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Factors Affecting Supply Chain Agility in Medical Health Sector (Case Study of Kenya Medical Supply Authority)

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Abstract:
As the government of Kenya has been criticized for being inefficient and ineffective in its service delivery to its citizen especially in the medical health sector which is marred with drug stock outs, poor quality drugs, inequality in service delivery, weak institutional capacity, late delivery and lack of professionalism in the medical health sector. The main objective was factors affecting supply chain agility in medical health sector. The independent variable is Market sensitivity, process intergration, swift response and flexibility. The study adopted a case study approach informed by the fact that the entity mandated to implement is only one organization, which is Kenya medical supply agency. The researcher will use descriptive research method. The target population for this research study will be 306 workers who are employed at the Kenya medical supply authority headquarter Nairobi in six department as follows, Procurement, warehousing, distribution, ICT, Finance and customer service. A total of 92 employees who constituted 30% of the total population will be selected using stratified and simple random sampling techniques these involves taking subjects from the entire department at KEMSA headquarter. The researcher use questionnaires to obtain data and analysis will be conducted through statistical packages for social science software. Descriptive research which involves percentages and tables will be used in data presentation. A Cronbach alpha test was used to establish validity of the questionnaire and was 0.73 indicating its validity and reliability. The model suggested that 86.2% of supply chain agility could be explained by the combination of the four selected independent variables. The researcher recommended that KEMSA should fully embrace supply chain agility to improve service delivery, reduce stock out by being market sensitive, enabling process integration in the organization, embracing swift response and finally being flexible.

1. Introduction

1.1. Background Information

The current business environment is characterized by constant change, turbulent and volatile markets, shorter product life cycle, and increased demand uncertainty (Christopher 2000; Agarwal et al. 2007; Almahamid et al. 2010).Supply chain being an integral part of the business it highly contributes to the success of an organization or sector. However this cannot be achieved without the organization incorporating agility to its supply chain. As these conditions became the norm, business organizations and business researchers alike have turned to the concept of agile supply chain in their quest for a sustainable source of competitive advantage and a measure of service delivery to their customers. Emergence of a new business era characterized by continuous and unpredictable changes with a focus on core competence and mass customization has forced companies to find flexible ways to meet customer demand (Ducloset al., 2003).

Agility is defined as business-wide capability that embraces organizational structures, information systems, logistics processes and, in particular, mindsets (Christopher and Towill, 2000). Agility focuses on maintaining good productivity under pressure of uncertainty (Helo, 2004). The goal in achieving agility is to establish a seamless supply chain in which all "players" think and act as one (Mason-Jones and Towill, 1999). An agile supply chain had been recognized as a competitive strategy for companies to survive and prosper (Xuet al., 2003). Poor supply chain management will ultimately determine the success and failure of any business that it delivers in its chosen market. Most organization are designing the supply chain to be " customer centric" with continuous transfer of power in the distribution channel from the producer to the consumer, this conventional philosophy was later termed to agile supply chain. Instead

of designing supply chain from the "factory outwards" The challenge is to design them from the "customer backwards". In the past the ground rules for market success were obvious: strong brands backed up by large advertising budgets and aggressive selling, but this formula now appears to have lost its power and touch to its respective customers. Instead, the argument is heard, companies must recognize that increasingly it is through their *capabilities* and *competencies* that they compete. Essentially, this means that organizations are becoming responsive to customers and consumers by managing their *core processes* in an agile manner better than competitors. These core processes encompass such activities agile product development, agile order fulfillment to its customers. Agile and supply chain is inherent to form an agile supply chain, Which is brought out as a network of different body integrated to streamline material, information and financial focusing on speed, flexibility and performance. In this research speed is a measure of the time it takes to ship or receive a good. Agile supply chain highlights the promptness and the degree to which a firm can adjust its supply chain speed, destinations and volumes to its customer's which matters most in this dynamic business environment. The agile supply chain is the method of responding to customers' demand more effectively, in which logistics capabilities focus on individual end-consumer demand. The essential difference in an *agile** supply chain is the development of the ability to respond to a range of possible customer needs in advance and hence increasing the value that logistics processes create for customers. Most organizations are forecast-driven rather than demand driven. In other words, because they have little direct feed-forward from the marketplace by way of data on actual customer requirements, they are forced to make forecasts based upon past sales or shipments and convert these forecasts into inventory.

Agile supply chain has been noted as a means for handling change, increasing customer responsiveness, and mastering market turbulence. Furthermore, it has emerged as the dominant competitive vehicle for organizations in such an uncertain and ever-changing business environment, and has been heralded as the business paradigm of the 21st century (Tseng and Lin 2011). It has been recognized that in order to achieve a competitive advantage in the rapidly changing business environment, firms must align with suppliers and customers to coordinate operations and together achieve a level of agility beyond that of competitors' (Lin et al. 2006). A comprehensive definition of agile supply chain cannot be developed unless the multidimensionality of the concept is fully explored. To facilitate an in-depth understanding of the concept, the sports science and military science theoretical bases are investigated, in addition to the agility-related literature within the business domain. The effort culminates in the identification of five firm agile supply chain dimensions: Market sensitivity, Process integration, flexibility and swift response. The identification and classification of the dimensions of agility enables the development of a comprehensive understanding of agile supply chain.

1.1.1. The Kenya Medical Supply Authority

The Kenya Medical Supplies Authority (KEMSA) is a specialized medical logistics provider for Ministries of Medical Services/Public Health-supported health facilities and programmes. A State Corporation established by a legal notice issued under CAP 466 of the Laws of Kenya, KEMSA replaced successive medical stores administrations that had existed since 1901 under various names. The Authority was formed on 11th February 2000 as a result of recommendations of a health stakeholders' forum dubbed "Strategies for Reforming the Drug and Medical Supplies Systems in Kenya" held between June 7 and 10, 1998. KEMSA works to support the National Health Strategic Plan and the Kenya Health Package for Health in providing public health facilities with the "right quantity and quality of drugs and medical supplies" at the best market value and at the right time. Kenya Medical Supplies Authority (KEMSA) as a state corporation under the Ministry of Health whose mandate is Procure, warehouse and distribute drugs and medical supplies for prescribed public health programs, Establish a network of storage, packaging and distribution facilities for the provision of drugs and medical supplies to health institutions, Collect information and provide regular reports to the national and county governments on the status and cost effectiveness of procurement, the distribution and value of prescribed essential medical supplies delivered to health facilities, stock status and on any other aspects of supply system status and performance which may be required by stakeholders and Support County Governments to establish and maintain appropriate supply chain systems for drugs and medical supplies. KEMSA Logistics function aims to deliver medical supplies direct to all health facilities in Kenya consistently and efficiently. In partnership with experienced third party transport service providers, KEMSA has set up a distribution structure with the capacity to reach all public Hospitals, Rural Health Centers and Dispensaries throughout the country. By making timely deliveries against hospital orders with regular deliveries to rural health facilities based on a mutually agreed schedule, KEMSA Logistics will remain versatile and responsive to public customer requirements, A process has started aimed at integrating parallel programs such as Reproductive Health commodities, TB/Leprosy and ARV's into KEMSA's overall distribution process. Ultimately, this will cut down on distribution costs and ensure medical commodities are managed within one supply chain resulting in greater reach and efficiencies whilst utilizing limited available resources according to study done by Dana Gelfeld Aronovich and Steve Kinzett on assessment of the health commodity supply chain and role of KEMSA. This was a radical step intended to contribute in the reversal of the decline of the health status of Kenyans through the improvement of medicines and medical supplies availability.

1.2. Statement of the Problem

Agile supply chain has become a competitive advantage factor to some private and public sector in Kenya; this is emphasized by market sensitivity, process integration, flexibility and swift response. All this dimension contributes to the success of any public sector to its services to its citizen but as its characterized in Kenya public sector which is marred with corruption, lack of professionalism, delays in services this are some of few reasons why agile supply chain cannot be implemented in the Kenya public sector. It's due to this various reasons that Kenya still has a major problem in accessing essential human needs like shelter, food and healthcare. According to UNICEF (2012), Kenya's infant mortality rate stands at 48%, (under 1 year olds) with the country's life expectancy at birth being 58%. This is significantly lower than the global average of 68%. Due to this reasons the government has been subjected

into look at the health value chain in order to address the various challenges that Kenya faces and initiate supply chain agility since health care is a service industry, which means that the customer is part of production process. According to (Hakansson and Persson 2004) identify three trends in the health industry, one is increased focus on integration to reduce cost, the second is increased specialization, and the third is an increase in the rate of product changes and new introductions. The health systems, as organized today, are not adequately addressing the increasing burden of diseases and accessibility of medical care in both rural and urban areas as stated in the millennium health development goal 2015.The Governments, healthcare agencies and non-governmental organizations have collective and tremendous opportunity to address factors affecting agile supply chain in medical healthcare in a bid to transform the sector and enhance efficiency and sustainability.

1.3. General Objectives

To determine the factors affecting agile supply chain in medical health sector in Kenya.

1.3.1. Specific Objectives

i. To analyze how market sensitivity affects supply chain agility in Kenya medical supplies authority.
ii. To find how process integration affects supply chain agility in Kenya Medical supplies authority.
iii. To find out how flexibility affects agile supply chain in Kenya Medical supplies authority.
iv. To assess how swift response affects supply chain agility in Kenya Medical supplies authority

1.4. Research questions

i. How does market sensitivity affect agile supply chain in Kenya medical supplies authority?
ii. How does process integration affect agile supply chain in Kenya medical supplies authority?
iii. How does flexibility affect agile supply chain in Kenya medical supplies authority?
iv. How does swift response affect agile supply chain in Kenya medical supplies authority?

1.5. Importance of the Study

This study analyzes the factors affecting supply chain agility in medical health sector. It will help the Kenya medical supply authority to realize the importance of agile supply chain and determine the factors affecting agile supply chain and determine the factors affecting agile supply chain. The Policy makers can learn of the existing gaps in their policies and apply corrective action to ensure that medical services are better. It may also be used as a source of knowledge and reference by future learners and researchers. Finally the study will help the researcher to fulfil one of the requirement for award of masters of science in procurement in logistics.

1.6. Scope of the Study

The study will be carried out in KEMSA at Nairobi Head office. The study will focus on the importance of agile supply chain and determine the factors affecting supply chain agility in Kenya medical suppliers authority. It will be applied by the supply chain in Kenya medical supplies authority. It will be applied by the government and private institution in service delivery.

2. Literature Review

2.1. Introduction

This chapter presents already written literature by various authors on the effect of supply chain agility. It focuses on the theoretical review, Conceptual frame work and a review of theories related to the variables of the study and empirical review that quotes various authors

2.2. Theoretical Review

Various models have been formulated to explain supply chain agility and how strategic it has become for both private and public entity in its services delivery to its customers. These models play an important role in the study of factors affecting supply chain agility. Supply chain agility may determine the survival of a firm (Vastag et al., 1994).

2.2.1. The Value Chain Theory

The term 'Value Chain' was used by Michael Porter in his book "Competitive Advantage: Creating and Sustaining superior Performance" (1985). The value chain analysis describes the activities the organization performs and links them to the organizations competitive position. Value chain analysis describes the activities within and around an organization, and relates them to an analysis of the competitive strength of the organization. Therefore, it evaluates which value each particular activity adds to the organizations products or services. This idea was built upon the insight that an organization is more than a random compilation of machinery, equipment, people and money. Only if these things are arranged into systems and systematic activates it will become possible to produce something for which customers are willing to pay a price. Porter argues that the ability to perform particular activities and to manage the linkages between these activities is a source of competitive advantage.

Porter distinguishes between primary activities and support activities. Primary activities are directly concerned with the creation or delivery of a product or service. They can be grouped into five main areas: inbound logistics, operations, outbound logistics, marketing and sales, and service. Each of these primary activities is linked to support activities which help to improve their

effectiveness or efficiency. There are four main areas of support activities: procurement, technology development (including R&D), human resource management, and infrastructure (systems for planning, finance, quality, information management etc.).These linkages are crucial for corporate success, flow of information, goods and services, as well as systems and processes for adjusting activities. If the Marketing & Sales function delivers sales forecasts for the next period to all other departments in time and in reliable accuracy, procurement will be able to order the necessary material for the correct date. And only if procurement does a good job and forwards order information to inbound logistics, only than operations will be able to schedule production in a way that guarantees the delivery of products in a timely and effective manner. The linkages are about seamless cooperation and information flow between the value chain activities which if not properly adhered would affect supply chain agility. In other words, the supply chain becomes the value chain. Efficiency and effectiveness is created not just by the focal firm in a network, but by all the entities that connect to each other.

2.2.2. Systems Theory

With respect to this theory, there are two issues that organizations should consider in terms of their supply chains. First, the issue of supply chain topology is pertinent. This principle would indicate that the longer the supply chain in terms of its links (that is, third, fourth or more party logistics providers are involved (Copacino, 1997: p43; Foster, 1999: p35; Parker, 1999: p17), the less adaptable the supply chain will be to possible changes needed for it to survive. As discussed by various scholars (Forrester, 1961; Senge, 1990; Fowler, 1999),the "physics" of a system limits its achievements, and the possible emergence of stability and control problems may lead to the system's mal performance. Furthermore, once a downstream disturbance initiates, it ripples back through the system with increasing amplitude (Forrester, 1958; Fowler, 1999). This again would apply to supply chains, where, for example, the consequences of marketing managers' decisions and/or sales representatives' actions, being in direct contact with the target market, may have an increased amplitude echo for upstream supply chain members (Fowler, 1999: p190). In terms of supply chain topology, the same argument would apply to supply chains that have evolved from simple dyadic relationships into quite complex networks. The more complex and longer the supply chain network, the more replete it would experience in terms of material-flow and information feedback loops. As such, long supply chains qualify as complex dynamic systems which are subject to potential problems of time delays, discontinuities, non-linearity (Fowler, 1999: p189), and difficulties in adaptability to changing environments. Secondly, the nature of the item that is being exchanged within the supply chain is pertinent.

As supply chains may evolve from the movement of only physical goods to the movement of both goods and information/knowledge, it is considered that they become more complex. That is, it becomes a more complex and difficult task to ensure that the right information and/or the right knowledge is passed 'up' or 'down' the supply chain, than it is to ensure that the right goods and/or the right services have been exchanged. Accordingly, the higher the degree of maturity of a supply chain, the less adaptable it will be to changing environmental forces. As known that system approach will be able to make sure that bottlenecks between the interlink can be reduced in order to make sure that the right goods, right quality, right time, right quantity and right place reaches the customer.

2.2.3. Network Perspective Theory

The performance of a firm depends not only on how efficiently it cooperates with its direct partners and in this case the customer, but also on how well these partners cooperate with their own business partners. Network perspective theory can be used to provide a basis for the conceptual analysis of reciprocity (Oliver, 1990) in cooperative relationships. Here, the firm's continuous interaction with other players becomes an important factor in the development of new resources (Haakansson and Ford,2002). Relationships combine the resources of two organizations to achieve more advantages than through individual efforts. Such a combination can be viewed as a quasi-organization (Haakansson and Snehota, 1995;Haakansson, 1987). The value of a resource is based on its combination with other resources, which is why inter-organizational ties may become more important than possessing resources per se. Thus, the resource structure determines the structure of the supply chain and becomes its motivating force. The network theory (NT) contributes profoundly to an understanding of the dynamics of inter organizational relations by emphasizing the importance of "personal chemistry" between the parties, the build-up of trust through positive long-term cooperative relations and the mutual adaptation of routines and systems through exchange processes. Through direct communication, the relationships convey a sense of uniqueness, ultimately resulting in supply chains as customization to meet individual customer requirements. The parties gradually build up mutual trust through the social exchange processes. A network does not seek an optimal equilibrium, but is in a constant state of movement and change. Links between firms in a network develop through two separate, but closely linked, types of interaction: exchange processes (information, goods and services, and social processes) and adaptation processes (personal, technical, legal, logistics, and administrative elements) (Johanson and Mattsson, 1987). Network theory is descriptive in nature and has primarily been applied in SCM to map activities, actors, and resources in a supply chain. The focus has been on developing long-term, trust based relationships between the supply chain members. This is theory will play a very important role in explaining the significance of the customers in this dynamic business environment and more so in the supply chain. Without this relationship, it would be very hard to adopt an agile supply chain into the network.

2.3. Conceptual Frame Work

Conceptual framework is an analytical tool with several variations and contexts. It is used to make conceptual distinction and organize idea. Strong conceptual frameworks capture something real in a way that is easy to remember and apply. The conceptual framework is this study gave an overview of the independent variables and dependent variables that defined the objective of the research. The independent variable includes market sensitivity, flexibility, process integration, swift response. There is a correlation between the independent variable and the dependent variable.

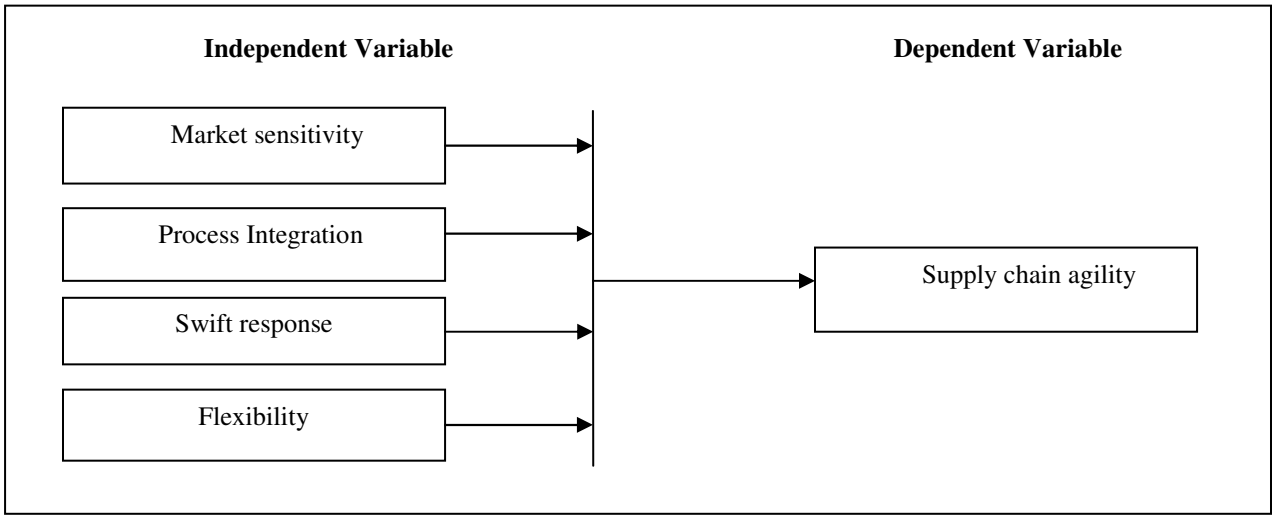

Figure 1: Conceptual Framework

2.4. Factors Affecting Supply Chain Agility

There are many factors that affect supply chain agility, but in this research will look at market sensitivity, flexibility, Process integration and swift response.

2.4.1. Market Sensitivity

Market-sensitive is meant that the supply chain is capable of reading and responding to real demand and in this case the medical supplies done to various parts of the county. This is a key attribute of modern approach from the traditional approach of managing supply chain. Market sensitivity is in total contrast to the traditional practices where majority of inventory was held as finished goods waiting to be sold. Market sensitive supply chains try to hold majority of stock as work in progress inventory awaiting build/configuration information coming from the final customer or market. This is because the insight and information gained from customers would help to resolve problems regarding market uncertainty (Hsieh and Chen, 2005) and assist supply chains tend to respond better to the final customer requirements.

Market sensitivity incorporates demand for the overall market, individualized products and services with quicker delivery time and fast response to sudden changes in order, quantity and specifications. It dictates that collaborative initiatives should be drive by quick response to customer requirements (Yusufet al., 2004) and requires that the agile supply chain is capable of reading and responding to real customer demands(Christopher and Towill, 2000). Sustainable advantages in supply chain agility can be achieved through learning market complex, changing customer demands. Furthermore, it has to be built on coordinated measures and a comprehensive examination in order not only to be able to design and implement it, but to also be able to control it with regards to the desired customers wants. In addition to high quality standards and the price of products, the logistic factors delivery time and delivery reliability take on progressively more importance as possibilities with which a company can distinguish itself within the market, as the primary function for fulfilling orders, is thus increasingly called upon to improve effectiveness. The goal of market sensitivity is therefore, to organize the entire material flow in the supply chain, from procuring raw materials and preliminary products, through the entire production process, including all of the interim storage stages, up to supplying distributors should be able to meet the expectation of the customers. Since agile supply chain improves efficiency and effectiveness in supply chain in mind of the customers' needs.

2.4.2. Process Integration

Process integration involves collaborative work between buyers and suppliers, joint product development, common systems and shared information which is a crucial element in agile supply chain. Bowersox, Closs and Stank (2001) have classified integration in a supply chain context in various different types; these are customer integration, internal integration, material intergration, service supplier integration, technology and planning integration, measurement integration and relationship integration. Supply chain agility recommend integration to achieve a long term competitive advantage.' process integrated' is added to emphasize and advocate a system in view of the whole supply chain. It is not useful to use only one partner in the supply chain rather the multiple partners to make each part work highly effectively in the performance of the entire chain.To provide smooth and effective business process integration play a vital role in any effective supply chain. One key reason that this is necessary is because most current businesses are not very efficient, but that almost all businesses contain enormous amounts of waste: misdirected efforts, poor or missing information, ineffectual management, lack of leadership, authority or trust, power plays, delays and excessive inventory. Process Integration should involve all stake holders to be part and parcel in any physically and logically distributed system of interacting autonomous business entities.

The complex reality of day-to-day operation of companies in industry and the service sector demands highly diligent detailed work. Here, in contrast to some strategic concepts in company management, the proof of truth namely, effectiveness shows up quickly and measurably. Errors and poor fusion between the customer and suppliers produce dissatisfied customers and employees, and thus poor business results. The concept of integrating the links of an entire supply chain to the demands of the market is the answer to the inefficiency of supply chain. Process integration synchronized has been tested repeatedly and it does address the more common problems of the traditional approach. The key is communication from the market. Material and information is released into the system based on the consumption at the primary control point. Every supplier of raw material as well as every producer along the supply chain is linked to that actual demand. Strategically sized and located buffers of inventory are designed to absorb the unpredictable variability, and sufficient protective capacity is planned to maximize the velocity of the product flow.

2.4.3. Swift Response

Kumar and Motwani (1995) defined swift response as the ability to accelerate the activities on a critical path that commences with the identification of a market need and terminates with the delivery of a customized product. In this context swift response should be considered as a concept which is solely customer focused. Today's volatile business environment is characterized by frequent supply chain disruptions from material shortages and drops in production capacity to sudden demand spikes. The responsiveness of supply chains to changing market requirements and their overall efficiency are important issues in supply chain design and management and therefore currently receive wide attention in the scientific community as well as in practice. Responsiveness can be defined as the ability to react purposefully and within an appropriate time-scale to customer demand or changes in the marketplace, to bring about or maintain competitive advantage. In an efficient supply chain, suppliers, manufacturers and retailers manage – implicitly through independent ordering processes between tiers or through explicit coordination of ordering decisions of the different supply chain elements – their activities in order to meet predictable demand at the lowest cost. A responsive supply chain, in contrast, requires an information flow and policies from the market place to supply chain members in order to hedge inventory and available production capacity against uncertain demand (Fisher, 1997, p. 108). Without a responsive supply chain this will certainly lead to ineffective and inefficient supply chain agility.

2.4.4. Flexibility

Flexibility is the ability of the firm to respond to a variety of customer requirements, which exist within defined constraints. Its multi-dimensional and consist various elements and some are more important in certain environments depending to nature of the product. Some authors distinguish between internal and external flexibilities. Swamidass (1988) distinguishes machine-level flexibility from plant-level flexibility. The former being "predominantly technology based" and the latter being derived from a combination of technology, infrastructure, design and engineering capabilities, and the competitive goals and objectives of a firm. Internal flexibility was defined as the operations strategy and the set of capabilities a firm nurtures to respond to its environment and external flexibility as capabilities possessed by the firm and used to accommodate sources of variability to which the firm must respond and which are seen as flexible by the market. The external dimension fits the two major strategies proposed by Hyun and Ahn 1992) for using flexibility: reactive and proactive. In the same vein, Gerwin (1993) also suggests two major strategies for using flexibility: adaptive and redefinition.

The adaptive strategy refers to the defensive or reactive use of flexible competencies to accommodate unknown uncertainty, while the redefinition strategy refers to the proactive use of flexible competencies to raise customer expectations, increase uncertainty for rivals and gain competitive edge. An organization is said to be flexible if it requires negligible effort and time in changing to a different process. (Slack 1983) describes five types or components of flexibility (new product; product mix; quality; volume and delivery). Flexibility can exist in many different areas if the customer is willing to pay for the flexibility. Firm may be flexible in the quantity and the timing that a customer can order from them. Flexibility gives the customer the exact the service desired, or electronic accesses to place orders or receive intangible products. This flexibility has manifold implications for the firms upstream in the supply chain. A firm may be flexible in its lead times to produce orders for customers. It may have a standard order lead time and a rush order lead time if it is an emergency for the customer. Flexible organization tends to adapt to changes in customers preferences, market demands and any other exceptional market conditions. A flexible supply chain can fulfill an extremely important order in an exceptionally short time. We have different kinds of flexibility according to the variable that raises the need for a change. We call product flexibility, the ability to adapt the product to customers' needs. Product flexibility manages the introduction of a new product.

To achieve this kind of flexibility the company might need to buy flexible production systems and might want to carry components over, that is use components and subsystems from previous generations of the product. Such kind of flexibility is more and more important nowadays given the growing importance of new product and product novelty. We call delivery flexibility, the ability to adapt deliveries to customers' needs. We call volume flexibility the ability to increase/decrease production and distribution quantities on a short notice. This flexibility is especially valued in markets with a sharply seasonal pattern such as Christmas. This flexibility can be gained through both spare resources (spare capacity), flexible resources, Or appropriate planning (produce/distribute all products with a predictable demand before the peak of the season so that during the peak we can use the limited production/distribution capacity to manage just the uncertain part of demand).Flexibility to be embrace to ensure that effective supply chain is achieve in the increasing complex market.

2.4.5. Measurement of Supply Chain Agility

It is tempting to assume that concepts about supply chain agility are readily understood and easily measured, but this is not the case. Such concepts are likely to be complex in both definition and measurement. Nonetheless, as organizations continue to develop and adopt management practices to build supply chain agility, the need for valid and reliable instruments to assess supply chain agility increases. However, this literature tend to downplay other factors like nature disasters or acts of God that directly or indirectly affects the supply chain agility such as wars, earthquakes floods and fires that tend to disrupt supply chain agility.

2.5. Empirical Review

From relevant literature in the study, researchers and scholars have advanced theories and concepts to demonstrate the importance of supply chain agility in any sector of an economy, it is definite according to the value chain theory that describes the activities with an around the organization and links them to the organization competitive position, this bring the idea that an organization is not a random compilation of machinery, equipment, people and money but a system of all factors of production to be harmonized and coordinated as one to ensure that agility is achieved in various dimension of organization. It has become apparent that business processes and structures, supply chain agility, and performance outcomes are inextricably linked in many ways (Li et al., 2008).

2.4.6. Research Gaps

This literature supports theoretical factors only and forgets to mention the empirical factors. The challenge of designing, integrating and implementing cost-effective and at the same time effective medical health care systems is to apply an interdisciplinary systems approach, where the production processes and flow of customer or patients are in focus. We believe that a prerequisite is to widen the system borders, allowing the system in focus to include multiple sub-systems which are optimized by their own, in order to achieve a supply chain agility, but since the system is synonymous with corruption, fraud and under dealings, nepotism the concept of the supply chain will still be a dream in Kenya government health care system.

The researcher suggest that further empirical and theoretical research is needed in order to find out the contingencies for choosing a specific combination of factors that adequate explains management decisions related to configuring supply chain agility. Considering the diversity of demands and needs for the patient processes concerning availability and lead-times and the complexity in production planning due to uncertainty – it can be concluded that different process strategies are needed to fully describe and design a medical health care supply chain.

2.6. Summary

Supply chain agility is a key element in gaining advantage and improving service delivery in Kenya Medical health sector. However in today's more challenging business environment, where volatility and unpredictability demands is the norm, agility should be recognized and the government implement the same in order to achieve the social pillar of the Kenya vision 2030. All those factors prove that Supply chain agility is an aspect enhancing competition and improving service delivery in an organization. What could be concluded is with supply chain agility in Medical health sector would improve customer satisfaction, increase market opportunity, decreased overall risks, and reduced total costs and finally improve the livelihood of its citizens. This can be simultaneously achieved through incorporating agility in its supply chain.

3. Research Methodology

3.1. Introduction

This chapter highlights the procedure and methodology that will be used in collecting and analyzing the data for this study. It includes the target population, sample design and methodology to use in the study. It includes the target population, sample design data collection procedure to be applied and the data analysis methods.

3.2. Research Design

Research design according to Babbie (2002) is the arrangement of condition for data collection and analysis in a way that aims to combine relevant to research purpose with economy in the procedure. This study adopted a descriptive research design. Descriptive research design seeks to obtain information that describes excising phenomena. In doing it seeks individual exacts perception, attitude, behavior or values to determine and report the way things are to enable description of the characteristics associated with target population, estimates of proportion of a population that have these characteristics and discovery of associations among different variables. Descriptive research portrays an accurate profile of persons, events, or situations (Robson, 2002) in their current state inferential statics were used to map the relationship between variables in the study. These approaches are vital to enable an understanding of the factors affecting supply chain agility in medical health sector.

3.3. Target Population

The target population for this research study was 306 workers who are employed at Kenya medical supply Authority headquarters in six department as follows, Procurement, warehousing, Distribution, ICT, Finance and Customer services department. They were chosen because of the role they participate in the supply chain of Kenya medical supply authority.

3.4. Sampling Size

According to Mugenda (2012) a representative sample size is one that is at least 30% of the population. The researcher used 30% of the target population to be the sample population from the entire department.

3.5. Sampling Technique

Proportionate stratified random sampling technique was defined by Sekaran (2003) as a Process that involves stratification or segregation, followed by random selection of the subject from each stratum was adopted for this study. This is because of the heterogeneity of the population and all respondents would have equal opportunity of participation. The respondents were selected from population of management and employees at KEMSA headquarters in Nairobi. A total of 46 employees who constituted 15% of the total population we selected using stratified and simple random sampling techniques this involved taking subject from the entire department at KEMSA as tabulated in table 1

Department	Target Population	Target Percentage	Sample Size Response
Procurement	35	30%	9
Warehousing	164	30%	45
Distribution	30	30%	8
ICT	28	30%	8
Finance	25	30%	6
Customer services	20	30%	6
TOTAL	**306**	**30%**	**92**

Table 1: Target population

3.6. Data Collection Methods

In this Research data was collected using questionnaires and interviews prefer using methods that provide high accuracy, generalizability.

3.6.1. Primary Methods

The questionnaire made it possible to obtain a wide variety of response and draw more reliable conclusion from the responses. The questionnaire contained both open and closed ended questions. The structured questionnaire was used to collect data from the respondent; both open-Ended and closed items were used. Questionnaires were administered to the employees without administrative responsibilities.

3.6.2. Secondary Method

The secondary data was collected from book written by other authors, journals and the internet. This provided a comprehensive data for the literature review.

3.7. Data Collection Procedure

A descriptive approach was applied to collect primary by the use of structured/closed ended questionnaires and interview schedules from the selected respondents on view on the factors affecting agile supply chain. Secondary data was mainly sourced from the library and records and journal within the Kenya medical supply authority. The researcher sought permission from the relevant authority to conduct the study upon visiting the departments; Permission will be obtained from Jomo Kenyatta University of Agriculture and Technology. Questionnaires will be dropped and later picked from the various respondents. For those respondents that may face reading and writing challenges, the researcher will administer the questionnaires in an interview format.

3.7.1. Pilot Testing

A pilot study will be conducted by dropping questionnaires randomly to 10 respondents. This will enable validity testing. Validity means that a particular instrument measures what it is supposed to measure (Cohen, 2007).Those questions that were not clear were revised to assist improve the questionnaire in order to guarantee its reliability**.**

3.8. Data Processing, Analysis and Presentation

The data is made up of qualitative statistics; analyzing information in a systematic manner in order to come to a useful conclusion and recommendation. The statistical method for this study will be descriptive and inferential statistics. After the fieldwork data analysis will be done using Statistical Package for Social Sciences computer software. Descriptive statistics such as mean, percentage and standard deviation will be used to present the various characteristics for the data sets. For this kind of study inferential statistics was the best in accessing the relationship between components of supply chain agility and its independent variables. Multiple correlation and regression model will be used to analyze the data, SPSS (Statistical Package for Social Sciences) computer software will be used to run the analyses. Kothari (2004), states that this model is best used when more than two independent variables are analyzed. The multiple regression equation will be applied to regression dependent variable against independent variables. The multiple regression equation will be as follows; $Y = a + \beta 1x_1 + \beta 2x_2 + \beta 3x_3 + \beta 4x_4 + e$

Where;
Y = Supply chain Agility
a = constant
β1, β2, β3, β4= regression coefficients
1x = Market sensitivity
2x = Swift response
3x = Process intergration
4x = Flexibility
e = error factor

4. Research Findings and Discussion

4.1. Introduction
After collecting data from the respondents, the data was edited, classified, coded and tabulated. The data analysis was based on the research objectives and questionnaire items which were analyzed using statistical tools like pie charts and frequency distribution tables and the results of the analysis.

4.2. Response Rate
The total questionnaire that were distributed to the field were 92 and out of these questionare, 80 questionnaires were returned fully answered which represents 87% of the total questionnaire that were administered to the field, while 12 questionnaire which represent 13% were not returned. On the response rate, the findings were as follows:

Respondents	**Frequency**	**%**
Respondents	80	87
Did not respond	12	13
Total	**92**	**100**

Table 2: Response rate

From Table 2 it can be concluded that the response rate was good

4.2.1. Gender
On gender the findings were as follows.

Gender	**Frequency**	**%**
Male	50	61
Female	32	39
Total	**82**	**100**

Table 3: Gender

From the above table majority of the gender represented was male that consisted 61% of the total sample simple size followed by Female consisting 39% of the sample size this explains that the majority of individual working in Kenya medical supply authority are male dominated.

4.2.2. Age of Respondents
On age, the following were as follows.

Age	**Frequency**	**%**
20-30	20	25
31-40	32	40
41-50	20	25
Above 50	10	10
Total	**82**	**100**

Table 4: Age of respondents

Majority of workers at Kenya medical supply authority are aged 31-40 which is 40% of the sample population followed by 20-30 and 41-50 which is represented by 25% of the sample size the finally above 50 which is represented by 10% of sample size. We can clearly say that the organization consist of youth.

4.2.3. Level of Education of Respondents

Level of Education	Frequency	Percentage
Primary	0	0
Secondary	16	20
College	24	30
University	42	50
Total	**82**	**100**

Table 5: Level of education

Demographic characteristics of respondents indicates high level of education of Kenya medical supply authority employees those with university graduates represent 50% followed by diploma with 30% and 20% for those with secondary education and nil for those with primary certificate.

4.2.4. Department Response

Department	Target population	Sample size	Sample size
			Response
Procurement	35	11	9
Warehousing	164	49	45
Distribution	30	9	8
I.C.T	28	9	8
Finance	25	8	6
Customer services	20	6	6
TOTAL	**306**	**92**	**80**

Table 6: Department Response

The above shows the distribution of the respondents in terms of their department they are involved with. Herein, it shows that 11 respondents are from procurement, 45 respondents are from warehousing department, 8 respondents from distribution department,8 respondents from ICT department, 6 respondents from finance and 6 respondents from customer services. The result indicates that overview of the various department duties and responsibilities.

4.3. Reliability and Validity Analysis

In this study Cronbach Alpha coefficient was used to measure reliability. According to Haurich (1999) If the coefficient is more than 0.73, the data is taken as reliable, but if it is below the date is treated as unreliable. The reliability analysis for constructs was as follows Market sensitivity (0.807), swift response (0.8), process integration (0.82), flexibility (0.79) and supply chain agility (0.75). The data was justified to be used for further analysis because the Cronbach Alpha Coefficient was more than 0.73 as indicated in the table 7 below.

Dependent variable	Items	Cronbach's Alpha	Comments
Market sensitivity	6	0.807	Accept
Swift response	6	0.8	Accept
Process integration	6	0.82	Accept
Flexibility	6	0.79	Accept
Supply chain agility	4	0.75	Accept

Table 7: Cronbach alpha reliability test for combined variable

4.4. Analysis of Supply Chain Agility Objective

In the research analysis the researcher used a tool rating scale of 5 to 1; where 5 was the highest and 1 the lowest. Opinions given by the respondents were rated as follows, 5 = Every time, 4 = Almost every time, 3 = Occasionally/Sometimes, 2 = Almost Never and 1= Never. The analysis for mean, standard deviation and coefficient of variation were based on this rating scale.

4.4.1. Market Sensitivity

This section was meant to establish how market sensitivity affects supply chain agility in Kenya medical supply authority.

Market sensitivity	N	Mean	Std. Deviation
Range of suppliers delivery frequencies (weekly, daily)	80	4.00	.779
Extend to which supplier lead-time can be expedited/changed	80	3.20	.604
Extend of collaboration between supplier and consumer	80	2.55	1.168
Number of inventory turnover	80	3.60	1.121
Level of dead stock	80	3.15	.731
Number of customer frequencies	80	2.55	1.168

Table 8: Market sensitivity on supply chain agility (N-80)

The first objective of the study was to establish how market sensitivity affects supply chain agility at KEMSA. Respondents were required to respond to set questions related to market sensitivity and give their opinion based on the 5 point scale. From the above table analysis of factors affecting supply chain agility in Kenya medical supply authority i found out that the range of suppliers frequencies was ranked high basing on mean (4.00), number of inventory turnover (3.60)the extent to which suppliers lead time can be expedited(3.20),level of dead stock having (3.15), number of customer frequencies and extend of collaboration between suppliers and consumers (2.55) frequently agreed that this factors do affect supply chain agility. Market sensitivity as the most recently introduced approach is still evolving and lacks a consensus of its defining characteristics. Whereas some proponents define it as a set of practices aimed at managing and coordinating the whole supply chain, starting from end customer and working backward to raw material supplier (Selen and Soliman, 2002).

4.4.2. Swift Responses

To analyse how swift response affects supply chain agility in Kenya medical supply authority

Swift response	N	Mean	Std.
Locate and procure services and product when required	80	4.00	.779
Change quantity of supplier order	80	3.25	.540
Change delivery time of order placed with suppliers	80	2.55	1.168
Change suppliers on a global scale when required	80	3.60	1.121
Number of item per order handled by each distribution facility	80	3.10	.836
Fill customer order from alternate various facilities	80	2.55	1.168

Table 9: Swift response on supply chain agility (N-80)

The table above swift response moderately affects supply chain agility since the mean for locate and procure services and product when required is (4.00), change suppliers on a global scale when required (3.60) change of quantity of suppliers order is(3.25),Number of item per order handled by each distribution by each distribution facility(3.10),change delivery time of order placed with suppliers and fill customer order from alternate facilities having a mean of (2.55) respectively. Similarly, to achieve the desired level of supply chain agility, firms must develop the ability to complete an activity as quickly as possible. For example, within manufacturing, the ability to carry out tasks and operations in the shortest possible time has been considered a necessary condition for agility as explained in the first annual report by the supply chain faculty at the University of Tennessee (2013).

4.4.3. Process Integration

To analyse how process integration affects supply chain agility in Kenya medical supply authority

Process integration	N	Mean	Std. Deviation
Organization relationship with suppliers & consumer	80	4.1	.765
Number of organization collaborative with suppliers and customer	80	3.90	.743
Number of customer delivery frequencies	80	3.55	1.168
Level of information technology usage between consumer, suppliers	80	4.0	.779
Range of production capacity across which Manufacturing can adjust	80	3.95	.749
The frequency of communication between suppliers and Consumer	80	3.55	1.168

Table 10: Process integration on supply chain agility (N-80)

The table above shows the ease at which the Kenya medical supply authority can exercise its products option with organization relationship with suppliers having the highest mean of (4.1), Level of information technology usage between consumer suppliers (4.0) Range of production capacity across which manufacturing can adjust (3.95)Number of organization collaborative with suppliers and customer (3.90),(3.55) frequency of communication between suppliers and consumer and Number of customer delivery frequencies (3.55)With high mean values interprets that integration should enable the factory to respond quickly and economically to dynamic market changes, thereby ensuring value creation for the customer (Piercy, 2007).

4.4.4. Flexibility

To analyze how flexibility affects supply chain agility in Kenya medical supply authority

Flexibility	**N**	**Mean**	**Std. Deviation**
Change in order volume capacity when necessary	80	4.00	.745
Accommodate change in production mix as required	80	4.20	.604
Reduce business throughput times to satisfy customer delivery	80	4.00	.745
Rotate workers among different business task	80	3.6	1.121
Alter delivery schedule to meet changing customer requirement	80	3.15	.731
Range of volume over which distribution can operate effectively	80	3.55	1.168

Table 11: How flexibility affects supply chain agility (N-80)

The table above shows the ability of Kenya medical supply authority to meet an increasing variety of customers' expectation without excessive cost, time and organization disruption. Accommodate change in production mix as required a mean of (4.2) Change in order volume capacity when necessary (4.00), Reduce business throughput times to satisfy customer delivery (4.00) rotate workers among different business task (3.6), range of volume over which distribution can operate effectively (3.55). Alter the delivery schedule, having a mean of (3.15), of volume over which distribution can operate effectively. The mean from the above table are above normal depicting that they frequently agree that flexibility affects supply chain agility. Often proposed from a contingency perspective, supply chain agility is seen as a suitable approach in contexts with a need to react quickly to changes in market demand – be they in volume, variety and mix (Christopher and Towill, 2002). This, in turn, enables the firm to exploit unpredictable changing customer opportunities (Goldman et al., 1995).

Supply Chain Agility Factors	**N**	**Mean**	**Std. Deviation**
Market sensitive	80	4.0286	.24733
Swift response	80	3.8571	.46361
Process integration	80	3.7714	.38143
Flexibility	80	3.4000	.40046
Valid N	80		

Table 12: Supply chain agility factors mean and standard deviation

The above table strongly shows how market sensitivity, swift response, process integration and flexibility affects supply chain agility. This show by the mean and the standard deviation of the response from the employees of Kenya medical supply authority.

4.5. Correlation Analysis

Correlation coeffient is a single number that describes the degree of the relationship between two or more variables. Pearson correlation indicates the direction, strength and significance of the bivariate relationship of two variables. According to Sekeran (2005) theoretically there could a perfect positive relationship of two variables which represented by 1.0 or perfect negative correlation which is represented by -1.0

Factors		Market sensitivity	Swift response	Process integration	Flexibility
Market sensitivity	Pearson Correlation	1	1.000**	.999**	.996**
	Sig. (2-tailed)		.000	.000	.000
	N	80	80	80	80
Swift response	Pearson Correlation	1.000**	1	.999**	.996**
	Sig. (2-tailed)	.000		.000	.000
	N	80	80	80	80
Process intergration	Pearson Correlation	.999**	.999**	1	.995**
	Sig. (2-tailed)	.000	.000		.000
	N	80	80	80	80
Flexibility	Pearson Correlation	.996**	.996**	.995**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	80	80	80	80
**. Correlation is significant at the 0.01 level (2-tailed).					

Table 13: Correlation

From the above table 9, it was deduced that the correlation of one variable to its own self equals to other variable. Thus a value of -1 indicates a perfect negative correlation, while 0 value indicates there is no association. The closer the value is to +1 or -1 the stronger the correlation. So the correlation coefficient indicates that there is stronger association between the market sensitivity with swift response, process integration and flexibility. The study found out that there was a perfect positive correlation significance between market sensitivity and swift response of +1, market sensitivity and process integration a correlation of strong positive 0.999 and also a strong positive correlation significance to process integration of 0.97.

4.6. Regression Analysis

In this study multiple regression analysis was conducted to test relationship among variables (dependent) on supply chain agility and market sensitivity, swift response, process integration and flexibility.

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig
(Constant)	**.282**	**0.426**		**6.629**	**0**
Flexibility	0.277	1.345	0.253	0.206	0.01
Process integration	0.569	2.354	0.542	0.242	0.04
Market sensitivity	0.179	0.024	0.111	2.217	0.02
Swift response	0.084	0.023	0.851	2.182	0.03

Table 14: Regression coefficients

From the Model coefficient table the regression model can be derived as follows Y(Supply chain agility)=2.821+0.277(Flexibility)+0.569(Process integration)+0.179(Market sensitivity)+0.084(swift response)
Where; Constant= 2.821, Indicating that flexibility, process integration, market sensitivity and swift response were all rated as zero, supply chain agility Will Still be 0.282 (28.2%).

From the standardised Beta;
$\beta_{1=}$ 0.277; Shows that a unit increase in flexibility in 0.277 increases supply chain agility other factors held constant.
$\beta_{2=}$ 0.569; Shows that an increase in process integration results in 0.569 increases supply chain agility other factors held constant.
$\beta_{3=}$ 0.179; Shows that an increase in market sensitivity results in 0.179 increases supply chain agility other factors held constant
$\beta_{4=}$ 0.084; Shows that an increase in patronage perception results in 0.0824 increase in supply chain agility other factors held constant

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.9268[a]	.8628	0.862	48.73278

Table 15: Model Summary

The correlation between the two variables is indicated by the multiple r value. In this case a t +0.92970 it a strong positive relationship, the r-squared value (0.8628) suggests the model is successful and that 86% of the variance in length of stay has been accounted for this model.

4.7. Anova

ANOVA findings In table shows that there is a correlation between the predictor variable Market sensitivity, swift response, process integration and flexibility and response variable of supply chain agility in medical health sector hence the regression model is a good fit of the data.

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	0.199	3	0.066	0.748	0.527
Residual	6.754	76	0.089		
Total	6.954	79			

Table 16: Anova

A) Predictors :(constant) Market sensitivity, swift response, process integration and flexibility

B) Dependent variable: Supply chain agility

From the above ANOVA table the calculated F ration was significance value for the model.748 which means that the model was statistically marginally significant since the level of significance value was less than the threshold of 527.Therefore the model was marginally fit for prediction.

4.8. Discussion of Findings

4.8.1. Market Sensitivity

In relation to the variable market sensitivity, the results in Table 8 indicate that Range of supplier's delivery frequencies was a major factor in market sensitivity in supply chain agility. It is seen as the range of suppliers delivery frequency affect market sensitivity and thus affect supply chain agility. For example availability of various goods to meet the customer is very important at any given time by improving service delivery and consumers' confidence and makes sure that frequent stock outs don't happen in this crucial medical sector. The number of inventory turnover and the level of dead stock also affect market sensitivity, this is by poor coordination and poor order planning thus contributes to a significant percent for the organization not achieving supply chain agility. Not forgetting that the collaboration between suppliers and consumer is vital in achieving market sensitivity, poor collaboration between suppliers and consumer automatically poses a challenge in between various logistical factors in KEMSA thus affecting market sensitivity.

4.8.2. Swift Response

High levels of logistics service have a significant level of customers satisfaction and can be achieved by swift response in any logistical aspects from table 9 we can say that to locate and procure services and product when required strongly affects the response of the organization to its customers through the financial capability of the organization to meet the increasing demand for the goods. Change supplies on a global scale, Number of item per order handled by each distribution facility and filling customers order from alternate facilities when required also affect swift response by ensuring that incase of any supply chain risk there is a smooth continuity of supply of products from various suppliers globally this makes it easier to mitigate the risks that may arise in supply chain agility.

4.8.3. Process Integration

Process integration based on information sharing between partners is necessary for continuity of the business. The results as shown in table 10 shows how organization relationship with suppliers and consumers, number of organization collaborative with suppliers, frequency of communication between suppliers and customers, level of information technology usage between consumer and suppliers and frequency of communication between suppliers affects process integration in supply chain agility. This comes about if the organization does not embrace information technology in its supply chain and poor customer services towards its suppliers and customer making it very difficult to know the customer needs.

4.8.4. Flexibility

Determining the degree of agility of a firms supply chain depends on how well the components of the supply chain are configured to include speed and flexibility, such that the level of supply chain agility increases as the levels of both speed and flexibility increases. This results is shown on table 11 Change in order volume capacity when necessary, reduce business throughput time to satisfy customer delivery, alter delivery schedules to meet changing customer requirement and accommodate change in product mix as required and rotate workers among different business shows to what extend flexibility contributes to supply chain agility. Flexibility enables the organization to cope up with the fluctuation of demand that was not anticipated in production and also in the purchase of the goods. There was a positive relation between flexibility and supply chain agility.

The results clearly highlight how market sensitivity, process integration, swift response and flexibility are core pillars of achieve supply chain agility. Market sensitivity has the strongest effect, followed by process integration, quick response and then flexibility which is the weakest impact on supply chain agility.

5. Summary, Conclusion and Recommendations

5.1. Introduction

This study examined factors associated with supply chain agility in Kenya medical supply authority. The study was motivated by the growing concern over poor health services in the health sector. Since there were several dimension to the measurement on supply chain agility in Kenya medical supply authority.

5.2. Summary of Major Findings

Summary of major findings have been analyzed considering each independent variables as follows

5.2.1. Market Sensitivity

The finding revealed a significant positive relationship between market sensitivity and supply chain agility. This implies that the supply chain cannot be agile if the market forces which include demand and supply are not monitored in a day to day basis. This finding are consistent with Kotler (1994) who state that, both public and private sector services with improved service quality have developed an increased awareness of the important of marketing in the creation of effective communication with customer and potential customers. By market sensitive is meant that the supply chain is capable of reading and responding to real demand. Most organizations are forecast-driven rather than demand-driven. In other words because they have little direct feed-forward from the marketplace by way of data on actual customer requirements they are forced to make forecasts based upon past sales or shipments and convert these forecasts into inventory.

Market sensitivity means that collaborative initiatives should be driven by quick response to customer requirements. High levels of logistics service have a significant impact on customer satisfaction. The primary relational requirement for improved responsiveness is the development of greater levels of trust between purchasing organizations and their suppliers. This was demonstrated by how they answered in the Likert scale for market sensitivity. It was concluded market sensitivity affected supply chain agility by the high mean as seen in table 9

5.2.2. Swift Response

By capturing new market trends, monitoring daily sales and listening to the customers feedback the company would be able to identify the potential market, thus can the subsequent monitoring of consumer demand be achieved (Masson et al, 2007). It is clear that agility in the firm's supply chain requires quick response in order to be able to fulfil market demand as soon as possible. Quick Response is a strategy that requires accuracy, rapid and cost-effective response to specific markets that are highly dynamic, and leveraging the capability of extensive supply chain and sourcing production through compressed lead time, real time efficiency, management of information systems, pipeline management flexibility and optimization of logistics and distribution systems. Swift response attempts to merge cost and scale efficiency by sourcing off-shore with quick response and accurately to fulfil market demand, information on which it obtains by dynamic planning and strong logistic management. For effective supply chain agility swift response from various departments must be embraced in order for the organization to be agile. Agile supply chain requires minimum total lead-times defined as the time taken from a customer raising a request for a product or service until it is delivered. Lead time reduction within the supplier-production-distribution chain is the mechanism for time based competition. Management of lead time can be competitive advantage. Managing time may be the mirror image of managing quality, cost, innovation, and productivity.

5.2.3. Process Integration

Mutual trust based information sharing between the partners in the supply chain is necessary not only for the continuance of the agreement but also for the continuous improvement of the service. Information sharing is crucial to successful partnerships. Unless the partner has complete information about a firm's business, it cannot work effectively toward achieving the company's goals. Trust is that intangible 5attitude that is widely recognized as a prerequisite to supply chain success. A framework should presented by establishing trust-building environment among the supply chain members.

5.2.4. Flexibility

Flexibility is the ability of the supply chain system to cope with changes in the nature, mix, volume or timing of its activities. Flexibility in operations and delivery may enable the user to give customized service to its customers, particularly in special or non-routine requests. According to the table 13There was positive relation between a flexibility and supply chain agility. The supply chain may be broken down into three basic segments, sourcing, manufacturing and delivery. The flexibility and speed of these supply chain segments lead to the definition of supply chain agility with which if it's not properly managed may lead to inefficiency in supply chain agility.

5.3. Conclusions

In this research project an attempt has been made to study the factors affecting supply chain agility in Kenya medical supply authority with the aim of

1. Developing a framework for responsive supply chain in medical health sector.Also, a framework has been offered in this project on how to develop supply chain agility.

2. The main objectives of this paper are to highlight the importance of supply chain agility. It has been believed that since health care service is very vital component for economic and social growth of a country for it to be achieved then supply chain agility need to be embraced in Kenya medical supplies authority. Market sensitivity, swift response, process integration and flexibility must be treated with a lot agency in medical health sector in Kenya.
3. This study tends to identified the most central dimensions of supply chain agility which serve as the first step on a path of proactive management, By carefully considering their own organization's approaches to the four dimensions of supply chain agility, managers can identify underlying problems (i.e. weakness and vulnerabilities in supply chain management to build up supply chain agility) and take corrective actions as appropriate to reduce or eliminate these problems.

5.4. Recommendations

The following are key to the success of supply chain agility:

1. Timely information sharing, shortening the total cycle time, coordinating the workflow at different tiers of the supply chain,
2. Good decision support systems, reducing lead times for information and materials flows, integrating information about operations, reducing redundant echelons, and flexible capacity. This is a number of characteristics that a supply chain must have in order to be "truly agile." These include being market sensitive (through the capturing and transmission of point-of-sale data), creating virtual supply chains (based on information rather than inventories), process integration (collaboration between buyers and suppliers, joint product development, etc., and networks (confederations of partners linked together as against "stand alone" organizations). An underlying assumption in this model is the transparency of information and the use of technology to create "connectivity" (the ability of organizations to share information in "real time").
3. The level of complexity in terms of brands, products, structures, and management processes can significantly hinder agility in individual organizations. This will improved responsiveness and flexibility, strategic planning includes the decentralization of operations to achieve flexibility and speed. Global outsourcing and strategic alliances with partners help reduce the time to market. Also, the system should be proactive.

5.5. Limitations of the Study

As a self-sponsored student relying on savings to progress my studies there was limitation of financial resources and the challenges during data collection where some target respondents failed to respond and others returned incomplete questionnaire due to their busy schedule and fear of disclosing unnecessary expense and sourcing for more funds from individuals and also assuring the respondent that the information will be handled with a lot of confidentiality and the outcome of the research will be shared to them.

5.6. Suggestion to Future Researcher

Exploring the research study on the above issue would be our suggestion for future research, whether the third party or outsourcer is valuable for long term supply chain network and the future development of the sector, and also the topic of the impact of third party or outsourcers upon the agility of the firm would be an interesting subject for study in the future. Business strategies like agility, lean supply, lead time reduction and quick response have a great importance in the health sector. Medical health sector need to implement these strategies in order to boost and provide more value in their supply chain. If we have another chance to write something about Kenya medical supply authority we will definitely try to explore the pros and cons of these strategies which are used in the supply chain. Furthermore, the process of selecting suppliers at Kenya medical supplies authority is a huge task. A deeper study of Kenya medical supplies authority is supplier selection process would be enthralling, with the concentration cost, geographical concentration, flexibility

6. Dedication

I would like to dedicate this proposal to my dear mum Mrs. Hilda, my dad Mr. Benjamin, Sisters and Brothers for their love and support toward my Master's program. I also dedicate it to my classmates and colleagues who have all along provided great inputs in terms of ideas and resources. God bless you all.

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8. Acronyms

- KEMSA Kenya Medical Supply Authority
- UNICEF United Nation Children Fund
- ARV Antiretral viral

9. Definition of Terms

- Agility: Is defined as the ability of an organization to thrive in a continuously changing, unpredictable business environment(Agility –forum,1994)
- Supply chain: Is defines a supply chain as the collective term defining all parties involved, directly or indirectly, in fulfilling a customer's request. This definition is consistent with that of Narguney (2006) who defines a supply chain as a system of organizations, people, activities and information involved in moving products and services from supplier to customer.
- Supply chain Agility:Is described as the capability of the supply chain and its member as a whole to rapidly align the network and its operations to dynamic and turbulent customer requirement Ismail and sharifi (2006)
- Market sensitivity: is the ability to reading and responding to real demand (Christopher 2009)
- Process integration: is a process of redefining and connecting parts of a whole in order to form a new one (Craft, 2006).
- Swift response: The ability to accelerate the activities on a critical path that commences with the identification of a market need and terminates with the delivery of a customized product Kumar and Motwani (1995)
- Flexibility: Is the organization's ability to meet an increasing variety of customer expectations without excessive costs, time, organizational disruptions, or performance losses Zhanget al.(2003)

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