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The Effect of Implementing Risk Management Strategies on Supply Chain Performance: A Case of Kenya Medical Supplies Agency

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1.0 Abstract
Implementing risk management strategies is an invaluable technique and tool to organizations' supply chains; awareness of risks should be regarded as positive traits for any successful supply chain professional. In addition, the most important thing is to make sure that when a disruption occurs, the company has the ability to go back to their normal state and continue their business.
This research sought to determine the effect of implementing risk management strategies on supply chain performance; a case study of KEMSA. The research objectives included to determine how risk identification strategies affect supply chain performance. Secondly, To determine how risk analysis and evaluation strategies affect supply chain performance and lastly was to determine how risk control and monitoring strategies affect supply chain performance within KEMSA.
The target respondents for the study were 24 KEMSA supply chain staff and the study used census approach. The data for this study included both primary and secondary data; this data was analyzed using descriptive statistics, that is, percentages, mean and standard deviation to determine the effect of implementing risk management strategies on supply chain performance. The data was presented using pie charts, graphs, bar charts and tables. The research established that the level of implementation of risk management strategies in the KEMSA supply chain was medium and that risk identification, risk analysis and evaluation and risk control and monitoring strategies that were implemented in the KEMSA supply affected the performance to a great extent. The key recommendation is for KEMSA to implement risk management strategies proactively at the planning stages of the supply chain and also ensure that there is joint participation with all supply chain partners in the implementation of the strategies.

1.1 Acknowledgement
I would like to express my sincere gratitude and appreciation to my parents for the help and understanding they showed me during the whole period of this study. Dr Martin Ogutu for his knowledge impartment towards the successful preparation of this research project, It's through his guidance and advice that I was able to prepare this project. All members of the Jomo Kenyatta University of Agriculture and Technology (CBD Campus), both: students, teaching and none teaching staff for the much needed support they gave me.

2.0 Introduction
Risk management in the public sector entails 'having in place a corporate and systematic process for evaluating and addressing the impact of risks in a cost effective way and having staff with the appropriate skills to identify and assess the potential for risks to arise' (NAO, 2000: p.2). While this is true for private organizations as well, risk management is clearly different between the public and private sector (Hood and Rothstein, 2000).
For instance whereas in the private sector, the main focus of risk management is to maintain and enhance profitability, in the public sector the focus is on the implementation of objectives and services for citizens. Government decision making is subject to strong expectations regarding transparency and accountability. Therefore, long term benefits may be easier to offset against short term risk in the public sector than in the private sector, as in the private sector risk is assessed considering the perception of stakeholders and financial markets, while in the public sector the delivery of services to citizens is regarded as a 'public value'.

2.1 Risk Management Strategies
According to the Cambridge Advanced Learner's Dictionary (2008) risk is defined as the possibility of something bad happening. Risk may also be understood as 'something happening that may have an impact on the achievement of objectives; It includes risk as an opportunity, as well as a threat' (NAO, 2000, p. 1). A broader definition distinguishes between different sources for the risk to occur, as risk is resulting 'from the direct and indirect adverse consequences of outcomes and events that were not accounted for or that were ill prepared for, and concerns their effects on individuals, firms or society at large. It can result from many reasons both internally induced and occurring externally, with their effects felt internally (Kogan and Tapiero, 2007, p. 378)
Kiser and Kitrell (2006) further define risks both outside and inside the supply chain, firstly, as External Risks which are driven by events either upstream or downstream in the supply chain, they include: Demand risks

related to unpredictable or misunderstood customer or end-customer demand, Supply risks related to any disturbances to the flow of product within your supply chain, Environment risks that originate from shocks outside the supply chain, Business risks related to factors such as suppliers' financial or management stability and Physical risks related to the condition of a supplier's physical facilities. Secondly, as Internal Risks that are driven by events within the company's control, this include: Manufacturing risks caused by disruptions of internal operations or processes, Business risks caused by changes in key personnel, management, reporting structures, or business processes, Planning and control risks caused by inadequate assessment and planning, and ineffective management and Mitigation and contingency risks caused by not putting in place contingencies.

Risk Management **"** is the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities" (ISO 31000:2009, 2009) Risks can come from uncertainty in financial markets, project failures, legal liabilities, credit risk, accidents, natural causes and disasters as well as deliberate attacks from an adversary.

Risk management strategies according to Khemani (2007) include: Risk Avoidance, that is, proactive action that eliminates the possibility of an event occurring, Risk Transfer which are proactive actions (often financial or legal) that shifts risks to a third party, Mitigate Risks, this are proactive actions that reduces the financial impact if an event occurs, Minimize Risks, which are actions meant to reduce the probability of an event occurring, Respond to Risks, these are predetermined actions taken after an event occurs in order to reduce the impact, Monitor Risks, is the continuous scanning of the environment that triggers alternative actions or the implementation of certain measures if predefined thresholds are exceeded and Risk Acceptance, which are decisions to bear risk exposure without taking any additional actions.

2.2 Supply Chain

Supply Chain Management is the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole (Mentzer et. al., 2001)

Supply chain management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996) Supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. Supply Chain Management involves the sharing of risk with suppliers. This can involve moving the risk up the supply chains to those suppliers best able to manage it. Such devolution of risk will come at a cost and so to that extent it is an economic decision.

2.3 Kenya Medical Supplies Agency (KEMSA)

According to the KEMSA Procurement Review Report (2008) The Kenya Medical Supplies Agency (KEMSA) is a State Corporation established by a legal notice issued under CAP 466 of the Laws of Kenya. The organization is a specialized medical logistics provider for Ministries of Medical Services/Public Health-supported health facilities and programmes. The Agency 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's core functions include procurement, warehousing and distribution of medical supplies. In performing these functions, KEMSA's mission is to improve the healthcare of Kenyans through efficient procurement and reliable distribution of quality medical commodities and promotion of rational drug use and practices. While, KEMSA's vision is to be to be the leading supplier of quality and affordable essential medical commodities to health facilities in Kenya, both the KEMSA mission and vision statements support the Ministry of Medical Services and Ministry of Public Health & Sanitation Mission, Vision and objectives as articulated in the National Health Sector Strategic Plan (NHSSP) II 2005-2010.

According to the KEMSA procurement Review Report (2008) there was no comprehensive consolidated annual procurement plan prepared by procurement unit for some tenders and contracts. Concerns were also raised over the inadequate pre-procurement planning that at times contributed to non-payment of suppliers. Clear procurement documentation, including objectives, scope, deliverables, timing, progress, and payment reporting must be established. All these are risks elements which will affect the performance of the supply chain function within the organization and therefore the need for a risk management strategy.

2.3 Statement of the Problem

The spate in the pharmaceutical supply chain risks and the accompanying pressure from regulatory bodies, changing legislation, customers, and cut-throat competition are forcing many forwarding looking pharmaceutical organizations to implement supply chain risk management. Some of the merits associated with supply chain risk management are gaining sustainable competitive advantage (Enyinda, et al., 2008), fewer surprises, better decision making, achieving an improved balanced between opportunity and threat, enhanced competitive

position, and manage suppliers more effectively (O'Brien and Joyce, 2007). However, it has been acknowledged that the most challenging aspect of supply chain risk management is the identification of risk factors for mitigation. Therefore, to ensure pharmaceutical supply chain resiliency and continuity, it is imperative to effectively assess risks and develop a comprehensive mitigation approach (Srividhya and Jayaranman, 2007).
According to the KEMSA procurement Review Report (2008) it highlights issues which represent deviations from achieving proficiency of their key supply chain functions. KEMSA has failed to develop arrangements that clarify accountability and contract administration and management structures for delivery of orders, internally and externally. There have also been issues with the effective development and standardization of specifications, because of conflicting interests from users, which have delayed the tendering process. Comprehensive supplier's evaluation and assessment reports are inefficient and are not conducted periodically.
There is a considerable focus to encourage supply chain professionals to incorporate risk management strategies in the development of the supply chain strategies. Considerable research has been conducted on risk management strategies in the supply chain, with a bias on the logistics function of the supply chain and the financial impact of risks in the supply chain (Zsidisin & Ellram, 1999; Zsidisin et al., 2000; Zsidisin, 2003; Harland, et al., 2003; Chopra & Sodhi, 2004; Christopher & Peck, 2004; Kiser & Cantrell, 2006). Risk in procurement, however, is often considered from a transactional viewpoint where risk management is focused on the failure to comply with the required processes (Zhao and Duan (2008) this research study focused on the evaluation of the effect of implementing risk management strategies on supply chain performance.

2.4 Research Objectives

The general objective of the research was to study the effect of implementing risk management strategies on supply chain performance. The following are the specific objectives of the study:

1. To determine how risk identification strategies affects supply chain performance within KEMSA.
2. To determine how risk analysis and evaluation strategies affect supply chain performance within KEMSA.
3. To determine how risk control and monitoring strategies affect supply chain performance within KEMSA

2.5 Research Questions

This study sought information to address the following questions:

1. How does the implementation of risk identification strategies affect the performance of the KEMSA supply chain?
2. How does the implementation of risk analysis and evaluation strategies affect the performance of the KEMSA supply chain?
3. How does the implementation of risk control and monitoring strategies affect the performance of the KEMSA supply chain?

3.0 Literature Review

3.1 Conceptual Framework

The conceptual framework for this study was developed from the risk management process model by Wagner and Bode (2007) where the process of implementing risk management strategies in the supply chain is summarized as a continuous process, which should be conducted from the conception stages of determining the procurement requirements up to the final contractual stages. The dependent variable for this research is supply chain, while the independent variables are the risk management strategies, which are implemented at different stages from the planning stages in the supply chain to the final stages of implementation and control. That is, the risk management strategies are categorised as being implemented across the different risk management processes, this are, risk identification strategies, risk analysis and evaluation strategies and risk control and monitoring strategies which are usually conducted concurrently, the conceptual framework is captured in figure 2.1.

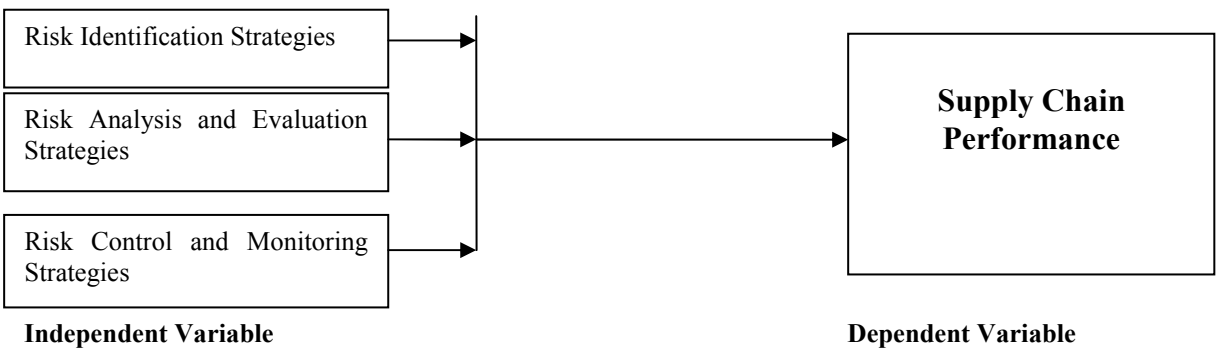

Figure 3.1: Conceptual framework

3.2 Strategy Implementation

Although formulating a consistent strategy is a difficult task for any management team, making that strategy work, implementing it throughout the organization, is even more difficult (Hrebiniak, 2006). A myriad of factors can potentially affect the process by which strategic plans are turned into organizational action. Unlike strategy formulation, strategy implementation is often seen as something of a craft, rather than a science, and its research history has previously been described as fragmented and eclectic. It is thus not surprising that, after a comprehensive strategy or single strategic decision has been formulated, significant difficulties usually arise during the subsequent implementation process. The best-formulated strategies may fail to produce superior performance for the firm if they are not successfully implemented, as Noble (1999b) notes.

Strategy implementation is portrayed as a lively process by which companies identify future opportunities. Reid (1989) cited in Schaap (2006). Strategy implementation may be viewed as a process inducing various forms of organizational learning, because both environmental threats and strategic responses are a prime trigger for organizational learning processes (Lehner, 2004). Implementation is a process that takes longer than formulation (Hrebiniak, 2006). Strategy implementation is an iterative process of implementing strategies, policies, programs and action plans that allows a firm to utilize its resources to take advantage of opportunities in the competitive environment (Harrington, 2006).

Executors are comprised of top management, middle management, lower management and non-management. Effectiveness of strategy implementation is, at least in part, affected by the quality of people involved in the process (Govindarajan, 1989). Here, quality refers to skills, attitudes, capabilities, experiences and other characteristics of people required by a specific task or position (Peng & Litteljohn, 2001). Viseras, Baines, and Sweeney (2005) group 36 key success factors into three research categories: people, organization, systems in the manufacturing environment. Their intriguing findings indicate that strategy implementation success depends crucially on the human or people side of project management, and less on organization and systems related factors.

3.3 Supply Chain Performance

Development of cross-functional teams aligns organizations with process oriented structure, which is much needed to realize a smooth flow of resources in a supply chain. As suggested by Trentand Monczka (1994), such teams promote improved supply chain effectiveness. They minimize or eliminate functional and departmental boundaries and overcome the drawbacks of specialization, which according to Fawcett (1995), can distribute the knowledge of all value adding activities such that no one, including upper level managers, has complete control over the process. Such teams helped in the formation of modern supply chains by promoting greater integration of organizations with their suppliers and customers.

The strategic, operational and tactical levels are the hierarchies in function, wherein policies and trade-offs can be distinguished and suitable control exerted (Ballou, 1992). According to Rushton and Oxley (1989), such a hierarchy is based on the time horizon for activities and the pertinence of decisions to and influence of different levels of management. The strategic level measures influence the top level management decisions, very often reflecting investigation of broad based policies, corporate financial plans, competitiveness and level of adherence to organizational goals. The tactical level deals with resource allocation and measuring performance against targets to be met in order to achieve results specified at the strategic level. Measurement of performance at this level provides valuable feedback on mid-level management decisions. Operational level measurements and metrics require accurate data and assess the results of decisions of low level managers. Supervisors and workers are to set operational objectives that, if met, will lead to the achievement of tactical objectives.

Anderson et al. (1997) describes SCM as a collection of seven principles of SCM consisting of customer segmentation, customized logistics, demand planning, customization, strategic sourcing, supply chain strategy, and supply chain performance measurement. Inherent in both process-based definitions is the need for the internal and external players of the supply chain to coordinate to ensure that supply chain operations (demand planning, logistics, and supply management) address specific customer requirements.

The supply focus is synonymous with rationalization and streamlining of the supply base, and integration of suppliers into product development and manufacturing activities. Managing the supply chain implies reducing and streamlining the supplier base to facilitate managing supplier relationships (Krause 1997), developing strategic alliances with suppliers (Mason 1996), working with suppliers to ensure that expectations are met, and involving suppliers early in the product development process to take advantage of their capabilities and expertise (Monezka et. al 1994)

3.4 Sources of Supply Chain Risk

The following, according to C.I.P.S (2010) are some of the potential sources of risks in the in the supply chain: sources of risks from buyers; Clarity of definition of requirements, Presentation and approach to market, internal relationships and barriers to use particular suppliers. Other Sources of risks are from Suppliers, Production process capacity & supply chains, Competing demands from different buyers, Commercial and financial

capability. Risks from existing buyer supplier Relationships; includes Contractual allocation of risks, Cultural fit and associated skill sets on both sides to manage the relationship Performance management arrangements.
According to the findings of Miller/Lessard 2008 and Keizer, Halman and Song (2002), there are five different sources of supply chain risks. These are based on, technological risks, political risks, market risks, turbulence risks, financial risks and organizational and societal risks. These risks affect the performance of the supply to varied levels depending with the existing circumstances.

3.5 Risk Management Process in the Supply Chain

General risk management and consequently supply chain risk management consist of the following processes: Risk Identification, Risk analysis and evaluation, Risk control and Risk monitoring. In the context of risk identification potential supply chain risks are systematically identified. Within the context of risk analysis and evaluation the identified risks are evaluated in terms of the probability of their occurrence and their damage potential. In order to cope with risks, measures are specified in the context of risk controlling. Risk monitoring serves permanent monitoring of risks (Wagner and Bode, 2007). Through monitoring one can receive information as to whether the defined risks are still current as well as the taken actions are still effective. Risk management process is an iterative process, in which after monitoring, risk identification and the consequent processes are executed again as far as it is necessary.
According to the type of executed activities supply chain risk management is classified into strategic, tactical and operational risk management (Rajamani et al. 2006) level one is Strategic Risk Management, which is the function of strategic risk management to design a supply chain for which disruptions or deviations arisen from risks, actions to prevent or mitigate disruptions or deviations and metrics to measure the success of taken actions can be defined as well as in which necessary time for recovering is short and costs for covering disruptions or deviations are low.
The second level is Tactical Risk Management, Tactical risk management deals with the identification of potential risks, classifying the identified risks by probability of their occurrence and their impact on the business continuity in supply chains. Identifying action alternatives and ranking these alternatives are also the functions of tactical risk management.
Lastly, is Operational Risk Management, In the context of operational risk management, the following activities are executed: Capturing events, Communication of event-related information to all relevant parties, Enabling collaboration on selecting the optimal mitigation strategy and Continuously improving supply chains against risks by updating the risk management database, which includes data such as type of risk, preferred mitigation strategy, alternative strategies, alert criteria, with lessons learned. The database is updated through tracking how often a risk event occurs, what was done, how effective it was, and how it could be improved for the next time

3.6 Risk Identification Strategies in the Supply Chain

Zsidisin and Smith (2005) highlight the importance of early supplier involvement (ESI) for new product development by referring to a case study of Rolls Royce. The importance of interaction is well known in innovation research, ESI underlines interaction early in the design cycle of importance to risk management and risk reduction. 'With better exchange of information comes knowledge of the situations surrounding the dynamics of a supply relationship, and with that knowledge comes greater potential for detecting, averting, and managing supply risk' (Zsidisin and Smith, 2005, p. 51) The problem variables these authors identify and how to deal with them are the following: Manage Legal liabilities through determining intellectual property rights during initial agreements and Effecting sharing of expertise. Control Supplier capacity constraints by ensuring supplier production flexibility during pre-selection and Share future demand forecast information immediately with suppliers to improve the planning process. Supply organizational issues, through providing clarity of supplier management structures and Obtaining knowledge of suppliers at both corporate and plant levels.
One general rule that probably is applicable to most procurement projects is that potential risks in any phases of the procurement life cycle should be identified early or ahead of the actual execution of a procurement project (Zsidisin and Smith, 2005 and Osipova, 2008). The various kinds of process risks potentially arising during the life of the project need to be borne in mind when planning the procurement, developing the contract and managing the project.
There are many different perspectives and knowledge domains that are relevant for risk management. Keizer et al (2002) discuss the use of a 'risk facilitator', an innovation expert who is not member of the project team and therefore independent and free from bias who can work with the project manager to diagnose risk. Several authors acknowledge the importance of including experienced co-workers for successful risk management (Al-Tabtabai et al, 1997; Wade and Bjorkman, 2004). Risk management is an issue not only for project owners but also for potential contractors, where one result of such analysis could be to abandon a project (Ward and Chapman, 1991). Risk reviews, contacts with subcontractors, research on persons or client, site visits, and financial considerations are also central elements in risk identification (Bajaj et al, 1997)
According to NWS (2006) when developing the risk identification strategies, the aim should be to enable the

organization to create a comprehensive list of the possible risks, and document what each involves. Consider all risks, whether or not they are under the control of the organization. Compile a list of the possible events that could have an unwanted or unintended effect on the procurement. Consider the full life-cycle of the good or service, and include problems that may arise after the goods are received or the service performed.

Different models of risk management exist which all have varying degrees of complexity. What many of these models have in common can be summarized as a process consisting of three stages include; firstly, Risk identification; that is, potential risks are determined; secondly, Risk assessment, that is, where the risks identified are evaluated and ranked and lastly is Risk response, that is, identification of the way risks are dealt with (Orsipova, 2008).

3.7 Risk Analysis and Evaluation Strategies in the Supply Chain

Zhaou and Duan (2008) developed a generic risk management model as displayed in table 1. Similar to other mentioned models, this model also displays an iterative pattern, but in their version it consists of nine steps. This model follows lifecycle logic where each phase of a project may be scrutinized according to the steps specified in the model and its logic can be applied to the procurement cycle model

Table 3.1: Integrated Risk Management Model

1.	Identify Issues, Setting the context.
2.	Asses Key Risk Areas
3.	Measure likelihood and impact
4.	Rank risks
5.	Set desired results
6.	Develop options
7.	Select a strategy
8.	Implement the strategy
9.	Monitor and evaluate and adjust

Source: Zhao and Duan (2008, p. 1390)

Applying the principles described by Zhao and Duan (2008), would prompt an analysis of potential risks in the different phases of public procurement projects. Assume, for instance, that the 'determination of contract award criteria/ would be analyzed. An issue concerning the stage of the procurement process in which award criteria are defined lies in the difference between 'should ideally' and 'must have' requirements, that is, whether or not a specific requirement should be mandatory and thus leading to exclusion of tenders which do not comply with it, or if it should be rendering higher evaluation points only (Bauer et al, 2008). If a 'must have' specification is used for a given feature, this may exclude suppliers which lack the capability necessary to deliver it, which may, if nothing else, save the public procurers from administrative overhead. On the other hand, if a 'must have' specification is used on a market where no suppliers have in their possession the required capacity, the procurement process will fail, as no supplier will be qualified, or it will be time consuming and costly to build up capacities of a supplier.

It should be noted that the way public procurement projects are set up may vary with the individual project (Osipova and Apleberger, 2007). It has even been argued that in practice 'it is virtually impossible to classify procurement by any sort of rational positivist approach' (Tookey et al, 2001, p. 28). No matter how the process is organized, it seems reasonable for procurers to carry out a thorough analysis of the steps envisaged in procurement cycle in the specific case. It may be expected that such analysis would identify potential risks in advance and create opportunities for risk mitigation. If a project includes competent and experienced colleagues in the project, this will increase likelihood of success (Wade and Bjorkman, 2004)

A number of options are generally used to screen and therefore avoid risky bids, for example, abnormally low offers, seeking third-party guarantees, such as surety bonds and letters of credits, and choosing 'less competitive' scoring rules (Cabral et al, 2006). However in the case of procurement highly innovative products, it is more difficult to assess risks, and these options may not be effective. A tender for highly innovative products is more likely to attract highly heterogeneous offers than would be the case in standardized products and services. The choice of scoring rules may also have a bias towards less innovative offers. Similarly, insurance schemes screening suppliers may prevent the most risky but innovative firms to participate (Cabral et al, 2006).

Managing risk in procurement can be achieved by using a checklist through to the development of a risk management plan. A risk management plan is a document outlining the potential risks for a complex procurement program, project or activity. It records the identified risks, the likely consequences of these risks, and the options to treat and monitor them. A risk management plan should be undertaken when: The value of the purchase is high, the procurement process is complex, adverse consequences could significantly affect a government agency's operation or when delivering the agency's core business services to the community will be significantly affected. Plans will vary from one government agency to another, depending on the needs of the particular organization, its corporate goals, the services it intends to provide, and the specific strategies adopted.

NSW (2006)

3.8 Risk Control and Monitoring Strategies in the Supply Chain

According to CIPS and OGC (2010) the risk management strategies should include the following: Avoid risk, that is, do not undertake the activity, if the activity is essential the risk must be accepted and managed. The next strategy is to minimize risk through reducing either the impact or the probability (or both) for example, where appropriate requiring parent company guarantees and link financial distress provisions to the parent company's financial performance. The third strategy is to Spread the risk, that is, develop 'insurance', For example, source from more than one supplier, although lowest price point may not be achieved. To be effective multiple sourcing requires knowledge of any supplier interdependencies like second or third tier supply base. The last strategy is to Accept risks, this is the best overall strategy, particularly if low impact or probability risks and alternative strategies are not deemed effective or efficient.

It is recommended that risk reduction or impact mitigation measures and monitoring be employed in these circumstances, as appropriate. Where the risk has to be accepted, minimize the likelihood of the risk occurring. Reduce the likelihood of risk by: clarifying the requirements, specifications and outcomes, revising procedures and specifying quality assurance and product standards, conducting product testing and inspection, specifying professional accreditation. Reduce the consequences through, contingency planning, contract terms and conditions, and inspections and checks to detect compliance. In many cases a combination of options will give the best overall result. For example, it may be best to take steps to reduce the likelihood of risks, reduce their consequences, and then accept any residual risks NWS (2006)

Risk treatment must be appropriate to the significance of the risk and the importance of the activity. For high priority risks requiring treatment, this will involve: identifying potential treatment options, evaluating and selecting appropriate options and preparing and implementing risk treatment plans. Risk treatment strategies may include: Avoiding risks by either deciding not to proceed with the activity that causes the risk or seeking alternative means of achieving the outcome. Transfer risk by shifting responsibility from the organization to another party, which ultimately bears the consequences if the risk arises. The organization will normally incur a cost for the other party assuming the risk. The general principle when considering whether to transfer a risk is that responsibility for the risk should be borne by the party best able to control and bear that risk. Accept risk when it cannot be avoided or transferred, or the cost of doing so would not be worthwhile NWS (2006)

Juttner et al (2003) outline four responses to supply chain risk, based on earlier literature on risk management in general. These are avoidance, control, cooperation and flexibility. In the context of the supply chain, avoidance will mean that if a particular supplier is seen as a weak link in the chain, they will be dropped. Particular materials will be engineered out of products and particular supply markets (geographically) will be avoided altogether, if these present as being risky. This action cannot be taken without first mapping the supply chain and performing the risk assessment process. Control means taking proactive steps to reduce the risk. Buffer inventories could be on such approach. Building penalty clauses into supplier contracts, linking pay to performance, and managing capacity can all help better control the situation. The extreme case is vertical integration, where the firm takes ownership of the supply source. The general literature on supply chain management would suggest, that in the recent past at least, firms prefer to gain control over their supply chains by sharing information and by collaborative approaches. The final strategy heading is flexibility. The literature on 'agility' fits well with this. Strategies such as postponement and maintaining multiple sources of supply, as well as flexible manufacturing systems all fall into this category.

4.0 Research Methodology

4.1 Research Design

This study employed a descriptive research design using a case study. According to Donald and Pamela (2006), a descriptive study deals with the what, how and who of a phenomenon which is the concern for this study. The study specifically tried to analyze the effect of the existing risk management strategies on the supply chain. Specifically the study focused on the Procurement and Distribution functions of the KEMSA supply chain. A case study is a study focusing on one institution of the same sector and has holistic approach and offers the opportunity to explain why certain outcomes are happening by analyzing the process and relationships of those factors of outcome (Denscombe, 1998)

4.2 Population Sample and Sampling Technique

The population sample was composed of twenty four (24) KEMSA staff working in the supply chain, that is, five (5) members of the KEMSA Tender Committee, five (5) members of the Procurement Committee, eight (8) members of the Procurement Unit, four (4) members of the distribution function, The Distribution Advisor and Procurement Advisor. This is because these groups of respondents are involved in the supply chain and were in a better position to provide accurate responses for the study.

The study employed a census approach to collect data from the respondents hence no sampling techniques was used. The approach involved gathering information from every member of the target population. This method is

appropriate because it reduces on biasness in research, since all the respondents were given an equal chance to participate in the study and there is also less logistics complexities in conducting the research since all the respondents are within Nairobi were accessed easily (Mugenda 2003)

4.3 Data Collection Procedure

The questionnaire was self administered to all the respondents, the questionnaire was dropped personally and picked by the researcher after a week to give the respondents adequate time to respond to the questions, telephone follow ups, will further be used to enhance the response rate; The questionnaire will be accompanied with an introduction letter, this letter will contain an adequate brief about the research under study and will be signed by the research for authenticity.

4.4 Data Processing and Analysis

Descriptive statistics was used to summarize the results for each of the main variables. These included the use mean scores, standard deviation and percentages to analyse data in order to determine the degree to which the implementation of risk management strategies affects the performance of the supply chain. Pearson coefficient correlation analysis was then used to determine the relationship between the effectiveness of the implemented risk management strategies and supply chain performance.

4.5 Data Presentation

The data was presented using pie charts, graphs, bar charts and tables. Tables were used to present responses and facilitate comparison. Cooper and Schindler (2003) notes that the use of percentages is important for two reasons; first they simplify data by reducing all the numbers to range between 0 and 100. Second, they translate the data into standard form with a base of 100 for relative comparisons. These generated quantitative reports through tabulations, percentages, mean scores and standard deviation.

5.0 Research Findings and Discussions

5.1 The current level of implementation risk management strategy in KEMSA

This section sought to establish from the respondents the level of implementation of risk management strategies in the KEMSA supply chain, the results of the findings are captured in figure 5.1.

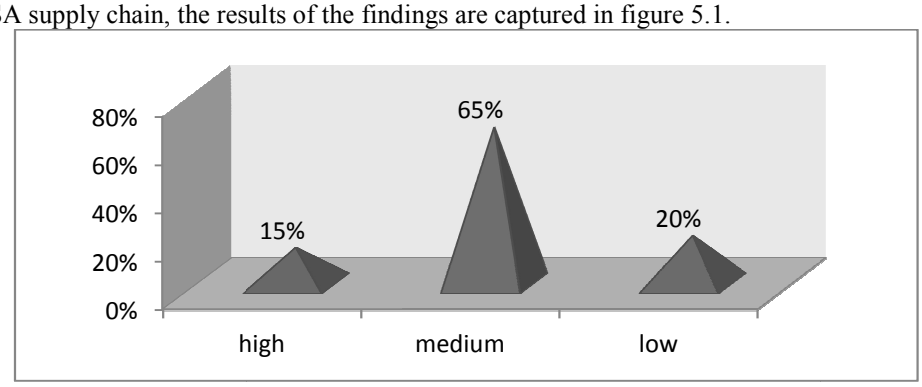

Figure 5.1 The current level of risk management strategy implementation

From the figure above, majority of respondents (65%) said that the current level of risk implementation strategy was medium while 20% said the level was low.

5.2 Techniques Used to Identify Risks in the KEMSA Supply Chain.

This section sought to establish from the respondents the techniques used to identify risks at KEMSA. Respondents' answers were as follows.

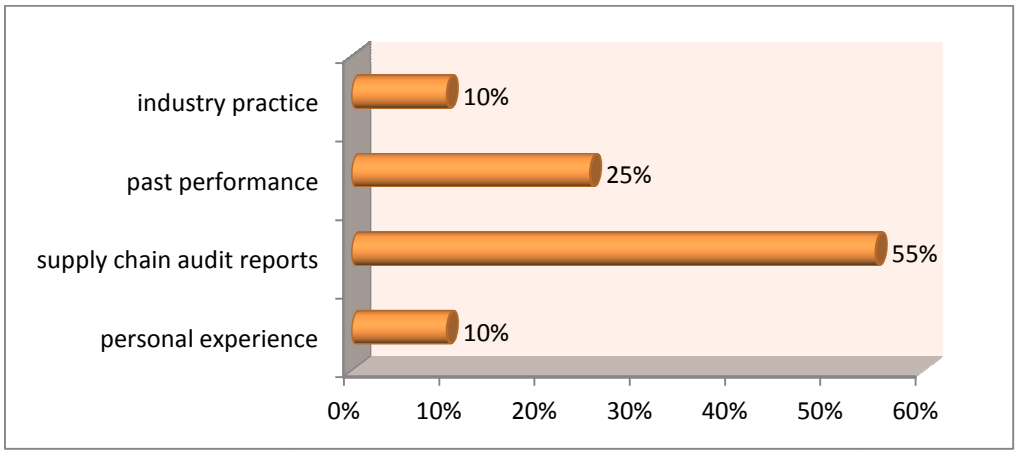

Figure 5.2 Techniques Used to Identify Risks in the KEMSA Supply Chain

From figure 5.2, 55% of the respondents said that KEMSA applied supply chain audit reports to identify risks while 25% said that they used past performance.

Table 5.1 Extent to Which Sources of Supply Chain Risks Affect Supply Chain Performance in KEMSA

	N	Minimum	Maximum	Mean	Std. Deviation
Technological Risks	20	1.00	5.00	3.1500	1.26803
Organizational Structure And Cultural Risks	20	2.00	5.00	3.4500	1.09904
Turbulence Risks	20	2.00	5.00	3.4500	.94451
Market Risks	20	2.00	5.00	3.6000	.75394
Financial Risks	20	3.00	5.00	4.1000	.71818
Legal Risks	20	2.00	5.00	4.2500	.71635
Political Risks	20	2.00	5.00	4.4000	.94032

From table 5.1, respondents rated the extent to which technological risks (3.15) organizational structure and cultural risks and turbulence risks, with mean scores of 3.45 each, affected supply chain performance in KEMSA to a moderate extent (3.15) In addition, respondents rated to a great extent, the extent to which market risks, financial risks, legal risks and political risks affect supply chain performance in KEMSA with mean scores of 3.6, 4.1, 4.25 and 4.4 respectively. This agrees to the findings of Miller/Lessard and Keizer (2008) and Halman and Song (2002) where they highlighted; Turbulence Risks, Financial Risks and Organizational Structure and Cultural Risks as the risks which have a high impact on the performance of the supply chain.

Table 5.2 Extent to Which Implementation of Risk Identification Strategies Affected the Performance of the Supply Chain in KEMSA

	N	Minimum	Maximum	Mean	Std. Deviation
Periodic Procurement Audits	20	2.00	5.00	3.7500	1.01955
Inventory Forecasting	20	1.00	5.00	3.7500	1.20852
Pre-Screening Of Supplier's Capacity	20	1.00	5.00	3.9500	1.35627
Joint Specifications Writing Teams	20	2.00	5.00	4.0000	1.12390
Periodic Quality Assessment Reviews	20	3.00	5.00	4.1500	.74516
Pre-Bid Meeting With Suppliers	20	2.00	5.00	4.2000	.95145
Joint Procurement Planning Teams	20	3.00	5.00	4.2500	.71635

From table 5.2, respondents rated the extent to which implementation of the following risk identification strategies affected the performance of the supply chain in KEMSA. According to the respondents, all the statements were rated to a great extent. These were rated in the following order; periodic procurement audits (3.75); inventory forecasting (3.75); pre-screening of suppliers capacity (3.95); joint specifications writing teams (4.0); periodic quality assessment reviews (4.15); pre-bidding meeting with suppliers (4.2); and joint procurement planning teams (4.25). Zsidisin and Smith (2005) highlight the importance of early supplier involvement (ESI) and the need to ensure that there an involvement of supply chain partners in the planning stages of the supply chain and ensuring that the specifications are comprehensive to cater for the requirements. This is in agreement with the findings of the study.

Table 5.3 Extent to Which Risk Identification Strategies are Implemented.

	N	Minimum	Maximum	Mean	Std. Deviation
Periodic Procurement Audits	20	1.00	5.00	3.2500	1.11803
Inventory Forecasting	20	1.00	5.00	3.2500	1.29269
Periodic Quality Assessment Reviews	20	2.00	5.00	3.4000	.88258
Joint Specifications Writing Teams	20	2.00	5.00	3.6500	.98809
Joint Procurement Planning Teams	20	1.00	5.00	3.6500	1.34849
Pre-Screening Of Supplies Capacity	20	1.00	5.00	3.8500	1.34849
Pre-Bid Meeting With Suppliers	20	2.00	5.00	3.9000	1.07115

From table 5.3, respondents rated the implementation of the following risk identification strategies to a moderate extent. These include; periodic procurement audits (3.25); inventory forecasting (3.25) and periodic quality assessment reviews (3.4). In addition, respondents rated the following strategies to have been implemented to a great extent; joint specifications writing teams (3.65); joint procurement planning teams (3.65); pre- screening of supplies (3.85) and pre-bid meeting with suppliers (3.9)

Table 5.4 Correlation between the Effect of Implementing Risk Identification Strategies and SC Performance at KEMSA

		Extent of performance of supply chain at KEMSA	Extent to which risk identification strategies affects SC performance at KEMSA?
extent of performance of supply chain at KEMSA	Pearson Correlation	1	.257
	Sig. (2-tailed)		.273
	N	20	20
To what extent has risk identification strategies affected SC performance at KEMSA?	Pearson Correlation	.257	1
	Sig. (2-tailed)	.273	
	N	20	20

From table 5.4, there exists is a positive relationship between risk identification strategies and performance of supply chain at KEMSA. This is shown by a Pearson correlation coefficient of 0.257. That is, an increase in the level of implementation of risk identification strategies, leads to an increase in the overall SC performance at KEMSA. This is in agreement to the findings of Zsidisin and Smith (2005) that implementation of risk identification strategies contribute to the improvement of the overall performance of the supply chain.

Table 5.5 Extent to Which Risk Analysis and Evaluation Strategies Affect Supply Chain Performance in KEMSA

	N	Minimum	Maximum	Mean	Std. Deviation
Use Of Cross Functional Teams With Supply Chain Partners	20	2.00	4.00	3.2000	.61559
Priority Ranking Of Supply Chain Risks	20	2.00	5.00	3.3500	1.03999
Whole Life Costing Of Supplies	20	2.00	5.00	3.5000	.82717
Frequency Analysis On Previous Occurrence Of Supply Risks	20	2.00	5.00	3.5000	.94591
Brainstorming Meetings With Supply Partners	20	1.00	5.00	3.7000	1.26074
Cost Benefit Analysis Of Potential Risks	20	2.00	5.00	3.8000	.83351
Internal Quality Assessment Of Supplies	20	2.00	5.00	4.1000	.96791

From table 5.5, respondents rated the extent to which risk analysis and evaluation strategies affected supply chain performance in KEMSA. Respondents rated the following strategies to a moderate extent; use of cross functional teams with supply chain partners (3.2); priority ranking of supply chain risks (3.35). In addition, respondents rated to a great extent the following risk analysis and evaluation strategies; whole life costing of supplies (3.5); frequency analysis on previous occurrence of supply risks (3.5); brainstorming meetings with supply partners (3.7); cost benefit analysis of potential risks (3.8) and internal quality assessment of supplies (4.1). The findings were in agreement to the fact that, if a project includes competent and experienced colleagues in the project both internally and externally, this will increase likelihood of success (Wade and Bjorkman, 2004)

Table 5.6 Extent to Which Risk Analysis and Evaluation Strategies are Implemented in the KEMSA Supply Chain

	N	Minimum	Maximum	Mean	Std. Deviation
Periodic Procurement Audits	20	2.00	5.00	3.7500	1.01955
Inventory Forecasting	20	1.00	5.00	3.7500	1.20852
Pre-Screening Of Supplier's Capacity	20	1.00	5.00	3.9500	1.35627
Joint Specifications Writing Teams	20	2.00	5.00	4.0000	1.12390
Periodic Quality Assessment Reviews	20	3.00	5.00	4.1500	.74516
Pre-Bid Meeting With Suppliers	20	2.00	5.00	4.2000	.95145
Joint Procurement Planning Teams	20	3.00	5.00	4.2500	.71635

According to the respondents, all risk analysis and evaluation strategies that were implemented in the KEMSA supply chain, were implemented to a large extent. This represented the desire by the organization to safeguard its supply chain against risk which emanate as a result of failing to implement appropriate risk analysis and evaluation strategies.

Table 5.7 Correlation between the Effect Implementing Risk Analysis and Evaluation Strategies and SC Performance at KEMSA

		Extent of performance of supply chain at KEMSA	Extent to which risk identification strategies affects SC performance at KEMSA?
Extent of performance of supply chain at KEMSA	Pearson Correlation	1	.181
	Sig. (2-tailed)		.444
	N	20	20
To what extent has risk analysis and evaluation strategies affected SC performance at KEMSA?	Pearson Correlation	.181	1
	Sig. (2-tailed)	.444	
	N	20	20

From table 5.7, there is a positive correlation between the effect of implementing risk analysis and evaluation strategies and SC performance in the KEMSA supply chain. This is shown by a Pearson Correlation Coefficient of 0.181. This shows that consistent implementation of risk analysis and evaluation strategies leads to an increase in SC Performance at KEMSA. This agrees to the findings of Christopher and Peck (2004) that implementation of risk analysis and evaluation strategies during the planning stages of the supply chain will enhance the overall performance of the supply chain.

Table 5.8 Extent to Which Risk Control and Monitoring Strategies Affect Supply Chain Performance in KEMSA

	N	Minimum	Maximum	Mean	Std. Deviation
Framework Contracts With Suppliers	20	2.00	5.00	3.6500	1.08942
Continuous Training On Risk Management	20	1.00	5.00	3.6500	1.22582
Pre-Shipment Inspection Of Supplies	20	1.00	5.00	3.8500	1.22582
Inventory Control Techniques	20	3.00	5.00	3.9000	.71818
Liquidated Damages Clauses	20	2.00	5.00	3.9500	.82558
Post Qualification Of Suppliers Capacities	20	1.00	5.00	3.9500	1.14593
Contract Management System	20	2.00	5.00	4.0000	.72548
Fixed Pricing Contracting	20	3.00	5.00	4.1500	.74516
Compressive Record Keeping	20	2.00	5.00	4.2000	.95145
Insurance Of Supplies	20	2.00	5.00	4.3000	1.03110
Performance Security From Suppliers	20	2.00	5.00	4.4000	.94032

From table 5.8, respondents rated all the statements to a great extent to which risk control and monitoring strategies affected supply chain performance in KEMSA. Framework contracts with suppliers was rated with a mean score of 3.65 as the lowest while performance security from suppliers was rated as the greatest risk control and monitoring strategy that affected supply chain performance at the organization with a mean score of 4.4. according to NWS (2006) risks can be controlled through the reduction of the likelihood of risk occur by: clarifying the requirements, specifications and outcomes, revising procedures and specifying quality assurance and product standards, conducting product testing and inspection, specifying professional accreditation. In addition, a number of options are generally used to screen and therefore avoid risky bids, for example, abnormally low offers, seeking third-party guarantees, such as surety bonds and letters of credits, and choosing 'less competitive' scoring rules (Cabral et al, 2006).

Table 5.9 Extent to Which Risk Control and Monitoring Strategies are Implemented in the KEMSA Supply Chain

	N	Minimum	Maximum	Mean	Std. Deviation
Continuous Training On Risk Management	20	1.00	5.00	3.3000	1.17429
Post Qualification Of Suppliers Capacities	20	1.00	5.00	3.4500	1.19097
Framework Contracts With Suppliers	20	2.00	5.00	3.5000	.94591
Inventory Control Techniques	20	2.00	5.00	3.6000	.94032
Contract Management System	20	2.00	5.00	3.8500	.87509
Pre-Shipment Inspection Of Supplies	20	1.00	5.00	3.9000	1.48324
Liquidated Damages Clauses	20	1.00	5.00	3.9500	1.19097
Compressive Record Keeping	20	2.00	5.00	4.0000	.85840
Insurance Of Supplies	20	1.00	5.00	4.0500	1.27630
Fixed Pricing Contracting	20	2.00	5.00	4.3500	.98809
Performance Security From Suppliers	20	2.00	5.00	4.4500	.94451

From table 5.9, respondents rated the extent to which continuous training on risk management and post qualification of suppliers' capacities had been implemented to a moderate extent with mean scores of 3.3 and 3.45 respectively. However respondents rated the implementation of the other control and monitoring strategies as being of great extent. Implementation of framework contracts with suppliers was rated with a mean score of 3.5 while performance security from suppliers was rated with a mean score of 4.45.

Table 5.10 Correlation between Implementing Risk Control and Monitoring Strategies and SC Performance at KEMSA

		Extent of performance of supply chain at KEMSA	Extent to which risk identification strategies affects SC performance at KEMSA?
Extent of performance of supply chain at KEMSA	Pearson Correlation	1	.169
	Sig. (2-tailed)		.477
	N	20	20
To what extent has risk control and monitoring strategies affected SC performance at KEMSA?	Pearson Correlation	.169	1
	Sig. (2-tailed)	.477	
	N	20	20

From table 5.10, there exists a positive correlation between consistent implementation of risk control and monitoring strategies and SC performance at KEMSA. This is shown by a Pearson correlation coefficient of 0.169. Which means that an increase in the level of implementing risk control and monitoring strategies, results to an overall improved supply chain performance. This is in agreement to the finding s of NWS (2006) that implementing an integrative approach to management of risk and development of risk mitigation strategies will help cushion the KEMSA supply chain activities and thus lead to overall growth and performance of the supply chain.

5.2 Conclusions

The study concluded that risk identification strategies affected supply chain performance at KEMSA. This was through periodic procurement audits; inventory forecasting; pre-screening of supplier's capacity; joint specifications writing teams; periodic quality assessment reviews; pre-bidding meeting with suppliers; and joint procurement planning teams. However, there exists disconnect in the implementation of risk the following risk management strategies: that is, inventory forecasting and periodic quality assessment reviews strategies were implemented moderately and yet they affected the performance on the supply to a large extent.

In addition, risk analysis and evaluation strategies affected the performance of supply chain at KEMSA through whole life costing of supplies; frequency analysis on previous occurrence of supply risks; brainstorming meetings with supply partners; cost benefit analysis of potential risks and internal quality assessment of supplies. Finally, risk control and monitoring strategies affected supply chain performance through continuous training on risk management, Pre-shipment inspection of supplies, inventory control techniques, liquidated damages clauses, post qualification of suppliers capacities, contract management system, fixed pricing contracting, compressive record keeping, insurance of supplies and performance security from suppliers

Its important for the organization to Identify and deal with risks proactively: As early as possible in the decision making process, the various types of risks have to be identified ex ante as far as possible. It's important to assess along the distribution chain cycle and procurement cycle, understand the key mitigation steps. This can be achieved through using supply chain partners, highly experienced in the health sector supply chains, to draw functional requirements and moderate procurements requirement to standardize the procurement specifications and ensure that there exists a feedback mechanism through consistent supply chain audits and joint planning meetings. Additionally it can be done through expert training from specialists in health sector supply chain management.

Financial risks in the supply chain are easier to identify but can not be quantified easily. KEMSA needs to conduct assessments of the possible risks during tendering and contract management processes and be able to devise mitigation strategies such as price hedging, fixed price contracting, and constant management of exchange rate fluctuations and use of bank securities.

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