

**CHALLENGES FACING IMPLEMENTATION OF TELEHEALTH PROJECTS IN  
KENYA**

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## **DECLARATION**

This project is my original work and has not been presented for a degree in any other university or for any other award.

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## **ABSTRACT**

Telemedicine projects seek to reduce burdens on these valuable resources by improving access to medical care for populations with sub-standard access to quality health care, no matter where they are physically located. Thus this research sought to investigate the determinants of implementation of telehealth projects in Kenya. In telehealth, information systems support goals of increased efficiency, effectiveness and quality of care. This could be achieved by facilitating the move towards evidence-based medicine, monitoring performance, improving telecommunication and co-operation between different organizations and professionals, and empowering patients. This research investigated the determinants of implementation of telehealth projects in Kenya. The study was limited to investigating the determinants for implementation of telehealth projects in Kenya with particular reference to Safaricom, Nokia Kenya and Orange Limited telehealth projects. The study focused on the influence of technology, planning, human resource skills and project funding on telehealth project implementation..The study used a descriptive research design in collecting data from the respondents. The questionnaires were attached to a cover letter from the researcher explaining the purpose of the study. The study concludes that human resources has been effectively deployed and utilized in the telehealth projects. It further concludes that these employees require comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for. It also concludes that organisation should invest in human resource skills both in size and level of technical sophistication. The study thus recommends that these organisations should use advanced equipment and high capacity bandwidth telecommunications lines. This will help them reach the remote and rural communities existing and incase the telecommunication systems do not have this capacity, costly alternative methods such as installing a satellite system may have to be considered. The study also recommends that the health professional groups within the medical community should develop technology standards.

## DEFINITION OF OPERATIONAL TERMS

- Telehealth:** Is the delivery of health-related services and information via telecommunication technologies.
- Technology:** Is the making, modification, usage, and knowledge of tools, machines, techniques, crafts, systems, methods of organization, in order to solve a problem, improve a preexisting solution to a problem, achieve a goal or perform a specific function.
- Planning:** is the extent to which time tables, milestones, workforce, equipment, and budgets are specified, becomes crucial in this type of complicated project environments.
- Project Implementation:** means technical implementation, namely ensuring that system development is completed and that the system functions adequately in a technical sense ( Berkun, 2005).
- Human Resource:** Human Resource is the set of individuals who make up the workforce of the telehealth project this includes medical professionals that operate the telehealth project.
- Teleradiology:** is the transmission of radiological patient images, such as x-rays, CTs, and MRIs, from one location to another for the purposes of sharing studies with other radiologists and physicians.
- Telepsychiatry:** refers to consulting between a doctor and patient using various forms of technology.

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

Telehealth uses computing and communications technology to support and provide health information to a variety of health professionals and on a variety of health issues, from the clinical to the general (Darkins & Cary, 2000). In specific terms Doarn (2004) describes telehealth as the use of computing and communications methodology and technology, to support health and health related fields such as medicine, pharmacy, dentistry and nursing. Telemedicine is not one specific technology but a means for providing health services at a distance using telecommunications and medical computer science (Joseph, 2011). Information to patients or healthcare personnel taking care of patients can be done using mobile technology-basically phones and in some cases, computers with wireless connections. Telemedicine is being propelled by two converging megatrends: advances in enabling technologies (digital compressed video) and telecommunications and increasing demand for access to high-quality medical care irrespective of location (Kaddu, Kovarik, Gabler & Soyer, 2009).

Since telehealth appeared at least 40 years ago, the majority of early projects did not survive the end of grant funding or trial financing (Darkins and Cary 2000). In the late 1980s and early 1990s there was a renewed interest in telehealth. Today, services offered include teleradiology, teleneurosurgery, telepsychiatry, transmission of echocardiographic images, electronic referrals, and video conferencing between primary and secondary healthcare providers (Yellowlees, 2006). In the UK, the majority of services are provided by pilot, small scale projects (Klecun-Dabrowska and Cornford 2002).

Indeed some companies in Kenya such as Safaricom Nokia and Orange Limited have began establishing telehealth projects with a central telemedicine station manned center with both e-Health and m-Health services (GoK, 2011). Usually project development and implementation is followed by the process of project performance which is the overall quality of a project in terms of its impact, value to beneficiaries, implementation effectiveness, and efficiency and sustainability (Allen, 2004). Measuring project performance is an important part of project management. It allows the project manager to identify cost and schedule problems early and take

steps for remediation quickly. In fact it provides the organization with a clear picture of the health of its projects and can instill confidence in the project teams. There are many factors that determine project performance, such as accessibility to appropriate technology, effective planning, and skilled human resources and finance (Smith, 2002).

Successful project implementation requires planning with a commitment to complete the project; spending time to define the project adequately; correctly planning the activities in the project; ensuring correct and adequate information flows; changing activities to accommodate frequent changes on dynamic; accommodating employees' personal goals with performance and rewards; and making a fresh start when mistakes in implementation have been identified (Chamoun, 2006). The issue of procuring and retaining human resources with the right skills in technology, time management, conflict resolution and management, networking, contracts management, project choice and project quality are key to project success (Comminos &, Frigenti, 2002).

To enhance project implementation success, management and sponsors must as much as possible adopt the project management approach, by clearly spelling out project objectives, create clear objectives, create the conditions for the attainment of good results, project requirements should be clearly defined in terms of resources, time scale, technical approach and the required technology (Berkun, 2005).

## **1.2 Overview of the Telehealth sector in Kenya**

Technology is increasingly changing the way health care is delivered in Kenya. A recently launched service 'Call-a-Doctor' initiated by a mobile phone service provider Safaricom which has partnered with clinicians to provide a tele-health consultation service, provides patients with a chance of calling a doctor to seek medical attention. This followed a move meant to spur adoption of e-health services and solutions; the Kenya government has developed a national e-health strategy through the ministry of medical services in order to help enhance health service and medicare provision by utilization of information and communications technologies. The strategy is expected to among other things address the country's low doctor to patient ratio which is currently estimated to be 0.14 physicians per 1,000 people while expenditure on health care services takes up about 4.9 per cent of the GDP (GoK, 2012)

Kenya's e-government directorate is working together with stakeholders to promote the adoption of a universal personal identifier for health applications, and its currently warehousing of people's health data. These health data warehouse will lower cost by sharing, increasing convenience for people, minimize expensive repetitions and ensure seamless movement between providers. It will also ensure remote access to records and availability as well as send data to multiple users, adding that this would open up opportunities for the use of technology in healthcare provision. The warehouse will have a personal key shared by all health stakeholders with information comprising of people's medical history, health insurance and subsidies as well as demographics, drugs, diseases, tests and test results and therapies (GoK, 2012)

Local software developers are also working on both web and mobile applications meant to bring the benefits of ICT to the medical arena. Recently, Shimba Technologies, a local software development outfit, and Nokia launched MedAfrica, a mobile application that provides information about medical solutions upon download with the aim to make healthcare information affordable and accessible to Kenyans. MedAfrica seeks to improve the health of communities and regions in which it operates by increasing access to healthcare-related information and services in Africa. Good health is a universal need that affects the output of communities directly impacting their socioeconomic standing. The MedAfrica app aims to create platforms that facilitate dissemination of information and build communities around the different issues and conditions. "The content in the platform will be provided by the government (courtesy of open data portal), private sector, academia and the general health practitioners (Ndegwa, 2012)

The MedAfrica app is currently available for download in Kenya and other African countries with similar infrastructural challenges as Kenya's. The platform will be accessible via a number of channels mobile applications (Java, Nokia, and Android), mobile web, Unstructured Supplementary Service Data (USSD), web and short message service (SMS). Shimba Technologies hopes to partner with government institutions, pharmaceutical companies, medical associations, medical support groups, non-governmental organizations, mobile network operators and general populations in order to drive uptake of the software (ibid).

### **1.3 Statement of the problem**

In Kenya the use of technology to deliver health services (Telehealth) is limited thus people residing in remote and rural areas struggle to gain access to timely and quality specialised medical care. Even when the rural areas may have access to a general practitioner, the residents are forced to expend considerable resources in the form of both time and money in order to seek specialised medical care from the few available health institutions (Obstfelder, Engeseth , Wynn, 2007).

In as much as there are few telehealth projects that have been established in Africa as compared to the rest of the world, there is a scarcity of papers that actually evaluate the success of implementation of these projects (Vander, 2004). Equally there is limited literature on the factors that affect telehealth projects in Africa and in Kenya specifically. Indeed, without determining the implementation process and the factors that affect the the implementation of these telehealth projects, implementers of these projects cannot be able to show evidence of the benefits of such projects and whether these projects are actually helping to achieve better health care for the population. Therefore this research study sought to investigate the determinants of implementation of telehealth projects in Kenya

### **1.4 Objectives of the Study**

#### **1.4.1 General Objective**

The purpose of the study was to investigate the determinants of telehealth projects implementation in Kenya. A case of Safaricom, Orange and Nokia Telehealth Projects.

#### **1.4.2 Specific objectives**

The following specific objectives were guiding the study:

- a) To determine the influence of technology on the implementation of telehealth projects in Kenya
- b) To assess the influence of project planning on the implementation of telehealth projects in Kenya
- c) To examine the effect of human resource skills on the implementation of telehealth projects in Kenya

- d) To assess the effect of project funding on the implementation of telehealth projects in Kenya

### **1.5 Research Questions**

- a) To what extent does technology determine the implementation of telehealth projects in Kenya?
- b) How does project planning determine the implementation of telehealth projects in Kenya?
- c) How do human resource skills determine the implementation of telehealth projects in Kenya?
- d) To what extent does project funding determine the implementation of telehealth projects in Kenya?

### **1.6 Justification of the Study**

In healthcare, information systems are now expected to support goals of increased efficiency, effectiveness and quality of care. This is to be achieved by, for example, facilitating the move towards evidence-based medicine, monitoring performance, improving communication and co-operation between different organisations and professionals, and empowering patients (Darkins, & Cary, 2000; Klecun-Dabrowska, 2002). The proponents of telehealth point out its potential to contribute to more equitable healthcare reaching for example, geographically and socially excluded populations, to develop enhanced modes of service delivery for health, and to reduce or at least contain the escalating costs of healthcare provision (Klecun-Dabrowska and Cornford 2002).. However, research into telehealth has been primarily concerned with technology and its performance, technical and to a lesser extent economic and organisational feasibility of telehealth services, legal considerations and ways of evaluating telehealth. The majority of literature on telehealth does not report on individual projects implementation or does it make claim regarding benefits of telehealth projects. In fact majority of these studies were done in Europe, America and Asia (Hakansson and Gavelin 2000, Whitten et al. 2000). Thus this research study will investigate the determinants of implementation of telehealth projects in Kenya

### **1.7 Significance of the Study**

The study will be significant to the telehealth project management because they will be able to understand the factors that affect the implementation of telehealth Projects and seek ways to

strengthen the variables that determine project implementation. The study will be significant to the telecommunication and the health sectors management because they will be able to understand and appreciate the factors that affect the implementation of telehealth project and look for ways to enhance the same through application of effective strategies, policies and management practices. The study will provide the background information to research organizations and scholars who will want to carry out further research in this area. The study will also facilitate individual researchers to identify gaps in the current research in this area.

### **1.8 Scope of the Study**

The study was limited to investigating the determinants of telehealth projects implementation in Kenya with particular reference to Safaricom, Orange and Nokia telehealth projects. The study focused on the influence of technology, planning, human resource and finance on project implementation. The target population of the study consisted of management, and staff. The research study covered the period between 2010 and 2012

### **1.9 Limitation and Delimitation of the Study**

There were some respondents who were unwilling to provide full information for fear of being reprimanded by their managers for giving out information that they consider confidential. However the researcher assured the respondents of the confidentiality of the information that they provided and sought authority from the management to undertake research. There were some respondents who did not provide authentic information but instead provide general information. However the researcher alternated closed and open ended questions in order to get direct answers.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

In this chapter, literature, which is related to and consistent with the objectives of the study, is reviewed. Important theoretical and practical problems are brought out; relevant literature on the aspects pertaining to the determinants of telehealth projects implementation in Kenya is discussed.

#### 2.2 Theoretical Review

The critical theory position that sees technology not as autonomous but as an instrument of social control placed in the hands of the ‘vested interests’ which control society (Feenberg 1991, Marcuse 1970). Critical theory argues that technology is not a thing in the ordinary sense of the term, but ambivalent” process of development suspended between different possibilities. This “ambivalence” of technology is distinguished from neutrality by the role it attributes to social values in the design, and not merely the use, of technical systems. On this view, technology is not a destiny but a scene of struggles. It is a social battlefield, or perhaps a better metaphor would be a parliament of things on which civilization’s alternatives are debated and decided. (Feenberg 1991)

Technology embodies values and norms of its designers and sponsors (as, for example, illustrated by social constructivists) but these do not come into play until they are drawn upon in use, and then they (and the technology) can be re-interpreted (Woolgar 1996, Orlikowski 2000). Yet, we are not free to assign any interpretations to technologies, as we are bounded (to a greater or lesser extent) by their characteristics, by organisational context, by wider economic and political interests, and as critical theorists would argue, by our own consciousness. Often technology appears if not autonomous then at least self augmenting (Doolin and Lowe 2002)



## **2.3 Empirical Review**

### **2.3.1 Project life cycle**

Projects follow a predictable pattern or life cycle. A project life cycle consists of several stages during which deliverables are created and end with approval of the deliverables. A project goes through various stages to completion. The project life cycle process may vary along the deliberate and emergent continuum (Mintzberg & Waters, 1985). The project life cycles goes through below stages.

Project definition is done before a project starts. The project manager must make ensure the project goals, objectives; scope, risks, issues, budget, timescale and approach have been defined. This should be communicated to all the stakeholders to get their agreement. Any differences of opinion need to be resolved before work starts.

Project initiation follows which is the introduction part of a project management that entails a broad scoped conceptualization and projection of the scope, inputs, outputs, costs and timescales. The initiation stage is imperative in the sense that it gives a direction through which the implementation and planning processes should be pegged on. The project manager should understand the goals of the venture and how they are to be achieved. The manager should identify who the project executors are and how results will be measured. A good initiation process is that which is bound on time and cost. The backbone of a successful project performance is the financial resource. Time presents itself as a control measure of the rate of execution plan, (Sutterfield , et al,2006).

During the initiation stage, telehealth project managers assess the goals, resource inputs and any underlying challenges and produce the projections. The cost should also be estimated and ascertained if the funds offered by the financiers are sufficient enough to carry through the process. Underestimation of the cost of project can result to inadequate funds to run the project. In the initiation stage, the amount of funds required is quoted. This is based on predictions and may not reflect the actual amount as may be shown on the project budget (Kloppenborg, 2009). The role of the project managers should also be established. There are core aspects that project managers should be accountable of for instance, poor management of

resources leading to substandard results. A project manager is the overseer of the venture and the workers are the driving force.

The initiation part should also bring out how the project team will realize its goals. Working as a team is encouraged. Group thinking must be emphasized. Job descriptions for every employee must be drawn and handed over to the staff members.

Project planning involves the development of tasks and a schedule to keep a project moving forward. Project planning defines the project activities and end products that will be performed and describes how the activities will be accomplished. The purpose of project planning is to define each task, estimate the time and resources required and provide a framework for management review and control. The project planning activities and goals include: the specific work to be performed and goals that define and bond the project; estimates to be documented for planning, tracking and controlling the project; commitments that are planned, documented and agreed to by affected groups; project alternatives, assumptions and constraints.

The planning process involves estimation of the size of the project; the technical scope of the effort; the resources required to complete the project; produce a schedule, identify and assess risks and negotiate commitment. Project implementation is a process of doing tasks and producing results according to preset and approved plan supplemented with additional guidance and expertise. It is what is necessary to compose before performing a project, if there are yet a number of essential recommendations, comments, and additional requirements immediately connected to working process. Implementation is the stage where all the planned activities are put into action.

Once the project is running it is important the project manager monitor and control the project. This is achieved by regular reporting of issues, risks, progress and the constant checking of the business case to ensure that expected benefits will be delivered and are still valid. While the project is in the implementation stage, monitoring and controlling is done to ensure it's moving along as planned.

Project closure is last stage in a project. It is important to get the customers agreement that a project has ended and no more work will be carried out. A project can be closed by inclusion, integration, or extinction, thus a plan must be developed to terminate it (Meredith & Mantel, 1995):. Once closed, the project manager should review the project and record the good and bad points, so successes can be repeated and failures avoided. A project that is not closed will continue to consume resources. Regardless whether a successful project is completed by inclusion, integration, or extinction, a plan must be developed to terminate it. An organization that is project-oriented may have a "termination manager" whose primary responsibility is to effectively and efficiently end projects. The management should be sensitive to the needs of its employees during the termination process (Stevens, 1992). Cancellation, in particular, can have a profound and lasting effect on the organization and its employees. Lastly, the final report is the opportunity to reflect on the project, document its successes and shortcomings and make recommendations for the future.

### **2.3.2 Project Implementation**

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Implementation is sometimes used to mean technical implementation, namely ensuring that system development is completed and that the system functions adequately in a technical sense (Berkun, 2005). At other times, it is used to refer to the human and social aspects of implementation, such as that the system is used frequently by organizational members or that it is considered valuable to them in their personal work activities or coordination with others. The process of project implementation, involving the successful development and introduction of projects in the organization, presents an ongoing challenge for managers (Comminos & Frigenti, 2002).

Project can be considered to be the achievement of a specific objective, which involves a series of activities and tasks which consume resources. It has to be completed within a set specification, having definite start and end dates (Berkun, 2005). In contrast, project management can be defined as the process of controlling the achievement of the project objectives. Utilizing the existing organisational structures and resources, it seeks to manage the project by applying a

collection of tools and techniques, without adversely disturbing the routine operation of the company (Heerkens, 2001).

Clements and Gido (2003) avers that after project initiation stage, designing or planning is done to streamline the task and make a flexible strategy to complete the task. Then the execution phase takes the center stage, and in this phase, the project is practically tackled with all its pros and cons. The monitoring and controlling of the project is done with the execution stage to check the possible threats and keep an eye on the performance of the team. Once the project is about to finish, it goes into the closing phase, where all the activities are finalized (Kerzner, 2003).

The process of project implementation involves effective and efficient setting of project objectives, allocating resources, assigning responsibilities and monitoring and evaluating the achievement of objectives (Clements & Gido, 2003). However this presents an ongoing challenge for managers and organizations as the project implementation process is complex, usually requiring simultaneous attention to a wide variety of human, budgetary, and technical variables. As a result, the organizational project implementation is faced with a variety of challenges characterized by shortage of necessary skills, unavailability of the needed funds, and lack of appropriate governance structures (Chamoun, 2006).

### **2.3.3 Technology**

Telemedicine technology is dependent on advanced telecommunications networks. Yet in rural Africa many areas do not yet have fibre optic lines. Instead there are twisted pair telephone lines. In some locations it has been difficult even to map where fibre optic lines are located. Lines may run within a mile of each other, yet still the networks are unconnected. Furthermore, when dedicated fibre optic lines must be used for telemedicine, the costs can be enormous. The tariff rates, especially for T1 services within local calling areas, may inhibit rural access to interactive video (Doarn, 2004).

The type of telehealth technology selected affect the implementation of the project as it is essential to ensure access technology that does not focus solely on the requirement to provide a service, but it also focuses on the needs of the users – patients, health care providers and administrators (Harum, 2004). Hardware, software and peripheral devices can vary among

telehealth specialties; but these equipments should be reliable, adequately accurate, and flexible enough to meet varying needs. In fact some manufacturers have developed workstations that enable a variety of peripheral devices to be connected to them allowing images, video, sound and text to be captured and transmitted from a workstation at one telehealth site to another via a telecommunications or network link ( Doarn, 2004).

The most important requirement for technology used in telehealth project include: interoperability - the ability of different technology components and platforms to communicate with each one another and achieve predictable results; Compatibility - the unanimity of earlier versions with newer versions of similar technologies; reliability - operational reliability and dependability, as well as technological effectiveness; scalability - the equipment has the ability to take on expanded capabilities without total replacement and is able to operate using a higher bandwidth than the level currently used; Integration - the ability of new, complex technology to blend or fuse with existing systems (the integration of Picture Archiving and Communication Systems (PACS) into a radiology department) (Kaddu, Kovarik, Gabler & Soyer, 2009).

Chief among the challenges facing the establishment of electronic networks in Africa is the poor telecommunications infrastructure. In most countries, the telecommunications authorities are run by the state, and therefore governed by bureaucratic regulations which tend to stifle any sort of liberal initiative. However this is changing in some countries; the Botswana Telecommunications Corporation was recently deregulated. This resulted in the immediate entry of private companies thus providing needed competition and services. Telehealth technology uses advanced equipment and high capacity bandwidth telecommunications lines. Many remote and rural communities existing telecommunication systems do not have this capacity, costly alternative methods such as installing a satellite system may have to be considered. Telstra is currently upgrading many of its facilities in rural and outback Australia to make high bandwidth connections possible ( Doarn, 2004).

Although one might speculate that the major barrier to full scale implementation would be the technology for telemedicine delivery, technology has not been reported as a major problem in the implementation of current individual telemedicine projects (Moore, 1993). There are, however, problems when existing equipment cannot be integrated to work with each other. The Consensus

Conference from the Mayo Telemedicine Symposium (1994) recommended that vendors work together to assure that various equipment communicate in the future. In order to assure a minimum standard of quality, it was also recommended that professional groups within the medical community develop technology standards.

In a telemedicine environment which by definition involves a telecommunications network, network management, performance management, change management and security management. The reliability of the network and the system is measured in terms of reliability metrics, which usually include rate of fault occurrence, mean time to failure, availability, and probability of failure for a particular level of demand. The greater the diversity of the network, that is, the greater the number of protocols, vendors, types of equipment, applications and platforms, the less reliable the network. The impact of all this complexity is that more time is spent on operational activities and less on project, that is, strategic activities (Doarn, 2004).

#### **2.3.4 Planning**

Project planning, which refers to the extent to which time tables, milestones, workforce, equipments, and budgets are specified, becomes crucial in this type of complicated project environments (Sandoe et al, 2001). Project planning generally consists of developing the scope statement; selecting the planning team; identifying deliverables and creating the work breakdown structure; identifying the activities needed to complete those deliverables and networking the activities in their logical sequence; estimating the resource requirements for the activities; estimating time and cost for activities; developing the schedule; developing the budget; risk planning; gaining formal approval to begin work (Chamoun, 2006).

Success or failure of a telemedicine project rests squarely on whether adequate and accurate planning has been done prior to starting it. A project is planned to an appropriate level of detail with the underlying objective of planning time, cost and resources adequately to estimate the work needed and to effectively manage risk during project execution. a failure to adequately plan greatly reduces the project's chances of successfully accomplishing its goals (Joseph, 2011).

Involving the users in the planning of the project. If the users have not been included in the planning process, they will not understand the role of the system in the business strategy. The

natural reaction will be to optimize the use of one's own time, rather than take the effort to learn the new system (Allen, 2004). Furthermore, it is vital to have physician "buy-in" if it is expected that the system be properly integrated into the process. This is best done by having a dedicated physician, who is familiar with the technology, being involved in any actual physician training. For example, needs assessment needs to be thorough. At first, telemedicine was used for remote areas alone. However, recent developments have placed it as a need in the general mass. Consider the case of using a mobile phone to alert a person taking medicine of the time and the type of medicine to be taken (Vander, 2004).

### **2.3.5 Human Resource Skills**

Dealing effectively with health projects calls for adequate human resources, both in size and level of technical sophistication; clearly most projects are constrained by small man-power. In spite of efforts, in many instances with external assistance, opportunities for higher education for sustainable development including for training in requisite specialized skills are sorely inadequate although the foundation for developing such skills, in terms of basic education exists in most although not all of them. Sustainable development calls for training in a large number of technical skills and cannot be effectively pursued with the help of manpower that is merely literate at a basic level (Chamoun, 2006)

Adam (1995) argues that maintaining the right skill mix and enhancing employee flexibility are two sides of the same coin and a direct consequence of a more unstable business environment, necessitating more frequent re-inventions and a continuous search for better ways of doing things. Developing a flexible workforce capable of performing a range of tasks and readily moving from one function to another is potentially a better option when there is no need for a fundamental cultural change, but requires a well developed training and education programme.

Health professionals require comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for. In a survey conducted on health professionals working with the South Australia telehealth renal dialysis system, 45 per cent of respondents said that lack of training and practice was a major impediment for using the telehealth system. In particular the health professionals wanted: general training on telehealth;

training on camera use; and training on the desktop videoconferencing unit (John Mitchell and Associates 1998).

From the user viewpoint, training is the other major activity before and during deployment. Medical professionals find it hard to make time for training. In some cases, independent practice physicians will not be controlled by the healthcare enterprise and it is impossible to mandate training for all those who might be users of the system. Attempts to utilize even designed technology without some familiarization and training will lead to frustration with the system. Adult training relies on the fact that people will learn because they want to be competent in performance of work functions (Project Management Institute, 2006).

The project management must have the skills and experience in managing health projects. Key human resources competencies for project managers are leadership, change management, communication, negotiating, team building, decision making, and problem solving (Brooks, 2002). An ability to lead is clearly one of the most important competencies a project manager must have. A lack of leadership qualities can readily result in the failure or delay of the financial system implementation. Leading a team also requires the ability to gain a consensus. Not all team members will necessarily be in complete agreement, so the project manager must be able to persuade all team members to cooperate and to accept the recommendations of others. In other words, the project manager must be able to negotiate to find mutually agreeable solutions. The project manager must be a leader handing out orders to the team, but must also work alongside the team and participate actively with it. One key aspect of this participation is encouraging and facilitating a cooperative environment (Lewis, 2002)

### **2.3.6 Project funding**

Project funding also describes a series of financial structures with a common characteristic: the funding will not primarily be based on the credit risk of its sponsors, or on the value of the physical assets involved in the project. Project funding will depend on the degree of confidence in, and performance of, the project itself, which will generate a cash flow, determined on the basis of a financial and economical balance that will be self-supporting in the medium to long term (Heerkens, 2001).



Funding for a project is based upon the provision of the estimated costs to the funding organization(s). It is therefore critical that these estimates be as inclusive and accurate as possible. Considerations: Acquire estimates for the set-up and installation costs of the technology and telecommunications link(s) selected. Include costs for facility upgrades, testing, and initial education and training. Estimate the direct project costs, including: capital costs: labor (contractual staff), hardware, software, interfaces, peripherals, preliminary studies, re-engineering of hospital services, facility upgrades, one-time license fees and project assessments (Darkins & Cary, 2000) .

Other costs such as labor (project manager, telehealth coordinator, technicians and other fulltime staff), office facilities, telecommunications (monthly connection fee, rate per minute), training and skill maintenance costs, power, insurance and administrative costs, provider remuneration adjustments, etc. estimate sustainability costs – ongoing costs to support and operate the telehealth system including the source of the funding. Be cautious about commencing a project without having identified and committed funding sources to sustain it. Assess indirect project costs, considering the impact of competition for available funds in times of scarcity (Joseph, 2011).

While a full-fledged feasibility study, including a cost-benefit analysis, could in itself be costly and time-consuming, particularly in the absence of readily available necessary inputs, it will enable health service planners, administrators, government and/or alternative funding sources to better understand the telehealth project funding requests. When conducting a cost-benefit analysis, the overall objectives of the telehealth project should be kept in mind. These may include meeting specific provincial or national objectives such as the provision of universal health care or the retention of health professionals in remote and rural regions (Vander, 2004).

An important factor to keep in mind when preparing a cost-benefit assessment is that telehealth is conducted in a complex and ever-changing social, economic and technological environment hence cost-benefit assumptions valid a year ago may or may not be valid today. As the cost of new technology declines, cost-benefit ratios can improve substantially. Projects that would not have been funded in the past may become feasible in the future and could be approved in due course. Telecommunications can be a major component of a telehealth project's overall costs.

These costs can be high. Because different telehealth applications require different technologies, assessing the costs for different combinations of technologies and infrastructures may be a difficult exercise (Joseph, 2011; Vander, 2004).

Telemedicine services are often undertaken to control the costs of health care. In rural areas the goal is to control the cost of transportation and distant referral. In urban areas the goal may be to avoid referring patients, and losing the income associated with those patients, to other facilities. Both environments have attempted to use non-physician care providers, supervised via telemedical links by physicians, to control costs. Calculations of the costs of telemedicine must include the one-time expenditure for equipment, recurring expenditures for network services, maintenance and personnel, and intangibles such as time spent learning how to use a new service, inconvenience to health care providers when they must leave their offices to use the new service, and lost opportunity costs. The nature of the health care organisation has demonstrated potential for reducing manpower costs by allowing support personnel to perform routine diagnosis and treatment, and freeing physicians to perform more complex tasks (Obstfelder , et al, 2007).

Generally, the cost of equipment is the most serious deterrent to adoption. Equipment costs include costs of Televideo equipment (camera, monitors) suitable for telemedicine applications; Operational costs, Staff to coordinate clinical site management monthly connectivity charges and gateway and/or bridging fees to with other networks and staff redirected to provide telehealth services or support to telehealth Clinical/Medical records management. Operations and maintenance typically consumes over 50% and sometimes as much as 70% of the life cycle costs. For software applications, only 17% of maintenance costs are attributable to corrective fixes. The remainder is due either to changes in environment, or changes demanded by user or operations personnel (Sommerville, 1988).

#### **2.4 Summary and Gaps to be filled by the Study**

Many project management authors like Woolf, Murray (2007), Kerzner, Harold (2003) and Berkun, Scott (2005) who have written on project management are all in agreement regarding the purpose of project planning which is geared to improving the design and performance of an ongoing project; They all describe and cite the influence of planning on project constraints of

time constraint, cost and scope constraint as what must be done to produce the project's end result. However these three constraints are often competing constraints hence require differing level of planning

Telehealth relies on a wide range of technologies with relevance to the full spectrum of medical specialties. As a result, it is difficult to keep abreast of changes in a field whose developments may be scattered among the literatures of radiology, pathology, cardiology, emergency medicine, surgery, psychiatry, informatics, engineering and others

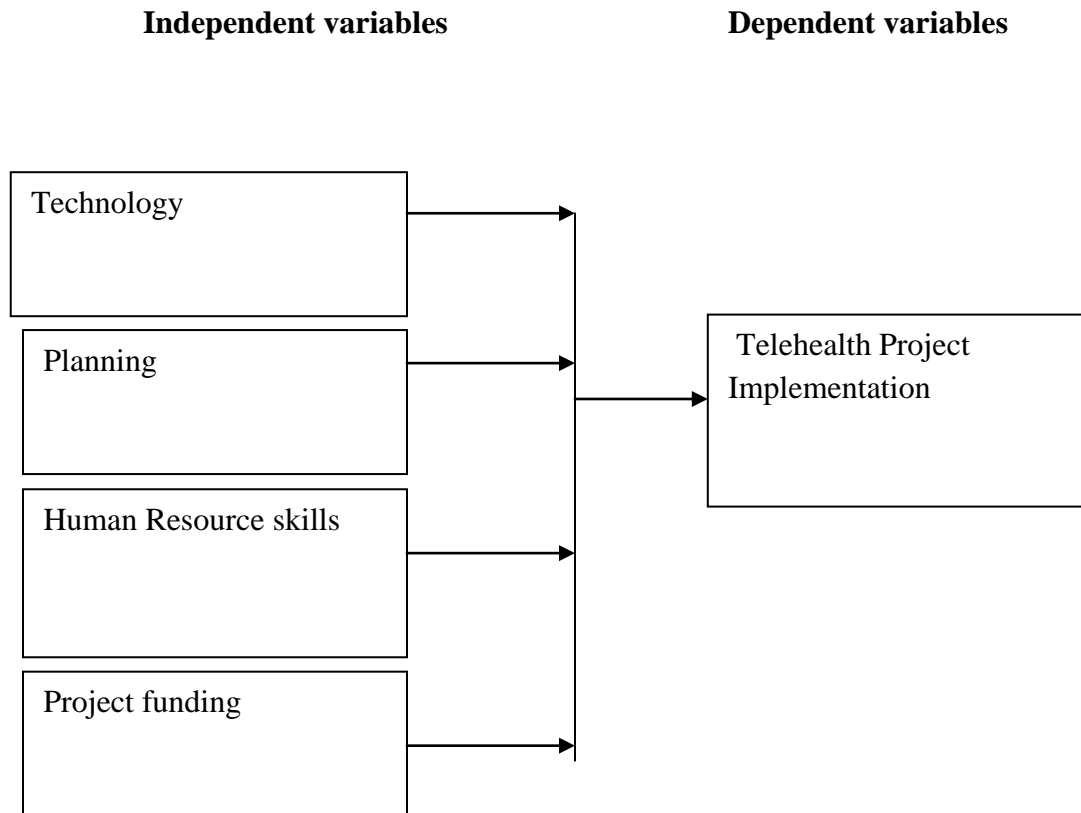
When doing a cost-benefit analysis of telehealth projects one must also consider the value of the services (Obstfelder, et al, 2007). However, measuring the effect of telemedicine on costs alone may not be an adequate basis for deciding whether to introduce a telemedicine system. Improvements in health care and patient outcomes are difficult to measure financially; the creation of markets, which then attracts investment and delivery of goods and services to these new markets. Additionally it inverts traditional medical costs, because the objective is no longer to see more patients, but fewer patients at a lower cost alternative.

Telehealth is a relatively new invention in Kenya especially to the medical practitioner's toolkit, but implementers and users of these innovative projects have not been able to acquire an extensive body of knowledge to ensure its performance. Understanding what that is, and what knowledge, experience, and tools the users should have, will reduce the unknowns and facilitate the implementation and performance of telehealth projects in Africa. Therefore this research study seeks to fill this research gap by examining the determinants of implementation of telehealth projects in Kenya with particular reference to Safaricom Telehealth projects.

## 2.5 Conceptual Framework

The study can be presented in a conceptual framework as shown in the figure below:

**Fig. 2.1 Conceptual Framework**



**Source author (2013)**

Telehealth project implementation is determined by technology, planning, human resources and finance.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter indicates the line of approach of the study. The first aspect deals with the method, population and sample of the study and second part provides the tools and techniques employed in the research. It also presents the procedure of the study; data organization and presentation are given in this section.

#### **3.2 Research Design**

Research design can be defined as the structure of a research. It is what holds all of the elements of a research project together. According to Trochim (2005), research design provides the glue that holds the research project together. The study will use a descriptive research design in collecting data from the respondents. Descriptive design portrays an accurate profile of persons, events, or account of the characteristics, for example behaviour, opinions, abilities, beliefs, and knowledge of a particular individual, situation or group (Burns and Grove 2003). The descriptive research design is preferred because it ensures complete description of the situation, making sure that there is minimum bias in the collection of data (Kothari, 2003).

#### **3.3 Target population**

Target population is the complete set of individual's cases or objects with some common characteristics to which the research wants to generate the results of the study (Mugenda and Mugenda, 2008). In this study, the population was drawn from Safaricom and Orange telehealth projects as they are the major telehealth projects in Kenya, the target population comprised of project management and operation staff drawn from Safaricom and Orange telehealth projects and who are currently in charge of the Telehealth projects in these companies. They consist of three (3) managers from Orange Limited, four (4) managers from Safaricom Limited and three (3) managers from Nokia Kenya and eighteen (18) operational staff from Orange , sixteen (16) operational staff from Safaricom Limited and twenty (20 ) operational staff from Nokia Kenya as indicated in the population frame provided by the Human resource departments of Safaricom, Orange Limited and Nokia and indicated on the table 3.1 below:

**Table: 3. 1 Target Population**

<b>Population Category</b>	<b>Population Size</b>	<b>Percentage</b>
Management	10	15.6
Operational Staff	54	84.4
Total	64	100

**Source: Safaricom and Orange and Nokia Kenya (2012)**

### **3.4 Sample and Sampling Procedures**

A sample is part of the target (or accessible) population that has been procedurally selected to represent it and whose properties are studied to gain information about the whole (Kombo & Tromp, 2006). According to Trochim (2005), Sampling is the process of selecting units (people, organizations) from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen. Sampling procedure is a technique the researcher uses to gather people, places or things to study (Mugenda, 2008). In this study it refers to the procedure the researcher used to select the final sample to study. Because of the size of the target population the study used census sampling method because it's attractive for small populations (e.g. less than 200 or less). Census eliminates sampling error and provides data on all the individuals in the population Kothari (2003).

### **3.5 Data Sources and Instruments**

The researcher used both primary and secondary sources. The data was collected from Safaricom and Orange telehealth projects in Nairobi, while secondary data was also be collected from the relevant sources which include reports, newsletter and unpublished data on project performance. Primary data was collected through questionnaires. Secondary data was collected through reviewing written records and reports on the subject matter.

Quantitative and qualitative data was collected using structured questionnaire containing closed and open ended questions. Kuter and Yilmaz (2001) define a questionnaire as a method for the elicitation, recording and collecting of information. Kothari (2003) argues that questionnaires generate data in a very systematic and ordered fashion.

### **3.6 Validity and reliability**

A pilot study undertook to discover any possible problems related to the design of the questionnaire in terms of the degree of clarity and its validity. The pilot study was conducted in two stages for the purpose of testing the validity, objectivity, and clarity of the questionnaire. Firstly, the questionnaire design was critiqued by peers who offered suggestions; secondly, a random sample of five (5) respondents was drawn from the target population to fill in the pilot version of the questionnaire. The basic aim was to evaluate the validity and objectivity of the study, and to assess the method and the procedure of collecting data using the questionnaire. The pilot results were aimed at pointing out any difficulties in understanding and answering the questions. Responses to the pilot yielded suggestions which involved making changes in sentence construction and removing a number of questions from the questionnaire.

### **3.7 Data Collection Procedures**

The researcher administered questionnaires containing closed and open ended questions structured on the basis of the research objectives such as technology, planning, human resources and finance. Each respondent received the same set of questions in exactly the same way. The questionnaires were attached to a cover letter from the researcher explaining the purpose of the study and the Questionnaire. The researcher and the assistants dropped the questionnaires and later collected them upon filling by the respondents. This method created provision for personal contacts between the researcher and the interviewees. Library and desk research was also carried out by scrutinizing reports, guides and documentation which were availed by project staff

### **3.8 Data Analysis and Presentation**

The data collected by use of the research instrument was initially edited to get the relevant data for the study. The edited data was then be coded for easy classification in order to facilitate tabulation. The tabulated data was then be analyzed quantitatively and qualitatively. Quantitative

data was analyzed by use of SPSS software which generated both descriptive and inferential statistics such as frequencies, percentages, mean, correlation and regression where applicable. Qualitative analysis was done through in-depth content analysis which involved categorizing and recombining evidences/themes to address the research question. Presentation of data was in form of Tables, Pie-charts and Bar graphs only where it provided successful interpretation of the findings. Descriptive data was provided in form of explanatory notes.



## CHAPTER FOUR

### DATA ANALYSIS, INTERPRETATION AND PRESENTATION

#### 4.1 Introduction

This chapter presents the research findings on the determinants of Telehealth projects implementation in Kenya a case of Safaricom, Nokia and Orange Telehealth Projects. The study was conducted on 64 respondents within Safaricom, Orange and Nokia offices in Nairobi. The respondents who were management and staff members of these companies were served with a questionnaire; out of 64 respondents, 50 respondents filled-in and returned the questionnaires which make a response rate of 78%.

The commendable response rate was achievable after the researcher administered the questionnaires and made personal visits and phone calls to remind the respondents to fill-in and return the questionnaires. Both descriptive statistics and inferential statistics were used to analyze the data. In the descriptive statistics, relative frequencies were used in some questions and other were analyzed using mean scores with the help of Likert scale ratings in the analysis. In inferential statistics, multiple linear regressions were used.

#### 4.2 Response Rate

The table below shows the job category of the respondents. The results were as follows;

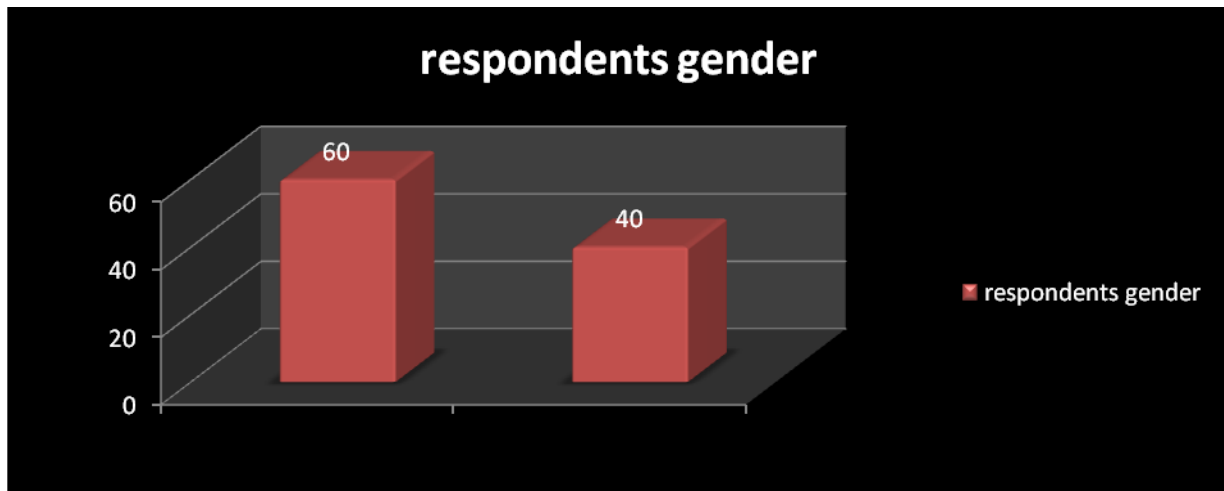
**Table 4.1 Response rate**

<b>Item</b>	<b>Cluster</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Managers</b>	Safaricom	3	6
	Orange	4	8
	Nokia	2	4
<b>Operational staff</b>	Safaricom	16	32
	Orange	13	26
	Nokia	12	24
<b>Total</b>		<b>50</b>	<b>100</b>

The study targeted a sample size of 64 respondents from which 50 filled in and returned the questionnaires making a response rate of 78%. This response rate was satisfactory to make conclusions for the study and the response rate was representative. According to Mugenda and Mugenda (1999), a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is considered to be excellent. Based on the assertion, the response rate was considered to be excellent. From our study majority of the respondents in the managers category were those from Orange as represented by 8%, Safaricom by 6% and finally Nokia by 4%.Safaricom operational staff occupied the largest portion of the staff category. This was represented by 32%, followed by Orange 26% and finally Nokia with 24%.This show that our study had almost an equal representation from all the targeted population.

#### 4.2.1 Respondent's gender

In this part of the study the researcher wanted to establish the respondent's gender, the results were as follows;

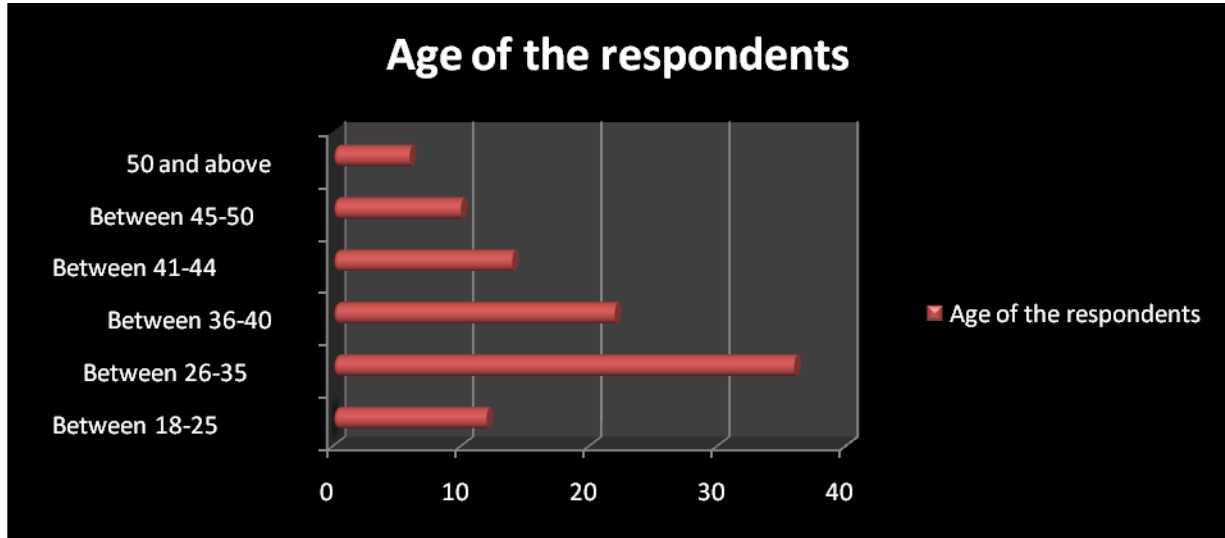


**Figure 4.1 Respondent's gender**

The study sought to determine the gender of the respondents and therefore requested the respondents to indicate their gender, from the findings the study found that majority of the respondents as shown by 60% indicated that they were males whereas 40% of the respondents indicated that they were females, this is an indication that both genders were involved in this study and thus the finding of the study would not suffer from gender biasness.

#### 4.2.2: Respondents Age

The age of the respondents was also an area investigated; the results from the study were as follows;



**Figure 4.2: Respondents Age**

From the figure above on the age of the respondents, the study requested the respondents to indicate their age category, from the findings, the study found that most of the respondents as shown by 36% indicated that they were aged between 26 to 35 years, 22% of the respondents indicated 36 to 40 years, 14% of the respondents indicated that they were between 41 and 44 years, 12% indicated that they were between 18 and 25 years, 10% indicated that they were between 45 and 5, whereas 6% of the respondents indicated that they were above 50 years, this is an indication that respondents were well distributed in term of their age. This also shows that majority of the respondents had been in their organisation for quite some time and they had adequate knowledge on Telehealth.

### 4.2.3 Highest level of education

**Table 4.2: Highest level of education**

The table below shows the educational level attained by the respondents in this research;

Item	Frequency	Percentage
Secondary	6	12
College	18	36
University	26	52
Total	50	100

From the table above on the respondent highest level of education, the study found that 52% of the respondent indicated that they had attained a degree from the university, 36% of the respondent indicated that they had attained a college certificate or a diploma, whereas only 12% had reached the secondary level, this shows that respondent in the three organizations were well educated.

### 4.2.4 Duration worked in the organisation

**Table 4.3: Duration worked in the organisation**

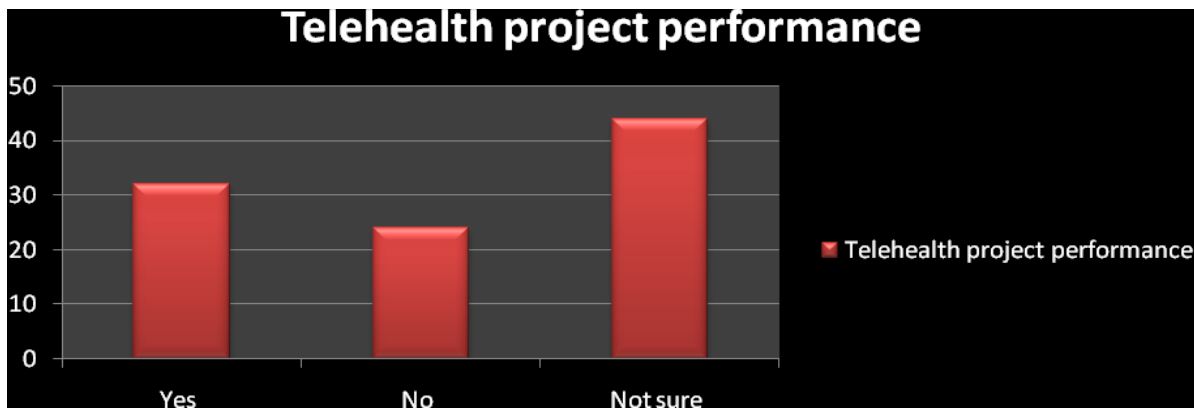
The duration spent in the organisation was also another area investigated by the researcher; the findings were as follows

Item	Frequency	Percentage
1-2 Years	7	14
3-5 Years	20	40
6-8 Years	15	30
9 and above Years	8	16
Total	50	100

From the finding on the time of service, the study found that majority of the respondents as shown by 40% indicated that they had served their company for 3 to 5 years, 30% indicated 6 to 8 years, 16% indicated to have served for above 9 years, whereas 14% indicated to have served for 1 to 2 years. This is an indication that majority of the respondents had served in their organization for more than 3 years and so give credible information. This is an indication that the respondents had adequate information in regard to Telehealth projects implementation in Kenya.

#### 4.2.5 Telehealth project performance opinion

The researcher also wanted to establish the performance of Telehealth projects by these organizations sampled, the findings were as follows;



**Figure 4.3: Telehealth project performance**

From the findings on whether telehealth project are performing well, the study found that majority of the respondents as shown by 44% indicated that they were not sure whether telehealth project were performing well, 32 percent had a feeling that telehealth projects were performing well whereas 24% of the respondent indicated that telehealth project were not performing well. This is an indication that telehealth project performance is not well known by many of the respondents.

### 4.3: Technology

**Table 4.4: Technological statements**

The study had the following statements which were subjected to a weighted mean and the findings were as follows;

	Strongly agree	Agree	Neutral	disagree	Strongly disagree	mean	Std deviation
<b>There is poor telecommunications infrastructure in rural areas hampering the implementation of telehealth projects.</b>	19	16	8	5	2	<b>3.90</b>	<b>0.14</b>
<b>Telehealth technology uses advanced equipment and high capacity bandwidth telecommunications lines inaccessible to rural areas.</b>	15	21	8	4	2	<b>3.86</b>	<b>0.16</b>
<b>Telecommunication network performance and security management influence the reliability of the network.</b>	12	26	6	6	0	<b>3.88</b>	<b>0.20</b>

On the respondent rating on the statements in regard to technology on telehealth project implementation, the study found out that majority of the respondents were in agreement with the following statements; there is poor telecommunications infrastructure in rural areas hampering the implementation of telehealth projects as indicated by a mean of 3.90, telecommunication network management, performance management and security management influence the reliability of the network affecting the implementation process as represented by a mean of 3.88, telehealth technology uses advanced equipment and high capacity bandwidth telecommunications lines which many remote and rural communities existing telecommunication systems do not have as represented by a mean of 3.86 and finally tariff rates, for health services within local areas inhibit rural access to interactive video as shown by a mean of 3.54 and a standard deviation of 0.13. This shows that the respondents opinions did not differ so much as this was indicated by standard deviations being less than one..

**Table 4.5: Influence of technology on the implementation of the telehealth projects**

The table below gives the findings on the influence of technology on telehealth projects;

Item	Frequency	Percentage
High	26	52
Average	15	30
Low	9	18
Total	50	100

From the findings on the respondent rating on the level of influence by technology on the implementation of the telehealth projects, the study found that most of the respondent as shown by 52 % rated technology on the implementation of the telehealth projects high, 30% of the respondent indicated average, while as 18% of the respondents indicated low. This shows that technology plays a fundamental role in telehealth projects implementation.

#### **Test of hypothesis of technology**

$H_{01}$ : Technology does not influence the implementation of telehealth projects in Kenya

The data on various aspects of technology on implementation of telehealth projects were subjected to Anova test using statistical package for social science to help to test the hypothesis that technology does not influence the implementation of telehealth projects in Kenya. The calculated values were compared with critical value to establish whether to reject or accept null hypothesis.

**Table 4.6: Testing hypothesis**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.832	2	3.916	8.495	.000
Within Groups	7.567	47	.161		
Total	15.339	49			

Critical value from student distribution table is **2.00**

From the results the calculated value was greater than the critical value ( $F_o = 8.495 > F_c = 2.00$ ) This means that there is a significant difference between various aspects of technology on implementation of telehealth projects. The hypothesis that Technology does not influence the implementation of telehealth projects in Kenya was therefore rejected. Therefore the alternative hypothesis is accepted i.e technology plays a fundamental role in influencing the implementation of telehealth projects



#### 4.4 Project Planning

**Table 4.7: Personal opinion on telehealth implementation**

Respondents were also required to give their personal opinions in regard to telehealth projects implementation

	Strongly agree	Agree	Neutral	disagree	Strongly disagree	Mean	Std deviation
Success or failure of a telemedicine project rests squarely on whether adequate and accurate planning id done	17	25	5	2	1	<b>4.10</b>	<b>0.21</b>
If the users have not been included in the planning and implementation process, they will not understand the importance and the role of the project.	11	18	14	5	2	<b>3.62</b>	<b>0.13</b>
It is vital to have physician “buy-in” during the planning and implementation process.	12	26	6	6	0	<b>3.88</b>	<b>0.20</b>

On the respondents rating on the above statements in regard to planning on telehealth projects implementation, majority of the respondents were in agreement with the following statements, Success or failure of a telemedicine project rests squarely on whether adequate and accurate planning has been done prior to starting it as shown by a mean of 4.10, It is vital to have physician “buy-in” during the planning and implementation process so as to effectively integrate the system into the health process as shown by a mean of 3.88, Thorough projects planning assessment needs to be undertaken before the implementation as represented by a mean of 3.74 and finally if the users have not been included in the planning and implementation process, they will not understand the importance and the role of the project as shown by a mean of 3.62 and a standard deviation 0.13.

**Table 4.8: Project planning influence on the implementation of telehealth projects**

The study also wanted to establish the impacts of project planning on the implementation of telehealth projects, the findings were as follows:

**Table 4.9: Project planning influence on the implementation of telehealth projects**

Item	Frequency	Percentage
Yes	35	70
No	15	30
<b>Total</b>	50	100

From the findings on whether project planning influence the implementation of telehealth projects, the study found that majority of the respondents as shown by 70 % indicated that project planning influences the implementation of telehealth projects whereas 30% of the respondent indicated that project planning do not influence the implementation of telehealth projects.

**Table 4.10: Level of influence of project planning on telehealth projects**

The level of influence of project planning on telehealth project was also investigated and findings illustrated as follows;

Item	Frequency	Percentage
High	26	52
Average	15	30
low	9	18
<b>Total</b>	50	100

From the table above rating the influence of project planning on the implementation of telehealth projects , the study found that most of the respondent as shown by 52% rated high, 30% of the respondent indicated average, 18 % of the respondent indicated low, this show that planning played a fundamental role the implementation of telehealth projects.

### **Test of hypothesis of Project planning**

H<sub>02</sub>: Project planning does not influence the implementation of telehealth projects in Kenya

The data on various aspects of Project planning were subjected to Anova test using statistical package for social science to help to test the hypothesis Project planning does not influence the implementation of telehealth projects in Kenya. The calculated values were compared with critical value to establish whether to reject or accept null hypothesis.

**Table 4.11: Test of hypothesis of Project planning**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.978	2	3.989	5.243	.002
Within Groups	12.267	47	0.261		
Total	20.254	49			

Critical value from student distribution table is 2.00

From the results the calculated value was greater than the critical value ( $F_o = 5.243 > F_c = 2.00$ ) This means that there is a significant difference between various aspects of planning and implementation of telehealth projects. The hypothesis that project planning does not influence the implementation of telehealth projects in Kenya was therefore rejected. The alternative hypothesis is therefore accepted that project planning influence to a greater extent implementation of telehealth projects

#### 4.5 Human Resource skills

**Table 4.12: Human resources effectively deployment in telehealth**

The table below gives the findings on the role of human resource in effectively and efficiently telehealth projects implementation.

Item	Frequency	Percentage
Yes	35	70
No	15	30
<b>Total</b>	<b>50</b>	<b>100</b>

From the findings on the respondents opinion on whether human resources was effectively deployed and utilized in the telehealth projects, the study found that majority of the respondents as shown by 70% indicated that human resources was effectively deployed and utilized in the telehealth projects whereas 30% of the respondent indicated that human resources was not effectively deployed and utilized in the telehealth projects

**Table 4.13: Personal opinion on role of human resource**

The table below shows the results of personal opinions of the respondents in regard to the role of human resource in telehealth projects implementation

	Strongly agree	Agree	Neutral	disagree	Strongly disagree	Mean	Std deviation
Dealing effectively with health projects calls for adequate human resources.	15	22	10	1	2	3.96	0.18
Right skill mix and enhanced employee flexibility promotes success.	13	15	11	8	3	3.70	0.09
Health professionals require comprehensive training and practice.	12	26	6	6	0	4.00	0.20
Utilizing even designed technology without familiarization and training lead to frustration with the system	13	20	10	5	2	3.84	0.14
The project managers must have the skills and experience in managing health projects.	17	14	14	4	1	3.92	0.14

On the respondent rating on the statements in regard to human resource on telehealth project implementation the study found out that Health professionals require comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for as shown by a mean of 4.00, Dealing effectively with health projects calls for adequate human resources, both in size and level of technical sophistication as shown by a mean of 3.96, The

project managers must have the skills and experience in managing health projects as shown by a mean of 3.92, Attempts to utilize even designed technology without some familiarization and training will lead to frustration with the system as shown by a mean of 3.84 and finally maintaining the right skill mix and enhancing employee flexibility promotes the success of project implementation as shown by a mean of 3.70 and a standard deviation of 0.09.

**Table 4.14: Level of influence of human resources on telehealth Projects**

The study also wanted to establish the level of influence human resource has on implementation of telehealth projects, the results were as follows;

item	frequency	percentage
High	35	70
Average	12	24
Low	3	6
Total	50	100

From the findings on the respondent rating the extent to which of human resources influenced the implementation of telehealth Projects, the study found that most of the respondent as shown by 70% of the respondent indicated high,24% of the respondent indicated average while as 6 % of the respondents indicated low. This shows that human resources influenced the implementation of telehealth Projects.

### **Test of hypothesis of Human resource skills**

H<sub>03</sub>: Human resource skills does not influence the implementation of telehealth projects in Kenya

The data on various aspects of human resource implementation of telehealth projects and were subjected to Anova test using statistical package for social science to help to test the hypothesis that. The calculated values were compared with critical value to establish whether to reject or accept null hypothesis.

**Table 4.15: Test of hypothesis of Human resource skills**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.604	2	0.302	3.800	.495
Within Groups	7.379	47	0.157		
Total	7.983	49			

Critical value from student distribution table is 2.00

From the results the calculated value was greater than the critical value ( $F_o = 3.800 > F_c = 2.00$ ) This means that there is a significant difference between various human resource skills and telehealth projects. The hypothesis that human resource skills do not influence the implementation of telehealth projects in Kenya was therefore rejected. The research therefore accept the alternative hypothesis that human resource skills influence to a greater extent the implementation of telehealth projects

#### **4.6 Project Funding**

**Table 4.16: Telehealth project funding**

The table below gives the findings on the adequacy of funding the telehealth projects by the investigated organisations; the results are as follows

<b>Item</b>	<b>Frequency</b>	<b>Percentage</b>
yes	16	32
No	34	68
Total	50	100

The study also wanted to investigate whether telehealth project were adequately funded; the study established that 68% of the respondents disagreed that telehealth projects were adequately funded whereas 32% of the respondent were in agreement that telehealth projects were adequately funded.

**Table 4.17: Personal opinion on projects funding**

The table below shows the findings on personal opinion in regard to projects funding in the implementation of telehealth projects

Attributes	Strongly agree	Agree	Neutral	disagree	Strongly disagree	Mean	Std deviation
Conducting and preparing a cost-benefit assessment of telehealth project is essential	17	25	5	2	1	<b>4.10</b>	0.21
Telecommunications is a major part of a telehealth project's costs	11	18	14	5	2	<b>3.62</b>	0.13
Telehealth applications require different technologies.	12	26	6	6	0	<b>3.88</b>	0.20
Hardware and software cost is the most serious deterrent.	16	14	13	5	2	<b>3.74</b>	0.12
Cost assessment is affected by the dynamic project implementation environment.	17	25	5	2	1	<b>4.10</b>	0.21

On the respondent rating on the statements in regard to funding on telehealth project implementation the study found out that it's important to conduct and prepare a cost-benefit assessment of telehealth project and Cost assessments is affected by the complex and changing project implementation environment hence cost-benefit assumptions keep on changing as shown by a mean of 4.10, Different telehealth applications require different technologies hence assessing the costs for different combinations of technologies and infrastructures may be a difficult as shown by a mean of 3.88, The cost of hardware and software is the most serious deterrent to adoption and implementation of telehealth projects as shown by a mean of 3.74 and finally Telecommunications is a major component of a telehealth project's overall costs as shown by a mean of 3.62 and a standard deviation of 0.13.

**Table 4.18: Project funding influence the implementation of telehealth project**

The table below gives the result on the influence of project funding in telehealth projects implementation

<b>Item</b>	<b>Frequency</b>	<b>Percentage</b>
yes	38	76
No	12	24
<b>Total</b>	<b>50</b>	<b>100</b>

The study also wanted to investigate whether project funding influenced the implementation of telehealth; the study established that 76% of the respondents agreed that project funding influence the implementation of telehealth project whereas 24% of the respondent dis agreed that project funding influence the implementation of telehealth project.

**Table 4.19: Level of influence of project funding to telehealth projects**

The table below also gives the result on the influence of project funding in telehealth projects implementation

<b>Item</b>	<b>Frequency</b>	<b>Percentage</b>
High	26	52
Average	18	36
Low	6	12
<b>Total</b>	<b>50</b>	<b>100</b>

From the findings on the respondent on what has been the level of influence of project funding to telehealth projects, the study found that most of the respondent as shown by 52% of the respondent indicated high,36% of the respondent indicated average while as 12 % of the respondents indicated low.



### Test of project funding

H<sub>04</sub>: project funding does not influence implementation of telehealth projects in Kenya

The data on various aspects of project funding and implementation of telehealth projects were subjected to Anova test using statistical package for social science to help to test the hypothesis that project funding does not influence implementation of telehealth projects. The calculated values were compared with critical value to establish whether to reject or accept null hypothesis.

**Table 20: Test of project funding**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.074	2	0.537	4.747	.525
Within Groups	5.593	47	0.119		
Total	6.667	49			

Critical value from student distribution table is 2.0

From the results the calculate value was greater than the critical value ( $F_o = 4.747 > F_c = 2.0$ ) This means that there is a significant difference between project funding and implementation of telehealth projects. The hypothesis that project funding does not influence implementation of telehealth projects was therefore rejected.

### 4.7 Regression Analysis

The following regression table shows how the dependent variable is being influenced by the research independent variables, the figures are as follows

**Table 21: Regression Analysis**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855 <sup>a</sup>	.731	.712	.52536

Adjusted R<sup>2</sup> is called the coefficient of determination and it shows how implementation of telehealth projects varied with changes in technology, project planning, human resource skills and project funding. From data in the above the value of adjusted R<sup>2</sup> is 0.712. This implies that, there was a variation of 71.2% of how implementation of telehealth projects changes in technology, project planning, human resource skills and project funding at 95% confidence interval, the study also found that there is a strong positive relationship between the study variable as shown by correlation coefficient of 0.855.

**Table 4.22: Table of Coefficients**

The following tables gives the coefficients which helps in establishing the regression line

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.161	.129		8.978	.000
	Technology	.282	.064	.093	1.286	.199
	Project planning	.142	.050	.232	2.867	.004
	Human resource skills	.218	.040	.030	.453	.651
	Project funding	.106	.059	.007	.106	.916

The established regression equation was

$$Y = 1.161 + 0.282 X_1 + 0.142 X_2 + 0.218 X_3 + 0.106 X_4$$

From the above regression model, holding technology, project planning, human resource skills and project funding to a constant zero, implementation of telehealth projects would be 1.161, it is established that a unit increase in technology would cause an increase in implementation of telehealth projects by a factor of 0.282, a unit increase in project planning would cause an increase in implementation of telehealth projects by a factor of 0.142, also a unit increase in human resource skills would cause an increase in implementation of telehealth projects by a factor of 0.218, also a unit increase in project funding would cause an increase in implementation of telehealth projects by a factor of 0.106. This clearly shows that there is a positive relationship between implementation of telehealth projects and technology, project planning, human resource skills and project funding. The study further revealed that the P-value were less than 0.05 in all the variables, which shows that all the independent variables were statistically significant and thus in position to make a conclusion for the study.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

From the analysis and data collected, the following discussions, conclusion and recommendations were made. The responses were based on the objectives of the study. The researcher intended to determine the influence of technology on the implementation of telehealth projects in Kenya, to assess the influence of project planning on the implementation of telehealth projects in Kenya, to examine the effect of human resource skills on the implementation of telehealth projects in Kenya and to assess the effect of project funding on the implementation of telehealth projects in Kenya.

#### **5.2 Summary of Findings**

From the findings on the determinants of telehealth projects implementation in Kenya the study established that majority of the respondents were not sure whether telehealth project were performing well as represented by 44%. This is an indication that telehealth project performance is not well known by many of the respondents. The study also revealed that there is poor telecommunications infrastructure in rural areas hampering the implementation of telehealth projects as indicated by a mean of 3.90, the study also established that telecommunication network management, performance management and security management influence the reliability of the network affecting the implementation process, telehealth technology uses advanced equipment and high capacity bandwidth telecommunications lines which many remote and rural communities existing telecommunication systems do not have as represented. This shows that the respondents opinions did not differ so much as this was indicated by standard deviations being less than one. The study further revealed that technology played a significant role on the implementation of the telehealth projects and this was rated high as indicated by 52%.

The study further revealed that success or failure of a telemedicine project rests squarely on whether adequate and accurate planning has been done prior to starting it as shown by a mean of 4.10. It further revealed that it is vital to have physician buy-in during the planning and implementation process so as to effectively integrate the system into the health process as shown

by a mean of 3.88. The study also established that project planning influence the implementation of telehealth project and this was represented by a 70% response rate. The study further established that project planning was rated high the implementation of telehealth projects and this show that planning played a fundamental role the implementation of telehealth projects.

Human resource skills were also another area investigated in this research. From the findings it was indicated that human resources was effectively deployed and utilized in the telehealth projects. It further revealed that health professionals require comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for as shown by a mean of 4.00. it also found out that dealing effectively with health projects calls for adequate human resources, both in size and level of technical sophistication. Human resource skills was also rated high in the implementation of telehealth Projects

The study also investigated whether telehealth project were adequately funded and it was established that the projects are poorly funded hence the slow adoption of this health concept. The study established that it's important to conduct and prepare a cost-benefit assessment of telehealth project and Cost assessments is affected by the complex and changing project implementation environment hence cost-benefit assumptions keep on changing.

The study finally established the  $R^2$  of 0.712. This implies that, there is variation of 71.2% of how implementation of telehealth projects changes in technology, project planning, human resource skills and project funding at 95% confidence interval, the study also reveals that there is a strong positive relationship between the study variable as shown by correlation coefficient of 0.855.

### **5.3 Conclusion**

Our study therefore concludes that technology plays a significant role on the implementation of the telehealth projects in many countries. In connection to this the study further concludes that poor telecommunications infrastructure in rural areas has been the major impediment in the implementation of telehealth projects.

The study also concludes that without adequate planning telehealth projects may fail miserably since project planning influence the implementation of telehealth project The study further

concludes that project planning played a fundamental role the implementation of telehealth projects.

The study also concludes that human resources has been effectively deployed and utilized in the telehealth projects. It further concludes that these employees require comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for. It also concludes that organisation should invest in human resource skills both in size and level of technical sophistication.

The study finally concludes that these projects are poorly funded hence the slow adoption of this health concept. This has been brought about by the organisations failing to conduct and prepare a cost-benefit assessment of telehealth project and eventually the projects are faced by the complex and changing project implementation environment.

#### **5.4 Recommendations**

The study thus recommends that these organisations should use advanced equipment and high capacity bandwidth telecommunications lines. This will help them reach the remote and rural communities existing and incase the telecommunication systems do not have this capacity, costly alternative methods such as installing a satellite system may have to be considered. The study also recommends that the health professional groups within the medical community should develop technology standards.

The study also recommends that the companies should come up with clear scope statement; select a planning team; identify deliverables and create the work breakdown structure when implementing these projects. This will help them in identifying the activities needed to be completed and estimating the resource requirements for the activities. It is also recommended that these organisations should gain a formal approval to begin any telehealth project. The study also recommends that the plan should have a detail with the underlying objective of planning time, cost and resources adequately to estimate the work needed and to effectively manage risk during project execution a failure to adequately plan greatly reduces the project's chances of successfully accomplishing its goals.

The study further recommends that before designing any technology the employees should be familiarized through training or else it will lead to frustration. The study thus recommends that human resource requires a comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for. It also recommends that the organisations should invest in human resource skills both in size and level of technical sophistication.

The study finally recommends that these companies should look for various ways of funding their projects. This can be inform of foreign donations, working in conjunction with other multinational companies or seeking financial assistance from the operating government.

### **5.5 Suggestions for Further Research**

This study sought to investigate the determinants of telehealth projects implementation in Kenya. A case of Safaricom and Orange and Nokia Telehealth Projects. There is need for a study to be conducted on the challenges facing these projects and giving much concentration on the consumer challenges.

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## APPENDICES

### APPENDIX I: INTRODUCTION LETTER

Amimo Benard

Kenyatta University

P.O. Box 3013

Nairobi, Kenya

Dear Respondent,

**Re: Data collection for my research**

I am a student at Kenyatta University undertaking Masters in Business Administration. I am conducting a study on the determinants of telehealth projects implementation in Kenya and you have been selected to contribute to it. Please answer the following questions honestly and objectively to the best of your knowledge, the information obtained will be treated with strict confidentiality. Please do not write your name on the questionnaire. Thank you for your acceptance and support.

Yours faithfully

Amimo Benard

## APPENDIX II: RESEARCH QUESTIONNAIRE

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You have been identified as one of the respondents in the study and are requested to complete the following questionnaire. The information you provide will be used only for the purpose of this study and will be held strictly confidential and in no way will your name or answers be revealed out.

Please answer all the questions as best as you can.

### **BACKGROUND- General Information**

1. What is your Gender?

Male  Female

2. What is your age?

Between 18-25  Between 26-35  Between 36-40

Between 41-44  Between 45-50  50 and above

3. What is your highest level of education?

Secondary  College  University

Others  Specify.....

4. How long have you been working at your organization?

1-2 Years  3-5 Years  6-8 Years  9 and above Years

5. In your view is the telehealth project performing well?

Yes  No  Not Sure

### **PART A- Technology**

1. Suggest area in which the organization uses the latest technology in the telehealth projects ?

2. Please tick the numeric value corresponding to your personal opinion for each statement

	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>disagree</b>	<b>Strongly disagree</b>
There is poor telecommunications infrastructure in rural areas hampering the implementation of telehealth projects	⑤	④	③	②	①
Telehealth technology uses advanced equipment and high capacity bandwidth telecommunications lines which many remote and rural communities existing telecommunication systems do not have	⑤	④	③	②	①
Telecommunication network management, performance management and security management influence the reliability of the network affecting the implementation process	⑤	④	③	②	①
Tariff rates, for health services within local areas inhibit rural access to interactive video.	⑤	④	③	②	①

3 Suggest how technology influences the implementation of telehealth projects in Kenya?

.....  
 .....

4. Rate the level of influence technology on the implementation of the telehealth projects

High [ ] Average [ ] Low [ ]

**PART B- Project Planning**

1. Suggest how your organization engages in project planning in telehealth projects.

.....  
 .....

2. Please tick the numeric value corresponding to your personal opinion for each statement

	Strongly agree	Agree	Neutral	disagree	Strongly disagree
Success or failure of a telemedicine project rests squarely on whether adequate and accurate planning has been done prior to starting it.	⑤	④	③	②	①
If the users have not been included in the planning and implementation process, they will not understand the importance and the role of the project.	⑤	④	③	②	①
It is vital to have physician “buy-in” during the planning and implementation process so as to effectively integrate the system into the health process.	⑤	④	③	②	①

Thorough projects planning assessment needs to be undertaken before the implementation	⑤	④	③	②	①
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3. In your considered opinion does project planning influence the implementation of telehealth projects?

Yes [ ] No [ ]

4. Explain how project planning influences the implementation of Telehealth Projects?

.....  
 .....

5. Rate the level of influence of project planning on the implementation of telehealth projects

High [ ] Average [ ] Low [ ]

**PART C- Human Resource skills**

1. In your opinion are human resources effectively deployed and utilized in the telehealth projects?

Yes [ ] No [ ]

2. Explain your answer above

.....  
 .....

3. Please tick the numeric value corresponding to your personal opinion for each statement

	<b>Strongly agree</b>	<b>Agree</b>	<b>Neutral</b>	<b>disagree</b>	<b>Strongly disagree</b>
Dealing effectively with health projects calls for adequate human resources, both in size and level of technical sophistication	⑤	④	③	②	①
Maintaining the right skill mix and enhancing employee flexibility promotes the success of project implementation	⑤	④	③	②	①
Health professionals require comprehensive training and practice on what the telehealth equipment can do and what procedures it is ideally suited for	⑤	④	③	②	①
Attempts to utilize even designed technology without some familiarization and training will lead to frustration with the system	⑤	④	③	②	①
The project managers must have the skills and experience in managing health projects.	⑤	④	③	②	①

4 Explain how human resources skills influence the implementation of Telehealth Projects

.....  
 .....



5. In your considered view rate the level of influence of human resources on the implementation of telehealth Projects

High [ ] Average [ ] Low [ ]

**PART D- Project funding**

1. In your view is the telehealth project adequately funded?

Yes [ ] No [ ]

2. Explain your answer above

.....  
 .....

3. Please tick the numeric value corresponding to your personal opinion for each statement

	Strongly agree	Agree	Neutral	disagree	Strongly disagree
It's important to conduct and prepare a cost-benefit assessment of telehealth project	⑤	④	③	②	①
Telecommunications is a major component of a telehealth project's overall costs	⑤	④	③	②	①
Different telehealth applications require different technologies hence assessing the costs for different combinations of technologies and infrastructures may be a difficult	⑤	④	③	②	①

The cost of hardware and software is the most serious deterrent to adoption and implementation of telehealth projects.	⑤	④	③	②	①
Cost assessments is affected by the complex and changing project implementation environment hence cost-benefit assumptions keep on changing	⑤	④	③	②	①

4. In your considered opinion does project funding influence the implementation of telehealth project?

Yes [ ] No [ ]

5. Explain how project funding influences the implementation of telehealth project

.....  
 .....

6. In your opinion, what has been the level of influence of project funding to telehealth projects

High [ ] Average [ ] Low [ ]

**THANK YOU FOR YOUR CO-OPERATION**