INVESTING IN A UNIFIED COMMUNICATIONS SYSTEM:
A CASE OF NOKIA SIEMENS NETWORKS IN KENYA

BY

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UNITED STATES INTERNATIONAL UNIVERSITY

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A Project Report Submitted to the School of Business in Partial Fulfillment of the
Requirement for the Degree of Global Executive Masters of Business Administration
(GeMBA)

UNITED STATES INTERNATIONAL UNIVERSITY

SPRING 2013
STUDENT’S DECLARATION

I, the undersigned, declare that this is my original work and has not been submitted to any other college, institution or university other than the United States International University in Nairobi for academic credit.

Signed: ________________ Date: ________________

ANDREW KAIRU KANG’ETHE (ID 612015)

This project has been presented for examination with my approval as the appointed supervisor.

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ABSTRACT

Unified Communications allows people to communicate with one another, anywhere, anytime and on any device. The study sought to establish a business case for unified communication adoption in today’s businesses. The study was guided by three research questions which included; what benefits do companies and organizations achieve today from unified communications? What risks would arise from this linkage of communication channels and what strategy is best for implementation of Unified Communications?

In order to answer these research questions the study adopted the case study approach design which allowed the researcher to gather in-depth information on a single entity which was Nokia Siemens Network (NSN) Kenya. This population comprises employees drawn from senior, middle to junior levels working in the under Sales, Customer Care, Finance & Control, Network Implementation and Logistics departments. Cluster sampling and simple random sampling were used to identify the study respondents.

The study found that there are perceived benefits of adopting a unified communications approach in the organization which included improved customer relations and improved employee collaboration which increases productivity whereby the decision – making process is much more faster. The study also found that there are risks in adopting a unified communications which included business investments in existing infrastructure which led to the slow adoption and deployment of unified communications influenced by the return on investment. Study findings indicate that the implementation of UC&C was appealing to the majority of respondents. Unified communications are adopted in organizations but have been allocated relatively less resources as compared to other departments in the organization which has contributed to a gradual approach of implementing unified communications. The most preferred UC&C model among the study participants was the hybrid model and the least preferred was the hosted / leased.

The study concludes that there are indeed benefits of unified communication to business organization as evidenced in the findings and that local business should be encouraged to learn more about unified communications and employ the best practices in implementing these in their organizations. The study further concludes that there are risks and threats associated with adoption of unified communications such as high costs of investments to
modern technology which is expensive based on the existing infrastructure that organisations have adopted in the organization.

The study recommends that organizations should conduct an assessment of existing communication structures that are present in their organization and how this compliment the work processes among employees before adoption of unified communication infrastructures. There should be more emphasis on the distribution of the fibre optic infrastructure to business enterprises and corporations to enable them to adopt unified communications infrastructure. Vendors and service providers of unified communications should provide sensitization and awareness programmes to businesses so as to enhance their knowledge and this may influence their adoption of unified communications in their firms. The study recommends that organizations should use mature and proven technologies which are commensurate with the current business environment.
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This study is dedicated to my dear mother – Mary Kang’ethe, father – Geoffrey Nugi, and siblings – Nyandia, Nyokabi, and Nugi for your support, patience and understanding during the entire period I undertook my MBA program – thanks a million. This study is also dedicated to Agnes Nyambura who through her companionship encouraged me to complete my studies.
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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Problem

With increasing demand for smart phones, tablets and real-time capabilities in the consumer marketplace, companies are feeling increased pressure to support their workforce with enhanced technology in order to enable them to stay productive both in and out of the office. Further, organizations today are facing time and process inefficiencies due to high “human middleware” interventions in globally distributed processes. Without new solutions, these processes will become more inefficient and costly. It is predicted that unified communications is going to play an important role to facilitate communication in the workplace as it integrates different modes of communications in an intuitive way (Costello et al. 2008). Unified communications broadly define a communication environment that comprises a variety of communication technologies (e.g. email, telephony, voicemail, instant messaging, video, Web conferencing, and short messaging services). These technologies can be used together seamlessly in various combinations to deliver improved working between people. To date, the development of the UC market has been slow because most enterprises have taken a conservative approach to investing in unified communications (UC). The downturn in the global economy has discouraged enterprises from investing in non-essential Information and Communication Technology (ICT) initiatives without a clear and compelling business case. The use of unified communications technology and its information acquisition plus transmission advantages can improve business processes, enhance intelligent decision making, reduce costs and production operations to improve customer satisfaction. Need citations

According to a major unified communications and collaboration solutions vendor (Microsoft Corporation, 2007), UC breaks down today’s silos of communications experiences and provides rich capabilities that allow people, teams, organizations to communicate simply and effectively while integrating seamlessly with business applications and processes. Another vendor (Nortel Networks Corporation, 2008) suggests that UC improves business processes by streamlining the tasks each of us perform in business, improves productivity and ultimately takes the human out of the "process" enabling employees to work more efficiently. Although enterprise information technology (IT) organizations recognize these benefits, most have difficulty assigning a
defendable, quantitative value to them and are reluctant to aggressively invest in UC applications, platforms, and technologies because of soft return-on-investment values.

Developing a business value proposition or justification for UC poses a particular problem because planners must demonstrate value for solutions or technologies that are new, that often involve changes in the way that people work or to organizational structures, and for which there aren’t clear metrics on which to build a business case. Because of this, it can be difficult to clearly define the tangible benefits required for a business case - organizations may find it prudent to calculate savings in an individual communications function independently, since the bigger picture can be complex and the impact too broad to achieve any obvious short-term benefit. However, it is also useful to view these collectively, as some functional areas could displace others. Each opportunity should be considered as a component of the broader UC vision (Nortel Networks Corporation, 2008).

In a survey conducted by an independent market research firm, more than 500 professionals, primarily in middle – management to senior management – level positions across 13 industries, were polled to gauge their knowledge of Unified Communications functionality, capabilities and benefits, specifically related to how the UC technology enables them to more efficiently work outside of the office (Teo, 2011). The study revealed that the majority of professionals surveyed are restricted in their ability to work effectively outside the office due to limited or no UC functionality. The survey also found that organizations that do have unified communications technology may not be leveraging their investment to its full potential. Most enterprises focus on UC for short-term cost savings and return on investment and less on how UC technologies deliver benefits and cost savings for the business. For end users, this means quantifying the value of UC solutions for specific groups of users, as well as the ability of the solution to meet business objectives. For UC vendors and service providers, it means clearly articulating how their solutions, pricing and delivery models (on-premises or service-based) address the tactical and longer-term strategic business objectives (Nortel Networks Corporation, 2008).

It is generally accepted that the average IT budget is 4% of an organization's revenue, while total operating expenses are between 80% and 90%. A small investment in UC can
reduce operating costs that are substantially larger. UC is projected to help organizations improve processes and reduce costs, extending the focus for UC investment beyond just cost savings for IT (Gartner, 2011). Although there are successful deployments of UC, the market and products remain at early stages of maturity, and adoption of well-integrated solutions remains slow. This slow adoption is the result of multiple technical and organizational issues, including:

- Enterprises have large investments in communication infrastructures that must be preserved; this leads to a slower evolutionary approach, rather than to the faster revolutionary "rip and replace" approach.
- Many applications and products are complex to deploy and may require organizational changes.
- The business case frequently is based on a soft return on investment (ROI) or a strategic investment, such as productivity improvements, rather than on hard ROIs, such as cost savings. As a result, in a conservative economy, deployments occur more slowly, perhaps as part of a broader technology update.

The Kenyan UC market is in its early growth stage. Greater adoption of IP telephony is expected to drive the increased deployment of UC solutions. The landing of the undersea cable and greater availability of bandwidth will provide an additional growth stimulus. According to Frost & Sullivan research (Kenyan Unified Communications Market, 2009); early adopters like large enterprises are deploying UC solutions, promoting market growth. "Large enterprises typically have multiple branch offices, mobile or remote works, and seek to consolidate several resources to reduce costs," says the analyst of this research. "The business and financial services industry, telecommunications, and government sectors are early adopter segments of UC solutions and are driving market growth." Growth in the telecommunications sector is driving demand for innovative products and services, creating new information and communication technology (ICT) requirements such as IP telephony and UC solutions.

However, some organizations do not see the immediate value of adopting UC solutions yet due to high investments in existing stand-alone systems and technologies whose return on investment is not yet fully realized, making it difficult to justify new purchases. "Large investments made in legacy equipment along with the cost perceptions about IP
telephony are the greatest threat to the growth of the Kenyan UC market," explains Frost & Sullivan (2009) in their Kenyan Unified Communications Market research. "Pricing is often out of the purview of local companies as the industry is largely dominated by small and medium-sized enterprises."

Exactly what is “Unified Communications”? Gartner (2011) defines UC as the products / equipment, software and services that facilitate the use of multiple enterprise communication methods. UC solutions integrate communication channels (media), networks and systems, as well as IT business applications and, in some cases, consumer applications and devices - UC is not a single product, but a platform that integrates these communication services with users' presence or availability information to simplify users' ability to connect with colleagues cite source. The availability of unified communications and collaboration solutions is a result of telecommunications, data networking, desktop computing, corporate computing, digital devices and applications all coming together through the advent and ubiquity of Internet-based networks and open software platforms. Gartner (2011) UC is a direct result of the convergence of multiple communications and applications. The convergence of all communications on Internet Protocol (IP) networks and open-software platforms is enabling a new paradigm for UC and is changing how individuals, groups and organizations communicate.

![Figure 1: Products and technologies basic Unified Communication](Hydari, 2008)

Gartner (2011) suggests that unified communications can be divided into six broad communications product areas: Voice and telephony, Conferencing, Unified messaging, Presence and instant messaging, Clients, and Communication applications. He further
adds that although unified communication products are used by employees to facilitate internal communication, and by enterprises to support workgroup collaboration, they may be extended beyond the company's boundaries to enhance communication for the "extended enterprise," which includes suppliers and partners.

UC offers the ability to significantly improve how individuals, groups and companies interact and perform. These products may be made up of a stand-alone suite or may be a portfolio of integrated applications and platforms spanning multiple vendors. In many cases, UC is deployed to extend and add functionality to communication investments. As a consequence of UC products being used by people to facilitate personal communications and by enterprises to support workgroup and collaborative communications, Unified Communications focuses on the user experience (Georgakopoulos, 2006).

While the term “Unified Communications” may connote different things to different people, a few underlying characteristics emerge in UC solution according to Kelly (2010) these are 1) presence and voice are fundamental and 2) capabilities are joined by some type of an intuitive unified interface. With these two fundamental characteristics, the actual features and functions that comprise a unified communications solution can be deployed gradually in an evolutionary fashion, or added all at once, in a “big bang” deployment. In either case, as functionality is added, it immediately becomes unified with other capabilities in the solution, eliminating communications silos.

Prior to these unified communications solutions, the end user experience was disjointed and awkward. People were required to decide in advance which communications modality they wished to use (voice, email, IM, web, video) and to manually set up communications channels independently and separately for each. Companies of all sizes and across all vertical markets recognize that the need for Unified Communications and Collaboration (UC&C) has never been greater. In particular, the growth of the mobile workforce means that workers have to communicate regardless of their location or device. The increasing shift to mobile access has inspired the creation of new unified communication technologies, while other real-time communications tools like instant messaging and video conferencing have become standard operating procedure in the workplace.
1.2 Problem Statement
Businesses are changing with more and more people working in disparate locations across the globe, and customers are expecting higher levels of engagement with the companies they choose to do business with. This leaves IT departments challenged to meet the growing need to keep people connected inside and outside the organization, while still effectively managing the increasing complexity of their communications infrastructure.

People and businesses use many different devices to communicate such as instant messaging, wireless phones, personal digital assistants / tablets, personal computers, among others. The emergence of smart phones, applications, social media technologies, storage in the cloud, social file sharing workspaces combined with ubiquitous digital connectivity anytime, anywhere has changed human behavior in a way that is rapidly affecting business norms and setting new demands on business leaders. We are in a new era – one where employees are rapidly incorporating non-traditional Communications technology into their daily work life. The essence of communication is to break down barriers – for instance, the telephone breaks distance and time barriers so that people can communicate in real time or near real time when they are not together. The goal of unified communications (UC) is to eliminate or reduce these barriers so that people using different modes of communication, different media, and different devices can still communicate to anyone, anywhere, at any time.

Unified communications is an area that is evolving rapidly, but companies are still challenged to come up with justifications beyond internal cost savings for its deployment. UC can be broadly described as equipment, software and services that enhance individual, workgroup and organizational productivity by facilitating the control, management and integration of multiple communication methods. UC products achieve this through the convergence and integration of communication channels, networks and business applications. Every adoption of a new system and infrastructure brings with it risks associated with change and new technologies. In this research, I will seek to examine how enterprises are approaching the justification of investments in UC.

1.3 Purpose of Study
The objective of this study was to determine a business case for investing in a unified communications system.
1.4 Research Questions
1.4.1 What benefits do companies and organizations achieve today from UC?
1.4.2 What risks would arise from this linkage of communication channels?
1.4.3 Which strategy is best for implementation of Unified Communications?

1.5 Importance of the Study
Business organizations adoption of unified communications (UC) is impacted by a complex set of business, cultural, economic, organizational, and technological factors whose relevance will differ from business to business; they uniquely combine to influence an enterprise's strategy for providing a UC-enabled business environment.

1.5.1 Business Process Transformation and Innovation
The ultimate benefit of deploying unified communications is achieved when the new capabilities are integrated into applications and key business processes to transform decision making, and customer interactions. This would positively impact profitability and become a strategic asset in the success of an organization. The findings of this study will also help business executives assess these drivers so that decisions on investing in UC are easier to make.

1.5.2 Information and Communication Planners.
Planners will benefit with information to guide them when making decisions on whether to migrate current technology silos towards a platform that provides better integration and functionality with other communication areas.

1.5.3 Users
For end users, this research would assist in understanding the technology options which will enable technology consolidation and which standards will enable interoperability. End users need to understand which solutions will be successful.
At Nokia Siemens Networks, end users are interested to understand discern between what is real and what is hype and, similarly, to understand which vendor products integrate easily.
1.5.5 Hardware Vendors
This research will enable vendors to understand which technologies and architectures are acceptable by NSN, therefore allowing vendors to understand the market.

1.6 Scope of study
The research study was undertaken between the months of June 2012 and March 2013 and targeted the global service delivery technical team in Nokia Siemens Networks. The study location was Nairobi where the NSN Kenya headquarters is located. The population of the study was the employees at NSN Kenya who were 102 and the sample size of the study was limited to a project team of 26 respondents. The study did not include physical assessment of availability unified communications hardware in the local market.

1.7 Definition of Terms
1.7.1 Unified Communications and Collaboration (UC&C)
UC integrates real-time and non real-time communications with business processes and requirements based on presence capabilities, presenting a consistent unified user interface and user experience across multiple devices and media types. UC supports the enterprise to manage various types of communications across multiple devices and applications, and across geographies, with personalized rules and policies, while integrating with back-office applications, systems and business processes. UC enables people to connect, communicate and collaborate seamlessly to improve business agility and results. UC is increasingly being integrated or offered with collaboration applications to form UC&C (Qian, 2012). Collaboration is the ability for different groups and teams to work together to achieve business goals.

1.7.2 Conferencing
This area includes audio, video and Web conferencing, as well as collaborative capabilities which brings collaboration to the desktop via a Web browser and an Internet connection, allowing participants to view presentations and other documents while participating in a real-time conference. Another collaboration component is shared workspaces, which enable participants to view, share, edit and save documents and files.
1.7.3 Instant Messaging (IM) and Presence
Instant Messaging applications allow employees to easily communicate and share files with other IM users in a real-time session similar to a private chat room. IM solutions are also used in organizations where IM communication is part of the corporate culture and presents significant business advantages. It incorporates publication of presence and location information of a desired contact showing connection status, such as ‘available’, ‘busy’, ‘off-line’. IM generally requires an enterprise-grade IM system, rather than a public IM service such as AOL or Yahoo. Enterprise IM systems offer security and privacy that public IM services cannot.

![Screenshot of a public Instant Messaging program by Google](image)

**Figure 2:** Screenshot of a public Instant Messaging program by Google

1.7.4 Clients
Unified clients enable access to multiple communication functions from a consistent interface. These may have different forms, including thick desktop clients, thin browser clients and mobile phone clients, as well as specialized clients embedded within business applications.

1.7.5 Communication Applications
A broad group of applications with directly integrated communication functions. Key application areas include consolidated administration tools, collaboration applications,
contact center applications and notification applications. Eventually, other applications will be communication-enabled.

1.7.6 Voice and Telephony
This area includes fixed, mobile and soft telephony, as well as the evolution of private branch exchange (PBXs - telephone system within an enterprise). This also includes live communications, such as video telephony.

1.7.7 Nokia Siemens Networks
Nokia Siemens Networks headquartered in Espoo, Finland, is a multinational data networking and telecommunications equipment company. Nokia Siemens Networks is a joint venture between Nokia of Finland, 50.1% control, and Siemens of Germany with 49.9% interest. With operations in around 150 countries, Nokia Siemens Networks generated revenues of €14.041 billion ($18.65 billion) in 2011, ranking behind Ericsson, Huawei, and Alcatel-Lucent (ALU). As of 2012, the company’s Africa region is headquartered in Nairobi, Kenya (Nokia Siemens Networks 2012).

1.7.8 Soft phone
A soft phone is a software program for making telephone calls over the Internet using a general purpose computer, rather than using dedicated hardware

1.8 Chapter Summary
The chapter gives a background of the study which examines the factors that would encourage unified communications and collaboration (UCC) adoption in organizations. In addition, the chapter highlighted the current use trends and the reasons for low levels of unified communications adoption. The chapter has also outlined the objectives and scope of the study.

The next chapter will review published literature on Unified Communications Systems and factors associated with their use. Chapter three will present the study methodology including the study design and sampling technique while Chapter 4 and Chapter 5 will present the study findings and discussion respectively.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

In this section the unique potential benefits that deployment of Unified Communications portends will be explored, as well the accompanying pitfalls. In addition, alternative best practice strategies for the implementation of a unified communications system are presented, with an explanation of the importance of each of the strategic tasks. The chapter also gives the gaps that the research sought to fill.

2.2 Benefits Companies and Organizations Achieve from Unified Communications

According to Gartner (2011) developing a business justification for UC poses a particular problem because planners must demonstrate value for solutions or technologies that are new, that often involve changes in the way that people work or to organizational structures, and for which there aren't clear metrics on which to build a business case. Because of this, it can be difficult to clearly define the tangible benefits required for a business case.

Osterman (2011) considers unified communications as an important capability that offers a number of benefits which include:

- The ability to integrate email, voice and instant messaging into a more cohesive communications system than most organizations have available to them today.
- The ability for users to launch a Web conference, audio conference or video-conference easily and from within another communications tool, thereby enhancing their productivity.
- The ability to better support mobile users, giving them a productive work and collaboration experience even when they are away from their normal work environment.
- Faster decision making because all of the data that users and organizations need is available through any access point and users can communicate with others inside and outside their organization more easily and more quickly.
- Lower overall information and communications technology costs, particularly for labor, because of the inherent economies of scale available with an integrated communications platform.
Gregory (2008) details some of the business benefits companies and organizations are achieving today from unified communications as described below:

2.2.1 Reduced Travel Costs
A common justification for deployment of unified communication, Gregory suggests real travel cost savings can be accrued if, for instance, video conferencing is used as an alternative to business travel. This can be a particularly suitable replacement for face-to-face meetings, training or job candidate interviews.

2.2.2 Lower Remote Calling and Roaming Costs.
For many organizations, in Gregory’s opinion, the cost of cellular roaming is increasing with the need for greater cross-border travel. Even with improvements in roaming tariffs from many mobile operators, the costs are still far in excess of fixed telecom costs. Softphones offer an opportunity to reduce some of those costs, and as more organizations deploy Internet Protocol-private branch exchanges (IP-PBXs).

2.2.3 Customer Control and Retention
UC can increase customer loyalty by simplifying interactions with customers, increasing the availability of employees, and accelerating the responsiveness to their needs. Clients receive the needed service on the spot even when a branch specialist is not available, without the need to schedule a later visit - no more lead loss, and immediate lead qualification.

2.2.4 Reducing Costs and Risks
A sound UC strategy results in reduced costs, freeing up capital for other critical initiatives. Risks of future disruptions are reduced, allowing company executive and managers to focus on production and services. In-house audio and Web conferencing facilities can significantly reduce collaboration expenses associated with service providers — often resulting in a return on investment in under a year. You’ve probably noticed this phenomenon around your own company: Cell phones are used a lot from the office, essentially wasting minutes from expensive cell phone plans. The ability to answer a call on a cell phone and shift it to a desk phone can reduce cell phone minutes for when they are truly needed, thereby drawing significant savings on mobile expenses.
2.2.5 Increasing Responsiveness
Customers and employees can reach the right persons, and also initiate real-time and non-real-time communications from anywhere. Employees can have increased access to other associates to deal with customer or vendor issues. All business voice messages are managed in a single mailbox, eliminating the challenge of forwarding important messages that are left in a mailbox associated with a cell phone or alternate location to another associate for information or action. Improved notification of (and access to) messages (e-mail, voicemail, fax), and increased ability to manage those messages accelerates the company’s ability to deal with customer demands.

2.2.6 Improving Effectiveness and Efficiency
Increasing the ability for people to communicate with each other increases their ability to do the right thing and do things right. Providing communication tools across formerly separate device- and network-appropriate environments transforms wasted time into productive time. Simplified communication interfaces increase the user adoption rate of communication tools, resulting in workers taking advantage of productivity tools that were previously too complex to use beyond the “power users.” According to Kelly (2010) a well-designed and implemented unified communications system significantly reduces multiple communications mechanisms in favor of more rapid, ad hoc, one-on-one and group meetings facilitated by presence, IM, voice, video, and web conferencing capabilities.

2.2.7 Integrating Communications
Integrated communications reduces the need to manage multiple devices or synchronize information among environments. As Gartner (2011) explains, the ability to manage and control one's inbound and outbound communications increases an employee’s ability to focus on what matters, rather than focusing on the technology itself. The tangible benefits arise from device reduction and consolidation - clients and endpoints, such as PC desktop communicator clients and dashboards, provide a single desktop interface to many or all communications functions. Gartner (2011) suggests that these consolidated clients simplify use, increase adoption, improve productivity and often offer a lower total cost of ownership.
2.2.8 Simplified Work flow and Interactions with Customers

With presence, workers are aware of each other's availability. This will allow them to send a quick IM when their colleagues are available, rather than calling on a mobile phone or sending e-mails that fill in-boxes. The impact of this can be much stronger with an integrated presence capability, such that callers can see if their colleagues are on the phone, away from their desks or on holiday. Gregory (2008) says that this accelerates access to decision makers, content and process experts, team members and employee groups, and external customers, suppliers, partners, and stakeholders thereby empowering people to communicate and get things done.

Through the use of a unified communications system, a company can implement a single number for customers to access a variety of services, be it for voice, fax, and notification. This number can stay the same regardless of the owner’s location, be it at their office desk, around the office, on their mobile device, virtual or work-at-home office, or on their PC from anywhere in the world. Gregory (2008) concludes that these features enable the ability to extend enterprise telephony functionality to mobile users regardless of their actual location or device in use at the time. A “borderless enterprise” is a company in which the geographical, business and technical borders have been broken down to achieve real-time interaction with customers, employees and partners. Enterprises require more efficient communication tools that enable all those involved to share information, to communicate in real-time and to make faster business decisions.

The differentiating factor will be the ability to efficiently manage unified multimedia communications and interactions so that the company can carry out its business anytime, anywhere. In Gregory’s opinion, simplifying the act of communicating, and integrating it into what people do ensures that communications take place when and how they should. This eliminates the cost of unsuccessful communications - those not made or delayed because it was inconvenient, or because the ability to do so was not readably available.

2.2.9 Decision Making the Smart way

With use of unified communication systems, Gregory (2008) suggests that employees can access decision makers in a more timely fashion and consult more with others to gather necessary content and contextual information leading to faster and better decisions. They can then share those decisions with individuals, groups, or the entire enterprise to keep
individuals and teams up to date. Improved access to people and messages provides necessary information to assist in decision making and workflow — often in a just-in-time manner. Gregory (2008) considers the ability to see associates through video interfaces as well as hearing their voices while participating in conference calls or listening to voice messages adds important context to the information at hand.

2.2.10 Social Networking and Enhancing Relationships

Businesses are also embracing social media capabilities to keep their own employees more connected, collaborative and efficient. As Gregory (2008) puts it, this trend leads to better team relationships, which improves project and program outcomes. Companies are also utilizing social media for communication externally, be it for recruiting or marketing outreach. Video provides much greater intimacy in a conversation than does an audio-only communication. Along with building better understanding, video allows distributed individuals and teams to forge stronger relationships due to the face-to-face interaction. For example, managers will often have more success managing remote employees when video conversations are employed from time to time. Financial institutions working with high net worth individuals often set up video interactions with these individuals to maintain and establish strong working relationships and relationships of trust.
Table 1: Unified Communications and Savings Opportunities (Gartner (2011), 2009)

As Kelly (2010) observes, the ultimate benefit of deploying unified communications is achieved when the new capabilities are integrated into applications and key business processes to transform decision making and customer interactions. Companies that use the platform to transform and re-engineer core processes will help the company drive measurable revenue growth via new and faster business processes and converged channels of customer interaction.

2.3 Unified Communications Risks and Counter Productivity

The drive for business agility is stimulating companies to adopt unified communications as a primary vector for enhanced communication and collaboration capabilities between remotely located and mobile employees, its supply chain and partner ecosystem, and with customers - organizations recognize the value of UC technologies for improving end user productivity, increasing customer satisfaction and reducing communications costs.
Almeida, Cruz, and Oliveira (2011) found that the introduction of a UC solution brings an array of new vulnerabilities into the enterprise, exploited by a growing number of malicious programs. They the most common of risks faced by the major dominant technologies used in unified communications solutions and an approach to mitigate them. On his part, Gregory (2008) is of the opinion that linking of communication channels via UC solutions introduces some risks as well to the enterprise. The issues / risks identified are detailed here below:

2.3.1 Risks of Instant Messaging
Without proper control, IM poses a significant security threat on many fronts, mainly in terms of theft of service and privacy. It is also common to see attacks in terms of identity theft and identity ambiguity. The most frequent used attack is stealing the account information of an unsuspecting user. This can be very dangerous as an attacker may gain access to privileged information, or proprietary or other confidential information being transmitted along the instant messaging network. The safest way to ensure organizational control over identity and credentials is to implement a corporate IM system. By implementing it, the organization obtains control over functionality of the system, resulting in better levels of compliance with corporate policy. This will provide corporate control over user credentials and published names as well as password and usage policies. In addition, file transfer can be disabled if necessary and messages can be logged and archived for future analysis.

2.3.2 Risks of Private Branch Exchange (PBX)
PBX forms the core of real-time communications within the organizations. In most unified communications projects the PBX is an IP-based platform that provides integration to desktop applications for remote call control and presence. Since almost all IP PBXs are implemented on a single device, the most typical security risks in a PBX system are related with denied of service and exposure of information. A denial of service (DoS) attack is a serious threat that a PBX system can face whereby it can be flooded with spurious traffic or server requests. The attack is generated by machines that have been compromised by a virus or other malware. The massive increase in traffic means the affected servers are unable to process any valid requests and the whole system grinds to a halt (service unavailability). Another vulnerability of VoIP is the ability of an outsider to eavesdrop on a private conversation. A way to mitigate these threats is to control the
traffic across subsystems by access control functions within a firewall to protect from network resource consumption and attacks from malicious users.

2.3.3 Risks of Conferencing
Conferencing applications or services offer the ability to blend audio and video conferencing and application sharing across multiple networks and endpoints. Using a conferencing application, groups can see, hear, text chat, present and share information in a collaborative manner. However, conferencing applications pose security threats as they involve and interact with many technologies within the enterprise. This risk is relevant, irrespective of whether the application is hosted externally or internally. A good practice is to choose a conferencing system that allocates random access codes for each conference ID rather than static attendance codes. Also, the conferencing services should allow the host review of the number of participants in a conference to determine if an additional party is present.

2.3.4 Cost of Managing and Maintaining Disparate Networks.
Use of Unified Communications could bring about many heterogeneous means for communication. Further overheads are incurred in trying to keep all employees’ communications devices updated with the latest applications, updates and security patches. Sometimes, as Gregory notes, a user may not have access to the “right” directory, or the directory that they have may not have the “right” connection options or information. He further notes that this could be further complicated if no company directory or single device in the unified communications can possibly track all of the various means, phone numbers, and addresses for company workers.

Despite the widespread usage of Information and Communication technology in the workplace, we are still not clear about the resources of the ICT and their impact on ICT-supported communication. Past studies have suggested that the resources offered through ICT may sometimes hinder effective and successful communication (Vera, Kuvan, West & Lai 1998). Gregory (2008) concludes that not only are monetary costs incurred, but also that a lot of time is spent by information technology staff managing the devices.
2.3.5 Risk of Disclosure.
Due to the dependence on public switched networks in linking disparate enterprise offices, Gregory notes there is a risk of having communications between customers, partners, suppliers and office workers that take place on popular “public” channels that the company does not govern, track, or control. He adds that most of these “public” means for communications have less protection than businesses require, for instance, most Instant Messaging services are unencrypted, personal e-mail is unencrypted and stored on multi-tenant servers, and Internet-based FAX is as unprotected as e-mail. Business information, therefore, exists on many service providers’ systems, away from corporate control and protection, putting the business at risk of noncompliance with data protection and retention regulations and policies.

2.3.6 Undocumented Communications.
Businesses are under increasing requirements to document their internal communications as well as communications with outside parties such as customers and suppliers. Gregory suggests that when communications take place over means not controlled by the business, the business is unable to archive such communications, putting it at risk of regulatory noncompliance. It is crucial for an organization to keep these networks secure in a manner that prevents leaks of customer records and protects intellectual property and proprietary information, Georgakopoulos (2006). In essence, to adopt UC successfully, an enterprise must address the risks associated with the changes in these areas to limit the chance of failure or security breach that could damage a company's reputation, or perpetuate vulnerability of sensitive proprietary information.

2.4 Strategies for Deploying Unified Communications Systems
As enterprises plan for unified communications and a migration away from siloed voice, video, and collaboration capabilities, it is important to consider both future directions as well as past purchases. The future for unified communications architectures is clearly a centralized, and possibly virtualized, SIP-based communications infrastructure. All of the major vendors and service providers are moving to this architecture. However, organizations already have hundreds or thousands of phones and video units that are still fully functional yet not fully depreciated. A compelling solution needs to be architected so that it can take an enterprise into the future while allowing it to use both emerging and legacy voice and video devices.
Enterprise UC solutions from vendors often reflect the vendors' specific strengths and backgrounds. Gartner (2011) identifies five approaches to UC optimal in addressing different requirements and different technology base. These five approaches to UC are:

- Telephony-centric approach, which is rooted in IP-PBX technologies
- Tightly bundled UC and collaboration approach, which focuses on a pre-integrated set of functions
- E-mail and collaboration-centric approach
- Best-of-breed portfolio approach
- Integrated on-premises-service approach

Each approach has its strengths and weaknesses. Many enterprises will find that they must use a combination to develop a complete road map.

Another important distinction among vendor solutions is the extent to which they are open to standards and to integration with third-party communication products - some solutions are intended primarily to enhance and operate on their own environments, while others are intended to interoperate in multiple environments. Because most enterprises will end up with communication solutions from multiple vendors, enterprises should ensure that the different products can interoperate and should consider the depth and quality of integration among the products.

The biggest challenge, according to market experts, is that companies typically treat component parts of the solution in silos. “They can no longer work this way as (unified communications and collaboration) represents a fusion of different communications cultures and work systems,” says Gartner (2011). He adds that the artificial separation they are used to will become a thing of the past. Gartner (2011) underscores the need to support interoperability and open standards, and strongly suggests taking a longer-term approach. Most enterprises start to examine a unified communications and collaboration deployment by defining the most cost-effective way to deliver value while controlling costs, retaining control over accounts and leveraging existing investments. Often, Gartner (2011) notes, initiatives start with a focus on a particular project and new projects are initiated as others are completed.
However, according to Georgakopoulos (2006), there is no one best approach as no one vendor offers everything an enterprise needs for unified communication. He suggests that companies must make decisions by evaluating the emerging options based on needs and how the options fit with the business's longer-term strategies. Gregory (2008) presents the following tips designed to propel an enterprise in the right direction in order to ensure success with its Unified Communications strategy.

2.4.1 Create a Worker Snapshot
Before you can propose possibly-sweeping changes in the way that your organization communicates today, it is important to understand how your employees communicate with the tools that they have right now. Gregory (2008) suggests that it is crucial to identify all of the organizations “internal” communication needs and patterns, chart them in terms of their business functions, technologies in use, and other factors that are relevant, such as urgency and frequency of communications. This chart can function as the baseline for worker communications — very crucial build your business case. This is especially vital in companies with multiple locations, highly mobile workers, and consistent outsourcing of certain functions. A rundown of the situations to consider (p.59) are such as:

- People who work at their desk and have access to a computer all day
- People who have little or no computer access
- Branch offices
- Virtual workers, such as those who work out of their homes and other “off-campus” locations
- On-the-go salespeople
- Workers with long commutes
- Outsourced business partners and vendors, especially where you need frequent and secure communications
- Mergers and acquisitions, which may involve different parts of your organization with different communications technologies and styles
- Multinational locations, where different time zones, customs and regulations may have an impact on communications
2.4.2 Focus on the Client
With the return to emphasis on customer service, it is imperative to make sure a Unified Communications solution retains or improves customers’ ability to reach your workers easily. In concept this has always been a no-brainer, but with your workers scattered throughout multiple locations and time zones, communication still needs to be seamless and easy for your clients implores Gregory (2008).

2.4.3 Leverage Existing Infrastructures and Applications
Gregory observes that a Unified Communications solution should, to the greatest extent possible, leverage what an organization already has in place. Today’s communications infrastructures are modular, and often permit logical overlays of multiple services such that voice and data networks can occupy the same physical network wiring. Similarly, it is advisable to use existing Internet connections to carry some or all of voice traffic to and from branch offices and/or Telco providers. There is no need to overhaul an entire network, hardware, and software to get make great strides toward Unified Communications. Additionally, it may be possible to make existing applications communications-aware, such as e-mail and instant messaging. This step both saves cost (by necessitating less training) and improves productivity Gregory (2010).

2.4.4 Converge Networks
As an organization develops its long-term communications strategy, it needs to incorporate convergence of its voice and data networks - a key step of the Unified Communications solution journey; Gregory (2008) suggests several ways to achieve convergence:

- Single wiring plant: Although existing building may have duplicate voice and data network wiring plants, monetary savings can gained in future buildings by building a single data network wiring plant for both voice and data.
- Single backbone: Modern designs can rely upon a single network backbone to carry enterprise data and voice traffic.
- Single Internet connection: Significant savings can be realized by converging voice and data Internet connections into a single data connection.
2.4.5 Use of Proven Technologies
Gregory (2008) cautions against the temptation; no matter how powerful, to risk a business on untested or proprietary technologies over mature and proven technologies. This would go a long way in mitigating obsolescence and the prospect of a costly migration in the future.
Some questions you can ask of your communications vendors include:
1. How long has the technology been in the field?
2. How many organizations have implemented and are still using the technologies?
3. Are the technologies/solutions based on open standards?
4. Do your products interoperate with those from other vendors?
Gregory (2008) says it is important to pay attention to the vendors’ answers, and how they answer these tough questions, such that if they get all squirmy and uncomfortable, or brush off answering specifics with a cocky “we work with everything!” attitude, it may be time to walk away.

2.4.6 Incorporating Management Tools
Gregory (2008) suggests that while developing your Unified Communications solution, some management tools should be factored-in for it to operate smoothly. These capabilities include:
Troubleshooting: There is a need for tools that help to quickly identify faults, performance, and capacity issues.
Reporting: Gregory (2008) says that unless one can readily see how your UC network is being used, it is difficult to make decisions about the future or understand the present. Besides, reporting statistics are useful in showing to the execs how much more efficiently the Unified Communications suite is using resources than the old solution did.

2.4.7 Expert Help
Chances are you’re an expert in your business, which is probably not UC. Gregory (2008) advises enterprises to seek help when considering Unified Communication solutions - consultants can provide valuable guidance by helping to identify business and technology issues that may have gone undiscovered until later.
2.4.8 A Positive approach to Change
When decisions are made to invest in Unified Communications, it is desirable for all stakeholders to become involved in systematic changes that can help the organization be more effective at what it does best. As Gregory alludes, it is human nature to become apprehensive when it comes to implementing change in any form. His view is that although the changes may be disruptive at first, the best way to deal with changes is to anticipate them and talk through the changes with stakeholders, in order to uncover additional issues. “This will help to avoid surprises - the kinds of changes that are no fun” (Gregory, 2008). He adds that the changes are more amenable when the benefits that the business will realize as it adopts unified communications are emphasized.

Unified communications (UC) is often not a single solution that can be supplied by a single bidder and deployed all at once (Gartner, 2011) Rather, enterprises likely will require multiple partners to support a complete UC solution, which they will implement over time via continuous improvements in capabilities and integrations, using a range of components that need to work together. Gartner (2011) recommends that when assessing potential solutions suppliers who can satisfy appropriate UC requirements, it is crucial to define business and technical requirements for UC by forming a project team that comprises stakeholders from key functional areas of the business, as well as personnel from procurement, human resource, and information technology. In addition, Gregory says it is imperative to valuate availability of support, regional distribution differences, price, management and user interfaces, service-level expectations and overall bidder viability in the request for proposal.

2.5 Chapter summary
This chapter has reviewed published literature on the potential benefits accruing from use of unified communications which can be used to promote and justify increased market adoption of UC solutions. The chapter has also highlighted some of the risks arising from the deployment of UC solutions. Lastly, some UC solutions implementation strategies have been presented. The next chapter will look at the research methodology including the study design, study population, the sampling technique, data collection and analysis.
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction
This chapter deals with the research design and methodology to be used in the study. The chapter has been organized into research design, data collection procedures and data analysis techniques that will be applied.

3.2 Research Design
The research problem was studied using a case study method. This design is the most suitable considering the research questions, time factor and budget implications. Yin (1984) defines the case study research method “as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. Through the case study method, a researcher is able to examine data at the micro level. As an alternative to quantitative or qualitative research, a case study can be a practical solution when a big sample population is difficult to obtain. This method was suitable for this study because it aims at giving in-depth information on the mediating factors critical to making the business case for investing in a unified communications system at Nokia Siemens Networks (NSN) in Kenya.

3.3 Population and Sampling Design
3.3.1 Population of the Study
A research population is generally a large collection of individuals or objects that is the main focus of a scientific query (Castillo, 2009). Since NSN (Kenya) is structured along key customers, the population used for this study was NSN (Kenya) employees working in one customer team. This population comprises employees drawn from senior, middle to junior levels working in the under Sales, Customer Care, Finance & Control, Network Implementation and Logistics departments.
### Table 2: Sampling Frame

<table>
<thead>
<tr>
<th>Position</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior level</td>
<td>20</td>
<td>19.6%</td>
</tr>
<tr>
<td>Middle level</td>
<td>32</td>
<td>31.4%</td>
</tr>
<tr>
<td>Junior level</td>
<td>50</td>
<td>49.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

*Source: NSN (Kenya)*

### 3.3.2 Sampling Design

#### 3.3.2.1 Sampling Frame

Basically, a sampling frame is a complete list of all the members of the population that a researcher wishes to study. For the study, data was collected from respondents who are working on this customer’s project. Employees actively engaged in a customer project are usually charted by the project managers as resources committed to a project during its lifespan. The project chart will provide the sampling frame for the study.

#### 3.3.2.2 Sampling Technique

Given that potential respondents in the population already belong to specific departments, cluster sampling was applied and, subsequently, each respondent was selected using simple random sampling from the list of department’s employees charted on the project on the day of data collection. With the use of this technique, the goal was to give all the clusters equal chances of being selected. In addition, the study can get a larger sample size than if only simple random sampling is used as more respondents can be obtained since the clusters are more accessible. A sufficient sample size will aid in giving a holistic representation of the company.

#### 3.3.2.3 Sample Size

The data will be collected from the employees who are working on this customer’s projects within Network Operations, Network Implementation and Logistics departments. The compelling reason is because employees in these departments are for most often working from locations outside NSN office premises.
### Table 3: Sampled Respondents

<table>
<thead>
<tr>
<th>Department</th>
<th>Number / Gender</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network operations</td>
<td>11 (Male – 10; Female – 1)</td>
<td>42.3 %</td>
</tr>
<tr>
<td>Network implementation</td>
<td>10 (Male – 7; Female – 3)</td>
<td>38.5 %</td>
</tr>
<tr>
<td>Logistics</td>
<td>5 (Male – 3; Female – 2)</td>
<td>19.2 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

### 3.4 Data collection

This study used only primary data. The data was collected through a questionnaire. The proposed questionnaire shall comprise both structured and open-ended questions which shall be self-administered. Given responses are gathered in a standardized way, and the fact that it is possible to collect large amounts of information from a large number of people in a short period of time and in a relatively cost effective way (self-administered), this data collection technique was best suited for the study. Also, results of the questionnaires can be quickly and easily quantified by either a researcher or through the use of a software package.

The questionnaire was structured in four sections; the first section comprised of background information, and data pertaining to the first research question obtained in the second section of the questionnaire. Questions intended to answer the second research question shall appear in the third section of the questionnaire, with the last part (section-4) capturing data pertaining to implementation strategies for a unified communications system.

### 3.5 Research Procedures

The questionnaire was pre-tested before the actual data collection to check for any inconsistencies, ambiguity and incomprehension. Modifications were made according to the observations during the pilot. Informed consent of the respondents will be sought before interviewing and confidentiality will be guaranteed.

### 3.6 Data Analysis

Descriptive analysis techniques were used to analyze the primary data. According to Mendenhall and Beaver (2005), descriptive statistics are used to draw conclusions and make predictions based on the descriptions of data. In this study, inferences will be made about a population from analyses of data obtained from a sample. That is, we can take the
results of an analysis using a sample and can generalize it to the larger population that the sample represents. Data was presented in tables, charts and graph accompanied by the researcher’s interpretation.

3.7 Chapter Summary
In this chapter, attention is drawn to the research design technique to be used for the study. In addition, the sampling method as well as data collection and analysis techniques are elaborated. The questionnaire itself was presented separately in the appendices section. Refer to the next chapter.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

4.1 Introduction
This chapter covers analysis of data and the findings of the study. The first section of the chapter presents the background data of the respondents. This chapter only presents results which are presented in four segments these include the general or biographical information, What benefits do companies and organizations achieve today from Unified Communications; what risks would arise from this linkage of communication channels and Which strategy is best for implementation of Unified Communications

4.2 Background information

4.2.1 Gender
In regard to their gender the study found that majority of the respondents were males and represented 76.9 percent compared to their female counterparts who accounted for 23.1 percent. This difference is attributed to the fact that the field of communication technologies is male oriented where the ratio of male to female tends to be high. These findings are illustrated in Figure 1.

![Figure 1: Gender Distribution among Respondents](Image)

4.2.2 Work Experience
Organization work experience was also another factor of the respondents’ background that the researcher sought to establish. Study findings indicated that 50.0 percent of the respondents had 5 – 7 years work experience, 30.8 percent had 2 – 4 years experience and 19.2 percent had more than eight years experience. There were no observed responses for respondents who had less than one year experience as illustrated in Figure 4.
4.3 Benefits of Unified Communications

As shown in Figure 2 the views of respondents regarding a Unified Communications (UC) enabling infrastructure and collaborations tools and systems. Study findings show that 65.0 percent of respondents indicated that unified communications has real offerings, is market ready and is here to stay. Further, 35.0 percent answered that unified communications has the potential but needs to be proven and standardized. However, there were no observed responses related to the response of no real return on investment. These findings indicate that staff at Nokia Siemens Network has confidence in Unified Communications systems.

Figure 3: Respondents' View on Unified Communications

Study participants were tested on their awareness of whether NSN planning to deploy/make use of Unified Communications enabling infrastructures and collaboration tools and systems. Majority of the respondents representing 50.0 percent of responses identified that NSN already had this systems in place. As indicated in Figure 5 respondents who answered yes accounted for 35.0 percent and 15.0 percent were unsure
of the organizations motives in deploying of Unified Communications enabling infrastructures and collaboration tools and systems.

Figure 2: Respondents View on NSN Deployment of Unified Communications Enabling infrastructures and Collaborations Tools and Systems

The study sought to establish the extent to which Unified Communications Enabling infrastructures and Collaborations Tools and Systems were deployed and used in NSN. In regard to this 75.0 percent indicated that there was a broad application of unified communication system, 20.0 percent indicated that the deployment of Unified Communications enabling infrastructure collaborations tools and systems were limited to specialists and / or focused teams. A relatively small share of the population indicated that they did not use them at all and this accounted for 5.0 percent of the respondents as shown in Figure 7.

Figure 3: Extent to which Unified Communications enabling infrastructures and collaboration tools / systems are deployed and used
4.3.1 Business Drivers
The literature reviewed for the study suggests that there are various business drivers that influence the adoption and use of a Unified Communications solution where these were used as answer options for study participants to identify. The study asked respondents to rank what was the most important business driver for adoption of a Unified Communication in their organization. As indicated in Table 1 improving business efficiency was identified as the most important driver by 78.2 percent, similarly improving business competency was ranked as the most important driver with 72.2 percent, 50.0 percent indicated higher employee productivity, 64.2 percent indicated reduce costs and travels expenses and better service to customers were 66.7 percent. In regard to the unimportant and least important drivers improved employee morale was identified by 78.2 percent, upgrading existing legal systems was 61.1 percent and improved sales and revenues was identified as a least important business driver with 58.6 percent.

Table 1: Most important business drivers for UC&C adoption

<table>
<thead>
<tr>
<th>Business drivers</th>
<th>Most important</th>
<th>Important</th>
<th>Least important</th>
<th>Unimportant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce costs and travel expenses</td>
<td>64.2%</td>
<td>11.1%</td>
<td>2.6%</td>
<td>22.1%</td>
</tr>
<tr>
<td>Higher employee productivity</td>
<td>50.0%</td>
<td>22.6%</td>
<td>5.6%</td>
<td>21.8%</td>
</tr>
<tr>
<td>Better collaboration with company</td>
<td>61.1%</td>
<td>16.7%</td>
<td>22.2%</td>
<td>0%</td>
</tr>
<tr>
<td>Improve business efficiency</td>
<td>78.2%</td>
<td>13.2%</td>
<td>2.6%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Improve business competency</td>
<td>72.2%</td>
<td>10.4%</td>
<td>7.8%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Upgrade existing legal systems</td>
<td>16.7%</td>
<td>4.4%</td>
<td>61.1%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Improve sales and revenues</td>
<td>22.2%</td>
<td>3.2%</td>
<td>58.6%</td>
<td>16.0%</td>
</tr>
<tr>
<td>Better service to customers</td>
<td>66.7%</td>
<td>23.3%</td>
<td>0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>63.3%</td>
<td>25.0%</td>
<td>11.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Improved employee morale</td>
<td>0%</td>
<td>0%</td>
<td>78.2%</td>
<td>21.8%</td>
</tr>
<tr>
<td>Reduction in carbon footprint</td>
<td>11.3%</td>
<td>5.6%</td>
<td>55.5%</td>
<td>27.6%</td>
</tr>
</tbody>
</table>

4.3.2 Important business drivers for Unified Communication adoption
The researcher further asked respondents to identify the most important driver for a Unified Communication and Collaboration adoption in NSN over the next 1-2 years. Cost effectiveness and dependable cellular mobile data network services was the most important driver for adoption according to 35.0 percent. This is attributed to the wide coverage afforded by mobile networks in the country which has seen improved coverage of regions in the country. Tablet, Smartphone and other developments in devices was identified by 30.0 percent of the respondents as the most important. This response was
influenced in the growing technological development where mobile devices have become more accessible in the market and would there facilitate the adoption of a unified communications system.

4.3.3 Unified communication infrastructure for Nokia Siemens Network
The researcher asked respondents to indicate which Unified Communication and Collaboration infrastructure area in NSN they thought it deserved attention the most over the next 1-2 years. Cellular mobile data network development was identified by 60.0 percent of the respondents identified it as the most deserving infrastructure, 25.0 percent indicated enterprise campus Wi-Fi (wireless LAN) services as most deserving, and 15.0 percent indicated enterprise campus wired LAN services as shown in Table 3. Findings also showed that 67.7 percent of respondents identified wireless LAN as least deserving along with 44.4 percent who identified Enterprise campus wired LAN services as least deserving.

4.3.4 Unified Communications Investment
Study participants were asked to identify which unified communication and collaboration application investment area do you think will hold attention the most over the next 1-2 years.
years. As indicated in Table 4 social networking tools and services required the most attention as identified by 75.0 percent, instant messaging tools and services were identified as they required less attention by 50.0% of respondents. Desktop applications content sharing and online meetings were also identified as requiring more attention by 44.4 percent and 35.0 percent indicated mobile platform voice solutions and services.

Table 4: Unified Communication and collaboration application investment

<table>
<thead>
<tr>
<th>UC&amp;C application Investment</th>
<th>Most attention</th>
<th>Attention</th>
<th>Less attention</th>
<th>No attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social networking tools and services</td>
<td>75.0%</td>
<td>25.0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Instant messaging tools and services</td>
<td>10.0%</td>
<td>5.6%</td>
<td>50.0%</td>
<td>34.4%</td>
</tr>
<tr>
<td>Desktop application content sharing and online meetings</td>
<td>44.4%</td>
<td>22.2%</td>
<td>11.1%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Mobile platform voice solutions and services</td>
<td>35.0%</td>
<td>25.0%</td>
<td>22.2%</td>
<td>17.8%</td>
</tr>
</tbody>
</table>

4.3.5 Firm Improvement

In regard to what improvements staff had witnessed since the adoption of the UC&C was access to information regardless to device and location of the recipient and was identified by 77.8 percent, employee collaboration was also identified as a big improvement with 55.7 percent, communication for mobile / remote workforce were 50.0 percent. Customer service was identified to have the least improvement with 75.0 percent, 50.0 percent also indicated system use , management and administration had the least improvement, 39.1 percent indicated no improvement in application availability as shown in Table 5.
Table 5: Improvements at NSN after UC&C adoption

<table>
<thead>
<tr>
<th>Improvements</th>
<th>Biggest improvement</th>
<th>Improvement</th>
<th>Least improvement</th>
<th>No improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Availability System use, management and/or administration</td>
<td>33.3%</td>
<td>27.6%</td>
<td>0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Access to information regardless to device and location</td>
<td>16.7%</td>
<td>33.3%</td>
<td>50.0%</td>
<td>0%</td>
</tr>
<tr>
<td>Customer Service Communication for Mobile / Remote Workforce</td>
<td>77.8%</td>
<td>22.2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Better-informed decision-making</td>
<td>22.2%</td>
<td>0%</td>
<td>75.0%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Employee Productivity</td>
<td>50.0%</td>
<td>25.5%</td>
<td>11.1%</td>
<td>13.4%</td>
</tr>
<tr>
<td>Employee Collaboration</td>
<td>16.7%</td>
<td>44.4%</td>
<td>13.9%</td>
<td>25.0%</td>
</tr>
<tr>
<td></td>
<td>27.8%</td>
<td>16.7%</td>
<td>44.4%</td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>55.7%</td>
<td>33.3%</td>
<td>11.0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

4.3.5 Valuable Capabilities

Respondents were required to highlight which capabilities were most valuable to them when outside of the office. These responses are highlighted in Table 6. Majority of the respondents identified that the ability to access each of their communication tools through a single interface was most valuable and were 67.7 percent, the ability to perform multi-party conferencing (for group conversations) was identified by 50.0 percent as the most valuable capabilities. Among the respondents 15.0 percent identified the ability to connect with co-workers and clients via their mobile phones as most valuable which corresponded with 50.0 percent who identified it as least valuable, 67.7 percent indicated the ability to have phone calls forwarded to wherever they were as the least valuable capabilities of UC&C adoption. The ability to video chat and to video message was not highlighted in any of the responses. This could be attributed to the poor data coverage and low bandwidth in the country which may not sufficiently facilitate video conferencing with minimal interruptions.
Table 6: Most valuable capabilities outside the office among respondents

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Most valuable</th>
<th>Valuable</th>
<th>Least valuable</th>
<th>Not valuable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to connect with co-worker and clients via my mobile phone</td>
<td>15.0%</td>
<td>33.3%</td>
<td>50.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Ability to have calls forwarded to wherever I am</td>
<td>25.0%</td>
<td>0%</td>
<td>67.7%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Ability to access each of my communications tools through a single interface.</td>
<td>67.7%</td>
<td>24.6%</td>
<td>7.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Ability to perform multi-party conferencing (for group conversations)</td>
<td>50.0%</td>
<td>22.2%</td>
<td>11.1%</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

4.4 Threats and Risks of Unified Communications Adoption

4.4.1 Challenges of Unified Communications Adoption

There are various risks associated with adoption of a unified communications infrastructure where respondents were required to rank the challenges where bandwidth costs and availability was identified as a major challenge by 61.1 percent, cost to upgrade or replace current tools and systems was identified as a major challenge by 44.4 percent, minor challenge by 44.4 percent. Complexity and user skills consideration was identified as a minor challenge by 61.1 percent, 50.0 percent of indicated that security considerations were a major challenge as indicated in Table 7.

Table 7: Challenges to adoption of UC&C enabling infrastructures

<table>
<thead>
<tr>
<th>Challenges of adoption</th>
<th>No challenge</th>
<th>Minor challenge</th>
<th>Major challenge</th>
<th>Serious challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of standardization</td>
<td>16.7%</td>
<td>38.9%</td>
<td>13.3%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Bandwidth costs and availability</td>
<td>0%</td>
<td>16.7%</td>
<td>61.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Cost to upgrade current tools &amp; systems</td>
<td>0%</td>
<td>44.4%</td>
<td>44.4%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Complexity and user skills consideration</td>
<td>22.2%</td>
<td>61.1%</td>
<td>16.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Security considerations</td>
<td>5.6%</td>
<td>27.8%</td>
<td>50.0%</td>
<td>16.7</td>
</tr>
<tr>
<td>User habits, attitudes and work styles</td>
<td>11.1%</td>
<td>44.4%</td>
<td>22.2%</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

4.4.2 Benefits of Unified Communications Adoption

Respondents were asked to indicate whether users within the organization see the benefits of Unified Communications enabling infrastructures and collaboration tools and systems.
As presented in Figure 4 overwhelmingly respondents indicated yes and accounted for 85.0 percent compared to 15.0 percent with no Responses indicated no.

Figure 4: Opinion as to whether Staff sees the benefits of Unified Communications systems

4.4.3 Challenges to Unified Communications Implementation

There are various challenges associated with the adoption of UC&C implementation in organizations. As such the study sought from respondents which were these challenges which required them to rank from the serious challenge to the one with no challenge. As indicated integration of UC&C with existing infrastructure was identified as a serious challenge with 75.0 percent, network bandwidth limitations were also identified as a major challenge with 55.5 percent, and integration with consumer devices was identified as a minor challenge by 78.8 percent. Cost and funding was however highlighted as not a challenge of implementation of UC&C by 44.4 percent, similarly 67.7 percent highlighted access to data within UC&C environment as not a challenge as highlighted in Table 8.

Table 8: Challenges in Implementation of UC&C Infrastructure

<table>
<thead>
<tr>
<th>Challenges in UC&amp;C implementation</th>
<th>No challenge</th>
<th>Minor challenge</th>
<th>Major challenge</th>
<th>Serious challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost / funding</td>
<td>44.4%</td>
<td>35.0%</td>
<td>20.6%</td>
<td>0%</td>
</tr>
<tr>
<td>Integration with existing</td>
<td>0%</td>
<td>11.1%</td>
<td>13.9%</td>
<td>75.0%</td>
</tr>
<tr>
<td>infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of experience / skill sets</td>
<td>32.3%</td>
<td>67.7%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Security / privacy</td>
<td>0%</td>
<td>45.0%</td>
<td>45.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Network bandwidth limitations</td>
<td>0%</td>
<td>9.5%</td>
<td>55.5%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Commitment / buy-in from</td>
<td>22.2%</td>
<td>67.7%</td>
<td>10.1%</td>
<td>0%</td>
</tr>
<tr>
<td>stakeholders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integration with consumer devices</td>
<td>21.2%</td>
<td>78.8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Application performance problems</td>
<td>44.4%</td>
<td>33.4%</td>
<td>22.2%</td>
<td>0%</td>
</tr>
<tr>
<td>Access to data within UC&amp;C</td>
<td>67.7%</td>
<td>22.2%</td>
<td>10.1%</td>
<td>0%</td>
</tr>
<tr>
<td>environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4.4 Concerns to Adoption of Unified Communications

In regard as to what is the most pressing concern that you have regarding your company’s ability to provide the appropriate Unified Communications applications. Respondents who indicated reliability concerns were represented at 25.0 percent and comprised of the study participant’s majority. As shown in Figure 5 security concerns were represented with 20.0 percent of responses along with those that indicated no concerns. Project priority within the organizations was identified as the most pressing concern by 15.0 percent of the respondents, 10.0 percent indicated the lack of WAN bandwidth and the expensive nature of Unified Communications technology.

![Figure 5: Respondents’ Concern on the Adoption of Unified Communications in Organization](image)

4.4.5 Concerns to Deployment of Unified Communications

Study participants were required to identify their concerns about deploying unified communication strategy where responses are highlighted in Figure 6. Time required for users to learn the new functionality will exceed estimate was represented by 45.0 percent, anticipated financial savings will be below estimate were 35.0 percent, similarly 35.0 percent identified effort and time to pilot and test UC will exceed estimate and 20.0 percent increased user productivity will be below expectations.
4.5 Unified Communications and Implementation Strategy

4.5.1 Unified Communications Appeal

Among the questions asked to respondents in this section of the study was to indicate how appealing a unified communications is where all the respondents indicated that it was appealing and accounted for 100.0 percent.

4.5.2 Preferred UC&C Models

In regard to their preferred UC&C models 55.0 percent indicated that the hybrid was the most preferred model along with 22.2 percent, 67.7 percent indicated the private on–premise was the least preferred, 78.8 percent least preferred the hosted / leased model, 44.4 percent and 20.0 percent preferred and most preferred the managed service UC solution as indicated in Table 9.

Table 9: Preferred UC&C Models

<table>
<thead>
<tr>
<th>Preferred models</th>
<th>Not preferred</th>
<th>Least preferred</th>
<th>Preferred</th>
<th>Most preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private On-Premise</td>
<td>67.7%</td>
<td>22.2%</td>
<td>10.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Managed service UC solution</td>
<td>2.3%</td>
<td>33.3%</td>
<td>44.4%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Hosted / leased</td>
<td>22.1%</td>
<td>78.8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Hybrid</td>
<td>0%</td>
<td>22.8%</td>
<td>22.2%</td>
<td>55.0%</td>
</tr>
</tbody>
</table>
4.5.2 UC & C Deployment
In regard to best positioned to advise / deploy / support Unified Communications enabling infrastructures and Collaboration tools and systems respondents indicated system / application integrators and vendors as the most suited were 60.0 percent and 35.0 percent indicated suited. Network integrators and vendors were also identified as suited to deploy UC with 55.0 percent indicting they were most suited and 44.4 percent who indicated suited. Telecommunications service providers were 55.0 percent and 22.2 percent who indicated suited and most suited respectively. Telephony integrators and vendors were identified as not suited by 67.6 percent and 32.3 percent as least suited as shown in Table 10.

<table>
<thead>
<tr>
<th>UC&amp;C Advisors / supporters</th>
<th>Not suited</th>
<th>Least suited</th>
<th>Suited</th>
<th>Most suited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network integrators and vendors</td>
<td>0.6%</td>
<td>0%</td>
<td>44.4%</td>
<td>55.0%</td>
</tr>
<tr>
<td>Telephony integrators and vendors</td>
<td>67.7%</td>
<td>32.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>System / application integrators and vendors</td>
<td>5.0%</td>
<td>0%</td>
<td>35.0%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Telecommunications service providers</td>
<td>22.8%</td>
<td>0%</td>
<td>55.0%</td>
<td>22.2%</td>
</tr>
</tbody>
</table>

4.5.3 Firm changes
Respondents were asked to rate the smoothness of the changes that had taken place in their firm where 61.1 percent rated smooth, 22.2 percent were below expectations, and 16.7 percent were undecided and none of the respondents indicated very smooth or poor as depicted in Figure 7.

*Figure 7: Smoothness of changes in firm*
4.5.4 Company Processes
The study sought to establish the impact of the adoption of unified communications where respondents were asked to indicate whether company processes had improved or worsened. As shown in Figure 8 majority of responses indicated that it had improved and accounted for 77.9 percent, 16.7 percent indicated that there was no change and 5.6 percent indicated that it had much improved.

![Figure 8: Status of company processes after UC&C adoption](image1)

4.5.5 Customer Satisfaction
The researcher asked respondents to indicate the customer satisfaction in regard to the adoption of a unified communication infrastructure where 72.2 percent indicated that there was some improvement, 16.7 percent were good improvement, and 5.6 percent were minimum or no improvement and strong customer benefit as depicted in Figure 9.

![Figure 9: Customer Satisfaction with UC&C Adoption](image2)

4.5.6 Factors of Evaluating UC&C Vendor
In regard to what factors staff would consider in choosing a supplier of UC&C where ability to meet security requirements ease of use of the system was identified as the most
important factor with 75.0 percent, ease of integration into existing infrastructure with 70.0 percent indicating it was most important, low cost of ownership was identified as not important by 44.4 percent and also as important by 44.4 percent. Data availability within the UC&C environment was identified as not important with 60.0 percent, skills requirement for the solution as least important with 65.0 percent, level of scalability as not important with 67.7 percent as indicated in Table 11.

Table 11: Factors to consider in choosing UC&C supplier

<table>
<thead>
<tr>
<th>Factors</th>
<th>Not important</th>
<th>Least important</th>
<th>Important</th>
<th>Most important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to meet security requirements</td>
<td>16.7%</td>
<td>0%</td>
<td>8.3%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Ease of use</td>
<td>16.7%</td>
<td>0%</td>
<td>61.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Low total cost of ownership</td>
<td>44.4%</td>
<td>0%</td>
<td>44.4%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Ease of integration into existing infrastructure</td>
<td>5.4%</td>
<td>24.6%</td>
<td>0%</td>
<td>70.0%</td>
</tr>
<tr>
<td>Support and services</td>
<td>35.0%</td>
<td>0%</td>
<td>11.1%</td>
<td>53.9%</td>
</tr>
<tr>
<td>Level of scalability</td>
<td>67.7%</td>
<td>12.3%</td>
<td>0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Knowledge building &amp; running UC&amp;C solutions</td>
<td>22.2%</td>
<td>44.4%</td>
<td>11.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Data availability within the UC&amp;C environment</td>
<td>60.0%</td>
<td>35.5%</td>
<td>0.5%</td>
<td>0%</td>
</tr>
<tr>
<td>Innovative solutions</td>
<td>75.5%</td>
<td>24.5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Skills requirement of the solution</td>
<td>35.0%</td>
<td>65.0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

4.5.7 Suppliers of UC&C Solutions

In regard to who are the suppliers of UC&C solutions Cisco was overwhelmingly identified as the suppliers by 100.0 percent of respondents, Microsoft were 40.0 percent, IBM were 30.0 percent, 15.0 percent were Alcatel Lucent, 25.0 percent identified Oracle as shown in Figure 7.

Figure 10: Suppliers of UC&C Solutions
4.5.8 Information Sharing at Workplace

In regard to the most popular methods by which staff work, collaborate and share information at their workplace respondents answers are highlighted in Table 12. As indicated emails were the most popular methods of information sharing at NSN as represented by 75.0 percent who indicated always and 25.0 percent indicating often. Among the responses 65.5 percent highlighted the phone, face – to – face meetings were also observed with 35.0 percent and 44.4 percent indicating always and often respectively. Video conferencing was never used as indicated by 90.0 percent, web conferencing with 75.0 percent and social networking tools with 55.0 percent had indicated never.

Table 12: Methods of work, Collaboration and Information Sharing

<table>
<thead>
<tr>
<th>Communication tools</th>
<th>Always</th>
<th>Often</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social networking tools</td>
<td>25.0%</td>
<td>20.0%</td>
<td>0%</td>
<td>55.0%</td>
</tr>
<tr>
<td>Extranet</td>
<td>35.0%</td>
<td>0%</td>
<td>65.0%</td>
<td>0%</td>
</tr>
<tr>
<td>Instant messaging session</td>
<td>30.0%</td>
<td>44.4%</td>
<td>0%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Text messaging</td>
<td>15.0%</td>
<td>0%</td>
<td>75.5%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Video conferencing</td>
<td>5.0%</td>
<td>0%</td>
<td>5.0%</td>
<td>90.0%</td>
</tr>
<tr>
<td>Web conferencing</td>
<td>25.0%</td>
<td>0%</td>
<td>0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Audio conferencing</td>
<td>35.0%</td>
<td>44.4%</td>
<td>0%</td>
<td>20.6%</td>
</tr>
<tr>
<td>Face – to – face meetings</td>
<td>35.0%</td>
<td>55.5%</td>
<td>9.0%</td>
<td>0%</td>
</tr>
<tr>
<td>Phone</td>
<td>65.5%</td>
<td>34.5%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Email</td>
<td>75.0%</td>
<td>25.0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

4.5.8 Office Time

The study sought to establish where respondents spent most of their time when in the workplace. As indicated in Table 13 majority of the respondents indicated they were always at their desks and accounted for 75.0 percent, 25.0 percent indicated often. At flexible workspaces there were 25.0 percent and 70.0 percent who indicated always and often respectively where 5.0 percent indicated seldom. In meeting rooms 85.0 0ercent indicated never and 15.0 percent were seldom.
Table 13: Place Spent at the Workplace

<table>
<thead>
<tr>
<th>Place</th>
<th>Always</th>
<th>Often</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the desk</td>
<td>75.0%</td>
<td>25.0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>At flexible workspaces</td>
<td>25.0%</td>
<td>70.0%</td>
<td>5.0%</td>
<td>0%</td>
</tr>
<tr>
<td>In meeting rooms</td>
<td>0%</td>
<td>0%</td>
<td>15.0%</td>
<td>85.0%</td>
</tr>
</tbody>
</table>

4.5.9 Definition of Unified Communications

Respondents were further asked what they preferred in defining their unified communications technology requirements. Those who chose a single vendor with a broad product portfolio that can supply most if not all of the UC applications that needed, but that may use proprietary technology were 32.2 percent while those who indicated a best-in-class approach for each application; selecting only vendors who support and promote interoperability were 67.8 percent.

![Preference for defining Unified Communications](image)

Figure 11: Preference for defining Unified Communications

4.6 Summary

This section of the study presented the data analysis which was complimented by the researchers own interpretations of the observations. The data is presented in pie charts, tables and graphs in reference to each of the study objectives and the questionnaire items as developed by the researcher.
CHAPTER FIVE

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter of the study provides the summary of the study, discussion of findings, conclusions and recommendations based on the study findings.

5.2 Summary of the Study

The purpose of the study was to determine a business case for investing in a unified communications system. The study sought to answer research questions which included; what benefits do companies and organizations achieve today from UC?; What risks would arise from this linkage of communication channels and which strategy is best for implementation of Unified Communications? The study adopted the case study approach design where the cluster sampling procedure was adopted to identify respondents from staff drawn from senior, middle to junior levels working in the under Sales, Customer Care, Finance & Control, Network Implementation and Logistics departments. The study undertook a descriptive analysis of the data collected to derive trends and summaries to make meaningful interpretations of the study findings.

The study sought to answer what benefits do companies and organizations achieve today from adoption of unified communications. Study findings indicated that 85.0 percent identified that there are benefits from adoption of unified communications. Further 77.9 percent indicated that since the adoption of unified communication company processes had in fact improved. 72.2 percent indicated that there was some improvement, 16.7 percent were good improvement, and 5.6 percent were minimum or no improvement and strong customer benefit was observed. In regard to the changes that had taken place at Nokia Siemens Network (NSN) after adoption of unified communications where 61.1 percent rated smooth and 22.2 percent were below expectations. For instance Nortel Networks boasts data infrastructure helps to accelerate the benefits of unified communications such as greater productivity, higher user and customer satisfaction, while efficiently using corporate resources for a ‘greener’ organization.

Secondly, the study sought to identify what risks would arise from this linkage of communication channels and which strategy is best for implementation of Unified Communications. In regard to the challenges to the adoption of a unified communication
infrastructure study findings found that bandwidth costs and availability was identified as a major challenge by 61.1 percent and cost to upgrade or replace current tools and systems was identified as a major challenge by 44.4 percent. Security considerations were also identified as a major challenge among the 50.0 percent of respondents. In regard to UC&C implementation study findings indicate that integration of UC&C with existing infrastructure was identified as a serious challenge with 75.0 percent, network bandwidth limitations were also identified as a major challenge with 55.5 percent, and integration with consumer devices was identified as a minor challenge by 78.8 percent.

Lastly, the study sought to establish which strategy is best for implementation of Unified Communications. Study findings indicate that the implementation of UC&C was appealing to the majority of respondents. The most preferred UC&C model among the study participants was the hybrid model and the least preferred was the hosted / leased model as represented with 78.8 percent. System / application integrators and vendors were identified as the most suited to advise / deploy / support Unified Communications enabling infrastructures and Collaboration tools and systems as identified by 60.0 percent of respondents whereas telephony integrators were identified as not suited as indicated by 67.7 percent. The most important factor in choosing a UC&C supplier ability to meet security requirements ease of use of the system with 75.0 percent, ease of integration into existing infrastructure with 70.0 percent indicating it was most important.

5.3 Discussion
5.3.1 Benefits of Unified Communications
Study findings show that 88.9 percent of respondents see the benefits of UC adoption in their organizations. Further respondents agreed that company processes had improved after adoption of unified communications where customer service was identified as having improved. This finding compliment the view held by Gregory (2008) UC can increase customer loyalty by simplifying interactions with customers, increasing the availability of employees, and accelerating the responsiveness to their needs. Other benefits of UC deployment highlighted by respondents included access to information regardless of device or location, employee collaboration and communication for mobile / remote workforce thus initiating improved responsiveness which leads to organization efficiency and effectiveness (Gregory, 2008). The researcher observed that although there
was deployment of unified communications at Nokia Siemens Network (NSN) the company had not adopted and implemented it to its full potential. These study findings are similar to those of Teo (2011) findings that organizations that do have unified communications technology may not be leveraging their investment to its full potential.

5.3.2 Various Risks and Threats of Unified Communications

There are various risks / threats associated with the deployment of UC in an organization as identified in the literature review which are exclusive to the different forms of unified communications that an organization adopts. Almeida, Cruz and Oliveira (2011) found that the introduction of a UC solution brings an array of new vulnerabilities into an enterprise, exploited by a growing number of malicious programs. Study findings indicate that the most pressing concern among respondents was associated to the security of information. Security and privacy was also observed as a challenge to the implementation of a UC solution and also security considerations were highlighted as a challenge for organizations towards adoption of a UC solution. As Gregory (2008) observes there is a risk of having communications between customers, partners, suppliers and office workers that take place on popular - public channels that the company does not govern, track, or control.

5.3.3 Implementation Strategy of Unified Communications

In regard to the implementation strategy of UC there are different platforms upon which this can be adopted and is influenced by the organization preference. Among the respondents 55.0 percent ranked the hybrid model and 44.4 percent managed service UC solution of the UC as the most preferred solution and preferred solution. System / application integrators and vendors were identified by respondent as the most suited to advise / deploy / support UC enabling infrastructures and Collaboration tools and systems. There are several factors that organizations and its staff should consider in evaluating a Unified Communications & Collaboration (UC&C) vendor / supplier for your organization where 75.0 percent ranked the ability to meet security requirements as the most important factor which is supported by Gregory (2008) who asserts that security concerns should in fact influence the choice of the selection and choosing of a UC vendor or supplier for an organization. The ease of integration into the existing infrastructure was ranked as the second most important factor. Gregory (2008) supports this finding by
observing that a Unified Communications solution should, to the greatest extent possible, leverage what an organization already has in place.

### 5.4 Conclusions

The results of this study show that organizations indeed acknowledge that there is a business case to adopt unified communication infrastructure in their processes. Study findings indicate that unified communications improve customer relations, employee collaboration at the workplace and also contribute to promoting a “greener corporate sector” through the reduction of carbon emissions albeit the little evidence indicated by respondents in the study.

Unified communications are adopted in organizations but have been allocated relatively less resources as compared to other departments in the organization which has contributed to a gradual approach of implementing unified communications. Investment in existing infrastructure limits the adoption and deployment of unified communications locally as compared to the developing world. Factors such as bandwidth size and connectivity were identified as limiting organizations in adopting and implementing unified communications.

Although the fibre optic cable infrastructure is available in locally its effect has not yet penetrated the core business market and as such organizations have been limited to the use of such infrastructure as video conferencing without the hang – ups and disconnections.

### 5.5 Recommendations

#### 5.5.1 Recommendations for improvement

Based on the study findings the researcher makes the following recommendations;

Organizations should conduct an assessment of existing communication structures that are present in their organization and how this compliment the work processes among employees before adoption of unified communication infrastructures. There should be more emphasis on the distribution of the fibre optic infrastructure to business enterprises and corporations to enable them to adopt unified communications infrastructure. Vendors and service providers of unified communications should provide sensitization and
awareness programmes to businesses so as to enhance their knowledge and this may influence their adoption of unified communications in their firms. The study recommends that organizations should use mature and proven technologies which are commensurate with the current business environment.

5.5.2 Recommendations for Future Research

Based on the study findings the researcher suggests the following areas of further research;

1. The study recommends for further research on the adoption of unified communications in small and medium enterprises to determine the

2. The study recommends for further research on the threats and risks of adopting unified communications for organisations

3. The study recommends for further research on the adoption and implementation, trends of unified communications in business organisations.
REFERENCES


APPENDIX A: LETTER OF INTRODUCTION

Dear Participant,

Thank you for taking out 30 minutes of your valuable time to complete this questionnaire.

This data collected through this questionnaire is solely for an MBA project and has requisite go-ahead from the Human Resources function. The survey is being conducted anonymously and the results will not be shared internally within NSN. It is hoped that this will enable you to respond as freely as possible to the following questions.

Thanking you in advance for your kind cooperation.
APPENDIX B : QUESTIONNAIRE FOR PROJECT TEAM

SECTION A: Background Information

1. What is your Gender?
   □ Male
   □ Female

2. Work experience with Nokia Siemens Network?
   □ Less than 1 year
   □ 2 – 4 years
   □ 5 – 7 years
   □ More than 8 years

SECTION B: Benefits of Unified Communications

3. What is your view on unified communications enabling infrastructures and collaboration tools and systems?
   □ Unified Communications has real offerings, is market ready and is here to stay
   □ Has potential but needs to be proven and standardized
   □ No real return on investment
   Other “please specify” …………………………………………………………………………

4. Does NSN make use of Unified Communications enabling infrastructures and collaboration tools and systems?
   □ No
   □ Yes
   □ Unsure

5. How widely are Unified Communications enabling infrastructures and collaboration tools/systems deployed and used within your organization?
   □ We do not use them
   □ Limited to specialist / focused teams
   □ Broad application
   □ Unsure

6. In your opinion, what are the main business drivers for implementing a UC&C solution? (Please ticks all that apply)? 1 = most important to 4 = least important
   □ Reduce costs travel and expenses 1 2 3 4 N/A
   □ Higher employee productivity 1 2 3 3 N/A
   □ Better collaboration within the company 1 2 3 4 N/A
   □ Improve business efficiency 1 2 3 4 N/A
   □ Improve business effectiveness 1 2 3 4 N/A
<table>
<thead>
<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade existing legacy systems</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve sales and revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better service to customers</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive advantage</td>
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<td></td>
<td></td>
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<tr>
<td>Improved employee morale</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in carbon footprint</td>
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<td></td>
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</tbody>
</table>

Other “Please specify” .................................

7. What do you think will be the most important driver for Unified Communication and Collaboration adoption in NSN over the next 1-2 years?

- No plans on adopting
- Enterprise campus network service readiness
- Cost effective and dependable cellular mobile data network services
- Wi-Fi (Wireless LAN) service provider developments
- Tablet, Smartphone and other mobile device adoption developments
- Enterprise application solution readiness and maturity of solution offerings

Other “please specify” ........................................

8. Which Unified Communication and Collaboration infrastructure area in NSN do you think deserves attention the most over the next 1-2 years? 1 = most deserving to 4 = least deserving

- Cellular mobile data network development
- Enterprise campus Wi-Fi (wireless LAN) services
- Enterprise campus wired LAN services

Other “please specify” ........................................

9. Which unified communication and collaboration application investment area do you think will hold attention the most over the next 1-2 years? 1 = most attention to 4 = least attention

- Social networking tools and services
- Instant messaging tools and services
- Desktop application content sharing and online meetings
- Mobile platform voice solutions and services

Other “please specify” ........................................
10. Which **video** service / solution investment area in NSN do you think needs attention the most over the next 1-2 years? 1 = most attention to 4 = least attention

- Tele-presence video conference solutions or services
- Meeting room video conference solutions or services
- Desktop / laptop video conference solutions or services
- Tablet video conference solutions or services
- Smartphone video conference solutions or services
- Video broadcast / streaming real-time

Other “please specify” ………………………………………………………………………

11. What were the three biggest improvements experienced at NSN after deploying UC? (1 = biggest improvement to 4 = least improvement)

- Application Availability
- System use, management and/or administration
- Customer Service
- Communication for Mobile / Remote Workforce
- Better-informed decision-making
- Employee Productivity
- Employee Collaboration

Other “please specify” ………………………………………………………………………

12. What capabilities are most valuable to you outside of the office? (1 – Most valuable to 4 = least valuable)

- Video chat
- Ability to connect with co-workers and clients via my mobile phone
- Ability to have calls forwarded to wherever I am
- Ability to access each of my communications tools through a single interface.
- Ability to perform multi-party conferencing (for group conversations)
- Ability to review call logs across multiple devices
- Ability to video message

Other “please specify” ………………………………………………………………………
**SECTION C: THREATS AND RISKS OF UNIFIED COMMUNICATIONS**

13. On a scale of one to four, rate the following challenges to the adoption of Unified Communications enabling infrastructures and collaboration tools/systems? *(1 = no challenge to 2 = Serious challenge)*

<table>
<thead>
<tr>
<th>Challenge</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of standardization</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Bandwidth cost and availability</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Cost to upgrade or replace current tools and systems</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Complexity and user skills considerations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Security considerations</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>User habits, attitudes and work styles</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

14. Do you think that users within your organization see the benefit of Unified Communications enabling infrastructures and collaboration tools and systems?  
   □ No  
   □ Yes  
   □ Unsure

15. In your opinion, what would be the greatest challenges when it comes to implementing Unified Communications and Collaboration solutions?  
   □ Cost / funding                       1 2 3 4 N/A  
   □ Integration with existing infrastructure 1 2 3 4 N/A  
   □ Lack of experience / skill sets       1 2 3 4 N/A  
   □ Security / privacy                    1 2 3 4 N/A  
   □ Network bandwidth limitations        1 2 3 4 N/A  
   □ Commitment / buy-in from stakeholders 1 2 3 4 N/A  
   □ Integration with consumer devices     1 2 3 4 N/A  
   □ Application performance problems      1 2 3 4 N/A  
   □ Access to data within the UC&C environment 1 2 3 4 N/A

16. What is the most pressing concern that you have regarding your company’s ability to provide the appropriate Unified Communications applications?  
   □ Security concerns 1 2 3 4 N/A  
   □ Aging infrastructure 1 2 3 4 N/A  
   □ Lack of WAN bandwidth 1 2 3 4 N/A  
   □ UC technology is too expensive 1 2 3 4 N/A  
   □ Reliability concerns 1 2 3 4 N/A  
   □ Other projects have a higher priority 1 2 3 4 N/A
Deployments are too complex 1 2 3 4 N/A

17. I have these concerns about deploying Unified Communications:
   □ Effort and time to pilot and test UC will exceed estimate
   □ Time required for users to learn the new functionality will exceed estimate
   □ Anticipated financial savings will be below estimate
   □ Increased user productivity will be below expectations

SECTION D: UC & C IMPLEMENTATION STRATEGY

18. How appealing is the idea of a Unified Communications service?
   □ Appealing
   □ Not appealing

19. Which of the following best describes your preferred Unified Communications and Collaboration (UC&C) model?
   □ Private On-Premise 1 2 3 4 N/A
   □ Managed service 1 2 3 4 N/A
   □ Hosted / leased 1 2 3 4 N/A
   □ Hybrid 1 2 3 4 N/A

20. Who do you think is best positioned to advise / deploy / support Unified Communications enabling infrastructures and Collaboration tools and systems?
   □ Network integrators and vendors 1 2 3 4 N/A
   □ Telephony integrators and vendors 1 2 3 4 N/A
   □ System / application integrators and vendors 1 2 3 4 N/A
   □ Telecommunications service providers 1 2 3 4 N/A

21. How would you rate the smoothness of the changes that have taken place in your firm?
   □ Poor
   □ Below expectations
   □ Undecided
   □ Smooth
   □ Very Smooth

22. From your perspective, have the company processes improved or worsened after the change (adoption of UC)?
   □ Much worse
   □ Worse
   □ No change
   □ Improved
□ Much Improved

23. Can you estimate the improvement in customer satisfaction if customers experienced fewer problems?
- □ No, minimum or no improvement
- □ Yes, some improvement
- □ Yes, good improvement
- □ Yes, strong customer benefit

24. Please indicate what factors you would use when evaluating a Unified Communications & Collaboration (UC&C) vendor / supplier for your organization.

- □ Ability to meet security requirements 1 2 3 4 N/A
- □ Ease of use 1 2 3 4 N/A
- □ Low total cost of ownership 1 2 3 4 N/A
- □ Ease of integration into existing infrastructure 1 2 3 4 N/A
- □ Support and services 1 2 3 4 N/A
- □ Level of scalability 1 2 3 4 N/A
- □ Knowledge building & running UC&C solutions 1 2 3 4 N/A
- □ Data availability within the UC&C environment 1 2 3 4 N/A
- □ Innovative solutions 1 2 3 4 N/A

25. Who do you believe are the main suppliers of integrated UC&C Solutions? (Please tick all that apply)
- □ Microsoft 1 2 3 4 N/A
- □ IBM 1 2 3 4 N/A
- □ Alcatel Lucent 1 2 3 4 N/A
- □ Oracle 1 2 3 4 N/A
- □ Cisco 1 2 3 4 N/A

26. Please rank what are the top methods by which you work, collaborate and share information with the people you interact with in your job?

- □ Video chat 1 2 3 4 N/A
- □ Social networking tools 1 2 3 4 N/A
- □ Extranet 1 2 3 4 N/A
- □ Instant messaging session 1 2 3 4 N/A
- □ Text messaging 1 2 3 4 N/A
- □ Video conference 1 2 3 4 N/A
- □ Web conference 1 2 3 4 N/A
- □ Audio conference 1 2 3 4 N/A
- □ Face-to-face meetings 1 2 3 4 N/A
- □ Phone 1 2 3 4 N/A
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>27. When you are in the office where do you spend most of your time? (Please rank)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ At the desk</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>□ In flexible workspaces</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>□ In meeting rooms</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

28. When defining your unified communications technology requirements, do you prefer?

□ A single vendor with a broad product portfolio that can supply most if not all of the UC applications that needed, but that may use proprietary technology.

□ A best-in-class approach for each application; selecting only vendors who support and promote interoperability

*Thanks for Your Cooperation*