

**SUPPLY CHAIN RISK MANAGEMENT PRACTICES IN
MOBILE TELECOMMUNICATIONS SECTOR INDUSTRY
IN KENYA**

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**A Management Research Project Submitted In Fulfillment of the Requirements for
the Award of Master of Business Administration (MBA), School of Business,
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DECLARATION

This research project is my original work and has not been submitted for the award of a degree in any other university.

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This research project has been submitted for examination with my approval as the university supervisor.

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DEDICATION

To God, for His continued and amazing spiritual support. To my dear wife Mercy Wanjiru for her emotional support and encouragement. To my parents: Patrick Ngugi and Lydia Wamaitha, My in-laws and my siblings for believing in me and for their encouragement and support.

ABSTRACT

The study sought to explore the supply chain risk management practices preferred by the mobile telecommunication companies in Kenya, effectiveness of these practices and the challenges they face while implementing supply chain risk management. In order to satisfy the objectives of the study, a survey was conducted in all the four mobile telecommunications companies in Kenya. The research instrument used was SPSS and descriptive statistics was used by way of percentages, proportions and frequency distribution distributions to analyze data. The findings revealed that most mobile telecommunications companies have implemented supply chain risk management. However, it was evident that most mobile telecommunication companies have not paid much attention to cyber supply chain risk management Plan as a supply chain risk management practice. It was also established that the major challenges to implementing supply chain risk management in mobile telecommunications companies were high investment costs in terms of technology, increasing fierce competition within the industry and lack of government support. The study therefore recommends that all mobile telecommunications companies in Kenya should endeavor to fully understand the supply chain risk management practices to drive them to world class status to ward off competition. The government should also offer tax holidays to mobile telecommunication companies to protect the industry which plays a significant role in Kenya's economy.

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ABBREVIATIONS

CCK	Communication commission of Kenya
ETA	Event Tree Analysis
FTA	Faulty Tree Analysis
GSM	Global System for Mobile
IP	Internet Protocol
IS	Information Systems
IT	Information Technology
LTD	Limited
Plc	Public Limited Company
SCMS	Supply Chain Management System
SCRM	Supply Chain Risk Management
SCRs	Supply Chain Risks
SMS	Short Messaging Service
SPSS	Statistical Package for Social Sciences

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Companies have been aware of the need for risk management and contingency planning for some considerable time and there exists a wide body of literature from such diverse fields as economics (Tversky & Kahnemann, 1979), strategic management (Bettis & Thomas, 1990) and international management (Miller, 1992).

Events have clearly shown that a disruption affecting an entity anywhere in the supply chain can have a direct effect on a corporation's ability to continue operations, getting finished goods to market or provide core services to customers. Organizations that think they have managed risk have often overlooked the critical exposures along their supply chains. Some writers suggest that the domino effects of disruptions in supply chains might have been exacerbated in the last decade (Christopher & Lee, 2001, McGillivray, 2000, Engardio, 2001)

In an analysis of the inventory problems recently facing the US electronics and telecommunications industry, (Engardio, 2001) noted that the "boasts" of flexible manufacturing and Just-in-Time supply chains have disguised some of the risks involved. The author further projects hefty write downs for "whomever ends up stuck with the inventory hot potato".

Given the widely acknowledged vulnerabilities of today's complex supply chains, one might expect the concept to have a clear meaning and a rich tradition of empirical findings and managerial approaches. On the contrary, a close examination of the literature reveals that only recently can a more systematic and structured approach to

conceptualize vulnerabilities and supply chain risks be traced (Harland, 2003; Norrman & Lindroth, 2002; Svensson, 2000 and 2002; Sheffi, 2002; Zsidisin, Panelli & Upton, 2000).

1.1.1 Supply Chain risk Management practices

In defining the concept of supply chain risk management, there is need to distinguish four basic constructs: supply chain risk sources, risk consequences, risk drivers and risk mitigating strategies. These constructs help us not only to probe the concept, but provide a basis for synthesizing the emergent themes and issues for future research.

According to Goldberg, Davis & Pegalis (1999) the uses of the term 'risk' can be confusing because it is perceived as a multidimensional construct (Zsidisin,1998).On the one hand, it is used to refer to uncertainty in environmental variables that reduce outcome predictability. In this regard, 'risk' actually refers to a source of risk and uncertainty, such as 'political risks' and 'market risks' or, from a supply chain view, 'the volatility of customer demand'. On the other hand, the term risk is also used when referring to the consequences of risks, i.e. to the potential outcome indicators. In this sense, the terms 'operational risks', 'human risks' or 'risks to customer service levels' are consequences of risks becoming events.

In defining the concept of supply chain risk management, there is need to adopt the definition by March & Shapira (1987), and define 'risk' as "the variation in the distribution of possible supply chain outcomes, their likelihood, and their subjective values". From supply chain perspective, these uncertain variations or disruptions affect the flows of information, materials or products across organization borders (LaLonde,

1997). Supply chain risks hence comprise “any risks for the information, material and product flows from original supplier to the delivery of the final product for the end user.” In simple terms, supply chain risks refer to the possibility and effect of a mismatch between supply and demand. ‘Risk sources’ are the environmental, organizational or supply chain-related variables which cannot be predicted with certainty and which impact on the supply chain outcome variables. Risk consequences are the focused supply chain outcome variables like e.g. costs or quality, i.e. the different forms in which the variance becomes manifest.

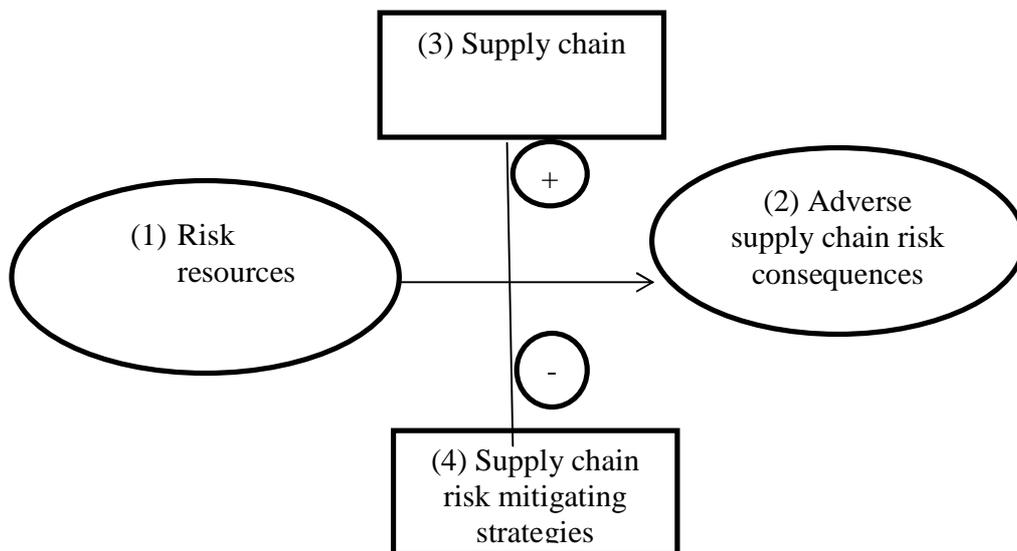
Among practitioners, risk taking is generally seen as an integrated and important part of management (March & Shapira , 1987).In their observation, risk taking equals decision making under uncertainty and hence any strategic choice has certain risk implications. For supply chain contexts, Hall (1999) noted that the relationship between corporate strategy, risk and the implications for supply chain management are poorly understood and in need of further exploration.

In defining the concept of supply chain risk management, there is a need to make a distinction between supply chain risk drivers and risk mitigating strategies. Several writers noted that some of the influences on contemporary supply chain management in the last decade, such as for example the globalization of supply chains or the trend towards outsourcing, have exacerbated the risk exposure as well as the impact of any supply chain disruption (Christopher & Lee, 2001; McGillivray, 2000; Engardio, 2001). Since competitive pressures are often the drivers of risk, Svensson (2000 & 2002) uses

the term “calculated risks” that a company takes in order to improve competitiveness, cut on costs, and improve profitability.

Risk mitigating strategies on the other hand are those strategic moves organizations deliberately undertake to curb the uncertainties identified from the various risk sources (Miller, 1992). The four, interrelated constructs of supply chain risk management are summarized in the following figure.

Figure 1.1: Supply chain risk management constructs



Source: Christopher, Martin & Peck (2004)

From this structure, the terms supply chain vulnerability and supply chain risk management can be derived: Supply chain vulnerability is “the propensity of risk sources and risk drivers to outweigh risk mitigating strategies, thus causing adverse supply chain consequences”. Whereas from a single firm perspective, the adverse consequences affect a firm’s goal accomplishment (Svensson, 2000 & 2002), in a supply chain context, they

jeopardize the supply chain's ability to effectively serve the end customer market. Supply chain risk management aims to identify the potential sources of risk and implement appropriate actions to mitigate supply chain vulnerability. Consequently, it can be defined as: "the identification and management of risks for the supply chain, through a coordinated approach amongst supply chain members, to reduce supply chain vulnerability as a whole."

1.1.2 Telecommunication industry in Kenya

"Historically, mobile telephones were first introduced in the Kenyan market in 1992, but the real diffusion of this technology and of affordable services started in 1999 when the Communications Commission of Kenya (CCK) was established and the newly privatized companies, Safaricom and Airtel Kenya (previously known as Ken Cell, Celtel and Zain Communications) were licensed by CCK to provide mobile services. These two operators, currently providing mobile connectivity in Kenya, have covered gradually the majority of the populated areas, and they are still continuing in this trend of growth."(Manica & Vescovi, 2008).

Currently, Kenya is ranked as one among the most advanced countries in the field of mobile telecommunication industry in Africa. Literature indicates that by the end of 2007, Kenyan mobile operators had offered services to more than ten million people. By the year 2012, it was estimated that more than 80% of Kenyans were covered by mobile network signals. The network is still growing and mobile operators are extending their coverage reaching even more remote areas of the country, In one year, from 2006 to 2007, the cellular mobile services recorded an increase in the number of channels

installed in GSM base station transmitters, from about 15,000 to about 20,000. This increase could be attributed to the increased subscriber base, requiring mobile operators to increase investment in network expansion (Kiberen, Musiega & Juma, 2013).

Safaricom, Ltd is a leading mobile network operator in Kenya. It was formed in 1997 as a fully owned subsidiary of Telkom Kenya. In May 2000, Vodafone group Plc of the United Kingdom acquired a 40% stake and management responsibility for the company. Safaricom employs over 1500 people mainly stationed in Nairobi and other big cities like Mombasa Kisumu, Nakuru and Eldoret in which it manages retail outlets. Currently, it has nationwide dealerships to ensure customers across the country have access to its products and services. As of December 2012, Safaricom subscriber base was approximately 19.8 million. Its headquarters are located in Safaricom House, Waiyaki Way in Westlands, Nairobi. Its main services and products include: Voice calling services, message services, mobile banking services, internet services among others (www.safaricom.co.ke). Its main rival is Airtel Kenya. Other rivals include Essar's YU and Orange Wireless (CCK, 2012).

Airtel Kenya ltd was launched in Kenya in 2000 as Kencell and rebranded to Zain in 2008 and finally Airtel in 2010. The company boasts of being Kenya's most innovative mobile phone operator. The company offers a host of services which include; Airtel Money, prepaid & postpaid plans, network connectivity, international roaming, and sms internet access (www.airtel.co.ke). Airtel Kenya has seen itself grow tremendously from network connectivity and quality of services despite continuous rebranding. 2012. (CCK, 2012)

Telkom Kenya was established as a telecommunications operator under the Companies Act in April 1999. The company provides integrated communications solutions in Kenya with the widest range of voice and data services, fixed lines, mobile technology and internet facilities for residential and business customers (Kiberen, Musiega & Juma, 2013). Telkom Kenya's partnership with France Telecom Group saw the launch of the Orange brand in Kenya in 2008. Orange Telkom had a subscriber base of over 3.2 million subscribers by December 2012 according to the (CCK, 2012) quarterly report.

Essar Telecom Kenya is Kenya's fourth mobile cellular network under the brand "yuMobile", launched in December, 2008. YuMobile grew its network coverage in Kenya fast and boasts of this achievement within 10 months from the date of its launch. The network had a subscriber base of over 2.4 million by December 2012 (CCK, 2012). YuMobile offers several innovative products and service offerings all target easier and more convenient. The services include; Yu cash, internet services, SMS services, and voice call services among others (www.yu.co.ke).

1.2 Statement of the Problem

The mobile telecommunications' supply chains have undergone major shifts during the past decade, and are still turbulent. Because of demand uncertainty in both level and timing, the roles and responsibilities in the supply chains are changing, often accelerated by outsourcing, leading to initially unclear interfaces. There is also strong growth and consolidation among suppliers, leading to shifts in the power balance, and different business logic and clock speed among the players (Agrell, 2002). Significant supply

chain disruption can reduce company's revenue, drop into market share, increase cost and negatively impact production distribution. The challenges portrayed above cannot be ignored because the mobile telecommunication industry plays a significant role in the economy. To ensure sustained operational efficiency, Supply chain risk management has to be put in place in mobile telecommunications industry (Ruud, 2006).

There have been various studies on mobile telecommunications worldwide; an example is a study on collaboration, innovation, and value creation in a global mobile telecommunication. The researcher found out that complexity can be dealt by engaging with others and sharing information – building mutually beneficial relationships across internal and external value networks to share knowledge and therefore handle business challenges (Alleand, 2006).

A number of studies had been conducted regarding the Kenyan mobile telecommunication industry in general. Mwangi (2012), studied influence of social media on customer service in Safaricom limited, she found out that social media has enabled the company to work more efficiently and innovative and gain more customer satisfaction when it comes to customer service, there had been a great increase in customer satisfaction levels and also increased number of users of the social media channels. Mukhwana (2010), studied supply chain management practices and performance at Safaricom Limited. Findings of the study were that there existed very strong supply chain management practices in Safaricom and there were evidence of superior operational performance within the supply chain.

In Kenya, a number of studies on supply chain risk management had been conducted. The Strathmore Governance Centre organized a workshop on the theme: 'Risk Management in the Domestic Supply Chain for Health Commodities'. They concluded that there are many complexities that affect the distribution of the drugs to the consumers, which are often relate to corruption, incompetence and inadequate resources. These issues points down to the integrity of individuals in the supply chain. (Workshop on governance in the health sector, 2008). Ambato (2012), studied supply chain vulnerability and customer satisfaction on petroleum products in Kenya, the study revealed that there is a positive relationship between the causes of supply chain vulnerability and customer dissatisfaction. The factors targeted as the causes of supply chain vulnerability like focus on efficiency rather than effectiveness, reduction of supplier base, volatility of demand, lack of visibility and control, natural calamities, just in time production system and regulations have a negative effect on customer satisfaction elements studied like price, speed, quality, delivery time and flexibility.

From the studies discussed above, little has been done regarding Supply chain risk management in mobile telecommunications. It is against this background that the study sought to fill the existing research gap. The study therefore sought to address the following questions; which supply chain risk management has been adopted by mobile telecommunication industry in Kenya? And what are the challenges being encountered during implementation of these supply chain management?

1.3 Objectives of the Study

The research intended to address the following objectives with regard to supply chain risk management in mobile telecommunication industry in Kenya.

- i) To determine the supply chain risk management practices commonly implemented by mobile telecommunication industry in Kenya.
- ii) To determine effectiveness of supply chain being implemented by mobile telecommunication industry in Kenya.
- iii) To determine challenges encountered while implementing supply chain risk management by mobile telecommunication industry in Kenya.

1.4 Value of the Study

To the mobile telecommunication industry players, findings from this study will provide an insight into the various SCRM in use that have ensured sustained competitiveness in mobile telecommunication industry.

To the other firms dealing with the mobile telecommunication industry players, findings from this study will enable them have a better understanding of the mobile telecommunication industry and enable them make well informed business decisions.

To the academicians and researchers, they may use the findings from this study as a source of reference. Besides, the study will be a basis for further research

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This literature reviews various studies and theories in relation to supply chain risk management practices employed by various organizations

2.2 Supply Chain Risks

Supply chain risks can take many forms (Harland, 2003; Morgan, 2004) and so lack of knowledge about various type of risk becomes a bottleneck in risk minimization. Researchers like Finch, Norrman & Jansson (2004) have classified various supply chain risks which includes; disruptions, these are rare but very damaging like natural disasters or more recently terrorism related. Although it is impossible to eliminate such risks but organizations can certainly develop contingency plans to minimize the impacts of such risks. Another risk observed by researchers is delays which may results due to poor quality, inflexibility at supplier end, excessive inspection and change of transportation mode. If anyone link of a supply chain is made to wait then the whole supply chains is greatly affected. They further noted system risk, in today's highly networked environment has made the risk of system failure an important issue for supply chains. The sources of these risks include virus, worms, hackers and employee frauds. They also classified forecast as a risk, this risk can cause havoc as product life cycles have shrunk and customers have plenty of choices in the market. Any one working in the domain of supply chain management must be aware of the "bullwhip effect" which is the result of non-availability of correct information to all the links of the supply chain.

The other classifications of risks by the same researchers include; intellectual property risks, intellectual property decides about a company's survival, as the investments to create IP are substantial. The risk is that as companies are focusing more on their core competencies and outsourcing other activities there are chances of intellectual property information being passed to competitors as there may be suppliers working for competing organizations. The other risks they observed are corporate social responsibility risks - In the wake of customers being more aware about the environmental, legal issues organizations are becoming more serious to not only becoming more socially responsible but also forcing their suppliers to stick to the standards and regulations. The reason for this concern is because organizations are outsourcing from many locations around the globe, it may happen that violations of human rights or environmental degradation by the suppliers may lead to a negative publicity and loss of customer goodwill. Finally is chaos risks - These risks are the result of over-reactions, unnecessary interventions, second-guessing, mistrust, and distorted information throughout a supply chain (Christopher & Lee, 2004). The well-known "bullwhip" effect, which describes increasing fluctuations of order patterns from downstream to upstream supply chains, is an example of such chaos.

2.3 Managing Supply Chain Risks through Agility

Agility concept popularized in early nineties by a group of scholars at Laccoca Institute of Lehigh University in USA, has emerged as an important competitive weapon for companies operating in today's volatile markets.

Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile market place (Mason, Naylor & Towill, 2000).It is a business-

wide capability that embraces organizational structures, information systems, logistics processes and in particular, mindsets (Christopher & Towill, 2001). As the effectiveness of an organization's response to rapidly changing market conditions will be largely determined by the capabilities of trading partners, the concept of agility has also been extended beyond the traditional boundaries of the individual organization to encompass the operations of the supply chain within which the organization operates (Power, Sohal & Rahman, 2001). The essence of an agile supply chain is its ability to respond quickly and efficiently to a volatile marketplace.

Companies like GE lighting, HP, ZARA reduced uncertainties and vulnerabilities for themselves and their supply chain partners by transforming their supply chains into more agile entities (Prater et al, 2001). According to researchers Yusuf, Gunasekaran, Adeleye and Sivayoganathan (2004); Christopher & Lee (2001) there are four distinguishing characteristics of an agile supply chain which includes; market responsiveness, this involves understanding and capturing quickly the need of the customers in order to create the competitive position of the organizations. It also requires that the whole supply chain should quickly adapt to the changing market requirements. The researcher also identified network integration as agile characteristics and proposes that supply chains should take advantage of the capabilities of its partners in fulfilling the customer requirements.

Process integration was also noted by researchers as another characteristic of agile supply chain. It requires collaborative working between buyers and suppliers, joint product development, common systems, and shared information. Virtual Integration is also a characteristic of agile supply chain according to (Yusuf, Gunasekaran, Adeleye &

Sivayoganathan, 2004; Christopher & Lee 2001). They noted that due to leveraging latest IT tools, supply chains are now becoming virtual and information based rather than the traditional inventory based. The new “paradigm” for agile competition concerns the ability to respond to unexpected changes, to survive unprecedented threats from the business environment, and to exploit changes as new business opportunities (Kidd, 1995) which require that agile thinking needs to grow to accommodate the full gamut of supply chain activities (Kasarda & Rondinelli, 1988). Creating an agile supply clearly requires a number of significant changes to the status quo, which necessitates supply chain managers, to act as change managers with not just managing change within the organization, but managing change in the way that relationships between organizations are structured (Christopher & Towill, 2001).

2.4 Framework to Manage Risks in a Supply Chain

Risk management processes include an understanding of the risks and develop strategies to curb their impact. There is a proposed framework to manage risk and this includes; analyzing risks from a supply chain perspective, organizations normally plan for risks that impact their operations but tend to ignore those risks that may impact their partners. To assess supply chain risk exposures, the company must identify not only direct risks to its operations, but also the potential causes or sources of those risks at every significant link along the supply chain. Improved understanding about risks in a supply chain helps to make better decisions and decreases the risks of both a single organization and a whole network. One important tool is risk mapping, i.e. using a structured approach for mapping risk sources and thereby understanding their potential consequences. Simulation and

Analytics approaches that include techniques like the “fault tree analysis” (FTA), “What If” scenarios; “event tree analysis” (ETA) should be used to carry out analysis of the factors and causes contributing to supply chain disruptions.

Strategic supply chain risk planning is another framework that manages risk in supply chain. It provides a framework for proactive decision making to assess continuously what could go wrong, determine which risks are important to deal with, and implement strategies to deal with those risks. Although at the strategic level supply chain risk management is relatively new but slowly organizations are learning their importance to meet the expectations of the marketplace. In the long run companies that would be able to survive and thrive in the turbulent marketplace would be those that can identify and develop contingency plans for the various risks that exist internally and externally to their supply chains.

Regularly monitor current and potential suppliers for possible supply chain risks also provides framework for managing risk; Ultimate supply chain success depends heavily on the performance of all links in the network. This requires monitoring and assessment of the supplier on dimensions like financial stability, quality, price competitiveness, and location risks. Also critical suppliers should be required to have contingency plans in place for potential supply chain disruptions.

Improve visibility and control is also important as a framework for managing risk. It is necessary that all the partners in a supply chain work on the same information, ideally, which should be available in real time. Apart from this all the partners should have the

knowledge about basic figures like order status, pipeline inventory, actual demand and forecasts etc. The best strategy to improve visibility is to facilitate the process of information sharing among the partners. This would reduce the uncertainties and consequently improve the overall performance of the supply chain. Along with improving the visibility, supply chain managers should develop the capability to react to sudden fluctuations in demand. Because of its reach and common standards, Internet has emerged as a dominant vehicle to carry and share information among the partners in a supply chain.

Support to partners is also very critical framework in managing risk. When we move across from Tier I to Tier II to Tier III levels in a supply chain it would be visible that the suppliers are usually small and medium enterprises. These companies generally have the objectives of maximizing their returns and so they have little strategic planning regarding risks. So large organizations should provide support in educating them about the risks and strategies to minimize them. Joint meetings, workshops are to be conducted on regular basis to facilitate the suppliers understand their responsibilities in managing risks in the supply chain.

Understand the trade-offs of various risk mitigation strategies is another framework on risk management. Supply chain risk can be managed by various strategies like having redundant suppliers, safety stock, flexibility and responsiveness. Each of the option has its benefits and similarly downsides. So supply chain managers should have a clear understanding of the trade-offs associated with various options in managing risks. Generally in supply chain managers would use a mix of these strategies to manage risks.

Risk sharing arrangements is equally important framework on risk management. There should be a well-defined arrangement of risks sharing among the partners of the supply chain. This is necessary, as smaller enterprises cannot absorb the risks solely without the support from their partners. Risk sharing arrangements would also facilitate more sharing of information and development of trust among supply chain partners, which is crucial for smooth functioning of the supply chain (SCMS Journal of Indian Management, 2006).

2.5 Barriers to Risk Mitigation in a Supply Chain

Risk management in a supply chain is not an easy task as it involves organizations which may have conflicting objectives and whose knowledge about risks is limited to the individual company. Sinha, Whitman & Malzahn (2004), Christopher & Lee (2001), and Finch (2004), identified various factors that hinder risk mitigation and these include; lack of trust among supply chain members which makes it difficult for them to share information, have no clear arrangement for revenue sharing and so there would be no motivation to work for a common goal. Another factor identified was adversarial competitive relationships; this type of relationship seeks to minimize the price of purchased goods and services (Faisal, Banwet & Shankar, 2004).

Though there has been a lot of literature in supply chain management strongly recommending long-term collaborative relationships with the suppliers, today many organizations are opting for low cost destinations like China, Taiwan with the single purpose of minimizing the cost. The researchers also identified misaligned Incentives as another factor. Narayanan & Raman (2004) observed that misaligned incentives are often

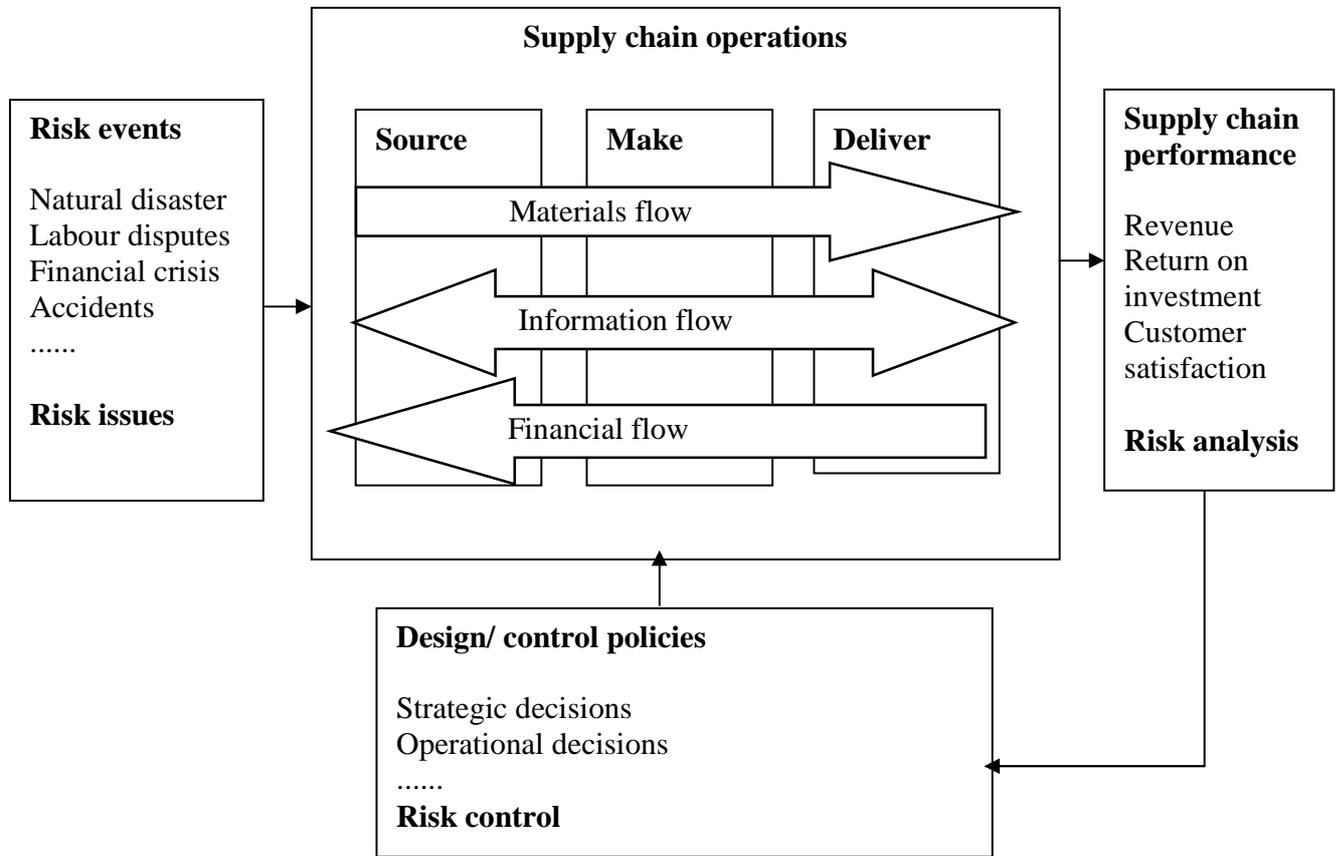
the cause of excess inventory, stock-outs, incorrect forecasts, inadequate sales efforts, and even poor customer service. All this also adds to the overall risk susceptibility of the supply chain.

Information distortion was also identified by the researchers as another factor, the causes of information distortion include promotions and incentives that lead to forward buying; batching of purchases, which leads to higher volatility in orders; and lack of knowledge of end customer demand at upstream locations. The “bullwhip effect” is the result of the information distortion as we move from one end to other in the supply chain. Lack of correct information makes the efforts to manage risks in a supply chain a difficult task. Low priorities to risk management also possess hindrance to risk mitigation. In most cases organizations focuses on strategies that would increase their revenues, while neglecting risk issues that require manpower and finances without immediate returns. This is because all the supply chain risks have associated probabilities and if a risk never materializes, it becomes difficult to justify the time spent on risk assessments, contingency plans, and risk management (Zsidisin, Panelli & Upton, 2000).

2.6 A-SCRM Conceptual Framework

The figure below shows that the continuity of supply chain operations can be affected by various risk events. A solid risk analysis process could identify the impact of disruption on supply chains. This could be established by monitoring supply chain performance, for example the production or financial performances. With a proper implementation of risk control, for instance via risk mitigation strategies, the impact of disruption on flows could be diminished, or even avoided.

Figure 2.1: A supply chain risk management conceptual framework



Source: Research data (2013)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, the population and how the data was collected and analyzed

3.2 Research Design

This research project adopted a census study. This research design is considered appropriate as it deals with every member in the population.

3.3 Population

The population of the study was four mobile telecommunication companies in Kenya i.e. Safaricom limited, Airtel Kenya limited, Yumobile limited and Orange Kenya limited. According to CCK, 2012; Register of mobile Telecommunications Licensees, there are four register mobile companies in Kenya (See appendix II)

3.4 Sample

Stratified random sampling design was used in the study. This method was appropriate because was able to represent not only the overall population but also the key sub groups at the populations. The method was considered appropriate as it minimized biasness. The general procedure for taking a stratified sample was to stratify population, defining a number of separate partitions using sample size, and then the researcher combined the results to obtain the required stratified sample. The respondents were supply chain manager, procurement manager, logistics manager, warehouse manager, 10% randomly selected stock controllers (see appendix III) and a supplier randomly selected from each provider. There were 37 respondents.

3.5 Data Collection

In order to determine the SCRM practices in the mobile telecommunication industry and the challenges encountered while implementing these supply chain risk management practices, semi-structured questionnaires was used collect primary data. These questionnaires had both open-ended questions that aimed to elicit qualitative responses from the respondents and close ended questions that aimed to elicit quantitative data for statistical analysis. In particular, the combination, or “triangulation”, of quantitative and qualitative methods rests on the premise that the weaknesses of one method will be compensated by the counter-balancing strengths of another method in order to capture a more complete, i.e. holistic and contextual portrayal of the units under study (Jick, 1979; Aastrup & Halldórrsson, 2008; Boyer & Swink, 2008). The questionnaires was administered by drop- and –pick- later method.

The questionnaire had three sections: section one targets general information of the participant and the organization. Section two seeks to identify the risks and SCRM practices adopted in the mobile telecommunication in Kenya while the third section addressed the challenges encountered while implementing supply chain Risk management practices. This made it easier to get adequate and accurate information necessary for the study

3.6 Data Analysis

Data analysis was done by checking the questionnaires for correct completion and entries checked for consistency and accuracy. Then it was arranged to simplify coding and tabulation. To determine the SCRM practices adopted by the mobile telecommunication in Kenya and the challenges encountered while implementing supply chain risk management, descriptive statistics was used by way of percentages, proportions and frequency distributions to analyze the data.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter covers data analysis, discussions and findings of the research. The data was summarized by means of statistical averages (including rankings) and presented in the form of tables and charts. Out of 37 questionnaires distributed, 31 were completed and returned representing a response rate of 83.78%, which was considered satisfactory for subsequent analysis.

4.2 General Information

The respondents were asked to state whether there exist supply chain risk management in their organization or not. From the research findings, it was established that 100% of the mobile telecommunication companies in Kenya have supply chain risk management. This means that all mobile telecommunication companies have realized the benefits of supply chain risk management in an organization. Supply chain executives in IBM believe that supply chain risk management (SCRM) is the second most important issue for them (IBM, 2008). Also, the research by AMR in 2007 reported that 46% of the executives believe that better SCRM is needed (Hillman & Keltz, 2007). A 2009 survey of 100 executives identified SCRM as the main risk area (Hannon, 2009).

Respondents were also asked to indicate the duration by which their supply chain risk management departments have been operational. From the research findings, it was established that 75% of the mobile telecommunication industry in Kenya have had their supply chain risk management departments for 1-5 years while 25% of them have had their supply chain risk management department for more than 10 years. None of the

mobile telecommunication companies has a supply chain risk department operating for less than one year. This suggests that mobile telecommunication companies have adopted supply chain risk management into their operations for a long period.

4.3 SCRs Facing Mobile Telecommunication Industry in Kenya

The respondents were asked to indicate the supply chain risks affecting their organizations. The research findings have been summarized in table 4.1 below.

Table 4.1: Supply Chain Risk Facing Mobile Telecommunication Industry in Kenya

Category	Risk	Frequency	Percentage	Average percentage
	Plant fire	14	45.16	
Political system	War, terrorism	25	80.65	
	Labor disputes	29	93.55	
	Customs and regulations	10	32.26	62.90
Competitor and Market Price	Fluctuation	28	90.32	
	Economic downturn	25	80.65	
	Exchange rate risk	27	87.10	
	Consumer demand volatility	28	90.32	
	Customer payment	20	64.52	
	New technology	29	93.55	
	Changes in competitive advantage	27	87.10	
	Obsolescence	19	61.29	81.85
Internal Available capacity	Capacity cost	12	38.71	
	Financial capacity/insurance	13	41.92	
	Structural capacity	10	32.26	
	Supplier bankruptcy	23	74.19	46.77
Internal operation	Forecast inaccuracy	22	70.97	
	Safety (worker accidents)	28	90.32	
	Bullwhip effect	27	87.10	
	Agility/flexibility	25	80.65	
	Holding cost/order fulfillment tradeoff	14	45.16	
	On-time delivery	19	61.29	
	Quality	27	87.10	74.65
Information system	IS breakdown	28	90.32	
	Distorted information	19	61.29	
	Viruses/bugs/hackers	9	29.03	60.21

Source: Research data (2013)

Respondents were also asked to list any other supply chain risks in mobile telecommunication companies in Kenya that were not included in the questionnaire. From the research findings it was established that they include strategic risks at the business unit, distribution risk, intellectual risks and risks at supplier premises. This implies that the list of supply chain risks cannot be fully covered. The increasing numbers of research studies on supply chain disruptions resulting from economic and political instability, volatile market dynamics, natural disasters or human actions, have shown that risk issues are becoming the new norm in supply chain operations (Berger et al., 2004; Christopher and Lee, 2004; LaLonde, 2004; Norrman and Jansson, 2004; Poirier et al., 2007; Quinn, 2006; Tang, 2006).

4.4 SCRM Practices Implemented by Mobile Telecommunication companies in Kenya

Respondents were asked to select supply chain risk management practices that have been adopted in their mobile companies. The research findings have been summarized in the table 4.2 below.

Respondents were also asked to list any other supply chain risk management practices in mobile telecommunication companies in Kenya that were not included in the questionnaire. From the research findings it was established that they include insurance, use of technology like GPS, education and training supplier quality management. This implies that the list of supply chain risk management practices cannot be comprehensively covered.

From the findings it was established that most mobile telecommunication companies have adopted supply chain management practices. However cyber supply chain risk management has not been well implemented compared to others and this poses more threat to supply chain operations. To reduce vulnerability, there have been calls for “resilience” (Shefi, 2005) or “robustness” (Tang, 2006).

Table 4.2: SCRM Practices Implemented by Mobile Telecommunication companies in Kenya

Practice	Frequency	Percentage
Personnel security reviews	31	100
Enhanced perimeter defense systems to detect intrusions.	31	100
A standardized Process for pre-qualifying suppliers.	28	90.32
Corporate-wide Capabilities in cyber security emergency Response.	25	80.65
An integrated IT supply chain life cycle testing/assurance approach.	28	90.32
Vendor security audits and contractual Mandates/penalties for security violations.	25	80.64
A Cyber Supply Chain Risk Management Plan.	19	61.29
An integrated IT supply chain dashboard/control panel.	21	67.74
Formal risk registries, a shared online database of IT supply chain risks.	22	70.97
Process Integration	28	90.32
Free phone support	26	83.87
Risk sharing Arrangements	27	87.10

Source: Research data (2013)

4.5 Challenges facing supply risk chain management implementation

Respondents were asked to select challenges facing supply chain risk management implementation in mobile telecommunication companies in Kenya. The research findings have been summarized in table 4.3

Table 4.3: Challenges facing supply chain risk management implementation

Challenge	Frequency	Percentage
i) Lack of management support	27	87.10
ii) Lack of understanding the supply Risk chain management concept	25	80.64
iii) Lack of government support	30	96.77
iv) High investment costs in terms of technology	30	96.77
v) Lack of qualified SCRM personnel	27	87.10
vi) Increasing fierce competition within the industry	30	96.77
vii) Turbulent nature of the telecommunication industry	29	93.55
viii) Current organizational arrangement structure	24	77.42

Source: Research data (2013)

Respondents were also asked to list any other challenges facing supply chain risk management implementation in mobile telecommunication companies in Kenya but have not been stated in the questionnaire. From the research findings it was established that they include fear of losing vital information to competitors and ever changing technology.

From these findings it was established that effective supply chain risk management has been hindered by lack of government support, high investment costs in terms of technology and increasing fierce competition within the industry. Supply chain risk management is not an easy task as it involves organizations which may have conflicting objectives and whose knowledge about risks is limited to individual company (Sinha et al 2004).

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study has determined the supply chain risk management practices preferred by mobile telecommunications companies in Kenya and the challenges they face while implementing supply chain risk management.

The first objective of the study to ascertain the supply chain risk management practices adopted by mobile telecommunication companies in Kenya has been compounded by the fact that all of these companies have established supply chain risk management departments. It was found that most of the supply chain risk management departments in these companies have been in operation for more than a year.

The study noted that all mobile telecommunication companies have adopted personnel security reviews and enhanced perimeter defense system as the main supply chain risk management. The companies have also ensured a standardized process for pre-qualifying suppliers, an integrated IT supply chain life cycle testing/assurance approach and Process Integration have been adhered to.

Strategic relationships with suppliers have been achieved by mobile telecommunication industry in Kenya through formal risk registries, a shared online database of IT supply chain risks and risk sharing arrangements, all this done with intention of minimizing supply chain risk associated with supplier. It is necessary to create multifunctional logistics and quality teams

that include other departments to support supplier. However some mobile telecommunication companies have not implemented cyber Supply chain risk management plan, which is great threat to supply chain.

The second objective to ascertain effectiveness of supply chain risk management was explained under conceptual framework which clearly illustrated the gains that can be gotten on supply chain risk management adoption. These gains include revenue, return on investment and Customer satisfaction. However, failure to adoption of the supply chain risk management can also lead to great loss like Labour disputes, financial crisis and accidents

The third objective of the study is backed by findings which revealed that there were challenges faced while implementing supply chain risk management as a result of high investment costs in terms of technology and lack of government support. The turbulent nature of the mobile telecommunication companies and the current organization arrangement structure and culture were found to have same hindrance to supply chain risk management adoption in mobile telecommunication industry. A few mobile telecommunication companies had been hindered by lack of management support to supply chain risk management adoption.

5.2 Conclusions

Even though most mobile telecommunication companies in Kenya have adopted supply chain risk management practices to a very large extent, they have not fully embraced

them in their operations. This is evident from the way respondents replied to questions and the analysis arising thereof. This study has shown that even though there is high adoption of supply chain risk management practices in the mobile telecommunication industry, most of them are concentrated on personnel security reviews and enhanced perimeter defense system.

Mobile telecommunication industry should endeavor to fully embrace the supply chain risk management practices and use them in driving them to world class status to ward off any competition within the industry.

5.3 Recommendations

This study recommends that the supply chain risk management concept should be addressed with great concern in the mobile telecommunication industry in Kenya. The management of mobile telecommunication industry in Kenya believes lack of understanding the supply chain risk management concept has derailed adoption of supply chain risk management.

Supply chain risk management practice has a place in the Kenyan mobile telecommunication industry if awareness is created. This calls for the need to address all the challenges that hinder implementation of supply chain risk management. The government should provide financial incentives to mobile telecommunication companies and tax breaks to stimulate adoption of supply chain risk management. The players also need to invest more with the latest technology innovations in supply chain risk management.

5.4 Limitations of the study

This study was successfully undertaken but not without a few limitations. One such limitation was that some of the respondents declined to respond to the questionnaires. The time period covered by the study and the resources available to the researcher were also limited.

5.5 Suggestions for further research

This study was confined to the supply chain risk management practices in mobile telecommunication industry in Kenya. It would be of interest for future researchers to establish how the supply chain risk management practices have been used to ensure competitiveness in the mobile telecommunication industry. Similar research to this can be replicated in a few years to come to assess if these supply chain risk management practices have changed as more mobile telecommunication companies are introduced to the industry.

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APPENDICES

Appendix I: Questionnaire

This questionnaire is for the purpose of collecting data on Supply chain risk management in mobile telecommunications. This questionnaire will benefit the researcher in accomplishing academic goals. You are kindly requested to answer the questions genuinely and exhaustively. Please tick within the boxes and fill the structured questionnaire with applicable answer to enable the study to be successful.

Section A: General Information

1. Name of Employee _____ (Optional)
2. Indicate the Department you work in
 - i) Supply chain department ()
 - ii) Procurement department ()
 - iii) Stock controller ()
 - iv) Supplier ()
 - v) Warehouse department ()
 - vi) Logistics department ()

Section B: Supply Chain Risk Management Practices

1. a) Do you have a SCRM department in your Company?
 - i) Yes ()
 - ii) No ()
- b) If yes, for how long has the department been in operation?
 - i) Less than 1 year ()
 - ii) 1-5 years ()
 - iii) 6-10 years ()
 - iv) More than 10 years ()

2. a) Tick supply chain risk affecting your organization

Category	Risk	
	Plant fire	
Political system	War, terrorism	
	Labor disputes	
	Customs and regulations	
Competitor and Market Price	Fluctuation	
	Economic downturn	
	Exchange rate risk	
	Consumer demand volatility	
	Customer payment	
	New technology	
	Changes in competitive advantage	
	Obsolescence	
Internal Available capacity	Substitution alternatives	
	Capacity cost	
	Financial capacity/insurance	
	Structural capacity	
Internal operation	Supplier bankruptcy	
	Forecast inaccuracy	
	Safety (worker accidents)	
	Bullwhip effect	
	Agility/flexibility	
	Holding cost/order fulfillment tradeoff	
	On-time delivery	
Information system	Quality	
	IS breakdown	
	Distorted information	
	Viruses/bugs/hackers	

Others;

b) For each of these practices, tick the one that has been implemented in your organization.

practice	Tick
Personnel security reviews.	
Enhanced perimeter defense systems to detect intrusions.	
A standardized Process for pre-qualifying suppliers.	
Corporate-wide Capabilities in cyber security emergency Response.	
An integrated IT supply chain life cycle testing/assurance approach.	
Vendor security audits and contractual Mandates/penalties for security violations.	
A Cyber Supply Chain Risk Management Plan.	
An integrated IT supply chain dashboard/control panel.	
Formal risk registries, a shared online database of IT supply chain risks.	
Process Integration	
free phone support	
Risk sharing Arrangements	

C) Give any other supply chain risk management practices that your company has implemented to curb supply chain risks.

Section C: Challenges facing SCRM implementation

1. a) Tick the factors that have hindered implementation of supply chain risk management in your organization.

Challenge	Tick
i) Lack of management support	
ii) Lack of understanding the supply chain management concept	
iii) Lack of government support	
iv) High investment costs in terms of technology	
v) Lack of qualified SCRM personnel	
vi) Increasing fierce competition within the industry	
vii) Turbulent nature of the telecommunication industry	
viii) Current organizational arrangement structure	

b) Give any other challenges that hinder implementation of supply chain RISK management in your Organization-----

Appendix II: Mobile telecommunication companies

1. Airtel Networks Kenya Limited
2. Essar Telecom Kenya Limited
3. Safaricom Limited
4. Telkom Kenya Limited

CCK, 2012; Register of Telecommunications Licensees

Appendix III: Stock Controllers

Stock controllers

Provider	Shops	2 stock controller per shop	Sample (10%)
Airtel Kenya	10	20	2
Safaricom limited	39	78	8
Orange Kenya	29	58	6
Yumobile Kenya	4	8	1
Total			17

Source; Providers Profile 2013