A STUDY ON THE EFFECT OF VIRTUAL TEAMS ON COMPETITIVE ADVANTAGE, A CASE OF INTERNATIONAL BUSINESS MACHINES (IBM) IN AIRTEL AFRICA PROJECT

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DECLARATION

This research study report is my original work and has not been presented for a degree or any other examination body in any college or University

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This research report has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

I would like to dedicate this work to my father, Samuel Abudho, for without his continued support and counsel I could not have completed this process.

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LIST OF ABBREVIATIONS AND ACRONYMS

IBM	International Business Machines
ICT	Information and Communication Technology
3D	3 Dimension
BMP	Business Process Management
EBO	Emerging Business Opportunities.
VUC	Virtual Universe Community
GOK	Government of Kenya
MIS	Management Information System
DSS	Decision Support Systems
TRA	Theory of Reasoned Action.
NPD	New Product Development
SME	Small & Medium Enterprises
IT	Information Technology

ABSTRACT

Virtual teams are quickly becoming a standard organization structure as more and more organizations globally are investing heavily in their systems, processes and people to create an environment that effectively supports virtuality. The question that remains unanswered is that despite these investments in virtual teams, has it enhanced competitive advantage. The purpose of this study was to evaluate the effect of virtual teams on competitive advantage in an organization, with a case of IBM – Airtel Africa Project. The project develops, installs and implements services, software and hardware across 16 countries for Airtel in Africa. This study utilized a sample of 118 out of a population of 175 to complete the study on the evaluation of virtual teams on competitive advantage. The instrument used in the study was a questionnaire which contained open ended and closed-ended questions which were previously pilot-tested with 3 other reviewers to establish content validity. Questionnaires were sent out and feedback received through soft and hard copies, and all responses remained confidential. Descriptive statistics were used to analyze the data. From the findings of this study it is evident that virtual information systems can be used to identify and create new products and services and to develop new markets or radically change products based on the demanding nature of the current markets. Organizations can also work on new initiatives of establishing pure online operations through implementation of virtual environments. Virtual systems also provide better capabilities and opportunities for innovation and plenty of opportunities to collaborate with customers, external partners and internal people. How a company uses information technology can affect each of the five competitive forces and can create the need and opportunity for change. The study shows that virtual teams represent a growing response to the need for fast time-to-market, low-cost and rapid solutions to customer needs. Virtual teams enable organizations to pool the talents and expertise of employees and non-employees by eliminating time and space barriers. Implementing a virtual workforce is also becoming a broader strategic option for reducing operating and real estate expenses associated with moving employees out of offices or facilities and removing commuting reimbursements are tangible and easily accountable savings. Evidently virtual processes can be used to build cost advantage through e-marketing, collaboration, organization learning and reduction in travelling expenses. Improved virtual processes offer companies a highly sustainable competitive advantage by allowing firms to improve quality and productivity, lowering costs and freeing up resources to focus on innovation and adding value. It can be recommended that companies should invest in information systems as these systems have an effect on competitive advantage. They can be used to create new products and services and to develop new markets or radically change products based on the demanding nature of the current markets. Organizations can also work on new initiatives of establishing pure online operations through implementation of virtual environments thereby creating new markets and reducing costs incurred through physical existence. Virtual workforce enables organizations to pool the talents and expertise of employees and non-employees by eliminating time and space barriers. Virtual workforce improves the outcomes that lead to competitive advantage; the improved income includes use of fewer resources, achievement of objectives, positive economic returns, reduced product development time, enhanced customization and enhanced variety. Virtual processes can be used to build cost advantage through e-marketing, collaboration, organization learning and reduction in travelling expenses. Improved virtual processes offer companies a highly sustainable competitive advantage by allowing firms to improve quality and productivity, lowering costs and freeing up resources to focus on innovation and adding value.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Organizations are currently facing important and unprecedented challenges in an ever dynamic, constantly changing and complex environment (Rezgui, 2007). Economic activity of all types are moving in the direction of globalization (Acs & Preston, 1997). Zhouying (2005) supports this statement by stating, the economic and technological gap between developed and developing countries can largely be explained by the gaps in the levels of soft technology and soft environments between the two sets of countries. With the rapid development of electronic information and communication media in the last decades, distributed work has become much easier, faster and more efficient (Hertel, Geister & Konradt 2005).

The concept of a team is described as a small number of people with complementary skills who are equally committed to a common purpose, goals, and working approach for which they hold themselves mutually accountable (Zenun, Loureiro and Araujo, 2007). It is worth mentioning that virtual teams are often formed to overcome geographical or temporal separations (Cascio & Shurygailo, 2003). Virtual teams work across boundaries of time and space by utilizing modern computer driven technologies. The term virtual team is used to cover a wide range of activities and forms of technology-supported working (Anderson, Bal & Carletta, 2007). Virtual teams are comprised of members who are located in more than one physical location. This team trait has fostered extensive use of a variety of forms of computer-mediated communication that enable geographically dispersed members to coordinate their individual efforts and inputs (Peters & Manz, 2007).

While work teams were used in the U.S.A. as early as the 1960s, the widespread use of teams and quality circles began in the Total Quality Management movement of the 1980s. In the late 1980s and early 1990s, many companies implemented self-managing or empowered work teams (Hertel, et al., 2005). To cut bureaucracy, reduce cycle time, and improve service, line-level employees took

on decision-making and problem-solving responsibilities traditionally reserved for management. By the mid-1990s, increasing numbers of companies such as Goodyear, Motorola, Texas Instruments, and General Electric had begun exporting the team concept to their foreign affiliates in Asia, Europe, and Latin America to integrate global human resource practices (Kirkman, et al., 2001). Now, due to communication technology improvements and continued globalization, virtual teams have increased rapidly worldwide (Kirkman, et al., 2002). This era is growing popularity for virtual team structures in organizations (Walvoord, et al., 2008). Martins, et al. (2004) in a major review of the literature on virtual teams, concluded that with rare exceptions all organizational teams are virtual to some extent. Organizations have moved away from working with people who are in visual proximity to working with people around the globe (Johnson, et al., 2001).

Walker, 2000 categorically states that in an attempt to encourage employees from different countries and product areas to communicate and help global learning, many international-based organizations are constantly moving their managers from one foreign subsidiary to another to help them develop a global view. This practice helps expatriate managers build a network of contacts throughout the world that they can use to increase global integration. If a specific problem arises, a manager with a global network can contact a colleague in another country to help find a solution. Groups of managers from foreign subsidiaries can practice the same to develop a global perspective. Global learning and the integration of global organizations occurs through the process of teams going from one subsidiary to another. Team members act as consultants and transfer new ideas and innovations to foreign subsidiaries. At the same time, team members learn new foreign techniques and innovations they can bring to the home country.

A virtual or networked corporation coordinates economic activity to deliver value to customers using resources outside the traditional boundaries of the organization (Financial Times, June, 1997). It relies on third parties to conduct its business. Outsourcing, once used for downsizing or cost reduction, is now being used to obtain teams with specialized expertise to complete a total product. To provide maximum flexibility and obtain the best teams, the selection process often covers a wide geographic area which makes the use of electronic technology a necessity.

Walker, 2000 reiterates that today's global markets have fostered the virtual organization because companies must move fast to take advantage of opportunities and bring human resources together more quickly than if they all had to be assembled in a single location. Since companies often lack expertise or resources in all areas, the virtual teams are formed. Johnson, et al., 2001, identifies examples of firms using the concepts of virtual corporations as Nokia, Nike, Reebok and Apple.

Embracing the technological revolution is a considerable challenge for most organizations. The internet and the dot.com phenomena in particular have transformed many old-economy workplaces into modern e-workplaces (Walker,2000). The pressures of the new-economy are forcing organizations to become more dynamic in their operations and adopt innovative approaches to survive and be competitive.

The old paradigm of work is slowly fading away, if not already gone. The prevailing assumption that to work together, members of a team must collocate is rapidly being overturned. This shuffle, not to say paradigm shift, has been driven by the steady rise of virtual teams in the workplace. Advances in technology have indeed made many traditional teams obsolete in favor of virtual teams that defy the place, time, and any form of geographical boundaries (Munkvold & Zigurs, (2007). Virtual teams have become possible with the www revolution of the mid-1990's. However, it was not until the late 1990's that the gradual shift toward virtual teams began to take place. With the rise of the internet, companies quickly saw the benefits of the new technology, thus starting to explore its potential uses. This resulted in the steady move towards virtual teams using emails, chats, and later videoconferencing.

As explained by Lipnack and Stamps (1999), face–to-face interactions have always been the traditional way for human beings to socialize and interact. However, in this digital age, one no longer has to be in the same building, never mind same continent, to work together. People are organized around virtual teams that transcend distance, time zones and organizational boundaries (Lipnack & Stamps, 1999). Already in 2000, some researchers and practitioners predicted that virtual teaming would become the norm, the survival skills in the 21st century; fast-forward to 2009 and, indeed, virtual teams have now become ubiquitous building blocks in

organizations. With the rise of the digital age and the subsequent rise of virtual teams, geographical boundaries and limited cooperation no longer exist. People in different buildings, different regions and different countries are teamed together through the communication highway; virtual teams have indeed become the building blocks of organizations. According to Anderson, et al., (2007) just as people have evolved from tribes to networked organizational structures, virtual teams are evolving into another dimension, immersing themselves into 3D environments. Virtual Reality will be, within the next decade the must have new technology according to many companies.

In the domestic front, Kenya Vision 2030 is the country's development program covering the period 2008 to 2030 (GOK, 2007). It was launched on 10th June 2008 to help transform Kenya into a middle-income country providing a high quality of life to all its citizens by the year 2030. The Vision is based on three pillars: the economic, the social, and the political. As the country makes progress to middle-income status through these development plans, it is expected to meet the Millennium Development Goals (MDGs) deadline of 2015. Vision 2030 spells out actions that will be taken to achieve these goals. The Government of Kenya in its quest to realize the Vision 2030 (GOK, 2007) has identified the Information and Communication Technology (ICTs) as a foundation for national transformation. The Vision lists the emerging challenges in ICT as bridging the islands of automation by allowing sharing of information among agencies. It clearly brings out the need to improve infrastructure in order to make virtual sharing of information more effective. One of the Government of Kenya's Strategic objective under ICT is to promote and facilitate GOK private partnership to enable innovations and competition to accelerate the growth of ICT Industries, and these partnerships can only be achieved cost effectively virtually.

While some modern organizations are now utilizing the benefits of virtual teams, it is also true that many organizations remain structured around conventional face-to-face teams. It is against this background that it has become necessary to evaluate the effect that virtual teams have on competitive advantage.

IBM is one of the Companies that has experience in building virtual spaces environments for remote mentoring and learning, enhanced team building and multipurpose global events with complex social interactions. In early 2006, small teams of innovators around IBM began exploring virtual worlds' technologies for business enablement. IBM has a well-funded IBM research digital convergence Emerging Business Opportunities (EBO) unit which explores the application of virtual world technologies to business and society.

The so called IBM 2006 Innovation Jam, an online brainstorming session that brought together more than 150,000 IBM employees, family members, business partners and clients from 104 countries, identified the virtul teams as one of top 10 focus areas for new business. IBM opened public islands and helped clients conduct business inside virtual worlds. IBM also built secure virtual spaces behind its firewall to exploit these emerging technologies and usage patterns for training, collaboration, immersive events, remote mentoring, business rehearsals, new employee orientation, joint software development, and other business areas.

The Virtual Universe Community (VUC) grew out of an enthusiast community and established its charter shortly after the 2006 IBM Innovation Jam. The community brings together virtual world enthusiasts, developers, innovators, and those interested in learning more about usage of virtual worlds. The goal is to find relevance and quick adoption of virtual worlds hence virtual teams for business, learning, and even social occasions.

The virtual teams provide a place for IBMers from across the world to meet, socialize, and make new business connections. It also allows formation of IBM groups both for communication purposes and for access control to private areas of land. From a technical point of view, it provides a platform where collaborative applications can be developed and deployed. However, employees have always questioned if using virtual teams leverages the competitive advantage of the Company.

The outcome of the ICT revolution has been a sea of change in the working environment. It has given organizations the ability to pool people from wherever they are in the world, without having to relocate them. People no longer have to be physically co-located to work on the same project, problem or task. Although diverse management literature exists on the topic of managing virtual teams,

little has been done to quantify the extent to which they have influenced Organization's competitiveness. In fact, Horwitz, Bravington & Silvis (2006) found that only in European countries did respondents correlate organization's success with virtual teams, as all others felt that the team and organizations could be more successful in face-to-face interaction. Horwitz, Bravington & Silvis' (2006) research found that respondents did not feel that they achieved more or less by working virtually.

1.2 Statement of the Problem

Virtual teams are quickly becoming a standard organization structure as more and more organizations globally are investing heavily in their systems, processes and people to create an environment that effectively supports virtuality. The question that remains unanswered is that despite these investments in virtual teams, has it enhanced competitive advantage? Little has been done to quantify the extent to which virtual teams have influenced the Organization's competitive advantage. Research on virtual teams is still in its nascent stages (Badrinarayanan & Arnett, 2008; Prasad & Akhilesh, 2002) and because of the relative newness of virtual teams, many areas of research have not been examined (Badrinarayanan & Arnett, 2008). Kock & Nosek (2000) states the number of global virtual teams in practice keeps growing and despite the investments of organizations in interaction media, global virtual teams do not always perform as was hoped for. Several researchers (Martins, et al., 2004; Kock, & Nosek, 2006) have pointed out that research regarding virtual teams is in its infancy and much work needs to be done. The tangible and intangible costs and benefits associated with virtual teams, especially those in virtual worlds, have not been thoroughly studied to date, thus further work is needed. Thus this study focused on the effect of virtual teams on Competitive advantage in an organization, with a case of IBM (Airtel Africa Project).

1.3 Purpose of the Study

The purpose of this study was to study the effect of virtual teams on competitive advantage in an organization, with a case of IBM – Airtel Africa Project.

1.4 Objectives of the study

The objectives of the study were:

i) To determine the effect of virtual information systems on competitive advantage in IBM.

ii) To determine the impact of virtually working employees on competitive advantage in IBM.

iii) To establish how virtual processes ensure sustainable competitive advantage in IBM.

1.5 Research Questions

i) What is the effect of virtual information systems on competitive advantage in IBM?

ii) What is the impact of virtually working employees on competitive advantage in IBM?

iii) How does virtual processes ensure sustainable competitive advantage in IBM?

1.6 Significance of the Study

The findings of this study will not only benefit IBM – Airtel project, but also Government of Kenya and many other national and multinational companies who employ virtual teams or who are looking to employ virtual teams to deal with the increased pressures including advent of technology, globalization and mergers/strategic alliances to build competitive advantage through new markets, plug skill gaps and product development. The study determined the effect of virtual systems on competitive advantaged, the impact of virtually working employees on competitive advantage and finally established how virtual processes ensure sustainable competitive advantage in IBM.

1.7 Limitations of the Study

This study was challenged by the reluctance of respondents to give information in fear that they might give out information that is confidential and sensitive. Financial constraints would have been experienced if the study was to do a survey of all firms investing in virtual teams. Limitations were overcome by settling on one organization and maximizing on time management to collect as much information as possible and use of online questionnaires as all respondents posed a high degree of computer and information literacy. The study focused on one firm to obtain more accurate information and minimize on cost. Respondents were assured that the

purpose of this research was purely academic and they should not fear that any confidential information will be shared with competitors.

1.8 Delimitation of the Study

This research was conducted in a multinational company, IBM, with focus on the Airtel project. The study was delimited to studying the effect of virtual teams on an organization's competitive advantage; Focus was on regular IBM employees in the IBM – Airtel Project who have been with the company for more than 3 years as they have been with the organization long enough to give feedback on the effectiveness of virtual teams and the relationship to organization's competitiveness which will ensure meeting the research objectives.

1.9 Basic Assumptions

The case of IBM-Airtel Project was effective in answering the objectives of the study as it is a "virtual hub" representative enough of organizations investing heavily on virtual teams to build competitive advantage. It was also assumed that the participants would be representative of the population and that they would not only be willing to participate in the study but that they would respond to questions honestly and participate without biasing results of the study.

1.10 Definitions of Significant Terms

Virtual Information Systems - A virtual information system is a system that allows its users to access common information from multiple perspectives.

Virtual workforce – A virtual workforce is comprised of members who are located in more than one physical location and work together with the aid of computer-mediated communication.

Virtual processes - A process which contributes in a stage of a theoretical model but is not, by itself, physically realizable.

Co-locate: Locate computer hardware or a person at a third-party site with access to efficient shared network resources

Collocated Teams: Group that is located at different sites but working towards one goal.

Collaboration: Processes where two or more people or organizations work together to realize shared goals.

Competitive advantage: The advantage that a business has over rivals who are competitors and which can be gained in a variety of ways.

Corporate Teaming: Companies with complementary strengths sometimes unite for a single, large project.

De-centralization: The spread of power away from the centre to local sites.

Digital age: This is a period in human history characterized by the shift from traditional industry that the industrial revolution brought through industrialization, to an economy based on the manipulation of information.

Lead-time: The time interval between the initiation and the completion of a production process.

Multicultural Human Resource: where employees of varied backgrounds, cultures, ethnicities, and experiences contribute freely, and achieve their individual potentials for their own and their organization's benefit.

Open Source Software: Refers to a program in which the source code is available to the general public for use and/or modification from its original design.

Telecommuters: Someone who works from home using the phone, internet, etc., for communication.

Telework: Work performed primarily on computers linked to other locations, esp. from home or a remote location.

Virtual: Existence made possible through a software.

Virtual Teams: Distributed work teams whose members are geographically dispersed and coordinate their work predominantly with electronic information and communication technologies.

1.11 Organization of the Study.

The rest of the research work is organized as follows: Chapter two is the literature review which consists of the theories supporting the study which are innovation diffusion and theory of reasoned action; an overview of competitive advantage; virtual information systems, virtually working employees and virtual process in relation to competitive advantage; Challenges of virtual teams; critical review and finally the conceptual framework as a theoretical guide to the study.

Chapter three covers the research methodology which is organized as follows; the research design. Target population; sample and sampling procedure; research instrument; research validity; research instrument reliability; data collection procedures and data analysis techniques.

Chapter four covers data analysis and presentation and finally, chapter five presents the summary of the study, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter is covers the literature review which consists of the theories supporting the study which are innovation diffusion and theory of reasoned action; an overview of competitive advantage; virtual information systems, virtually working employees and virtual process in relation to competitive advantage; Challenges of virtual teams; critical review and finally the conceptual framework as a theoretical guide to the study.

2.2. Innovation Diffusion Theory

Innovation diffusion theory provides an account of the manner in which any technological innovation moves from the stage of invention to widespread use or not. Rogers, (1983) states that the theory posits five characteristics of innovations that affect their diffusion: relative advantage which is the extent to which a technology offers improvements over currently available tools, compatibility (its consistency with social practices and norms among its users), complexity which is the ease of use or learning, trial-ability (the opportunity to try an innovation before committing to use it), and observability (the extent to which the technology's outputs and its gains are clear to see). Rodgers further explains that each of these characteristics on its own is insufficient to predict either the extent or the rate of diffusion, but diffusion studies have demonstrated that innovations affording advantages, compatibility with existing practices and beliefs, low complexity, potential trial-ability, and observability, will be more extensively and rapidly diffused than an innovation with the cluster of opposite characteristics. This explains the growth and widespread use of virtual teams as the world is becoming a global village. The theory points out that compatibility and relative advantage have the greatest influence on the rate of diffusion.

Rogers (1983) states that researchers seek to identify the factors that determine user acceptance of any information technology and, in particular, factors that can be influenced by design, the question of acceptance has come to be tackled more directly by researchers working outside the classical innovation diffusion tradition. Most noticeably, researchers in the fields of human-computer interaction and management information systems (MIS) have drawn heavily on theoretical work in social and cognitive psychology, as well as sociology, in studying user acceptance.

2.3 Theory of Reasoned Action

Fishbein Ajzen's Theory of Reasoned Action (TRA) in the social psychology literature defines relationships between beliefs, attitudes, norms, intentions, and behavior. According to this theory, an individual's behavior i.e use or rejection of technology is determined by one's intention to perform the behavior, and this intention is influenced jointly by the individual's attitude and subjective norm, defined as the person's perception that most people who are important to him think he should or should not perform the behavior in question (Fishbein & Ajzen, 1980). For this reason when an organization adopts the use of Virtual Teams then the individual employees will work hard to make the concept work as they perceive the employer who has introduced the concept as an important person in their lives hence influencing them to make the virtual teams a success.

Based on TRA, attitude toward a behavior is determined by beliefs about the consequences of the behavior and the affective evaluation of those consequences. Beliefs are defined as the individual's subjective probability that performing a given behavior will result in a given consequence. Affective evaluation is an implicit evaluative response (Fishbein & Ajzen, 1980) to the consequence; thus the attitude construct in TRA is general in nature and is not anchored to any given belief set. This approach represents an information processing view of attitude formation and change which states that external stimuli influence attitudes only through changes in the person's belief structure

2.4 Competitive Advantage

McDonough et al., (2001) defines a competitive advantage as an advantage gained over competitors by offering customers greater value, either through lower prices or by providing additional benefits and service that justify similar or possibly higher prices. According to Ozer, (2000), building a competitive advantage involves looking at what the customer wants to ensure customer satisfaction, cost reduction to facilitate better pricing, employee satisfaction to ensure improved delivery of goods and services and finally, profitability for organizations. Smith, 2006 summarized that the four main global areas of focus in competitive advantage as cost, quality, time and flexibility.

Ferrier (2001) states that competitive advantage theory suggests that everyone is better off if decisions are made based on the competitive advantage at all levels – national, corporate, local, and individual. Stalk et al., (2010) simply puts it that it is nothing more than asking for optimal utilization of resources and the globalization of manufacturing and services across the world as if we lived in a borderless world and not a world with thick boundaries that define the territory of nations; hence the only viable solution for killing the borders are the virtual teams.

The theory of competitive advantage is based on a fundamental assumption that adequate employment opportunities are available to those who are engaging themselves to leverage competitive advantage of others to the degree that they can optimize their own potential (Treacy & Wiersema 1995). Similarly, it assumes that resources will move to where they find their best employment opportunities irrespective of socio-cultural factors. At a macro level, those forces will be at play as people will redeploy themselves to the best possible opportunities available and relocate if necessary. However, at an individual level, there may be adjustment pains due to lack of societal support, capability gaps and personal financial situations. While that is true at the micro level, the trend does not negate the fact that it is beneficial to everyone at a macro level. Man-made obstacles can slow it down but not reverse the trend that offers a beneficial outcome to everyone involved. Hence the conclusion that off-shoring services to the nations and locations which offer a competitive advantage is an irreversible trend.

A study by Ale & Nader (2010) identified the factors which influence the effectiveness of virtual teams as knowledge workers (people), process and technology/information systems. The results of the study suggest that people, technology and process are tightly correlated and need to be considered early in virtual teams.

2.5 Virtual Information Systems and Competitive Advantage

The widespread use of computer technology has changed the way companies do business. Information technology has altered relationships between companies and their suppliers, customers and rivals. Porter & Millar (1985) discuss two specific ways that information technology can affect competition: by altering industry structures and by supporting cost and/or differentiation strategies. A common approach used to identify opportunities to change the structure and profitability of an industry is to examine five competitive forces. Porter (1979) argued that the power of buyers, the power of suppliers, the threat of new entrants, the threat of substitute products and the rivalry among existing competitors determines the profitability of an industry. How a company uses information technology can affect each of the five competitive forces and can create the need and opportunity for change. For example, information technology has altered the bargaining relationships between companies and their suppliers, channels and buyers. Today it is easy for information systems to cross company boundaries. Porter & Millar (1985) states that inter-organizational systems have become common and, in some instances, they have changed the boundaries of the participating industries; Virtual information systems can reduce the power of buyers and suppliers, and also erect new barriers that reduce the threat of entrants, they can help differentiate products and services and reduce the threat from substitutes. Porter & Millar (1985) continues to state that virtual systems can also help managers reduce the cost of rivalry actions and, in some cases, reduce the need for competitive actions and reactions.

Virtual decision support systems can potentially help a firm create a cost advantage and at the same time provide many benefits including improving personal efficiency and reducing staff needs, expediting problem solving and increasing organizational control (Porter & Millar, 1985). Managers who want to create a cost advantage should search for situations where decision processes seem slow or tedious and where problems reoccur or solutions are delayed or unsatisfactory. In some cases, DSSs can reduce costs

where decision makers have high turnover and training is slow and cumbersome, and in situations where activities, departments and projects are poorly controlled.

Powel (2007) explains that Virtual DSSs can also create a major cost advantage by increasing efficiency or eliminating value chain activities. For example, a bank or mortgage loan firm may reduce costs by using a new virtual DSS to consolidate the number of steps and minimize the number of staff hours needed to approve loans. Technology breakthroughs can sometimes continue to lower process costs, and rivals who imitate an innovative DSS may nullify or remove any advantage. Porter & Millar (1985) reiterates that virtual decision support systems can potentially create a differentiation which increases profitability when the price premium charged is greater than any added costs associated with achieving the differentiation. Successful differentiation means a firm can charge a premium price, and/or sell more units, and/or increase buyer loyalty for service or repeat purchases. In some situations, competitors can rapidly imitate the differentiation, and then all competitors incur increased costs for implementing the DSS (Power, 2002). This decision support systems can be used to help a company better focus on a specific customer segment and hence gain an advantage in meeting that segment's needs. Management information systems and decision support systems can help track customers, and DSSs can make it easier to serve a specialized customer group with special services (Power, 2007).

A now classic study (Kettinger, et. al., 1994) identified a number of companies that had gained an advantage from information systems. Some of those systems were decision support systems, but most were transaction processing systems; Air Products, a vehicle scheduling system; Cigna, a risk assessment system; IBM, a marketing management system; Owens-Corning, a materials selection system; and Procter & Gamble, a customer response system. Most companies however, wisely do not provide many details on their success with computerized decision support. Kettinger, et. al., 1994 reiterates that if a company is trying to develop a decision support system that provides a competitive advantage, managers and analysts should ask how the proposed DSS affects company costs, customer and supplier relations, and managerial effectiveness. Managers should also attempt to assess how the proposed strategic system will impact the structure of the industry and the behavior of competitors. Finally, companies must continuously improve their information and decision support technology to gain and maintain any competitive advantage.

The advent of information and communication technology (ICT) provides opportunities for employees with offices in geographically dispersed locations to communicate share and collaborate on projects to achieve common business goals. In the process, ICT has broken down the boundaries within organizations and between organizations. All this has freed people to work in locations of their choice (Powell, et al. 2004). Rapid advances in ICT in the past decade have made virtual team working both within and across companies practical and cost-effective for any organization and this style of working and collaboration has primarily expanded in recent years.

Based on conventional information technologies and internet-based platforms virtual, environments may be used to sustain companies' progress through virtual interaction and communication. Lin, et al., (2008) study indicates that social dimensional factors need to be considered early on in the virtual team creation process and are critical to the effectiveness s of the team. Communication is a tool that directly influences the social dimensions of the team and in addition the performance of the team has a positive impact on satisfaction with the virtual team. Virtual teams are growing in popularity (Cascio, 2000), additionally, the rapid development of new communication technologies such as the internet has accelerated this trend so that today, most of the larger organization employs virtual teams to some degree (Hertel, et al., 2005). Information technology is providing the infrastructure necessary to support the development of new organization forms. Virtual teams represent one such organizational form, one that could revolutionize the workplace and provide organizations with unprecedented level of flexibility and responsiveness (Powell et al., 2004). Virtual teams are important mechanisms for organizations seeking to leverage scarce resources across geographic and other boundaries (Munkvold & Zigurs, 2007).

Kratzer et al. (2005) research shows that traditional R&D teams have become rare as research activities need to done 24/7 for innovations to be realized by a company. This means Researt and Development needs a virtual time. The processes used by successful virtual teams will be different from those used in face-to-face collaborations (Rice et al.,2007). In an innovation network resembling a traditional organization, the innovation process is more restricted by location and time. In other words, the innovation

process mostly takes place within the framework of physical offices and working hours. In virtual organizations, individuals' work is not restricted by time and place, and communication is strongly facilitated by IT. Such a product development environment allows a greater degree of freedom to individuals involved with the development project (Ojasalo, 2008). Hence multinational companies are more likely to become tightly integrated into global R&D network than smaller unit (Boehe, 2007). Distributed teams can carry out critical tasks with appropriate decision support technologies (Chen et al., 2007).

Yip & Dempster, (2005) in their study realized that perhaps the most important lesson is that the virtual information systems helps companies to be both global and local at the same time. The virtual information systems can facilitate the collaboration of different people who are involved in product development, increase the speed and the quality of new product testing and validation and improve the effectiveness and the efficiency of product development and launch (Martinez-Sanchez et al., 2006). Rice et al., (2007) found that the adoption of formal procedures and structured processes significantly increased the effectiveness of virtual teams. Arranz & Arroyabe, (2008) point out that geographical dimension is not a variable that impacts substantially on the typology and objectives of R&D cooperation, in contrast with the results highlighted in the literature review that they have one.

Camarinha-Matos (2003) conclude that, setting up an infrastructure for virtual team still requires a large engineering effort, which represents a major obstacle for the implementation of this new paradigm. Effective and efficient cooperation across disciplines and distributed teams becomes essential for the success of projects (Zhang, et al., 2008).

2.6 Virtually Working Employees and Competitive Advantage

According to Lipnack & Stamps (2002) teams have been in place since the nomadic era. The first information based cultures were hunters and gatherers who worked in small groups to accomplish their daily tasks in order to survive. The second era is called the agricultural era where family size increased as population grew larger. The third era of industrial age gave birth to bureaucracy and factories and replaced farms as the economic engine. This age spawned the new digital civilization. The fourth era is the information age where world's economies fall as are information based, electronically connected and globally interdependent. Lipnack & Stamps

(2002) continues to state that the information age brought networks which are the foundation of virtual teams. Responding to the increasing de-centralization and globalization of work processes, many organizations have responded to their dynamic environments by introducing virtual teams that collaborate by communication technologies across geographical, temporal, cultural and organizational boundaries to achieve common goal in their organizations outputs.

Gassmann & Von Zedtwitz (2003b) defines virtual team as a group of people and sub-teams who interact through interdependent tasks guided by common purpose and work across links strengthened by information and communication technologies. Virtual teams are distributed work teams whose members are geographically dispersed and coordinate their work predominantly with electronic information and communication technologies (Hertel, et al., 2005). From the perspective of Leenders, et al., (2003) virtual teams are groups of individuals collaborating in the execution of a specific project while geographically and often temporally distributed, possibly anywhere within and beyond their parent organization. Virtual project teams, by definition, are therefore groups of people working together toward a common goal. Whether, they are called virtual or distributed, the team members are not co-located; they can reside in different cities, states or countries. Since these team members work in the context of a project, there is a definite beginning and end to the work and the time schedule. The degree of geographic dispersion within a virtual team can vary widely from having one member located in a different location than the rest of the team to having each member located in a different country (Staples & Zhao, 2006).

Working in today's business world is like working in a world where the sun never sets. Rezgui (2007) investigates the effectiveness of virtual teams and any other suitable form of virtual collaboration and explores the factors that influence their successful adoption. May & Carter (2001) in their case study of virtual team working in the European automotive industry have shown that enhanced communication and collaboration between geographically distributed engineers at automotive manufacturer and supplier sites make them get benefits of better quality, reduced costs and a reduction in the time-to-market (between 20% to 50%) for a new product vehicle.

Leenders, et al., (2003) explains that Organizational environment has gone through tremendous changes during the past few years and is now relying on employee empowerment which becomes the basis of virtual team based working environment. This is the working style that delegates power to the employees as well as management; hence making the organizations more decentralized. Virtual teams which members do not work at the same time or place (Stoker, et al., 2001) often face tight schedules and a need to start quickly and perform instantly (Munkvold & Zigurs, 2007). When virtual teams are used in outsourcing that involves other countries, the situation is referred to as off shoring. Dunn et al. (2009) notes, that the off shoring decision has become a major strategy aimed at improving or maintaining profitability in highly competitive industries.

Beranek & Martz (2005) reiterate that by deploying a project across team members, be they employees, partners or even customers, located in various time zones, tasks can be passed from one team member to the next as companies effectively stretch the workday. Subsequently, leading to greater productivity and business effectiveness, as companies boost accuracy, speed and agility. With these gains, organizations can respond more quickly to potential and existing customer requests, react faster to market changes and gain a competitive edge all the while reducing office costs by enabling employees to work from home, at satellite offices, or on the road. According to Bravington & Silvis (2006) virtual teaming is an increasingly popular organizational tool because while it helps companies trim and balance the corporate budget by cutting down on travel expenses and excessive office space, it also acts as a change agent for synergizing and forming geographically diverse cross-functional teams of employees to partake in an emergent area that is being leveraged for better corporate competition. Cascio, (2000) also notes that across the board, the companies showing record profits in today's sluggish economy look to technologically savvy collaboration mechanisms to build team success.

Virtual teams can leverage talent wherever it resides, and also deliver additional productivity gains and cost savings. Another benefit of supporting virtual teams is the ability to better attract and retain newer members of the workforce (Martins, et al., 2004). As more and more millennial workers enter the corporate world, they bring new skills with them. The trend toward a virtual workplace, as explained by Rezgui (2007) is also driven by growing numbers of workers' spending more time in the field, interacting with

customers, business partners, and collaborators and spending less time in traditional offices which means sustained relationships are created. Using the growing number of other digital devices and Internet connection gives these workers access to documents and other resources and to their colleagues. This means fewer than half of the employees come regularly to the companies' office facilities saving on space and administration costs.

According to Pinto and Slevin (1998) Virtual workplaces also enable temporary or part-time workers meet other project-team members and to come up to speed quickly and easily by accessing, perhaps from their home offices, virtual project rooms where they can find all the project documents as well as information about the project team members. As organizations seek new ways to reduce costs and increase productivity and efficiency and at the same time perhaps improve their "green credentials" (by reducing unnecessary travel because teams can meet virtually), the drivers behind the move toward the virtual workplace will continue to push organizations to make the virtual workplace more effective (Mcdonough, et. al., 2001).

Xue, et al. (2005) states that there are many intangible benefits also felt with the increasing prevalence of virtual employees. Telecommuters are more satisfied with their work and life balance and report lower rates of job burnout. Employers see the most success with telecommuting by first recruiting the people best fit to fill these remote roles. However, the process of developing remote employees is a process that requires constant monitoring. Wong & Burton (2000) noted that workers who are allowed flexible hours by their companies actually work more intensely than coworkers with rigid hours. These employees also reported better satisfaction with their jobs. According to Kirkman, et al., (2002) employees who worked remotely one day a week thus reducing their required weekly office hours reported higher job satisfaction, lower stress and stronger loyalty to their company.

Rogers (1983) states that one clear advantage to a virtual team is flexible work schedule and the ability for employees to arrange their workday around personal obligations. For example, instead of working the traditional 8 a.m. to 5 p.m. shift, you can work from 7 a.m. to 4 p.m. and use the extra hour after work for appointments or other personal matters. According to Leenders, et al.,

(2003), other benefits of a flexible schedule include increased productivity and satisfaction, and decreased absenteeism, overtime hours and employee turnover.

Bal & Gundry, (1999) lists the advantages of Virtual Teams include developing and spreading better practices faster, connecting islands of knowledge into self-organizing, knowledge sharing networks of professional communities, fostering cross-functional and cross-divisional collaboration, increasing ability to initiate and contribute to projects across organizational boundaries. Corporate mentoring programs also provide a means of cultivating required skills throughout your organization, which translates into talent retention (instead of turnover), happier employees and management, and a healthier bottom line (Bal & Gundry, 1999).

In information technology, survey results by Xue, et al., (2005) indicate 49% of employers reported on average they save over $20,000 per head while 15% percent of employers reported they are saving more than $50,000 per head. Hertel, et al., (2005) notes that besides cutting costs, outsourcing can also reduce implementation times and alleviate talent shortages. Virtual communities are alternative ways to organize work that involves the complete or partial use of ICT to enable workers to get access to their labor activities from different and remote locations (Martinez-Sanchez, et al., 2006). Virtual teams provide cost savings to employees by eliminating time -consuming commutes to central offices and offers employees more flexibility to co-ordinate their work and family responsibilities (Johnson, et al., 2001). Hence it is just not a blessing to employees but an advantage to the organization.

2.7 Virtual Processes.

With globalization, the demand to accelerate business processes to come up with real-time solutions is becoming a necessity. In the name of growing a brand's recognition and business profit, organizations will have to learn how to synergize by getting rid of information anxiety and empowering teams at all levels (Munkvold & Zigurs, 2007). It will all come down to managing IT, the people and maximizing business value where technology is concerned. These days, the fast will be big and everyone will be forced to

innovate. Doing business in real time may simply means alignment of business processes to be able to be able to respond quickly to change.

Kirkman, et al., (2002) lists the things that need to happen in order for organizations to make effective use of virtual teams include: processes for team management and development have to be designed, defined, piloted, tested, refined team managers have to be trained in new team management strategies team members have to be trained in new ways of working, the culture of the organization has to be reshaped to support new structures and processes organizational structures have to be modified to reflect new team dynamics, rewards systems have to be updated to reflect new team structures new information technology (IT) systems have to be built to support teams new management, measurement and control systems have to be designed. The real basic structure of the workplace is the relationship. Each relationship is itself part of a larger network of relationships.

Business process virtualization forces a firm to closely examine all of its business processes and how they inter-relate. Barker (2001) explains that Virtual Process Management provides the ability to gain visibility and control over information flows or transactions that span multiple applications and people; and that when a firm is hypersensitive to the inter-relationship of its core processes it becomes nearly impossible for any team to introduce an incompatible rogue process. The point of process management applied to process virtualization is to streamline and standardize business processes, data, and IT infrastructure (Cascio, 2000). For example, it is not unusual for companies to have different ways of handling customer orders depending on whether the order came in over the web, the phone, in the mail, in a store, or through a sales associate, creating an inconsistent customer experience, potentially negatively affecting customer satisfaction and retention. Hertel, et. al., (2005) through their study stated that from the business perspective, the inconsistency makes it difficult for the company to quickly gauge customer response to new items or sale pricing, making it nearly impossible to create a just-in-time inventory management system run by the company suppliers. Without process management, the drawbacks cascade from the customer experience through the company out to the supply chain.

According to Kirkman, et. al., (2001) with implementation of business process virtualization the firm achieves consistency and predictability of outcomes and that the four primary beneficiaries of the virtualization are: Customers as the transactions and transaction times become predictable, and Product and service deliverables become consistent; Employees as well-designed processes help ensure efficiency and quality of outcomes, freeing up time for employees to pursue creative work that adds value; Partners as Virtual processes coupled with process management streamlines transactions and makes them more predictable, improving partner profitability and loyalty; Shareholders as efficient processes drive productivity for growth and lower costs, improving greater profitability and enhanced leverage of existing resources. Virtualizing business processes provide firms with an opportunity to streamline the business, increase the number of transactions, improve customer and partner satisfaction and loyalty, and free up time for employees to explore adjacent market opportunities (Kock & Nosek, 2005). Virtual business processes can be implemented incrementally, providing exponential value up and down the business chain. With each new virtualized process, the speed of business transactions increases providing a differentiated, sustainable competitive advantage (Smith, 2006).

Collaboration is also becoming increasingly important in creating the knowledge that makes business more competitive. Virtual teams are growing in popularity and many organizations have responded to their dynamic environments by introducing virtual business processes. Additionally, the rapid development of new communication technologies such as the internet has accelerated this trend so that today, most of the larger organization employs virtual teams to some degree (Rezgui, 2007). A growing number of flexible and adaptable organizations have explored the virtual environment as one means of achieving increased responsiveness Zhouying (2005) states that the shift from serial to simultaneous and parallel working has become more common place. New product development (NPD) requires the collaboration of new product team members both within and outside the firm (Martinez-Sanchez, et al., 2006) and NPD teams are necessary in almost all businesses (Leenders, et al., 2003). On the other hand, virtuality have been presented as one solution for small and medium enterprises (SMEs) aiming to increase their competitiveness (Pihkala, et al., 1999). The SMEs are one of the sectors that have a strong potential to benefit from advances in ICTs and the adaptation of new business

modes of operation. The combination of explosive knowledge growth and inexpensive information transfer creates a fertile soil for unlimited virtually invention (Miles, et al., 2000).

Through intergrated virtual business processes, complex products are now designed much more collaboratively with the suppliers being involved in the design process. However by comparison in today's competitive global economy, organizations capable of rapidly creating virtual teams of talented people can respond quickly to changing business environments. Capabilities of this type offer organizations a form of competitive advantage (Bergiel, et al., 2008). Virtual teams represent a large pool of new product know-how which seems to be a promising source of innovation. On the other hand, virtual teams reduce time-to-market (May & Carter, 2001). Lead time or time to market has been generally admitted to be one of the most important keys for success in manufacturing companies (Bergiel, et al., 2008).

In some ways, virtual teams are like the canary in the mine that detects life -threatening problems before anyone else realizes they are in danger (Pinto & Slevin 1998). The issues raised for virtual team managers and members about managing people and projects at a distance are really the issues which need to be raised about all teamwork. Managing virtual teams is not about taking our old management techniques and transposing them for delivery using new media. Rather, it's about expanding available tools to create new dynamics aligned with the best thinking about supporting collaborative work.

Malhotra, Majchrzak & Rosen (2007) gives various ways in which Managers of virtual teams can support their teams; recognizing them and their importance, encouraging members to explore questions that matter including questions about how they are working together, supporting the creation of some kind of shared space (the feeling that there is an infrastructure where people are working together), facilitating the coordination of the technology, work processes, and the formal organization, recognizing reflection as action and as legitimate work (getting the infrastructure of the organization to support the learning process) and supporting activities which make the informal network visible.

Research by Xue, et al., (2005) clearly indicates that outsourcing involves virtual teams. This fact makes the performance of virtual teams crucial to the success of the outsourcing initiatives. Virtual teams are changing the way work gets done today. Companies with employees, partners, and even customers that span the globe are learning that having team members in different time zones all working on the same project stretches the day (Munkvold & Zigurs, 2007). Work can begin one morning in Asia, move via collaboration and efficient business processes through time zones into the next morning, accomplishing far more than a collocated team putting in the standard eight hours. Pinto & Slevin (1998) state that when processes are reinvented and new technologies embraced to support these teams, this virtual, collaborative way of working boosts productivity, quickens the pace of decision-making, and gives companies a competitive edge. The trend is helping companies test the boundaries of corporate teaming. Due to advances in technology, such as mobile devices, social networking tools, collaboration software and video conferencing—and more flexible corporate attitudes toward work, virtual teams can be created and recreated on the fly based on who has the right knowledge and talent, not who is available to meet in the conference room down the hall.

Pinto & Slevin (1998) explains that besides the high impact virtual training has due to double-level learning, it is also a huge cost saver, which means that delivering a two day training programme virtually instead of face to face can lead to an immediate cost saving, during the average time of 12 hours that a participant is travelling back and forth to the training location, he or she could have attended online training sessions. For many businesses online training classes and videos are becoming more attractive as more and more companies are turning to specialists in training employees virtually (Munkvold & Zigurs, 2007). Free management and training courses also are available on Web sites of some big companies for any new employee's orientation. On-demand e-learning, delivered over the Web or by audio or videodisc, has become the second most popular approach to learning and training for many organizations. Classes can be downloaded for use in video iPods or hand-held sales devices for employee's convenience. Hence, virtual training saves money, time, environment and puts less strain on employees.

2.8 Challenges of virtual teams

Virtual teams face particular challenges involving trust (Malhotra et al., 2007, Bal & Teo, 2001) which is a key element to build successful interactions and to overcome selfish interests, effective communication (Beranek & Martz, 2005,) that is even more critical for success in the virtual setting (Shachaf & Hara, 2005), deadlines (Jarvenpaa and Leidner, 1999), and team cohesiveness (Dineen, 2005). While there are great advantages that come with the adoption of the virtual teams, new challenges rise with them (Precup et al., 2006). Cascio (2000) declared that there are five main disadvantages to a virtual team: lack of physical interaction, loss of face-to-face synergies, lack of trust, greater concern with predictability and reliability, and lack of social interaction. In building a virtual team, all of these issues must be at least implicitly addressed in order to have an effective virtual team (Hunsaker & Hunsaker, 2008).

Virtual teams are challenged because they are virtual; they exist through computer mediated communication technology rather than face-to-face interactions (Gaudes et al., 2007, Hardin et al., 2007). Sometimes they report to different supervisors and they function as empowered professionals who are expected to use their initiative and resources to contribute to accomplishment of the team goal (Hunsaker & Hunsaker, 2008). Fewer opportunities for informal work and non-work-related conversations may form challenges to virtual team (Furst et al., 2004). Furthermore, virtual team members are expected to become interdependent, successfully negotiate cultural differences (Dafoulas & Macaulay, 2002, Dekker et al., 2008), and accomplish their tasks through computer-mediated technology (Hunsaker & Hunsaker, 2008). The process to motivate team members may differ depending on their orientation (Paul et al., 2004).

2.9 Critical Review

Rogers (1983) reiterates that most organizations must have adopted the virtual teams with the belief of gaining relative advantage in the quest for their organization objectives. However, the current conceptualizations relative advantage are ambiguous because the criteria used to judge what is advantageous is often not defined (e.g., an innovation could be advantageous because it costs less or is less complex).

During the last decade, words such as virtual, virtualization, virtualized have been very often advocated by scholars and practitioners in the discussion of social and economic issues (Walvoord, Elliot & Coovert, 2008) but the advantages and pitfalls of virtual team is concealed. The availability of a flexible and configurable base infrastructure is one of the main advantages of agile virtual teams. All project teams face obstacles to success. When one decomposes virtual teams into the summary of its parts, it is evident that virtual teams are especially challenging. Lipnack & Stamps (2000) notes that all the pitfalls that can trip up a collocated team are dangers to a virtual team, also termed as team killers and they include false consensus, unresolved overt conflict, underground conflict, closure avoidance, calcified team meetings, uneven participation, lack of accountability, and forgetting the customer.

The natural tendency of distant participants not to collaborate with each other can cause disengagement from the project and its objectives (Alami, Wong & McBride, 2008). The lack of face-to-face interaction in virtual teams may create obstacles to effective coordination and communication more salient and thus further impair team effectiveness (Jarvenpaa & Leidner, 2004). Some researchers explicitly advocate periodic face-to-face meetings for teams involved in intensive communication tasks to build and maintain interpersonal relationships (Dineen, 2005). Cascio (2000) declared that there are five main disadvantages to a virtual team: lack of physical interaction, loss of face-to-face synergies, lack of trust, greater concern with predictability and reliability, and lack of social interaction. In building a virtual team, all of these issues must be at least implicitly addressed in order to have an effective virtual team (Hunsaker & Hunsaker, 2008).

Virtual team may allow people to collaborate more productivity at a distance, but the trip to coffee corner or across the hallway to a trusted colleague is still the most reliable and effective way to review and revise a new idea (Gassmann & Von- Zedtwitz, 2003a). As a drawback, virtual teams are particularly vulnerable to mistrust, communication break downs, conflicts, and power struggles (Rosen et al., 2007). The trust factor is even more vital for virtual teams because of the lack of personal face to face interaction. Jarvenpaa & Leidner, 2004 found that building trust is the greatest challenge in creating successful virtual teams. Studies on the

sustainability of virtual collaboration suggest that trust is critical to ensuring the optimal use of Information and Communication Technologies (ICT) to support the exchange among business partners. It is also evident from the previous studies on ICT, trust and collaboration that understanding social systems in which individuals, groups or organizations operate is a powerful mechanism for the development and sustainability of trust in an on-line or virtual environment (Hossain & Wigand, 2002).

Virtual teams face particular challenges involving trust (Malhotra, et al., 2007) which is a key element to build successful interactions and to overcome selfish interests, effective communication (Beranek & Martz, 2005, Dustdar, 2004) that is even more critical for success in the virtual setting and team cohesiveness (Dineen, 2005). Kimble, Li, and Barlow suggest that virtual teams face barriers which can be either technological or non-technological. Technological barriers would include such inconveniences as slow network computers, poor architecture, and lack of collaborative software. They also note that most equipment and software has been designed for use in a conventional office, so those working at remote sites may face problems interfacing with their team. Although some technological problems can be inhibiting, the authors considered other barriers to be more serious. Chief among these would be organizational and cultural barriers. Also included in the list are perceived disruption of virtual teams to corporate culture and the loss of employee's loyalty.

Virtual teams face problems encountered by all teams, people working with others in the organization, plus those face by the virtual nature. These can be numerous. In the end it simply boils down to the fact that it is difficult to collaborate on something when the communication process is inhibited. New technologies just provide new mechanism to make distant collaborative teams possible, not necessarily superior to other options. Since virtual teams present stiff challenges to its members, most authors end up heavily emphasizing one of three areas: building trust, enhancing communication, and developing virtual management skills. While there are great advantages that come with the adoption of the virtual teams, new challenges rise with them (Precup, et al., 2006).

2.10 Conceptual Framework

The conceptual framework shows the relationship between the independent variable, virtual teams and the Dependant Variable which is the Competitive advantage broken into the major 4 areas of focus of competitive advantage.

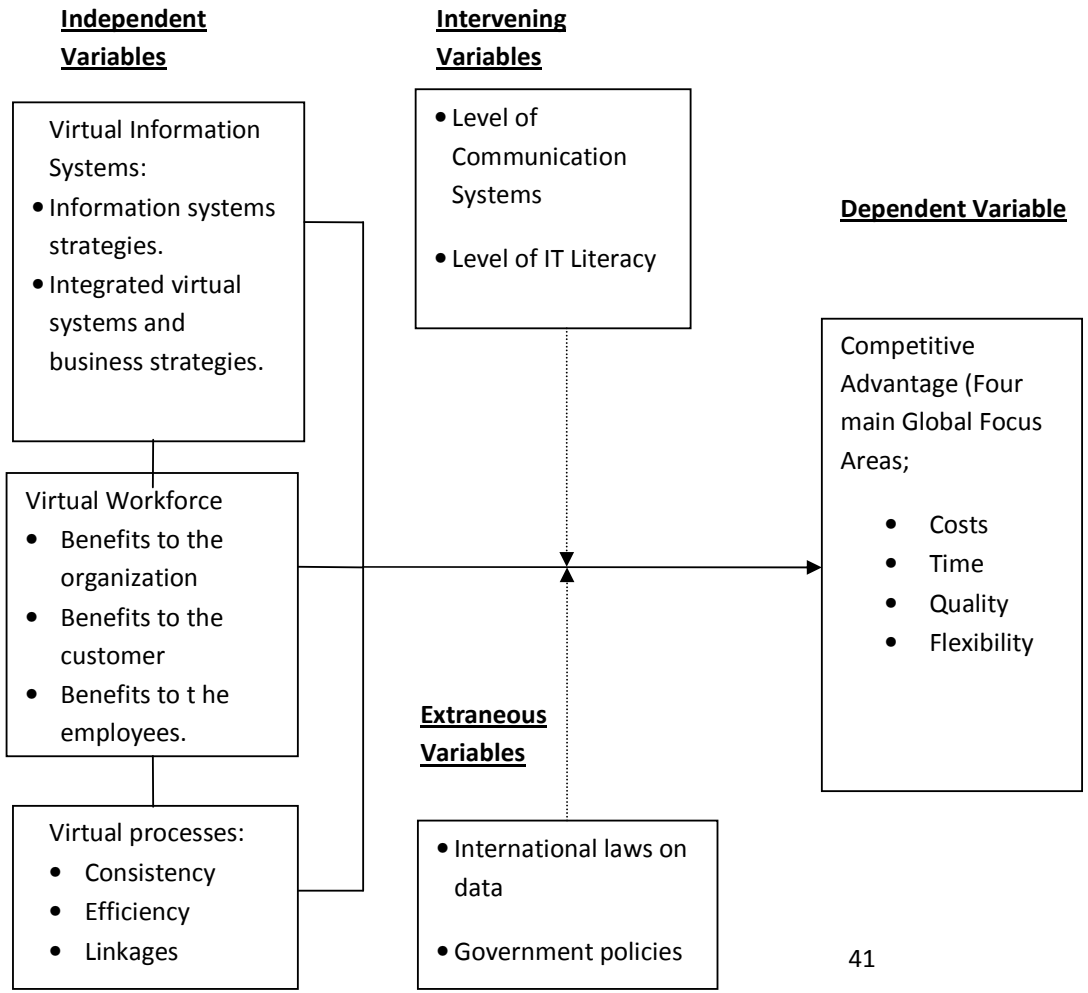

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Figure 2. 1 Conceptual Framework

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

The chapter on research methodology covers research design appropriateness, the target population, sample and sampling procedure, instrument validity and reliability, data collection procedure, data analysis and presentation and finally operationalization of variables.

3.2. Research Design

Research design is defined as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari, 1990). The study followed survey research design. In line with the purpose of this research, the following factors as outlined by Kothari (1990), were taken into consideration and formed the basis of the decisions taken in this research; the means of obtaining the information, the availability and skills of the researcher, the objective of the problem to be studied and the availability of time and money for the research work.

Descriptive research methods were used which according to Kothari (1990), are concerned with describing the characteristics of a particular individual group. The research questions sought to obtain a description of the effect of virtual teams on competitive advantage. According to Blumberg, et al., (2005), if the research is concerned with finding out who, what, where, when or how, then the type of study to be undertaken is descriptive, as opposed to causal study that is concerned with learning why certain factors result in certain outcomes.

3.3. Target Population

According to Welman, et al. (2005), population is the full set of cases from which sample is taken. The study targeted the virtual 175 members of IBM staff working in the Airtel Africa Project, which provides IT services across 16 countries in Africa. Table 3.1 represents the 6 strata making up the population together with the frequency and the percentage of the total population.

Table 3.1 Target Population

Role	No of Employees
Account Executives	10
Service Technicians	80
Training Representatives	10
Installation Operation Coordinators	20
Account Management Specialists	30
Competency Leads	25
Total	**175**

Source: Human Resource Office IBM- Kenya (2013)

3.4. Sample and Sampling Procedure

Estimation of sample size in research using Krejcie & Morgan (1970) is a commonly employed method. Krejcie & Morgan (1970) used the following formula to determine sampling size and come up with a table for determining sample size from a given population:

S = X2NP (1-P)/ d2 (N-1) + X2P(1-P)

S = required sample size

X2 = the table value of chi-square for one degree of freedom at the desired

confidence level

N = the population size

P = the population proportion (assumed to be .50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05)

The relationship between sample size and target population is illustrated in Table 2 as stated in Krejcie & Morgan (1970). The table was used to determine the sample size for this population.

Table 3.2 Table for Determining sample size from a given population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380

85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Note: "N" is population size "S" is sample size.

Source: Krejcie, Robert V., Morgan, Daryle W., "Determining Sample Size for Research Activities", Educational and Psychological Measurement, 1970.

The sample size was 118 as per the table above. According to Mugenda & Mugenda (2003), Nachmias & Nachmias (1996) and Peil (1995), a representative sample must be at least 10% of the entire target population. Thus from the population of 175, the sample of 67.4% (118) is representative enough making the data collected dependable and reliable. The respondents were identified by use of stratified sampling technique where the target population was divided into 6 roles i.e. Account Executives, Service Technicians, Training Representatives, Installation Operation Coordinators, Account Management Specialists and Competency Leads. Malhotra et al (2006) states stratified sampling is precise as it includes all important sub-populations as cited in Polonsky & Waller (2011). Thereafter random sampling technique was used to pick respondents from each stratum in order to give each member an equal chance of being selected independently as a subject. According to Polonsky and Waller (2011) random sampling is projectable. The composition of the sample frame is presented in Table 3.2.

Table 3.3 Sample Size

Role	**No of Employees**	**Sample Size**
Account Executives	10	7
Service Technicians	80	54

Training Representatives	10	7
Installation Operation Coordinators	20	13
Account Management Specialists	30	20
Competency Leads	25	17
Total	**175**	**118**

3.5. Research Instrument

The data was collected by use of self-administered questionnaires with both closed and open-ended questions. These are instruments used to collect information from people who complete the instrument themselves (Bourque & Filder, 1995). Questionnaires are considered the best in collection of primary data because they provide an avenue for the researcher to ask probing questions, are free from interviewer's bias and respondents who are not easily approachable may be reached conveniently and can be self administered (Mugenda & Mugenda, 2003; Kothari, 1990). The questionnaire was designed and questions generated with purpose of research, objectives and questions of research in mind, after which instrument validity was established using panel of experts and a field test. Reliability was subsequently established using test-retest method.

3.6. Instrument Validity

Leedy, et al., (2005) highlighted validity as one of the important factors when considering the measurement of data. Validity is the soundness and the effectiveness of the measuring instrument which refers to the functionality of the instrument and accuracy of the reading by the instrument. Internal validity addresses how valid it is to make causal inferences about the intervention in the study. The high response rate from adequate representation of the population ensured respondents sufficiently represented the sample. Content

Validity to measure the degree to which the test items are a true representation, was achieved through three ways, namely; literature review to establish the variables of this study and their relationship; seeking expert opinion from my Research Supervisor and IT experts view to ensure that the instrument actually represent and capture the information in the area of study; finally piloting of questionnaire was done amongst sample population.

3.7 Instrument Reliability

Leedy, et al. (2005) defines reliability as the accuracy of the measuring instrument and how dependable the data read or taken from the instrument are. The questionnaires were tested using test-retest technique. Pearson r is the index of correlation most often used in this context. If the test is reliable, and the subjects have not changed from Time 1 to Time 2. then there should be a high value of r (Wuensh, 2012). The questionnaires were given to the same individuals on two different occasions with the second administration coming after one week; the answered questionnaires were scored manually and the scores for the two occasions were then compared to evaluate the test for stability, that is to determine how closely the participants' responses on the second occasion matched their responses on the first occasion. In this study results for test retest was 0.75 which was corrected using Spearman's prophecy resulting to reliability coefficient being 0.86.

$$r = \frac{\sum x}{\sqrt{(\sum x^2)(\sum y^2)}}$$

Where r = correlation coefficient, x = x – x and y =y – y. The calculated reliability coefficient was 0.75 which was within the limit of r > 0.75 and < 1 (Mugenda & Mugenda, 2003). This results were corrected using Spearman-Brown Prophecy formula;

$$r_{tt'} = \frac{n \times r}{(n-1)r+1} = \frac{2 \times 0.75}{(2-1)0.75+1}$$

$$= 0.86$$

3.8. Data Collection Procedure

The following was the data collection procedure; A research proposal and questionnaire was developed and defended. With the approval of the panel during defense a permit was obtained from NCST (National Council of Science and Technology) to proceed to the data collection phase. Appointments were made with the respondents to explain the purpose of the research and subsequently the questionnaires were sent out to them through mail. After two weeks follow ups were made through phone calls with the respondents who had not returned the questionnaires to improve the response rate.

3.9. Data Analysis and Presentation

According to Zikmund (2003), data analysis is the application of reasoning to understand and interpret the data that has been collected. The collected questionnaires were first checked for completeness, and then coded and tabulated to provide an easy summary for analysis. This practice, according to Kothari (1990), is aimed at detecting any errors and omissions and further correct errors wherever possible. Descriptive statistics such as tables, percentages and means were used to analyze and present data.

3.10 Ethical Considerations

In conducting the study, the researcher strived to adhere to research ethical guidelines. A research clearance permit was obtained from National Council for Science and Technology authorizing the research to be undertaken in the County of Nairobi. Individual consent was also the basis for respondents to participate in the study. Respondents were not coerced or forced to reveal

information that they felt was confidential and assurance was given to the respondents that the information provided will be treated with confidentiality and used only for the purposed of this research. All sources cited in this study were acknowledged to avoid plagiarism.

3.11. Operationalization of Variables

Conceptualization is the process of specifying the vague mental imagery of a concept and sorting out the kinds of observations and measurements that will be appropriate for the research (Blalock, 2000).

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Table 3.4 Operationalization of Variables

Objective/ Research Question	Variables (Independent)	Indicators	Measure of Scale	Data Collection Instrument	Data Analysis Technique	Study Design
To determine the effect of virtual information systems on competitive advantage in IBM?	Virtual Information Systems	•Use of Information System Strategies. •Driving business strategies using Virtual information. • Benefits realized by using Virtual information Systems.	• What is the %age of virtual Information Systems strategies applied to achieve business strategies? • What is the percentage of business strategies improved by use of information system? • Rating benefits of virtual information systems to the organization using weighted mean.	• Questionnaire	• Frequency • Mean • Percentage	•Descriptive study
To determine the impact of virtually	Virtual Workforce (People)	• Adoption of virtual workforce in business operations.	• %Age of the involvement of virtual workforce in	• Questionnaire	• Frequency • Mean	•Descriptive study

working employees on competitive advantage in IBM.		• Benefits of a virtual workforce. • Improved outcomes to customers by virtual workforce	business operations. • Using weighted mean to rate the benefits of virtual workforce • %age of customer measures improved by virtual workforce		• Percentage	
To establish how virtual process ensure sustainable competitive advantage in IBM.	Virtual processes	• Results of efficient virtual processes • Efficiency from virtual process on cost advantage	• Weighted mean of the outcome of efficient virtual. • How virtual process impacts ond s cost advantage.	• Questionnaire	• Frequency • Mean • Percentage	•Descriptive study

Source: Author (2013)

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

In this chapter data was collected analyzed, compiled and presented with reference to the specific objectives of the study.

4.2 Response Rate

The study sent out 118 questionnaires to all the sample population which were collected from the respondents and the response rate was as presented below**.**

Table 4.1 Response Rate

State of Questionnaires	Number of questionnaires	Percentage (%)
Complete & returned	100	85
Incomplete & returned	2	2
Not returned	16	13
Total	**118**	**100**

With 118 questionnaires issued, 102 were returned. A total of 100 which represents 85% were complete for analysis, 2% were returned incomplete and 13% were not returned.

Table 4.2 Strata Representation

	Account Execs.	Service Techs.	Training Reps	Installation Operations Coordinators	Account Mgt Specialists	Competency Leads	Total
Complete	7	44	5	12	18	14	**100**
Incomplete	0	0	0	1	1	0	**2**
Not returned	0	10	2	0	1	3	**16**
Total	**7**	**54**	**7**	**13**	**20**	**17**	**118**

The breakdown of the strata representation is as detailed in table 4.2.

4.3 Demography of respondents

The data analysis was based on the complete 100 questionnaires. The respondent general information included the gender, age bracket, highest level of education, the number of years they have worked for the firm, their roles and the core activities in their job description which gave the value chain representation.

4.3.1 Gender

The researcher sought to establish the gender of the respondents. The findings is as show in table 4.3.

Table 4.3 Respondent Gender Representation.

Gender	Frequency	Percentage
Male	60	60%
Female	40	40%
	100	100%

Respondents comprised of 60% male and 40% female which translates to 60 and 40 male and female respondents respectively.

4.3.2 Age

The study sought to establish the respondents age brackets which was grouped in intervals of 5 years as presented in Table 4.4 below.

Table 4.4 Category of Age of respondents

Category of age in years	Frequency	Percentage
20 – 25	2	2%
26 – 30	10	10%
31 – 35	25	25%
36 – 40	35	35%
Above 40	28	28%
	100	100

The table shows 2% respondents were between 20-25 years, 10% were 26-30 years, 25% were 31-35 years, 35% were 36-40 years and 28% were over 40 years.

4.3.3 Level of Education

The study sought to find out the highest level of education of respondents.

Table 4.5 Level of Education

Level of Education	Frequency	Percentage
Diploma	12	12%
Bachelors Degree	29	29%
Masters Degree	19	19%
PHD	3	3%
Professional Certifications	37	37%
	100	100%

The Level of Education of the respondents was identified as 12% with Diplomas 29% with Bachelors Degree, 19% with Masters Degree, 37% with Professional Certifications and 3% at the Doctorate level.

4.3.4 Years of Service

The researcher sought to establish the years of service of Respondents in the company. The numbers of years with which the employees have worked for the company were grouped into 5 categories i.e. 0-5, 6-10, 11-15 years, 16-20 years and more than 20 years.

Table 4.6 Years of Service

Category of years of service	Frequency	Percentage
Less than 5	25	25%
5 – 10	28	28%
11 – 15	30	30%
16 – 20	13	13%
More than 20 years	5	5%
	100	100%

Out of the 100 respondents 25% had been in the organization for less than 5 years, 28% for 6-10 years, 30% for 11-15 years, 1%3 for 16-20 years and 5% for more than 20 years.

4.3.5 Role Category of Respondents

The study sought to establish the job role category of the respondents. The role category were divided into 6 role categories and the percentage of participating respondents from the various role categories are represented in table 4.7.

Table 4.7 Role Category of Respondents

Role Category	Frequency	Percentage
Accounts Executives	4	4%
Service Technicians	44	44%
Training Representatives	5	5%
Installation Ops Coordinators	14	14%
Accounts Management Specialists	16	16%
Competency Leads	17	17%
	100	100%

The results showed that 4% Account Executives, 44% Service Technicians, 5% Training Representatives, 14% Installation Operation Coordinators, 16% Account Management Specialists and 17% Competency Leads.

4.4 Effect of Virtual Information Systems on Competitive Advantage

The study collected information on effect of virtual information systems on competitive advantage. This was done by looking at three areas i.e. extent to which information systems help businesses use synergies, core competencies, and network based strategies to achieve competitive advantage; extent to which Virtual Information System Strategies work with Competitive Forces and extent to which benefits of Virtual Information Systems enhance competitive advantage.

4.4.1 Virtual Information Systems' effect on Competitive Advantage

The researcher sought to establish if they believed that virtual information systems have an effect on competitive advantage.

Table 4.8 Respondents rating on belief that virtual information systems have an effect on competitive advantage.

	Frequency	Percentage
Yes	70	70%
No	30	30%
	100	100%

The 70% respondents gave in the affirmative that they believed that virtual information systems have an effect on competitive advantage while 30% said they did not believe that Virtual Information Systems have an effect on competitive advantage.

Further, respondents gave reasons for their responses in table 4.9 below.

Table 4.9 Effect of Information Systems on Competitive Advantage

Reasons why Information Systems Build Competitive Advantage	**Reasons why Information Systems do not Build Competitive Advantage**
Improved Coordination	Increased cost of maintenance
Work sharing	Failure of hardware risks
Cutting Cost	Need for more competent HR
24/7 business hours	Monitoring of staff
Availability of central and accessible data storage	Instability of network.
Innovation	
Flexible communication	

As summarized in Table 4.9., those who believed Information Systems have an effect on competitive advantage gave their reasons as improved coordination, work sharing, cutting cost, 24/7 business, availability of central and accessible data storage and flexible communication. The respondents who believed Information Systems does not have an effect on competitive advantage gave their reasons as increased cost of maintenance, failure of hardware, need for more competent HR, monitoring of staff and instability of networks.

4.4.2 How Information systems support synergies, core competencies and network based Strategies to achieve Competitive Advantage.

The study sought to determine the extent to which virtual information systems support business synergies, core competencies and network based strategies to achieve competitive advantage. This was done on a Likert Scale of 1 to 5 where 1 is for No Extent, 2 for Small Extent, 3 for Indifferent, 4 for Large Extent and 5 for Very Large Extent. Table 4.10 shows the frequency of response and the weighted mean of each strategy as supported by Information Systems.

Table 4.10 Basis of Business Strategies

Basis of business strategies	Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)	Weighted Mean
Use of synergies	46	44	0	10	0	5
Core Competencies	30	15	0	55	0	2
Network based strategies	58	42	0	0	0	5

The result showed that use of synergies and network based strategies to a very large extent used to achieve competitive advantage while a core competency to a small extent was used to achieve competitive advantages.

4.4.3 The Effect of Virtual Information System Strategies on Competitive Forces.

The study sought to find out the effect of Virtual Information Systems strategies on competitive forces. The virtual information systems strategies that were focused on include low cost leadership, product differentiation, strengthening customer & supplier intimacy, innovation strategy and growth strategy. Table 4.11 shows the frequency of response and the weighted means.

Table 4.11 Virtual Information Systems Strategies

Virtual Information Systems Strategies	Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)	Weighted Mean
Low Cost Leadership	85	13	2	0	0	5
Product differentiation	67	29	3	1	0	5
Strengthen customer & supplier intimacy	19	79	2	0	0	3
Innovation Strategy	91	9	0	0	0	5
Growth Strategy.	17	72	10	1	0	4

The result of the weighted means shows that low cost leadership, product differentiation and innovation strategy have an effect on competitive forces to a very large extent. Virtual information system strategies that are also responsive to competitive forces to a large extent are strategies strengthening customer & supplier intimacy and growth strategy.

4.4.4 Enhancing Competitive Advantage through the Benefits of Virtual Information Systems

The study sought to find out how virtual information systems enhance competitive advantage through benefits of virtual information systems which include increased employee productivity by reducing time, errors and costs, enhanced decision making, Improved team collaboration and creating business partnerships and alliances. The frequency of response and the weighted averages are presented in the Table 4.12

Table 4.12 Benefits of using Virtual information systems

Benefits of using Virtual information systems	Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)	Weighted Mean
i) Increased employee productivity by reducing time, errors and costs.	35	14	23	23	0	5
ii) Enhanced decision making.	55	37	1	2	5	5
iii) Improved team collaboration	18	82	0	0	0	4
iv) Creates business partnerships and alliances.	24	40	16	20	0	5

The result of the weighted means shows that there were no benefits from virtual information system rated at no extent, small extent and indifferent. Increased employee productivity by reducing time, errors and costs, enhanced decision making, and creating business partnerships and alliances are strong benefits from virtual information systems that enhance competitive advantage. Improved time collaboration is also a benefit that enhances competitive advantage to a large extent.

4.5 Impact of Virtually Working Employees on Competitive Advantage.

The study collected information on the impact that virtually working employees have on competitive advantage by focusing on the extent to which improved outcomes of virtual workforce impacts competitive advantage, benefits of virtual work force on competitive advantage and the extent to which virtual workforce improve on customers.

4.5.1 Virtual workforce improvement on outcomes that lead to competitive advantage.

This question sought to find out to what extent virtual workforce improved the outcomes that lead to competitive advantage strategies. These outcomes included use of fewer resources, achievement of objectives, positive economic returns, reduced product development time, enhanced volume flexibility, enhanced customization and enhanced variety.

Table 4.13 Virtual Workforce Improved Outcomes that lead to Competitive Advantage

Improved Outcomes		Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)
i) Enables use of fewer resources	Frequency	77	33	0	0	0
	Percentage	77%	33%	0	0	0
ii) Achievement of objectives	Frequency	23	46	0	31	0
	Percentage	23%	46%	0	31%	0
iii) Results to positive economic returns	Frequency	40	25	0	35	0
	Percentage	40%	25%	0	35	0
iv) Reduced product development time	Frequency	33	47	0	20	0
	Percentage	33%	47%	0	20%	0
v) Enhanced volume flexibility	Frequency	19	26	0	55	0
	Percentage	19%	26%	0	55%	0
vi) Enhanced Customization	Frequency	26	56	0	18	0
	Percentage	26%	56%	0	18%	0

vii) Enhanced variety	Frequency	23	62	0	15	0
	Percentage	23%	62%	0	15%	0

The result shows that to a very large extent virtual workforce enhances use of fewer resources, positive economic returns while it improves customization and reduced product development time, enhanced variety and achievement of objectives to a large extent.

4.5.2 Impact of Virtual Workforce on the Organization

The study sought to establish the impact of benefits of using a virtual workforce on the organization. The benefits include product innovation, process innovation, motivation, customer responsiveness, process coordination and cross-functional competence.

Table 4.14 Impact of Virtual Workforce on Organizations

Benefits of virtual workforce	**Very Large Extent (5)**	**Large Extent (4)**	**Indifferent (3)**	**Small Extent (2)**	**No Extent (1)**	**Weighted mean**
i) Product Innovation	41	32	0	26	0	**5**
ii) Process Innovation	42	35	0	23	0	**5**
iii) Motivation	51	43	0	6	0	**5**
iv) Customer Responsiveness	62	36	0	2	0	**5**
v) Process Coordination	35	37	0	28	0	**4**
vi) Cross-functional Competence	47	42	0	11	0	**5**

The result shows that product innovation, process innovation, motivation, customer responsiveness and cross functional competence works impacts on the organization positively to a very large extent, while process coordination impacts on the organization positively to a large extent.

4.5.3 Impact of Virtual Workforce on Customers

The respondents gave the impact of virtual workforce on customers as this builds competitive advantage. The measures of customer impact include timeliness, reduced cost, quality, customer support, 24/7 service, customized products and in-time delivery.

Table 4.15 Impact of Virtual Workforce on Customer

Customer Measures	Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)	Weighted Mean
i) Timeliness	61	39	0	0	0	5
ii) Reduced Cost	52	39	0	9	0	5
iii) Quality	55	42	0	3	0	5
iv) Customer Support	81	19	0	0	0	5
vii) 24/7 Service	80	20	0	0	0	5
viii) Customized Products	37	48	0	15	0	5
ix) In-time delivery	36	56	0	18	0	4

The results showed that virtual workforce impacts on customers through timeliness, reduced cost, quality, customer support, 24/7 service and customized products to a very large extent while on time delivery impacts the customer to a large extent.

4.6 Effect of Virtual Processes on Competitive Advantage

The study sought to find out the effect of virtual process on competitive advantage by looking at efficiency of virtual processes through coordination of systems and people, extent to which virtual processes enhance competitive advantage and variables that result to cost advantages.

4.6.1 Virtual Processes Impact on Competitive Advantage in IBM.

The researcher sought to determine if virtual processes impacts on competitive advantage negatively or positively.

Table 4.16 Respondents response on if Impact of Virtual Processes on Competitive Advantage

	Frequency	Percentage
Positively	59	59%
Negatively	9	9%
Both	32	32%
	100	100%

Respondents were asked to indicate if virtual process impact negatively or positively or even both to competitive advantage. Out of the 100 respondents, 59% indicated positive, 9% indicated negative and 32% indicated it has both impacts.

4.6.2 Results of efficient virtual process and their impact on Competitive Advantage.

The researcher sought to find out if the results of efficient virtual process and their impact on competitive advantage. Respondents rated the results of efficient virtual processes which included differentiated products, low-cost products, high switching cost, increased sales, reduced customer complaints and customer loyalty.

Table 4.17 Results of Efficient Virtual Process.

Results of Efficient virtual processes	**Strongly Agree (5)**	**Agree (4)**	**Indifferent (3)**	**Disagree(2)**	**Strongly Disagree(1)**	**Weighted Mean**
I) Differentiated Products	24	56	19	1	0	**4**
Ii) Low-Cost Products	30	60	0	10	0	**5**
Iii) High Switching Cost	45	36	0	9	9	**5**
Iv) Increased Sales	55	37	8	0	0	**5**
V) Reduced-Customer Complaints	61	36	0	3	0	**5**
Vi) Customer Loyalty	77	23	0	0	0	**5**

According to the results respondents strongly agreed that high switching cost, increased sales, reduced customer complaints and customer loyalty are results of efficient virtual processes to a very large extent, while they agreed that low-cost products and differentiated product impacted on competitive advantage.

4.6.3 How Virtual Processes Enhance Cost Advantage

Finally the respondents gave their feedback on how virtual processes build on cost advantage through variables including economies of scale, E-marketing, collaboration, organization learning, reduction in travelling expenses.

Table 4.18 How Virtual Processes Enhance Cost Advantage

Variables Impacting on Cost		Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)
i) Economies of Scale	Frequency	63	32	0	5	0
	Percentage	63%	32%	0	5%	0
ii) E-marketing	Frequency	71	29	0	0	0
	Percentage	71%	29%	0	0	0
iii) Collaboration	Frequency	78	22	0	0	0
	Percentage	78%	22%	0	0	0
v) Organization Learning	Frequency	81	19	0	0	0
	Percentage	81%	19%	0	0	0
vii)Reduction in travelling Expenses.	Frequency	90	10	0	0	0
	Percentage	90%	10%	0	0	0

Results showed that all the indicated variables impact on cost advantage to a Very Large Extent, these include economies of scale, e-marketing, collaboration, organization learning, and reduction in travelling expenses.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, DISCUSSION AND RECOMENDATIONS

5.1 Introduction

This chapter is to summarize the findings with reference to research questions, discussion and recommendations for further research and possible studies.

5.2 Summary of Findings

On the effect of virtual information systems on competitive advantage, the study revealed that 70% respondents believed that virtual information systems have an effect on competitive advantage while 30% said they did not believe that virtual information systems have an effect on competitive advantage. Further, the result showed that use of synergies and network based strategies to a very large extent used to achieve competitive advantage while a core competency to a small extent was used to achieve competitive advantages. Virtual information systems strategies to a very large extent have an effect on competitive forces. Increased employee productivity by reducing time, errors and costs, enhanced decision making, and creating business partnerships and alliances are strong benefits from virtual information systems that enhance competitive advantage. Improved time collaboration is also a benefit that enhances competitive advantage to a large extent.

Regarding the extent to which virtual workforce improved the outcomes that lead to competitive advantage, results showed that to a very large extent virtual workforce enhances use of fewer resources, achievement of objectives, positive economic returns, reduced product development time and volume flexibility while it improves customization and variety to a large extent. The study established the impact of benefits of using a virtual workforce on the organization; benefits which included product innovation, process innovation, motivation, customer responsiveness, process coordination and cross-functional competence. The result shows that to a very large extent, virtual workforce impacts on the organization positively through supporting product innovation, process innovation, motivation, customer responsiveness, process coordination and cross-functional competence. The respondents also gave the impact of virtual workforce on customers which competitive advantage. The measures of customer impact include timeliness,

reduced cost, quality, customer support, 24/7 service, customized products and in-time delivery. The results showed that virtual workforce impacts on customers through timeliness, reduced cost, quality, customer support, 24/7 service and customized products to a very large extent and also to a large extent on in-time delivery.

Respondents were asked if virtual processes impacts on competitive advantage negatively or positively. Out of the 100 respondents, 59% indicated positive, 9% indicated negative and 32% indicated it has both impacts. Respondents rated the results of efficient virtual processes which included differentiated products, low-cost products, high switching cost, increased sales, reduced customer complaints and customer loyalty through a Likert scale. Respondents rated the results of efficient virtual processes that is low-cost products, high switching cost, increased sales, reduced customer complaints and customer loyalty are results of efficient virtual processes to a very large extent. A differentiated product is also a result impacted to a large extent. Respondents also gave their feedback on how virtual processes build on cost advantage through variables including economies of scale, e-marketing, collaboration, organization learning, reduction in travelling expenses. Results showed that all the indicated variables impact on cost advantage to a very large extent including economies of scale, e-marketing, collaboration, organization learning, and reduction in travelling expenses.

5.3 Discussion

The study found out that virtual information systems have an effect on competitive advantage, This study agrees with Porter & Millar (1985) which stated that virtual systems has a direct impact on competitive advantage. According to the study use of synergies, network based strategies and core competencies to a very large extent and large extent respectively impacts on competitive advantage. Porter & Millar (1985) further states that the idea of synergies is that when the output of some units can be used as inputs to other units, or two organizations pool markets and expertise, these relationships lower costs and generate profits. Respondents stated that information systems supports core competencies which is used to achieve competitive advantage. Powel et al (2004) supports this finding through his study that shows that virtual information system encourages the sharing of knowledge across business units thereby enhancing competency which in turn encourages or enhance existing competencies and help employees become aware of new external knowledge. Respondents further indicated that virtual

information systems supports network based strategies with is also supported by the study of Ojasalo (2008) which states that virtual systems enables use of networks to link people, assets, and ideas, enabling the organization to ally with other companies to create and distribute products and services without being limited by traditional organizational boundaries or physical locations. The study's findings on virtual information strategies influencing competitive forces is supported by Powel (2007) which states that when a firm is faced with competitive forces it applies four generic strategies enabled by virtual information systems to counteract these forces which include low-cost leadership, product differentiation, focus on market niche, and strengthening customer and supplier intimacy. Use information systems to achieve the lowest operational costs and the lowest; Use information systems to enable new products and services, or greatly change the customer convenience in using your existing products and services; Use information systems to enable a specific market focus, and serve this narrow target market better than competitors' prices.

The study's findings shows that virtually working employees have an impact on competitive advantage which agrees with the findings of Rice et al (2002) that virtual workforce model is useful as it has benefits to a company that gives it competitive advantage over those companies that have the traditional teams. May & Carter (2001) in their case study of virtual team working in the European automotive industry have shown that enhanced communication and collaboration between geographically distributed engineers at automotive manufacturer and supplier sites make them get benefits of better quality, reduced costs and a reduction in the time-to-market (between 20% to 50%) for a new product vehicle. Dunn et al. (2009) notes, that the off shoring decision has become a major strategy aimed at improving or maintaining profitability in highly competitive industries. The respondents indicated that a virtual workforce to a very large extent improves on the outcomes that lead to competitive advantage which include, enabling use of fewer resources, achievement of objectives, positive economic returns, reduced product development time, enhanced volume flexibility, enhanced customization and enhanced variety which agrees with the citings done by Martin, et al., (2004) that expected rewards associated with virtual work programs include a combination of reduced fixed costs, improved scores on human capital metrics, real estate cost savings, improved recruitment, organizational attraction, corporate sustainability and increased employee performance and retention which opens the

company with several strategies to build on competitive advantage. The study is in agreement with the findings of Wong & Burton (2001) who found out that virtual workforce works more intensely in product innovation, customer responsiveness, process coordination and cross functional competence and they are more motivated. Beranek & Martz (2005) reiterate that by deploying a project across team members, be they employees, partners or even customers, located in various time zones, tasks can be passed from one team member to the next as companies effectively stretch the workday. The findings of the study on the impact of virtual workforce on customers is supported by Bravington & Silvis (2006) who state that virtual teaming is an increasingly popular organizational tool because while it helps companies trim and balance the corporate budget by cutting down on travel expenses and excessive office space, 24 hours service to customers, and in time delivery for better corporate competition. The findings of the study further shows that improved quality and customized products are other customer measures that are improved on by virtual workforce leading to competitive advantage which findings are supported by Baranek & Martz (2005) as they state virtual teams are more effective than face-to-face teams because virtual team has asynchronous communication and it allows for more time for digestion and reduces the pressure of group conformity leading to improved quality and timeliness.

The study shows that efficient virtual process impact on competitive advantage through low cost products, increased sales, reduced customer complaints, customer loyalty and differentiated products. This study confidently supported with the findings by Barker (2001) which explains that virtual process management provides the ability to gain visibility and control over information flows or transactions that span multiple applications and people; and that when a firm is hypersensitive to the inter-relationship of its core processes it becomes nearly impossible for any team to introduce an incompatible rogue process. This is further supported by Hertel, et. al., (2005) that the inconsistency makes it difficult for the company to quickly gauge customer response to new items or sale pricing, making it nearly impossible to create a just-in-time inventory management system run by the company suppliers and virtual process produce consistency. As cited by Kirkman et al., (2001) vital processes enhance cost advantage by impacting o variables on cost which include Economies of scale, E-marketing, collaboration

According to Kirkman, et. al., (2001) and supporting the findings of this study implementation of virtual processes, a firm achieves consistency and predictability of outcomes and that the four primary beneficiaries of the virtualization are: Customers as the transactions and transaction times become predictable, and Product and service deliverables become consistent; Employees as well-designed processes help ensure efficiency and quality of outcomes, freeing up time for employees to pursue creative work that adds value; Partners as Virtual processes coupled with process management streamlines transactions and makes them more predictable, improving partner profitability and loyalty; Shareholders as efficient processes drive productivity for growth and lower costs, improving greater profitability and enhanced leverage of existing resources. The study shows that collaboration is greatly improved by virtual process which is consistent with the findings of Bergiel, et al., (2008) that through integrated virtual business processes, complex products are now designed much more collaboratively with the suppliers being involved in the design process. In support of the findings Smith (2006) further states that with each new virtualized process, the speed of business transactions increases providing a differentiated, sustainable competitive advantage. Respondents indicated that organization learning and reduction in travelling expenses to a very large extent enhances cost advantage which is also supported by Pinto and Slevin (1998) who cites that virtual training has due to double-level learning, it is also a huge cost saver, which means that delivering a two day training programme virtually instead of face to face can lead to an immediate cost saving, during the average time of 12 hours that a participant is travelling back and forth to the training location, he or she could have attended online training sessions.

5.4 Conclusion

From the findings of this study it is evident that a virtual information system have an effect on competitive advantage in various ways. Virtual information creates new products and services and to develop new markets or radically change products based on the demanding nature of the current markets. Organizations can also work on new initiatives of establishing pure online operations through implementation of virtual environments thereby creating new markets and reducing costs incurred through physical existence. At the same time, virtual systems provide better capabilities and opportunities for innovation and plenty of opportunities to collaborate with customers, external partners and internal people. How a company uses information

technology can affect each of the five competitive forces and can create the need and opportunity for change. The study shows that virtual teams represent a growing response to the need for fast time-to-market, low-cost and rapid solutions to customer needs. Virtual teams enable organizations to pool the talents and expertise of employees and non-employees by eliminating time and space barriers. Implementing a virtual workforce is also becoming a broader strategic option for reducing operating and real estate expenses associated with moving employees out of offices or facilities and removing commuting reimbursements are tangible and easily accountable savings. It is evident from the study that the organization uses virtual information systems to support their different business strategies which are use of synergies, core competencies and network based strategies to achieve competitive advantage. IBM also uses virtual information system strategies including low cost leadership, product differentiation, strengthening customer and supplier intimacy, innovation strategy and growth strategy to give them a competitive edge. The findings also revealed that the benefits of using virtual information systems enhanced the organization's competitive edge.

Virtual workforce enables organizations to pool the talents and expertise of employees and non-employees by eliminating time and space barriers. From the data analysis, virtual workforce improves the outcomes that lead to competitive advantage; the improved income includes use of fewer resources, achievement of objectives, positive economic returns, reduced product development time, enhanced customization and enhanced variety. With improvement in this areas then the organization is able to get competitive advantage in diverse areas. The benefits that a firm gets when using virtual workforce also contributes in building the organization's competitive edge through improved product innovation, process innovation, motivation of employees, customer responsiveness, process coordination and cross functional competence. With the virtual workforce's impact on customers through timeliness, reduced costs, improved quality, customer support, 24/7 service and customized product range a firm is able to have an edge over its competitor who have not adopted the virtual team concept. Virtual teams, which are linked primarily through advanced computer and telecommunications technologies, provide a potent response to the challenges associated with today's downsized and lean organizations, and to the resulting geographical dispersion of essential employees. Virtual teams also address new workforce demographics, where the best employees may be located anywhere the world, and where workers demand increasing technological sophistication and personal flexibility.

Results of efficient virtual process were rated to have to a very large extent impacting on competitive advantage. These include product differentiation, low-cost products, high switching cost, increased sales, reduced customer complaints and customer loyalty. Evidently virtual processes can be used to build cost advantage through e-marketing, collaboration, organization learning and reduction in travelling expenses. Improved virtual processes offer companies a highly sustainable competitive advantage by allowing firms to improve quality and productivity, lowering costs and freeing up resources to focus on innovation and adding value. Process virtualization also unifies the focus of the firm, whether the focus is on creating profit, monitoring and fulfilling consumer needs, growing the business or all of these areas. Process virtualization streamlines and standardizes business processes, data, and IT infrastructure which achieves consistency and predictability of outcomes. Virtual processes enable organizations to become more flexible by providing the impressive productivity of team-based designs. Through virtual teams transaction times become predictable and product and service deliverables become consistent; virtual workforce ensure efficiency and quality of outcomes, freeing up time for employees to pursue creative work that adds value; virtual processes coupled with process management streamlines transactions and makes them more predictable, improving partner profitability and loyalty

Despite virtual teams growing prevalence, relatively little was known as to the effect of the virtual teams on competitive advantage. Hence this study has been able to provide extensive literature review and the effect of virtual teams on competitive advantage. The study has established how virtual Information Systems, virtual workforce and virtual processes have an effect on competitive advantage.

5.4 Recommendations of the study

i) It can be recommended that companies should invest in information systems as these systems have an effect on competitive advantage. They can be used to create new products and services and to develop new markets or radically change products based on the demanding nature of the current markets. Organizations can also work on new initiatives of establishing pure online operations through implementation of virtual environments thereby creating new markets and reducing costs incurred through physical existence. At the same time, virtual

systems provide better capabilities and opportunities for innovation and plenty of opportunities to collaborate with customers, external partners and internal people.

ii) Virtual workforce enables organizations to pool the talents and expertise of employees and non-employees by eliminating time and space barriers. From the data analysis, virtual workforce improves the outcomes that lead to competitive advantage; the improved income includes use of fewer resources, achievement of objectives, positive economic returns, reduced product development time, enhanced customization and enhanced variety. With improvement in this areas then the organization is able to get competitive advantage in diverse areas. The benefits that a firm gets when using virtual workforce also contributes in building the organization's competitive edge through improved product innovation, process innovation, motivation of employees, customer responsiveness, process coordination and cross functional competence. With the virtual workforce's impact on customers through timeliness, reduced costs, improved quality, customer support, 24/7 service and customized product range a firm is able to have an edge over its competitor who have not adopted the virtual team concept.

iii) Evidently virtual processes can be used to build cost advantage through e-marketing, collaboration, organization learning and reduction in travelling expenses. Improved virtual processes offer companies a highly sustainable competitive advantage by allowing firms to improve quality and productivity, lowering costs and freeing up resources to focus on innovation and adding value. Process virtualization also unifies the focus of the firm, whether the focus is on creating profit, monitoring and fulfilling consumer needs, growing the business or all of these areas. Process virtualization streamlines and standardizes business processes, data, and IT infrastructure which achieves consistency and predictability of outcomes. Virtual processes enable organizations to become more flexible by providing the impressive productivity of team-based designs. Through virtual teams transaction times become predictable and product and service deliverables become consistent.

5.5 Recommendations for further studies

This study collected and analyzed data to test the three research questions i.e. what is the effect of virtual information systems on competitive advantage? What is the impact of virtually working employees on competitive advantage? How does virtual processes ensure sustainable competitive advantage in IBM? Sufficient information was gathered from data collection and analysis. However the significant findings have gaps and limitations which need to be bridged and hence the following recommendations:

i. With this research being a case study in the IT Industry, further studies should be done on more companies from various service industries that depend heavily on virtual teams to build competitive advantage e.g. banking sector and education sector which will allow for generalization to firms in dynamic environments.
ii. Researchers could use each objective in this study as topics of study and expound on them to give more insight of the chosen objective.

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APPENDICES

APPENDIX A: INTRODUCTION LETTER

Molly Awasi-Katei,
P. O. Box 550-00515,
NAIROBI.

mollyawasy@yahoo.com

Dear Respondent
RE: INTRODUCTION LETTER

I am a student at the University of Nairobi pursuing by Master of Arts Degree in Projects Planning and Management. As part of fulfillment of the requirement for the Masters Degree I am required to submit a research project on the Effect of Virtual Teams on Competitive Advantage. Your organization has been selected as a Case Study for this investigation. You have subsequently been selected to participate in the study by filling the attached questionnaire to provide the required data for the study.
The information will be used purely for academic purposes and your name will not be mentioned in the report.
Findings of the study shall upon request be availed to you.
Your assistance and cooperation shall upon request be availed to you.

Thanking you in advance.

Molly Awasi-Katei.
e-mail: mollyawasy@yahoo.com

Tel: 0722755976

Appendix B

QUESTIONNAIRE

Instructions: Please put a tick in the box ☑ next to the answer of your choice or write in the space provided as the case may be**.**

Section A: Respondent Background

1. What is your Gender?

   □Male □Female

2. What is your Age bracket?

   □20-25 years □26-30 years □31-35 years □36-40 years □Over 40 years

3. What is your highest Level of education?

   □Diploma Level □Bachelors Degree □Masters Degree □Doctorate

   □ Professional Certification. Please specify_____

4. For how long have you worked with the Company?

□Less than 5 years □ 6-10 years □11-15 years □16-20 years □More than 20 years

5. Which role category do you belong to?

   □Account Executives □Service Technicians □Training Representatives

   □Installation Operation Coordinators □Account Management Specialists

   □Competency Leads

Section B: Effect of Virtual Information Systems on Competitive Advantage

6. Do you believe Virtual Information Systems have an effect on competitive advantage?

   Yes□ No□

Give reasons for your answer above,

_____

_____

_____

_____

7. To what extent do you agree that information systems help businesses use synergies, core competencies, and network based strategies to achieve competitive advantage?

Basis of business strategies	**Very Large Extent (5)**	**Large Extent (4)**	**Indifferent (3)**	**Small Extent (2)**	**No Extent (1)**
i) Use of synergies					
ii) Core Competencies					
iii) Network based strategies					

8. To what extent do the following Virtual Information System Strategies have an effect on Competitive Forces.

Virtual Information Systems Strategies	**Very Large Extent (5)**	**Large Extent (4)**	**Indifferent (3)**	**Small Extent (2)**	**No Extent (1)**
i) Low Cost Leadership					
ii) Product differentiation					
iii) Strengthen customer & supplier intimacy					
iv) Innovation Strategy					
v) Growth Strategy.					

9. To what extent do you agree that the following benefits of Virtual Information Systems enhance competitive advantage?

Benefits of using Virtual information systems	**Very Large Extent (5)**	**Large Extent (4)**	**Indifferent (3)**	**Small Extent (2)**	**No Extent (1)**
i) Increased employee productivity by reducing time, errors and costs.					
ii) Enhanced decision making.					
iii) Improved team collaboration					
iv) Creates business partnerships and alliances.					

Section C: Impact of Virtual workforce on the organization.

10. To what extent do Virtual workforce improve on the following outcomes consequently competitive advantage

Improved Outcomes	**Very Large Extent (5)**	**Large Extent (4)**	**Indifferent (3)**	**Small Extent (2)**	**No Extent (1)**
i) Enables use of fewer resources					
ii) Achievement of objectives					
iii) results to positive economic returns					
iv) Reduced product development time					
v) Enhanced volume flexibility					
vi) Enhanced Customization					
vii) Enhanced variety					

11. To what extent do the following benefits of a virtual work force impact competitive advantage?

Benefits of virtual workforce	Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)
i) Product Innovation					
ii) Process Innovation					
iii) Motivation					
iv) Customer Responsiveness					
v) Process Coordination					
vi) Cross-functional Competence					

12. To what extent has the following outcomes of virtual workforce improved for customers?

Outcomes Improved	Very Large Extent (5)	Large Extent (4)	Indifferent (3)	Small Extent (2)	No Extent (1)
i) Timeliness					
ii) Reduced Cost					
iii) Quality					
iv) Customer Support					
vii) 24/7 Service					
viii) Customized Products					
ix) In-time delivery					

Section D: Effect of Virtual Processes on Competitive Advantage.

13. Do virtual processes impact on Competitive advantage negatively or positively?

    Negatively□ Positively□ □Both

14. Do you agree that efficient virtual processes through coordination of systems and people enhances competitive advantage?

Results of virtual processes	**Strongly Agree (5)**	**Agree (4)**	**Indifferent(3)**	**Disagree(2)**	**Strongly Disagree(1)**
i) differentiated Products					
ii) low-cost Products					
iii) high switching cost					
iv) increased sales					
v) reduced-customer complaints					
vi) customer loyalty					

15. To what extent do the efficient virtual processes impact on variables impacting on cost as a source of competitive advantage?

Variables Impacting on Cost	**Very Large Extent (5)**	**Large Extent (4)**	**Indifferent (3)**	**Small Extent (2)**	**No Extent (1)**
i) Economies of scale					
ii) E-marketing					
iii) Collaboration					
v) Organization learning					
vii)Reduction in travelling expenses.					

Appendix C

Research Authorization

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telephone: 254-020-2213471, 2241349, 254-020-2673550
Mobile: 0713 788 787 , 0735 404 245
Fax: 254-020-2213215
When replying please quote
secretary@ncst.go.ke

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RCD/14/013/1355**

Date: **24th July, 2013**

Molly Awasi Katei
University of Nairobi
P.O.Box 30197-00100
Nairobi.

RE: RESEARCH AUTHORIZATION

Following your application dated ***19th July, 2013*** for authority to carry out research on "***Influence of virtual teams on Competitive Advantage, a case of International Business Machines (IBM) – Airtel Africa Project,***" I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for a period ending **31st December, 2013.**

You are advised to report to **the Managing Director, International Business Machines and the Managing Director, Airtel Africa** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

SAID HUSSEIN
FOR: SECRETARY/CEO.

Copy to:

The Managing Director
International Business Machines

Appendix D

Research Permit

PAGE 2

THIS IS TO CERTIFY THAT:
Prof./Dr./Mr./Mrs./Miss/Institution
Molly Awasi Katei
of (Address) University of Nairobi
P.O.Box 30197-00100, Nairobi.
has been permitted to conduct research in

Location
District
Nairobi County

on the topic: Influence of virtual teams on Competitive Advantage, a case of International Business Machines (IBM) – Airtel Africa Project.

for a period ending: 31st December, 2013.

PAGE 1

Research Permit No. NCST/RCD/14/013/1355
Date of issue 24th July, 2013
Fee received KSH. 1,000

Applicant's Signature

For Secretary
National Council for Science & Technology