quality scores than big hospitals.

Kirigia, Sambo and Lambo (2015) analysed the performance of hospitals in Kwazulu-Natal province in South Africa. The study extracted secondary data of 56 hospitals from the provincial department of health, Kwazulu Natal health informatics bulletin. The data collected were for years 1995 and 1996. The output considered was inpatient days, outpatient visits, surgical operation and live births. The input considered were the number of medical staff and number of beds. The study employed the DEA model to analyze data. The study found that only 40% of the hospitals were technically inefficient. The study found that some medical employees were not fully utilized and therefore there was a need to reduce them to improve the efficiency of the hospitals.

Kamau (2014) sought to determine the effect of internal factors on the profitability of private hospitals in Kenya. The study collected data from 54 employees of Karen hospital in Kenya. The study used descriptive statistics and regression to analyze data. The study found a positive relationship between profitability of private hospital and size, capital employed and assets while leverage showed a negative relationship. The study concluded that hospitals should strive to expand in a meticulous manner so as to avoid situations where they are highly leveraged as they increase in size.

Wangari, Anyango and Wanjau (2013) investigated the factors that affect the provision of quality in the public health sector in Kenya. The study focused on employee capability, technology, communication and financial resources. Data was collected from 103 employees in Kenyatta National Hospital, the largest referral hospital in Eastern & Central Africa. The study applied descriptive statistics to analyze data. The study found that low employee capacity, inadequate technological adoption, ineffective communication, and insufficient financial resources affected quality performance of hospitals. The study recommended a comprehensive healthcare policy that addressed the plight of medical staff, working environment and resources were critical in ensuring optimal performance of hospitals increased patient satisfaction and loyalty.

2.5 Critique of existing literature

One essential supposition in the supply chain ambidexterity strategy literature focuses on the relationship between supply chain ambidexterity stratagems and supply chain performance. Both exploitation and exploration strategies in supply chain innovation are essential for adaptation, meaning simultaneously exploiting existing supply chain competences to produce value across all supply chain partners and exploring new opportunities to gain long term efficiency (Krishnan & Pertheban, 2017).

However the empirical literature reviewed has shown that major research that have been undertaken on innovation and ambidextrous strategy are within the context of an organizational level (Keupp, Palmie, & Gassmann, 2012). However, most organization innovations and effects occur not only within the organization but also more critically at the organizations interface with its upstream and downstream partners (Adner & Kapoor, 2010). The superior role played by modern supply chains in leading innovations as a means to sustain grander performance and ensure survival of partner organizations is the subject of the study. Also the study has found key research gaps that it seeks to fulfil. Based on the scholars above it is evident that there is a research gap in that past scholars were mainly addressing the concept of ambidexterity in organizations from a manufacturing point of view and therefore the

study will address this empirical gap by assessing if the application of supply chain ambidexterity in hospital supply chain impacts on organizational performance.

Supply chain ambidexterity has been defined as the accomodation of both exploitation and exploration strategies for the purpose of organization's long-term survival (O'Reilly & Tushman, 2013). In the same regard, hospitals that manages to succeed in the long run and in the face of environmental and technological change are only those that change their structural alignments in line with environmental changes by exploiting existing assets and capabilities while at the same time engaging sufficient exploration to survive in the market (Rodrigues, Vivan, & Storopoli, 2016). Prior research has showed that process innovation contributes to the new product's market success and explains firm performance (Ar & Baki, 2011).

The ambidexterity effect on organizational performance has attracted several researchers examining the tensions between exploitation and exploration. However most literature streams to the discussion on how to simultaneously adopt or balance both exploration and exploitation strategies (Lavie, Stettner, & Tushman, 2010). Other researchers have analyzed the antecedents of ambidexterity which this research adopts for this study. Among the antecedents identified included supply chain orientation, lean supply chain and agile supply chain as exploitative antecedents and supply chain resilience and supply chain integration as explorative facet of supply chain ambidexterity. (Tucker, 2011; Borrel, 2013; Gligor & Holcomb, 2012; Krishnan & Pertheban, 2017; Annan, Boso, Mensah, & Eliza, 2016).

Supply chain orientation has been defined as organization-wide recognition of the importance of supply chain partners leading to trustful, credible, committed and compatible relationships with supply chain partners (Tinney, 2012). Trust, internal supply chain management focus and supply chain partner reliability were proposed as three key SCO factors that support enhancement of supply chain operation performance (Tucker, 2011). Shanmugan and Kabiraj (2012) also hypothesized that SCO can be effectively measured by analyzing the effects of the following capabilities; supply chain policy, sales persons knowledge and expertise, learning orientation, information sharing, customer orientation, relationship building, flexibility, collaboration, trust, inter functional cooperation and self development.

Krehbiel, Francis, Balzer, & Shea (2016) advanced that lean appears to have a significant and measurable value when used to improve academic and administrative operations in higher education. Kanakana (2013) also held that lean principles could be implemented in hospitals by developing efficient and cost effective processes through streamlining, waste minimization and collaboration among departments. Borrel (2013) further postulated that organizations pursuing ambexterity would initially pursue exploitation strategy through lean practices which would increase turnover, profits and resources that can support exploratory and innovative strategies.

Moturi and Emurugat (2015) further found that it was possible to turn ordinary data management systems into a flexible, powerful, and inexpensive business intelligence system that gives users significant power and flexibility to implement ambidexterity. The adoption of supply chain analytical capabilities is statistically correlated to performance of hospitals (Trkman, McCormack, Valadares de Oliveira, & Ladeira, 2010). Supply chain analytics compliments supply chain integration by exploiting the use of integrative technologies. SCI therefore unifies supply chain processes and create a seamless flow of materials, services and information to all supply chain partners with the objective to maximize competitive advantage (Himanshu, Moharana, Murty, Senapati, & Khuntia, 2012).

Finally, Ishaq, Khaliq, Hussain and Waqas (2012) advanced that organizations must implement the 'triple A' resilient strategies to successfully create an ambidexterity environment. The three resilient strategies include agility, adaptability and alignment. However the effect of the antecedents of supply chain ambidexterity towards improvement of organizational performance is dependent on the level of participation of top leadership on process improvement and innovation (Tinney, 2012).Top leadership participation is contingent on the type of leadership adopted, leadership support granted and commitment to change (Sanzo, Alvarez, Rey, & Garcia, 2012).

2.6 Research Gaps

Though research about exploitation and exploration is extensive, most studies analyze the consequences for innovation as well as addressing the trade-offs between the two innovative paradigms. Only few scholars have addressed the antecedents that provide

favorable environment for ambidexterity supply chain to exist and more so generate superior performance compared to competitors (Kim, Song, & Nerkar, 2012). Lavie, Stettner and Tushman (2010) also pointed out that research on the performance implications of exploration and exploitation has been sparse.

Secondly, major research have been undertaken on innovation and ambidextrous strategy application at an organizational level (Keupp, Palmie, & Gassmann, 2012). However, most organization innovations and effects occur not only within the organization but also more critically at the organizations interface with its upstream and downstream partners (Adner & Kapoor, 2010). The superior role played by modern supply chains in leading innovations as a means to sustain grander performance and ensure survival of partner organizations is the subject of the study. This is in line with the arguments of Levina and Vaast (2005) and fortified by boundary spanning theorem that successful organizations collaborate and interact with other supply chain partners drawing expertise, competences and knowledge from diverse organizations in the supply chain.

Further, the past researches on ambidexterity strategy and performance of organizations had agreed that ambidextrous supply chain strategy and performance is statistically collerated. However the scholars have not agreed on the direction of relationship. Some researchers have found a positive relationship between ambidextrous supply chain and supply chain performance while others have found that exploitation-exploration strategy is inversely related to performance (O'Reilly & Tushman, 2013; Sanchez-Perez, Marin-Carrillo, & Bourlakis, 2014). Other scholars have compared between the two innovative strategies postulating that since process innovation (exploitation) is mainly incremental than radical (exploration), then the logical inference is that exploitation provides better performance than exploration and that exploration strategies would moderate negatively the effect of exploitation on performance (Benner & Tushman, 2003).

Finally, most scholars have assessed the aspect of ambidexterity from manufacturing organizations point of view. The unique characteristics of SSC and more so the concept of customer- supplier duality in education SC have contributed to the dearth of research in this area. The few research on service innovation have also not agreed

whether it's possible for service organizations to pursue both explorative and exploitative strategies, with one school demonstrating that it's possible for service organizations to be ambidextrous and another school of thought arguing that service firms lean more towards incremental innovations as opposed to radical innovations (Marabelli, Frigerio, & Rajola, 2012; Cefis & Marsili, 2012). The research sought to address these research gaps that enriched the knowledge on the correlation between supply chain ambidexterity and performance of hospitals as well as analyzed the mediating effect of size on the relationship between implementation of explorative and exploitation strategies and performance of Hospitals.

2.7 Summary of Literature Reviewed

This chapter reviewed the theoretical literature on supply chain ambidexterity strategy and its influence on performance. The theories adopted included ambidexterity theory, SCM theory, boundary spanning theory, RCT and contingency theories. The empirical review supported the study that the concept of supply chain ambidexterity has not been exhausted fully in existing studies. The chapter further criticized the existing literatures relevant to the study in order to identify study gaps that current exist and which the current study aimed at fulfilling.

From the literature reviewed, past scholars on ambidexterity strategy and performance of organizations have agreed that ambidextrous supply chain strategy and performance is statistically collerated. However the scholars have not agreed on the direction of relationship. Some researchers have found a positive relationship between ambidextrous supply chain and supply chain performance while others have found that exploitation-exploration strategy is inversely related to performance. Individual ambidextrous supply chain strategies have also shown contradicting relationship with performance with some scholars relating them with performance positively and vice versa.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed the research methodology that was used to collect, measure and analyze the data. The section provided an overall scheme, plan or structure that the study used to either reject or fail to reject the research hypothesis set at the beginning of this study. The following subsections were used; research design, philosophy used in the study, population of the study, sampling techniques and procedures, data collection techniques, pilot study in terms of reliability and validity as well as data analysis and presentation.

3.2 Research Design

The study used a cross-sectional and descriptive research design. The design was appropriate because it was useful in establishing the nature of existing situation and current conditions and also in analyzing such situations and conditions (Creswell, 2013). Descriptive design was mainly used when the researcher wanted to describe the phenomena as it prevailed without controlling the variables. Descriptive research design is therefore concerned with identifying and describing relationships or causation as they currently are (Fowler, 2013).

Mugenda (2013) contends that cross-sectional studies are appropriate where the overall objective is to establish whether significant associations among variables exist at some point in time. Since the study aimed at assessing the relationship between application of ambidexterity in supply chain and performance of supply chain, the appropriateness of a cross sectional survey design in this study was from the backdrop that the research problem was based on the information provided at the time of enquiry and records concerning events that had already taken place.

3.2.1 Research Philosophy

Research philosophy is a paradigm explaining researcher's perspective or how the researchers view the world and the assumptions they make as they gather, analyze and interpret data (Saunders & Lewis, 2014). Social research is dictated by many different philosophies. However the most common ones influencing social research are positivism and interpretivism (Ramanathan, 2008). The study adopted the positivism philosophy. Positivists believe that reality is stable and can be observed and described from an objective viewpoint without interfering with the phenomena being studied (Wilson, 2010). The key features of positivism and interpretivism philosophical approaches are presented in Table 3.1.

Table 3.1 Key differences between positivism and interpretivism

	Positivism	**Interpretivism**
The observer	Must be independent	Is part of what is being observed
Human Interest	Should be irrelevant	Are the main drivers of science
Explanations	Must demonstrate causality or relationship	Aim to increase general understanding of the situation
Research	Hypothesis and deductions	Gather each data from which ideas are induced
Concepts	Need to be operationalized so that they can be measured	Should incorporate stakeholder perspectives
Unit of analysis	Should be reduced to simplest terms	May include the complexity of the whole situations
Generalization	Statistical probability	Theoretical abstraction
Sampling	Large numbers selected randomly	Small numbers of cases chosen for specific reasons

Source: (Ramanathan, 2008)

3.3 Target Population

The target population was all level three to level six hospitals in Kenya offering both inpatient and outpatient services as listed by the National Hospital Insurance Fund

(NHIF, 2017). According to NHIF, there were 773 hospitals offering both inpatient and outpatient services in Kenya and accredited to provide inpatient medical insurance cover for their patients. The choice of hospitals offering both inpatient and outpatient services was premised on the fact that these hospitals are usually categorized as level three to level six by Kenyan government and therefore have autonomy in their management and prepare independent budgets (RoK, 2017). They therefore can be able to make independent decisions regarding supply chain innovation and improvements.

Also, the study measured performance of both inpatient and outpatient services so as to provide a holistic view of hospital performance in general. Outpatient services are the backbone of any hospital operation and therefore improvements in this area can result in huge savings and general quality improvements. Inpatient service also provides critical services that need to be assessed regularly to ensure quality operations since they directly impact on perception about performance of hospitals. Further, hospitals that have registered with NHIF have met all regulatory and standard requirements of offering inpatient and outpatient services (NHIF, 2017). These standards are mandatory requirements so that the insurer can be able to cushion the patient against higher costs of service. Therefore, these hospitals are committed to provide efficient and quality care at reasonable costs and the study finds them appropriate for this study.

The unit of analysis was the public and private hospitals in Kenya offering both inpatient and outpatient services as listed by the NHIF (see appendix III). The unit of observation on the other hand was the key managers in procurement or supply chain in either public and private hospitals in Kenya offering inpatient and outpatient services as listed by the NHIF. The choice of procurement or supply chain managers was due to the fact that the respondents was familiar with the area of study and readily provided data as required.

3.4 Sampling Frame

A sampling frame refers to a list of sampling units where the population of the study is derived from (Fowler, 2013). The sampling frame for this study was level three to

level six hospitals listed by NHIF as offering both inpatient and outpatient services for the year 2017. The sampling frame has a total of 773 hospitals categorized into eight regions as follows; Nairobi (85 hospitals), Central (97 hospitals), Eastern (111 hospitals), Coast (116 hospitals), North Eastern (25 hospitals), Nyanza (107 hospitals), Rift Valley (182 hospitals), Western (50 hospitals) (NHIF, 2017).

3.5 Sample Size and Sampling Techniques

Sampling is defined as selection of a subset of individuals from within a population to estimate the characteristics of whole population (Singh & Masuku, 2014). Sampling therefore is a technique of determining a suitable sample size that can adequately represent the whole population in the study and true inferences about the population can be made from the results obtained (Kadam & Bhalerao, 2010). The study adopted the simplified formula for sample propositions as provided by Yamane (1967).

$$n = \frac{N}{1 + N(e)2}$$

Where n is the sample size, N is the population size, and *e* is the level of precision. The level of precision is set at 5% meaning 95% confidence level. The population of the study was 773 units.

Therefore, $n = \frac{773}{1+773(0.05)2}$= 263.5976.

The sample size therefore was 264 accredited hospitals in Kenya.

The study also adopted stratified sampling technique to select the hospitals across the eight regions. To identify the sample size of each stratum, the study applied the following formula; ni = kNi hence k = n/N = 264/773 = 0.341527. The sample size was therefore divided into eight strata based on the regions as shown in table 3.2.

Table 3.2 Sampling Table

Region	No. of Hospitals	Sample Size (34%)
Nairobi	85	29
Central	97	33
Eastern	111	38
Coast	116	40
North Eastern	25	9
Nyanza	107	36
Rift Valley	182	62
Western	50	17
Total	**773**	**264**

The stratum was further stratified according to size of the hospitals and individual hospitals within the size stratum randomly selected. The size of the hospital was determined by bed capacity as contained in the Medical Practitioners and Dentists policy guidelines (RoK, 2017). The sizes were; 1-24 bed capacity (small hospital), 25-400 bed capacity (Medium hospitals) and above 400 bed capacity (big hospitals). The same formula (k = n/N) was used to identify the number of hospitals based on size.

3.6 Data Collection Procedure

The study collected data from both primary and secondary sources. The rationale behind the tact is that the two sources of data were meant to reinforce each other (Denscombe, 2014). The primary data composed of responses on all the study variables: supply chain orientation, lean supply chain, supply chain analytics, supply chain integration, hospital size and performance of hospitals. Secondary data was quantitative data on hospital performance which was sourced from the hospitals annual reports, pamphlets, office manuals circulars, policy papers, corporate or business plans as well as survey reports from Ministry of health and Kenya National Bureau of Statistics.

The questionnaire was the principal tool used to collect primary data and secondary data respectively. The questionnaire had been developed with the aim of covering the basic research objectives. The questionnaire was organized into seven sections, each section collecting data on each of the study variable. Section one to five collected data on independent variables namely supply chain orientation, lean Supply chain, supply chain analytics, supply chain integration and supply chain resilience. Section six collected data on the meditating role of hospital size and section seven collected data on the dependent variable, the overall performance of the hospitals. The study used structured questionnaires to collect data. The questionnaires were self administered. Where possible, the researcher personally delivered the questionnaire to the respondents. Where it was not possible, the researcher emailed the questionnaire. Two research assistants were also used to ensure that the response rate was adequate to facilitate analysis of the collected data.

3.7 Pilot Study

Pilot study or pre-testing is a method of collecting data from a small subsample to test whether the data collection plan for the main study is appropriate. This helps the researchers to minimize any potential errors that may crop up during the main study. (Sreejesh, Mohapatra, & Anusree, 2014). Mugenda (2013) advised that a pilot sample should be between 1% and 10% depending on the sample size. Therefore the study did a pilot study on 10% of the sample i.e. conducted a pilot on 26 hospitals. The pilot test results were used to adjust the questionnaire accordingly before actual data collection. The hospitals used for piloting were not used in the final research analysis.

3.7.1 Reliability

Measuring reliability of study entails analyzing the consistency of the research findings in relation to the application and appropriateness of the methods used and integrity of the final results (Noble & Smith, 2015). Reliability in research is influenced by the degree of error. As random error increases, reliability decreases (Mugenda, 2013). In order for results to be usable in further research steps they must be reliable and valid. Cronbach's Alpha is a popular method for estimating the reliability of an instrument and has become common practice in medical education

research when multiple-item measures of a concept or construct are employed (Tavakol & Dennick, 2011).

Further, the test only requires one test administration making it relatively easy compared to other reliability tests (e.g. test-retest reliability estimates). Cronbach's Alpha measures internal consistency of a test or scale and it is expressed as a number between 0 and 1. The test determines the internal consistency and reliability of test scores such that the more the research item scores are in agreement with the total scores, the more reliable the test is (Tavakol & Dennick, 2011). The Cronbach Alpha coefficient of 0.7 will be considered adequate for the study.

3.7.2 Validity

Validity is the ability of the research instrument to measure the intended results accurately (Csikszentmihalyi & Larson, 2014). The study used convergent validity to determine whether instrument accurately measured what they were intended to measure. Convergent validity will be assessed using average variance extracted (AVE) as used by Cheon, Lee, Crooks and Song (2012) in the same thematic area. The adopted threshold for AVE values was 0.5 meaning that more than 50% of the variation was considered adequate for the study. Further, the study used content validity through consulting the experts in the thematic area as well as by giving the questionnaire to the supervisors whose comments were incorporated before final data collection was undertaken.

3.8 Data Analysis and Presentation

Positivism philosophy advocates for hypotheses testing using quantitative techniques and thus the data was analyzed using quantitative data analytical techniques (Howlett, Rogo, & Shelton, 2013). The study therefore used descriptive statistics, correlation analysis, regression analysis and hypotheses testing to analyze data. The study further conducted statistical assumption analysis to reduce possibility of statistical errors. Finally the results were presented in form of a multivariate regression model for future application.

The study used descriptive statistics to provide simple summaries about the data gathered and the measures undertaken. Descriptive statistics provided the basic features of the data collected on the variables as well as the impetus for conducting further analyses on the data (Mugenda, 2013). The descriptive statistics applied included the measures of central tendency especially the mean, standard deviations and measure of variation for variables in the questionnaire. The measures of dispersion especially variance, standard deviation and range were also used in order to explore the underlying features in the data. Descriptive statistics therefore covered all response variables as well as the demographic characteristics of respondents. The results were presented using tables, pie charts, column charts and bar charts where appropriate.

A correlation analysis was used to establish the relationships among the study variables (Schmidt & Hunter, 2014). The correlation analysis was done to describe the relationships that exist between the dependent variable (hospital performance) and independent variables (Supply chain Orientation, Lean supply chain, Supply chain Analytics, Supply chain Integration and Supply Chain Resilience). Pearson Product-Moment Correlation was used to show the strength and direction that exists between the dependent and independent variables as well as rank the independent variables in terms of their strength of relation with the performance. The result was expressed within a range of -1 and +1 where, -1 was strong negative relationship and +1 was strong positive relationship (Prion & Haerling, 2014). The result meant that the bigger the value was to zero the stronger the relationship and more significant the variable was.

Regression analysis was used to investigate the relationship between all independent variables together and the dependent variable. The study used the coefficient of determination (R^2) and the F test. The R^2 was used to test the proportion of the variations in dependent variable that can be explained by the independent variable and F test measured the suitability of the model to confirm or reject the research hypotheses (Mertler & Reinhart, 2016).

The R^2 value range between 0% and 100% where 0% indicate that none of the independent variables can be used to explain performance of hospitals and thus performance must be caused by other factors. However a value of 100% indicate that

entire performance of hospitals can be explained by the independent variables only. The study adopted a threshold of 0-50% (poor), 50%-70% (moderate) and over 70% (Strong) to explain the strength of relationship. F test was used to assess the level of significance of the model by comparing the F value with the overall level of significance and P value. If the F value is less that the level of significance or the p value is higher than the level of significance then the study will reject the research hypotheses (Harrell, 2015).

The study also conducted a multistage analysis to determine the significance of the moderator in improving the relationship between the independent and dependent variable. The first stage involved running the R^2 and F-test without the moderator and comparing the strength when including the moderator. An increase in the value of R^2 and F value was interpreted to mean that the moderator is statistically significant and vice versa. The strength, direction and significance of the relationship between individual variables and the dependent variable was assessed using the beta, t and P values. The beta coefficient values indicated the strength of each of the independent variable in influencing the dependent variable. The direction of the relationship was indicated by the –ve or +ve sign before the beta value. A positive beta coefficient showed a positive relationship between the variables and vice versa.

The level of significance of each individual variable was assessed by comparing t test and P values with the level of significance which were set at 0.05 because the study was a one tailed test. If the t values were than t statistic, then they were viewed as statistically significant. Further, the study conducted a multi stage analysis to determine the effect of the mediator on each of the independent variable. The study compared the values of beta, t and P when the test are run without a mediator and when with a mediator. Presence of a significant change in the values, led to the conclusion that the mediator has a significant effect on the relationship between each of the independent variables and the dependent variable.

3.8.1 Statistical Modeling

A multiple linear regression model also known as the ordinary least square (OLS) model and mediated multiple regression model were adopted to present a linear

relationships among the various study variables. A multiple linear regression analysis is a multivariate statistical technique used to estimate the model parameters and determine the effect of many individual independent variables (IVs) on the dependent variable (DV) (Mertler & Reinhart, 2016). In multiple regression analysis, the model took the form of an equation that contains a coefficient β_i for each predictor; which indicated the individual contribution of each predictor to the model.

In sum, the coefficient β_i indicated the relationship between the dependent variable and each predictor. If the value was positive, it was an indication of a positive relationship between the predictor and the outcome variable whereas a negative coefficient represented a negative relationship (Harrell, 2015). The model was used to show the relationship between the independent variable (hospital performance) and independent variables (Supply chain Orientation, Lean supply chain, Supply chain Analytics, Supply chain Integration and Supply Chain Resilience) without involving the mediator as shown in model i.

$$Y= \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots i$$

Where Y is dependent variable (hospital performance) and is a linear function of X_1, X_2, X_3, X_4, X_5 and ε.

B_0 is the regression constant or intercept and $\beta1 - \beta5$ are the coefficients of the independent variables

X_1, X_2, X_3, X_4, X_5 are Supply chain Orientation, Lean supply chain, Supply chain Analytics, Supply chain Integration and Supply Chain Resilience respectively.

ε is the error term

The second model of the study introduced the mediator variable (hospital size) in order to determine the mediating effect of hospital size on the relationship between supply chain ambidexterity and performance of accredited hospitals in Kenya as follows;

$$Y= \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6Z + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots ii$$

Where Y is dependent variable (hospital performance) and is a linear function of X_1, X_2, X_3, X_4, X_5 and ε.

B_0 is the regression constant or intercept and $\beta1 - \beta5$ are the coefficients of the independent variables

X_1, X_2, X_3, X_4, X_5 are Supply chain Orientation, Lean supply chain, Supply chain Analytics, Supply chain Integration and Supply Chain Resilience respectively.

Z is the mediator variable (Size of the hospital) and

ε is the error term

3.8.2 Diagnostic Tests

The data collected was also subjected to diagnostic tests to determine whether the assumptions of the study were observed and that the probability of type 1 and type 2 errors were minimal (Harrell, 2015). The tests included factor analysis, linearity, normality tests, heteroscedasticity test and multicollinearity tests. In the event that the study found some assumptions were not observed, the study dropped some variables that did not conform to the statistical assumptions or adjusted them to suit the statistical rules. On the other hand if the statistical assumptions were observed by the data, then the study concluded that the data was statistically good for analysis and inference.

Factor analysis or data reduction technique is a method for investigating whether a number of variables of interest are linearly related to a smaller number of unobservable factors (Cooper & Schindler, 2014). Factor analysis is used to reduce the variable factors into few but strong related ones. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's sphericity tests was used to ascertain the appropriateness of factor analysis. KMO values greater than or equal to 0.5 qualifies use of the factor under analysis (Quach, Vo & Pham, 2016). The chi square for Bartlett's test need to be significant in order to confirm the appropriateness of the factor under analysis (Anastasiadou, 2011).

A prerequisite for using linear regression models for purposes of prediction is linearity of the relationship between the dependent and independent variables (Field, 2013). The expected value of the dependent variable is a straight-line function of each independent variable holding others constant, and the effects of different independent variables on the expected value of the dependent variable are additive. Linearity test was done using the Durbin-Wartson test (Rayner, Best, Brockhoff & Rayner, 2016). If a significant deviation from linearity was greater than 0.05, then the relationship

between the independent variable was confirmed to be linearly dependent and admissible (Draper & Smith, 2014).

Prior to analyzing data using inferential statistical techniques, the study checked the normality of the data set by looking at skewness and kurtosis (Park, 2015). The skewness values should indicate that the scores are skewed and many are negatively skewed and not that much closer to zero (Ghasemi, Amini, Ataei, & Khalokakaei, 2014). The skewness values should fall within the range of -7 to 7 to indicate that there is no case of excessive skewness in the data. The kurtosis values should also fall within the range of -2 to +2, and therefore do not display excessive kurtosis as well (Garg & Kothari, 2014).

Heteroscedasticity occurs when the variance in scores on one variable is somewhat different to all of the values of the other (Mertler & Reinhart, 2016). In statistics, heteroscedasticity describes a situation in which the error term in the relationship between the independent variables and the dependent variable, is different across all values of the independent variables. The research used Glejser Test to test for heteroscedasticity. A significant value of 0.05 was used meaning that values greater than the significant value implied lack of heteroscedasticity issues in the study (Hanushek & Jackson, 2013).

To measure multi-collinearity in the regression models, this study used the variance inflation factors (VIF). The VIF assesses how much the variance of an estimated regression coefficient increases if the predictors are correlated (Harrell, 2015). If no factors are correlated, the VIF will all be 1. In other words, if the VIF is equal to 1 there is no multi-collinearity among factors. If the VIF is greater than 1, the predictors may be moderately correlated but way below the threshold of the multi-collinearity red flag. A VIF of between 5 and 10 indicated a high correlation in the predictor variables. A VIF of more than 10 invalidated the regression model. However, a VIF value of greater than 10 or less than 1 indicated multicollinearity issues in the study (Dormann, et al., 2013).

3.9 Ethical Considerations

There were ethical issues encountered during collection of data which included nonresponsiveness of the respondents, respondents providing false information and clearance by the organizations studied. Before actual data collection, the researcher first obtained an introduction letter from Jomo Kenyatta University of Agriculture and Technology and a research permit from the National Comission for Science, Technology and Innovation (NACOSTI) which contained a confidentiality form that the researcher signed and agreed to uphold. Further, the researcher prepared a cover letter which was attached to all questionnaires explaining the aim of the study as well assuring the respondents of confidentiality. In addition, the research assistants were briefed on the need to observe ethical standards when collecting data. The research assistants were also required to declare any personal interest that could breach the confidentiality clause. Originality of the work was also observed during research process.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

The chapter presents the results that were collected from the supply chain managers of accredited hospitals in Kenya. Data has been analyzed at two levels; descriptive and inferential statistics. The analysis has been guided by the objectives of the study for each level of analysis. Preliminary analysis has also been done and includes the response rate, reliability, validity and general information. The order of analysis was as follows; response rate, reliability findings, validity analysis, demographics, descriptive analysis and inferential analysis and finally statistical tests.

4.2 Response Rate

The study sought to collect data from 264 supply chain managers of accredited hospitals in Kenya. However, the study managed to collect data from 216 key respondents and 48 respondents were non-responsive. Therefore, the study realized a response rate of 82% as shown in Figure 4.1. This response rate is good in accordance to Garg and Kothari (2014) who posited that a response rate of more than 70% is good to conduct data analysis. Therefore, the study continued with analysis as the response rate was sufficient.

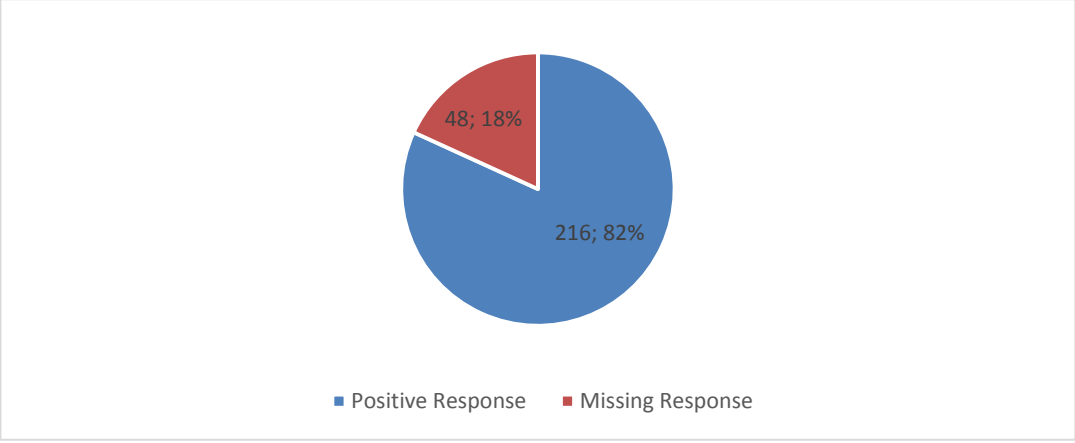

Figure 4.1 Response Rate

4.3 Pilot Study Results

The study sought to undertake a pilot study in order to measure the reliability and validity of the data collection instruments. In doing so, 10% of the sample size was considered which translated to 26 accredited hospitals in Kenya. The study also conducted factor analysis and multicollinearity before final analysis in order to reduce the items of analysis to a few but strong related ones and estimate whether regression coefficients were correlated. The findings are organized into four sub-sections which include reliability tests, validity tests, factor analysis and multicollinearity.

4.3.1 Reliability Test Results

Cronbach's Alpha was used to test for reliability of the data collection instruments. The purpose was to determine if the questions in the data collection instruments were consistent. The Cronbach Alpha coefficient of 0.7 or more was considered adequate for this study. Reliability statistics were done based on the objectives of the study. The findings show that all the objectives had met the set Cronbach Alpha coefficient threshold of more than 0.7. The overall Cronbach Alpha for the 45 items used in the study was 0.879 as shown in Table 4.1.

Table 4.1 Reliability Results

Construct	No of Items	Cronbach Alpha
Supply Chain Orientation	9	.848
Lean Supply Chain	9	.843
Supply Chain Analytics	9	.948
Supply Chain Integration	9	.882
Supply Chain Resilience	9	.959
Overall Cronbach	**45**	**.879**

4.3.2 Validity Test Results

The study used convergent validity to determine whether instrument accurately measured what they were intended to measure. Convergent validity was assessed using

average variance extracted (AVE). The adopted threshold for AVE values was 0.5 meaning that more than 50% of the variation was considered adequate for the study. The study found an overall AVE value of 0.820 which is above the 50% threshold and therefore the study concludes that the questionnaire was capable of measuring the intended information. The findings on validity are shown in Table 4.2.

Table 4.2 Validity Test Results

Construct	N of Items	AVE value
Supply chain orientation	9	.879
Lean Supply Chain	9	.837
Supply chain analytics	9	.957
Supply chain integration	9	.893
Supply chain resilience	9	.965
Overall AVE Value	**45**	**.820**

4.3.3 Factor Analysis

Factor analysis in the study was used to reduce the variable factors into few but strong related ones. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's sphericity tests were used to ascertain the appropriateness of factor analysis. KMO values greater than or equal to 0.5 qualifies use of the factor under analysis. The chi square for Bartlett's test need to be significant in order to confirm the appropriateness of the factor under analysis.

In regard to supply chain orientation, the study found a KMO value of 0.750 and Bartlett's test, $x2(36, N = 216) = 456.903$, $p = .000$. The test results indicated that supply chain orientation met KMO threshold of 0.6 and Bartlett's Test of Sphericity threshold of <0.05. The study therefore concluded that sampling was adequate for supply chain orientation variable. The findings are shown in Table 4.3. The study further conducted the factor loading analysis to determine the number of variables that were retained. The study found that the first two factor had Eigenvalues of more than 1 representing 72.937% of the total variance explained while the remaining seven

factors had Eigen values of less than 1. Further, the first factor accounts for 52.173% of the variance in supply chain orientation and the second factor accounts for 20.764% of the variance. All the remaining factors were found to be insignificant and therefore were dropped as shown in Appendix V. The study further sought to determine the factor loadings for supply chain orientation. The findings obtained indicated that "Suppliers and the hospital possess similar operating principles" had the highest factor loading in the first component with 0.907 while "Suppliers have similar work ethics as those of the hospital" had the highest factor loading in the second component with 0.728 as shown in Appendix IV.

Regarding lean supply chain, the study findings indicated a KMO value of 0.670 and Bartlett's test, $x2(36, N = 216) = 839.290$, $p = .000$. The test results indicated that lean supply chain met KMO threshold of 0.6 and Bartlett's Test of Sphericity threshold of <0.05. The study therefore concluded that sampling was adequate for lean supply chain variable. The findings are shown in Table 4.3. The study further conducted the factor loading analysis to determine the number of variables that were retained. The study found that the first three factors had Eigenvalues of more than 1 representing 84.241% of the total variance explained while the remaining six factors had Eigenvalues of less than 1. Further, the first factor accounts for 47.635% of the variance in lean supply chain, the second factor accounts for 23.104% of the variance and the third factor accounts for 13.502% of the variance in lean supply chain. All the remaining factors were found to be insignificant and therefore were dropped as shown in Appendix V.

The study further sought to determine the factor loadings for lean supply chain. The findings obtained indicate that "The hospital uses ICT to manage patient information" had the highest factor loading in the first component with 0.904, "The hospital has a human resource management policy" had the highest factor loading in the second component of 0.881 while "The Hospital has a standard policy regarding procurement process" had the highest factor loading in the third component with 0.558 as shown in Appendix IV.

Concerning supply chain analytics, the study established a KMO value of 0.719 and Bartlett's test, $x2(36, N = 216) = 299.237$, $p = .000$. The test results indicated that supply chain analytics met KMO threshold of 0.6 and Bartlett's Test of Sphericity threshold

of <0.05. The study therefore concluded that sampling was adequate for supply chain analytics variable. The findings are shown in Table 4.3. The study further conducted the factor loading analysis to determine the number of variables that were retained for supply chain analytics. The study found that the first factor had Eigenvalues of more than 1 representing 74.958% of the total variance explained while the remaining eight factors had Eigenvalues of less than 1. The eight factors were therefore found to be insignificant and were dropped. The findings are shown in Appendix V. The study also sought to determine the factor loadings for supply chain analytics. The findings obtained indicate that "The hospital has an automated financial management system" had the highest factor loading in the first component with 0.968 as shown in Appendix IV.

In regard to supply chain integration, the study found a KMO value of 0.614 and Bartlett's test, $x2(36, N = 216) = 275.678$, $p = .000$. The test results indicated that supply chain integration met KMO threshold of 0.6 and Bartlett's Test of Sphericity threshold of <0.05. The study therefore concluded that sampling was adequate for supply chain integration variable. The findings are shown in Table 4.3. The study further conducted the factor loading analysis to determine the number of variables that were retained. The study found that the first two factors had Eigenvalues of more than 1 representing 74.759% of the total variance explained while the remaining seven factors had Eigenvalues of less than 1. Further, the first factor accounts for 54.805% of the variance in outsourcing and the second factor accounts for 19.954% of the variance. All the remaining factors were found to be insignificant and therefore were dropped. The findings are shown in Appendix V. In addition, the study sought to determine the factor loadings for supply chain integration. The findings obtained indicate that "The hospital has a long term relationship with its service providers" had the highest factor loading in the first component with 0.866, and "The hospital has an integrated system with its suppliers" had the highest factor loading in the second component of 0.752 as shown in Appendix IV.

Finally, the study findings for supply chain resilience indicated a KMO value of 0.698 and Bartlett's test, $x2(21, N = 216) = 191.478$, $p = .000$. The test results indicated that supply chain resilience met KMO threshold of 0.6 and Bartlett's Test of Sphericity

threshold of <0.05. The study therefore concluded that sampling was adequate for supply chain resilience variable. The findings are shown in Table 4.3. The study further conducted the factor loading analysis to determine the number of variables that were retained. The study found that only the first factor had Eigenvalues of more than 1 representing 76.638% of the total variance explained while the remaining six factors had Eigenvalues of less than 1 and therefore found to be insignificant and were dropped. The findings are shown in Appendix V. The study sought to determine the factor loadings for supply chain resilience. The findings obtained indicate that "The hospital uses different payment platforms" had the highest factor loading in the first component with 0.953 as shown in Appendix IV.

Table 4.3 KMO and Bartlett's Tests

KMO and Bartlett's Test for Supply Chain Orientation		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.750
Bartlett's Test of Sphericity	Approx. Chi-Square	456.903
	Df	36
	Sig.	.000
KMO and Bartlett's Test for Lean Supply Chain		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.670
Bartlett's Test of Sphericity	Approx. Chi-Square	839.290
	Df	36
	Sig.	.000
KMO and Bartlett's Test for Supply Chain Analytics		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.719
Bartlett's Test of Sphericity	Approx. Chi-Square	299.237
	Df	36
	Sig.	.000
KMO and Bartlett's Test for Supply Chain Integration		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.614
Bartlett's Test of Sphericity	Approx. Chi-Square	275.678
	Df	36
	Sig.	.000
KMO and Bartlett's Test for Supply Chain Resilience		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.698
Bartlett's Test of Sphericity	Approx. Chi-Square	191.478
	Df	21
	Sig.	.000

4.3.4 Multi-collinearity Tests

To measure multi-collinearity in the regression models, this study used the variance inflation factors (VIF). The VIF assesses how much the variance of an estimated

regression coefficient increases if the predictors are correlated. If no factors are correlated, the VIF will all be 1. In other words, if the VIF is equal to 1 there is no multi-collinearity among factors. If the VIF is greater than 1, the predictors may be moderately correlated but way below the threshold of the multi-collinearity red flag. A VIF of between 5 and 10 indicated a high correlation in the predictor variables. The findings indicated that all values were between 1 and 10, and therefore the study concluded that there were no multicollinearity issues as shown in Table 4.4.

Table 4.4 Multi-collinearity Test Results

Model		Collinearity Statistics	
		Tolerance	VIF
1	Supply Chain Orientation	.345	2.902
	Lean Supply Chain	.155	6.447
	Supply Chain Analytics	.103	9.689
	Supply Chain Integration	.152	6.596
	Supply Chain Resilience	.335	2.988

a. Dependent Variable: Performance

4.4 General Information

The study sought to determine the general characteristics of the hospitals studied. The general information sought was the type of hospital and the bed capacity of the hospitals. The bed capacity was used to measure the mediating variable, size, while the type of hospital was used to access the legal form of the hospitals studied. The findings are presented in this section based on the type of the hospital and the size of the hospital.

4.4.1 Type of Hospitals

The findings obtained indicated that 50% of the hospitals were private, 29% were public and 21% were faith based hospitals. The findings imply that more private hospitals were sampled than the public and faith based hospitals, which show generally that there are more private hospitals than faith based and public hospitals, in line with

NHIF (2017), further details are presented in Appendix III. The findings are shown in Figure 4.2.

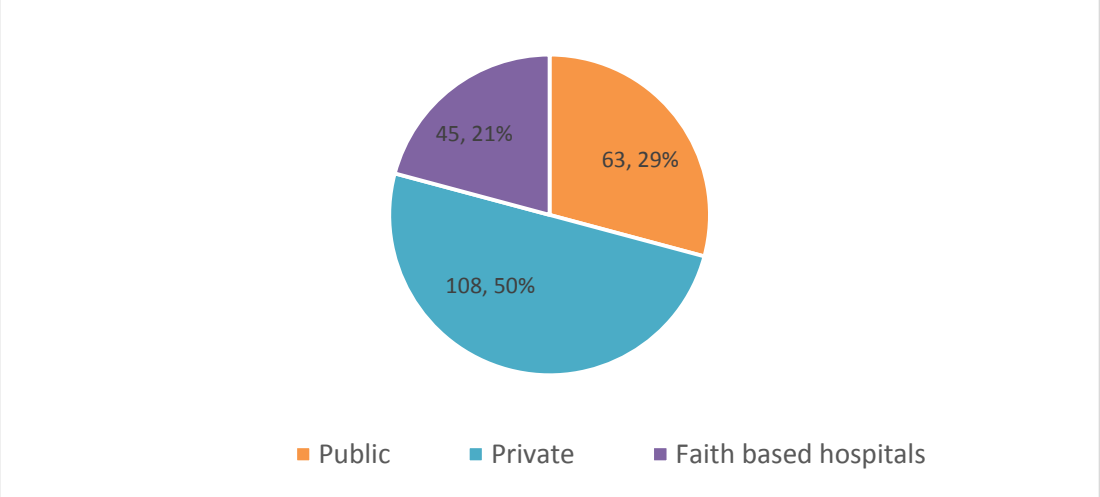

Figure 4.2 Type of Hospital

4.4.2 Bed Capacity

The findings indicate that 71% of the hospitals had a bed capacity of 25-400, 21% had 1-24 beds and 8% had above 400 beds. The findings imply that there were more hospitals with a bed capacity of between 25 and 400 than those with more than 400 beds. The majority hospital sampled were therefore medium and big accredited hospitals in Kenya. This is in line with ROK (2017) which indicate that there are more more medium and big accredited hospitals in Kenya compared to small hospitals. The findings are as shown in Figure 4.3.

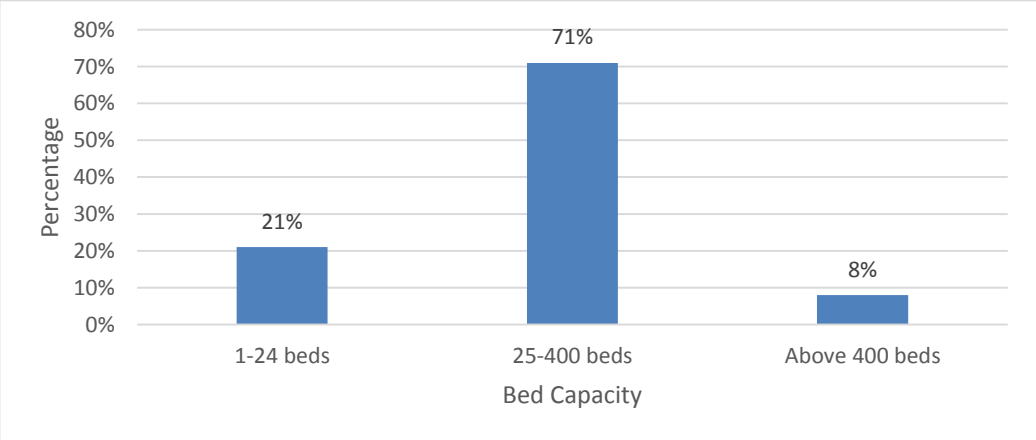

Figure 4.3 Bed Capacity

4.5 Descriptive Findings

The main objective of the study was to examine the influence of supply chain ambidexterity on performance of accredited hospitals in Kenya. Descriptive statistics in this study were done using means, standard deviations, maximum and minimum values. The results were presented in line with the objectives of the study and presented using tables. The objectives of the study were to determine the influence of supply chain orientation, lean supply chain, supply chain analytics, supply chain integration and supply chain resilience on performance of accredited hospitals in Kenya.

4.5.1 Influence of SCO on Performance of Accredited Hospitals.

The study sought to determine the influence of supply chain orientation on performance of accredited hospitals in Kenya. Means and standard deviations and variances were used to give the findings under this objective. The means were interpreted as follows; A mean value of 0-1 implied the majority of the respondents agreed to the statements to a very small extent, a mean value of 1.1-2.0 implied the respondents agreed with the statements to a small extent, a mean value of 2.1-3.0 implied the respondents neither agreed nor disagreed with the statements, a mean value of 3.1-4.0 means that the respondents agreed to the statements to a great extent and a mean of 4.1-5.0 implied the respondents agreed with the statements to a very great extent.

The findings indicate that the mean values obtained for the majority of the items were above 3.0 indicating that the majority of the respondents agreed with the statements. The highest standard deviation was 1.083 while the lowest was 0.511 indicating that there were no major variations in the responses obtained across the means. The study findings indicate that the majority of the respondents agreed to a great extent that the suppliers and strategic partners were reliable (M = 3.67, SD = 0.686).

The respondents also agreed to a great extent to the following statements: The hospital is satisfied with the past performance of current suppliers (M = 3.50, SD = 0.511); suppliers provide services that are superior compared to alternatives in the market (M = 3.38, SD = 1.056); suppliers demonstrate high level of professionalism (M = 3.33,

SD = 0.917); and suppliers provide reliable information to hospital administration (*M* = 3.29, *SD* = 1.083). The respondents neither agreed nor disagreed that suppliers were willing to make short term sacrifices to maintain relationship with the hospital. The findings for means and standard deviations on the influence of supply chain orientation on performance are shown in Table 4.5.

The findings of the study align with those of Tucker (2011) who found that trust, internal supply chain management focus and supply chain partner reliability are three key SCO factors that support enhancement of supply chain operation performance. Similarly, the findings are in conformity with Chen, Preston and Xia (2013) who adopted trust, knowledge exchange, IT integration between the hospital and its suppliers, and hospital–supplier integration as key factors that influence supply chain performance of hospitals and found that trust and IT integration directly affected knowledge exchange which in turn improved performance.

Table 4.5 Descriptive Statistics on Supply Chain Orientation and Performance

	N	Mean	Std. Deviation
The hospital is satisfied with the past performance of current suppliers	216	3.50	.511
Suppliers provide reliable information to hospital administration	216	3.29	1.083
Suppliers demonstrate high level of professionalism.	216	3.33	.917
Suppliers and strategic partners are reliable.	208	3.67	.686
Suppliers provide services that are superior compared to alternatives in the market.	216	3.38	1.056
Suppliers are willing to make short term sacrifices to maintain relationship with the hospital.	216	2.96	1.083
Suppliers and the hospital possess similar operating principles.	216	3.04	.550
Suppliers have similar work ethics as those of the hospital.	216	3.21	.932
Suppliers have complementary goals and objectives with those of the hospital.	216	3.00	.780

4.5.2 Influence of Lean SC on Performance of Accredited Hospitals.

The influence of lean supply chain on performance of accredited hospitals in Kenya was sought in the study. Means and standard deviations were used to give the findings under this objective. The means were interpreted as follows; A mean value of 0-1 implied the majority of the respondents agreed to the statements to a very small extent, a mean value of 1.1-2.0 implied the respondents agreed with the statements to a small extent, a mean value of 2.1-3.0 implied the respondents neither agreed nor disagreed with the statements, a mean value of 3.1-4.0 means that the respondents agreed to the statements to a great extent and a mean of 4.1-5.0 implied the respondents agreed with the statements to a very great extent.

The findings obtained on the relationship between lean supply chain and performance indicate that the mean value for majority of the items were above 3.0 implying that most respondents agreed to the statements to a great extent. The study findings indicate

that the majority of the respondents agreed to a great extent with the following statements: The hospital uses ICT to manage patient information (*M* = 3.88, *SD* = 1.191); the hospital has a human resource management policy (*M* = 3.67, *SD* = 1.167); the hospital has an integrated system for patient management (*M* = 3.55, *SD* = 1.371) and the hospital uses IT to manage its inventory (*M* = 3.50, *SD* = 1.351). The respondents however neither agreed nor disagreed that the hospitals used ICT in their procurement process (*M* = 2.79, *SD* = 1.474). The standard deviations were all above 1 indicating that varying opinions among the responses obtained from the mean value as shown in Table 4.6.

The present study findings are in agreement with Wachuma and Shalle (2016) who found out that information communication and technology (ICT) integration was an important component of lean SC which necessitated organization performance. In addition, Rechel, Wright, Barlow and McKee (2010) confirmed that lean principles can equally be applied in healthcare in areas such as elimination of unnecessary inventory, waiting, mistakes, unplanned re-admissions and inappropriate procedures or processes. The elimination increases efficiency within organizations and along the value stream of products, as confirmed by Francis (2014).

Table 4.6 Descriptive Statistics on Lean Supply Chain and Performance

	N	Mean	Std. Deviation
The hospital has installed process flow charts and signage across hospital premises to guide supply chain partners.	216	3.29	1.160
The hospital has formulated a service charter to manage supply chain service provision.	216	3.13	1.262
The hospital has an information desk to receive complaints and guide suppliers on the process flow and expectations.	216	3.21	1.841
The hospital uses ICT in its procurement process.	216	2.79	1.474
The hospital uses ICT to manage patient information.	216	3.88	1.191
The hospital uses IT to manage its inventory.	216	3.50	1.351
The hospital has an integrated system for patient management	216	3.55	1.371
The Hospital has a standard policy regarding procurement process.	216	3.33	1.049
The hospital has a human resource management policy	216	3.67	1.167

4.5.3 Influence of SCA on Performance of Accredited Hospitals

The researcher sought to determine the relationship between supply chain analytics and performance of hospitals using means and standard deviations. The means were interpreted as follows; a mean value of 0-1 implied the majority of the respondents agreed to the statements to a very small extent, a mean value of 1.1-2.0 implied the respondents agreed with the statements to a small extent, a mean value of 2.1-3.0 implied the respondents neither agreed nor disagreed with the statements, a mean value of 3.1-4.0 means that the respondents agreed to the statements to a great extent and a mean of 4.1-5.0 implied the respondents agreed with the statements to a very great extent.

The findings of the study indicate that the majority of the respondents agreed to a great extent to the following statements: The hospital has an automated financial management system (M = 4.00, SD = 0.722); the hospital has a quality and standard

management system (M = 3.33, SD = 0.816); and the hospital has a centralized system of storing data (M = 3.33, SD = 1.204). The respondents however neither agreed nor disagreed that the hospitals collaborated with their key suppliers in joint planning and forecasting (M = 2.75, SD = 1.225). Further, the respondents agreed to a small extent that hospitals had linked their systems with those of suppliers (M = 2.00, SD = 1.504). The findings are shown in Table 4.7.

The study found that the accredited hospitals in Kenya only applied basic levels of analytics in their operations. This is consistent with the findings of Moturi and Emurugat (2015) who found that it was possible to turn ordinary spreadsheets into a flexible, powerful, and inexpensive business intelligence system that gives users significant power and flexibility with minimal intervention from IT department. However, these findings disagree with Chae, Olson and Sheu (2014) who postulated that data management resources (DMR), IT-enabled planning resources and performance management resources (PMR), were necessary and highly used and thereby contributed to operational performance.

Table 4.7 Descriptive Statistics on Supply Chain Analytics and Performance

	N	Mean	Std. Deviation
The hospital has linked its system with those of suppliers	216	2.00	1.504
The hospital has a centralized system of storing data	216	3.33	1.204
The hospital collaborates with its key suppliers in joint planning and forecasting	216	2.75	1.225
The hospital has an automated capacity planning system such as staff and ward scheduling.	216	2.54	1.503
The hospital has an automated financial management system	216	4.00	.722
The hospital has an automated system that can analyze patient health history	216	3.29	1.268
The hospital has an automated standard performance system	216	3.08	1.139
The hospital has a quality and standard management system	216	3.33	.816
The hospital has standard key performance indicators for evaluating performance of suppliers.	216	2.54	1.215

4.5.4 Influence of SCI on Performance of Hospitals.

The study also sought to determine the influence of supply chain integration on performance of accredited hospitals in Kenya. Means and standard were used to descriptively analyze the findings. The means were interpreted as follows; a mean value of 0-1 implied the majority of the respondents agreed to the statements to a very small extent, a mean value of 1.1-2.0 implied the respondents agreed with the statements to a small extent, a mean value of 2.1-3.0 implied the respondents neither agreed nor disagreed with the statements, a mean value of 3.1-4.0 means that the respondents agreed to the statements to a great extent and a mean of 4.1-5.0 implied the respondents agreed with the statements to a very great extent.

The findings obtained on the influence of supply chain integration on performance indicate that the mean value for all items was above 3.0 implying that most respondents

agreed to the statements to a great extent. The findings indicate that the respondents agreed to a great extent with the following statements: The hospital has a long term relationship with its service providers (M = 3.83, SD = 0.702); the hospital has outsourced some services (M = 3.54, SD = 1.285) and the hospital frequently evaluates performance of its suppliers (M = 3.08, SD = 1.349. The respondents however neither agreed nor disagreed that hospital involves suppliers in procurement and inventory management (M = 2.88, SD = 1.035); the hospital involves employees and partners in decision making (M = 2.83, SD = 1.435) and the hospital uses ICT to communicate to the clients (M = 2.58, SD = 1.018). The findings of the study on the relationship between supply chain integration and performance are shown in Table 4.8.

The findings of the study are in line with those of Epping (2014) who found out that effective and frequent supply base rationalization assist to develop synergistic long term relationships thereby promoting exploitation strategies while at the same time encouraging new supplier relationships that would promote exploration strategies. In addition, Himanshu, Moharana, Murty, Senapati and Khuntia (2012) support these findings that SCI unifies supply chain processes and creates a seamless flow of materials, services and information to all supply chain partners with the objective to maximize competitive advantage for improve performance.

Table 4.8 Descriptive Statistics on Supply Chain Integration and Performance

	N	Mean	Std. Deviation
The hospital consults and involves staff in matters concerning their departments.	216	3.08	1.412
The hospital involves suppliers in procurement and inventory management.	216	2.88	1.035
The hospital has outsourced some services	216	3.54	1.285
The hospital involves employees and partners in decision making.	216	2.83	1.435
The hospital frequently evaluates performance of its suppliers	216	3.08	1.349
The hospital has a long term relationship with its service providers	216	3.83	.702
The hospital uses ICT to communicate to the clients.	216	2.58	1.018
The hospital has an integrated system with its suppliers	216	2.33	1.308
The Hospital has invested in ICT that links departments.	216	3.17	1.579

4.5.5 Influence of SC Resilience on Performance of Hospitals.

The influence of supply chain resilience on performance of hospitals was sought in the study using means and standard deviations. Means and standard were used to descriptively analyze the findings. The means were interpreted as follows; a mean value of 0-1 implied the majority of the respondents agreed to the statements to a very small extent, a mean value of 1.1-2.0 implied the respondents agreed with the statements to a small extent, a mean value of 2.1-3.0 implied the respondents neither agreed nor disagreed with the statements, a mean value of 3.1-4.0 means that the respondents agreed to the statements to a great extent and a mean of 4.1-5.0 implied the respondents agreed with the statements to a very great extent.

The findings indicate that the mean values obtained for the majority of the items were above 3.0 indicating that the majority of the respondents agreed with the statements.

The study findings indicate that majority of respondents agreed to a very great extent that hospitals used different payment platforms (M = 4.04, SD = 1.042). The respondents agreed to a great extent to the following statements: The hospital has clear roles and responsibilities to minimize conflict (M = 3.75, SD = 1.359); the hospital uses multiple sourcing of goods and services (M = 3.71, SD = 0.999); and the hospital has adequate capacity to mitigate against demand and supply variation (M = 3.54, SD = 1.062). However, the respondents neither agreed nor disagreed that hospitals encouraged the use of local suppliers (M = 2.67, SD = 1.341). The findings are shown in Table 4.9.

The findings agree with those of Rodrigues, Vivan and Storopoli (2016) who found that institutional attractiveness can be build through resilience by internally aligning resources, capacities and processes. Similarly, Todo, Nakajima and Matous (2015) agree that firms benefited from diversified networks with suppliers and clients because they would substitute the surviving firms in the network for the damaged partners and receive support from them. In addition, Wieland and Wallenburg (2012) found that robustness has a direct, strong positive effect on business performance and recommended that organizations need to consider robustness and agility due to their primary importance to withstand everyday risks and exceptions.

Table 4.9 Descriptive Statistics on Supply Chain Resilience and Performance

	N	Mean	Std. Deviation
The hospital has adequate capacity to mitigate against demand and supply variations.	216	3.54	1.062
The hospital has an efficient logistics system.	216	3.25	.944
The hospital has process back up plans and systems	212	3.41	1.563
The hospital uses multiple sourcing of goods and services.	216	3.71	.999
The hospital encourages the use of local suppliers.	216	2.67	1.341
The hospital uses different payment platforms	216	4.04	1.042
The hospital has clear roles and responsibilities to minimize conflict	216	3.75	1.359
The hospital has an equal access to information, data and plans across all departments and across all strategic partners	210	3.59	1.260
The hospital continuously assesses the needs of immediate and ultimate customers.	212	3.50	1.144

4.5.6 Results on Performance of Accredited Hospitals

Performance in the study was measured using four constructs namely total inventory expenditure, total wage bill, income from outpatient and income from inpatients. The findings indicate that the maximum inventory expenditure was 1,500,000,000 while the minimum was 1,026,000. The mean value was 180,952,306.21 with a standard deviation of 413,310,520.895. The maximum total wage bill reported was 7,100,000,000 and a minimum of 741,216 with a mean value of 672,825,692.54. The mean value for income from outpatients was 149,343,461.21 with a maximum value of 1,300,000,000 and a minimum of 1,665,456. Further, the mean value of income from inpatients was 927,698,608.71 with a maximum of 10,100,000,000 and a minimum of 1,184,040.

Data Envelopment Analysis (DEA) model was used to measure efficiency and optimum performance of the hospitals. DEA is simply calculated as the total weighted

output divided by the total weighted input. The findings of the study indicate that the mean value for DEA in public hospitals was 1.0478, 2.1426 for private hospitals and 0.7144 for faith based hospitals. This implied that private hospitals were more efficient than the other types of hospitals, followed by public hospitals and finally faith based hospitals. The findings are shown in Table 4.10.

The study adopted DEA (Data Envelopment Analysis) model to measure efficiency and optimum performance of accredited hospitals in Kenya in line with other scholars in the thematic area such as Caballer-Tarazona, Moya-Clemente, Vivas-Consuelo and Barrachina-Martinez (2010); Ozcan (2014); Chansky, Garner and Raichoudhary (2013) and Mayer (2013). The findings obtained in the study also concur with Pham (2011) who used data envelopment analysis method to calculate the relative efficiency of the hospitals and found that there was improvement in relative efficiency of hospitals that were attributed to technical aspects through encouragement of innovation in hospital operations thereby improving efficiency of hospitals.

Table 4.10 Descriptive Statistics on Performance of Hospitals

	N	Minimum	Maximum	Mean	Std. Deviation
Total inventory expenditure	216	1026000	1500000000	180952306.21	413310520.895
Total wage bill	216	741216	7100000000	672825692.54	1981981429.638
Income from outpatient	216	1665456	1300000000	149343461.21	356925556.777
Income from inpatients	216	1184040	10100000000	927698608.71	2827532036.076
Data Envelopment Analysis for Performance					
Public	63	.82	1.33	1.0478	.23002
Private	108	1.00	4.63	2.1426	1.52214
FBO	45	.56	1.34	.7144	.34939

4.6 Correlation Analysis

A correlation analysis was used to establish the relationships among the study variables. The correlation analysis was done to describe the relationships that exist between the dependent variable (hospital performance) and independent variables (Supply chain Orientation, Lean supply chain, Supply chain Analytics, Supply chain Integration and Supply Chain Resilience). Pearson Product-Moment Correlation was used to show the strength and direction that exists between the dependent and independent variables as well as rank the independent variables in terms of their strength of relation with the performance. The result was expressed within a range of -1 and +1 where, -1 was strong negative relationship and +1 was strong positive relationship.

Findings of the study shown in Table 4.11 indicate that supply chain orientation and performance of accredited hospitals in Kenya had a Pearson coefficient of 0.633. The significant value was obtained as (p = .000) which was below 0.05 at 1 tailed test conducted in the study. This implies that there was a strong positive significant relationship between supply chain orientation and organizational performance. The findings are in agreement with the findings earlier posited by Tinney (2012) who determined that SCO directly influences firm performance through the development and sustainment of behavior elements that allow a firm to build trustful relationships with their supply chain partners. Further, the findings are in conformity with Tucker (2011) who found that trust, internal supply chain management focus and supply chain partner reliability are three key SCO factors that support enhancement of supply chain operation performance.

The findings also indicate that lean supply chain and performance of hospitals had a Pearson coefficient of -0.023. The significant value was obtained as (p = .367) which was above 0.05 at 1 tailed test conducted in the study. This implies that there was no significant relationship between lean supply chain and performance in accredited hospitals in Kenya. Al-Hyari et al. (2016) agree with the fndings when they posited that lean practices have a dramatic effect on hospital performance in private hospitals as opposed to public hospitals. However, the findings obtained agree with Drotz and Poksinska (2014) who found that healthcare adopted process improvement and

teamwork as lean practices which had a positive effect on the organizational performance.

Further, the findings indicate that supply chain analytics and organizational performance had a Pearson coefficient of 0.129. The significant value was obtained as (p = .030) which was below 0.05 at 1 tailed test conducted in the study. This implies that there was a small positive significant relationship between supply chain analytics and performance. Bichsel (2012) qualified the relationship between analytics and performance by postulating that analytics is most successful when various constituents or departments, functional leaders and executives work in partnership. This is conformity with the findings of the present study, as a very small relationship was found which can be explained by lack of a strong partnership between hospital and its strategic partners. However, the findings are inconsistent with those of Trkman, McCormack, Valadares de Oliveira and Ladeira (2010) who found existence of a statistically strong significant relationship between analytical capabilities and performance.

In addition, the results indicate that supply chain integration and performance of hospitals had a Pearson coefficient of 0.543. The significant value was obtained as (p = .000) which was below 0.05 at 1 tailed test conducted in the study. This implies that there was a moderate positive significant relationship between supply chain integration and performance. The findings obtained in this study agree with those of Fuloria (2013) who found that the use of integrated technology improves performance of hospitals by enabling healthcare professionals innovatively and collaboratively organize their curative and preventive procedures and regimen in a cost efficient way. However the study found a weak relationship between SCI and performance of accredited hospitals in Kenya which is not in conformity with Wright (2016) who found a strong relationship between integration and performance of firms in Malaysia.

Finally, the study found that supply chain resilience and performance of hospitals had a Pearson coefficient of 0.669. The significant value was obtained as (p = .000) which was below 0.05 at 1 tailed test conducted in the study. This implies that there was a strong positive significant relationship between supply chain resilience and performance. The findings are in agreement with those of Eltantawy (2016) who

postulated that resilience is a dynamic capability by which firms integrate, build and reconfigure internal and external competences to sustain firm performance. Additionally, the study is in line with Krishnan and Pertheban (2017) findings which that SC resilience is an important component of organizational performance.

Table 4.11 Overall Correlation Matrix

		SC Orientation	Lean SC	SC Analytics	SC Integration	SC Resilience	Performance
Supply Chain Orientation	Pearson Correlation	1					
	Sig. (1-tailed)						
	N	216					
Lean Supply Chain	Pearson Correlation	.416**	1				
	Sig. (1-tailed)	.000					
	N	216					
Supply Chain Analytics	Pearson Correlation	.543**	.898**	1			
	Sig. (1-tailed)	.000	.000				
	N	216	216	216			
Supply Chain Integration	Pearson Correlation	.730**	.748**	.813**	1		
	Sig. (1-tailed)	.000	.000	.000			
	N	216	216	216	216		
Supply Chain Resilience	Pearson Correlation	.669**	.389**	.345**	.673**	1	
	Sig. (1-tailed)	.000	.000	.000	.000		
	N	216	216	216	216	216	
Performance	Pearson Correlation	.633**	-.023	.129*	.543**	.669**	1
	Sig. (1-tailed)	.000	.367	.030	.000	.000	
	N	216	216	216	216	216	216

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

4.7 Hypotheses Testing

Hypotheses testing was conducted to determine the influence of supply chain ambidexterity strategies and performance of hospitals in Kenya. The alternative hypotheses of the study were as follows: There is a significant and positive influence between supply chain orientation and performance of hospitals; there is a significant and positive influence between lean supply chain and performance of hospitals; there is a significant and positive influence between supply chain analytics and performance of hospitals; there is a significant and positive influence between supply chain integration and performance of hospitals; there is a significant and positive influence between supply chain resilience and performance of hospitals and hospital size mediates the relationship between supply chain ambidexterity and performance of hospitals.

H_a1: There is a significant and positive influence between supply chain orientation and performance of hospitals.

According to the findings shown in Table 4.12, supply chain orientation had coefficients (β = .633, t = 11.973, p = .000). The significant value obtained was less than 0.05 set by the study, similar to the t value which was more than 1.96 at 5% significant level. The results therefore imply that there was a positive significant relationship between supply chain orientation and performance of accredited hospitals in Kenya. Based on the findings, the study rejected the null hypothesis and therefore confirmed that supply chain orientation had a positive significant influence on performance of hospitals.

H_a2: There is a significant and positive influence between lean supply chain and performance of hospitals.

In addition, lean supply chain had coefficients (β = -.023, t = -.340, p = .735). The significant value obtained was more than 0.05 set by the study, similar to the t value which was less than 1.96 at 5% significant level. The results therefore imply that there was no significant relationship between lean supply chain and performance of accredited hospitals in Kenya. Based on the findings, the study failed to reject the null

hypothesis and therefore postulated that lean supply chain has no significant influence on performance of hospitals.

H_a3: There is a significant and positive influence between supply chain analytics and performance of hospitals.

Further, supply chain analytics had coefficients (β = .129, t = 1.898, p = .059). The significant value obtained was more than 0.05 set by the study, similar to the t value which was less than 1.96 at 5% significant level. The results therefore imply that there no significant relationship between supply chain analytics and performance of accredited hospitals in Kenya. Based on the findings, the study failed to reject the null hypothesis and therefore concluded that supply chain analytics had no significant influence on performance of hospitals.

H_a4: There is a significant and positive influence between supply chain integration and performance of hospitals.

Similarly, supply chain integration had coefficients (β = .543, t = 9.465, p = .000). The significant value obtained was less than 0.05 set by the study, similar to the t value which was more than 1.96 at 5% significant level. The results therefore implied that there was a positive significant relationship between supply chain integration and performance of accredited hospitals in Kenya. Based on the findings, the study rejected the null hypothesis and therefore confirmed that supply chain integration had a positive significant influence on performance of hospitals.

H_a5: There is a significant and positive influence between supply chain resilience and performance of hospitals.

Additionally, supply chain resilience had coefficients (β = .669, t = 13.180, p = .000). The significant value obtained was less than 0.05 set by the study, similar to the t value which was more than 1.96 at 5% significant level. The results therefore imply that there was a positive significant relationship between supply chain resilience and performance of accredited hospitals in Kenya. Based on the findings, the study rejected the null hypothesis and therefore confirmed that supply chain resilience had a positive significant influence on performance of hospitals.

H_a6: Hospital size mediates the relationship between supply chain ambidexterity and performance of hospitals.

Finally, the study found that when hospital size is mediating the relationship between supply chain ambidexterity and performance, improvement in the second model is seen. The findings indicated an R^2 change value of 0.163 implying that hospital size improved the relationship by 16.3%. The study therefore rejected the null hypothesis and affirmed that hospital size mediates the relationship between supply chain ambidexterity and performance of accredited hospitals in Kenya.

Table 4.12 Hypotheses Testing

Hypothesis	Beta value	T value	P-value	Conclusion
Ha1: There is a significant and positive influence between SCO and performance of hospitals.	.633	11.973	0.000	Reject $H_0$1
Ha2: There is a significant and positive influence between lean SC and performance of hospitals.	-.023	-0.340	0.735	Fail to reject $H_0$2
Ha3: There is a significant and positive influence between SCA and performance of hospitals.	.129	1.898	0.059	Fail to reject $H_0$3
Ha4: There is a significant and positive influence between SCI and performance of hospitals.	.543	9.465	0.000	Reject $H_0$4
Ha5: There is a significant and positive influence between SC resilience and performance of hospitals.	.669	13.180	0.000	Reject $H_0$5
Ha6: Hospital size mediates the relationship between SCX and performance of hospitals.	-.465	$R2\ \Delta =$ 0.163	0.00	Reject $H_0$6

4.8 Diagnostic Tests

The data collected was subjected to diagnostic tests to determine whether the assumptions of the study were observed and that the probability of type 1 and type 2

errors were minimal. The presence of type 1 and type 2 imply that the data collected would not be suitable for regression analysis. The tests done included linearity, normality and heteroscedasticity tests. Linearity was done using Durbin-Wartson test, normality test was done using the Shapiro-Wilk test, and heteroscedasticity conducted using Glejser test.

4.8.1 Linearity Tests

Linearity test was done using the Durbin-Wartson test. If a significant deviation from linearity was greater than 0.05, then the relationship between the independent variable was confirmed to be linearly dependent and admissible. The findings on supply chain orientation indicate that there was a significant linear relationship between supply chain orientation and performance of hospitals as a significant deviation from linearity value of 0.063 was obtained. The findings also indicate that performance and lean supply chain had a linear relationship as a significant deviation from linearity value of 0.062 was realized in the study.

The study further determined that supply chain analytics and performance of hospitals were linearly related, as a significant deviation from linearity value of 0.109 was obtained, which was more than 0.05 set by the study. The findings on the relationship between the performance of hospitals and supply chain integration indicate that there was a linear relationship between the two variables as a significant deviation from linearity value of 0.068 was obtained. In addition, the study determined that a significant linear relationship between performance of hospitals and supply chain resilience existed as the deviation from linearity value was 0.056 which was more than 0.05 set by the study. The findings are as shown in Table 4.13.

Table 4.13 Linearity Test for Supply Chain Ambidexterity

			Sum of Squares	df	Mean Square	F	Sig.
Performance * Supply Chain Orientation	Between Groups	(Combined)	232.824	7	33.261	468.465	.163
		Linearity	.836	1	.836	11.785	.056
		Deviation from Linearity	231.988	6	38.664	544.573	.063
	Within Groups		15.030	208	.071		
	Total		247.854	215			
Performance * Lean Supply Chain	Between Groups	(Combined)	247.788	7	35.398	111492.896	.087
		Linearity	40.258	1	40.258	126799.890	.100
		Deviation from Linearity	207.530	6	34.588	108941.731	.062
	Within Groups		.066	208	.000		
	Total		247.854	215			
Performance * Supply Chain Analytics	Between Groups	(Combined)	104.678	7	14.954	21.725	.051
		Linearity	16.455	1	16.455	23.906	.072
		Deviation from Linearity	88.222	6	14.704	21.361	.109
	Within Groups		143.176	208	.688		
	Total		247.854	215			
Performance * Supply Chain Integration	Between Groups	(Combined)	242.200	7	34.600	1273.023	.093
		Linearity	10.036	1	10.036	369.239	.111
		Deviation from Linearity	232.165	6	38.694	1423.654	.068
	Within Groups		5.653	208	.027		
	Total		247.854	215			
Performance * Supply Chain Resilience	Between Groups	(Combined)	247.807	8	30.976	138143.319	.047
		Linearity	44.238	1	44.238	197289.118	.050
		Deviation from Linearity	203.569	7	29.081	129693.919	.056
	Within Groups		.046	207	.000		
	Total		247.854	215			

4.8.2 Normality Test

Prior to analyzing data using inferential statistical techniques, the study checked the normality of the data set by looking at skewness and kurtosis. The skewness values obtained in the study indicate that the scores are skewed as many are negatively skewed and not that much closer to zero. However, because all the skewness values fall within the range of -2 to +1, there is no case of excessive skewness in the data. The kurtosis values also fall within the range of -2 to +1, and therefore do not display excessive kurtosis as well. These results suggest that the normality assumption is not strictly violated in the study. Normality test was done at 95% confidence interval for mean. The findings are shown in Table 4.14.

Table 4.14 Normality Test Results

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Supply Chain Orientation	216	.593	.166	-.359	.330
Lean Supply Chain	216	-.656	.166	-.508	.330
Supply Chain Analytics	216	.368	.166	-.933	.330
Supply Chain Integration	216	.096	.166	-1.250	.330
Supply Chain Resilience	216	-1.127	.166	.096	.330

4.8.3 Heteroscedasticity Tests

Heteroscedasticity occurs when the variance in scores on one variable is somewhat different to all of the values of the other. In statistics, heteroscedasticity describes a situation in which the error term in the relationship between the independent variables and the dependent variable, is different across all values of the independent variables. The research used Glejser Test to test for heteroscedasticity. A significant value of 0.05 was used meaning that values greater than the significant value implied lack of heteroscedasticity issues in the study. The obtained values of significance for Supply Chain Orientation, Lean Supply Chain, Supply Chain Analytics, Supply Chain

Integration and Supply Chain Resilience variables were 0.115, 0.198, 0.984, 0.237 and 0.653 respectively. This indicates that there are no heteroscedasticity problems as all the variables have a score of higher than 0.05. The findings are shown in Table 4.15.

Table 4.15 Heteroscedasticity Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.221	.082		14.936	.000
Supply Chain Orientation	-.050	.032	-.128	-1.584	.115
Lean Supply Chain	-.319	.035	-1.098	-1.095	.198
Supply Chain Analytics	.001	.036	.003	.020	.984
Supply Chain Integration	.268	.033	.977	1.002	.237
Supply Chain Resilience	-.094	.022	-.351	-.267	.653

a. Dependent Variable: AbsUt

4.9 Regression Results

Regression analysis was used to investigate the relationship between all independent variables together and the dependent variable. The study used the coefficient of determination (R^2) and the F test. The R^2 was used to test the proportion of the variations in dependent variable that can be explained by the independent variable and F test measured the suitability of the model to confirm or reject the research hypotheses. F test was used to assess the level of significance of the model by comparing the F value with the overall level of significance and P value.

The strength, direction and significance of the relationship between individual variables and the dependent variable were assessed using the beta, t and P values. The beta coefficient values indicated the strength of each of the independent variable in influencing the dependent variable. The level of significance of each individual variable was assessed by comparing t test and P values with the level of significance which were set at 0.05 because the study was a one tailed test.

4.9.1 Influence of SCO on Performance of Accredited Hospitals.

The study conducted regression analysis between supply chain orientation and performance of accredited hospitals in Kenya. This was done using the coefficient of determination which was used to show the variability of the dependent variable in relation to the independent variable, ANOVA which was used to show the significance of the model and the coefficients which were used to test hypothesis of the study. The findings are shown in Table 4.16.

The study realized an R^2 value for the relationship between supply chain orientation and performance of 0.401. This implied that 40.1% of the variation in performance could be attributed to changes in supply chain orientation in accredited hospitals in Kenya. Therefore, other factors not studied in the present study contribute to 59.9% of the variation in performance of hospitals. Further, the study conducted ANOVA to test for the reliability of the regression model. The significant value obtained was 0.000 which was less than 0.05 at 95% confidence level. The F value was 143.351 which was significant as shown by the significant value. This implied that the model was reliable in predicting the relationship between supply chain orientation and performance.

The findings obtained by the study align with those of Acar et al. (2017) who revealed that SCO had significant and positive effects on performance. In addition, Chen, Preston and Xia (2013) found that supply chain orientaion constructs of trust and IT integration directly affected knowledge exchange and by extention led to improved overall performance. Based on the ordinary least square model; $Y= \beta_0 + \beta_1 X_1 + \varepsilon$ for the ordinary least square model, ordinary least model therefore will be; $Y = -0.111 + 0.924X_1 + 0.259$. This implies that a unit increase in supply chain orientation will lead to 92.4% increase in hospital performance in Kenya.

Table 4.16 Regression Analysis for Supply Chain Orientation

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.633[a]	.401	.398	.69998	.401	143.351	1	214	.000

a. Predictors: (Constant), Supply Chain Orientation

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.238	1	70.238	143.351	.000[b]
	Residual	104.854	214	.490		
	Total	175.093	215			

a. Dependent Variable: Performance

b. Predictors: (Constant), Supply Chain Orientation

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.111	.259		-.429	.669
	SC Orientation	.924	.077	.633	11.973	.000

a. Dependent Variable: Performance

4.9.2 Influence of Lean SC on Performance of Accredited Hospitals.

The study conducted regression analysis to determine the influence of lean supply chain on performance of accredited hospitals in Kenya. To achieve this aim, the study used the coefficient of determination to access the variability of performance in relation to lean supply chain. The study also conducted ANOVA test to determine the significance of the regression model. Finally, the study used the regression coefficients to test the study hypothesis. The results are as shown in Table 4.17.

The study found an R^2 value for the relationship between lean supply chain and hospital performance of 0.001. This implies that 0.1% of the variation in performance can be attributed to changes in lean supply chain of accredited hospitals in Kenya. Therefore, other factors not studied in the present study contribute to 99.9% of the

variation in performance of hospitals. The study therefore concluded that there was no relationship between lean supply chain and performance of accredited hospitals in Kenya. The ANOVA test was also conducted to determine the reliability of the regression model. The significant value of 0.735 and F value of 0.115 were obtained, a confirmation that there was no significant relationship between lean supply chain and hospital performance and therefore not a reliable model.

The study findings disagree with the findings of Leite and Vieira (2015) who evaluated principles of lean service as well as best practices and tools for implementing lean in service sector and found that application of lean lean manufacturing practices in the service sector can generate large economic and financial results. Further, Wachuma and Shalle (2016) while studying the effect of lean supply chain management practices on organizational performance in government ministries in Kenya found out that there was a significant positve relationship between lean practices and organization performance.

Table 4.17 Regression Analysis for Lean Supply Chain

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.023[a]	.001	-.004	.90429	.001	.115	1	214	.735

a. Predictors: (Constant), Lean Supply Chain

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.094	1	.094	.115	.735[b]
	Residual	174.998	214	.818		
	Total	175.093	215			

a. Dependent Variable: Performance

b. Predictors: (Constant), Lean Supply Chain

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.023	.267		11.344	.000
	Lean Supply Chain	-.025	.074	-.023	-.340	.735

a. Dependent Variable: Performance

4.9.3 Influence of SCA on Performance of Accredited Hospitals

The study sought to determine the influence of supply chain analytics on the performance of accredited hospitals in Kenya. In order to achieve this objective, the coefficient of determination was used to predict the variability of performance in relation to supply chain analytics. ANOVA test was also used to test the significance of the regression model while the regression coefficients were used to test for the study hypothesis. The findings are shown in Table 4.18.

The study realized an R^2 value of 0.017. This implies that 1.7% of the variation in performance could be attributed to changes in supply chain analytics of accredited hospitals in Kenya. Therefore, other factors not studied in the present study contribute

to 98.3% of the variation in performance of hospitals. The ANOVA test was also conducted to determine the reliability of the regression model. The significant value obtained was 0.059 which is more than 0.05 at 95% confidence level. The F value was 3.602 which was insignificant as shown by the significant value. The findings of the present study disagree with Trkman, McCormack, Valadares de Oliveira and Ladeira (2010) who found existence of a statistically significant relationship between analytical capabilities and performance. In addition, Chae, Olson and Sheu (2014) also found a significant relationship between application of analytics systems such as PMR and DMR and operational performance.

Table 4.18 Regression Analysis for Supply Chain Analytics

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.129[a]	.017	.012	.89702	.017	3.603	1	214	.059

a. Predictors: (Constant), Supply Chain Analytics

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.899	1	2.899	3.603	.059[b]
	Residual	172.194	214	.805		
	Total	175.093	215			

a. Dependent Variable: Performance
b. Predictors: (Constant), Supply Chain Analytics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.570	.202		12.738	.000
	Supply Chain Analytics	.117	.062	.129	1.898	.059

a. Dependent Variable: Performance

4.9.4 Influence of SCI on Performance of Accredited Hospitals.

The study sought to determine the influence of supply chain integration on performance of accredited hospitals in Kenya. In doing so, the study used the coefficient of determination to predict the variability of performance in relation to

supply chain integration. The study also carried outs ANOVA test to determine the significance of the model as well as the regression coefficients which were to test hypothesis in the study. The findings are as shown in Table 4.19.

The study found an R^2 value of 0.295. This implies that 29.5% of the variation in performance could be attributed to changes in supply chain integration of accredited hospitals in Kenya. Therefore, other factors not studied in the present study contribute to 70.5% of the variation in performance of hospitals. The ANOVA test was also conducted to determine the reliability of the regression model. The significant value obtained was 0.000 which is less than 0.05 at 95% confidence level. The F value was 89.589 which is significant as shown by the significant value. This implies that the model was reliable in predicting the relationship between supply chain integration and hospital performance.

The findings of the study agree with those of Hwang, Chang, LaClair and Paz (2013) who found that integrated delivery systems have positive effects on hospital performance. Similarly, Cheruiyot (2013) indicated that the supply chain integration (both upstream and downstream) was positively associated with supply chain performance in terms of improving transport cost, distribution cost, raw material purchasing cost, asset turnover and inventory holding cost hence overall performance. Additionally, the findings are in line with those of Leuschner, Rogers and Charvet (2013) who determined that there there was a positive and significant correlation between supply chain integration and firm performance. Based on the ordinary least square model; $Y= \beta_0 + \beta_1 X_1 + \varepsilon$ for the ordinary least square model, ordinary least model therefore will be; $Y = 1.192 + 0.553X_1 + 0.191$. This implies that a unit increase in supply chain integration will lead to 55.3% increase in hospital performance in Kenya.

Table 4.19 Regression Analysis for Supply Chain Integration

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.543[a]	.295	.292	.75944	.295	89.589	1	214	.000
a. Predictors: (Constant), Supply Chain Integration									

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	51.670	1	51.670	89.589	.000[b]
	Residual	123.423	214	.577		
	Total	175.093	215			
a. Dependent Variable: Performance						
b. Predictors: (Constant), Supply Chain Integration						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.192	.191		6.235	.000
	Supply Chain Integration	.553	.058	.543	9.465	.000
a. Dependent Variable: Performance						

4.9.5 Influence of SC Resilience on Performance of Accredited Hospitals.

The study conducted regression analysis to determine the influence of supply chain resilience on the performance of accredited hospitals in Kenya. To achieve this, the study conducted the coefficient of determination to help predict the variability of performance in relation to supply chain resilience. Further, ANOVA test was done to determine the significance of the model. The coefficients of regression were also used to test the hypothesis of the study. The findings obtained are presented in Table 4.20.

The study realized an R^2 value of 0.448. This implies that 44.8% of the variation in performance could be attributed to changes in supply chain resilience of accredited hospitals in Kenya. Therefore, other factors not studied in the present study contribute to 55.2% of the variation in performance of hospitals. The ANOVA test was also conducted to determine the reliability of the regression model. The significant value

obtained was 0.000 which is less than 0.05 at 95% confidence level. The F value was 173.717 which is significant as shown by the significant value. This implies that the model was reliable in predicting the relationship between supply chain resilience and hospital performance.

The findings of the study support the findings of Rodrigues, Vivan and Storopoli (2016) who found that institutional attractiveness and performance can be build through resilience by internally aligning resources, capacities and processes. Similarly, Aigbogun, Ghazali and Razali (2014) found that supply chain resilience constructs of flexibility, visibility, adaptability, collaboration, reserve capacity and supplier dispersity improved performance. Based on the ordinary least square model; $Y= \beta_0 + \beta_1 X_1 + \varepsilon$ for the ordinary least square model, ordinary least model therefore will be; $Y = 0.523 + 0.665X_1 + 0.189$. This implies that a unit increase in supply chain resilience will lead to 66.5% increase in hospital performance in Kenya.

Table 4.20 Regression Analysis for Supply Chain Resilience

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.669[a]	.448	.445	.67201	.448	173.717	1	214	.000

a. Predictors: (Constant), Supply Chain Resilience

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	78.450	1	78.450	173.717	.000[b]
	Residual	96.642	214	.452		
	Total	175.093	215			

a. Dependent Variable: Performance
b. Predictors: (Constant), Supply Chain Resilience

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.523	.189		2.772	.006
	Supply Chain Resilience	.665	.050	.669	13.180	.000

a. Dependent Variable: Performance

4.9.6 Mediating Influence of Hospital Size on the Relationship between Supply Chain Ambidexterity and Performance of Hospitals

The mediating influence of hospital size on the relationship between supply chain ambidexterity and performance of hospitals was sought in the study. The study used a multi-stage approach to determine the influence of the mediator. This was done in two stages where the first stage involved running regression analysis between supply chain ambidexterity and hospital performance. The second stage involved running regression analysis between supply chain ambidexterity and hospital performance with hospital size included as a mediator. Since lean supply chain and supply chain analytics were found to have no relationship with performance of hospitals, the study did not analyze them further to assess their relationship with hospital size as the mediator.

The findings in Table 4.21 indicate that the R^2 value of 0.510 was obtained when the supply chain ambidexterity was applied indicating a relationship between supply chain orientation, supply chain integration and supply chain resilience and performance. Upon introduction of hospital size as a mediator, the R^2 value improved to 0.673. The findings imply that when size is used as a mediator, 67.5% of the variation in performance could be attributed to the three factors. Therefore, hospital size was a good mediator in the study. The findings from the ANOVA test indicate that significance values of 0.000 were obtained for the two models showing that the models were reliable. The F values were also obtained as 73.620 and 108.634 which confirmed the significance.

The findings of the study disagree with those of McDermott and Prajogo (2012) who did not find a direct relationship between organizational size and its performance. Similar results were posited by Foster and Zrull (2013). However, Pervan and Visic (2012) found a weak positive relationship between firm size and performance of the organizations. The study findings however are in agreement with those of Jimenez-Jimenez and Sanz-Valle (2011) who found that size mediated the relationship between organization learning, innovation and performance. In addition, John and Adebayo (2013) also revealed that firm size, both in terms of total assets and in terms of total sales, has a positive effect on the profitability of companies.

Table 4.21 Mediated Regression Models

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.714[a]	.510	.503	.63600	.510	73.620	3	212	.000
2	.820[b]	.673	.667	.52080	.673	108.634	4	211	.000

a. Predictors: (Constant), Supply Chain Resilience, Supply Chain Orientation, Supply Chain Integration

b. Predictors: (Constant), Hospital Size, Supply Chain Integration, Supply Chain Resilience, Supply Chain Orientation

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	89.338	3	29.779	73.620	.000[b]
	Residual	85.754	212	.405		
	Total	175.093	215			
2	Regression	117.862	4	29.465	108.634	.000[c]
	Residual	57.231	211	.271		
	Total	175.093	215			

a. Dependent Variable: Performance

b. Predictors: (Constant), Supply Chain Resilience, Supply Chain Orientation, Supply Chain Integration

c. Predictors: (Constant), Supply Chain Resilience, Supply Chain Orientation, Supply Chain Integration, Hospital Size

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.283	.239		-2.185	.007
	Supply Chain Orientation	.492	.110	.337	4.485	.000
	Supply Chain Integration	-.003	.077	-.003	-5.038	.000
	Supply Chain Resilience	.442	.069	.446	6.417	.000
2	(Constant)	2.255	.315		7.150	.000
	Supply Chain Orientation	.027	.101	.018	4.263	.002
	Supply Chain Integration	.121	.064	.119	2.892	.010
	Supply Chain Resilience	.472	.057	.475	8.342	.000
	Hospital Size	-.785	.077	-.465	-10.255	.000

a. Dependent Variable: Performance

4.10 Optimal Model

The aim of the study was to examine the influence of supply chain ambidexterity on performance of accredited hospitals in Kenya. In order to achieve that, the study used five independent variables namely supply chain orientation, lean supply chain, supply chain analytics, supply chain integration and supply chain resilience. Further, the study sought to evaluate the mediating effect of hospital size in promoting performance of hospitals. The study however found that lean supply chain and supply chain analytics had no relationship with performance of accredited hospitals in Kenya. The study therefore omitted the two variables from the model.

To demonstrate the relationship using the models, the study used two models, the first model depicted the relationship between supply chain ambidexterity and hospital performance. The model was derived as follows; $Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$

Where Y is dependent variable (hospital performance) and is a linear function of X_1, X_2, X_3, and ε.
B_0 is the regression constant or intercept and $\beta1 - \beta3$ are the coefficients of the independent variables
X_1, X_2, X_3, are Supply chain Orientation, Supply chain Integration and Supply chain Resilience respectively and ε is the error term.

Based on the outcome of the regression analysis shown in Table 4.21, the model became; $Y = -0.283 + 0.492X_1 – 0.003X_2 + 0.442X_3 + 0.239$.

This model implies when all other supply chain ambidexterity strategies are held constant except supply chain orientation, a unit increase in supply chain orientation will improve performance by 49.2%, when all other supply chain ambidexterity strategies are held constant except supply chain integration, a unit increase in supply chain integration will reduce performance by 0.3% and when all other supply chain ambidexterity strategies are held constant except supply chain resilience, a unit increase in supply chain resilience will improve performance by 44.2%.

The second model was obtained when hospital size was used as a mediator. The following model was therefore derived; $Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4Z + \varepsilon$

Where Y is dependent variable (hospital performance) and is a linear function of X_1, X_2, X_3, Z and ε.

B_0 is the regression constant or intercept and β1 – β4 are the coefficients of the independent variables

X_1, X_2, X_3, are Supply chain Orientation, Supply chain Integration and Supply chain Resilience respectively and ε is the error term. Z is the mediating variable (hospital size).

Based on the outcome of the regression analysis shown in Table 4.21, the model therefore became; $Y = 2.225 + 0.027X_1 + 0.121X_2 + 0.472X_3 - 0.785Z + 0.315$.

This model implies when all other supply chain ambidexterity strategies are held constant except supply chain orientation, a unit increase in supply chain orientation will improve performance by 2.7%, when all other supply chain ambidexterity strategies are held constant except supply chain integration, a unit increase in supply chain integration will increase performance by 12.1% and when all other supply chain ambidexterity strategies are held constant except supply chain resilience, a unit increase in supply chain resilience will improve performance by 47.2%. The study also found that hospital size as variable negatively affected performance by 78.5%.

The study in light of the findings derived the following optimal model;

$Y = 2.225 + 0.472X_1 + 0.121X_2 + 0.027X_3 - 0.785Z + 0.315.$

Where X_1, X_2, X_3, are Supply chain Resilience, Supply chain Integration and Supply chain Orientation respectively and ε is the error term. Z is the mediating variable (hospital size).

4.11 Revised Conceptual Framework

The study developed a revised conceptual taking into the knowledge gained from the hypotheses tested. The framework identified in 2.1 was based on the study objectives while the revised conceptual framework took into consideration only the study objectives that were found to have a positive influence on performance of accredited hospitals in Kenya starting with the highest to lowest relevant variables as shown in Figure 4.4. The study found that application of supply chain ambidexterity strategy

directly improves performance of hospitals. The SC ambidexterity strategies that were found to positively influence performance were supply chain orientation, supply chain integration and supply chain resilience. The study however found that lean supply chain and supply chain analytics did not have a significant influence on performance of hospitals. The size of the hospitals was also found to mediate the relationship between SCX and performance of accredited hospitals in Kenya.

The study postulated that the reason for lack of relationship between lean SC and performance in hospitals was due to the fact that hospitals were among few special institutions that could be adversely affected by implementation of lean principles and hence many hospitals avoid them. Further the research postulated that investment in supply analytics may not have a significant effect in hospital supply chain as it would in medical research and that's why many hospitals may have not invested much in it. However this hypotheses are subject to future research.

Overall, the study found that improvement in hospital performance could be achieved by improving hospital supply chain by simultaneously adopting supply chain ambidexterity strategies of SC orientation, SC integration and SC resilience. The strategies will be achieved through ensuring trust, credibility and commitment among employees, adopting supply chain design and integrating technology to promote collaboration and ensuring that there is adequate spare capacity to mitigate against supply chain risks and promote agility, adaptability and alignment of operations.

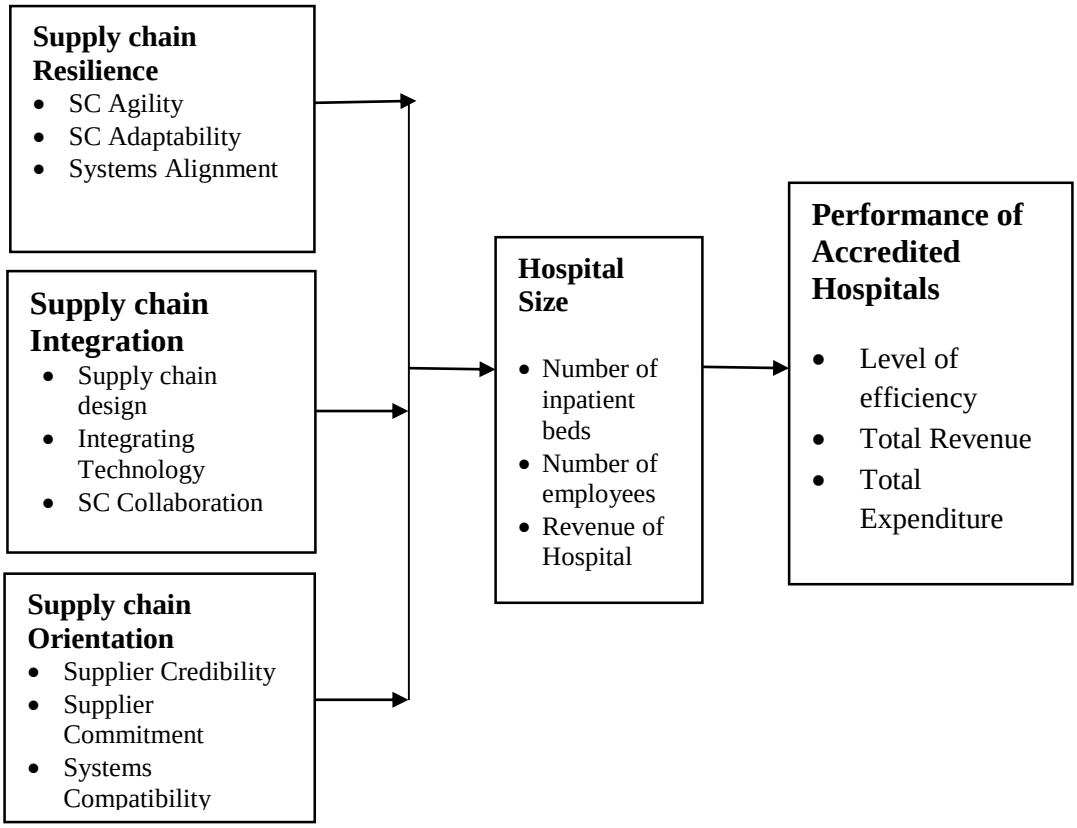

Figure 4.4 Revised Conceptual Framework

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main objective of the study was to determine the influence of ambidextrous supply chain strategies and performance of accredited hospitals in Kenya. The chapter provides a summary of the main findings provided in the previous chapter, draw conclusions from the findings related to the study, and recommend areas for improvement to specific beneficiaries as well as areas for further studies. The knowledge gained is also presented in this chapter.

5.2 Summary of Major Findings

This section has been arranged in accordance to the objectives of the study; to examine the role of supply chain orientation, the role that lean supply chain, the influence of supply chain analytics, the influence of supply chain integration as an antecedent of ambidextrous SC and influence of supply chain resilience in enhancing hospitals. The study findings indicated that private hospitals had a higher Data Envelopment Analysis score compared to the public and faith based hospitals. The findings implied that private hospitals were generally efficient than other type of hospitals. Further, the study determined that supply chain orientation, supply chain resilience and supply chain integration had a positive significant relationship with performance. However, the study did not find a significant relationship between supply chain analytics and lean supply chain with performance of accredited hospitals in Kenya.

5.2.1 Supply Chain Resilience and Performance

The study sought to determine the influence of supply chain resilience on performance of accredited hospitals in Kenya. The study realized a coefficient of determination (R^2) value of 0.448 which implied that 44.8% of the variation in performance of accredited hospitals in Kenya could be attributed to supply chain resilience. The study findings indicated that supply chain resilience positively and significantly influenced the performance of accredited hospitals in Kenya. These findings led to the rejection of

the null hypothesis and therefore it was inferred that supply chain resilience positively influenced performance of accredited hospitals in Kenya. It was determined therefore that supply chain resilience plays an important role in the performance of accredited hospitals in Kenya.

5.2.2 Supply Chain Integration and Performance

The study intended to determine the influence of supply chain integration on performance of accredited hospitals in Kenya. The study found a coefficient of determination (R^2) value of 0.295 denoting that 29.5% of the variation in performance could be attributed to changes in supply chain integration of accredited hospitals in Kenya. Similarly, the study findings from regression analysis established that supply chain integration had a positive significance on performance of hospitals as the regression coefficients obtained were significant. Conversely, the study asserted that supply chain integration was an important factor in determining performance of accredited hospitals in Kenya.

5.2.3 Supply Chain Orientation and Performance

The study aimed at determining the influence of supply chain orientation on performance of accredited hospitals in Kenya. The study realized a coefficient of determination (R^2) value of 0.401 which implied that 40.1% of the variation in performance of accredited hospitals in Kenya could be attributed to supply chain orientation. Based on the significance of the regression coefficients, the study therefore rejected the null hypothesis and confirmed that supply chain orientation had a positive significant influence on performance of hospitals. Supply chain orientation was therefore an important factor in improving performance.

5.2.4 Lean Supply Chain and Performance

The study sought to determine the influence of lean supply chain on performance of accredited hospitals in Kenya. The findings obtained indicated a coefficient of determination R^2 value of 0.001 implying that 0.1% of the variation in performance could be attributed to changes in lean supply chain of accredited hospitals in Kenya.

The study determined that the regression coefficients for the relationship between lean supply chain and performance were insignificant. These findings led to the failure to reject the null hypothesis and therefore the study postulated that lean supply chain did not significantly influence performance of accredited hospitals in Kenya. Lean supply chain was therefore not an essential factor in improving performance of accredited hospitals in Kenya.

5.2.5 Supply Chain Analytics and Performance

The study purposed to establish the influence of supply chain analytics on performance. The study found a coefficient of determination (R^2) value of 0.017 implying that 1.7% of the variation in performance could be attributed to changes in supply chain analytics of accredited hospitals in Kenya. The findings concur with those obtained from the regression coefficients which were found to be insignificant. This implied that supply chain analytics did not play a significant role in the improvement of performance and the study therefore rejected the null hypothesis set by the study and therefore asserted that supply chain analytics did not significantly influence performance of accredited hospitals in Kenya. Supply chain analytics was therefore not a crucial factor in improving performance in accredited hospitals in Kenya.

5.2.6 Mediating influence of Hospital size on the relationship between supply chain ambidexterity and performance of hospitals

The study finally sought to determine the mediating influence of Hospital size on the relationship between supply chain ambidexterity and performance of hospitals. The study found a general increase the inferential statistics when size mediated supply chain ambidexterity. The study found a coefficient of determination R^2 value of 0.510 which improved to 0.673 when mediated by hospital size indicating that hospital size played a key role in the variation of performance. Also, the regression coefficients were significant for supply chain resilience. This indicated that hospital size was an important mediator in determining the relationship between supply chain resilience and performance of accredited hospitals in Kenya. However, there was no mediating effect of hospital size on the relationship between supply chain orientation and supply chain integration. This indicated that hospital size was overall a good mediator.

5.3 Conclusions

The study concluded that application of supply chain ambidexterity strategy was a key practice in improving hospital performance. The study therefore concluded that hospitals needed to simultaneously implement supply chain resilience, SC integration and SC orientation to realize superior supply chain performance expressed in terms of efficiency or a higher DEA. Efficiency enables the hospitals to provide quality and affordable service to citizens.

With reference to supply chain resilience, the study found a strong positive relationship between supply chain resilience and performance of accredited hospitals in Kenya. The study therefore concluded that SC resilience was important in promoting hospital performance. The study also concluded that most hospitals had spare capacity to mitigate against demand and supply variances. The study further concluded that hospital supply chains were agile, adaptable to environmental changes and were generally aligned with their stated goals and objectives.

In relation to supply chain integration, the study found that there was a positive significant influence of supply chain integration on hospital performance. The study concluded that SC integration was a critical ingredient to hospital performance. The study concluded that the accredited hospitals in Kenya had invested in integrating technology that linked hospitals with their service providers. The hospital supply chain designs ensured collaboration among supply chain partners.

Regarding supply chain orientation, the study concluded that supply chain orientation was critical in the performance of accredited hospitals in Kenya. The study also concluded that the suppliers and strategic partners were found to be reliable and generally the hospitals were satisfied with their current suppliers. The study therefore concluded that hospital suppliers generally were trustworthy, credible and committed as supply chain partners which was instrumental in supporting the goals and objectives of hospitals.

In regard to lean supply chain, the study found that there was no significant relationship between lean supply chain and performance of accredited hospitals in Kenya. The study thus concluded that majority of hospital processes were not

optimized, nor standardized. Further, the study concluded that majority of hospitals did not have visual management strategies in place to monitor inefficiencies and prevent wastes.

Concerning supply chain analytics, the study found that there was no significant relationship between supply chain analytics and performance of hospitals. In addition, the study concluded that most hospitals employed only descriptive analytical level of ICT in the hospitals such as automating their financial management system, use of centralized data storing system and quality management systems. The study also concluded that the hospitals lacked predictive and prescriptive analytical level of ICT such as capacity planning system, supply chain management systems and automated key performance indicators.

In regard to hospital size as a mediator, the study found a positive mediating effect of hospital size on the relationship between supply chain resilience and performance of hospitals. Further, the study concluded that among the supply chain ambidexterity variables, supply chain integration and supply chain orientation were not affected by the size of the hospital in Kenya. Also, supply chain analytics and lean supply chain had no relationship with performance of accredited hospitals in Kenya.

Finally, simultaneous application of supply chain ambidexterity practices namely SC resilience, SC integration and SC orientation was shown to have an increased performance of accredited hospitals in Kenya compared to individual application of supply chain practices. Lean SC and SC analytics were however found to have no relationship with hospital performance.

5.4 Recommendations

The study also recommended the use of outsourcing, spare capacity, and use of local suppliers to mitigate against operational risks. The study also recommended investment in long term relationship with service providers and involving them in decision making. In addition, the study recommended that employees should be involved in decision making; however ensure that their roles and responsibilities are clearly spelt out to avoid disputes.

The study recommended that hospitals need to invest in infrastructural development that would improve outpatient services as well as take care of employee affairs. The outpatient were found to be contributing the least to hospital revenue compared to hospital services. Areas such as hospital ambiance, customer service, hospital turn around and availability of variety treatment regiments need to be put in place in the hospitals.

Based on the findings and the conclusions obtained by this study, the study recommended that the hospitals needed to invest in improving the supply chain orientation practices such as improving the level of trust and credibility so that suppliers may be willing to offer short term sacrifices. Further, hospitals needed to encourage contracting suppliers with complementary goals and objectives so as to facilitate and promote growth of hospitals.

The study found that there was influence of lean supply chain on performance of hospitals which could be attributed to low investment in ICT. Therefore, the study recommended that it is imperative to invest in ICT to manage all supply chain processes thereby eliminating wastes. The notable areas that the study recommends for improvement include aligning of the procurement process, human resource management and improvement in the supply chain service charter.

Further, the study found that only descriptive analytical systems were being employed in hospitals. The study therefore recommended employment of more advanced levels of supply chain analytics to ensure utilization of data in decision making. Among the areas that need improvement include capacity planning systems, integrative systems such as supply chain management systems and electronic data interchange systems as well as key performance indicators to monitor performance.

5.5 Areas for Further Study

The study was able to determine the relationship between supply chain ambidexterity and performance of accredited hospitals in Kenya. However, the study was based on only accredited hospitals in Kenya listed by NHIF offering both inpatient and outpatient services and therefore classified as level 3 and above. The study therefore recommended that future scholars can corroborate the studies with focus on other

medical facilities such as outpatient clinics, pharmacies, laboratory diagnostic centers and counselling centers.

Further, the study recommended that future scholars can assess if the same findings can apply in other sectors such as education, hospitability, manufacturing and public sector. Since the study concentrated on only accredited hospitals in Kenya, the study recommended future scholars to corroborate the findings by undertaking a similar study across Africa and the world. Finally, the study used hospital size as a mediating variable. Therefore, future scholars can assess the relationship between supply chain ambidexterity and performance using other mediating or moderating variables such as information technology and leadership styles.

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APPENDICES

Appendix I: Letter of Introduction

Dear Sir/Madam, ----------

RE: Supply Chain Ambidexterity and Performance of Hospitals in Kenya.

I am a doctoral Candidate in the Department of Procurement and Logistics, College of Human Resource Development, Jomo Kenyatta University of Agriculture and Technology. I am pursuing PhD in Supply Chain Management and currently in my research year of my postgraduate studies focusing on "Supply Chain Ambidexterity and Performance of Hospitals in Kenya".

Please assist me in gathering enough information to present a representative finding on the current status of the relationship between supply chain ambidexterity and performance of hospitals in Kenya, by completing the attached questionnaire. Your participation is entirely voluntary and the questionnaire is completely anonymous.

If you are interested in the results from this study you are welcome to request a copy of the final report by supplying your name and email address. Any queries regarding the questionnaire or the overall study can be directed to the undersigned. Please be assured that this information is sought for research purposes only and your responses will be strictly confidential. No individual's responses will be identified and the identity of persons responding will not be published or released to anyone. All information will be used for academic purposes only.

Thank you very much for helping with this important study.

Sincerely,

Kariuki Joseph Ngera
Mobile: 0707 440 400
ngerajoe@gmail.com

Appendix II: Research Questionnaire

The questionnaire is meant to collect information on supply chain ambidexterity and accredited performance of hospitals in Kenya. Please use the spaces provided to tick on the appropriate information.

Section A: Research Variables

1. To what extent do you agree with the following statements regarding the level of supply chain orientation in your organization?

Supply Chain Orientation	Very small	Small extent	Average	Great extent	Very great
The hospital is satisfied with the past performance of current					
Suppliers provide reliable information to hospital					
Suppliers demonstrate high level of professionalism.					
Suppliers and strategic partners are reliable.					
Suppliers provide services that are superior compared to alternatives in the market.					
Suppliers are willing to make short term sacrifices to maintain relationship with the hospital.					
Suppliers and the hospital possess similar operating					
Suppliers have similar work ethics as those of the hospital.					
Suppliers have complementary goals and objectives with those of the hospital.					

2. To what extent do you agree with the following statements regarding the level of lean supply chain in the hospital?

Lean Supply Chain	Very small extent	Small extent	Average	Great extent	Very great extent
The hospital has installed process flow charts and signage across hospital premises to guide supply chain partners.					
The hospital has formulated a service charter to manage supply chain service provision.					
The hospital has an information desk to receive complaints and guide suppliers on the process flow and					
The hospital uses ICT in its procurement process.					
The hospital uses ICT to manage patient information.					
The hospital uses IT to manage its inventory.					
The hospital has an integrated system for patient					
The Hospital has a standard policy regarding procurement process.					
The hospital has a human resource management policy					

3. To what extent do you agree with the following statements regarding the level of supply chain analytics in the hospital?

Supply Chain Analytics	Very small extent	Small extent	Average	Great extent	Very great extent
The hospital has linked its system with those of suppliers					
The hospital has a centralized system of storing data					
The hospital collaborates with its key suppliers in joint planning and forecasting					
The hospital has an automated capacity planning system such as staff and ward scheduling.					
The hospital has an automated financial management system					
The hospital has an automated system that can analyze patient health history					
The hospital has an automated standard performance system					
The hospital has a quality and standard management system					
The hospital has standard key performance indicators for evaluating performance of suppliers.					

4. To what extent do you agree with the following statements regarding the level of supply chain integration in the hospital?

Supply Chain Integration	Very small extent	Small extent	Average	Great extent	Very great extent
The hospital consults and involves staff in matters concerning their departments.					
The hospital involves suppliers in procurement and inventory management.					
The hospital has outsourced some services					
The hospital involves employees and partners in decision making.					
The hospital frequently evaluates performance of its suppliers					
The hospital has a long term relationship with its service Providers					
The hospital uses ICT to communicate to the citizens.					
The hospital has an integrated system with its suppliers					
The Hospital has invested in ICT that links departments.					

5. To what extent do you agree with the following statements regarding the level of supply chain resilience in the hospital?

Supply Chain Resilience	Very small extent	Small extent	Average	Great extent	Very great extent
The hospital has adequate capacity to mitigate against demand and supply variations.					
The hospital has an efficient logistics system.					
The hospital has process back up plans and systems					
The hospital uses multiple sourcing of goods and services.					
The hospital encourages the use of local suppliers.					
The hospital uses different payment platforms					
The hospital has clear roles and responsibilities to minimize Conflict					
The hospital has an equal access to information, data and plans across all departments and across all strategic partners					
The hospital continuously assesses the needs of immediate and ultimate customers.					

Section C: Performance of the hospital

This section asks questions on performance of your organization as a results of applying ambidexterity strategies. Please fill in the table as appropriate.

Item	Unit of Measure	
Total number of hospital beds in 2016	Number	
Total Inventory expenditure for the hospital in 2016	Kes	
Total wage bill (total remuneration costs) in 2016	Kes	
Income from outpatient services in 2016	Kes	
Income from inpatient services in 2016	Kes	

Appendix III: List of Accredited Hospitals in Kenya

	Nairobi Region		
	Name Of Hospital	**Bed capacity**	**Physical Location**
1	Abrar Health Services Ltd	30	Buruburu
2	Andalus Nursing Home	22	Eastleigh
3	Avenue Healthcare Ltd	60	Westlands
4	Baldo Ippolita Catholic Health Centre	115	Industrial Area
5	Blessed Louis Palazzolo Health Center	24	Westlands
6	Cana Family Clinic And Resource Centre	22	Industrial Area
7	Care Hospital Limited	20	Eastleigh
8	Chiromo Lane Medical Centre	25	Westlands
9	Chiromo Lane Hospital	150	Westlands
10	Coptic Hospital	37	Nairobi
11	Divine Word Parish Health Center	32	Buruburu
12	Dorkcare Nursing Home Ltd	25	Eastleigh
13	Eagle Health And Clinic Services	25	Kangemi
14	Edelvale Trust Jamaa H&M Hospital	46	Buruburu
15	Ednah Medical Centre	20	Eastleigh
16	Emarat Hospital	28	Eastleigh
17	Emmaus Innercore Nursing Home	26	Buruburu
18	Family Health Options	29	Industrial Area
19	Family Health Hospital	20	Industrial Area
20	Frepals Nursing Home	40	Nairobi
21	Gertrudes Garden Children's Hospital Nbi	72	Westlands
22	Giovanna E-Sylvia Medical Centre	20	Ruaraka
23	Guru Nanak Ramgarhia Sikh Hospital	85	Ruaraka
24	H.H. Agakhan Hospital (Nairobi)	165	Westlands
25	Huruma Nursing & Maternity Home	26	Ruaraka
26	Imara Health Care Centre	30	Industrial Area
27	Jacaranda Maternity Hospital	22	Ruaraka

28	Kahawa West Health Centre	31	Ruaraka
29	Kasarani Nursing	60	Ruaraka
30	Kasarani Mat. Home	28	Ruaraka
31	Kayole Hospital	40	Buruburu
32	Kenyatta National Hospital (Amenity)	225	Nairobi
33	Kenyatta National Hospital (General Ward	1804	Nairobi
34	Ladnan Hospital Limited	50	Eastleigh
35	Lions Sight First Eye Hospital	52	Westlands
36	Madina Hospital Limited	28	Eastleigh
37	Maria Immaculate Hospital	28	Westlands
38	Maria Mat. & Nursing Home	20	Buruburu
39	Mariakani Cottage Hospital	21	Industrial Area
40	Mariakani Cottage Hospital, Utawala	25	Industrial Area
41	Marie Stopes Kenya Limited	24	Eastleigh
42	Marura Nursing Home	23	Ruaraka
43	Mater Misericordiae Hospital Nairobi	135	Industrial Area
44	Mathare Mental Hospital (General Ward)	1138	Ruaraka
45	Mbagathi District Hospital	250	Nairobi
46	Melchizedek Hospital	24	Nairobi
47	Menelik Medical Center	23	Nairobi
48	Metropolitan Hospital	35	Buruburu
49	Midhill Maternity & Nursing Home	28	Nairobi
50	Mkunga Maternity & Nursing Home	24	Buruburu
51	Mother & Child Hospital	23	Eastleigh
52	Muteithania Nursing And Maternity Home	28	Kangemi
53	Nairobi Equator Hospital	40	Industrial Area
54	Nairobi Hospital Nairobi	220	Nairobi
55	Nairobi South Medical Centre	25	Industrial Area
56	Nairobi West Hospital	66	Industrial Area
57	Nairobi Womens Hospital	50	Nairobi
58	National Spinal Injury Hospital	30	Nairobi
59	Neema Hospital	24	Ruaraka

60	Ngumba Center And Laboratory Services	22	Ruaraka
61	Olive Link Healthcare	20	Industrial Area
62	Parkroad Nursing Home (Nairobi)	57	Ruaraka
63	Pumwani Hospital Management Board	350	Eastleigh
64	Radiant Group Of Hospitals	20	Eastleigh
65	Radiant Group Of Hospitals Umoja	34	Buruburu
66	Reinha Rosary Health Centre	24	Industrial Area
67	Ruai Medical Centre	20	Buruburu
68	Ruai Family Medical Centre	25	Buruburu
69	Ruaraka Uhai Neema Hospital	28	Ruaraka
70	S.S. League M.P Shah Hospital Nairobi	108	Westlands
71	Samaritan Medical Services	32	Ruaraka
72	Scion Health Care Ltd	20	Industrial Area
73	Seventh Day Adventist Health	30	Nairobi
74	South B Hospital	22	Industrial Area
75	South C Hospital Limited	23	Industrial Area
76	St. Johns Hospital Ltd	24	Ruaraka
77	St. Francis Community Hospital	100	Ruaraka
78	St. Francis Health Services	26	Ruaraka
79	Texas Cancer Centre	20	Nairobi
80	Umoja Hospital	23	Buruburu
81	Unity Maternity And Nursing Home	28	Buruburu
82	University Dental Hospital, Nairobi	29	Nairobi
83	University of Nairobi Health Services	22	Nairobi
84	Uzima Maternity	21	Ruaraka
85	Wema Maternity And Nursing Home	20	Kangemi
	Central Region		
	Name Of Hospital	**Beds**	**Physical Location**
86	A.I.C Kijabe Medical Centre	235	Limuru
87	ACK Mount Kenya Hospital	32	Kerugoya
88	AIC -Cure International Children's Hos	30	Limuru

89	AIC Githumu Hospital	40	Muranga
90	Baari Health Centre	23	Olkalou
91	Beta Care Hospital Limited	50	Kiambu
92	Caritas Community Hospital	50	Thika
93	Central Memorial Hospital (Thika)	29	Thika
94	Consolata Hospital (Nyeri)	239	Nyeri
95	Donyo Sabuk Mat & Nur Home	29	Thika
96	Ebenezer Nursing Home	20	Nyeri
97	Gaichanjiru Catholic Hospital(Muranga)	130	Muranga
98	Gakoe Health Centre	24	Thika
99	Gatundu District Hospital	124	Ruiru
100	Githunguri Health Centre	20	Kiambu
101	Holy Family Mission Hospital	27	Kiambu
102	Holy Family Catholic Mission Hospital	20	Kiambu
103	Igegania Health Centre	24	Thika
104	Immaculate Heart Of Mary Hospital	56	Thika
105	ISMC Services Hospital	28	Limuru
106	Ithanga Health Centre	25	Thika
107	J. K. U. A. T. Hospital	20	Thika
108	J.M. Kariuki(Ol Kalou) District Hospital	222	Olkalou
109	Jamii Hospital	46	Nyeri
110	Juja Farm Health Centre	26	Thika
111	Kagio Nursing Home	24	Kerugoya
112	Kalimoni Mission Hospital	30	Thika
113	Karatina District Hospital	88	Nyeri
114	Karatina Maternity And Nursing Home	20	Nyeri
115	Kerugoya Catholic Health Centre	26	Kerugoya
116	Kerugoya District Hospital	197	Kerugoya
117	Kerugoya Medical Centre	120	Kerugoya
118	Kiambu District Hospital	417	Kiambu
119	Kiandutu Health Centre	24	Thika
120	Kianyaga Sub-District Hospital	20	Kerugoya

121	Kikuyu Nursing Home	67	Limuru
122	Kikuyu Sub County Lussegetti	22	Kiambu
123	Kimbimbi Sub-District Hospital	46	Kerugoya
124	Kimkan Hospital	56	Muranga
125	Kiriaini Consolata Hospital(Muranga)	90	Muranga
126	Lari Health Centre	25	Limuru
127	Limuru Nursing Home	55	Limuru
128	Maragua District Hospital	24	Muranga
129	Marie Stopes Hospital (K) Ltd	22	Muranga
130	Marie Stopes Hospital (K) Ltd	25	Muranga
131	Mary Help Of The Sick Mission Hosp.	79	Thika
132	Mary Immaculate Hospital	42	Nyeri
133	Mercy Light Hospital	27	Kiambu
134	Mt. Kenya Hospital	27	Nyeri
135	Mt.Sinai Hospital	24	Thika
136	Mugumo Medical Centre Kagumo	25	Kerugoya
137	Mukurwe-Ini Sub District Hospital	78	Nyeri
138	Muranga District Hospital	317	Muranga
139	Muriranja District Hospital	400	Muranga
140	Mwea County Medical Centre	40	Kerugoya
141	Mwea Medical Centre	106	Kerugoya
142	Naidu Hospital	75	Thika
143	Nazareth Hospital Riara Ridge	210	Kiambu
144	Nazareth Hospital Ruiru	21	Kiambu
145	Nazareth Hospital	45	Kiambu
146	Ndeiya Health Centre	27	Limuru
147	Ngenda Health Centre	22	Ruiru
148	Ngoliba Health Centre	20	Thika
149	Ngorika Health Centre	28	Olkalou
150	Ngurubani Medical Services	21	Kerugoya
151	Ngurubani Medical Services	40	Kerugoya
152	North Kinangop Catholic Hospital	166	Olkalou

153	Nyathuna Sub-County Hospital	20	Limuru
154	Nyeri Provincial General Hospital	407	Nyeri
155	Oasis Mission Hospital	25	Thika
156	Oldmawingo Health Centre	29	Olkalou
157	Othaya Sub-District Hospital	77	Nyeri
158	Our Lady Of Lourdes Mwea Hospital	106	Kerugoya
159	Our Ladys Hospice	29	Limuru
160	Outspan Hospital, Nyeri	40	Nyeri
161	Outspan Hospital	69	Nyeri
162	P.C.E.A Hospital Kikuyu	76	Limuru
163	P.C.E.A Hospital(Tumutumu) Karatina	203	Nyeri
164	P.C.E.A Hospital	243	Nyeri
165	P.C.E.A Kikuyu Orthopaedic Reh. Centre	30	Limuru
166	PEFA Mercy Medical Centre	25	Kiambu
167	Plainsview Nursing Home	22	Ruiru
168	Radiant Group Of Hospitals-Kiambu	26	Kiambu
169	Romkan Medical Centre	25	Thika
170	Ruby Medical Centre	26	Limuru
171	Ruiru Private Hospital	35	Ruiru
172	Ruiru Sub District Hospital	24	Ruiru
173	St. Jude Nursing Home	20	Ruiru
174	St. Matia Mulumba Hospital	40	Thika
175	St.Ann Medical Centre	28	Limuru
176	St.Teresa Kikuyu Maternity & Nur. Home	27	Limuru
177	Thika Level 5 Hospital	317	Thika
178	Thika Nursing Home (Thika)	27	Thika
179	Tigoni District Hospital	68	Limuru
180	Vineyard Hospital	40	Thika
181	Waka Ruringu Maternity	120	Nyeri
182	Wangige Health Centre	20	Limuru

	Eastern Region		
	Name Of Hospital	**Beds**	**Physical Location**
183	AIC Gatab Health Centre	21	Marsabit
184	AIC Mulango Health Centre	20	Kitui
185	Al-Bilal Nursing Home	25	Moyale
186	Athi River Health Centre	24	Machakos
187	Bishop U Kioko Catholic Hospital	140	Machakos
188	Consolata Hospital Chuka (Meru)	54	Chuka
189	Consolata Hospital Kyeni (Embu)	157	Embu
190	Consolata Hospital (Embu town)	167	Embu
191	Consolata Hospital Nkubu (Meru)	257	Meru
192	Cottolengo Mission Hospital	30	Meru
193	County Medical Centre	40	Embu
194	County Medical Centre, Embu town	25	Embu
195	Emali Nursing Home	25	Wote
196	Embu Children's Hospital	50	Embu
197	Embu Children's Home	20	Embu
198	Embu Provincial Hospital	199	Embu
199	Gabartulla District Hospital	60	Isiolo
200	Giaki Sub District Hospital	28	Meru
201	Ikutha Health Centre	22	Mwingi
202	Ishiara District Hospital Embu	90	Embu
203	Isiolo County Nursing Home	29	Isiolo
204	Isiolo District Hospital	48	Isiolo
205	Isiolo District Hospital (Amenity)	26	Isiolo
206	Jordan Hospital	30	Kitui
207	Joy Kim Nursing Home	30	Embu
208	Kangundo District Hospital	128	Machakos
209	Kanyakine Sub-District Hospital	80	Meru
210	Kasaala Health Centre	26	Mwingi
211	Kathiani Hospital Machakos	180	Machakos

212	Katse Health Centre	25	Mwingi
213	Katulani Sub-District Hospital	33	Kitui
214	Kikoko Mission Hospital (Machakos)	52	Wote
215	Kilala Model Health Centre	24	Wote
216	Kilome Maternity & Nursing Home	35	Wote
217	Kisasi Health Centre	24	Kitui
218	Kisau Sub-County Hospital	31	Wote
219	Kitui District Hospital	20	Kitui
220	Kyuasini Health Centre	20	Wote
221	Laare Nursing & Maternity Home	22	Meru
222	Laisamis Catholic Hospital	20	Marsabit
223	Laisamis Hospital	40	Marsabit
224	Liberty Maternity & Nursing Home	20	Embu
225	Machakos Medical Clinic	22	Machakos
226	Magutuni District Hospital	40	Chuka
227	Makindu District Hospital	58	Wote
228	Makueni Hospital Machakos	152	Wote
229	Marsabit District Hospital	94	Marsabit
230	Matungulu Medical Centre	28	Machakos
231	Matuu Sub District Hospital	20	Machakos
232	Maua Methodist Hospital (Meru)	164	Meru
233	Mbeere District Hospital	30	Embu
234	Mbitini Health Centre	22	Kitui
235	Mbooni Sub-District Hospital	30	Wote
236	Merti District Hospital	26	Isiolo
237	Meru District Hospital(Amenity)	25	Meru
238	Meru District Hospital (General)	246	Meru
239	Miambani Health Centre	22	Kitui
240	Miathene District Hospital	40	Maua
241	Migwani Sub-District Hospital	22	Kitui
242	Mikinduri Catholic Church Health Centre	24	Chuka
243	Mikinduri Sub-District Hospital	32	Meru

244	Mikumbune Sub District Hospital	30	Meru
245	Milimani Maternity & Nursing Home	41	Meru
246	Mitunguu Medical Services	26	Meru
247	Moyale District Hospital	58	Moyale
248	Moyale Nursing Home	27	Moyale
249	Mukothima C.C.M Health Centre	32	Chuka
250	Mumbuni Maternity & Nursing Home	23	Mwingi
251	Mumoni Nursing Home	28	Kitui
252	Muthale Mission Hospital (Kitui)	75	Kitui
253	Mutomo Health Centre	26	Mutomo
254	Mutomo Mission Hospital (Mutomo)	140	Kitui
255	Mutuati Catholic Mission Hospital	60	Meru
256	Mutuati Sub District Hospital	25	Meru
257	Mwingi Hospital (Kitui)	73	Kitui
258	Mwingi Medicare Centre	22	Mwingi
259	Mwingi Nursing Home	28	Mwingi
260	Neema Hospital	20	Kitui
261	Neema Nursing Home	49	Kitui
262	New Ngei Road Maternity & Nursing	40	Machakos
263	Ngomeni Model Health Centre	31	Kitui
264	Nuu Sub-District Hospital	24	Kitui
265	Nyambene Clinical Services & Nursing	20	Maua
266	Nyambene District Hospital	40	Maua
267	Nyambene Maternity And Nursing Home	30	Meru
268	P.C.E.A. Chogoria Hospital (Meru)	297	Chuka
269	Provincial General Hospital (Machakos)	507	Machakos
270	Shalom Hospital	220	Machakos
271	Sololo Mission Hospital Sololo	64	Moyale
272	St. Anne Maternity –Cottage	43	Meru
273	St. Lucies Hospital	20	Chuka
274	St. Luke Cottage Hospital Kiamuri	37	Meru
275	St. Michael Maternity & Nursing Home	48	Machakos

276	St. Michael Hospital	50	Embu
277	St. Michael Nursing Home	24	Embu
278	St. Orsola Hospital, Materi	70	Chuka
279	St. Teresa Riiji Health Centre	25	Meru
280	St.Francis De Sales Health Centre	26	Chuka
281	St.Theresas Mission Hospital-Kiirua	20	Meru
282	Sultan Hamud Sub County Hospital	26	Wote
283	Tahidi Nursing Home (Mwingi)	25	Kitui
284	Tei Wa Yesu Hospital	45	Kitui
285	Test Hospital Of Hope	25	Machakos
286	Tharaka District Hospital	22	Chuka
287	The Kitui Maternity & Nursing Home	20	Kitui
288	Tigania Hospital (Meru)	43	Meru
289	Tseikuru Sub-District Hospital	20	Kitui
290	Tuuru Cottolengo Health Centre	22	Meru
291	Waso Medical Services & Nursing Home	29	Isiolo
292	Woodlands Hospital Meru	27	Meru
293	Yanzuu Health Centre	24	Kitui
	Coast Region		
	Name of Hospital	**Beds**	**Physical Location**
294	Adu Medical Centre	22	Malindi
295	Alfarooq Hospital	30	Mombasa
296	Bakarani Maternity & Nursing Home	26	Mombasa
297	Bamba Sub-District Hospital	27	Kilifi
298	Baricho Medical Centre	23	Malindi
299	Boalala Model Health Centre	20	Malindi
300	Bomani Malde Medical Centre	21	Kilifi
301	Bomu Medical Center	28	Mombasa
302	Bura Sub-County Hospital	20	Hola
303	Chakama Medical Centre	22	Malindi
304	Coast General Hospital (Mombasa)	533	Mombasa

305	Dagamra Medical Centre	28	Malindi
306	Diani Beach Hospital	32	Ukunda
307	Dida Medical Centre	22	Kilifi
308	Dungicha Medical Centre	21	Kilifi
309	Dzikunze Medical Centre	23	Malindi
310	Faza Sub District Hospital	20	Lamu
311	Fundi Issa Medical Centre	21	Malindi
312	Ganze Health Centre	25	Kilifi
313	Garashi Medical Centre	26	Malindi
314	Gede Health Centre	56	Malindi
315	Gongoni Health Centre	26	Malindi
316	H.H Aga Khan Hospital (Mombasa)	111	Mombasa
317	Hola District Hospital	157	Hola
318	Ibnusina Nursing Home	26	Lamu
319	Jaribuni Medical Centre	21	Kilifi
320	Jibana Health Centre	54	Mombasa
321	Jilore Medical Centre	28	Malindi
322	Jocham Hospital	53	Mombasa
323	Kakoneni Medical Centre	22	Malindi
324	Karimboni Medical Centre	22	Malindi
325	Khairat Medical Centre	23	Kilifi
326	Kikoneni Health Centre	20	Ukunda
327	Kilifi District Hospital	192	Mtwapa
328	Kinango Hospital Kwale	116	Ukunda
329	Kinondo Kwetu Health Services	29	Ukunda
330	Kipini District Hospital	32	Lamu
331	Kiteje Medical Centre	21	Ukunda
332	Kizibe Medical Centre	19	Ukunda
333	Kwale District Eye Centre	52	Ukunda
334	Kwale District Hospital	26	Ukunda
335	Lady Griggs Maternity Hospital	105	Mombasa
336	Lamu District Hospital	34	Lamu

337	Langoni Medical Centre	23	Lamu
338	Langoni Nursing Home	20	Lamu
339	Madunguni Medical Centre	16	Malindi
340	Mainland Health Centre	30	Mombasa
341	Malindi District Hospital	145	Malindi
342	Mamba Medical Centre	21	Ukunda
343	Mambrui Medical Centre	24	Malindi
344	Marafa Health Centre	17	Malindi
345	Marekebuni Medical Centre	22	Malindi
346	Marereni Medical Centre	26	Malindi
347	Mariakani Sub-District Hospital	60	Mombasa
348	Marie Stopes Hospital (K) Mombasa	20	Mombasa
349	Mary Immaculate Nursing Home	17	Mombasa
350	Mary Immaculate Medical Centre	16	Mombasa
351	Matolani Medical Centre	21	Malindi
352	Matsangoni Model Health Centre	20	Mtwapa
353	Mazumalume Medical Centre	22	Ukunda
354	Mbuani Medical Centre	19	Ukunda
355	Mbugini Medical Centre	21	Ukunda
356	Medina Diagnostic Limited Hola	32	Hola
357	Mewa Medical Centre	44	Mombasa
358	Midoina Medical Centre	21	Malindi
359	Mizijini Medical Centre	12	Malindi
360	Mla Leo Health Centre	18	Mombasa
361	Moi Hospital- Voi	88	Voi
362	Mombasa Hospital Association	80	Mombasa
363	Mpeketoni Sub- District Hospital	48	Lamu
364	Msambweni District Hospital	106	Ukunda
365	Mtondia Medical Centre	22	Mtwapa
366	Mtwapa Health Centre	16	Mtwapa
367	Mtwapa Med Clinic and Nursing Home	18	Kilifi
368	Muhaka Medical Centre	22	Ukunda

369	Mwaluphamba Medical Centre	14	Ukunda
370	Mwangatini Medical Centre	21	Malindi
371	Mzizima Medical Centre	23	Ukunda
372	Nairobi Homes Nursing Home	16	Mombasa
373	New Wananchi Maternity And Nursing	20	Mtwapa
374	Ngao Hospital Tana River	68	Hola
375	Ngerenya Medical Centre	24	Mtwapa
376	Njukini Health Centre	17	Voi
377	Pablo Horstman Health Centre	20	Lamu
378	Palakumi Medical Centre	21	Malindi
379	Palm Beach Hospital	18	Ukunda
380	Pandya Memorial Hospital (Mombasa)	95	Mombasa
381	Pandya Memorial Hospital	70	Mombasa
382	Port Reitz Chest Hospital	121	Mombasa
383	Pwani Maternity and Nursing Home	22	Mtwapa
384	Rabai Rural Health Demonstration Centr	22	Mombasa
385	Riflot Medical Center	15	Voi
386	Roka Maweni Medical Centre	20	Kilifi
387	Sokoke Medical Centre	21	Malindi
388	Sabaki Medical Centre	21	Malindi
389	Sagalla Health Centre	20	Voi
390	Sayyid Fatmah Hospital, Kisauni	38	Mombasa
391	Shomella Medical Centre	12	Malindi
392	Sosoni Medical Centre	16	Malindi
393	St. Joseph Shelter Of Hope Health Centre	15	Voi
394	St. Luke Hospital Kaloleni (Mombasa)	140	Mombasa
395	St. Thomas Maternity Hospital	22	Ukunda
396	Star Hospital	28	Malindi
397	Taveta District Hospital	105	Voi
398	Tawfiq Hospital	96	Malindi
399	Tawfiq Nursing Home	86	Malindi
400	The River Jordan Medical Centre	22	Voi

401	The Sofiaz Medical Clinics	20	Voi
402	Tudor Healthcare	15	Mombasa
403	Ukunda Medical Centre	20	Ukunda
404	Vigurungani Medical Centre	20	Ukunda
405	Vipingo Health Centre	16	Mtwapa
406	Vitengeni Health Centre	13	Mtwapa
407	Vitsangalaweni Medical Centre	21	Ukunda
408	Watamu Nursing Home	20	Malindi
409	Wesu District Hospital	172	Voi
	North Eastern Region		
	Name Of Hospital	**Beds**	**Physical Location**
410	Alhayat Nursing Home	18	Wajir
411	Alliance Medical Centre-Garissa	20	Garissa
412	Balambala Sub-County Hospital	30	Garissa
413	Blue Light Nursing Home	12	Mandera
414	Buna Nursing Home	18	Wajir
415	Camel Medical Centre	30	Wajir
416	District Hospital Mandera	53	Mandera
417	Eastgate Medical Centre	16	Mandera
418	Eldas Health Centre	20	Wajir
419	Excel Health Services, Garissa	12	Garissa
420	Garissa Mother & Child Health Care	14	Garissa
421	Garissa Nursing Home	18	Garissa
422	Hulugho Sub-District Hospital	20	Garissa
423	Ifttin Sub-District Hospital	30	Garissa
424	Ijara District Hospital	20	Garissa
425	Mandera West Nursing Home	15	Mandera
426	Medina Diagnostic Limited	20	Garissa
427	Provincial General Hospital Garissa	162	Garissa
428	Samaad Hospital	30	Wajir
429	Simaho Mch/Fp Clinic	17	Garissa

430	Takaba District Hospital	20	Mandera
431	Twaheed Community Nursing Home	40	Garissa
432	Wajir District Hospital (Wajir)	79	Wajir
433	Woodlands Hospital	20	Mandera
434	Zonal Annex Nursing Home	24	Mandera
	Nyanza Region		
	Name Of Hospital	**Beds**	**Physical Location**
435	Acorn Community Hospital	13	Homa Bay
436	Afya Health Systems Organization	18	Homa Bay
437	Ahero Sub District Hospital	62	Kisumu
438	Alpha Community And Nursing Home	30	Migori
439	Ambira Sub-County Hospital	25	Siaya
440	Awasi Catholic Mission Medical Centre	17	Kisumu
441	Awendo Sub-District Hospital	17	Migori
442	Bama Nursing & Maternity Home	20	Siaya
443	Bondo Medical Centre	31	Siaya
444	Bondo Sub County Hospital	38	Siaya
445	Bosongo Medical Centre	35	Kisii
446	Boya Rural Nursing Home	114	Kisumu
447	Chemelil Sugar Company Health Centre	13	Kisumu
448	Christa Marianne Hosp & Nursing Home	143	Kisii
449	Coptic Nursing Home Maseno	15	Kisumu
450	Divine Mercy Aluor Health Centre	23	Siaya
451	Dophil Nursing & Maternity Home	29	Siaya
452	Etago Sub District Hospital	14	Kisii
453	Gesusu Sub-District Hospital	17	Kisii
454	Getembe Nursing Home	83	Kisii
455	Getembe Medical Centre	30	Kisii
456	Gucha Cottage Maternity & Nursing Home	20	Kisii
457	Gucha District Hospital	25	Kisii
458	H.H Aga Khan Disp. & Mat. Hosp.Kisumu	76	Kisumu

459	Hema Hospital	245	Kisii
460	Holy Family Catholic Mission Hospital	18	Kisumu
461	Homabay District Hospital	294	Homa Bay
462	Homabay District Hosp. (Amenity Ward)	12	Homa Bay
463	Homeground Medical Centre	15	Siaya
464	Inuka Nursing Home	20	Siaya
465	Isana Nursing Home	14	Kisii
466	Isebania Sub-District Hospital	24	Migori
467	Jalaram Nursing & Maternity Home	97	Kisumu
468	Janeiro Nursing Home	77	Homa Bay
469	Kendu Mission Hospital (Kendu Bay)	164	Oyugis
470	Kisii Level V Hospital (General)	450	Kisii
471	Kisii Level V Hospital (Amenity)	302	Kisii
472	Kisumu District Hospital (Kisumu)	565	Kisumu
473	Kombewa District Hospital	54	Kisumu
474	Kuria District Hospital	35	Migori
475	Lenmek Hospital	60	Kisii
476	Madiany District Hospital	16	Siaya
477	Mama Pilista Health Centre	15	Kisumu
478	Mamas Nursing Home-Riat	38	Homa Bay
479	Maseno Hospital	150	Kisumu
480	Matangwe Community Medical Centre	21	Siaya
481	Matata Nursing & Maternity Home	60	Oyugis
482	Migori District Hospital	45	Migori
483	Milimani Maternity Hospital	15	Kisumu
484	Mother Solbrit Health Centre	12	Migori
485	Mt.Sinai Hospital	39	Kisumu
486	Nightgale Maternity & Nursing Home	40	Kisumu
487	Nyabondo Centre For The Disabled	36	Kisumu
488	Nyamira District Hospital – Amenity	20	Nyamira
489	Nyamira District Hospital Kisii	242	Nyamira
490	Nyamira Maternity & Nursing Home	30	Nyamira

491	Nyangena Hospital	150	Kisii
492	Nyangoma Sub-County Hospital	20	Kisumu
493	Nyansiongo Maternity And Nursing Home	40	Nyamira
494	Oasis Doctors Plaza Kisumu	20	Kisumu
495	Oasis Specialist Hospital	20	Kisii
496	Ogembo Medical Centre	30	Kisii
497	Ogra Medical Centre & Community	30	Kisumu
498	Ojele Memorial Hospital	40	Migori
499	Oruba Nursing & Maternity Home Ltd	91	Migori
500	Owens Maternity & Nursing Home	30	Siaya
501	Pastor Machage Memorial Hospital	74	Migori
502	Provincial General Hospital Kisumu	461	Kisumu
503	Rabuor Sub-County Hospital	18	Kisumu
504	Rachar Sugar Belt Nursing Home	40	Kisumu
505	Rachuonyo District Hospital	27	Homa Bay
506	Ram Memorial Hospital	60	Kisii
507	Rangala Mission Hospital	48	Siaya
508	Rapogi Community Health & Mat. Centre	30	Migori
509	Rongo Sub-District Hospital	26	Migori
510	Rosewood Nursing Home	25	Migori
511	Sagam Community Hospital	55	Siaya
512	Samjomen Nursing Home	15	Migori
513	Santa Jane Nursing Home & Maternity	46	Kisumu
514	Sega Cottage Hospital	40	Siaya
515	Siaya County Referral Hospital	227	Siaya
516	Sori Lakeside Nursing Home	114	Migori
517	St Akidiva Memorial Hospital	30	Migori
518	St,Marys Mission Health Centre	20	Mbita
519	St. Akidiva Mindira Mabera	25	Migori
520	St. Consolata Kisumu Hospital	23	Kisumu
521	St. Elizabeth Chiga Medical Centre	21	Kisumu
522	St. Elizabeth Hospital Lwak	40	Siaya

523	St. Elizabeth Ndisi Health Centre	21	Homa Bay
524	St. Joseph's Hospital (Nyabondo)	167	Kisumu
525	St. Joseph's Mission Hospital Migori	164	Migori
526	St. Lukes Medical Centre	16	Kisumu
527	St. Monicas Medical Centre	20	Kisumu
528	St. Monicas Hospital	80	Kisumu
529	St.Camillus Mission Hospital	64	Migori
530	St.Pauls Mission Hospital	42	Homa Bay
531	St.Vincent De Pauls Health Centre	41	Siaya
532	Star Children Hospital	30	Kisumu
533	Steken Nyarombo Maternity & Nursing	23	Migori
534	Suba District Hospital	31	Mbita
535	Suna Mat & Nursing Home	30	Migori
536	Tabaka Mission Hospital (Kisii)	240	Kisii
537	The Port Florence Community Hospital	40	Kisumu
538	Tombe Medicare Centre	20	Nyamira
539	Victoria Hospital (Kisumu)	23	Kisumu
540	World Youth International Mama Ann Odede Health Complex	18	Siaya
541	Yala Sub District Hospital	20	Siaya
	Rift Valley Region		
	Name Of Hospital	**Beds**	**Physical Location**
542	A.I.C Kapsowar Hospital (Eldoret)	130	Iten
543	A.I.C. Litein Cottage Hospital Kericho	57	Kericho
544	AIC Kijabe Hospital Naivasha Med. Centre	22	Naivasha
545	Akemo Valley Maternity	38	Kilgoris
546	Akemo Valley Nursing Home	30	Kilgoris
547	Alexandria Cancer Centre & Palliative	40	Eldoret
548	Archers Post Health Centre	31	Nanyuki
549	Arror Health Centre	34	Iten
550	Assisi Nursing Home	15	Kitengela

551	Athi River Medical Services	15	Kitengela
552	Athi-River Shalom Community Hospital	278	Kitengela
553	Bahati District Hospital	54	Nakuru
554	Baraka Maternity Nursing Home	20	Nakuru
555	Baraton Jeremic Community Medical	50	Kapsabet
556	Baringo District Hospital (Kabarnet)	120	Kabarnet
557	Barnet Memorial Medical Centre	14	Kabarnet
558	Bethania Medical Centre	19	Nakuru
559	Bishop Eddie Long Bondeni Hospital	65	Nakuru
560	Burnt Forest Sub-District Hospital	16	Eldoret
561	Care Givers Community Hospital	11	Kajiado
562	Catholic Hospital Wamba Via Maralal	59	Maralal
563	Charity Nursing Home	30	Nanyuki
564	Charity Medical Centre	19	Nanyuki
565	Cheborgei Health Centre	20	Sotik
566	Chemase Health Centre	20	Kapsabet
567	Chemosot Health Centre	16	Sotik
568	Chepkanga Health Centre	18	Eldoret
569	Chepkigen Health Centre	25	Eldoret
570	Chepkorio Health Centre	12	Iten
571	Cheptil Maternity Wing	12	Kapsabet
572	Cherangany Nursing Home	27	Kitale
573	Chesongoch Health Centre	49	Iten
574	Consolata Maternity &Children's Hosp.	38	Nanyuki
575	County Medicare Ltd- Maralal	20	Maralal
576	Egerton University Health Centre	30	Nakuru
577	Elburgon Nyayo Hospital	72	Nakuru
578	Eldama Ravine Sub-District Hospital	29	Kabarnet
579	Eldoret Hospital	136	Eldoret
580	Elgon View Hospital	42	Eldoret
581	Emining Health Centre	20	Kabarnet
582	Endo Health Centre	36	Iten

583	Enkitok Joy Nursing Home	15	Ongata Rongai
584	Entarara Health Centre	20	Loitoktok
585	Entasopia Health Centre	20	Ongata Rongai
586	Esageri Health Center	17	Kabarnet
587	Evans Sunrise Medical Centre	44	Nakuru
588	Family Healthcare Medical Centre	16	Eldoret
589	Fatima Maternity Hospital	32	Ongata Rongai
590	Favour Medical Services	16	Kajiado
591	Finlays Medical Centre	44	Naivasha
592	Fountain Healthcare	24	Eldoret
593	Fountain Medical Centre	14	Nakuru
594	Gilgil Sub District Hospital	15	Naivasha
595	Goldenlife Victors Hospital Limited	50	Naivasha
596	Good Hope Medical Centre	15	Nanyuki
597	Imurtot Health Centre	18	Loitoktok
598	Iten District Hospital	17	Iten
599	Kaiboi Mission Health Centre	34	Kapsabet
600	Kajiado District Hospital	100	Kajiado
601	Kakuma Mission Hospital	56	Lodwar
602	Kapenguria District Hospital	286	Kapenguria
603	Kapkatet District Hospital	46	Kericho
604	Kapkoi Health Centre	15	Iten
605	Kapsabet District Hospital	124	Kapsabet
606	Kapsabet District Hospital (Amenity)	70	Kapsabet
607	Kapsara District Hospital	40	Kitale
608	Kaptarakwa Sub-District Hospital	24	Eldoret
609	Karen Hospital Ltd	102	Ongata Rongai
610	Kenlands Health Services Nkr Maili Sita	16	Nakuru
611	Kericho District Hospital	142	Kericho
612	Kericho Nursing Home Ltd.	142	Kericho
613	Keringet Health Centre	12	Nakuru
614	Kimalel Health Center	24	Kabarnet

615	Kimanjo Sub County Hospital	24	Nanyuki
616	Kiminini Cottage Hospital	50	Kitale
617	Kipchimchim Mission Hospital	40	Kericho
618	Kipwastuiyo Health Centre	16	Sotik
619	Kitale District Hospital	167	Kitale
620	Kitale Nursing Home	62	Kitale
621	Kitengela Medical Centre	40	Kitengela
622	Kitengela Medical Services-Kajiado	20	Kajiado
623	Kobujoi Mission Hospital	30	Nandi Hills
624	Kocholwa Sub-District Hospital	20	Eldoret
625	Langas Racecourse Health Centre	15	Eldoret
626	Langata Hospital	33	Ongata Rongai
627	Lelmolok Nursing Home	13	Eldoret
628	Lodwar District	38	Lodwar
629	Loitoktok District Hospital	150	Kajiado
630	Lokitang Hospital Lodwar	12	Lodwar
631	Londiani District Hospital	39	Kericho
632	Longisa County Referral Hospital	78	Bomet
633	Lopiding District Hospital	150	Lodwar
634	Maasai Nursing Home	26	Narok
635	Magadi Soda Company Hospital Magadi	50	Ongata Rongai
636	Makadara Health Care	18	Kitengela
637	Maralal District Hospital	59	Maralal
638	Marigat Sub-District Hospital	12	Kabarnet
639	Maryhill Medical Centre	12	Nyahururu
640	Matasia Health Clinic	23	Ongata Rongai
641	Mediheal Hosp.& Fertility Center	18	Eldoret
642	Mediheal Hospital	65	Nakuru
643	Mercy Hospital Eldama Ravine	79	Kabarnet
644	Meteitei Sub-District Hospital	24	Nandi Hills
645	Mogil Health Centre	30	Iten
646	Mogotio Sub-County Hospital	22	Nakuru

647	Moi Teaching & Referral Hospital Amty	50	Eldoret
648	Moi Teaching & Referral Hospital Amty	29	Eldoret
649	Moi Teaching & Referral Hospital.	420	Eldoret
650	Molo District Hospital	130	Nakuru
651	Mosoriot Rural Health Training Clinic	15	Kapsabet
652	Mount Olive Sinai Hospital Limited	32	Ongata Rongai
653	Mt. Longonot Medical Services Limited	27	Naivasha
654	Mulemi Maternity Nursing Home	20	Naivasha
655	Naivasha District Hospital	66	Naivasha
656	Naivasha Quality Healthcare Services Ltd	15	Naivasha
657	Nakuru Heart Centre	60	Nakuru
658	Nakuru Nursing And Maternity Home Ltd.	65	Nakuru
659	Nakuru War Memorial Hospital (Nakuru)	16	Nakuru
660	Nandi Hills District Hospital	53	Kapsabet
661	Nanyuki Cottage Hospital (Nanyuki)	20	Nanyuki
662	Nanyuki District Hospital	102	Nanyuki
663	Nanyuki Maternity	30	Nanyuki
664	Nanyuki Nursing Home	50	Nanyuki
665	Narok Cottage Hospital	17	Narok
666	Narok County Referral Hospital	99	Narok
667	Nasha Lengot Medical Centre	36	Nakuru
668	Ndaragwa Health Centre	15	Nyahururu
669	Ngong Rapha Hospital	15	Ongata Rongai
670	Njoro Health Centre	16	Nakuru
671	Nyahururu District Hospital	105	Nanyuki
672	Nyahururu Private Hospital	35	Nanyuki
673	Olchobosei Medical Centre	15	Narok
674	Oleguruone Subdistrict Hospital	25	Nakuru
675	Oljabet Annex Medical & Nursing Home	25	Nanyuki
676	Oljabet Medical Centre – Laikipia	25	Nanyuki
677	Olkiramatian Medical Centre	12	Kajiado
678	Ortum Mission Hospital (Kitale)	104	Kapenguria

679	P.C.E.A. Nakuru West Hospital	18	Nakuru
680	Plateau Mission Hospital (Eldoret)	77	Eldoret
681	Poly-Clinic Hospital	40	Naivasha
682	Provincial General Hosp. Annex Nakuru	492	Nakuru
683	Rapha Medical Centre Nakuru	18	Nakuru
684	Reale Medical Centre	64	Eldoret
685	Reale Medical Centre	127	Eldoret
686	Rift Valley Prov. General Hosp. Nakuru	580	Nakuru
687	Rombo Mission Hospital	25	Kajiado
688	Roret Sub District Hospital	50	Sotik
689	Segera Mission Clinic	15	Nanyuki
690	Seniors Medical Services	15	Kitengela
691	Sereolipi Health Centre	13	Maralal
692	Sigor Sub District Hospital	31	Bomet
693	Siloam Hospital	70	Kericho
694	Sinai Hospital Rongai	32	Ongata Rongai
695	Sipili Maternity & Nursing Home	16	Nanyuki
696	Sister Fridas Medical Centre	18	Kitale
697	Sister Mazzoldi Maternity	17	Nakuru
698	Soy Health Centre	18	Eldoret
699	St Elizabeth Medical Centre	32	Nakuru
700	St. Anthony Health Centre	15	Nakuru
701	St. Brigitas Catholic Ya Mumbi	16	Eldoret
702	St. Clares Mission Hospital (Kaplong)	220	Sotik
703	St. Joseph Mission Hospital	50	Kapsabet
704	St. Joseph's Hospital (Kilgoris)	200	Narok
705	St. Joseph's Nursing And Maternity Home	22	Nakuru
706	St. Leonards Hospital Limited	124	Kericho
707	St. Peter Claver RC Medical Centre	15	Ongata Rongai
708	Tambach District Hospital	72	Iten
709	Tambach Sub - District Hospital	72	Eldoret
710	Tenges Health Centre	24	Kabarnet

711	Tenwek Hospital Bomet (Sotik)	299	Bomet
712	The Light Naivasha Doctors Plaza	15	Naivasha
713	The Nairobi Womens Hospital Kitengela	21	Kitengela
714	The Nairobi Womens Hospital-Nakuru	30	Nakuru
715	Timboroa Health Centre	15	Eldama Ravine
716	Transmara Medicare Hospital	50	Kilgoris
717	Transmara West Sub-County Hospital	32	Kilgoris
718	Trinity Care Centre Limited	29	Ongata Rongai
719	Uasin Gishu District Hospital	15	Eldoret
720	Unilever Tea (K) Ltd-Central Hospital	50	Kericho
721	Valley Hospital Limited	72	Nakuru
722	Wama Nursing Home	18	Ongata Rongai
723	Wananchi Jamii Maternity & Nursing	12	Ongata Rongai
	Western Region		
	Name of hospital	**Beds**	**Physical Location**
724	Ahmadiya Muslim Hospital	20	Mumias
725	Alupe Hospital (Busia)	102	Busia
726	Appex Hospital	20	Busia
727	Banja Health Centre	18	Vihiga
728	Bukaya Medical Centre	20	Mumias
729	Bungoma District Hospital (General)	216	Bungoma
730	Bungoma District Hospital (Amenity)	184	Bungoma
731	Busia District Hospital	13	Busia
732	Butere District Hospital	34	Mumias
733	Butula Mission Hospital (Busia)	42	Busia
734	Central Maternity & Nursing Home	56	Kakamega
735	Elgon View Medical Cottage	16	Bungoma
736	Emuhaya Sub-District Hospital	30	Vihiga
737	Friends Lugulu Hospital	101	Bungoma
738	Holy Family Hospital Nangina	78	Busia
739	Itando Mission Of Hope And Healthcare	23	Kakamega

740	Jumuia Friends Hospital	75	Vihiga
741	Kakamega County General Hospital	322	Kakamega
742	Kakamega Orthopedic Hospital	10	Kakamega
743	Kari(Trc)Alupe Hospital-Busia	16	Mumias
744	Kima Mission Hospital	50	Vihiga
745	Kimilili District Hospital	49	Bungoma
746	Kory Family Hospital	15	Bungoma
747	Likuyani Sub-County Hospital	50	Kakamega
748	Lumakanda County Hospital	12	Kakamega
749	Lumino Maternity & Nursing Home	25	Kakamega
750	Lupe Medical Centre	32	Kakamega
751	Makunga Rural Health Demonstration	13	Mumias
752	Malava County Hospital	66	Kakamega
753	Manyala Sub-County Hospital	26	Mumias
754	Mautuma Sub-County Hospital	22	Kakamega
755	Mt.Elgon County Hospital	36	Bungoma
756	Mungoma Hospital	15	Vihiga
757	Mwihila Mission Hospital (Yala)	111	Mumias
758	Nala Maternity & Nursing Home	40	Kakamega
759	Namasoli Health Centre	26	Mumias
760	Navakholo Sub-County Hospital	16	Kakamega
761	New Busia Maternity And Nursing Home	101	Busia
762	Nzoia Medical Centre	20	Bungoma
763	Port Victoria Sub-District Hospital	35	Busia
764	Sabatia Eye Hospital	40	Vihiga
765	Shibwe Sub-County Hospital	15	Kakamega
766	St. Damiano Medical Hospital	50	Bungoma
767	St. Elizabeth Hospital (Mukumu)	233	Kakamega
768	St. Marys Hospital (Mumias)	220	Mumias
769	Tanaka Nursing Home	30	Busia
770	Teso District Hospital	27	Busia
771	The Great Lakes Medical Centre	30	Vihiga

772	Vihiga District Hospital	145	Vihiga
773	Webuye District Hospital	40	Bungoma

Appendix IV: Factor Loadings

Supply Chain Orientation	**Component**	
	1	2
The hospital is satisfied with the past performance of current suppliers	.789	-.478
Suppliers provide reliable information to hospital administration	.805	-.531
Suppliers demonstrate high level of professionalism.	.771	-.509
Suppliers and strategic partners are reliable.	.570	.538
Suppliers provide services that are superior compared to alternatives in the market.	.506	.060
Suppliers are willing to make short term sacrifices to maintain relationship with the hospital.	.815	.343
Suppliers and the hospital possess similar operating principles.	.907	.330
Suppliers have similar work ethics as those of the hospital	.584	.728
Suppliers have complementary goals and objectives with those of the hospital.	.649	-.222

Lean Supply Chain	**1**	**2**	**3**
The hospital has installed process flow charts and signage across hospital premises to guide supply chain partners.	.663	-.497	.396
The hospital has formulated a service charter to manage supply chain service provision.	.829	-.099	.292
The hospital has an information desk to receive complaints and guide suppliers on the process flow and expectations.	.810	.129	.385
The hospital uses ICT in its procurement process.	.494	.726	-.348
The hospital uses ICT to manage patient information.	.904	-.053	-.321
The hospital uses IT to manage its inventory.	.724	-.114	-.507
The hospital has an integrated system for patient management	.897	-.262	-.172
The Hospital has a standard policy regarding procurement process.	.314	.647	.558
The hospital has a human resource management policy	.126	.881	-.059

Supply Chain Analytics	**1**
The hospital has linked its system with those of suppliers	.770
The hospital has a centralized system of storing data	.794
The hospital collaborates with its key suppliers in joint planning and forecasting	.884
The hospital has an automated capacity planning system such as staff and ward scheduling.	.946
The hospital has an automated financial management system	.968
The hospital has an automated system that can analyze patient health history	.812
The hospital has an automated standard performance system	.818

The hospital has a quality and standard management system	.824	
The hospital has standard key performance indicators for evaluating performance of suppliers.	.949	
Supply Chain Integration	**1**	**2**
The hospital consults and involves staff in matters concerning their departments.	.833	.287
The hospital involves suppliers in procurement and inventory management.	.542	.574
The hospital has outsourced some services	.713	-.578
The hospital involves employees and partners in decision making.	.813	-.464
The hospital frequently evaluates performance of its suppliers	.847	.025
The hospital has a long term relationship with its service providers	.866	-.350
The hospital uses ICT to communicate to the citizens.	.722	.306
The hospital has an integrated system with its suppliers	.597	.752
The Hospital has invested in ICT that links departments.	.657	-.228
Supply Chain Resilience	**1**	
The hospital has adequate capacity to mitigate against demand and supply variations.	.832	
The hospital has an efficient logistics system.	.921	
The hospital has process back up plans and systems	.928	
The hospital uses multiple sourcing of goods and services.	.928	
The hospital encourages the use of local suppliers.	.643	
The hospital uses different payment platforms	.953	
The hospital has clear roles and responsibilities to minimize conflict	.883	

Extraction Method: Principal Component Analysis.
a. 1 components extracted.

Appendix V: Eigenvalues table

	Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Supply Chain Orientation	1	4.696	52.173	52.173	4.696	52.173	52.173
	2	1.869	20.764	72.937	1.869	20.764	72.937
	3	.911	10.126	83.063			
	4	.732	8.130	91.193			
	5	.519	5.767	96.960			
	6	.219	2.438	99.399			
	7	.054	.601	100.000			
Lean Supply Chain	1	4.287	47.635	47.635	4.287	47.635	47.635
	2	2.079	23.104	70.739	2.079	23.104	70.739
	3	1.215	13.502	84.241	1.215	13.502	84.241
	4	.699	7.770	92.011			
	5	.472	5.241	97.252			
	6	.174	1.931	99.183			
	7	.052	.573	99.756			
	8	.022	.244	100.000			
Supply Chain Analytics	1	6.746	74.958	74.958	6.746	74.958	74.958
	2	.909	10.102	85.060			
	3	.557	6.186	91.245			
	4	.442	4.909	96.155			
	5	.211	2.341	98.496			
	6	.068	.753	99.249			
	7	.032	.357	99.606			
	8	.026	.293	99.899			
	9	.009	.101	100.000			
Supply Chain Integration	1	4.932	54.805	54.805	4.932	54.805	54.805
	2	1.796	19.954	74.759	1.796	19.954	74.759
	3	.867	9.638	84.397			
	4	.713	7.918	92.315			
	5	.382	4.243	96.559			
	6	.225	2.499	99.058			
	7	.071	.790	99.848			
	8	.012	.137	99.985			
	9	.001	.015	100.000			
Supply Chain Resilience	1	5.365	76.638	76.638	5.365	76.638	76.638
	2	.842	12.032	88.671			
	3	.417	5.953	94.623			
	4	.202	2.892	97.515			
	5	.126	1.805	99.319			
	6	.035	.494	99.814			
	7	.013	.186	100.000			

Extraction Method: Principal Component Analysis.