UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

TELECOMMUTING SYSTEM FOR KENYAN ORGANIZATIONS

BY

GITHINJI RUTH WANJIRU

SUPERVISOR

DR. CHRISTOPHER CHEPKEN

A THESIS SUBMITTED FOR THE DEGREE OF MASTER OF SCIENCE IN COMPUTER SCIENCE

NOVEMBER 2014

Declaration

I hereby confirm that I am the sole author of the written work enclosed here. Information derived from the published and unpublished work of others has been acknowledged in the text and references are given in the list of sources.

---------- November 2014

Ruth W Githinji Date

Acknowledgement

I would like to acknowledge my supervisor Dr. Christopher Chepken for the continual guidance that he gave me during this project period. I would not have come this far without his support. To all my family members who encouraged me to finish this work. I will always be forever grateful.

Abstract

The time taken to commute from home to the office and back is a major concern to workers in Kenya and especially in Nairobi. A lot of time which could be spent on productive activities is wasted on the roads while employees and employers travel from their residences to their places of work. Some of these problems could be solved by using Telecommuting, which is defined as work arrangement in which the employee works outside the office, often working from home or at a location close to home. This paper reports work done to find out if there were Telecommuting models used by various Organizations within Nairobi, Kenya, investigated the challenges faced in Telecommuting as well as proposed a solution to address the challenges.

Initial data was collected using questionnaires which were administered to employees and managers in various organizations in Nairobi. From the respondents' responses we discovered the challenges faced by those who would want to telecommute. These are the challenges which guided the development of the Telecommuting System. Testing of the system was carried out by having some individuals ran the system. They filled a post-test questionnaire confirming their experience with the system usage. The testing of the system had three main features which were used to confirm its success, i.e. System's Simplicity, System's Capability and Systems usefulness. The implementation of a Telecommuting System answered the research question appropriately, i.e. the research question number three: "How can the telecommuting challenges be addressed?"

Dedication

This work is dedicated to my father, Mr. Nicholas Githinji, and to the rest of my family.

Table of Contents

List of Tables

List of Figures

CHAPTER ONE

1. Introduction

Commuting expenses (personal car expenses and public transportation costs) have become exceedingly high and the time taken to commute to work is higher than it was ten years ago. Personal Vehicle Drivers pay to buy and maintain a car which includes oil and tyres, insurance, registration, and parking. Public transport in Kenya on the other hand is expensive as it is not well regulated and usually prone to increase any time depending on the decision made by the Driver and Conductor of the Public Service Vehicle. Indirect costs of commuting, such as road construction and maintenance, add to commuters' financial burden through taxes and fees. In addition, there are quality of life costs that drivers and non-drivers alike pay to support automobile transportation. According to a recent study by IBM Corporation, a multinational technology and consulting company, Kenya loses close to 50 million shillings a day due to traffic congestion in the city of Nairobi and its environs.

Telecommuting is defined as working from a remote location far from a traditional office. Jack Nillies the father of Telecommuting defined telecommuting as periodic work out of the principal office, one or more days per week either at home, a client's site or in a telework center (Nillies, 1998). This is made possible through the use of technology (computers and communications software). In other parts of the world, Telecommuting has been successfully used and they have existing models that support Telecommuting. The study we carried out investigated the existence of Telecommuting Models which are used in some Kenyan Organizations. Our investigation revealed that Kenyan Organizations did not use any existing Telecommuting models. The challenges experienced by telecommuters were an important guide for proposing a system that would solve the problems facing the employees and the organizations, hence enabling the organizations and employees to enjoy the benefits of telecommuting.

1.1 Background

1.12 Problem Definition

Travel, to and from work to home, takes most of our productive time and is one of the difficult things to manage. With overcrowding of cities, commuting time has constantly increased. Most Kenyans commute to work from the outskirts of the capital city (Nairobi) and with Petrol prices increasing, the commuting budget increases. For drivers who own vehicles, maintenance, parking, fuel and personal costs on personal injury are expenses they must incur. For commuters using public transport, all the vehicle expenses are transferred to them through the bus fares. Lack of regulation in the Industry causes fluctuations in the amount of bus fare charged which increases depending on factors like fuel increase, parking fee increase and rainy seasons. Traffic jam is also a factor that public vehicle operators use to justify fare increase.

A lot of time which could be spent on productive activities is wasted on the roads while employees commute from their residences to the places of work. Travel is a cost to employees spent during movement from home to office. Most people spend an increasing amount of time commuting between their residence and workplace. Residential affordability for housing located further away from central areas (where most of the employment remains) is more affordable. Therefore, commuters trade time for housing affordability. The amount of time spent in commuting is unpaid. When an employer or an employee spends too much time in traffic, they are tense and frustrated when they get to work; this inherently lowers their performance. Saving time and money is a concern for both employees and employers.

1.13 Problem Justification

A lot of time, money and resources could be saved if the commuting problem was addressed using an ICT solution. With the adoption of telecommuting, employees will reduce travel time and expenses, have increased job satisfaction as well as have work-life balance. There are three reasons used to justify this study:

Technology Readiness

Most organizations have the tools required for telecommuting, but not all of them have implemented the programs. The tools include, but not limited to: Virtual Private Network which allows remote workers to connect to a company's internal network over the Internet, with all the privileges of a local network user. Communication tools like email with shared address book are used for transmission of documents including attachments. (Kioskia, 2014). Voice over Internet Protocol is available for most organizations where they make free calls to landline phones. Web-conference is also a facility available to most organizations used to conduct virtual meetings. Most employees on the other hand have laptops, reliable internet, and smart-phones. Today's breed of smart-phones enable remote workers to participate fully in the operations of the business without even needing access to a computer. The Android, BlackBerry, and iPhone smart-phone platforms each support tens of thousands of apps that can extend your company's technology infrastructure to your workers' pockets.

Generation Y workers

Generation Y (also referred to as Millennials) constitutes of people born between 1981 to 2000. Millenials have been using computers, mobile phones, the internet, social media and other technologies from an early age. They have great computer skills – they know the technology and they can keep up with the technology (Dottie Callina, 2011). Telecommuting allows them to work on a schedule that fits their personality and at a time of the day where they feel most energized to do what they have to do. Used to working anywhere, everywhere and any time of day or night on their laptops, tablets and

smartphones, Millennials won't be satisfied to just punch in and sit at a desk from 8.00 a.m. to 5.00 p.m., Monday to Friday.

Nature of Jobs

Not all jobs require the employees to be at the place of work. Tasks most suitable for telecommuting are portable (can be performed anywhere). Some jobs like analysis, data entry, design, documents' writing and editing, evaluations, graphics, field visits, insurance broking, journalism, market analyst, marketing among others do not require the employees to work from the office.

1.2. Purpose of the Project

The purpose of the study was to investigate which telecommuting models are used in Kenya. After identification of the models, the study proposed to investigate the challenges the employees were facing while telecommuting. After identifying the challenges, a solution to address the challenges was proposed.

The specific objectives of this study were:

i. To investigate the telecommuting models existing in Kenya.
ii. To identify the challenges faced in telecommuting.
iii. To propose a Solution to address the challenges identified.

The research questions governing this study include:

i. What telecommuting models exist in Kenya?
ii. What challenges are organizations using telecommuting facing?
iii. How can the telecommuting challenges be addressed?

1.3 Significance of the Study

The findings of this study will be important to the following groups:

Organizations

The study findings will benefit organizations which have lost money over the years as a result of the expenses incurred during commuting. This study will also enlighten the managers and management on the required successful implementation of telecommuting programs.

Managers

The findings of this study would enable management teams to make informed decisions regarding the adoption of telecommuting programs. At the same time managers will be in a position to use telecommuting programs to better improve organizational productivity through efficiency and effective program use.

Researchers

The study findings will add to the existing knowledge. The study will act as a point of reference for future research especially on aspects of methodology and literature on related research.

CHAPTER TWO

2. Literature Review and Theory

Introduction

This chapter will cover the overview of telecommuting and Telecommuting in Kenya.

2.1 Overview of Telecommuting

Telecommuting which is also called Teleworking, or flexiplace, is an innovative business solution that enables employees to do productive work away from the traditional office. It has been described as the act of moving work to the workers, rather than the workers to the work (The American Telecommuting Association, 1999).With the availability of computers and all the other communication equipments and links, it is no longer mandatory to work from the office at all times. The acceptance of Telecommuting is growing and this is due to its benefits which favor organizations as well as employees.

Improving productivity has been one of the major benefits of telecommuting as workplace interruptions are eliminated as well as commute time. Work-Life balance is another benefit of Telecommuting which yields to employee satisfaction hence improving the productivity. Previous studies have shown that Telecommuting benefits are: organizational loyalty and belonging, savings of office space, increased flexibility, improved employee morale and employee retention and attraction.(Bélanger, 1999; Pinsonneault&Boisvert, 2001; Potter, 2003).

Telecommuting is a generally accepted work arrangement in America. As of 2012, estimates suggest that over fifty million U.S. workers (about 40% of the working population) could work from home at least part of the time. (Matthews, H. Scott; Eric Williams (February 2012).

2.2 Telecommuting in Kenya

A study established that there are very few elaborate telecommuting programs being used within organizations in Kenya (Muhambi 2010). The study puts together a telecommuting model that outlines the set of strategies, methods, technologies and organizational changes necessary for successful implementation of telecommuting. The researcher proposed the telecommuting model but it has never been tested in a real life situation, even though some organizations especially multinationals have the capacity to implement telecommuting, many only go as far as offering flexible work programs.

Statistics on how many Kenyan government employees actually telecommute are not available, but the number is unlikely to be significant. The government has been slow in the adoption of cloud services (Mbote 2010).

Another research showed that the basis for the telecommuting skeptism is grounded on the following: corporate culture, technological inferiority, lack of sound technological skills, and inadequate communications infrastructure. This research empirically demonstrates that telecommuting transforms organizational competitiveness (Nyaga 2013).

If Telecommuting is well-implemented, it can benefit the city and the nation in many ways. Telecommuting will reduce vehicle traffic, thus reducing carbon emissions and benefiting the environment. It can also be a boon for workers as it will reduce commute-related stress; moreover, it can improve productivity with reduced commute time. Nairobi is well-positioned to benefit from telecommuting. There is pressure on the roads. The central business district is constantly congested. Nairobi occupants have become more and more conscious of protection of the environment and they need that lost productivity to boost economic output. It is also opportune, given that technology and related infrastructure is now available. Today the country is laying down optical fiber to major centers, which will mean substantial bandwidth availability for the city, government and companies to partake. Moreover, we now have a tech-savvy workforce that is more proficient to use of technology. And they need jobs. (Nyanchama 2009)

A study done at Safaricom Ltd investigated Telecommuting Adoption focusing on the desirability of Telecommuting. The findings of the study provided strong evidence that the benefits of telecommuting outweigh its challenges. The study recommends the development of a comprehensive telecommuting policy and strategy as an off-shoot of the Vision 2030 popularization of the adoption of IT enabled services. (Ngetich, Stella J. 2012)

Another study seeking to establish the extent of Telecommuting in the Banking Industry in Kenya was conducted. Specifically the objective of the study was to establish which forms of telecommuting were being used in the banking sector in Kenya. The study revealed that that there was no specific literature available in this particular area of study in Kenya that could be reviewed and so only related material from other parts of the world were examined. (Mailu 2002).

2.3 Literature Review Conclusion

More and more companies have begun to allow people to work from home, if not on a full time basis then at least for one or two days a week. With the advent of the internet, companies have realized they can actually increase productivity by allowing workers more freedom as to where they can work, whilst at the same time reducing their overheads.

There is very little research in Kenya concerning the Telecommuting subject, and in particular, the Telecommuting Models.

CHAPTER THREE

This chapter covers the Research Methodology used.

3 Research Methodology

This section covers Design of study and Data collection.

3.1 Design of Study

This study adopted the survey design. It was a survey of telecommuting models adopted by profit making organizations in Nairobi. In this case the survey design enabled us to collect data on the population being studied and allowed us to be more focused in giving specific and relevant recommendations and more especially in regarding to proposing a system to be used due to the challenges established in the research.

Research Organizations

The study targeted employees in some firms from various industries including those in commercial and service sector, insurance industry and telecommunications and technology industries. The Total number of companies whose employees participated in the research was 15. The reason for choosing the mentioned sectors was because they have a number of employees who have portable jobs. The use of technology is also high in the mentioned sectors as they are continually upgrading with the current technology. This study was concerned with organizations whose workers worked an average of at least 40 hours per week. The characteristics of the employees were important for this research as this would show us if we had the relevant employees for Telecommuting.

On the choice of the sampled organizations, we first listed the Industries that were required, then narrowed down to individual organizations for the distribution of the questionnaires.

Questionnaires

There was need to gather substantive amount of information concerning Telecommuting and therefore distribution of questionnaires was a fast way of getting that information. The first focus of the research was to find out if the employees had any knowledge concerning any Telecommuting models that were used in the Kenyan organizations. From the point of the model's knowledge, the research set to find out if the organizations had adopted any of the

models. With the knowledge of existing models, we also investigated how the implementation of the models was carried out. We researched on the success of a Telecommuting program within the organizations. A very important aspect of the research was the challenges faced in Telecommuting. All this guided our design of the questions in the questionnaire.

3.2 Data Collection

Primary data was derived from questionnaires distributed to the managers and employees of 15companies within Nairobi; Kenya. The Sampling method used was Snowball sampling. Snowball sampling is an approach that uses recommendations to find people with the specific range of skills that has been determined as being useful to a particular subject (Patton, M. 1990). The reason snowball sampling was used is due to its simplicity in reaching the intended population through referral. The method was also cost effective because the referrals received the questionnaires through mail or hard copy and they distributed and collected the questionnaires. I did not have to get in touch with every respondent. The responses came in batches.

Out of 100 questionnaires that were distributed, samples of 60 questionnaires were filled with usable data. Questionnaires were handed to the respondents at their places of work with the assistance of a reference person who was responsible for distributing them. Completed questionnaires were collected through the reference person and sent through email or collected from the reference person. Interviews were conducted for some managers and some employees who preferred to answer verbal questions rather than fill in a questionnaire.

Secondary data was gathered from library material, various companies` journals and reports, media publications and various internet search engines covering telecommuting concepts and models. This guided us to examine the already existing Models mentioned in chapter four in relation to how they relate to Kenyan Organizations.

The study used qualitative data analysis methods - content analysis. The researcher compiled and reviewed all responses to determine the outcome of the findings. Section A of the questionnaire focused on the respondent's characteristics. This was important to

show us the characteristics of the respondents. Section B of the Questionnaire focused on Telecommuting in Kenya. All the questions in this section were directed at investigating the Application of Telecommuting to the organizations as well as challenges faced.

CHAPTER FOUR

4 Results

This chapter shows the results and findings of the research. Section 4.1 shows the Characteristics of the participants. Section 4.2 discusses the respondents' knowledge of the existing models. Section 4.3 discusses the Telecommuting Programs that have been adapted in other countries. Section 4.4 discusses the telecommuting challenges we discovered.

4.1 Participant Characteristics

From the data collected, we were able to summarize the characteristics of the respondents from section A of the questionnaire.

Table 1 shows the characteristics of the participants who answered the questions from the questionnaires distributed. 80% of the participants were male. 75% of the participants were aged between 26 and 35 years. All the participants were degree holders. 80% of the participants have worked for less than 10 years in their relevant professions.

CHARACTERISTIC	**REMARKS**
GENDER	80% MALE
AGE BRACKET	75% BETWEEN 26 AND 35 YEARS OLD
EDUCATION LEVEL	100% DEGREE HOLDERS
WORK EXPERIENCE	80% BELOW 10 YEARS EXPERIENCE

Table 1 Participant Characteristics

The respondents' characteristics in Table 1 clearly indicate that the majority of the employees were prime candidates for telecommuting. From the departments in which the respondents worked in, we found out that 50% of the participants' job categories did not require frequent in-person interaction with colleagues, customers, or others. Such jobs could be performed from a remote place smoothly. The Age bracket between 26 and 35 years falls under Generation Y; who are referred to as techno savvy and can work from anywhere and any time of day or night on their laptops, tablets and smart-phones. 80% of the respondents had worked for less than 10 years; therefore adopting the telecommuting

work arrangement would be easier for this group of people. 100% of the respondents were degree holders and therefore qualified for their specific roles in the organizations. 80% of the respondents were male. A recent research by Flex+Strategy Group/Work+Life Fit Inc indicated that Men outpace women when it comes to telework, while women are more likely to put their hours in at the office. (Aliah D. Wright. May 2014).

With the mentioned characteristics and we found out that given the right Telecommuting program, the benefits of Telecommuting would be achieved.

4.2 Knowledge of existing Models

The participants were required to indicate if they knew the models their organizations used for telecommuting.

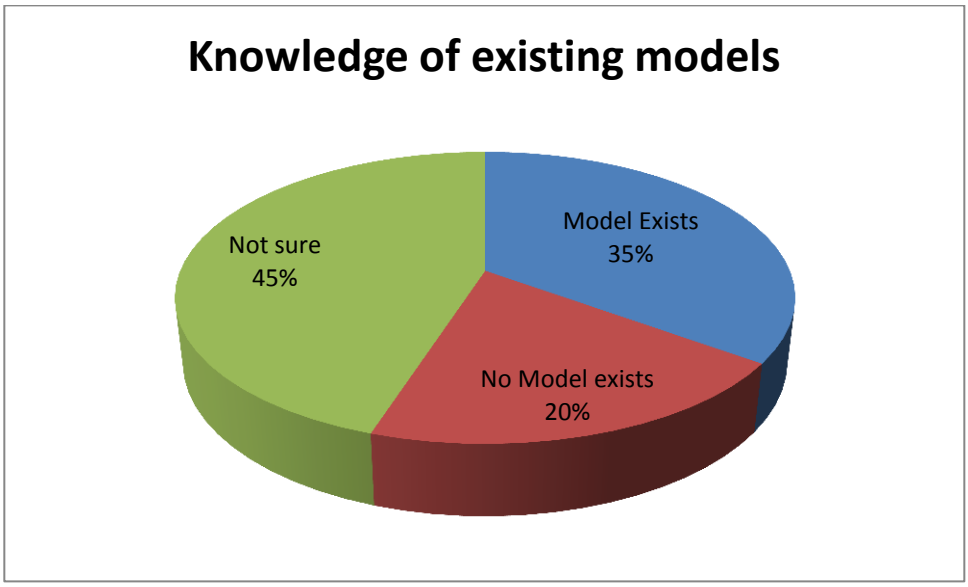

Figure 1 Knowledge of existing Models

45% of the Participants know telecommuting is used in their organization but were not sure which exact models were used. 35% answered "Yes" to the question "Has your organization adopted any telecommuting model/program?" while 20% said telecommuting

is an informal arrangement which takes place at the convenience of the employee's schedule.

The respondents indicated that no structured model was used to manage telecommuting. Even for the 35% who responded yes to the existence of models in their respective organization, the name of the model was never mentioned; therefore the existence of the Models used was not clear.

4.3 Telecommuting Programs Adopted

From the study findings it was clear the organizations surveyed adopted no telecommuting systems or programs, owing to the fact that the telecommuting programs adopted were not considered core in their operations. The research on existing models was a clear indicator that since the respondents could not name any model existing in Kenya, it would be impossible that its adaptation had taken place.

A look at existing models was compared with what existed in Kenya. The reason for comparing the models was prompted by the responses that came from the question: "How did your organization go about implementing the telecommuting programs?" The answers to this question focused on factors that contribute to a successful telecommuting program. These factors were; availability of Technology, employee's commitment to Telecommute and the organization's cooperation to support the Telecommuting Program. The two Models (Simplified Supply-Demand Model of Telecommuting and the adaptation process framework) compared to the factors we investigated from the research.

4.31 Simplified Supply-Demand Model of Telecommuting

With Technology as the Main enabler for telecommuting, the Supply-Demand Model of Telecommuting was developed by Nillies and Gray:

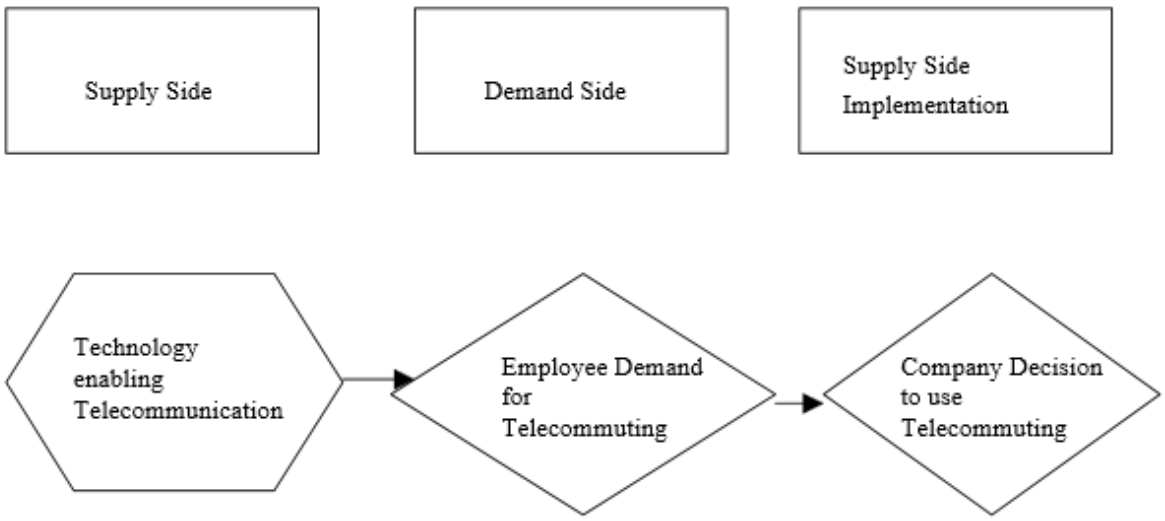

Figure 2 Simplified Supply-Demand Model of Telecommuting (Nilles 1976 and Gray 1997)

The model in figure 2 is a simple one based on the fundamental concept of supply and demand as documented by Gray (1997). Technology is an enabler for telecommuting. Technologies have dramatically changed the way employees access and share information and, ultimately, work. With the implementation of intranets and client-server networks over the last decade, the sharing of resources within an organization has become an almost-effortless endeavor.

Cloud computing technology and Wi-Fi have become popular technologies thus enabling access to remote servers via a combination of portable hardware and software.

From the interviews, we found out that most organizations had the appropriate technology, which led to employees demand for telecommuting. The employees demand for telecommuting was driven by pressures like; traffic congestion and rush hour gridlock, as well as stress between job and family demands. This demand is what prompted some companies to implement Telecommuting.

As much as the simplified supply-demand model closely suits how Telecommuting is done in some Kenyan Companies, Telecommuting was not the companies' decision but employees demand to be allowed to work remotely. This therefore is more of an informal arrangement within the sampled companies instead of an adopted model.

4.32 Adaptation Process Framework

Part of the investigation was to find out how Telecommuting had been adapted in the sampled organizations. The information collected was compared with the following framework (Developed by Jin-Ru Yen and Hani S. Mahmassani).

Figure 4 elaborates the Adaptation Process Framework.

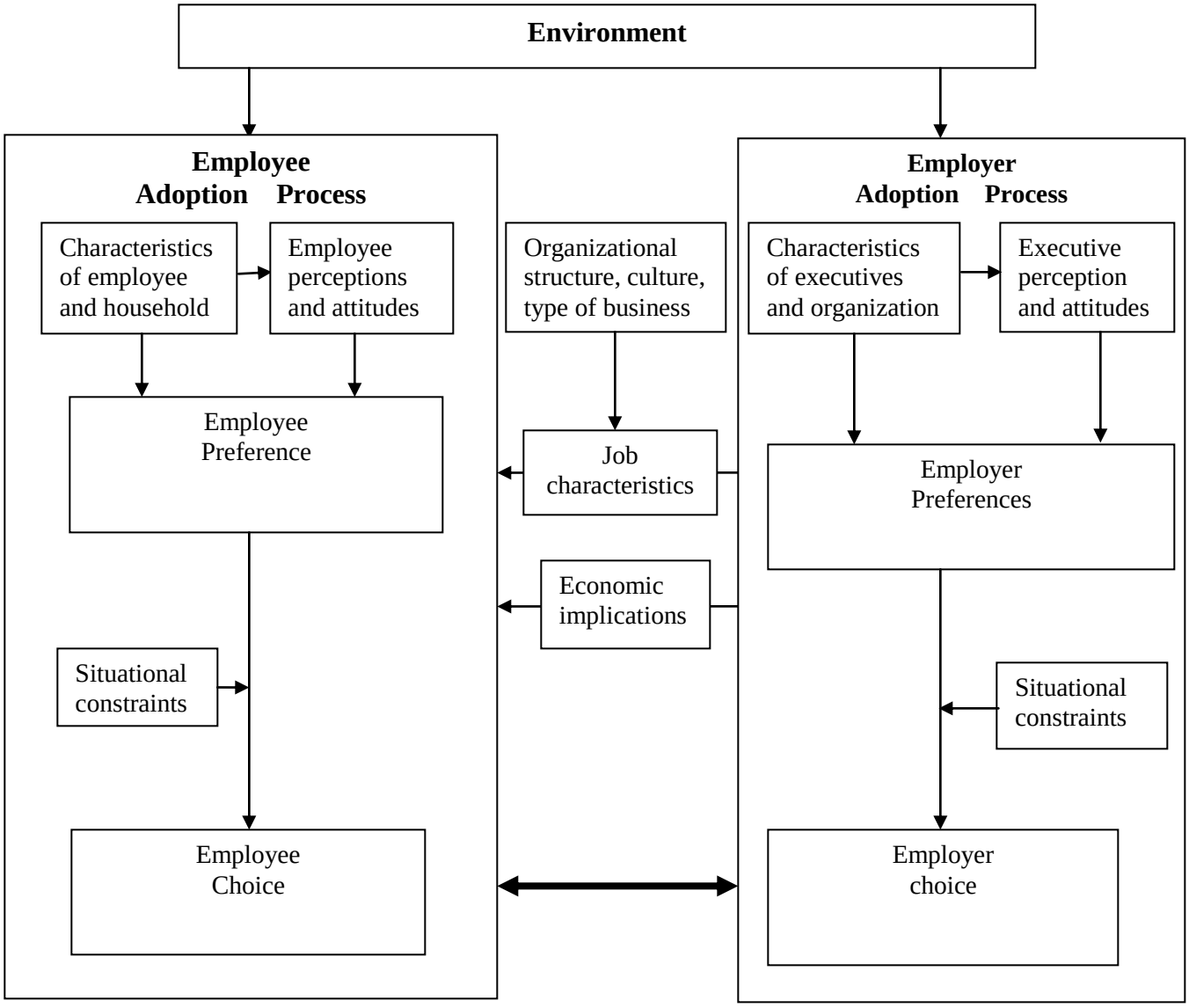

Figure 4: The Telecommuting Adoption Process**(Jin-Ru Yen and Hani S. Mahmassani)**

As shown in figure 4 the employee faces the decision situation of whether to work from home or to commute to work. This is influenced by the characteristics of the available telecommuting program, the nature and requirements of their work, their characteristics and those of their household as well as their perceptions and attitudes toward telecommuting.

A situational constraint refers to things like facility and work space availability at home. These constraints affect the employee's preferences toward telecommuting. They in turn guide the employees' choice on whether to Telecommute or not. Employees will also consider remuneration when considering to Telecommute or not to Telecommute.

The employer on the other hand decides whether or not to let employees telecommute. This is a decision they make from the organization's viewpoint, which is generally dominated by executives' characteristics such as personal management style and inclination to adopt new policies. Other management considerations which also influence the employer's decision of providing a telecommuting program in the organization may include the arrangement of work hours, the difficulty of communication with and supervision of telecommuters, productivity measurement, and data security.

From Question 3 of the section B of the research questionnaire, most of the answers in our research revealed that Telecommuting was implemented informally; where employees decided to work away from the office when a need arose. The decision was usually an agreement between the Manager and the employee. The adaptation of Telecommuting therefore was not found as structured as the framework shown in figure 4.

4.4 Telecommuting Challenges

From the study the already existing models were not adopted in the surveyed organizations as the interviewees did not have an understanding of the models that existed. The challenges raised were concerned with the current issues faced in telecommuting.

The issues mentioned were derived from the feedback from the respondents concerning making telecommuting better:

4.41. Communication:

Communication was a main factor why many organizations were not successfully practicing telecommuting effectively as they should. Since the telecommuter is isolated from their manager and co-workers on a regular basis, the respondents stated it was also important to stay in contact frequently.

The lack of communication included not being able to answer emails and return phone calls quickly. In a work setup, being proactive by asking questions and otherwise making it known that the telecommuter was involved and committed to the workwas something the respondents said was critical for smooth running of operations. In situations where the telecommuter was assigned to a project team, communicating effectively with team members was crucial when collaborating in the assigned project.

4.42. Job nature

The study revealed that not any employee can telecommute. The decision to know who to telecommute was a factor that made telecommuting programs not get utilized efficiently. The people who were involved in Telecommuting were those who had laptops and an access to Internet while away from the office.

On a case-by-case basis, managers should look at the job description of the employee. The manager should assess whether the employee's responsibilities are suitable to be performed independently, and at an off-site location. For example, job functions that involve mostly indirect customer services are more suitable for telecommuting, while jobs that require

special tools or equipment are not. From our research 50% of the respondents jobs were eligible for Telecommuting.

4.43. Technology

Some organizations did not have the defined technology that is enabled for use for purposes of easier collaboration of the work.

In addition to the desktop or laptop computers, there must be or other broadband connections. In some cases, this is simply a modem that connects the broadband service to the telecommuter's PC, while in other cases it could be a combination of equipment including a router, switch, wireless access point, firewall, or VPN appliance.

Telecommuters that work independently from other employees should have access to the systems and applications that allow them to complete their tasks. Telecommuters who work in teams should have sufficient communication tools to facilitate collaboration among team members as well as to communicate with their supervisors. Based on the technology available, managers should decide whether the infrastructure is fitted to accommodate the job requirements of the telecommuter.

4.44 Remote Management and Performance Evaluation

Most Managers had a concern about how they manage their subordinates from a remote location. This was one of the major challenges for most organizations. Most Managers in many organizations had problems with managing Performance monitoring and measurement, as well as managerial control.

4.5 Developed System

The developed System addressed the challenges that interviewees raised concerning the reasons why telecommuting was not successful as it should be.

The system was developed in VB.Net and the Database was supported by SQL Server 2005. The System was accessed through a web browser interface.

System Overview

From the results of the research, we discovered that Telecommuting must be supported by both the employee and the managers. We therefore designed the system to incorporate the Management, Telecommuting employees as well as the IT support team (ICT for smooth operations of the system). The information is stored in system tables and is referenced when the system is running on a web browser.

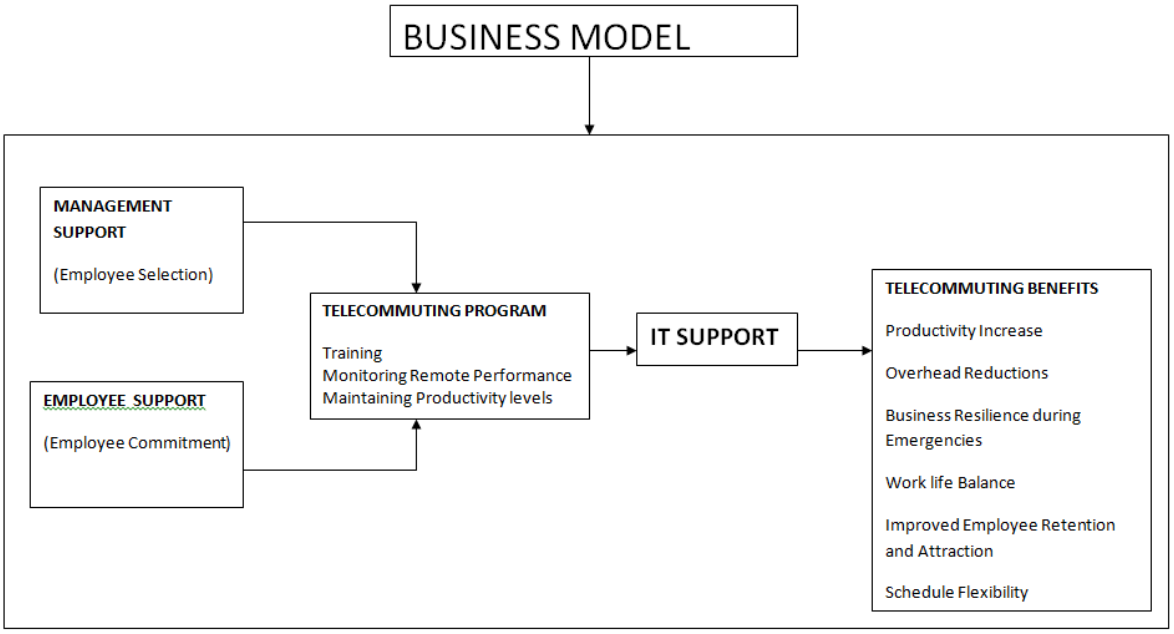

Figure 5 Developed Telecommuting Management System Overview

4.51 Management Support

The first consideration while developing this system was the organization's Business Model. The first question we looked at is: What Business needs will be served by Telecommuting?

The management should be involved and supportive from the inception of the program. The system setup and updating of the master is guided by the management .Not all positions are suitable for Telework. It is the mandate of the Management to provide the correct departments, positions and Branches which will be used by the telecommuters.

4.52. Employee Support

Telecommuting requires interest and commitment from the employee. To use the Telecommuting System, the employee must register, which is a sign of commitment to be able to log in and use the system for Telecommuting. The employee should also commit to follow through the program and be willing to be trained. The individuals who participate in telecommuting arrangements must ensure that they have all the requirements to access their network and also for the protection of their data.

4.53 Telecommuting Program

The system has set programs on how employees and managers handle work regardless of the location of the Telecommuter. Discussion of work schedules, communication methods, required technology, success strategies and proper organization is important for telecommuting employees to know what is expected of them when working remotely.

Training

Effective telecommuting training should include a focus on the following issues:

- What to expect as a telecommuter
- Improving organization and time management skills
- Setting objectives and measuring productivity
- Developing performance management skills
- Enhancing communication with co-workers and managers at the office

Monitoring Remote Performance and Maintaining Productivity Levels

Work expectations should be understood and, when concerns arise, they should be addressed immediately to ensure that a smooth working relationship continues. The system has a reporting facility that shows the progress of work. The performance of one employee or a group of employees can be seen by checking the reports in the system.

Good communication between supervisors and employees is essential for successfully completing work and is especially necessary in a teleworking environment.

4.54 IT Support

The system requires to be supported by the ICT personnel for the Telecommuting system to work effectively. An organization's IT department should determine a teleworker's technology needs in order to be just as sufficient working remotely as he or she would be in the main office. The system has a provision for communicating with IT department who in turn supports the system as well as the rest of the Infrastructure. It is the IT department that is responsible for updating the master.

4.6 Telework System

A web based system to support telecommuting was developed. There are perceived benefits of telecommuting, which can be achieved fully if the concerns that rose from the research were addressed. The choice of a web system was mainly because when hosted, the users could access it easily, even using their mobile phones.

4.61 System Design

This section defines the modules and interfaces for the Telecommuting System. The user registration process design is captured to show the process of registration.

System Modules

The system is divided into three major modules: Managers' Module, Employees' Module and ICT Module. This section describes the function of each module.

Managers Module

The Managers Module has the Tasks assignment where they assign specific tasks to specific employees. It is the manager who sets the pace for work, by also giving timelines on when the task is expected to be complete. When the employees views the tasks and updates, the Manager is able to see the update for approval. Reporting will help to view all the information required.

Employees Module

The employee works under instructions as directed by the Manager. This module allows users to update their tasks as well review managers updates. Reporting is also available to the employees.

ICT Module

The ICT module allows ICT personnel to update the Master as well us view user issues and update on the action of the issues.

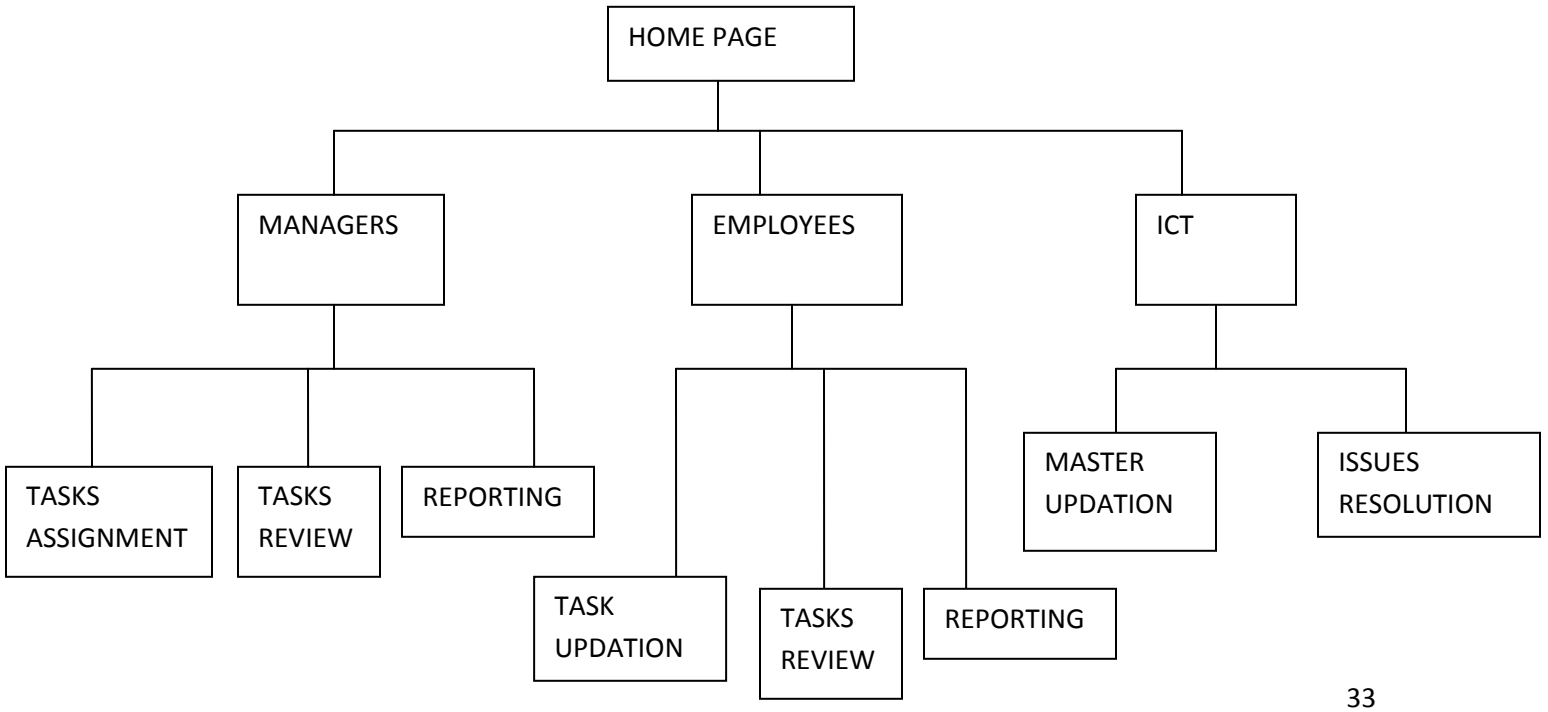

Figure 6 System Modules

User Registration Process Flow

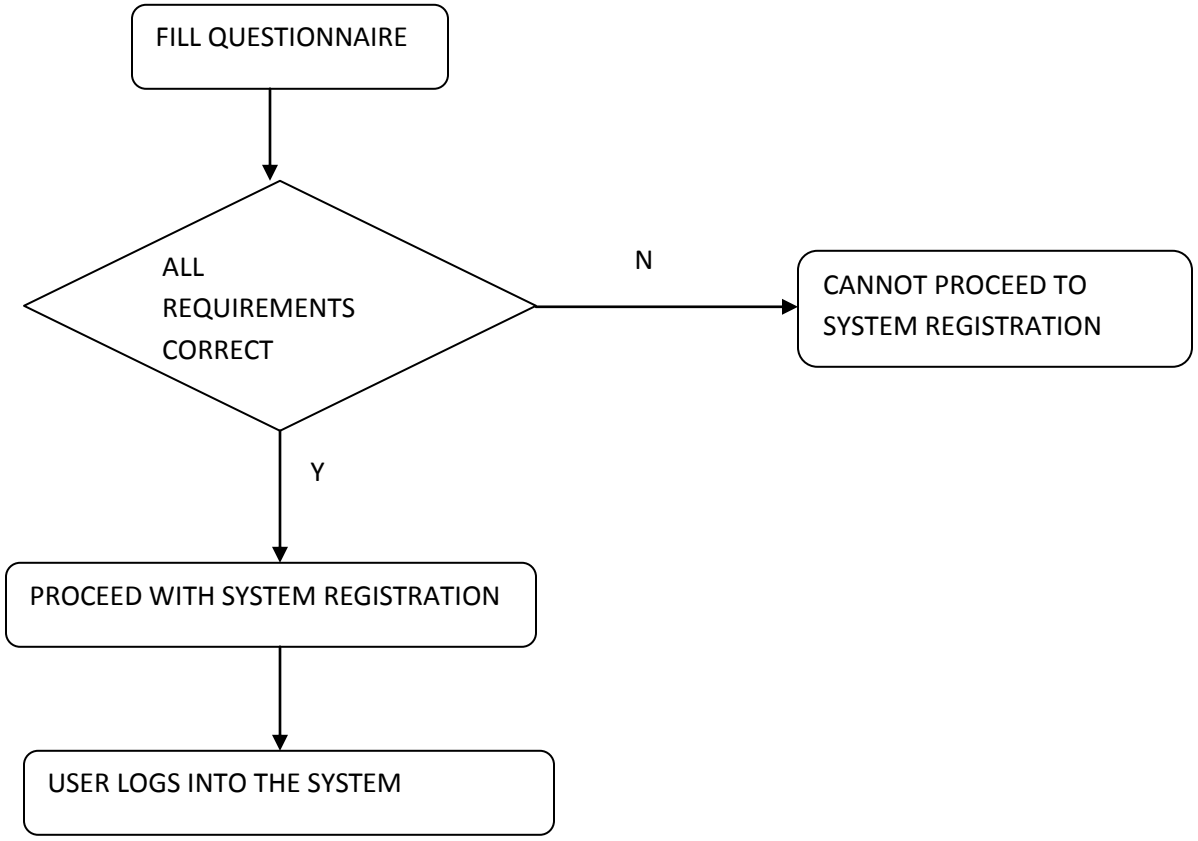

Figure 7 User Registration Process Flow

Figure 7 shows the flow for registration of users into the System. At registration, an unique ID for the user is generated. Only users who have all the requirements can be successfully registered.

Registration Questionnaire

Management decides which departments and job roles are suitable for telecommuting, therefore only the approved ones are set in the system. Eligible employees on the other hand need to fill a questionnaire which if successful; can proceed to register as users of the system. The questionnaire's purpose is to ensure they have the required requirements for the telecommuting program, as well as confirmation of commitment to the Program.

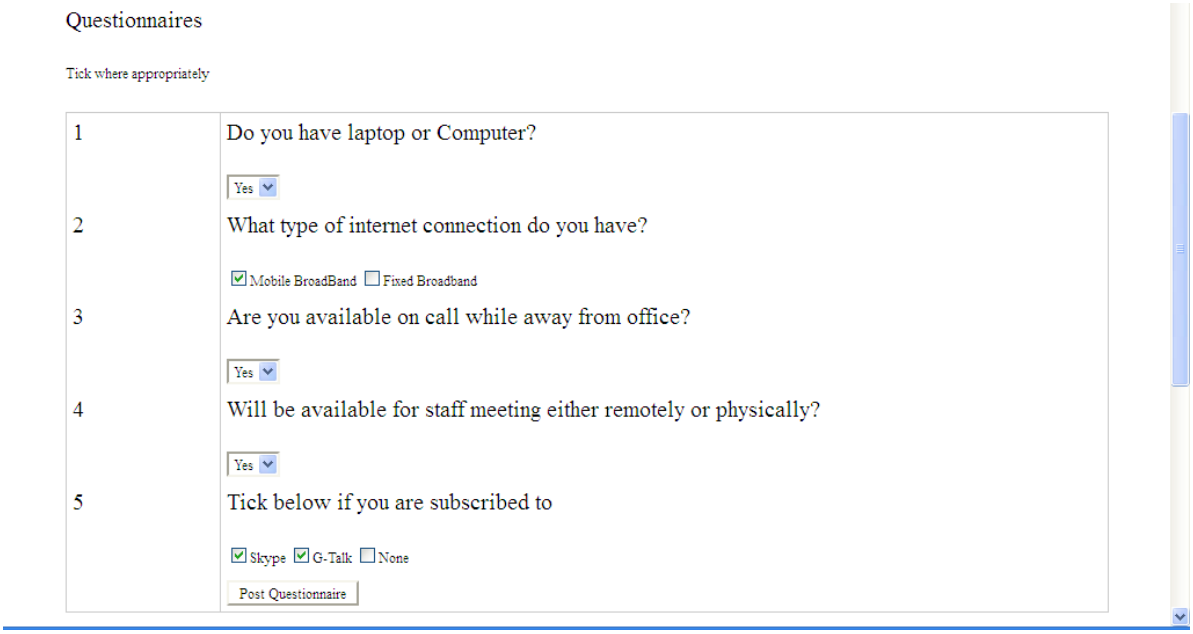

Figure 8 Registration Questionnaire

Figure 8 shows the questionnaire that has to be filled so as to have access to log into the system.

User Registration

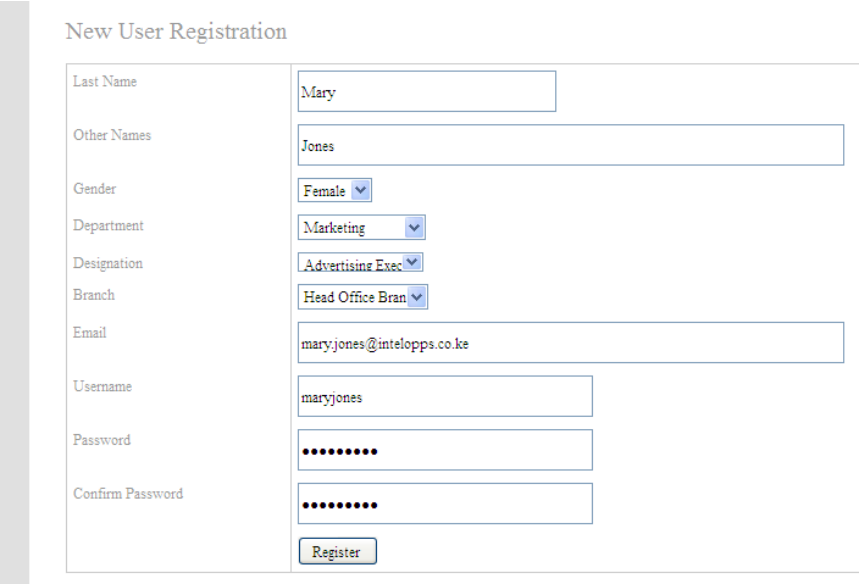

Figure 9 User Registration

Only registered users can log into the system:

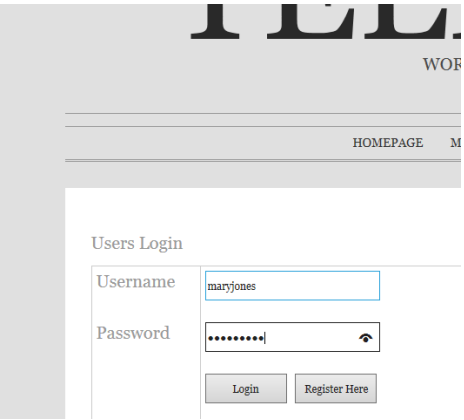

Figure 9a User Login

Figure 9a shows the login screen used by users to access the system.

Training is an essential part of the system as both Managers and employees need to have a thorough understanding of telecommuting and the system supporting Telecommuting. The employees work will take place offline. Communication through the available tools, (email, skype, gtalk, phone) is an essential part of the Program.

Posting Tasks

Managers will set tasks to specific employees indicating to them what is required of them, as well as when the job should be completed.

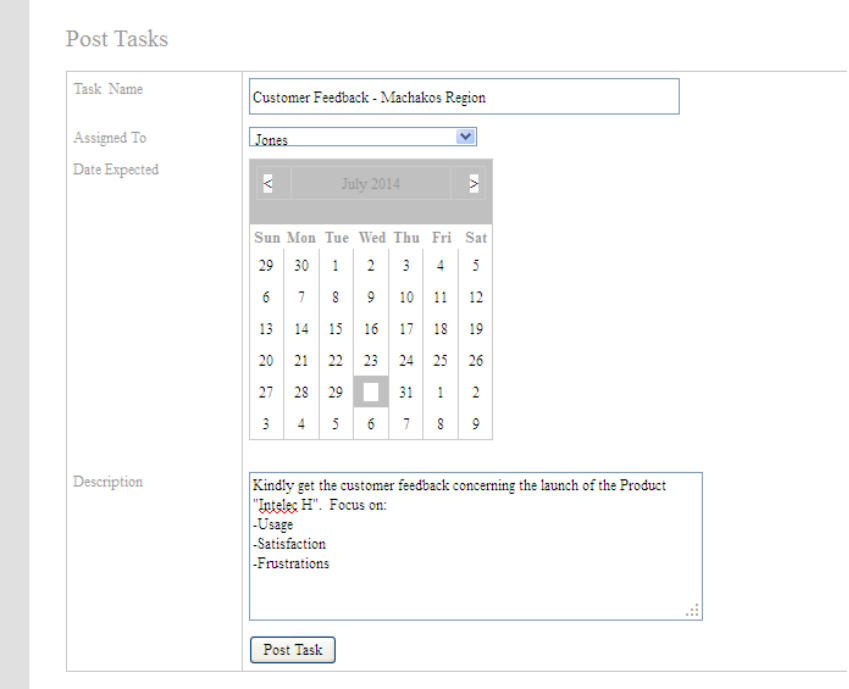

Figure 10 Task Posting

Figure 10 shows how tasks are posted by Managers, assigned to specific employees.

The employee on the other hand will update the system and give the feedback concerning the task. This is continually updated on the Managers section.

Tasks View

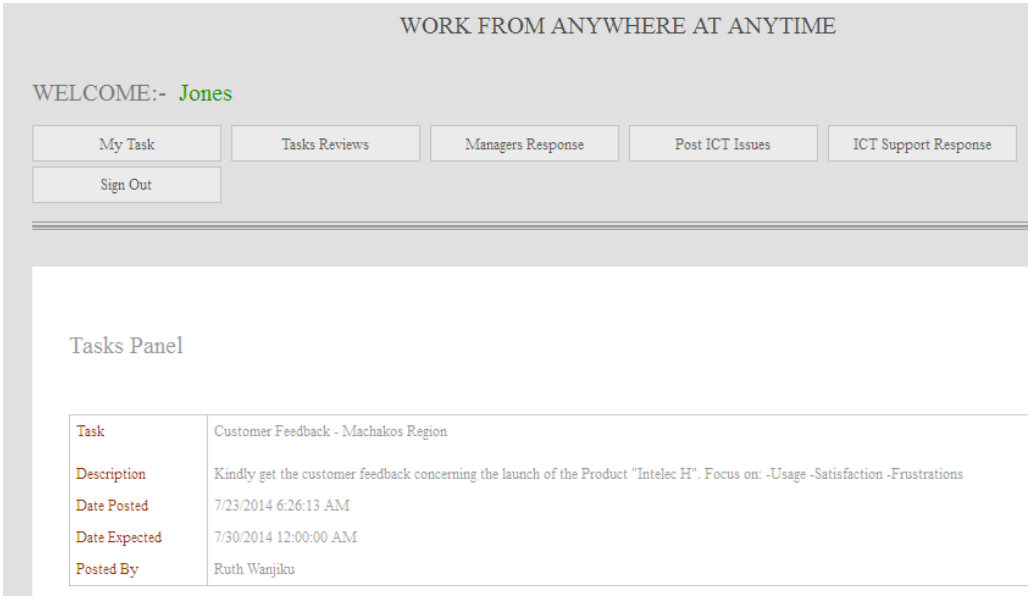

Figure 11 Employee Task View

Figure 11 shows the Tasks Panel where the employee is able to see the Task assigned to them.

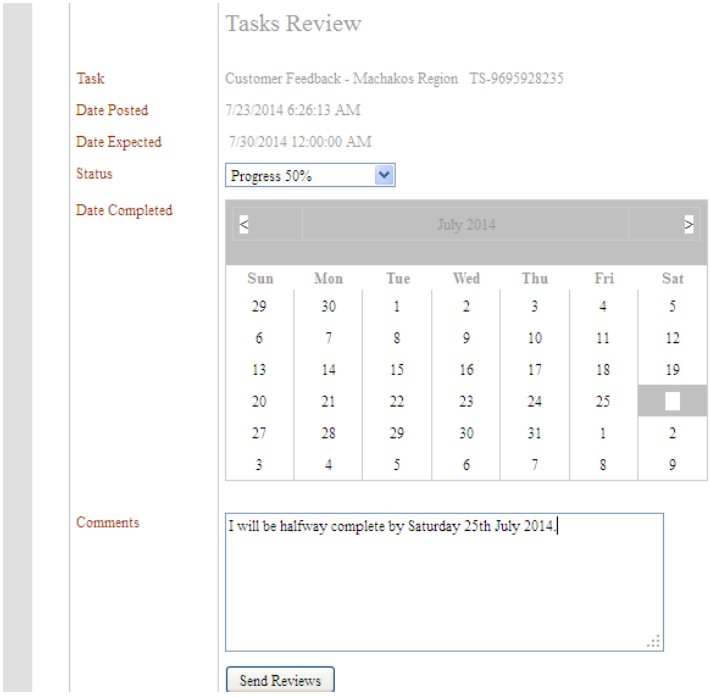

Figure 12 Employee Task Update

Figure 12 shows the screen for Tasks update. The employee updates the progress of the Task by setting the status, date and comment.

Managers' Review

Managers have the mandate to approve or reject a task depending on their analysis of the job required.

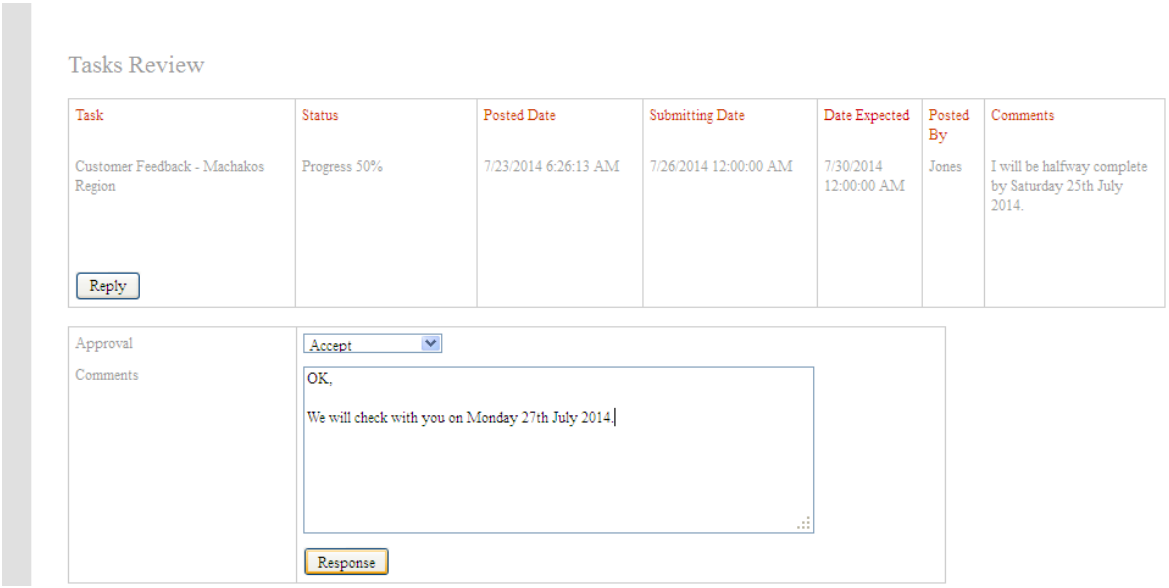

Figure 13 Manager's Task Approval

Figure 13 shows the approval section where the Manager receives feedback from the employee. He enters an approval status and a comment.

A user is able to see the Manager's response and continually update the task to completion.

Figure 14 Employees Task Review

Figure 14 shows Manager's comments as they are seen from Tasks Review.

To Monitor Performance, the system captures reports of employees, shows the progress of their work and this is helpful for Management to make decisions such as performance reward. This also helps as a guide for maintaining productivity levels. The system captures feedback from its users, which gives an opportunity for management to improve the program where required.

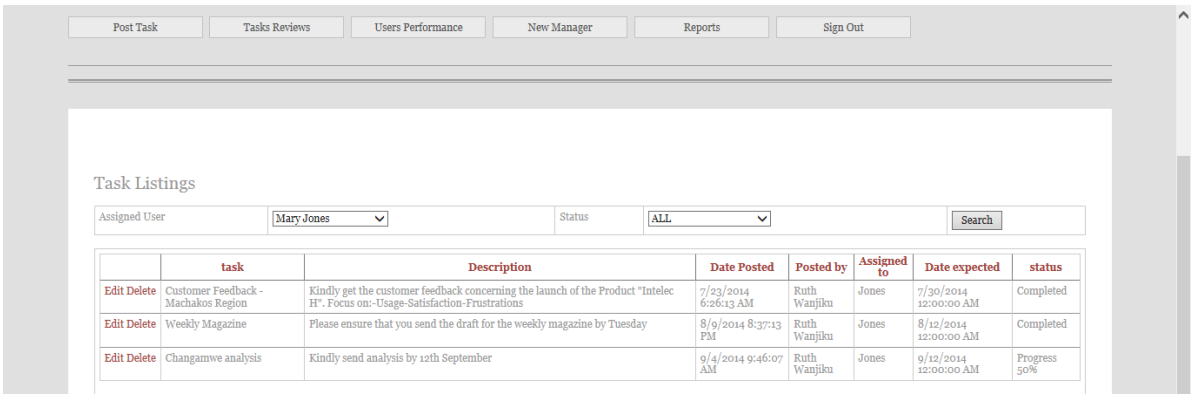

Figure 14a. Task Listings per user

Figure 14a gives a summary of the tasks filtered for one particular employee.

Figure 14b. Task Listings for status

Task Listings

Assigned User | ALL | Status | COMPLETED (100%) | Search

	task	Description	Date Posted	Posted by	Assigned to	Date expected	status
Edit Delete	Lilongwe Report	Please ensure that the report on Lilongwe is completed by end month	8/10/2014 1:19:21 PM	Ruth Wanjiku	d	8/31/2014 12:00:00 AM	COMPLETED (100%)
Edit Delete	Service Maintenance for Lilongwe Branch	Please service the 10 machines at Lilongwe Branch	8/9/2014 2:29:21 PM	Ruth Wanjiku	Donald	8/12/2014 12:00:00 AM	COMPLETED (100%)
Edit Delete	Project Plan	Send the project plan for the pilot project by Wednesday 13th August	8/9/2014 3:47:34 PM	Ruth Wanjiku	Johnson	8/13/2014 12:00:00 AM	COMPLETED (100%)

Figure 14b gives a summary of tasks that have been fully completed

IT Support

IT Support is a very core component in the program. The IT users are responsible for updating the required fields in the system. Communication from the users to IT makes it easy for the IT department to support the users in whichever way the help is required.

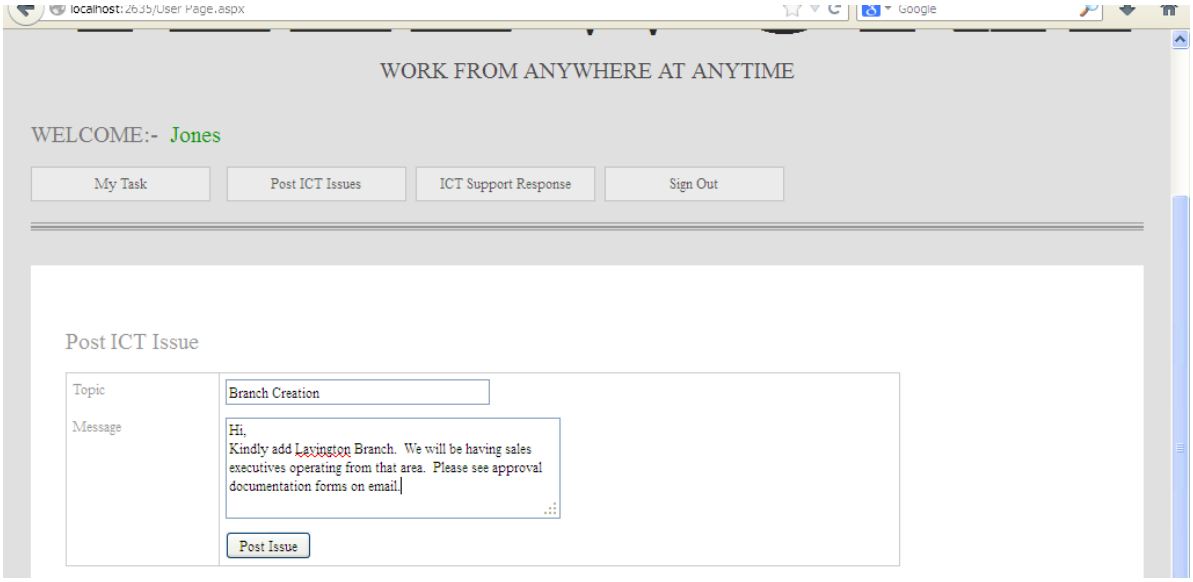

Figure 15 IT Service Desk Posting

Figure 15 shows Posting of Issues to be addressed by ICT staff.

The ICT team receives questions, address issues and give feedback to the employees needing assistance.

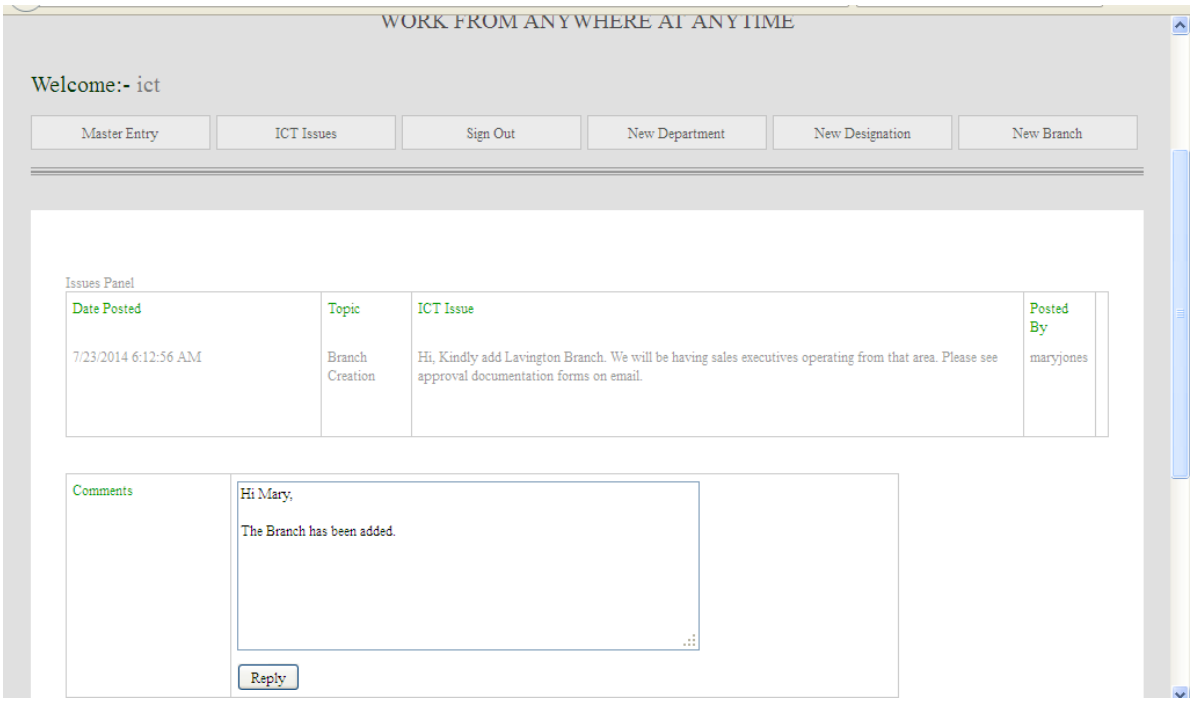

Figure 16 IT Service Desk Response

Figure 16 shows an update of the ICT Issue posted by a user. When an update is done by the ICT user, the initiator of the request will see the update on their profile.

4.62 System Testing

The developed Prototype was tested through functional testing, where the application flow was tested and validated. The efficiency of use, learn-ability and user satisfaction were tested so as to ensure intended goals were achieved effectively with the use of proper resources. The reason for using functional testing is because the results that were examined needed to conform to the functionality it was intended for.

Testing of the System focused on the perceived benefits. The users manually tested the system exploring the software to test the systems functionality. To test the System, the technique used was questionnaires. The users were not given a user manual, as it was important to test the simplicity of the system. Feedback was collected from the users who filled in the "Post Test Questionnaire" and the results were analyzed.

A total of 20 respondents all filled the Post-Test questionnaires.

The various respondents were from the mentioned industries: IT (5 respondents), Insurance (5 respondents), Media (2 respondents), Tours and Travel (1 respondents), Financial services (4 respondents), Marketing research (3 respondent). We used respondents from the fields mentioned because those are some of the fields in which Telecommuting is mostly used.

Participant responses:

Simplicity	**1**	**2**	**3**	**4**	**5**	**Total Respondents**
1. In relation to the interface, I found the Telecommuting System to be: Very difficult to use, Very easy to use	0	0	0	2	18	20
2. The menu items were well organized and functions were easy to find.	0	0	0	1	19	20
3. I immediately understood the function of each menu item.	0	0	0	1	19	20
4. Both occasional and regular users would like this system	0	0	0	2	18	20

5. The system requires the fewest steps possible to accomplish what I want to do with it	0	0	0	1	19	20
6. I quickly became skillful with the system	0	0	0	2	18	20
7. The interaction with the system was clear and understandable	0	0	0	1	19	20
8. The system easily does what I want it to do	0	0	0	3	17	20
Total				17	153	160

Table 2 Participants response on System Simplicity

System Capabilities	**1**	**2**	**3**	**4**	**5**	Total Respondents
1. The system speed is fast	0	0	0	2	18	20
2. The system is designed for all levels of users	0	0	0	2	18	20
3. The system is flexible to interact with	0	0	0	1	19	20
4. I can use the System without written Instructions	0	0	0	2	18	20
5. The system's input produces the required output	0	0	0	3	17	20
Total				**10**	**90**	**100**

Table 3 Participants response on System Capabilities

Usefulness	1	2	3	4	5	Total Respondents
1. The system enables me to monitor the progress of my work	0	0	0	2	18	20
2. The system enables me to view various reports	0	0	0	2	18	20
3. Using the system enables me to be more productive	0	0	0	3	17	20
4. While using the system, I can recover from mistakes quickly and easily.	0	0	0	2	18	20
5. Using the system helps me increase my work effectiveness	0	0	0	2	18	20
6. I can use the system successfully anytime and anywhere	0	0	0	2	18	20
7. I didn't notice any inconsistencies as I used the system.	0	0	0	1	19	20
Total				**14**	**126**	**140**

Table 4 Participants response on System Usefulness

Summary: Participant responses

System Feature	Systems Feature Agreement (%)
Simplicity	95
Capability	90
Usefulness	90

Table 5 Participant responses on the System Features (Summary)

Table 5 gives information collected from questionnaires filled in by respondents who tested the system. It indicates that 95% of the respondents rated the system as simple to use. 90% of the users appreciate the capabilities of the system while 90% found the system useful.

4.63 Telecommuting Benefits in relation to the System

From the responses given by the participants, these were the perceived benefits of telecommuting:

Productivity

In the test for system capabilities and usefulness, we see that 85% of the respondents said that the system's input produces the required output. 95% of the respondents also said that the system is flexible to interact with. 95% of the respondents said they did not notice any inconsistencies as they used the system. 85% of the respondents said that using the system enables them to be more productive. 90% of the respondents said the system enables them to monitor the progress of their work. 90% of the users said the system enables them to view various reports, which is a good indicator of productivity.

Work-Life Balance

90% of the users said they can use the system successfully anytime and anywhere. 90% of the respondents said that using the system helps them to increase their work effectiveness. For a Telecommuter, an effective system is key to enable them to balance between their work and other responsibilities out of the work domain.

Schedule Flexibility

95% of the respondents said the system requires the fewest steps possible to accomplish what they want to do with it. 95% of the respondents also said that the system is flexible to interact with. A telecommuter needs to have a system that can support the flexibility of their schedule.

Cost Reduction

80% of the respondents said that the system requires the fewest steps possible to accomplish what I want to do with it. A system that is easy to learn saves time which eventually cuts on costs. 90% of the respondents said they quickly became skillful with the system. 90% of the respondents said while using the system, they can recover from mistakes quickly and easily.

Business Resilience during emergencies

For business continuity even in emergencies, the system's availability is crucial. 90% of the respondents said they could use the system successfully anytime and anywhere. 90% of the respondents said the system speed is fast, which is an important element when an emergency arises. It is also very important to recover from a mistake as fast as possible. 90% of the respondents said while using the system, they could recover from mistakes quickly and easily.

CHAPTER FIVE

5 Discussions

This chapter discusses the significance of the findings. The discussion section describes the findings in relation to the research objectives. The Implications Section states the implications of the study. The consequences section discusses the consequences of Telecommuting. The Limitations section states the research limitations. The sections that follow are discusses the Recommendation for Follow up Work as well as the Conclusions, Summary and Achievements of Study.

5.1 Discussion

The main purpose of this study was to identify the Telecommuting Models used in Kenya, identify the challenges faced in telecommuting and finally address the challenges identified in the research. The findings suggest that the existing models used in other countries were not used in Kenya. Only 35% of the participants who took part in the research stated that there was a Telecommuting Model used in their organization. Probing further to identify the specific models proved that the participants could not identify the specific Models by name. This led to the conclusion that there were no models in use in the Kenyan context. The identification of the challenges was well captured from the respondents, which informed us on how to address the challenges; hence the development of the Telecommuting System.

The findings show that one of the perceived telecommuting benefits:(Improved Employee Retention)was not well measured in the research. Out of the 6 perceived benefits mentioned in the beginning of the research, the implementation of the system has addressed 5 of those benefits as seen in the findings.

From the study finding it is clear that the current existing models of telecommuting are successful though not in Kenya. The Testing of the Telecommuting System indicated that with 5/6 perceived benefits achieved, employees and managers could use the

Telecommuting System to successfully achieve the Telecommuting benefits for both the employees and the organization.

In relation to the Objectives, these were the Findings:

i. To investigate the telecommuting models existing in Kenya.

   We found out that in Kenya, Telecommuting Models have not been implemented successfully.

   As discussed in the Telecommuting Programs Adopted section, we discovered that there were no implemented models in Kenya. The respondents never provided the models in use within their respective organizations. The information gathered included factors that contribute to a successful Telecommuting Program. Another reason for lack of models in the Kenyan Context as discussed in the same section was that Telecommuting was not considered core in the organization's operations.

ii. To identify the challenges faced in telecommuting.

   The challenges were Identified and they were Communication, Job Nature, Technology, Remote Management and Performance Evaluation

iii. To propose a Solution to address the challenges identified.

   A solution was proposed and a Telecommuting System Developed to address the challenges identified

The Research Questions were answered as follows:

i. What telecommuting models exist in Kenya?

   No existing telecommuting Model has been successfully implemented in Kenya.

ii. What challenges are organizations using telecommuting facing?

   Communication, Job Nature, Technology, Remote Management and Performance Evaluation

iii. How can the telecommuting challenges be addressed?

The use of the Telecommuting system by the telecommuting employers to manage the Telecommuting process

5.2 Implications

As a result of this study an organization will make informed decisions on why it is important to create a structure that can be supported by a system to manage Telecommuting.

This study provided a clearer understanding on why existing telecommuting models have not been applicable in Kenya and why a telecommuting system helps to address the telecommuting problems encountered by the organizations.

5.3 Consequences

We see that any successful telecommuting system in any organization will assist the employees to enjoy the benefits of Telecommuting like work-life balance, productivity, and scheduling flexibility. On the other hand the study findings have enabled to shed more light on how organizations with sophisticated Technology can use telecommuting programs to find a number of ways to reduce costs both for the organization and for the employees as well as have Business resilience during emergencies.

The study has highlighted that employees can comfortably work from a remote place as long as there is a successful Telecommuting system in place. A Telecommuting Program that is not well planned for will not reap the benefits.

5.4 Limitations

A sample of 15 organizations in Nairobi was used to carry out this research. Generalizations were therefore made using this sample size.

5.5 Recommendation for Follow up Work

With the successful implementation of a Telecommuting System, we recommend further work to be done on: The Development of a Telecommuting Model tailored for Kenyan Organizations; Modeling the relationship between Telecommuting and Improved employee retention.

Another worthwhile direction for further work would be to compare the models and findings of the Telecommuting adoption preference analysis to results based on actual adoption choice behavior of the organizations.

5.6 Conclusions, Summary and Achievements of Study

The study findings have shed more light to the telecommuting concept and its applicability in Kenya. It is clear that the concept and the models used in other countries have not been fully adopted by organizations in Kenya.

We saw that Management plays a key role on the success of a Telecommuting Program and any program cannot be successfully implemented without having management fully involved in the design of the program. We also saw that Telecommuting is voluntary for employees and their commitment to the Telecommuting program plays a key role in its success.

This study managed to address the challenges faced in Telecommuting by developing a system that users tested and passed the test of perceived benefits of Telecommuting.

References

Joseph Mwamunyange, Isaac Khisa and Berna Namata. Saturday, May 26 2012. Unlocking our cities' horror traffic jams, the IBM way, The East African Newspaper.

Sep 2011. IBM's fourth annual Commuter Pain survey.

ANAMI Martin M. Muhambi. July 2010. A Model for Telecommuting in Kenya.

Kamau Mbote. Transport problems call for telecommuting solutions in business, humanipo.com, November 2012

Solomon Nyaga. September 2013. Virtual Organization, A Strategic Management option for Businesses in Developing Countries

Matunda Nyanchama. February 2009. Metropolitan Nairobi – Some Thoughts on Development

Levinson, M. July 2008. "Telecommuting Improves Productivity, Lowers Costs, New Survey Finds", MIT Sloan Executive Education.

Kioskea.net. June 2014. Tools for telecommuting.

Abdel-Wahab, A. 2007."Employees' attitudes towards Telecommuting.Anempirical investigation in the Egyptian Governorate of Dakahlia", Behavior & Information Technology, Vol. 26, No. 5, pp. 367-375.

Aliah D. Wright. May 2014. Myth Buster: Men Telework More

Butler, E.S.,Aasheim, C., and Williams, S. 2007. "Does Telecommuting Improve Productivity?", Communications of the ACM, Vol. 50 No. 4, pp. 101-103.

Forgacs, T. 2010."Empirical research findings on telework management experiences and attitudes", Business and Economic Horizons, Vol. 1, No. 1, pp. 6-13.

Hoang A, Nickerson R, Beckman P, and Eng J. (2008). "Telecommuting and corporate culture:

Implications for the mobile enterprise", Information Knowledge Systems Management [serial online]. March 2008; 7(1/2):77-97. Available from: Academic Search Complete, Ipswich, MA.

Hunton, J. and Norman, C. 2010. "The impact of alternative telework arrangements on organizational commitment: insights from a longitudinal field experiment", Journal of Information Systems, Vol. 4, No. 1, pp 67-90.

Neufeld, D. and Fang, Y. 2005."Individual, social, and situational determinants of telecommuter productivity", Information and Management, Vol. 42, pp. 1037-1049.

Westover, J., Westover, L. and Westover L. 2010. "Enhancing long-term worker productivity and performance: the connection of key work domains to job satisfaction and organizational commitment", International Journal of Productivity and Performance Management, Vol. 59, No. 4, pp. 372-387.

IDC Government, Telecommuting. March 1995. New Challenges in Information Security, IDCG Pub. No.: W1831.

Matthews, H. Scott; Eric Williams.February 2012."Telework Adoption and Energy Use in Building and Transport Sectors in the United States and Japan".

Ngetich, Stella J. 2012. Adoption of telecommuting in Safaricom Limited

Timothy MbathaMailu. May 2002. A Survey of the Practice of Telecommuting in the Banking Industry in Kenya

John Pescatore. February, 1996. Telecommuting and Security Aspects, Research Activity #9008, IDC Government.

The American Telecommuting Association. February 1999. Practice Brief: Telecommuting

Mello, J.A. 2007. Managing telework programs effectively. Employee Responsibilities and Rights Journal, 19: 247-261.

Perez, M., & Sanchez, A. M. 2005.The differences of firm resources and the adoption of teleworking.Technovation, 25:12, 1476–1483.

Peters, P., &Heusinkveld, S. 2010. Institutional explanations for managers' attitudes towards telehomeworking, Human Relations, 63: 107-135.

Potter, E. 2003. Telecommuting: The future of work, corporate culture and American society. Journal of Labor Research, 24:1, 73–84.

Shanks, J.(2007). Federal telework: A model for the private sector. Public Manager, 36:2, 59-63.

Taskin, L., & Edwards, P. 2007. The possibilities and limits of telework in a bureaucratic environment: Lessons from the public sector. New Technology, Work and Employment, 22:3, 195-207.

Tartaro, M. 2003. Best practices for supporting home users. Network Computing, 14:11, 73-75

Belanger, F., Collins, R. W., and Cheney, P. H.2001.Technology requirements and work group communication for telecommuters. *Information Systems Research 12*(2), 155-176.

Beyerlein, M. M., Johnson, D. A., and Beyerlein, S. T. (Eds.) (2001).*Virtual Teams.Advances in Interdisciplinary Studies of Work Teams 8*, 1-258.

Cooper, C. D., and Kurland, N. B. 2002.Telecommuting, professional isolation, and employee development in public and private organizations. *Journal of Organizational Behavior 23*(4), 511-532.

Cawyer, C. S., and Friedrich, G. W.1998. Organizational Socialization: Processes for new communication faculty. *Communication Education 47*(3), 234-245.

Golden, T. D., and Veiga, J. F. 2005. The Impact of Extent of Telecommuting on Job Satisfaction: Resolving inconsistent findings. Journal of Management 31(2), 301-318.

Hartman, R. I., Stoner, C. R., and Arora, R. 1991.An investigation of selected variables affecting telecommuting productivity and satisfaction.Journal of Business and Psychology 6(2), 207-225.

Hill, E. J., Ferris, M., and Martinson, V. 2003. Does it matter where you work? A comparison of how three work venues (traditional office, virtual office and home office) influence aspects of work and personal / family life.Journal of Vocational Behavior 63(2), 220-241.

Karnowski, S., and White, B. J. 2002.The role of facility managers in the diffusion of organizational telecommuting, Environment and Behavior 34(3), 322-334.

Patton, M. 1990. Qualitative evaluation and research methods, Sage Publications, Newbury Park, California

Appendices

APPENDIX I: DATA COLLECTION QUESTIONNAIRE

Dear respondent please provide appropriate responses to the following questions. All the responses given shall be kept in strict confidentiality.

SECTION A GENERAL QUESTIONS

1. Organization Name (Optional)……..
2. Organization Type……..
3. What is your Gender

   Male ( )

   Female ( )

4. What is your Age in years

   Below 25 yrs ( )

   26 – 35 yrs ( )

   36 – 45yrs ( )

   Above 45yrs ( )

5. Highest Level of Education attained

   High school ( ) Certificate ( ) Diploma ( ) Degree ( )

   Other (Indicate)……..

6. Which is your department in the organization?

   Marketing ( )

   Customer Care ( )

   Human Resource ( )

   Financial ( )

   Other (Indicate)……..

7. How long have you worked in this organization?

Below 3 yrs ( )

3– 6 yrs ( )

7 – 10 yrs ( )

11– 13yrs ( )

Over 13 yrs ( )

SECTION B: TELECOMMUTING IN KENYA

1. What telecommuting models do you know exist in Kenya?

……
……
……
……

2. Has your organization adopted any telecommuting model/program? (Tick)

Yes ( )

No ( )

3. What telecommuting models/ programs has your organization adopted? How did your organization go about implementing the telecommuting programs?

……
……
……
……..

4. Which departments have adopted the models?

……
……
……
……

5. If your company has adopted any telecommuting model/ program do you think it has been successful?

Yes ( )

No ( )

6. If your answer in (5) above is no please propose ways in which the models can be improved to achieve organizational objectives

……
……
……
……

7. What telecommuting frameworks can you propose that could solve the commuting problem in your organization?

……
……
…….....**.....**
.....

8. What are some of the major management implications of telecommuting models is your organization faced with?

……
……

…….....

.....

9. What are some of the challenges your organization faces in relation to telecommuting programs/models?

……

……

……

……..

10. What recommendations could u give in relation to telecommuting?

……

……

……

……

11. Any other issue that you feel should have been addressed?

……

……

……

……

APPENDIX II: SAMPLE CODE

```
<?xmlversion="1.0"?>
<!--
  For more information on how to configure your ASP.NET application, please visit
  http://go.microsoft.com/fwlink/?LinkId=169433
-->
<configuration>
<configSections>
<sectionGroupname="system.web.extensions"type="System.Web.Configuration.SystemWebExte
nsionsSectionGroup, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35">
<sectionGroupname="scripting"type="System.Web.Configuration.ScriptingSectionGroup,
System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35">
<sectionname="scriptResourceHandler"type="System.Web.Configuration.ScriptingScriptRes
ourceHandlerSection, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"requirePermission="false"allowDefinition="MachineToAp
plication"/>
<sectionGroupname="webServices"type="System.Web.Configuration.ScriptingWebServicesSec
tionGroup, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35">
<sectionname="jsonSerialization"type="System.Web.Configuration.ScriptingJsonSerializa
tionSection, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"requirePermission="false"allowDefinition="Everywhere"
/>
<sectionname="profileService"type="System.Web.Configuration.ScriptingProfileServiceSe
ction, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"requirePermission="false"allowDefinition="MachineToAp
plication"/>
<sectionname="authenticationService"type="System.Web.Configuration.ScriptingAuthentic
ationServiceSection, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"requirePermission="false"allowDefinition="MachineToAp
plication"/>
<sectionname="roleService"type="System.Web.Configuration.ScriptingRoleServiceSection,
System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"requirePermission="false"allowDefinition="MachineToAp
plication"/>
</sectionGroup>
</sectionGroup>
</sectionGroup>
</configSections>
<connectionStrings>
<addname="ApplicationServices"connectionString="data source=.\SQLEXPRESS;Integrated
Security=SSPI;AttachDBFilename=|DataDirectory|\aspnetdb.mdf;User
Instance=true"providerName="System.Data.SqlClient"/>
<addname="teleConnectionString"connectionString="Data Source=NICHOLAS-PC\RUTH;Initial
Catalog=tele;Integrated Security=True"providerName="System.Data.SqlClient"/>
</connectionStrings>
<system.web>
<compilationdebug="true"strict="false"explicit="true">
<assemblies>
<addassembly="System.Core, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=B77A5C561934E089"/>
<addassembly="System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"/>
<addassembly="System.Xml.Linq, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=B77A5C561934E089"/>
```

```
<addassembly="System.Data.DataSetExtensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=B77A5C561934E089"/>
</assemblies>
</compilation>
<authenticationmode="Forms">
<formsloginUrl="~/Account/Login.aspx"timeout="2880"/>
</authentication>
<membership>
<providers>
<clear/>
<addname="AspNetSqlMembershipProvider"type="System.Web.Security.SqlMembershipProvider
"connectionStringName="ApplicationServices"enablePasswordRetrieval="false"enablePassw
ordReset="true"requiresQuestionAndAnswer="false"requiresUniqueEmail="false"maxInvalid
PasswordAttempts="5"minRequiredPasswordLength="6"minRequiredNonalphanumericCharacters
="0"passwordAttemptWindow="10"applicationName="/"/>
</providers>
</membership>
<profile>
<providers>
<clear/>
<addname="AspNetSqlProfileProvider"type="System.Web.Profile.SqlProfileProvider"connec
tionStringName="ApplicationServices"applicationName="/"/>
</providers>
</profile>
<roleManagerenabled="false">
<providers>
<clear/>
<addname="AspNetSqlRoleProvider"type="System.Web.Security.SqlRoleProvider"connectionS
tringName="ApplicationServices"applicationName="/"/>
<addname="AspNetWindowsTokenRoleProvider"type="System.Web.Security.WindowsTokenRolePr
ovider"applicationName="/"/>
</providers>
</roleManager>
<pages>
<controls>
<addtagPrefix="asp"namespace="System.Web.UI"assembly="System.Web.Extensions,
Version=3.5.0.0, Culture=neutral, PublicKeyToken=31BF3856AD364E35"/>
<addtagPrefix="asp"namespace="System.Web.UI.WebControls"assembly="System.Web.Extensio
ns, Version=3.5.0.0, Culture=neutral, PublicKeyToken=31BF3856AD364E35"/>
</controls>
</pages>
<httpHandlers>
<removeverb="*"path="*.asmx"/>
<addverb="*"path="*.asmx"validate="false"type="System.Web.Script.Services.ScriptHandl
erFactory, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"/>
<addverb="*"path="*_AppService.axd"validate="false"type="System.Web.Script.Services.S
criptHandlerFactory, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"/>
<addverb="GET,HEAD"path="ScriptResource.axd"validate="false"type="System.Web.Handlers
.ScriptResourceHandler, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"/>
</httpHandlers>
<httpModules>
<addname="ScriptModule"type="System.Web.Handlers.ScriptModule, System.Web.Extensions,
Version=3.5.0.0, Culture=neutral, PublicKeyToken=31BF3856AD364E35"/>
</httpModules>
</system.web>
```

```
<system.webServer>
<modulesrunAllManagedModulesForAllRequests="true">
<removename="ScriptModule"/>
<addname="ScriptModule"preCondition="managedHandler"type="System.Web.Handlers.ScriptM
odule, System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"/>
</modules>
<validationvalidateIntegratedModeConfiguration="false"/>
<handlers>
<removename="WebServiceHandlerFactory-Integrated"/>
<removename="ScriptHandlerFactory"/>
<removename="ScriptHandlerFactoryAppServices"/>
<removename="ScriptResource"/>
<addname="ScriptHandlerFactory"verb="*"path="*.asmx"preCondition="integratedMode"type
="System.Web.Script.Services.ScriptHandlerFactory, System.Web.Extensions,
Version=3.5.0.0, Culture=neutral, PublicKeyToken=31BF3856AD364E35"/>
<addname="ScriptHandlerFactoryAppServices"verb="*"path="*_AppService.axd"preCondition
="integratedMode"type="System.Web.Script.Services.ScriptHandlerFactory,
System.Web.Extensions, Version=3.5.0.0, Culture=neutral,
PublicKeyToken=31BF3856AD364E35"/>
<addname="ScriptResource"verb="GET,HEAD"path="ScriptResource.axd"preCondition="integr
atedMode"type="System.Web.Handlers.ScriptResourceHandler, System.Web.Extensions,
Version=3.5.0.0, Culture=neutral, PublicKeyToken=31BF3856AD364E35"/>
</handlers>
</system.webServer>
<system.codedom>
<compilers>
<compilerlanguage="vb;vbs;visualbasic;vbscript"extension=".vb"type="Microsoft.VisualB
asic.VBCodeProvider, System, Version=2.0.0.0, Culture=neutral,
PublicKeyToken=b77a5c561934e089"warningLevel="4">
<providerOptionname="CompilerVersion"value="v3.5"/>
<providerOptionname="OptionInfer"value="true"/>
<providerOptionname="WarnAsError"value="false"/>
</compiler>
</compilers>
</system.codedom>
<runtime>
<assemblyBindingappliesTo="v2.0.50727"xmlns="urn:schemas-microsoft-com:asm.v1">
<dependentAssembly>
<assemblyIdentityname="System.Web.Extensions"publicKeyToken="31bf3856ad364e35"/>
<bindingRedirectoldVersion="1.0.0.0-1.1.0.0"newVersion="3.5.0.0"/>
</dependentAssembly>
<dependentAssembly>
<assemblyIdentityname="System.Web.Extensions.Design"publicKeyToken="31bf3856ad364e35"
/>
<bindingRedirectoldVersion="1.0.0.0-1.1.0.0"newVersion="3.5.0.0"/>
</dependentAssembly>
</assemblyBinding>
</runtime>
</configuration>
```

APPENDIX III TELECOMMUTING SYSTEM TEST QUESTIONNAIRE

Dear respondent please provide appropriate responses to the following questions.

Your Organization Type……..

Your Job Position (Manager/Employee) ……..

Simplicity

1. In relation to the interface, I found the Telecommuting System to be:

Very difficult to use 1 … 2 … 3 … 4 … 5 … Very easy to use

2. The menu items were well organized and functions were easy to find.

Strongly disagree 1 … 2 … 3 … 4 … 5 … strongly agree

3. I immediately understood the function of each menu item.

Strongly disagree 1 … 2 … 3 … 4 … 5 … strongly agree

4. Both occasional and regular users would like this system

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

5. The system requires the fewest steps possible to accomplish what I want to do with it

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

6. I quickly became skillful with the system

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

7. The interaction with the system was clear and understandable

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

8. The system easily does what I want it to do

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

9. I found navigating around the Telecommuting system screen to be:

Very difficult 1 … 2 … 3 … 4 … 5 … Very easy

10. Organization of the information in the system was

Very Confusing 1 … 2 … 3 … 4 … 5 … Very Clear

System Capabilities

1. The system speed is fast

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

2. The system is designed for all levels of users

Strongly disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

3. The system is flexible to interact with

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

4. I can use the System without written Instructions

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

5. The system's input produces the required output

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

Usefulness

1. The system enables me to monitor the progress of my work

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

2. The system enables me to view various reports

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

3. Using the system enables me to be more productive

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

4. While using the system, I can recover from mistakes quickly and easily.

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

5. Using the system helps me increase my work effectiveness

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

6. I can use the system successfully anytime and anywhere

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree

7. I didn't notice any inconsistencies as I used the system.

Strongly Disagree 1 … 2 … 3 … 4 … 5 … Strongly agree