SUPPLY CHAIN RISK MANAGEMENT PRACTICES AMONG TELECOMMUNICATIONS EQUIPMENT VENDORS IN KENYA: A CASE STUDY OF NOKIA KENYA

KENNETH MUSUNGU ALUDA

A research project submitted in partial fulfillment of the requirements for the award of the degree of master of business administration

School of business, University of Nairobi

2015

DECLARATION

This research project is my original work and has not been presented for award of a degree at the University of Nairobi or any other university.

Signature……Date……..

KENNETH MUSUNGU ALUDA D61/72725/2009

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

Signature……Date……

ONSERIO NYAMWANGE

DEDICATION

I wish to dedicate this project to my wife Roselyne and our daughters, Kelsey and Reyna for their inspiration.

ACKNOWLEDGEMENTS

My deepest appreciation goes to my supervisor Onserio Nyamwange for his guidance, input and support in preparation of this research paper.

Sincere thanks and appreciation go to my family who have been a great source of inspiration and encouragement.

My appreciation to the staff of Nokia Kenya who set aside their precious time to go through and complete the questionnaire.

And finally, All Glory goes to the Almighty God who has made everything possible.

ABSTRACT

An emerging high priority issue for supply chain executives to address is how to enhance operations to deal with supply chain disruption risks. Many companies are now finding that a major disruption to the supply chain can have a lasting impact on the financial picture, not to mention shareholder value. To address the emerging need for supply chain risk management, the research looks into some of the practices for enhancing operational resiliency and responsiveness to supply chain disruptions. The study, specifically, sought to identify the main Supply Chain Risks faced by Nokia Kenya, establish SCRM practices employed by Nokia Kenya and to determine the barriers to adopting SCRM practices by Nokia Kenya. A case study design which is an in-depth study of a particular research was adopted for this research so as to effectively realize the objectives of the study. The population included all the staff departments within supply chain management in Nokia Kenya. Research data was collected through a structured questionnaire, which was administered by use of "drop and pick up later" method. The data collected was analyzed using descriptive statistics. The statistical measure like frequency distributions, percentages and central tendency such as mean were used in this study. The study found that supply chain risks faced by Nokia include currency fluctuations, quality, taxes, customs, and other regulations, regulatory approvals as indicated and physical theft. The study also found that Nokia was using supply chain risk management tools like master data management tools, sourcing tools, operations planning tool, spend management analysis tool, sales tools and inventory optimization tool. The study further found that barriers to implementing supply chain risk management practices include concerns of increased costs, poor communication across supply chain and lack of adequate resources to implement SCRM practices. The study recommends that the managements of the telecommunication vendors should keep on doing regular risk assessments in their supply chains as a way of averting adverse effects of uncertainty. The firms can also benchmark themselves against the best players in the world as a way of improving their supply chain risk management practices. The study also recommends that Nokia as well as other organizations should adopt an information system that can allow information exchange across the supply chain. This will help the partners in the supply chain to make key decisions on the production of products. In addition, the study recommends that Nokia should increase its financial budget for Kenya and employ more staff so as to enhance the implementation of supply chain risk management practices.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

SCRM:	supply-chain risk management
SCRLC:	Supply Chain Risk Leadership Council
ICTs:	information and communications technologies
BPO:	Business Process Outsourcing
SCR:	supply chain risk
SCRMP:	Supply Chain Risk Management Process
ISO:	International Organization for Standardization
BSI:	British Standards Institution
SD:	Standard deviation
MAD:	Mean Absolute deviation

CHAPTER ONE: INTRODUCTION

1.1 Background

Nearly a decade ago, lightning struck a Philips microchip plant in New Mexico, causing a fire that contaminated millions of mobile phone chips. Among Philips' biggest customers were Nokia and Ericsson, the mobile phone manufacturers, but each reacted differently to the disaster. Nokia's supply chain management strategy allowed it to switch suppliers quickly; it even re-engineered some of its phones to accept both American and Japanese chips, which meant its production line was relatively unaffected. Ericsson, however, accepted Philips' word that production at the plant would be back on track in a week and took no action. That decision cost Ericsson more than US$400m in annual earnings and, perhaps more significantly, the company lost market share. By contrast, Nokia's profits rose by 42% that year (The Economist Intelligence Unit Limited, 2009).

Managing supply-chain risk is not new in itself, but examples such as the above show that the one constant in any strategy may be to expect the unexpected. The global economic downturn is a case in point. It has forced many companies to pay special attention to their supply chains, but recession or no recession, an efficient and adaptable supply-chain risk management (SCRM) strategy can be the difference between survival and success (The Economist Intelligence Unit Limited, 2009).

1.1.1 Supply Chain Risk Management Practices

The Supply Chain Risk Leadership Council (SCRLC, 2011) defines "supply-chain risk" as the likelihood and consequence of events at any point in the end-to-end supply chain, from sources of raw materials to end use of customers, and "supply-chain risk management" as

the coordination of activities to direct and control an enterprise's end-to-end supply chain with regard to supply-chain risks.

Modern enterprises increasingly find themselves relying on others for their success. Historically, enterprises have spent less than a third of their budgets on purchased goods and services, having relied on internal sources for these. Today, many enterprises spend most of their budget on purchased goods and services. This is in large part because of the advantages enterprises have found in strategies such as globalization, outsourcing, supply-base rationalization, just-in-time deliveries, and lean inventories. In addition, many companies have consolidated operations both internally and externally to achieve economies of scale (SCRLC, 2011).

While globalization, extended supply chains, and supplier consolidation offer many benefits in efficiency and effectiveness, they can also make supply chains more brittle and can increase risks of supply-chain disruption. Historic and recent events have proven the need to identify and mitigate such risks (Lee and Pierson, 2011).

According to SCRLC (2011), supply chain risk management practices include; identifying internal and external risk environments, risk identification and assessment, risk treatment and continual monitoring and review of risks and their treatment. Approaches for identifying, evaluating, treating, and monitoring supply chain risk will differ across individual enterprises depending on their industry, the nature of their extended supply chains, and their tolerance for risk (or risk appetite).

(Elkins, Handfield & Craighead, 2010) advances Strategic Sourcing or Advanced Procurement, Supply Base Management, Real-Time Operations Management and Enterprise Risk Management or Strategic Supply Chain Design as some of the best supply chain risk management practices.

The problems of SCRM and the means to address them will continue to change. This study sought to identify supply chain risk management practices in telecommunication industry in Kenya; a case of Nokia Kenya.

1.1.2 Telecommunication Vendors in Kenya

The Kenyan government has underscored universal access to information and communications technologies (ICTs) as a major objective of Vision 2030 – Kenya's economic blueprint that is aimed at propelling Kenya from a developed to a middle-income country in the next 19 years. It is expected that access to ICTs will contribute to the country's economic growth by reducing transaction costs, increasing business efficiency, improving educational standards and ensuring accountability on the part of government officials. The Kenyan government also acknowledges that ICTs will increase the country's productivity and raise the competitiveness of local businesses in a knowledge-based economy. According to Vision 2030, the economic impact of ICTs will be driven by the Business Process Outsourcing (BPO) sector. In 2008, the BPO sector generated almost 700 billion Kenya shillings (Kimutai, 2011).

Given that mobile telecommunication vendors are part of the wide and complex world of ICT, vendor availability is key to enhancing outsourcing in telecommunications operators. As the vendors fulfill contracts entered into with the operators, they are faced with many supply, demand, process, control and environmental risks. In Kenya, telecommunication sector currently supports 32.8 million mobile subscribers through the operators (CAK, 2015). Vendors have also developed an internal model to partner with other suppliers in an effort to be classified under major vendors.

Telecommunication vendors are companies that manufacture and sell equipment which make the transmission of data and communication physically possible. This is composed

of active/electronic infrastructure. The components of active infrastructure include base tower stations, microwave radio equipment, antennas, switches and transceivers. Some of the largest telecommunication vendors in the world and Kenya are Nokia, Ericsson, Huawei, ZTE and Alcatel Lucent. Telecommunication equipment vendors have to put all their efforts directed towards sustaining a competitive edge with the consistent delivery of innovative products. Telecommunication vendors must help network providers and associated hardware and software businesses transition into a complex but ultimately more elegant and less expensive landscape in which voice, video and data co-exist.

In Kenya, the key vendors in the telecommunications mobile industry are Ericsson, Huawei, Nokia Networks, ZTE and Alcatel Lucent (Dell'Oro, 2010). The telecommunications mobile operators include Safaricom, Airtel Kenya and Orange Telkom (CAK, 2015).

1.1.3 Nokia Kenya

Nokia is a multinational data networking and telecommunications Equipment Company headquartered in Espoo, Finland, and wholly owned subsidiary of Nokia Corporation. Nokia Networks has operations in around 150 countries. Nokia Networks has organized its operations into the following business units: Mobile Broadband and Global Services (Nokia, 2014).

Nokia has set up an operational base in Africa with three regional offices. Northern Africa, Southern Africa and Central, East and West Africa with headquarters in Nairobi. Nokia's main clients are Safaricom Kenya Limited and Airtel Limited. The solutions supplied to these operators are Base Transceiver Systems, Mobile Switching Center Server, Microwave solution, Customer Subscriber Database and Customer Experience Management. In providing these solutions, Nokia is contracted to provide an end-to end

solution to the operator which consists of supply of the equipment and provision of related services. Related equipment installation services provided by the local office are project management, installation and commissioning, testing and integration and after sales support. Third party equipment is procured either locally or globally while the main telecom (active) equipment is imported from Nokia factories (Nokia, 2014).

From the signing of the contract to acceptance of the equipment and services by its customers, there are many challenges and risks throughout the supply chain. Nokia employs various SCRM practices to eliminate or mitigate against such risks. It is the supply chain risk management practices by Nokia that was the subject of this case study.

1.2 Research Problem

An emerging high priority issue for supply chain executives to address is how to enhance operations to deal with supply chain disruption risks. In light of the events surrounding 9/11, the West Coast Port strike, the Iraq war, and the increasing development of global manufacturing operations in Eastern Europe and Asia, many executives are realizing that these extended supply chains are exposing their enterprises to an increased level of risk, unparalleled in our history. Many companies are now finding that a major disruption to the supply chain can have a lasting impact on the financial picture, not to mention shareholder value. To address the emerging need for supply chain risk management, the research looks into some of the practices for enhancing operational resiliency and responsiveness to supply chain disruptions (Elkins et al, 2010).

According to Elkins, et al (2010) the challenge to managing supply chain risks is that supply chain disruptions can occur for a wide variety of reasons such as industrial plant fires, transportation delays, work slowdowns or stoppages, or natural disasters. Companies running lean operations no longer have inventory or excess capacity to make up for

production losses, so that material flow problems rapidly escalate to wide-scale network disruptions.

Tummala and Schoenherr (2011) did a research on assessing and managing risks using the Supply Chain Risk Management Process (SCRMP) and found that supply chain risks can be managed more effectively when applying the Supply Chain Risk Management Process (SCRMP). The structured approach can be divided into the phases of risk identification, risk measurement and risk assessment; risk evaluation, and risk mitigation and contingency plans; and risk control and monitoring via data management systems, a research by Karne (2012) focused on supply chain risk management practices among state corporations in Kenya. He established that state corporations are not performing any of the best practices at needed levels as advanced by Elkin et al (2010). The closest study was done by Ngugi (2013) on supply chain risk management practices in the mobile telecommunications sector industry in Kenya based on the top four mobile telecommunications operators. The study revealed that the mobile telecommunications players under study have adopted supply chain risk management practices to a large extent but the practices are embedded only in their operations.

It is with this background that this study focused on supply chain risk management practices among telecommunication vendors in Kenya with reference to Nokia Kenya. This study aimed at answering the following questions among the telecommunications vendors in Kenya: What are the major supply chain risks faced by Telecommunications vendors in Kenya? What are some of the supply chain risk management practices by Telecommunications vendors in Kenya? What are some of the barriers to adopting the SCRM practices by the telecommunication vendors in Kenya?

1.3 Research Objectives

The objectives of the study were to:

i. Identify the main Supply Chain Risks faced by Nokia Kenya

ii. Establish SCRM practices employed by Nokia Kenya.

iii. Determine the barriers to adopting SCRM practices by Nokia Kenya.

1.4 Value of the Study

The results of the study are of great importance to telecommunications vendors to understand the main supply chain risks and how to manage them better. The results are a valuable input to supply chain departments in companies within the same industry in managing supply chain risks. The study also contributes more knowledge to the already existing literature in the field of supply chain risk management and thus help students and other researchers in their related studies.

CHAPTER TWO: LITARATURE REVIEW

2.1 Introduction

This chapter deals with related literature review of the study. It covers what other researchers have discussed and researched on in this area under study or areas related to this study. The chapter covers overview of supply chain risks, SCRM practices, SCRM processes and critical review.

2. 2 Supply Chain Risk Management

The terms ‘risk’ ‘uncertainty’ ‘disruption’ and ‘disaster’ are frequently and interchangeably used in supply chains to describe the perceptions and interpretations of individuals and organizations. A general interpretation of risk is influenced by the negative consequences of variation in expected outcomes, their impact and likelihoods (March and Shapira, 1987). Risk events are also studied with core supply chain activities and investigated with common business practices. Christopher and Peck (2004) relate the risks with the vulnerability and likelihood of being lost or damaged. Interruptions to the flow of information, material and finance from the original supplier to the end user which cause a mismatch between demand and supply are also considered as risks.

According to Singhal, Agarwal and Mittal, (2011), Supply Chain Management as a discipline has witnessed a tremendous growth during the last two decades. This growth has been noticed in terms of modeling and analyzing various issues arising due to the development of complex networks amongst different organizations not only within countries but also across the globe. These issues are mainly related to designing, planning and coordinating the material, information and money flows across the supply chains. But owing to increasing dynamism and uncertainty in the business environment risk issues are becoming key concerns to the organizations.

Effective management of risks is becoming the focal concern of the firms to survive and thrive in a competitive business environment. Thus the SCRM has emerged as a natural extension of supply chain management with the prime objective of identifying the potential sources of risks and suggesting suitable action plans to mitigate them. But developing an effective SCRM program is always a critical task and requires skills and expertise in multiple areas. Considerable work has been reported in the SCRM literature dealing with issues with qualitative and quantitative approaches.

2.3 Supply Chain Risk Management Process

The process begins with identifying internal and external risk environments. Enterprises may inadvertently overlook internal risks. These may include those posed by a rogue employee, as well as those posed by inadequate policies, strategies, or organizational structures. The external environment in which an enterprise, and its suppliers, must work will also pose differing risks. For example, some suppliers will face meteorological risks, while others, because of their distance, may have greater transportation risks. Mapping its supply chain can help an enterprise identify the risks it faces and how best to prioritize and address them. To prioritize and address risks, firms will need to identify criteria for determining what may pose a risk to its operations. One potential starting point is the supply chains for the products most affecting firm profitability (SCRLC, 2011).

According SCRLC (2011), once a firm understands how to identify risks, it may undertake risk identification and assessment, which includes risk identification, risk analysis, and risk evaluation. Risk identification may entail using a list of common risks including external risks such as natural disasters, accidents, sabotage, or labor uncertainty; supplier risks such as production problems, financial issues, or subcontractor problems; distribution risks such as cargo damage, warehouse inadequacies, or supply pipeline constrictions; and internal

risks such as personnel availability or facility unavailability. Such process will also involve prioritizing risks by the threat (as measured by likelihood and consequence) they can pose to a firm's operations (SCRLC, 2011).

Enterprises must also undertake continual communication and consultation as well as monitoring and review throughout this process. Monitoring and review entails not only evaluating the effects of risk treatment but also maintaining the plan and responding to changes in suppliers, processes, and regulation affecting elements of the supply chain. It also entails continually identifying opportunities for improvement (SCRLC, 2011).

2.4 Supply Chain Risk Identification and Assessment

Risks exist at discrete levels and entities within an organization. Manufacturing risks exist at manufacturing sites while supplier risks exist at supplier sites. Distribution risks exist at suppliers and in upstream and downstream transportation and logistics systems. Legislative, compliance, intellectual property, and regulatory risks exist at the country or regional level for multinational enterprises. Finally, strategic risks exist at the business-unit or corporate level (SCRLC, 2011).

Firms may use several criteria to identify risks (Moore, Grammich, and Bickel, 2007). Pareto analysis, also known as A-B-C analysis, can help firms identify the proportion of goods and suppliers on which it is most dependent in terms of profitability or criticality, and hence the goods and suppliers that can pose the most risk to the supply chain.

A solid risk management program, from initial deployment to sustainable operation, includes a robust and ongoing risk identification and assessment process. That is, it includes a risk-assessment process that is able to evaluate a wide variety of risks over time.

Developing an initial risk register, which is a one-time effort, is necessary to identify baseline risks. Too many organizations start a risk management program without knowing what threats the organization faces, or what consequence a disruption would have. As a result, they focus too much protecting against the wrong threats or too little protecting against threats that matter. Risk identification might begin with brainstorming sessions, previous risk assessments, surveys, or still other efforts to identify and list potential risks within supply-chain processes (SCRLC, 2011).

To identify risks, firms may also wish to consider number and location of suppliers, number and origin of shipments, contractual terms defining responsibility for shipping, modes of transport and routes for shipments and other logistics providers or partners involved in the supply chain (e.g., packaging companies, warehousing, trucking companies, freight forwarders, air or ocean carriers), who handle shipments.

According SCRLC (2011), the risk analysis process should estimate the likelihood and consequence of risks facing a firm and accordingly prioritize them for ultimate treatment. The enterprise should then undertake risk evaluation to rate the likelihood and consequence of risks before and after treatment to evaluate residual risk levels against acceptable risk levels, that is, their risk tolerance.

Once an enterprise understands its supply chain and analyzed its potential risks, risk treatment may include implementation of an effective supply-chain risk management program. Such a program should have at least three elements: protecting the supply chain, responding to events, and continuing business operations while recovering from events. Finally once an organization has established a SCRM program, including processes for identifying and treating risks, it should implement a monitoring program, evaluating plans, procedures, and capabilities through periodic review, testing, post-incident reports, and

other exercises. It should check conformity and effectiveness of the program, establish, implement, and maintain procedures for monitoring and taking corrective action as necessary. This includes reviewing other organizational changes that may affect SCRM.

According to Tummala, et al (2011), risk identification involves a comprehensive and structured determination of potential supply chain risks associated with the given problem. Understanding risks, related to such categories as demand, manufacturing, inventory disruption, capacity, supply and transportation is critical.

Khan (2010) groups sources of supply chain risks in five major categories. Demand risks examples being loss of major accounts, volatility of demand, concentration of customer base, short life cycles and innovative competitors. Supply risks examples include dependency on key suppliers, consolidation in supply markets, quality and management issues arising from off-shore sourcing, potential disruption at 2nd tier level, length and variability of replenishment lead-times. Process risks that include, manufacturing yield variability, lengthy set-up times and inflexible processes, equipment reliability, limited capacity/bottlenecks, outsourcing key business and process. Network risk that include asymmetric power relationships, poor visibility along the pipeline, inappropriate rules that distort demand, lack of collaborative planning and forecasts and bullwhip effects due to multiple echelons. Finally environmental risk that include natural disasters, terrorism and war, regulatory changes, tax, duties and quotas and strikes.

SCRLC (2011) groups risks into two major category as either internal or external risks. According to them external risks would further be grouped into end-to-end, supplier and distribution risks. End-to-end risks include natural disasters, accidents, sabotage, terrorism, political uncertainty, labor unavailability, market challenges, lawsuits, technological trends. Supplier risks include physical and regulatory, production problems, financial

losses and premiums, management and upstream supply risks. Finally distribution risks include infrastructure unavailability, lack of capacity, labor unavailability, cargo damage or theft, warehouse inadequacies, IT system inadequacies or failure, long, multi-party supply pipelines. Some of the internal risks include operational, political uncertainty, demand variability, personnel availability, design uncertainty, planning failures, financial uncertainty, facility unavailability, testing unavailability, enterprise underperformance, and supplier relationship management

A case study by Miklovic and Witty (2010) on how Cisco addresses SCRM presented at Gartner's Security and Risk Management Summit conference in 2010 had made the following key findings: A product-centric approach provides more business value than an incident-centric approach to risk assessment. For most businesses, transparency is critical to both internal and external support for supply chain resiliency and that senior management support is critical to success. Recommendations from the study included tailoring your resiliency challenge to your organization, making business continuity planning an essential foundation, picking your approach and incorporating resiliency in the supply chain design rather than focusing on post-disaster recovery.

Ceryno, Scavarda. Klingebiel & Yüzgülec (2013) view risk drivers as how certain trends on contemporary SCM responses to competitive pressures might increase or decrease the vulnerability of the supply chain, i.e. drivers are recognized as competitive pressures with risk implications. They link SCR drivers to globalization, product, outsourcing, reduction of the supplier base, focus on efficiency, partnerships and other close relationship, centralized distribution and centralized production.

2.5 Supply Chain Risk Management Practices

In general, an agile supply chain is all about being fast and flexible. Lee (2004) specifies that the main objectives of supply chain agility are to respond to short-term changes in demand or supply quickly and to handle external disruptions smoothly. Intuitively, agile supply chain is also highly market responsive, because it is able to fast react on sudden demand peaks. He further advances that innovative products should always require responsive supply chain that responds quickly to unpredictable demand in order to minimize stock-outs, forced markdowns and obsolete inventory.

Christopher (2000) defines four key characteristics for agile supply chain. First, an agile supply chain is always market sensitive with capability of reading and responding to real demand. Second, extensive demand and supply information sharing between buyers and suppliers creates a virtual supply chain where physical inventories are maximally replaced with information. The effective use of automated transaction systems, e.g. collaborative e-business solutions, between supply chain partners is often required for creating agility into operations. The third key characteristic for agility is deep process integration between the partners. The extensive demand information sharing also enables truly collaborative working methods, joint product development and common systems between buyers and suppliers. Fourth, agile supply chain typically is network based with shared targets. The supply chain partners create competing networks with committed and close relationships with their final customers.

A research project sponsored by General Motors, and conducted by the North Carolina State University Supply Chain Resource Consortium led by Elkins et al (2010) which interviewed different organizations in various industries, and explored post event analysis of several major disruption events recommended several best SCRM practices.

Strategic Sourcing or Advanced Procurement primarily deals with developing supply market intelligence, developing sourcing strategy, negotiation with core suppliers, and finalization of contracts for material or service supply. Screening and monitoring (regularly) current and potential suppliers with respect to potential supply chain risks through self-assessment templates or internally developed risk scoring methods (which can include risk metrics on quality, financial condition of supplier, technology leadership, price competitiveness, location risk exposure, shipping modes and routes exposure, etc.) to identify high likelihood/high severity potential disruptors, for use in the requests for quotations evaluation process. Ongoing monitoring of current and potential suppliers should include maintaining a database of suppliers and tracking assessment results, or risk scores over time. Require critical suppliers to produce a detailed plan of disruption awareness, and to identify supply chain risk management capabilities that can be executed if disruptions occur in the supplier's own supply base network. Include expected costs of disruption and operational problem resolution in the total cost equation derived through strategic sourcing decision process. Finally require suppliers to provide timely information and visibility of material flows that can be electronically shared with their enterprise (Elkins et al, 2010).

Real-Time Operations Management includes all processes from the point of delivery by the supplier and the banks/buffers of inventory held at warehouses, manufacturing locations, and distribution centers. Options to improve resiliency include: improving visibility of inventory buffers in domestic distribution channels at a part-level, to assist real-time contingency planning and mitigation execution, classifying buffered material for different levels of criticality to ensure appropriate inventory positioning (safety stock) to mitigate risk of disruptions, Training and educating key employees and groups to improve real-time decision-making capabilities, and equip managers and associates with plans and

processes for managing disruptions when and if they occur and finally developing real-time supply chain reconfiguration decision support, to enable evaluation and execution of contingency plans in response to disruption discovery (Elkins et al 2010).

Enterprise Risk Management / Strategic Supply Chain design are system-wide issues pertaining to disruptions, including system-wide supply chain redesign issues. Companies should develop predictive analysis systems, incorporating intelligent search agents and dynamic risk indexes at major nodes in the supply chain to identify potential problems (including likelihood of occurrence and potential impact if the disruption occurs), construct damage control plans for likely disruption scenarios, by modeling supply chain events and using scenario envisioning tools, utilizing supply chain redesign tools and models to understand cost tradeoffs between strategies such as increased inventory, premium freight, parts substitutability, or manufacturing process flexibility and enhancing system-wide visibility and supply chain intelligence, in the form of improved databases collecting daily or hourly snapshots of demand, inventory, and capacity levels at key nodes in the supply chain, including ports and shipping locations (Elkins et al, 2010).

Supply Base Management that deals with the ongoing day-to-day interaction with existing suppliers as well as the transportation of the material from these sources to domestic warehouses and points of use. It includes conducting weekly teleconferences with critical suppliers to identify current issues that may disrupt daily operations, and tactics to reduce them. Conducting a detailed disruption incident report and analysis following a major disruption event, using root cause and/or failure mode and effects analysis to learn from and prevent recurrence of similar events. Create an “Exception” Event Detection and Early Warning Systems to discover critical logistics events that exceed normal planning parameters on an exception basis, which can trigger managerial action to mitigate the impact of the disruption. Gather supply chain intelligence and monitor critical supply base

locations to allow real-time sense and response maneuvers against material flow disruptions (Elkins et al, 2010).

2.6 Barriers to adopting supply chain Risk Management practices

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) and Christopher & Lee (2001), 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 increase in geographical distance to suppliers may make it more challenging to implement the supply chain risk management practices.

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. The lack of supply chain knowledge is hindrance to supply chain risk management.

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 or lack of risk culture also possess hindrance to risk mitigation. In most cases organizations focus 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).

2.7 Theoretical Framework

This study is founded on the agency and contingency theories. These theories provide a look at the firm in relation to risks and the relationship of a firm with others within supply chains.

2.7.1 Contingency Management Theory

Flinsch (2010), the basic premise of Contingency Theory is that there is no one best way to lead an organization. There are too many external and internal constraints that will alter what really is the best way to lead is in a given situation. In other words, it all depends upon the situation at hand as to what will be the best course of action. Fred Fiedler is a theorist whose Contingency Trait Theory was the precursor to his Contingency Management Theory. Fiedler believed there was a direct correlation to the traits of a leader and the effectiveness of a leader. According to Fiedler, certain leadership traits helped in a certain crisis and so the leadership would need to change given the new set of circumstances. Fiedler's Contingency Theory proposes the concept that there is no one best

way to manage an organization. It implies that different organizations will react differently to same situation and it follows that that supply chain risk management practices may vary from one organization to the other.

2.7.2 Agency theory

From a management perspective, the evolution of agency theory can be dated to the 1960s and 1970s (Eisenhardt, 1989). Nevertheless, its origins can be found in the works on economic risk analysis where it began by addressing a common problem in organizations, individual-group goal incongruence and its impact on risk-sharing behavior. This is reflected in the theory's recognition of the broader agency problems as entailing a portfolio of issues that need to be managed under conditions of uncertainty. Agency theory, in its modern form, largely originates from the work of Mitnick (1973) and Ross (1973), and embraces the areas of political science and economics, which broadens its application beyond simple contract relations. Following Mitnick's (1973) and Ross's (1973) lead, agency theory was subsequently adapted and used in a variety of other disciplines such as sociology (by Shapiro, 1987), management (by Eisenhardt, 1989) and in work involving the theory of the firm (by Jensen and Meckling, 1976).

In agency relationships, one party (the principal) delegates work to another party (the agent) (Jensen and Meckling, 1976; Ross, 1973; Eisenhardt, 1989). When the agent is acting for the principal it resembles behaviours such as performing for the benefit of the principal or acting as the principal's representative or employee. Telecommunication vendors work with other partners by subcontracting some of their requirements in order to deliver an end to end solutions to their customers.

2.8 Empirical review

Recent research on SCRM by Ngugi (2013), who 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. The findings revealed that most mobile telecommunications companies have implemented supply chain risk management. 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.

Mutua (2014), sought to establish the supply chain risk management and performance in three to five star hotels in Nairobi, Kenya. He identified the imperatives for implementation of comprehensive supply chain risk management. He found out that effective supply chain risk management can improve organizational performance but there would be need for adequate infrastructure to be available in companies for implementing SCRM. He also identified that the key to effective SCRM is the ability to establish long term strategic relationships with supply chain partners. The study only concentrated on top management within the organization and as such may not have gotten a well representation of risk management at all levels with supply chain structures. This study goes further and interviews managers in departments along supply chain.

Kisaka (2014), researched on managing supply chain risks within the state department of agriculture in Kenya focused on identifying supply chain risks within the public sector in Kenya with special reference to the Department of Agriculture, establishing mitigation measures for key supply chain risks that sought to enable effective and efficient supply

chain management and to establishing the challenges faced in mitigation of supply chain risks within the public sector. She found out that the challenges to addressing risk in the public sector was identified as inadequate budget and political interference among others. She recommended that the classification and management of supply chain risks is a fundamental ingredient to effective management and governance in the public sector and the responsibility of risk mitigation responsibility actually resides with staff at all levels of the entity.

Anggara, (2008), researched on implementation of Risk Management Framework in Supply Chain: A Tale from a Biofuel Company in Indonesia. His objectives were to investigate the overall supply chain network in the firm, identify the inherent risks along its supply chain, assess those risks, categorizes those risks according to their level, and explore risk mitigation strategies. The research identified the demand, supply, environmental and operational risks within biofuel companies in Indonesia. The research also identified collaborative forecast planning with customer, reconfiguring supply base, implementing quality management and implementing optimum inventory level (buffer &safety stock) as some of the mitigation strategies.

Karne, (2012), focused on Supply chain Risk management practices used among the state corporations in Kenya. He found out that state corporations adopted SCRM practices such as supply chain intelligence gathering, screening and monitoring suppliers, and training of key employees within supply chain. However they were not performing any of the best practices at needed levels in all functional areas as advanced by Elkin et al (2005).

Miklovic & Witty (2010) did a case study on how Cisco addresses supply chain risk management to identify how Cisco manages the risks associated with supply chain disruptions. The findings revealed that a product-centric approach provides more business

value than an incident-centric approach to risk assessment for most businesses. They also ascertained that transparency is critical to both internal and external support for supply chain resiliency and that objective metrics contribute to transparency. It was also noted that as with any significant business endeavor, senior management support is critical to success.

2.9 Summary of Literature review

For any business to succeed effective supply chain risk management is essential. As businesses make use of supply chain strategies such as globalization, just-in-time deliveries, outsourcing activities and lean supply chains so do supply chain risks increase. Enterprises need to identify any potential risks, analyze them and mitigate them by employing supply chain risk management practices.

As challenging it may be to fully predict, mitigate or prevent risks, enterprises that implement supply chain management programs will be more prepared when their supply chains are disrupted.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section briefly discusses the research design, data collection, data analysis and presentation techniques. It sets out research design in the first section, data collection method in the second section and finally data analysis and presentation in the last section.

3.2 Research Design

A case study design which is an in-depth study of a particular research was adopted for this research so as to effectively realize the objectives of the study. The study concerns Nokia Kenya.

3.3 Data Collection

In this study, the population included all the departments within supply chain management in Nokia Kenya. These are product management, logistics, service delivery, procurement, finance, cost & progress management, sales and services solutions. Due to the relatively small size of population, a census was carried out.

Table 3. 1: List of departments and employees interviewed

Department	Number of employees
Procurement	3
Service Delivery	7
Services Solutions	4
Product Management	1
Cost and progress management	4
Logistics	3
Sales	2
Contract Management	3
Finance	4

Research data was collected through a structured questionnaire. The questionnaire was divided into four parts. Part A consisted of general information, Part B sought to identify the main supply chain risks faced by Nokia, part C determined supply chain risks management practices employed by Nokia while part D determined the barriers to adoption of supply chain risk management practices. The questionnaires was dispatched using the "drop and pick" method.

3.4 Data Analysis

The data collected was analyzed using descriptive statistics. The statistical measure of central tendency such as frequency distributions, percentages and mean were used to determine the SCRM practices used by Nokia Kenya. The mean was used to determine on average the main risks in Nokia Kenya, the main mitigation and SCRM practices employed

by Nokia Kenya. To identify on average the barriers to adopting the SCRM Practices, mean was used.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the data analysis, results and interpretations obtained from the research as well as the discussion of the findings. The first section deals with the general information of the respondents under study while the second section seeks to address the research objectives: identify the main Supply Chain Risks faced by Nokia Kenya, establish SCRM practices employed by Nokia Kenya and determine the barriers to adopting SCRM practices by Nokia Kenya.

The respondents in this study included 31 all the staff working in all the departments within supply chain management in Nokia Kenya. These departments include product management, logistics, service delivery, procurement, finance, cost & progress management, sales and services solutions. Out of 31 staff, 28 filled and returned their questionnaires. This gives a 90.32% response rate.

4.2 General Information

The general information of this study comprised of the respondents' gender, highest academic qualification, duration of time they had worked in Nokia and the departments in which they were working.

As part of the general information, the respondents were asked to indicate their gender. From the findings, 85.7% of the respondents indicated that they were male while 14.3% indicted that they were female. This shows that the departments related to supply chain management in Nokia Kenya had more male staff as compared to the female.

The respondents' were also asked to indicate their highest level of education. According to the findings, 60.7% of the respondents indicated they had bachelor's degree and 39.3% had

master's degree. This shows that most of the staff working in departments related to supply chain management in Nokia have Bachelors' degree followed by master's degree.

The respondents were also asked to indicate for how they long had worked in Nokia. From the findings, 46.4% of the respondents reported that they had worked in Nokia for more than 5 years, 32.1% for between 3 and 5 years and 21.4% for between 1 and 2 years. This shows that most of the staff working in departments related to supply chain management in Nokia had been working in the organization for more than 5 years and hence they had the information required to meet the objectives of the study.

The staff were also asked to indicate the departments in which they were working. According to the findings, 21.4% of the respondents indicated that they were working in the service delivery department, 14.3% were working in the sales department, and the same percent were working in the cost progress management department. In addition, 10.7% of the respondents indicated that they were working in the contract management department; the same percent were working in the finance department, logistics department and procurement department. Further, 7.1% of the respondents indicated that they were working in the product management department. This clearly shows that most of the respondents in this study were working in the service delivery department.

4.3 The main supply chain risks faced by Nokia

The first objective of this study was to identify the main Supply Chain Risks faced by Nokia Kenya.

The respondents were asked to indicate the extent to which Nokia uses the stated risk identification strategies with a Likert scale of No extent (1), Small extent (2), Moderate extent (5), Great extent (4) and Very great extent (5)

The results were as presented in table 4.1 below.

Table 4. 1: Risk Identification Strategies

	Mean	Standard deviation (SD)	Mean Absolute Deviation (MAD)
Risk estimation	4.357	0.78	0.643
Previous risk assessments	4.178	1.055	0.879
Developing risk register	4.107	1.196	0.893
Brainstorming sessions	3.785	1.197	0.990
Surveys	3	1.24	0.963

From the findings, the respondents indicated with a mean of 4.357 with SD of 0.78 and MAD of 0.643 that Nokia was using risk estimation to a great extent, risk assessment with mean of 4.178, SD of 1.055 and MAD of .879, risk register with a mean of 4.107, SD of 1.196 and MAD of 0.893 and brainstorming sessions with a mean of 3.785, SD of 1.197 and MAD of 0.990 to a great extent was being used by Nokia as a risk identification strategy. Surveys with mean of 3.000, SD of 1.24 and MAD of 0.963 were moderately used. The study found that Nokia was using risk estimation as a risk identification strategy most, followed by previous risk assessments, developing risk register, brainstorming sessions and surveys. According to SCRLC (2011), risk identification might begin with brainstorming sessions, previous risk assessments, surveys, or still other efforts to identify and list potential risks within supply-chain processes.

The respondents were asked to indicate which of the stated external end to end supply chain risks pose the most potential threat to Nokia with Likert scale of No threat (1), Low (2), Moderate (3), High (4) and Highest (5).

Table 4. 2: External, End to End supply Chain Risks

	Mean	Standard deviation	MAD
Physical theft	2.666	1.301	1.086
Taxes, customs, and other regulations	3.259	1.163	1.010
Currency fluctuations	3.888	1.05	0.815
Regulatory Approvals	2.963	1.255	1.010
Quality	3.481	1.155	1.021

The study found that currency fluctuations was a high potential threat to Nokia with a mean of 3.888, MAD of 0.815 and SD of 1.050, followed by quality as a moderate potential with mean of 3.481, MAD of 1.021 and SD of 1.155 while taxes, customs, and other regulations moderately with a mean of 3.259, MAD of 1.010 and SD of 1.163, regulatory approvals as indicated and physical theft was the least potential threat. These findings agree with Elkins, et al (2010) argument that telecommunication vendors were facing supply chain risks like foreign exchange rate fluctuations and regulation approvals. In addition, the findings are in line with SCRLC (2011) findings that legislative, compliance, intellectual property, and regulatory risks exist at the country or regional level for multinational enterprises

The respondents were also asked to indicate which of the stated external supplier risks pose the most potential threat to Nokia with Likert scale of No threat (1), Low (2), Moderate (3), High (4) and Highest (5).

Table 4. 3: External, Supplier Risks

	Mean	Standard deviation	MAD
Safety practices	3.296	1.381	1.226
performance	3.481	1.155	0.985
Lead Times	3.925	1.071	0.776
Cost escalation	3.74	0.902	0.716
Poor Communication	3.037	1.192	0.936
No or poor relationships with subcontractors	3.296	1.102	0.944

The study established that lead times with a mean of 3.925, MAD of 0.776 and SD of 1.071 and cost escalation with mean of 3.740, MAD of 0.716 and SD of 0.902 as the most significant supplier potential risk to Nokia. The low SD on cost escalation. This is in agreement with the findings by Faisal, Banwet & Shankar, (2004) that price is a major concern.

The respondents were also asked to indicate which of the stated external distribution risks/disruption pose the most potential threat to Nokia with Likert scale of No threat (1), Low (2), Moderate (3), High (4) and Highest (5).

Table 4. 4: External, Distribution Risks/Disruptions

	Mean	**Standard deviation**	**MAD**
Infrastructure Unavailability	3.222	1.154	0.930
Cargo Damage	2.74	1.129	0.936
Warehouse Inadequacies	2.74	0.984	0.842
Longer lead time	3.461	1.066	0.888

The study revealed that longer lead time with mean of 3.461, MAD of 0.888 and SD of 1.066 was moderately posing as a potential threat to Nokia, followed by infrastructure unavailability with mean of 3.222, MAD of 0.930 and SD of 1.154. Cargo damage and warehouse inadequacies were seen to be of low threat mean of 2.740, MAD of 0.842 and SD of 0.984.

The respondents were asked to indicate which of the stated internal enterprise risks pose the most potential threat to Nokia with Likert scale of No threat (1), Low (2), Moderate (3), High (4) and Highest (5).

Table 4. 5: Internal, Enterprise Risks

	Mean	Standard deviation	MAD
Process Issues	3.407	1.118	0.955
Lack of training or knowledge	2.963	1.091	0.861
Subcontracting agreements	3.037	1.125	0.933
Strategic risk	3.037	1.125	0.864
Supplier Relationship Management	3	1.3	1.111

Process issues was a moderate threat with mean 3.407, MAD of 0.995 and SD of 1.118 as an enterprise risk posing as a potential threat to Nokia. Supplier relationship management and subcontracting agreements with a mean of 3.037, MAD of 0.933 with SD of 1.125 while lack of training or knowledge with mean of 2.963, MAD of 0.861 and SD of 1.091were moderately seen to be potential threats to Nokia. These findings are in line SCRLC (2011) argument that internal risks such as personnel availability and competence or facility unavailability pose a threat to implementation of supply chain risk management practices.

The respondents were asked to indicate which category of risks pose the most potential threat to Nokia with a Likert scale of 1 to 5; No threat (1), Low (2), Moderate (3),

High (4) and Highest (5).

Table 4. 6: Risks Category that pose the Most Potential Threat to Nokia

Risk Category	Mean	Standard deviation	MAD
End to End supply Chain Risks	3.535	1.137	0.959
Supplier Risks	3.642	0.869	0.719
Distribution Risks/Disruptions	3.285	0.854	0.735
Enterprise Risks	3.142	1.044	0.888

The respondents indicated with a mean of 3.642 with SD of 0.869 and MAD of 0.719 that supplier risks were posing as a high potential threat to Nokia. This was followed End to

End supply Chain Risks as indicated by a mean of 3.535 with SD of 1.137 and MAD of 0.959, distribution risks/disruptions as indicated by a mean of 3.285 and SD of 0.854 and enterprise risks as indicated by a mean of 3.142 and SD of 1.044.

The study found that supplier risks category was posing as the most potential threat to Nokia, followed by end to end external supply chain risks, distribution risks/disruptions and enterprise risks. According to Khan (2010), supply risks examples include dependency on key suppliers, consolidation in supply markets, quality and management issues arising from off-shore sourcing, potential disruption, length and variability of replenishment lead-times.

4.4 Supply Chain Risk Management Practices Employed by Nokia Kenya

The second objective of this study was to establish SCRM practices employed by Nokia Kenya.

The respondents were asked to indicate to what extent Nokia currently uses supply chain risk management practices. From the findings, 46.4% of the respondents indicated that Nokia currently uses supply chain risk management practices to a great extent, 35.7% indicated to a moderate extent and 17.9% indicated to a very great extent. This shows that Nokia currently uses supply chain risk management practices.

The respondents were further asked to indicate which potential SCRM tools were used in Nokia with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5).

The findings were as shown in table 4.7.

Table 4. 7: Potential SCRM tools Used Today

	Mean	Standard deviation	MAD
Sales tools	3.28	1.568	1.366
Inventory optimization tool	2.75	1.326	1.146
Sourcing tools	3.375	1.582	1.344
Operations planning tool	3.52	1.446	1.174
Master Data management	3.791	1.444	1.128
Spend management analysis	3.333	1.659	1.445

The study found that Nokia was using master data management tool as a supply management tool very often followed by operations planning tool, sourcing tools, spend management analysis tool, sales tools and inventory optimization tool. The high standard deviation which shows the responses are spread out could be as a result of each department using a unique tool at their level. These findings concur with Tummala and Schoenherr (2011) argument that assessing and managing risks using the Supply Chain Risk Management Process (SCRMP) and found that supply chain risks can be managed more effectively when applying the Supply Chain Risk Management Process (SCRMP). The structured approach was divided by Karne (2012) into phases of risk identification, risk measurement and risk assessment; risk evaluation, and risk mitigation and contingency plans; and risk control and monitoring via data management systems.

The respondents were further asked to indicate which steps were being taken by Nokia as a practice to manage supply chain risks with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5).

Table 4. 8: Steps Taken by Nokia as a practice to Manage Supply Chain Risks

	Mean	Standard deviation	MAD
Streamline processes	4.142	0.89	0.735
Improve demand forecasting	4.407	0.693	0.615
Strengthen business continuity planning	4.111	0.8	0.658
Creation of supply chain risk register	3.692	0.928	0.822
Centralize distribution	3.807	1.059	0.899
Increase inventory levels	2.615	1.358	1.136
Decentralize distribution	2.615	1.168	0.982

From the findings, it can be revealed by improved demand forecasting with mean of 4.407and SD of 0.693, streamlined processes with mean of 4.142 and SD of 0.890 and strengthened business continuity planning with mean of 4.111 and SD of 0.800 are very often used as a practice by Nokia to manage supply chain risk management. The low SD reveals that responses were very close to the mean. Increased inventory levels and decentralize distribution both with a mean of 2.615 are rarely used. According to Elkins, et al (2010) companies running lean operations no longer have inventory or excess capacity.

The respondents were further asked to indicate which of the stated supplier strategies were being taken by Nokia to manage supplier related risks with Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5).

Table 4. 9: Supplier Strategies Taken By Nokia to Manage Supplier Related Risks

	Mean	Standard deviation	MAD
Improve collaboration with suppliers	4.285	0.658	0.561
Shift from single to multiple supplier base	4.178	0.983	0.763
Conduct risk audit of key suppliers	4.214	0.786	0.673
Supplier development	4.285	0.762	0.612

In relation to supplier strategies used to manage supplier related risks, the study found that improved collaboration with suppliers, supplier development, conducting risk audit of key suppliers and shifting from single to multiple supplier base were all very often used with a mean of over 4 and standard deviation of less than 1 and mean very low mean absolute deviation implying that the responses were mainly concentrated around the mean. According to SCRLC (2011) supplier risks target physical and regulatory, production problems, financial losses and premiums, management and upstream supply risks.

The respondents were asked to indicate which strategic sourcing or advanced procurement practices were performed by Nokia as a practice in management of supply chain risks with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5).

Table 4. 10: Strategic Sourcing or Advanced Procurement Practices Performed by Nokia

	Mean	Standard deviation	MAD
Screen and monitor regularly current suppliers	4.423	0.643	0.577
Screen and monitor regularly potential suppliers	3.73	1.003	0.849
Require critical suppliers to produce a detailed plan of disruption awareness	3.807	0.938	0.775
Include expected costs of disruption in the total cost equation	3.423	0.902	0.751
Require suppliers to provide timely information & visibility of material flow.	3.925	0.997	0.771

With regard to strategic sourcing or advanced procurement practices used by Nokia, the study revealed that screening and monitoring regularly current suppliers was very often used with a mean of 4.423 and SD of 0.643 followed by requiring suppliers to provide timely information and visibility of material flow with a mean of 3.925 and SD of 0.997 and requiring critical suppliers to produce a detailed plan of disruption awareness with a

mean of 3.807 and SD of 0.938. As indicated by Elkins et al (2010) strategic Sourcing or Advanced Procurement primarily deals with developing supply market intelligence, developing sourcing strategy, negotiation with core suppliers, and finalization of contracts for product or service supply

The respondents were further asked to indicate which Real-Time supply chain risk management practices are used in Nokia with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5).

Table 4. 11: Real-Time Supply Chain Risk Management Practices Used in Nokia

	Mean	Standard deviation	MAD
Conducting frequent meetings/teleconferences with critical suppliers	4.222	0.751	0.634
Implement technologies to track containers in distribution channels	3.192	1.265	1.053
Conduct a detailed disruption incident report & analysis following a major disruption event	3.592	1.083	0.867
Create an exception event detection and early warning system	3.333	1.176	0.914

According to the findings, the respondents indicated with a mean of 4.222 with SD of 0.751 that Nokia was very often conducting frequent meetings/teleconferences with critical suppliers. The respondents also indicated with a mean of 3.592 with SD of 1.083 that Nokia was very often conducting a detailed disruption incident report and analysis following a major disruption event. The respondents further indicated with a mean of 3.333 with SD of 1.176 that Nokia was sometimes creating an exception event detection and early warning system. In addition, the respondents indicated with a mean of 3.192 with SD of 1.265 that Nokia was sometimes implementing technologies to track containers in distribution channels. . Regarding Real-Time supply chain risk management practices used in Nokia,

the study established that conducting frequent meetings/teleconferences with critical suppliers was used most followed by conducting a detailed disruption incident report and analysis following a major disruption event, creating an exception event detection and early warning system and implementing technologies to track containers in distribution channels. According to Elkins et al (2010) Real-Time Operations Management include all processes from the point of delivery by the supplier and the banks/buffers of inventory held at warehouses, manufacturing locations, and distribution centers.

The respondents were asked to indicate which Real-time supply chain base operations management practices were employed in Nokia with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5)

The findings were as shown in table 4.12.

Table 4. 12: Real-Time Supply Chain Base Operations Management Practices Employed in Nokia

	Mean	Standard deviation	MAD
Improve visibility of inventory buffer in domestic distribution channels	3.25	1.075	0.875
Classify buffered materials for different levels of criticality	3.296	0.953	0.796
Training key employees	4.037	0.649	0.428
Develop real-time supply chain reconfiguration decision report	3.111	1.086	0.815

From the findings, the respondents indicated with a mean of 4.037 with SD of 0.649 that Nokia very often was training key employees. The respondents also indicated with a mean of 3.296 with SD of 0.953 that Nokia was sometimes classifying buffered materials for different levels of criticality. In addition, the respondents also indicated with a mean of 3.250 with SD of 1.075 that Nokia was sometimes improving visibility of inventory buffer

in domestic distribution channels. Further, the respondents indicated with a mean of 3.111 with SD of 1.086 that Nokia was sometimes developing real-time supply chain reconfiguration decision report In relation to Real-time supply chain base operations management practices employed in Nokia, the study found that training key employees was the most used strategy, followed by classifying buffered materials for different levels of criticality, improving visibility of inventory buffer in domestic distribution channels and developing real-time supply chain reconfiguration decision report. This is in agreement as advanced by (Elkins et al 2010).

4.5 Barriers to Adopting Supply Chain Risk Management practices

The third objective of the study was to determine the barriers to adopting SCRM practices by Nokia Kenya.

The respondents were asked to indicate their assessment of the capability of Nokia to mitigate the key supply chain risks it faces. From the findings, 46.4% of the respondents indicated that the capability of Nokia to mitigate the key supply chain risks it faces was to a great extent, 35.7% indicated to a moderate extent and 17.9% indicated to a very great extent. This implies that to a great extent Nokia is capable to mitigate the key supply chain risks it faces.

The respondents were asked to indicate which were the barriers to implementing strategic sourcing or advanced procurement practice as a SCRM practice at Nokia with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5)

The results were as shown in table 4.13.

Table 4. 13: Barriers to Implementing Strategic Sourcing Practices

	Mean	Standard deviation	MAD
Concerns about increased costs	3.592	0.722	0.957
Poor communication across supply chain	2.777	1.185	0.872
Inadequate technology	1.925	1.12	0.617
Lack of management support	2.333	0.828	0.839
Suppliers geographical distance	2.333	1	0.889
Lack of supply chain management knowledge	2	1.037	0.593

From the findings, the respondents indicated with a mean of 3.592 and SD of 0.722 that concerns about increased costs was very often a barrier to implementing strategic sourcing or advanced procurement practice as a SCRM practice at Nokia. The respondents also indicated with a mean of 2.777 and SD 1.185 that poor communication across supply chain was sometimes a barrier to implementing strategic sourcing as a SCRM practice at Nokia.. The study also revealed that barriers to implementing strategic sourcing or advanced procurement practice as a SCRM practice at Nokia included concerns about increased costs and poor communication across supply chain. These findings are in line with SCRLC (2011) findings that enterprises must undertake continual communication and consultation as well as monitoring and review throughout risk management process. Monitoring and review entails not only evaluating the effects of risk treatment but also maintaining the plan and responding to changes in suppliers, processes, and regulation affecting elements of the supply chain. However, the study found that inadequate technology, lack of management support, suppliers' geographical distance and lack of supply chain management knowledge were not considered to be barriers.

The respondents were also asked to indicate the barriers to implementation of Real-Time

supply chain risk management practice as SCRM practice in Nokia with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5)

Table 4. 14: Barriers to Implementation of Real-Time SCRM Practices

	Mean	Standard deviation	MAD
Concerns about increased costs	3.37	0.832	1.023
Poor communication across supply chain	2.629	1.181	0.903
Lack of risk culture	2.23	1.114	0.669
Inadequate technology	2.0385	0.815	0.822
Lack of adequate resources to implement SCRM practices	2.538	1.038	0.917
Lack of supply chain management knowledge	1.961	1.066	0.592

The study found that concerns about increased costs, poor communication across supply chain and lack of adequate resources to implement SCRM practices moderately influence the implementation of Real-Time supply chain risk management practice as SCRM practice in Nokia. However, lack of risk culture, inadequate technology and lack of supply chain management knowledge were not considered to be barriers to implementation of Real-Time supply chain risk management practice as SCRM practice in Nokia. These findings agree with Zsidisin, Panelli and Upton (2000) argument that low priorities to risk management or lack of risk culture also possess hindrance to risk mitigation.

The respondents were requested to indicate the barriers to the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5)

Table 4. 15: Barriers to Implementation of Real-Time Supply Chain Base Operations Management Practice

	Mean	Standard deviation	MAD
Concerns about increased costs	3.307	0.823	0.923
Underestimation of potential impact of supply chain risks	2.884	1.086	0.621
Lack of risk culture	2.461	0.863	0.728
Excessive focus on efficiency	3	0.859	0.615
Lack of supply chain management knowledge	2	0.848	0.615

The study found that a concern about increased costs with a mean of 3.307 and SD of 0.823 and excessive focus on efficiency with mean of 3 and SD of 0.859 were sometimes a significant barrier in the implementation of Real-time supply chain base operations risk management practice as SCRM practice in Nokia. However, underestimation of potential impact of supply chain risks, lack of risk culture and lack of supply chain management knowledge were not significantly affecting the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia. According to Elkins, et al (2010) the challenge to managing supply chain risks is that supply chain disruptions can occur for a wide variety of reasons such as industrial plant fires, transportation delays, work slowdowns or stoppages, or natural disasters. Companies running lean operations no longer have inventory or excess capacity to make up for production losses, so that material flow problems rapidly escalate to wide-scale network disruptions.

The respondents were asked to indicate the barriers to implementation of supplier strategies as SCRM practice at Nokia in management of supplier related risks with a Likert scale of Never (1), Rarely (2), Sometimes (3), Very often (4) and Always (5).

Table 4. 16: Barriers to Implementation of Supplier Strategies

	Mean	Standard deviation	MAD
Concerns about increased costs	3.28	0.8	0.989
Poor communication across supply chain	2.461	1.173	0.769
Lack of management support	2.23	0.947	0.704
Suppliers geographical distance	2.384	0.908	0.893
Lack of supply chain management knowledge	1.961	0.823	0.666

From the findings, the respondents indicated with a mean of 3.280 and SD of 0.8 that concerns about increased costs was sometimes a barrier to the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia. The respondents also indicated with a mean of 2.461 and SD of 1.173 that poor communication across supply chain is rarely a barrier to the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia. The respondents also indicated with a mean of 2.384 and SD of 0.908 that supplier's geographical distance is rarely a barrier to the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia. The respondents further indicated with a mean of 2.230 and SD of 0.947 that lack of management support is rarely a barrier to the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia. Lastly, the respondents indicated with a mean of 1.961 and SD of 0.823 that lack of supply chain management knowledge is rarely a barrier to the implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter covers five major sections. These include the summary of the findings, conclusion of the study, limitations encountered during the study, recommendations for policy formulation and practice and suggestions for future research.

5.2 Summary of Findings

The study found that currency fluctuations was the most potential threat to Nokia, followed by quality, taxes, customs, and other regulations, regulatory approvals as indicated and physical theft was the least potential threat. The study also revealed that Nokia was using risk identification strategies that include risk estimation, previous risk assessments, developing risk register, brainstorming sessions and surveys. The study also found that supplier risks was posing as the most potential threat to Nokia, followed by end to end supply chain risks, distribution risks/disruptions and enterprise risks. The study further established that lead times was the most significant supplier potential risk to Nokia, followed by cost escalation, performance, safety practices, no or poor relationships with subcontractors and poor communication. The study also revealed that longer lead time was posing as a potential threat to Nokia, followed by infrastructure unavailability, cargo damage and warehouse inadequacies. Process issues was an enterprise risk posing as a potential threat to Nokia most followed by supplier relationship management, subcontracting agreements, strategic risk and lack of training or knowledge.

The study found that Nokia currently uses supply chain risk management practices. The

study also found that Nokia was using master data management tool as a supply management tool most followed by sourcing tools, operations planning tool, spend management analysis tool, sales tools and inventory optimization tool.

In the management of supply chain risk, the study found that Nokia was using improved demand forecasting most, followed by streamlined processes, strengthened business continuity planning, centralized distribution, creation of supply chain risk register, increased inventory levels and decentralized distribution. In addition, supplier strategies used to manage supplier related risks in Nokia include improved collaboration with suppliers, supplier development, conducting risk audit of key suppliers and shifting from single to multiple supplier base.

The study also established that strategic sourcing or advanced procurement practices used by Nokia include screening and monitoring regularly current suppliers, requiring suppliers to provide timely information and visibility of material flow, requiring critical suppliers to produce a detailed plan of disruption awareness and including expected costs of disruption in the total cost equation. In addition, Real-Time supply chain risk management practices used in Nokia comprise of conducting frequent meetings/teleconferences with critical suppliers was used most followed by conducting a detailed disruption incident report and analysis following a major disruption event, creating an exception event detection and early warning system and implementing technologies to track containers in distribution channels. Further, Real-time supply chain base operations management practices employed in Nokia include training key employees, classifying buffered materials for different levels of criticality, improving visibility of inventory buffer in domestic distribution channels and developing real-time supply chain reconfiguration decision report.

The study revealed that the capability of Nokia to mitigate the key supply chain risks it faces was to a great extent. It was also established that barriers to implementing strategic sourcing or advanced procurement practice include concerns about increased costs and poor communication across supply chain. The study found that concerns about increased costs, poor communication across supply chain and lack of adequate resources to implement SCRM practices moderately influence the implementation of Real-Time supply chain risk management practice as SCRM practice in Nokia. Further, a concern about increased costs was the most significant barrier in the implementation of Real-time supply chain base operations risk management practice. Lastly, the study found that a concern about increased costs was moderately a barrier to the implementation of Real-time supply chain base operations risk management practice as SCRM practice in Nokia.

5.3 Conclusion

This study concludes that the supply chain risks faced by Nokia include currency fluctuations, quality, taxes, customs, and other regulations, regulatory approvals as indicated and physical theft. The study also found that supply chain risks are categorized into supplier risks, end to end supply chain risks, distribution risks/disruptions and enterprise risks.

The study also concludes that Nokia was using supply chain risk management tools like master data management tools, sourcing tools, operations planning tool, spend management analysis tool, sales tools and inventory optimization tool. Supply chain risk management practices include improved demand forecasting, centralized distribution, improved collaboration with suppliers, supplier development, conducting risk audit of key

suppliers, shifting from single to multiple supplier base, screening and monitoring regularly current suppliers, requiring suppliers to provide timely information and visibility of

material flow, requiring critical suppliers to produce a detailed plan of disruption awareness and including expected costs of disruption in the total cost equation. Real-Time supply chain risk management practices include conducting frequent meetings/teleconferences with critical suppliers, conducting a detailed disruption incident report and analysis, creating an exception event detection and early warning system and implementing technologies to track containers in distribution channels.

The study further concludes that barriers to implementing supply chain risk management practices include concerns of increased costs, poor communication across supply chain and lack of adequate resources to implement SCRM practices.

5.4 Recommendations for Policy and Practice

The managements of the telecommunication vendors should keep on doing regular risk assessments in their supply chains as a way of averting adverse effects of uncertainty. The firms can also benchmark themselves against the best players in the world as a way of improving their supply chain risk management practices.

The study found that poor communication across the supply chain was hindering the implementation of supply chain risk management practices by Nokia. The study therefore recommends that Nokia as well as other organizations should adopt an information system that can allow information exchange across the supply chain. This will help the partners in the supply chain to make key decisions on the production of materials.

The study also found that there was lack of adequate resources to implement SCRM practices. The study therefore recommends that Nokia should increase its financial budget for Kenya and employ more staff so as to enhance the implementation of supply chain risk management practices.

5.5 Limitations of the Study

The study adopted a case study approach where only Nokia was studied. This limits the study in that the results obtained cannot be generalized. In addition, Nokia cannot be representative of all the telecommunication vendors in Kenya and hence the findings cannot relate to other firms nor can conclusions be related to the industry practices. Specific factors within the firm like cash flow challenges and size of the market affects supply chain management practices adopted.

Data collection was also limited by the busy schedules of the respondents. The researchers had to exercise utmost patience and make extra effort in reminding respondents and making constant follow-ups so as to acquire sufficient data from respondents. The researcher had to thoroughly explain the use of information provided and why the respondents should participate in the study.

In addition, company information is proprietary and confidential. Most of the respondents approached were reluctant in giving some information fearing that the information sought would be used to intimidate them. The researcher handled the problem carrying an introduction letter from the University so as to assure them that the information will be treated as confidential and will be used purely for academic purposes.

5.6 Suggestions for Further Research

This study was limited to Nokia Kenya and hence its findings cannot be generalized to the telecommunication vendors in Kenya. This study therefore suggests similar studies to cover all the telecommunication vendors in Kenya. In addition the study did not show how the use of various supply chain risk management practices influence organizational performance. The study therefore suggests further studies on the influence of supply chain

risk management practices on the organization performance of telecommunication vendors in Kenya.

REFERENCES

Anggara, R. A.(2008). "*Implementation of Risk Management Framework in Supply Chain: A Tale from a Bio-fuel Company in Indonesia*" Retrieved from https://kemisan.files.wordpress.com/2008/11/dissertation_ranggara.pdf

Anastas, J. W. (1999). *Research Design for Social Work and the Human Services*. Chapter 4, Flexible Methods: Descriptive Research. (2nd Ed.). New York: Columbia University Press.

Ceryno P. S., Scavarda L.F, Klingebiel K. and Yüzgülec G. (2013) "Supply Chain Risk Management: A Content Analysis Approach" *Internationa*l *Journal of Industrial Engineering and Management (IJIEM),* Vol. 4 No 3, 2013, pp. 141-150

Christopher, M. & Peck, H. (2004). "Building the resilient supply chain", *The International Journal of Logistic Management, 15* (2), 1-13.

Christopher M. & Lee H, (2001). Supply chain confidence. England: Working Paper, Cranfield School of Management.

Christopher, M. (2000). "The agile supply chain: competing in volatile markets", *Industrial Marketing Management,* 29, 37-44.

Communications Authority of Kenya (CAK) (2015). Retrieved from www.cak.go.ke

Dell'Oro Group (2010). *Quarter 2 2010 Mobility Report*. Retrieved from http://www.delloro.com/2010?post_type=delloro_news

Eisenhardt, K.M. (1985), "Control: organizational and economic approaches", *Management Science*, Vol. 31 No.2, pp.134-49

Elkins, D. Handfield , R. B., Blackhurst, J. & Craighead, C. W. (2010). "*A "To Do" List to Improve Supply Chain Risk Management Capabilities"*.

Faisal M.N. and Banwet D.K. and Shankar R. (2004). "Flexibility of buyer supplier relations in the supply chain management in SMEs," *In Innovation, Flexibility and Technology Transfer*. New Delhi: TATA McGraw-Hill.

Flinsch, P. (2010). Retrieved on 9th September 2015 from http://www.business.com/management-theory/contingency-management-theory/

Jensen, M.C., Meckling, W.H. (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No.4, pp.305-60.

Karne, L. N. (2012). *"Supply chain Risk Management Practices used among the state corporations in Kenya"*.

Kimutai, C. (2011). *"ICT at the heart of Kenya's Vision 2030"* Retrieved from http://www.biztechafrica.com/article/ict-heart-kenyas-vision-2030/1594/?section=government

Kisaka D. (2014) Managing supply chain risks within the state department of agriculture, Kenya".

Khan, O (2011), "Supply Chain Risk". *Logistics Seminar 6th October 2011 Santiago, Chile Retrieved from http://www.revistalogistec.com/congreso/omera_khan.pdf*

Lee, H. (2004). "The triple-A supply chain", H*arvard Business Review*, 10, 102-12. Retrived from http://scap.pk/article/174992-The_Triple-A_Supply_Chain.pdf

Mallman, C. (1996). "Risk and organizational behaviour: a research model", *Disaster Prevention and Management, 5* (2), 12-26.

March, J.G. & Shapira, Z. (1987). "Managerial perspective on risk and risk taking", *Management Science, 33* (11), 1404 -1418.

Mitnick, B. (1973), "Fiduciary rationality and public policy: the theory of agency and some consequences", paper presented at the Annual Meeting of the American Political Science Association, New Orleans, LA,

Miklovic D. & Witty, R. J. (2010). "*Case Study: Cisco Addresses Supply Chain Risk Management".Retrieved from http://www.cisco.com/web/strategy/docs/manufacturing/Cisco_Case_Study_AMR_10-0917.pdf*

Moore, Nancy Y., Clifford A. Grammich, and Robert Bickel (2007). *Developing Tailored Supply Strategies*, Santa Monica, Calif.: RAND Corporation.

Mutuku D. (2014). "Supply chain risk management and performance of Hotels in Kenya'

Narayanan V.G.& Raman A. (2004). Aligning Incentives in SupplyChains. *Harvard Business Review*, Vol 82 No 11, 94-103.

Nokia company profile. (2014). Retrieved on 7th February 2015. http://company.nokia.com/en/about-us/our-company

Ngugi P. (2013) "Supply chain risk management practices in mobile telecommunications sector industry in Kenya"

Ross, S.A. (1973), "The economic theory of agency: the principal's problem", *The American Economic Review,* Vol. 63 No.2, pp.134-9

SCRLC (2011). *Supply Chain Risk Management: A compilation of Best Practices"*.

Singhal, P. Agarwal, G & Mittal, M. (2011) "Supply chain risk management: review, classification and future research directions", *Int. Journal of Business Science and Applied Management, Volume 6, Issue 3, 201*.

Sinha P.R. & Whitman L.E. & Malzahn D. (2004). Methodology to mitigate supplier risk in an aerospace supply chain. *Supply Chain Management: An International Journal*, Vol 9 No 2, 154 –168.

The Economist Intelligence Unit (2009). "Managing supply-chain risk for reward" Retrieved from http://www.acegroup.com/se-en/assets/ace-supply-chain-web.pdf

Tummala, R., & Schoenherr, T. (2011). Assessing and managing risks using the Supply Chain Risk Management Process (SCRMP). *Supply Chain Management: An International Journal*, 16(6), 474 – 483.

Zsidisin G.A. & Panelli A. & Upton R. (2000). Purchasing organization involvement in risk assessments, contingency plans, and risk management. *An International Journal*, Vol 5 No4, 187.

APPENDICES

APPENDIX I: RESEARCH QUESTIONNAIRE

Introduction

This questionnaire is designed to gather information on supply chain risk management practises in Nokia, Kenya. Your response will be accorded strict confidentiality. A supply chain is the network of all the individuals, organizations, resources, activities and technology involved in the creation and sale of a product, from the delivery of source materials from the supplier to the manufacturer, through to its eventual delivery to the end user.

Kindly respond to the questions honestly by ticking the most appropriate response

Part A: General Information

1. Gender:

   □ Male □ Female

2. Highest academic qualification

   □ College Certificate □ Diploma

   □ Bachelor's Degree □ Master's Degree

   □ Others (Specify).....

3. For how long have you worked in Nokia?

   □ Less than one year □ 1 – 2 years

   □ 3 – 5 years □ More than 5 years

4. Please indicate the department you work for:

   □ Procurement □ Service Solutions

- ☐ Sales
- ☐ Logistics
- ☐ Service Delivery
- ☐ Finance
- ☐ Product Management
- ☐ Contract Management
- ☐ Cost progress management

PART B Identify the main supply chain risks faced by Nokia.

1. To what extent does Nokia use the following in risk identification?

	No extent (1)	Small extent (2)	Moderate extent (5)	Great extent (4)	Very great extent (5)
Risk estimation					
Previous risk assessments					
Developing risk register					
Brainstorming sessions					
Surveys					

2. In your opinion, which of the below risks pose the most potential threat to Nokia?

	No threat (1)	Low (2)	Moderate (3)	High (4)	Highest (5)
External, End to End supply Chain Risks					
Physical theft					
Taxes, customs, and other regulations					
Currency fluctuations					
Regulatory Approvals					
Quality					
External, Supplier Risks					
Safety practices					

performance					
Lead Times					
Cost escalation					
Poor Communication					
No or poor relationships with subcontractors					
External, Distribution Risks/Disruptions:					
Infrastructure Unavailability					
Cargo Damage					
Warehouse Inadequacies					
Longer lead time					
Internal, Enterprise Risks					
Process Issues					
Lack of training or knowledge					
Subcontracting agreements					
Strategic risk					
Supplier Relationship Management					

3. In your opinion, which category of the below external risks pose the most potential threat to Nokia?

	No threat (1)	Low (2)	Moderate (3)	High (4)	Highest (5)
End to End supply Chain Risks					
External, Supplier Risks					
External, Distribution Risks/Disruptions:					
Internal, Enterprise Risks					

PART C Determine supply chain risk management practices employed by Nokia Kenya.

4. To what extent does Nokia currently use supply chain risk management practices?

□ No extent (1) □ Small extent (2)

□ Moderate extent (3) □ Great extent (4)

□ Very great extent

5. Which of the following potential SCRM tools do you use today?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Sales tools					
Inventory optimization tool					
Sourcing tools					
Operations planning tool					
Master Data management tool					
Spend management analysis tool					

6. Which of the following steps are being taken by Nokia as a practice to manage supply chain risks?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Streamline processes					
Improve demand forecasting					
Strengthen business continuity planning					
Creation of supply chain risk register					
Centralize distribution					
Increase inventory levels					
Decentralize distribution					

7. Which of the following supplier strategies are being taken by Nokia to manage supplier related risks?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Improve collaboration with suppliers					
Shift from single to multiple supplier base					
Conduct risk audit of key suppliers					
Supplier development					

8. Which of the following Strategic sourcing or advanced procurement practices is performed by Nokia?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Screen and monitor regularly current suppliers					
Screen and monitor regularly potential suppliers					
Require critical suppliers to produce a detailed plan of disruption awareness					
Include expected costs of disruption in the total cost equation					
Require suppliers to provide timely information & visibility of material flow.					

9. Which of the following Real-Time supply chain risk management practices are used in Nokia?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Conducting frequent meetings/teleconferences with critical suppliers					
Implement technologies to track containers in distribution channels					
Conduct a detailed disruption incident report & analysis following a major disruption event					
Create an exception event detection and early warning system					

10. Which of the Real-time supply chain base operations management practices are employed in Nokia?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Improve visibility of inventory buffer in domestic distribution channels					
Classify buffered materials for different levels of criticality					
Training key employees					
Develop real-time supply chain reconfiguration decision report					

PART D Determine the barriers to adopting Supply Chain Risk Management practices.

11. In your opinion to what extent is Nokia capable to mitigate key supply chain risks it faces right now?

	No extent (1)	Small extent (2)	Moderate extent (3)	Great extent (4)	Very great extent (5)
Nokia capability					

12. Which of the following is a barrier to implementing Strategic sourcing or advanced procurement practice as a SCRM practice at Nokia?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Concerns about increased costs					
Poor communication across supply chain					
Inadequate technology					
Lack of management support					
Suppliers geographical distance					
Lack of supply chain management knowledge					

13. What are the barriers to implementation of Real-Time supply chain risk management practice as SCRM practice in Nokia?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Concerns about increased costs					
Poor communication across supply chain					
Lack of risk culture					
Inadequate technology					
Lack of adequate resources to implement SCRM practices					
Lack of supply chain management knowledge					

14. What are the barriers to implementation of Real-time supply chain base operations management practice as SCRM practice in Nokia?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Concerns about increased costs					
Underestimation of potential impact of supply chain risks					
Lack of risk culture					
Excessive focus on efficiency					
Lack of supply chain management knowledge					

15. What are the barriers to implementation of supplier strategies as SCRM practice at Nokia in management of supplier related risks?

	Never (1)	Rarely (2)	Sometimes (3)	Very often (4)	Always (5)
Concerns about increased costs					
Poor communication across supply chain					
Lack of management support					
Suppliers geographical distance					
Lack of supply chain management knowledge					