A MODEL FOR IMPROVED ADOPTION OF TELEMEDICINE IN LOW-RESOURCE COUNTRIES

CASE STUDY: NKOZI HOSPITAL IN UGANDA

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Master's Dissertation

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Master's Dissertation

Approval

This dissertation has been produced under my/our supervision and submitted for examination with my/our approval as the appointed academic supervisor/s.

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DEDICATION

I dedicate this report to my dear mum, my siblings and mummy Lucy who endeavored to set a firm foundation on which I proudly stand now.

ACKNOWLEDGEMENT

I give thanks to the Almighty God for keeping me alive and in good health up to this time. It is by His grace that I have been able to complete this study. I wish to also, in a special way, thank my supervisor Mr. Kasozi Brian, for the time devoted, encouragement and guidance during the research process which led to the successful completion of this research project. I could not ask for more.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS

DOI	Diffusion of Innovation Theory
e-health	Electronic health
HRSA	Health Resources and Services Administration
ICT	Information and communication technology
LRCs	Low Resource Countries
MCT	Multipurpose Community Telecentre
MIS	Management Information System
MoH	Ministry of Health
NH	Nkozi Hospital
m-health	Mobile health
RRH	Regional Referral Hospital
NS	Not Sure
RESCUER	Rural Extended Services and Care for Ultimate Emergency Relief
SA	Strongly Agree
SD	Strongly Disagree
TAM	Technology Acceptance Model
UCC	Uganda Communications Commission
UN	United Nation
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United State of America
UTAUT	Unified theory of acceptance and use of technology
WHO	World Health Organization

ABSTRACT

The ever-growing advancement in technology has opened up opportunities for healthcare delivery, especially in low-resource environments where access to quality healthcare services is limited. Telemedicine, the remote provision of medical services through telecommunication and information technology, holds incredible potential for bridging the healthcare gap in these underserved areas. However, the adoption of telemedicine in low-resource environments faces unique challenges and requires a tailored approach.

This study aimed at designing a Telemedicine Adoption Model for low-resource environments. Furthermore, the study identified factors that affect the adoption and successful implementation of telemedicine in resource-constrained settings. The research employed a mixed-methods approach, combining qualitative interviews and quantitative surveys with healthcare providers, administrators, and patients to gather comprehensive data.

The preliminary research findings indicate that several key factors play a pivotal role in telemedicine adoption in low-resource environments. These factors include infrastructure accessibility, technical capability, perceived usefulness and ease of use, social acceptance, regulatory framework, cost-effectiveness, patient trust and satisfaction. The Telemedicine Adoption Model developed through this study incorporates these factors into a comprehensive framework, providing a guide for successful telemedicine implementation in low-resource environments.

The proposed Telemedicine Adoption Model can serve as a valuable resource for policymakers, healthcare providers, and organizations seeking to leverage telemedicine to improve healthcare access and results in resource-constrained settings. By considering the special challenges and opportunities of low-resource environments, the TAM offers practical experiences and guidelines for implementing telemedicine solutions that are both effective and sustainable. Additionally, this study contributed to the development body of information on telemedicine adoption and highlighted the significance of context-specific approaches in overcoming barriers to healthcare access and delivery in low-resource environments.

This study established a number of critical success factors which included: Attitude towards change (SD=0.731, p-value=0.045), Project planning and management (SD=0.986, p-value=0.031), Commitment to Change (SD=0.233, p-value=0.027), Technology- task fit, complexity and training (SD=0.111, p-value=0.019), Management Commitment (SD=0.867, p-value=0.008), Management support (SD=0.568, p-value=0.022), Triability SD=0.981, p-value=0.039), Relative advantage (SD=0.998, p-value=0.044), and user satisfaction with the system (SD=1.334, p-value=0.048).

A model for improved adoption of Telemedicine in Low Resource Countries like Uganda was developed. This model has factors such as Organizational Affiliations (ẋ=4.333), Management Commitment and Support (ẋ=3.933), User involvement and triability (ẋ=3.67), telemedicine Policies and guidelines(ẋ=4.5), Technological (ẋ=4.2), Financial(ẋ=4.4) and Human Resources (ẋ=3.67), User acceptance of telemedicine(ẋ=4.133), Organizational structure and culture (ẋ=3.67), Relative Advantage (ẋ=4.6), Hospital Management and staff(ẋ=3.47), IT department of the hospital (ẋ=3.93) and NH Telemedicine Model Outcomes (ẋ=4.8). The developed model for improved adoption of telemedicine in low-resource countries was evaluated by 15 health informatics experts who asserted that the developed model was complete.

Keywords: Telemedicine, Information technology, Technology adoption model, Low-resource environments.

CHAPTER ONE
GENERAL INTRODUCTION

1.0 Introduction

Worldwide, the quality of health care accessible by those residing in remote areas is generally worse than that accessible by the urban population. This difference is often caused by a variety of factors including a lack of affordable and reliable public transport and the deployment of medical experts in urban areas. Although this problem is common worldwide, it is particularly critical in Low Resource Environment (LREs). Several studies have been done and it has been widely acknowledged that the most cost-effective solution to this problem is the introduction of telemedicine. Telemedicine can easily be afforded by those who reside in remote areas and have access to quality healthcare services as it is available to those in urban areas without the need to take trips (Bandara, 2020).

Telemedicine, the remote delivery of healthcare services using telecommunications technology, has the potential to revolutionize healthcare delivery, particularly in low-resource countries. With its ability to overcome geographical barriers and improve access to specialized medical expertise, telemedicine holds great promise for improving healthcare outcomes in underserved areas (Akintunde et al., 2019). However, the adoption and implementation of telemedicine in low-resource countries face numerous challenges and barriers.

Uganda, a low-resource country in East Africa, is grappling with significant healthcare disparities, including limited access to quality healthcare services, scarcity of healthcare professionals, and inadequate infrastructure (Hill *et al.,* 2016). The introduction of telemedicine in Uganda has the potential to address these challenges by bridging the gap between patients and healthcare providers, enabling remote consultations, diagnosis, and treatment. Nkozi Hospital is my case study, a rural hospital located in the Mpigi District of Uganda. It serves a large population with limited access to specialized healthcare services due to geographic constraints and resource limitations.

Healthcare delivery in low-resource countries continues to face persistent challenges such as shortages of skilled medical professionals, inadequate infrastructure, limited access to specialized care, and geographical barriers that restrict healthcare access for rural and underserved populations (Omboni et al., 2022). These limitations have contributed to poor health outcomes, high disease burdens, and inequitable healthcare systems. Telemedicine, defined as the use of information and

communication technologies (ICT) to deliver healthcare services remotely, has emerged as a transformative innovation with the potential to overcome many of these barriers (Gogia et al., 2022). By facilitating remote consultations, diagnosis, monitoring, and treatment, telemedicine provides an opportunity to improve access, quality, and affordability of healthcare in resource-constrained environments.

The COVID-19 pandemic further accelerated the global adoption of telemedicine, highlighting its role in maintaining continuity of care amidst lockdowns and social distancing measures (Almathami et al., 2022). However, despite the recognized potential, telemedicine adoption in low-resource countries remains limited due to a range of technical, organizational, socio-cultural, and policy-related barriers. Challenges such as poor internet connectivity, lack of interoperability between systems, inadequate legal frameworks, low digital literacy, and financial constraints hinder the scalability and sustainability of telemedicine in these settings (Scott et al., 2021). Therefore, while telemedicine offers a promising avenue for improving healthcare delivery, its successful adoption in low-resource contexts requires context-specific frameworks that address these multifaceted challenges.

Existing information technology (IT) adoption models, such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Diffusion of Innovations (DOI), provide insights into the behavioral and technological factors influencing technology uptake (Al-Hamad et al., 2021). However, these models often fail to fully capture the complex socio-economic, infrastructural, and policy dynamics that characterize healthcare systems in low-resource countries. Consequently, there is a growing need to develop a more comprehensive adoption model that integrates critical success factors—technological readiness, regulatory frameworks, financing mechanisms, cultural acceptance, and training—into a unified framework tailored for resource-constrained settings (Kruse et al., 2021).

1.1 Background of the Study

Globally, ICT devices like telephones (both landlines and mobiles), printers, personal computers, and scanning devices are used for e-Health aid communication between doctors and patients, sharing of data and knowledge between healthcare providers as well as creating better healthcare services for patients (World Health Organisation, 2017). Over the years, the internet has evolved and expanded far and wide as a means of leisure, research, and communication. This has greatly contributed to the enhanced delivery of healthcare services the world over. Information technology has improved the available treatments, patients' medical records and consultations with experts

are now easily accessible with the advent of the internet. Telemedicine has the potential to resolve many of the hindrances to access to quality, efficient, and effective human resources, remoteness, high costs of medical equipment, and poor infrastructure remain major barriers to access to quality healthcare (World Health Organisation, 2017).

According to the National Academy of Sciences, the common place side of the spectrum are familiar uses of the telephone for consultations between patients and clinicians and the use of radio to link emergency medical personnel to medical centers. On the other end of the telemedicine spectrum are largely experimental innovations such as tele surgery in which a surgeon receives visual and tactile information to guide robotic instruments to perform surgery at a distant site. In between these two ends of the spectrum lie an array of video, audio, and data transmission technologies and applications. Some, such as relatively expensive interactive video conferencing, allow clinicians to see, hear, examine, question, and counsel distant patients for "real-time" diagnostic and therapeutic purposes. Others, based on "store and forward" technologies, permit digital images and other information to be saved and transmitted relatively cheaply to consultants who can receive and interpret them when convenient, thus offering more scheduling flexibility for those on both ends of the communications link. In addition to patient care, these varied technologies have a multiplicity of current and possible uses in professional education, research, public health, and administration. Such multiple uses potentially allow costs for expensive information and communications investments to be spread more broadly.

In the 1980s, a teleconferencing connection, which is a telemedicine initiative, was put in place to connect the researchers of Makerere University in Uganda, those in the University of Nairobi in Kenya with their colleagues in Canada. This however failed due to political instability in both Uganda and Kenya. The project provided for training of researchers from Uganda and Kenya in particular fields. The colleagues from Canada often visited and physically trained the researchers at both universities (Kiberu *et al.*, 2017). Furthermore, UNESCO partnered with various international and local partners to fund a telecentre initiative at Nakaseke. Multipurpose Community Telecentre (MCT) in Nakaseke district in Uganda. This project was aimed at providing telemedicine services for Nakaseke Hospital in partnership with Mulago National Referral Hospital to improve the delivery of healthcare services for the people of Nakaseke as well as other services like printing, internet/emails, and telephone services. A partnership between Uganda and Germany gave birth to internet-based telepathology. This project was, however, affected by poor internet connections (Wamala *et al.*, 2011). Likewise, the MCT project was inhibited by poor ICT infrastructure, unreliable electricity supply, and a generally illiterate populace (World Health Organisation, 2016).

According to Kiberu *et al.* (2017), it's safe to say that Uganda's health sector has greatly improved as a result of funds from donors among other things. The Canadian International Development Research Centre (CIDRC) sponsored a telemedicine project, 'HealthNet'. The purpose of this initiative was to advance remote learning among medical students and to assist in resource exchange between health workers at Mulago Hospital and other healthcare providers in far-off areas. Furthermore, a project was implemented in pilot phase to improve data capture, interpretation, storage of and access to patients' data by healthcare providers using a portable computer device (Kiberu *et al.*, 2017).

1.2 Statement of the problem

Telemedicine is widely regarded as a transformative tool in healthcare delivery, especially in low-resource countries such as Uganda. It holds immense potential to bridge gaps in access through remote consultations, enhanced diagnostics, and timely interventions, particularly for rural and underserved communities. Ideally, telemedicine would be fully integrated into health systems like Nkozi Hospital, supported by clear policies, reliable infrastructure, trained personnel, and a culture that embraces innovation.

However, the reality at rural Ugandan facilities diverges markedly from this ideal. Despite rising global recognition of telemedicine's advantages, its uptake remains minimal. Key barriers include inadequate IT infrastructure, limited funding, poor digital literacy among healthcare workers, and weak policy frameworks, as noted by Isabalija et al. (2011) and Kiberu et al. (2017). Cultural resistance and social apprehension further complicate implementation efforts.

The scale of these challenges is significant. At Nkozi Hospital, infrastructural deficits, scant training, limited technological investment, and low staff awareness severely limit telemedicine deployment. Without a tailored, context-appropriate model to guide implementation in such low-resource settings, many rural sites remain without a roadmap for effective telemedicine integration.

As a consequence, patients at facilities like Nkozi Hospital experience limited access to specialist care, delayed diagnoses, and poorer health outcomes. These systemic inefficiencies widen existing health disparities and undercut efforts to enhance healthcare accessibility, quality, and efficiency. This stagnation hampers Uganda's progress toward equitable healthcare goals at both national and global levels.

To address these pressing issues, this study aims to develop a practical, context-specific model for improved telemedicine adoption at Nkozi Hospital. By identifying key barriers and enablers and designing a framework that integrates technical, infrastructural, cultural, and regulatory

components, the research will offer a strategic guide for sustainable implementation. The goal is to empower rural hospitals in Uganda—and similar settings—with the tools needed for effective telemedicine uptake and to drive better health outcomes.

1.3 Research Questions

This study wants to answer the question: how can the adoption of telemedicine be enhanced in low-resource countries? This question is broken down into the following sub-questions.

1. What factors are hindering the adoption and critical success of telemedicine in LRCs?
2. What is the best model design for improved adoption of telemedicine in low-resource countries like Uganda?
3. How can the existing IT models be used to improve the usefulness of telemedicine in LRCs?

1.4 Objectives of the study

1.4.1 Major objective

The aim of this study was to design a telemedicine model to be used in low-resource areas in Uganda.

1.4.2 Specific Objectives

1. To identify the factors hindering adoption and the critical success for the adoption of telemedicine in low-resource countries like Uganda through a literature review and examining a case study.
2. To design a model for improved adoption of telemedicine in low-resource countries like Uganda.
3. To evaluate the usefulness of the designed telemedicine model.

1.5 Scope of the study

This section presents the subject, the geographical scope and the time scope.

1.5.1 Geographical scope

The study was conducted at Nkozi Hospital. The hospital is located in the parliamentary constituency of Mawokota County South, off of Kampala–Masaka Road. This location is approximately 55 kilometres (34 mi), by road, northeast of Masaka Regional Referral Hospital, in the city of Masaka. The study targeted staff members like hospital management, medical personnel of Nkozi Hospital and also the patients within the hospital.

1.5.2 Content scope

This study was limited to developing and evaluating a model to improve adoption of telemedicine; investigating the factors hindering adoption of telemedicine through conducting literature review and examining a case study; identifying and determining critical success factors for adoption of telemedicine; investigating the application of the IT approaches in developing a model for improved adoption of telemedicine.

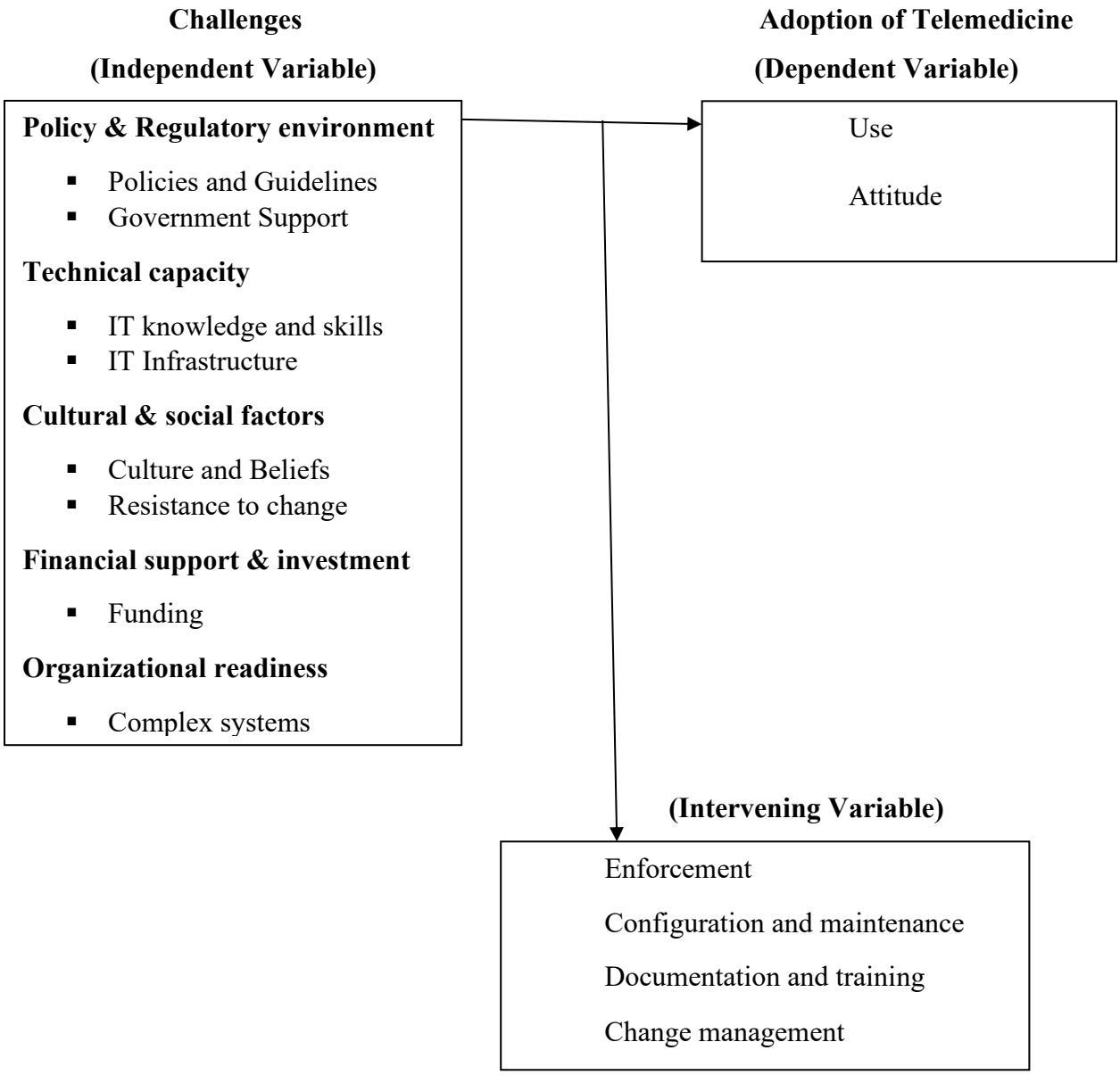
1.5.3 Time scope

This study considered a period of 10 years running from 2015 to 2024, since this is the period within which Uganda started implementing telemedicine projects in the hospitals and some of the projects were unsuccessful.

1.6 Conceptual Framework

The adoption of telemedicine in low-resource settings like Uganda is influenced by several interconnected factors. A supportive policy and regulatory environment, including clear policies, guidelines, and government backing, provides the necessary structure and legitimacy for telemedicine implementation. Technical capacity, encompassing IT infrastructure and the digital skills of healthcare workers, is crucial for the effective operation of telemedicine systems. Cultural and social factors, such as local beliefs and resistance to change, can either facilitate or hinder acceptance of telemedicine, depending on how well they align with digital healthcare practices. Financial support is equally important, as consistent and adequate funding ensures the sustainability and scalability of telemedicine services. Organizational readiness, reflected in the internal culture, openness to innovation, and efficiency of systems within healthcare institutions, plays a vital role in determining whether telemedicine can be successfully integrated and maintained. Intervening variables such as enforcement of policies and standards, proper configuration and ongoing maintenance of telemedicine systems, comprehensive documentation and training for users, and effective change management strategies further shape the adoption process by ensuring that systems are not only implemented but also sustained and effectively utilized. Addressing these variables holistically enhances the likelihood of successful and long-term adoption of telemedicine in low-resource contexts.

A conceptual framework for improving the adoption of Telemedicine in Low Resource Countries like Uganda.



Source: Developed by the Researcher (2024)

1.7 Technology Acceptance Model (TAM)

TAM tries to explain user acceptance and to predict the adoption of technologies relatively few have used TAM in healthcare settings. This is due to the complexity associated with this category of health information systems. Hospital information systems, electronic medical records, telemedicine and computerized patient order entry are those which fall into the category of complex information systems. In a complex information system, the efficacy of usefulness and usability of the system cannot be felt immediately but can only be realized through a long-term process of usage and integration in a user work process. Telemedicine services Manila (2020).

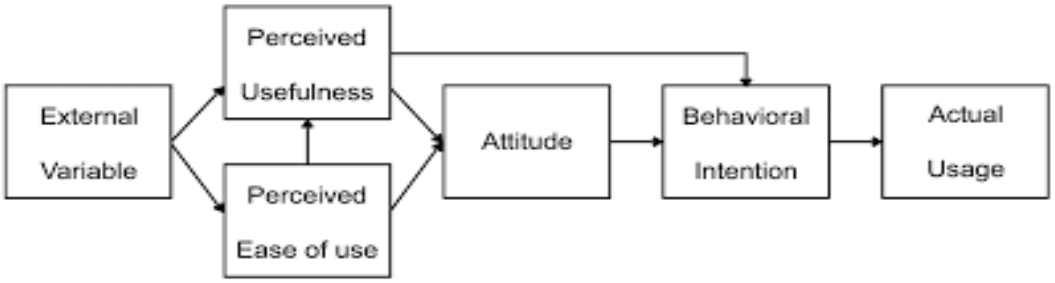


Figure 1:8(Telemedicine Services Manila, 2020)

1.9 Conclusions of the Study

According to the findings of this study, it's vivid enough that the design and adoption of the Telemedicine framework has improved the medical practice in health facilities, specifically NH and other health facilities in Uganda. However, the study will also establish the utmost hindrance to the adoption of telemedicine systems is a lack of awareness about telemedicine, its uses, and profits to all stakeholders. Most of the findings also cite the fact that the government of Uganda has a key role to play in the advancement of telemedicine in the country by initiating pilot projects and providing financing for telemedicine projects.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

In this chapter, the researcher discussed what other scholars and researchers have written in relation to the adoption of telemedicine. It highlighted the different theories utilized for the adoption of telemedicine, factors hindering the adoption of telemedicine, critical success factors for the adoption of telemedicine, and application of the existing IT adoption models in developing a model for improved adoption of telemedicine.

2.1Review of existing Models, Theories, Approaches and Frameworks

Many scholars have written about different theories in the adoption of telemedicine. Some of the theories are as discussed below:

i) Diffusion of Innovation (DoI)

Rogers (2003) assumes that the adoption of innovations occurs through five stages: knowledge, persuasion, decision, implementation, and confirmation, and is influenced by attributes such as relative advantage and compatibility. In this study, DoI was used to identify which adoption stage Nkozi Hospital currently occupied and to assess clinicians' perceptions of telemedicine's compatibility and benefits. This helped target specific strategies like demonstration projects to move the innovation forward. The framework was particularly relevant in positioning telemedicine as an organizational-level innovation and guiding interventions to accelerate its uptake.

ii) Technology Acceptance Model (TAM)

Davis (1989) posits that perceived usefulness and perceived ease of use shape users' intention to adopt technology. The study deployed TAM via surveys and qualitative interviews to assess clinicians' beliefs about telemedicine's usability and impact on patient care; an approach supported by Siedner et al. (2015) in Uganda, which identified factors like SMS confidentiality and stigma as influential. TAM's relevance lies in identifying practical usability barriers and psychological factors that might limit telemedicine adoption in resource-limited settings (Davis 1989; Siedner et al. 2015).

iii) Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) assume that behavioral intentions and use behavior are determined by performance expectancy, effort expectancy, social influence, and facilitating conditions, moderated by demographics. The study adapted UTAUT through mixed-methods, capturing quantitative measures of expectancy and infrastructure readiness, then unpacking nuances via

interviews, a structure mirrored in Namatovu et al. (2021) in Uganda. UTAUT's multidimensional framework facilitated a comprehensive understanding of both internal and external determinants shaping telemedicine uptake at Nkozi (Venkatesh et al. 2003; Namatovu et al. 2021).

iv) Model on the Transfer and Adoption of Telemedicine by Physicians in Ethiopia

Kifle et al. (2010) posit that professional identity, contextual compatibility, training, and organizational support underlie telemedicine uptake. The study applied this model by exploring similar themes through interviews with Nkozi clinicians, examining how their professional roles and context influenced readiness. This theory was instrumental in grounding the study's framework in regional similarities, ensuring contextual fit and transferability in low-resource East African settings.

v) A Framework for Designing Sustainable Telemedicine Systems

Bashshur et al. (2015) assume that sustainability relies on four pillars: technology, organizational capacity, financial structure, and policy support. This framework guided the model's design phase, ensuring balanced consideration of each domain, like budgeting, infrastructure, and mentoring. Its relevance lies in guarding against the failure of well-intended initiatives by ensuring long-term viability of telemedicine at Nkozi.

vi) Process theories

Kotter (1996); Lewin (1947) assume that change occurs through sequential phases that must be managed. The study aligned its implementation plan with these staged approaches, creating urgency, securing leadership buy-in, piloting projects, and embedding systems, to facilitate institutional integration. Their relevance lies in offering a systematic change process that accounts for Nkozi's organizational dynamics.

vii) Behavioral theories

Ajzen (1991) assume that behavior stems from attitudes, subjective norms, and perceived control. These constructs were evaluated through interviews and surveys to understand clinicians' intentions toward telemedicine adoption. The theory was relevant in informing strategies aimed at improving attitudes, leveraging social norms, and enhancing self-efficacy.

viii) Evaluation frameworks

Glasgow et al. (1999) assume that success must be measured across reach, effectiveness, adoption, implementation fidelity, and maintenance. The study adopted RE-AIM to evaluate both immediate and long-term impacts of the proposed model, relevant in planning future scalability and continuous service improvements at Nkozi.

ix) Organizational Change Management

Lewin (1947) assumes change involves unfreezing, changing, and refreezing stages. These principles informed the cultural shift model at Nkozi by first building awareness (unfreeze), training and piloting (change), and finally institutionalizing new routines (refreeze). The approach was relevant in minimizing resistance and embedding telemedicine practices into hospital procedures.

2.2 Factors hindering the Adoption of telemedicine.

2.2.1 Organizational structure

The absence of official organizational structures to supply telemedicine solutions is the leading obstacle for the expansion of telemedicine in several countries. Telemedicine is generally a mixture of several disciplines and therefore requires the cooperation of all possible participants in the healthcare delivery system. The removal of the cooperation between the participants and the lack of specific procedures presents a bottleneck in the expansion of telemedicine (Hassibian *et al.*, 2023). According to Molfenter *et al.* (2023) and Driessen *et al.* (2017), implementing new technologies often alters the organization's workflow plus the functions of the employees. Accordingly, these organizations will have to develop new workflows in order to overcome the resistance to these changes.

According to Cockroft & Hendy (2018), organizational culture, change management planning, and cultural readiness are key contributors to the adoption of telemedicine systems. When the organizational culture is not considered during the implementation of telemedicine, it is more than likely that a solution not fit for the organization would be considered for implementation.

2.2.2 Lack of confidence

According to several scholars, patients generally have little confidence in the results of telemedicine systems. Most patients find it hard to trust that a machine can offer quality healthcare services without visiting a healthcare provider physically (Jang-Jaccard *et al.*, 2023). This attitude and social view of these new technologies is a risk to the expansion and adoption of telemedicine. Training, sensitization, and support from government entities is paramount in changing the attitude of the populace (Jang-Jaccard *et al.*, 2023).

Several medical practitioners likewise believe that patient consultation, diagnosis, and treatment are lacking without physical contact and therefore favor physical consultations over the use of ICT platforms (Hassibian *et al.*, 2016). Medical personnel are often not very different from their patients when it comes to attitude issues, they also don't trust that telemedicine systems can offer

healthcare services efficiently and effectively. This remains a major hindrance to the acceptance of telemedicine in low-resource countries. In order to improve the acceptance levels of telemedicine, both doctors and patients need to have confidence that these systems can deliver effectively and efficiently (Shayan *et al.*, 2022). Confidence within the organizations promotes the adoption of telemedicine (Belanger *et al.*, 2014).

2.2.3 ICT Literacy

In the study carried out by Venkatesh and his colleagues (2012), about the adoption of AI tools, found out that low-resource Countries generally have low ICT literacy levels. However, their findings did not clearly identify the factors hindering the adoption for this case, this study indended to address those factors.

In 2016, Hassibian *et al.* made a study attempting to explain the benefits, categories and barriers for acceptance and implementation of telemedicine in developing countries. In their study, the concluded that high costs and cultural resistance are considered as the main barriers for developing countries in their approach to apply telemedicine. However, this study unanimously highlighted meagre technological infrastructure as the main challenge in the use of telemedicine in Low Resource Countries like Uganda.

Hassibian *et al. (2016)* furthermore found out that lack of knowledge about emerging technologies and how they are used in offering health care services seems to be a another hindrance in low-resource countries and this was in line with the findings of this study.

In the study carried out by Tandon,,*et al. (2022)* titled "Social media induced fear of missing out (FoMO) and phubbing: Behavioural, relational and psychological outcomes", found out that the populace in low-resource countries is generally unaware of the benefits of using telemedicine in healthcare delivery. It's not uncommon to find medical personnel who also lack the requisite IT knowledge to operate these systems (Hassibian *et al.*, 2016). The lack of knowledge about these initiatives breeds fear and general resistance toward ICT initiatives thereby creating obstacles to the adoption of telemedicine. Most of the older medical personnel and patients would rather not interact with ICT initiatives due to a lack of knowledge and unwillingness to learn at their advanced ages (Hassibian *et al.*, 2016). Some healthcare providers view telemedicine as an initiative that could render them jobless and therefore are not comfortable with it. Others view it as an extra workload (Bishop *et al.*, 2013). This study, too, agreed with these authors.

2.2.4 ICT infrastructure

In the study conducted by Einolghozati (2013) about barriers and challenges to implementing telehealth among physicians and advanced practice nurses in the United States concluded that

most telemedicine systems require reliable and high speeds of connectivity if they are to motivate users thereby increasing the chances of acceptance which this study conquered with,.

Also, in the study about acceptance factors of telemedicine in times of COVID-19, which was carried out in Argentina by Schlottke et al. showed that several low-resource countries continuously grapple with unreliable and low speeds of connectivity to run the systems and this study is also in agreement with them. Some examples of telemedicine applications are real-time teleophthalmology and emergency consultations. Healthcare providers and patients alike have not warmly welcomed the newer ICT.

2.2.5 Shortage of skilled manpower

According to the study conducted in Iran by Mehrolhassan et al. (2025) on Barriers to Telemedicine Establishment in Iran, found out that many healthcare providers and the general populace are often unable to resolve technical issues on their computers. It furthermore stated it is essential that the doctors and patients are equipped with sufficient skills to operate these systems if the adoption rates are to increase. It is also evident in this study agrees with them.

2.2.6 Social Obstacles in the Adoption of Telemedicine

The cultural and social settings of the communities of a country can also contribute to the obstacles to adopting, consuming, and supporting telemedicine solutions. The language barriers, lack of general knowledge of the systems, and cultural gaps are also major issues that inhibit further development and expansion of telemedicine initiatives in low-resource countries (Hassibian *et al.*, 2016). Several countries have diverse languages and dialects. This makes it difficult to develop an acceptable oral form of communication between patients and doctors (Hassibian *et al.*, 2016).

2.2.7 Financial Barriers to telemedicine development

The preliminary cost of implementing telemedicine systems is often very high. This cost is often related to the processes of development of these telemedicine systems. Despite initial interest in telemedicine solutions, online treatment systems are often looked at as too expensive to procure and run (Molfenter *et al.*, 2015). Some of the costs related to telemedicine systems include, but are not limited to, the expenses incurred in implementing the communication channels, the costs of skilling and/or training the system users i.e. doctors and patients, and the costs of the devices to host and run the systems. Basically, telemedicine costs can vary widely and are dependent on the intended use of the application (Moffatt and Eley, 2011; Driessen *et al.*, 2017). The costs of operating telemedicine systems in low-resource countries are often high because of a general lack of knowledge of the populace, low ICT literacy, and limited access to efficient and effective

infrastructure (Demaerschalk *et al.*, 2012; Kahn*et al.*, 2014; Endeva *et al.*, 2017). Often times, the implemented telemedicine solutions are funded by the governments, especially in their initial phases. As a result, whenever the governments cut off funding, the healthcare facilities are unable to sustain these projects because they lack alternative business models. Also, reliance on public funding is an additional obstacle to the progress of telemedicine in low-resource countries (Endeva *et al.*, 2017). Financial barriers to the adoption of telemedicine have been articulated in other settings (Rogove *et al.*, 2012; Kulcsar *et al.*, 2014; Uscher-Pines *et al.*, 2014).

2.2.8 Policy barriers

Generally, there is an absence of a reputable universal framework on the adoption of telemedicine. There's also limited consensus on similar international principles for best practices for telemedicine usage. Telemedicine is used to exchange patient data and provide healthcare services across long distances. This definitely requires, at least, common international agreements on how best to utilize telemedicine systems (World Health Organization, 2010). Furthermore, protecting patient anonymity and keeping their data confidential is an additional consideration for telemedicine use (Molfenter *et al.*, 2015). Extensive research is yet to be done to establish the extent of dangers of telemedicine malpractice (Hassibian *et al.*, 2016).

2.3 Critical success factors for the adoption of telemedicine

Telemedicine has become a key enabler of healthcare delivery, especially in resource-constrained environments, through its ability to bridge geographical, economic, and infrastructural gaps. The COVID-19 pandemic accelerated its uptake, highlighting both its transformative potential and the challenges that hinder full adoption (Almathami et al., 2022). However, for telemedicine to be effectively implemented and scaled, several **critical success factors (CSFs)** must be considered. These factors cut across technical, organizational, regulatory, and human dimensions, influencing not only the initial adoption but also the long-term sustainability of telemedicine systems.

Management support for telemedicine in order to enforce the use of the innovations within the health sector. The role of the Department of Health is to address the lack of e-health policy to ensure a coordinated and well-regulated environment (Flowerday, 2016). Areas in ICT in the health sector that must be addressed through legislative frameworks include ethical issues such as privacy and confidentiality of patient data. Once the policy is in place, the information will strengthen the scientific foundations of health policy enabling governments to provide resources based on scientific reasoning and avoid pitfalls in future projects (WHO, 2004). The local hospital

management often do not fully appreciate the impact of ICT or the disadvantages of lagging behind in this field in medical education or clinical care. Even when such awareness is present the response is limited usually to attempts to introduce computer literacy among staff. Management should also make it clear that Telemedicine is not an optional referral system. Once the resources are available, it should be compulsory for doctors to make use of the system in order to speed up consultations with specialists or create educational opportunities (Flowerday, 2016).

Adequate education of staff both in computer literacy and awareness about the technology in order to decrease frustration with the system. Throughout literature, it is evident that the level of confidence in a technology greatly impacts the level of the subsequent acceptance of this technology (Hassibian *et al.*, 2016). This confidence can only be added through education. In addition to educating them about the innovations, awareness campaigns must be held to induct them about the threats of using ICTs and ways to avoid them (Flowerday, 2016).

Proper change management, financial management and project management principles when planning for and introducing the new technology in order to decrease apprehension and increase acceptance of the technology. Change management can be defined as a structured approach to transitioning individuals or teams from a current position to a preferred future position (Flowerday, 2016). The process is aimed at empowering health care workers to agree and take on changes in their current setting. When new technology is introduced into the health care setting it will bring about changes in work forms and tasks. These changes must be anticipated as they relate to the workload at the key and outer sites. The goal however should be to integrate Telemedicine into established work practice with consideration that the skill requirement of the staff may have to change (Flowerday, 2016). Traditionally ICT has been perceived as expensive and with no concrete evidence to show differently, a minimal budget has been allocated for Telemedicine in health care. Recent technological advances however have meant that Telemedicine is now more affordable and efficient than before and can be implemented making use of existing infrastructure (Motsoaledi, 2010). When introducing a new technology, it is important not to overwhelm the users with all the technical aspects associated with ICT. Rather plan the introduction in stages with concrete milestones, which will ease user anxiety and provide the users with an opportunity to master fundamental skills before continuing with more complex concepts. According to Mitchell (1995) these principles include early involvement of all stakeholders, steering a needs analysis, clearly defining goals and intentions, coming up with a project plan with clear roles and responsibilities, regular feedback sessions, developing a clear operational management system, monitoring methods to measure the achievement of objectives, setting of smaller milestones and

making use of proper project management tools such as Gantt charts in order to track progress easily (Mitchell, 2022).

Making use of a local champion to promote the technology. One of the ways to facilitate social influence is to introduce a champion who will advance the objectives of the project. Various studies have revealed that the appointment of a champion to promote Telemedicine would increase the acceptance rate of the health care workers (Flowerday, 2016).

Awareness of the various technical aspects of the technology in order to minimize down time. This will include compatibility of the system and technical support when needed. The functionalities of the system must work properly so as to provide the end users with immediate benefit (Telemedicine Operational Plan E-health, 2009). These functionalities must be user friendly and be compatible with existing infrastructure so as to avoid further expenses to upgrade the existing infrastructure. Local conditions and limitations such as electricity supply must be taken into consideration when choosing the physical infrastructure of the Telemedicine system (Telemedicine Operational Plan E-health, 2009).

A fundamental CSF is the availability of **robust ICT infrastructure**. Telemedicine relies on stable internet connectivity, adequate bandwidth, secure servers, and interoperable platforms to facilitate seamless communication between patients and healthcare providers (Omboni et al., 2022). Without reliable infrastructure, teleconsultations are prone to interruptions, reducing trust in the system. Moreover, **interoperability** between telemedicine platforms and existing hospital information systems is essential to avoid data silos and ensure continuity of care (Kruse et al., 2021).

Successful adoption of telemedicine is contingent upon **clear legal and regulatory frameworks** that govern licensing, malpractice liability, data protection, and reimbursement mechanisms. In many countries, unclear policies around cross-border consultations and electronic prescriptions limit adoption (Scott et al., 2021). Governments and professional councils must provide guidelines that ensure compliance with ethical standards while promoting innovation. For instance, data privacy regulations such as the GDPR in Europe or HIPAA in the US serve as benchmarks for secure handling of patient data (Marques & Ferreira, 2021).

The economic viability of telemedicine systems is another CSF. Healthcare providers and patients must see clear value in using telemedicine. This requires **affordable access**, investment in infrastructure, and viable **reimbursement policies** for virtual consultations (Wootton et al., 2020). Countries where telemedicine consultations are integrated into insurance coverage have shown

higher uptake compared to those where patients bear the full cost. Long-term sustainability also depends on government subsidies or private-public partnerships (PPPs) to reduce financial barriers.

Adoption of telemedicine requires healthcare professionals to be trained in both technical and communication aspects of virtual care. Resistance often arises due to lack of awareness, fear of technology, or concerns about reduced quality of care (Alabdulhafith et al., 2021). Structured **capacity building programs**, continuing professional development, and digital literacy campaigns for patients are vital. Change management strategies should also address cultural resistance and promote acceptance of telemedicine as a legitimate extension of healthcare delivery.

Patient and provider trust in telemedicine platforms is a strong determinant of adoption. Systems must be **user-friendly**, accessible across devices, and available in local languages to enhance inclusivity (Gogia et al., 2022). Trust is built through secure data handling, confidentiality assurance, and reliable service delivery. Studies applying the **Technology Acceptance Model (TAM)** and the **Unified Theory of Acceptance and Use of Technology (UTAUT)** confirm that perceived usefulness, ease of use, and social influence significantly impact adoption (Al-Hamad et al., 2021).

Institutional support and leadership commitment play a central role in telemedicine adoption. Hospitals and health systems must integrate telemedicine into their **strategic plans** and allocate resources for continuous improvement (Omboni et al., 2022). Governance structures should define roles, responsibilities, and accountability mechanisms to avoid fragmentation. The presence of **telemedicine champions** within organizations has also been identified as a driver for successful implementation (Kruse et al., 2021).

Data security and patient privacy are critical concerns in telemedicine adoption. Breaches can severely undermine confidence in the system. Therefore, the implementation of **end-to-end encryption, authentication protocols, and compliance with cybersecurity standards** is essential (Marques & Ferreira, 2021). Ethical considerations, such as informed consent and equity of access, are equally vital. Ensuring that vulnerable populations are not excluded from telemedicine services is part of building sustainable adoption.

The successful adoption of telemedicine depends on a holistic consideration of multiple critical success factors. These include technological readiness, supportive policies, sustainable financing,

training, user trust, organizational leadership, and strong security frameworks. Addressing these factors in an integrated manner can ensure that telemedicine is not merely a temporary solution but a permanent, effective, and equitable component of modern healthcare delivery.

2.4 Application of the existing IT models in developing a model for improved adoption of telemedicine.

Several scholars have attempted to examine the factors affecting the use of telemedicine especially with the use of technology acceptance models. Studies show the great ability of the technology acceptance models to show the extent of acceptance of technologies among doctors (kahooei *et al.*, 2013). A combination of both the diffusion of innovation (DOI) and technology acceptance model (TAM) has been employed to study the extent of utilization of mobile devices for healthcare delivery amongst doctors in a study (Putzer and Park, 2012). In 2014, a study was done by Mekić to develop a technology acceptance model (TAM) for the use of smartphones (Mekić, 2014). Furthermore, in 2009, Aggelidis *et al.* did a study that highlighted a pattern in medical personnel's intention to use technology based on TAM (Aggelidis *et al*, 2009). Haselina and Harvard investigated the factors affecting the adoption of an electrical medical records system using TAM (Holtz *et al.*, 2011).

According to Garavand *et al.*, (2017), TAM can be used to define the aspects hindering the adoption of mobile technology towards healthcare service delivery amongst doctors. Aspects of the TAM model included; perceived usefulness and perceived ease of use which, among others, have a large impact towards the adoption of mobile technology for healthcare service delivery amongst doctors. Garavand *et al* (2017) in their study concluded that the perceived ease of use and perceived usefulness are the most important factors affecting the adoption of picture archiving and communication systems (Garavand *et al*, 2015). Several scholars have highlighted in their studies the impact that the aspects of perceived ease of use and perceived usefulness have towards the adoption of technologies like EMR (Electronic Medical Records system) (Abdekhoda *et al.*, 2015; Tayakoli *et al.*, 2015).

Unified Theory of Acceptance and Use of Technology (UTAUT) is another example of a model that has been applied to the studies of technology acceptance in recent years. UTAUT was developed in 2003 and has since been utilized by scholars in recent years to examine the issues hindering the adoption of mobile technology for health service delivery (Garavand *et al.*, 2017). Khatun *et al* (2017) used the UTAUT model in their study to evaluate the importance of cloud-based mHealth service to crucial care. The authors concluded that the end-users' intentions to use My Online Clinic innovation were mainly swayed by factors such as hardware, software, and the

understanding of users. It was concluded that the cloud-based mHealth would eliminate some hindrances, like the variances in software types and interoperability (Khatun *et al.*, 2017). Similarly, Irfanahemad *et al* (2018) employed unified theory of acceptance and use of technology (UTAUT) as theoretical foundation to understand the behavior and intention of health care personnel in the utilization pattern, current and future challenges of telemedicine. It was also concluded that the telemedicine solution has been mostly under-utilized and has therefore not delivered its potential in Karnataka state. One of the reasons for the failure noted was most (52%) of health care personnel reported they had never undergone training in telemedicine (Irfanahemad *et al.*, 2018).

Gordana (2006) used the diffusion of innovation theory to explore the status of mobile, wireless and wearable technological applications within the medical environment. The paper explained the relationship between the diffusion of innovation theory and the adoption of Medical Technology Applications and suggested that the technology has passed through the knowledge, persuasion and decision stages, as outlined by the Diffusion of Innovation Theory (Gordana, 2006).

Xiaojun, Ping, Jun (2015) used the diffusion of innovation model in their study which was aimed at understanding the aspects affecting patient use of consumer e-health inventions. From the study, it was noticed that the general adoption of the e-appointment service improved gradually. Three months after implementation of the service, the usage was at 1.5%. This grew to 4% at 29 months' post-implementation. This meant that only the users categorized as 'innovators' had tried out this innovation. The bulk of the patients were not interested in using this e-appointment service. The aspects that caused the low adoption rate were cited as inadequate announcement about the new service to the patients, low value-addition from it since the majority of patients found it easier to make telephone call-based appointments, a general lack of experience with online health services, the patients' inclination towards oral communication with the receptionists and the limitation of the caliber of patients who lacked internet literacy, access to a computer or the internet at home (Xiaojun *et al.*, 2015).

2.5 Evaluation of the developed telemedicine adoption model for completeness

Telemedicine has emerged as a critical tool in modern healthcare delivery, bridging geographical, financial, and accessibility gaps in patient care. Its adoption, however, depends on a combination of technological, organizational, and social factors. To address these complexities, several adoption models have been developed to guide healthcare institutions in integrating telemedicine effectively. Evaluating a telemedicine adoption model for completeness is crucial to ensure that it captures all relevant dimensions that influence adoption, scalability, and sustainability (Alami et

al., 2020). Completeness in this context refers to the extent to which the model integrates technological, human, organizational, regulatory, and contextual determinants of adoption.

Key Dimensions of Completeness in Telemedicine Adoption Models

1. Technological Dimension

A complete telemedicine adoption model must evaluate the robustness of technological infrastructure such as network reliability, interoperability of systems, cybersecurity, and user-friendliness of platforms. Studies have shown that lack of reliable technology infrastructure is a major barrier to adoption in low- and middle-income countries (Adjekum et al., 2021). Moreover, completeness requires consideration of emerging technologies such as artificial intelligence, cloud computing, and mobile health applications, which are reshaping telemedicine ecosystems (Agarwal et al., 2021).

2. Organizational Dimension

Organizational readiness plays a central role in successful telemedicine integration. This involves leadership support, budget allocation, workflow redesign, and human resource preparedness (Gagnon et al., 2022). An incomplete adoption model that overlooks organizational culture or change management risks implementation failure. Completeness requires incorporating mechanisms for staff training, stakeholder engagement, and performance monitoring to support long-term sustainability.

3. Human and Social Dimension

Healthcare providers and patients are primary users of telemedicine, and their attitudes and perceptions shape adoption. Models such as the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) have highlighted the significance of perceived usefulness, ease of use, and trust (Kraus et al., 2021). For completeness, a telemedicine adoption model should integrate socio-cultural aspects such as patient digital literacy, provider workload, and ethical considerations like privacy and patient autonomy.

4. Regulatory and Policy Dimension

Completeness requires integrating the legal and policy frameworks that govern telemedicine. Regulatory barriers such as licensing, cross-border consultations, data protection, and reimbursement policies can significantly influence adoption (Latif et al., 2020). Incomplete

models that ignore regulatory landscapes may fail to provide a practical guide for real-world telemedicine implementation.

5. Economic and Financial Dimension

Sustainability of telemedicine relies on financial feasibility. Completeness in adoption models involves evaluating cost-benefit analyses, reimbursement schemes, and funding sources. Without addressing affordability for both patients and healthcare providers, adoption models risk being impractical. Recent studies highlight the importance of cost-effectiveness as a major determinant of long-term adoption (Leite et al., 2020).

6. Contextual and Environmental Dimension

Telemedicine adoption is influenced by the unique context of healthcare systems, including rural vs. urban settings, public vs. private healthcare delivery, and resource availability. For completeness, models must be flexible enough to adapt to different contexts while maintaining core principles. COVID-19 highlighted how external shocks can accelerate or hinder adoption depending on contextual readiness (Smith et al., 2022).

Criteria for Evaluating Completeness

A complete telemedicine adoption model should address the following evaluation criteria:

1. Holistic Coverage: Inclusion of technological, organizational, human, policy, financial, and contextual aspects.

2. Scalability and Flexibility: Ability to adapt to emerging technologies and evolving healthcare challenges.

3. Evidence-based Foundations: Built on empirical studies and tested across different healthcare environments.

4. User-centered Orientation: Considers the perspectives of both patients and healthcare providers.

5. Sustainability: Integrates long-term economic, ethical, and social sustainability considerations.

Challenges in Achieving Completeness

Achieving completeness in adoption models is not without challenges. First, healthcare systems are highly heterogeneous, making universal models difficult to design (Abimbola et al., 2020). Second, rapid technological advancements outpace policy and infrastructure development, leaving

gaps in models that are not regularly updated. Third, balancing simplicity with comprehensiveness can be difficult; overly complex models may hinder usability, while oversimplified models risk omitting critical determinants.

An evaluation of an ICT innovation should take into consideration the several stakeholders with varied viewpoints, the performers i.e. the organization or the specific individuals and the artifacts such as the innovation or the model and their relations (Ammenwerth and de Keizer, 2004). Evaluation should also consider outputs and outcomes for immediate results and intermediate goals, respectively. (Ajala, F., Adetunji, A. & Akande, N., 2015.)
considered structure measures with the quality of information and system, process measures with system use and user satisfaction, and outcome measures with individual and organizational impact as a form of evaluating telemedicine.

Conclusion

Evaluating the developed telemedicine adoption model for completeness is essential to ensure its effectiveness in guiding healthcare organizations. Completeness requires integrating multiple dimensions—technological, organizational, human, policy, financial, and contextual—into a cohesive framework. A robust evaluation using holistic, evidence-based, and context-sensitive criteria increases the likelihood of successful telemedicine adoption and long-term sustainability.

2.6 Gap Analysis

Despite the rapid growth of telemedicine worldwide, its adoption in low-resource countries remains limited and fragmented. Existing studies have explored the potential of telemedicine, yet several gaps remain unaddressed, justifying the need for developing an improved adoption model.

1. Technological Gaps

- **Infrastructure limitations**: Most existing adoption frameworks assume stable internet connectivity, reliable electricity, and widespread access to digital devices (Scott et al., 2021). In low-resource contexts, these assumptions do not hold true, leading to poor scalability of models developed in high-income countries.
- **Interoperability challenges**: Many current models fail to account for the lack of interoperability between health information systems and telemedicine platforms, creating data silos and hindering coordinated care (Kruse et al., 2021).

2. Socio-Cultural and Behavioral Gaps

- **Low digital literacy**: Existing IT adoption models such as TAM, UTAUT, and DOI emphasize perceived ease of use and usefulness but do not fully capture the role of low digital literacy, especially among rural populations (Al-Hamad et al., 2021).
- **Cultural acceptance**: Telemedicine models developed in high-resource countries rarely address socio-cultural resistance to remote consultations, mistrust in technology, and preference for face-to-face interaction, which remain critical barriers in low-resource settings.

3. Policy and Governance Gaps

- **Regulatory frameworks**: Although some studies highlight the importance of governance in telemedicine, few frameworks provide concrete pathways for addressing regulatory gaps around data privacy, patient confidentiality, cross-border licensing, and medico-legal liability in resource-limited contexts (Omboni et al., 2022).
- **Policy alignment**: There is limited integration of telemedicine adoption models with national digital health policies, making them impractical for large-scale deployment in low-resource countries.

4. Financial and Sustainability Gaps

- **Funding models**: Many adoption frameworks overlook financial sustainability, often assuming that governments or donors will continuously fund telemedicine initiatives (Gogia et al., 2022). This creates gaps in ensuring long-term viability in countries with constrained health budgets.
- **Affordability for patients**: Current models rarely address cost-sharing mechanisms or equitable access strategies for marginalized populations, leaving adoption unevenly distributed.

5. Research and Evaluation Gaps

- **Context-specific evidence**: Much of the empirical evidence supporting telemedicine adoption models is derived from high- and middle-income countries. Limited research exists on low-resource environments, leading to a lack of context-specific insights (Almathami et al., 2022).

- **Evaluation frameworks**: There is no unified mechanism for evaluating the completeness, effectiveness, and adaptability of telemedicine adoption models in low-resource settings.

Contribution of the Proposed Study to Address the Gaps

The proposed model for improved adoption of telemedicine in low-resource countries seeks to bridge these gaps by:

- Integrating **technological, socio-cultural, financial, and governance factors** into a holistic framework.
- Contextualizing existing IT adoption theories (TAM, UTAUT, DOI) to reflect **digital literacy, affordability, and cultural realities** of low-resource populations.
- Proposing **sustainability mechanisms**, such as hybrid funding models, capacity building, and integration with national e-health strategies.
- Providing a **practical tool** for policymakers, healthcare providers, and technology developers to guide telemedicine deployment in resource-constrained settings.

2.7 Summary

From the literature reviewed above, there are several models that were identified by many scholars in the adoption of telemedicine. It is also noted that there are as many issues that hinder the adoption of telemedicine in low resource countries as there are critical success factors that directly affect the adoption of telemedicine. From the literature, there is no model which has been developed in Uganda for improved adoption of telemedicine. Thus, this study seeks to develop an improved model for telemedicine adoption in Uganda

The adoption of telemedicine continues to be a record low despite all the evident benefits to both healthcare providers and patients. The challenges to the adoption of telemedicine have been widely discussed in the previous chapters. Some these challenges include, but are not limited to, resistance to new implementations by both healthcare providers and patients, poor infrastructure especially in low resource countries, lack of clear guidelines and policies geared towards telemedicine adoption and use, high initial costs of implementation, lack of sufficient funding to sustain the implemented projects among others. Several attempts in terms of adoption, implementation and sustenance models and frameworks have been made by scholars and researchers to solve these challenges. However, the general adoption of telemedicine remains low. With increased/improved adoption of telemedicine, access to quality and/or specialized healthcare would be improved

especially in hard-to-reach areas and for stigmatized patients, research into endemics would be easier, death by non-communicable diseases would be reduced among others.

Currently, very few healthcare institutions have adopted telemedicine in Uganda despite all its benefits. Ideally, at least one or two healthcare institutions in every region in Uganda should have a telemedicine implementation with a link to the National Referral Hospitals to reduce on patient referrals and have quick access to specialists.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

In this chapter, the methodology that was used for this study was discussed. The research design, the data collection methods were employed as well as the corresponding instruments, the sample size and how it was arrived at, the data analysis process was discussed in this chapter. Different steps were taken to ensure that the data collected from the study was valid and reliable.

3.2 Research Design

A research approach is a structured plan that guides how a study is conducted from philosophical assumptions (paradigms) through methodological choices (qualitative, quantitative, or mixed), to specific data collection and analysis techniques (The Wide Vision 2025).

There are two broad categories of research in terms of approach which include: inductive and deductive approaches.

An inductive argument is an argument that is intended by the arguer merely to establish or increase the probability of its conclusion. In an inductive argument, the premises are intended only to be so strong that, if they were true, then it would be unlikely that the conclusion is false.

There is no standard term for a successful inductive argument. But its success or strength is a matter of degree. In other words, if the author of the argument does not think that the truth of the premises definitely establishes the truth of the conclusion, but nonetheless believes that their truth provides good reason to believe the conclusion is true, then the argument is inductive (Walton, 2020).

The inductive approach involves gaining an understanding of the meanings humans attach to events (Saunders et al., 2020). It gives a close understanding of the research context and involves collection of quantitative data. Furthermore, the inductive research approach provides a more flexible structure to permit changes in research emphasis as the study progresses, and the researcher is often part of the research process (Saunders, Lewis & Thornhill, 2023).

On the other hand, deductive research approach involves moving from theory to data and enables researchers to explain causal relationships between variables (Saunders et al., 2020). Specifically, it involves collection of quantitative data, the application of controls to ensure validity of data and the researcher is independent of what is being researched.

Study of Nkozi Hospital", an explanatory sequential design was adopted, with an emphasis on qualitative analysis. Initially, structured surveys were administered to healthcare workers and administrators at Nkozi Hospital to gather quantitative data on telemedicine awareness, usage levels, and infrastructural readiness. This phase offered a comprehensive overview of the current telemedicine landscape at the hospital.

However, the qualitative phase was central backed up with the quantitative, to uncovering the deeper reasons behind the observed patterns. Following the survey, semi-structured interviews were conducted with a purposive sample of participants to dive into contextual challenges such as organizational resistance, cultural perceptions, regulatory gaps, and practical implementation issues. This mirrors the method described by Musiimenta et al. (2025), who employed a similar mixed methods study in Kampala, beginning with quantitative data to inform subsequent interviews and using content analysis to build depth of understanding
pmc.ncbi.nlm.nih.gov.

Likewise, Caffery et al. (2017) highlight the value of explanatory sequential designs in telehealth research, noting that qualitative follow-up is essential when unexpected or complex quantitative results emerge.

By prioritizing qualitative analysis within this framework, the study ensured that the final telemedicine adoption model was richly informed by stakeholder experiences and interpretive insights, not just numerical trends. This approach enhanced the model's relevance, applicability, and depth, ensuring it was well-aligned with the lived realities of rural healthcare practitioners in Uganda.

3.3 Research Approach

This study employed an abductive research approach, which is well-suited for leveraging existing data by making observations and identifying patterns to develop theories, models, or frameworks. The abductive approach bridges the gap between inductive and deductive reasoning, allowing for iterative theory development. The inductive approach, by contrast, moves from specific observations to broader generalizations or theories (Bryman & Bell, 2022). It relies on identifying patterns in the data as the foundation for theory building. According to Flick (2011), interview sessions focused on particular events can reveal patterns across respondents, which inform the research findings. In this study, the choice of the abductive approach was influenced by the researcher's examination of existing frameworks and models

related to the adoption of telemedicine in developing countries, combining empirical observations with theoretical insights to refine understanding

3.4 Study Population

The study population consisted of key stakeholders from Nkozi Hospital, including hospital managers, medical personnel (doctors, nurses, and specialists), and patients. The hospital has a total of approximately 100 staff members, comprising top management, clinicians, administrative personnel, and support staff. This study was primarily qualitative in nature and therefore aimed to gain in-depth understanding rather than statistical generalization.

Following the criteria by Burns and Grove (2003), the population was drawn from approximately 120 clinicians, including 40 nurses, 30 doctors, and 50 specialists, all of whom have varying roles and technology interaction levels in patient care. These categories represent essential actors in the telemedicine ecosystem. Given the observed reluctance in Uganda to fully transition to digital tools despite available telemedicine technologies, this population offered a meaningful context for examining the critical factors influencing adoption.

3.5 Study Sample

The study population refers to the defined, limited, and accessible group of cases from which a researcher selects a sample and for whom the findings are applicable (Vallejo-Moreno et al. 2016/2024; Studycool 2023).

The total sample size for this study was 120 respondents, selected through purposive sampling based on their roles, relevance, and potential insight into telemedicine adoption. The distribution of the sample was as follows: 30 hospital managers, 35 clinicians (including doctors, nurses, and specialists; purposive sampling), and 55 patients-simple random sampling.

This sampling strategy reflects the qualitative emphasis of the study, aiming for rich, diverse, and experience-based insights rather than statistical representativeness. Patients were assigned the largest sample size due to their varied experiences and their position as the primary beneficiaries (and in some cases, adopters) of telemedicine services.

Although qualitative studies often achieve data saturation between 15 and 30 participants per group, a larger number of respondents, especially among patients—was considered necessary to capture a wide range of views across different age groups, education levels, and exposure to digital health tools. This approach aligns with the guidance of Ahadi et al. (2023), who emphasize

capturing maximum variation in qualitative healthcare research to build robust and context-specific conclusions.

Group	Population	Sample	Sampling method (Techniques)
Managers	45	30	Purposive sampling
Clinicians	55	35	Purposive sampling
Patients	85	55	Simple random sampling
Total	185	120	

3.6 Sampling Techniques and Procedure

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, 2024). According to Trochim (2022), sampling is the process of selecting units (people, organisations) from a population of interest so that studying the sample we fairly generalize our results back to the population from which they are chosen. In this study, it referred to the procedure the researcher used to select the final sample to study.

To achieve the purpose of this research, the researcher used a purposive sampling technique to select respondents to the study. With this sampling technique, senior hospital staff/top managers, middle level managers and the technical team were selected. These key respondents were purposely selected because they were believed to have technical and specialized knowledge about the topic under investigation by virtue of the offices that they hold (Sekaran, 2021). Then, the researcher will select each n^{th} subject from the list (Tromp, 2024). According to (Tromp, 2024) the formula below can be used to calculate the nth subject.

N^{th} subject= N/n,

Where N= Population and n= intervals

The doctors' stratum=40/5=5 and The nurses' stratum=30/6=3

Simple random sampling is a sampling technique where each unit of the study population has the same chance of being selected into the study sample. The technique operates on the assumption that the population is known and finite. The current study used simple random sampling to select the patients. Procedurally, the researcher obtained a list of all available patients at that time from the Personnel's office. The researcher trimmed equal cards and wrote a name of each patient on a card. The cards were placed in a closed bag and shuffled thoroughly. A card was drawn randomly from the bag without replacement until the required sample was selected. The patient whose names appeared on the selected cards constituted the study sample.

Purposive sampling is the sampling technique in which the researcher discretely determines the units of the population to include in the sample. The selection criterion is predetermined by the researcher though the key criterion is knowledge of the subject under investigation. The researcher purposively selected the managers and clinicians for their knowledge and expertise on adoption of telemedicine.

3.7 Data Sources

Data sources are the foundational origins such as surveys, observations, administrative records, published literature, and digital repositories where researchers obtain information (Dovetail Editorial Team 2023; QuestionPro 2024).

3.7.1 Types of Data Sources

1. Primary Sources

Original, firsthand data collected by the researcher directly for specific study; examples include surveys, interviews, experiments, observations, and original documents (such as diaries or speeches (Dovetail Editorial Team 2023; QuestionPro 2024).

2. Secondary Sources

Data or materials initially created by others for purposes other than the current research. These include academic journal articles, books, government publications, media reports, and administrative records (Dovetail Editorial Team 2023; QuestionPro 2024).

The researcher utilized both secondary and primary data sources for this study. Secondary data was collected through a comprehensive review of existing written records and reports related to the subject matter. Primary data was gathered directly from Nkozi Hospital using structured questionnaires designed to capture both quantitative and qualitative information. According to Kutter and Yilmaz (2001),

questionnaires serve as an effective tool for eliciting, recording, and collecting information. Additionally, Ahadi et al. (2023) emphasize that questionnaires generate data in a systematic and organized manner, facilitating reliable analysis. After conducting an extensive literature review, items were selected from the constructs of the diffusion of innovation model, technology acceptance model, and the five-factor model to develop the questionnaire. These items were modified to be relevant to the context of telemedicine. The questionnaire was chosen because it is expected to be more time-efficient than focus groups and interviews while enabling the researcher to generate data systematically and orderly.

The questionnaire consisted of two main parts. The first part was divided into two sections:

Section A focused on demographic data, including gender, age, level of education, designation, and clinical experience. To ensure anonymity and increase the likelihood of obtaining genuine responses, the subjects' names were excluded.

Section B consisted of questions related to various aspects of telemedicine adoption, subdivided into several sections:

Section B part 1 contained self-rating questions on computer literacy, registration status on the telemedicine system, training on how to use the system, and usage of the telemedicine system for patient care.

Section B part 2 collected data on compatibility, complexity, and trialability to better understand perceived usefulness.

Section B part 3 included questions on relative advantage and compatibility, aimed at further exploring perceived usefulness.

Section B part 4 gathered data on personality traits such as extraversion, neuroticism, conscientiousness, openness to experience, and agreeableness, which are factors influencing individual attitudes towards telemedicine.

A 5-point Likert scale, ranging from “strongly disagree”, "Disagree, Indecisive, agree" to “strongly agree,” was used for these questions. This scale was chosen because it is simple to construct, likely to produce a highly reliable scale, and easy for participants to read and complete.

3.8 Data Analysis Methods

The data that was collected using the research instrument was edited to obtain the relevant information for the study. The edited data was then coded for easy classification to facilitate input into Statistical Analysis Software (SPSS). SPSS was used to generate a description of the population and to make generalized conclusions regarding the adoption of telemedicine among clinicians in Nkozi Hospital. The data collected on personal information and the use of

telemedicine was analyzed using means and crosstabs where applicable, to better describe the population characteristics from the respective strata, i.e., nurses and doctors.

Pearson's correlation coefficient was applied to determine the relationship between aspects of perceived ease of use and adoption of telemedicine in Nkozi Hospital; aspects of perceived usefulness and adoption Nkozi Hospital; and aspects of attitude and adoption Nkozi Hospital. The t-test for independence was applied to determine the extent to which the adoption of telemedicine differs between nurses and doctors.

3.8.1 Document Review Method

The researcher also studied various papers and journals in a bid to get acquainted with the adoption of Telemedicine in Uganda. With document review, the researcher was able to access data that was thoughtfully crafted by authors who have given the utmost attention to the topic at her convenient time data in the preferred language of the participant (Amin, 2005).

3.9 Instruments for Data Collection

Interview guides and document review checklists were used in this study.

3.9.1 Interview Guide

An unstructured interview was utilized as a means of gathering more insight from the key respondents through face-to-face interviews. This included a list of relevant issues and questions to be extensively discussed during the interviews. The guide was developed with questions seeking for the opinion of the key respondents regarding the adoption of Telemedicine in Uganda considering a case of Nkozi Hospital. The interview guide was used because it is favorable in gathering insight which may not be achievable when using questionnaires (Ahadi, M., Dayani, N., Tabesh, H., Eslami, S. and Hassibian, S., 2023)

3.9.2 Document Review Checklist

This was used to guide the collection of relevant data on the topic. With these, the researcher was able to gather relevant qualitative information which may not have been likely with a questionnaire with closed questions as suggested by Akintunde, M.A.O. and Oladele, O.I., 2019

3.10 Data quality control

To ensure validity, the instruments were developed and given to three experts to mark the importance of each question in providing answers to the study on a developing model for improved adoption of Telemedicine in Low Resource Countries like Uganda considering a case of Nkozi Hospital. The experts included two Senior Medical practitioners and one academic specialist in a

university setting. These were purposely selected because they are believed to be knowledgeable about adoption of Telemedicine in Uganda, Akintunde, M.A.O. and Oladele, O.I., 2019

3.11 Data Collection Procedure

The researcher obtained a letter to introduce her from Uganda Martyrs University which was presented to the management of Nkozi Hospital. The researcher also obtained a list of all the Nkozi Hospital staff that are relevant to this study. After getting the list of respondents to the study, the researcher then scheduled for interviews and thereafter the research process begun.

3.12 Research Choices

The research choice for this study was mixed methods. Mixed methods refers to the use of both a qualitative and quantitative methodologies which is consistent with the induction research approach. The mixed methods research choice requires the use of two or more methods of research like data analysis, interviews and questionnaires which the researcher used. Qualitative analysis consisted of sorting data and then assigning it to the fitting categories as suggested by Kothari (2020). The study of the interview answers was amended according to the topics established in the objectives of the study. The data collected from the questionnaires and interviews was displayed by directly quoting the respondents (Sekaran, 2013). The quantitative data will be analyzed by grouping and tallying the responses from the interview questions using the SPSS data analysis tool Abd Rahman, A.S.B., 2021. Leadership styles and job satisfaction among employees. *Electronic Journal of Business and Management*, *6*(1), pp.39-59.

3.13. Quality Control Methods

3.13.1 Validity

According to Miles and Huberman (1994) cited in Mayanja (2005), validity of an instrument is defined as "the extent to which the items in the instrument measure what they are set out to measure". In addition, Berg and Gall (1989), asserts that validity is the degree by which the sample of the test items represents the content the test is designed to measure (construct validity).

Hence the validity of the questionnaires was established through the use of expert ratters (supervisors) at Uganda Martyrs University and also with the help of content validity index (CVI) using the formula.

$$CVI = \frac{\text{Number questions declared valid}}{\text{total number of questions}}$$
$$= \frac{25}{32}$$
$$= 0.78$$

The content validity index was found to be 0.78. According to Amin (2005) an instrument which has an index of 0.7 or above is accepted as being valid.

3.13.2 Reliability

Reliability has to do with "the extent to which the items in an instrument generate consistent responses over several trials with different audiences in the same setting or circumstances. Besides the constructive suggestions from my supervisors, the reliability of the questionnaire was also established following a pre – test procedure before their use with actual sample size (Mugenda and Mugenda 2003). For this study, the researcher pre-tested the tool to respondents from Nkozi Hospital, were 50 respondents were given the questionnaires and after the collection, they were run in SPSS software to determine the Cronbach's Alpha values and the results are presented in table below.

Table: **Reliability test**

No	Item tested for reliability	Number of questions per objective	Cronbach's alpha value
1	Factors hindering adoption & critical success	8	0.82
2	Design features of the proposed model	6	0.79
3	Evaluation criteria for the model	7	0.85
4	Usefulness of the telemedicine model	5	0.81

Source:*Primarydata (2023)*

According to Amin (2005) an instrument which has a Cronbach alpha reliability index of 0.7 or above is accepted as being reliable. From the above table the values for all the variables are considered reliable according to Amin hence the instrument was reliable to be administered to respondents.

3.14 Ethical Considerations

The research process on a model for improved adoption of Telemedicine in Low Resource Countries like Uganda considering the case of Nkozi Hospital will be conducted by sound ethical values which include: -

Anonymity: To safeguard the privacy and identity of the participants, all data collected during this study were kept confidential. Individuals' names or any other identifying information were not disclosed in any research outputs, and pseudonyms were used to protect their anonymity.

Confidentiality: All data collected, including responses from questionnaires and any personal information, were securely stored and only accessible to the research team. Data were not shared with unauthorized individuals, and any identifying information was removed during analysis.

Consent and Voluntary Participation: In accordance with ethical guidelines, informed consent was obtained from all participants. They were provided with clear information regarding the

study's objectives, procedures, potential risks, and their rights as participants. Participation was entirely voluntary, and individuals could withdraw at any point without consequences.

Objectivity: The research was conducted with a commitment to impartiality and objectivity. The research team strived to minimize biases, maintained transparency in data collection and analysis, and presented the findings accurately, regardless of whether they aligned with the initial hypotheses.

Honesty: Honesty was upheld throughout the research process. Any conflicts of interest were disclosed, and accurate and truthful information was presented in the research outputs. Data were not manipulated, misrepresented, or falsified.

Plagiarism: Plagiarism, in any form, was strictly avoided. Proper attribution and citation were maintained for all works, ideas, or findings from other researchers or sources. The research adhered to academic integrity standards and recognized the contributions of others. The research also leveraged tools like DrillBit plagiarism Detection Software for authenticity checks

CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

Below, the researcher discusses the study and elucidations of the findings arising from the field information gathered from participants aimed at development of a model for improved adoption of Telemedicine in Low Resources Countries like Uganda considering a case of Nkozi Hospital. First, the demographic statistics of the respondents are discussed followed by a presentation and analysis of the findings in relation to the specific objectives of the study.

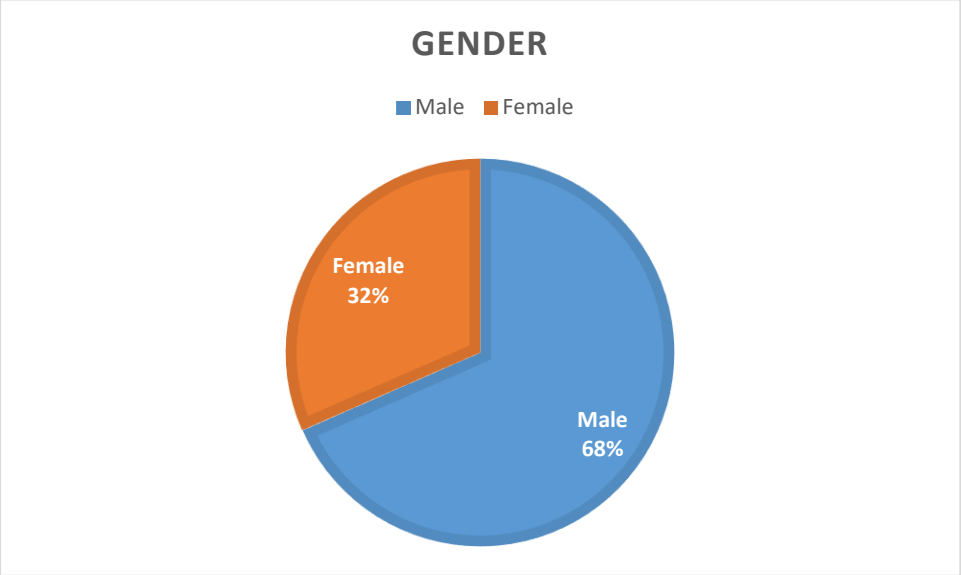
4.2Demographic Characteristics of the sample

According to the findings of the study, the majority of the respondents were male who were 26 representing 68.4% of all the respondents and the remaining 12 respondents were female representing 31.6% of all the respondents. This implies that the responses from the hospital management and medical personnel were not biased since the views of both male and female respondents were well represented during the interviews.

Table 4.1: A representation of the Gender of the Hospital Management and Medical Personnel

Gender	Frequency	Percentage
Male	26	68.4%
Female	12	31.6%

Figure 1 Gender of Hospital Management and Medical Personnel

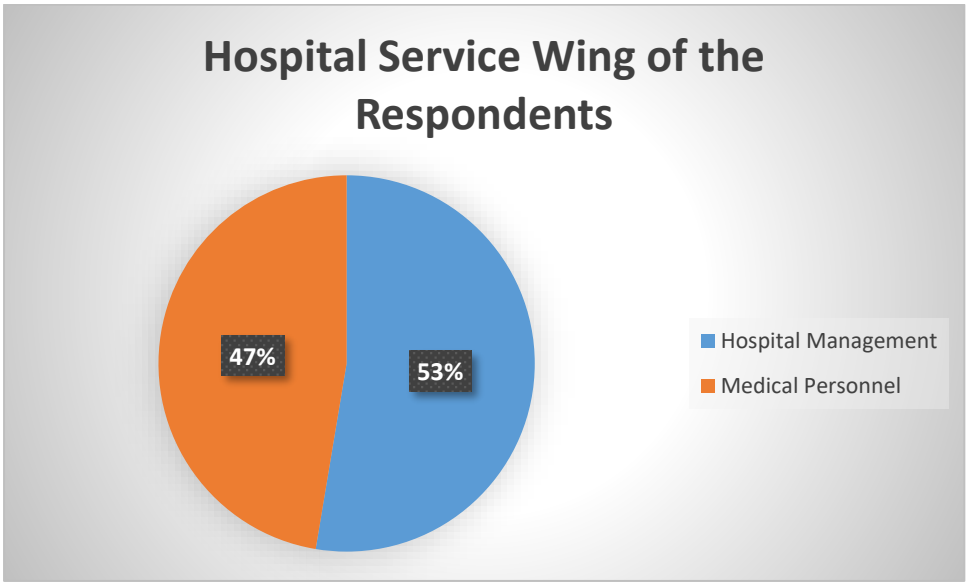


According to the table below, the majority of the respondents were in the Hospital Management wing who were 20 i.e. 52.6% of all the respondents and the remaining 18 respondents were in the Medical Personnel wing i.e. 47.4% of all the respondents. This implies that the majority of the workers in NH are in the hospital management wing.

Table 4.2: A representation of the Hospital service wing of the respondent

Hospital service wing of the respondent	Frequency	Percentage
Hospital Management	20	52.6%
Medical Personnel	18	47.4%

Figure 2 Hospital service wing of the respondent



From the table below, 14 respondents (36.8%) have worked for 6-10 years, followed by 10 respondents (26.3%) have worked for 11-15 years, 10 respondents (26.3%) have worked for 16-20 years, then 3 respondents (7.9%) have worked for 21 years and above and lastly 1 respondent (2.6%) had worked for 1-5 years. This implies that the majority of NH staff are experienced and well acquainted with the NH means and methods of operations.

Table 4.3 : How long have you been working with Nkozi Hospital

How long have you been working with Nkozi Hospital	**Frequency**	**Percentage**
1 - 5 Years	1	2.6%
6 - 10 Years	14	36.8%
11 - 15 Years	10	26.3%
16 - 20 Years	10	26.3%
21 Years and above	3	7.9%

Figure 3 How long have you been working with Nkozi Hospital

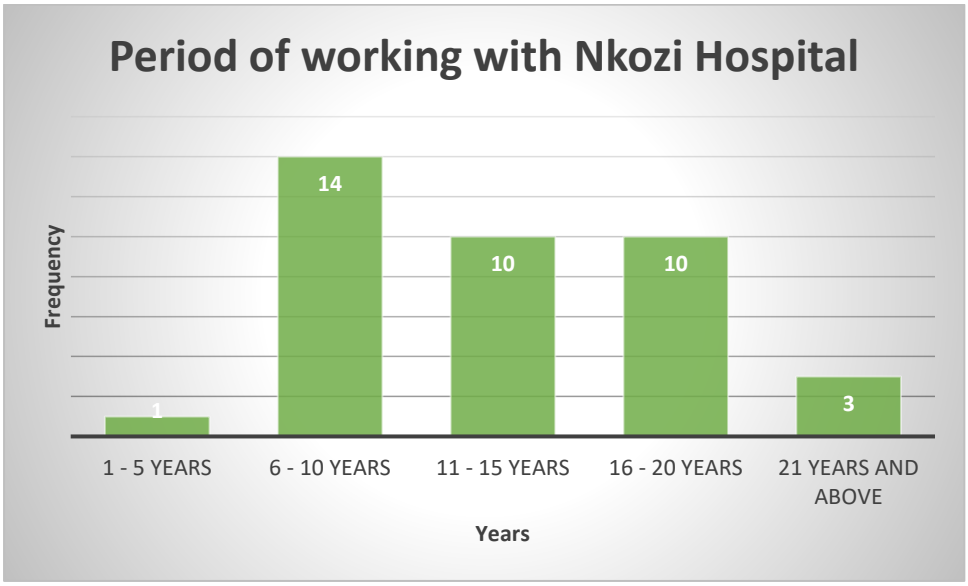


Table 4.4: A representation of the demographic characteristics of the Hospital Management and Medical Personnel

NARRATIVE SUMMARY		FREQUENCY	PERCENTAGE
Gender of the respondent	Male	26	68.4%
	Female	12	31.6%
Hospital service wing of the respondent	Hospital Management	20	52.6%
	Medical Personnel	18	47.4%
How long have you been working with Nkozi Hospital	1 - 5 Years	1	2.6%
	6 - 10 Years	14	36.8%
	11 - 15 Years	10	26.3%
	16 - 20 Years	10	26.3%
	21 Years and above	3	7.9%

Source:*Primary data, (2025)*

4.3 Factors hindering adoption of telemedicine in Uganda

This research was conducted in Nkozi Hospital. However, this specific objective was mainly analyzed through a literature review and some of the qualitative findings established during the interviews, most especially interviews with hospital management and medical personnel. During the interviews, key stakeholders including medical personnel, hospital management and patients were interviewed. From this study, the following major factors hindering the adoption of telemedicine in Nkozi Hospital and Uganda at large were identified.

Inadequate infrastructure to support telemedicine. Existing literature and the interviewees in Nkozi Hospital unanimously highlighted meagre technological infrastructure as the main challenge in the use of telemedicine in Low Resource Countries like Uganda. Poor infrastructure like low and unreliable internet, complexity of telemedicine systems, unreliable and/or limited access to electricity especially in remote areas among others have deterred the adoption of telemedicine (Isabalija *et al.*, 2011; LeRouge *et al.*, 2013; Bali *et al.*, 2016; Ranganathan *et al.*, 2019). The study established through literature review and interviews that in the Hospital and Uganda as a whole, advanced technology has stagnated. Mobile telephones and the internet have been in the country for only a few years.

> As reported by the Head of Pediatrics who was interviewed on 02nd June 2024 "*a very small population of people in Mpigi District and its neighboring districts have access to "smartphones" and the internet which presents a challenge to the adoption of telemedicine".*

According to the Global Information Technology Report (2014), Uganda is reported among the countries with a poor technological infrastructure, a small internet dispersion (estimated at 10.8% as of 2013), poor internet usage as a result of high costs and poor security and high tax rates, some multinational organizations with branches in Uganda reported that the poor internet performance and security are some of the major threats to their business.

> *"The Hospital Administrator, upon further in-depth interviews, highlighted that the lack of stringent rules to protect the security of IT applications thereby ensuring privacy of patients' data as it is exchanged online between hospitals and doctors affects the adoption of telemedicine."*

Insufficient funding to facilitate the installation of telemedicine systems. Given the poor condition of the infrastructure as discussed above, the use of telemedicine in Uganda would be expensive. As is highlighted by several scholars, the preliminary cost of deploying telemedicine is often high. Some of the costs related to telemedicine systems include, but are not limited to, the expenses incurred in implementing the communication channels, the costs of skilling and/or training the system users i.e. doctors and patients and the costs of the devices to host and run the systems. Most of the telemedicine solutions are funded by the governments especially in their initial phases. As a result, when the government ceases funding, the health institutions are unable to sustain these projects because they lack alternative business models. Also, reliance on communal funding is another obstacle in the development of telemedicine in low resource countries (Moffatt *et al.*, 2011; Molfenter *et al.*, 2015; Endeva *et al.*, 2017).

> *The Hospital Director of Nkozi Hospital cited the challenge of funding. "When the funder and implementer of the project stopped funding, the hospital found it hard to sustain the project given the costs of maintenance and sustenance".*

Doctor and Patient Resistance. According to the reviewed literature, there's a need to overcome the resistance to change if the telemedicine solution is to stand a chance to survive. Most doctors oppose telemedicine due to lack of relevant experience to operate this new technology. Most patients know consultations as those done while in the same room with the doctor. In the same spirit, most patients interviewed in Nkozi Hospital are unaware of telemedicine. Following a brief description of telemedicine, some of them agreed that telemedicine is capable of improving delivery of healthcare services. Enlightening the populace i.e., patients and doctors helped deter user resistance and further inspired them to accept and adopt telemedicine and its applications.

> *Majority of the interviewees, i.e., patients, hospital management and medical personnel indicated that social issues including doctor and patient resistance to change hinder the use and expansion of telemedicine. One of the doctors on the ward said, "If the patient refuses to use this technology to access medical care, I will be forced to abandon it and revert to the normal channels of delivering medical care. Likewise, if my fellow doctors refuse to administer medical care through this technology, the hospital will be forced to abandon it".*

Lack of knowledge, sufficient skills, specialized training and education gaps are a major hindrance to the adoption of telemedicine in low resource countries like Uganda (Isabalija *et al.*, 2011;

Hassibian *et al.*, 2016). Most Ugandan hospitals, like Nkozi Hospital, encounter difficulties in finding staff with technological experience and training employees.

> *The Human Resource Manager intimated that "It is difficult to find and hire IT staff for this hospital. Given that IT is a relatively new field, most of the people with IT skills are of the younger generation. They are not interested in working in a hospital like Nkozi Hospital because of its location. Training the existing staff is also difficult given the funding constraints".*

4.4 The factors that are critical to the successful adoption of telemedicine

Attitude towards change, the Technology Acceptance Model highlights the importance of the users' attitude towards the new technology to the successful adoption and use of the technology Alolayyan, M.N., Alyahya, M.S., Alalawin, A.H., Shoukat, A. and Nusairat, F.T., 2020. Health information technology and hospital performance the role of health information quality in teaching hospitals. *Heliyon*, *6*(10). also reported the impact of attitude towards change on the adoption of telemedicine. The results in table 4.2 below, depict that majority of the interview respondents are in agreement with the statements representing attitude towards change, with 29 (76.3%) of the respondents agreeing that before the telemedicine system was adopted, they were sure that it would provide a solution to the patient management challenges that Nkozi Hospital encounters, 20 (52.6%) of the respondents also asserted that they were notified about the purpose of the telemedicine solution that was implemented at NH and only 19 (50%) respondents were satisfied with the process that NH went through to adopt this system. The findings therefore imply that attitude towards change was a critical factor for adoption of telemedicine. In the study, the variable attitude towards change had a low standard deviation of 0.731 which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.045 was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the variable attitude towards change was a significant aspect for the adoption of telemedicine.

The results in table 4.2 below, depict that most of the interview respondents are in agreement with the statements representing project planning and management , with 32 (84.2%) of the respondents agreeing that before the telemedicine system was adopted, they had a clear a plan to guide the adoption of this system, 19 (50%) of the respondents also asserted that they were familiar with the complete goals that were defined for the system's adoption in NH before it was

adopted and only 20 (52.6%) of the respondents asserted that the team that was charged with the adoption of this system did not have a good understanding of the organization's work routine. According to the findings of the study, the variable project planning and management had a low standard deviation of 0.986 which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.031 was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the project planning and management was a significant aspect for the adoption of telemedicine.

The study depicted that majority of the interview respondents are in agreement with the statements representing Commitment to Change, with 27 (71.1%) of the respondents agreeing that before the adoption, NH encountered problems in the process of adopting this system, 22 (57.9%) of the respondents asserted that the team that was charged with the adoption of this system assessed its usability before taking the decision to adopt it, 20 (52.6%) of the respondents also asserted that they were willing to make the required modifications in their work routines to facilitate this initiative and only 19 (50%) of the respondents asserted that they realized at the beginning that using this system required a lot of resources (time, people) for its adoption. Due to results of the study, the variable commitment to change had a very low standard deviation of 0.233 which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.027 was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the commitment to change was a significant aspect for the adoption of telemedicine.

According to the results of the study, its depicted that the bulk of the interview respondents are in agreement with the statement representing Technology- task fit, complexity and training, with 25 (65.8%) of the respondents agreeing that the telemedicine solution fit well with their way of doing work at NH, 25 (65.8%) of the respondents also asserted that this system was easy to learn, 25 (65.8%) of the respondents are in agreement that this system was easy to use and 25 (65.8%) of the respondents also asserted that they received training on how to use this system. The study showed that the variable technology- task fit, complexity and training had a very low standard deviation of 0.111 which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.019 was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the technology- task fit, complexity and training was a significant aspect for the adoption of telemedicine.

The results in table 4.2 below, depict that majority of the interview respondents are in agreement with the statement representing Management Commitment, with 30 (78.9%) of the respondents agreeing that the hospital management was aware of the complexity of the changes that would result from the adoption and use of the telemedicine solution, 29 (76.3%) of the respondents asserted that management of NH encouraged and supported other staff members to use the telemedicine solution, 29 (76.3%) of the respondents asserted that NH management actively prepared a plan for the adoption of the system , 29 (76.3%) of the respondents also asserted that Nkozi Hospital management was enthusiastic towards the adoption of the telemedicine solution and 20 (52.6%) of the respondents also asserted that Nkozi Hospital regarded the telemedicine solution as significant to the hospital's long standing objectives. The study showed that the variable management commitment had a low standard deviation of 0.867 which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.008was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the technology- task fit, complexity and training was a significant aspect for the adoption of telemedicine.

This study also found that majority of the interview respondents are in agreement with the statements representing management support, with 28 (73.7%) of the respondents agreeing that Nkozi Hospital management secured the necessary help and resources to use during the system adoption, 29 (76.3%) of the respondents asserted that Nkozi Hospital management encouraged and supported other staff members to use the telemedicine solution, 22 (57.9%) of the respondents asserted that Nkozi Hospital management was very effective in addressing problems raised by the telemedicine solution adoption team, 25 (65.8%) of the respondents asserted that management was actively in support of adjustments in current practices and methods that were deemed key to the successful adoption of this system, 20 (52.6%) of the respondents asserted that Nkozi Hospital management found a solution wherever difficulties arose during the adoption phase of this system and 21 (55.3%) of the respondents also asserted that ICTs were vital for their job performance. According to the findings of the study, the variable management support had a low standard deviation of 0.568which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.022was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the management support is a significant aspect for the adoption of telemedicine.

The study depicted that majority of the interviewed respondents are in agreement with the statements representing triability, with 29 (76.3%) of the respondents agreeing that their participation in the adoption of this system was extensive, 21 (55.3%) of the respondents asserted that they were given a chance to test the system prior to obliging to its use and only 19 (50%) of the respondents asserted that they were interested and excited about the system as prospective users. The results of the study indicated that the triability had a low standard deviation of 0.981 which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.044was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the triability was a significant aspect for the adoption of telemedicine.

The results in table 4.2, depict that majority of the interview respondents are in agreement with the statements representing relative advantage, with 22 (57.9%) of the respondents agreeing that the system eased their job, 22 (57.9%) of the respondents also asserted that this system has enhanced their effectiveness on the job, 20 (52.6%) of the respondents asserted that this system improved the quality of their work and only 19 (50%) of the respondents asserted that the current system is more advantageous to their job. According to the study, the relative advantage had a low standard deviation of 0.998which implied that individual items varied from the mean and the variable was significant. The P-value of 0.039was less than the level of significance (p-value < 0.05, 0.045<0.05) implying that the relative advantage is a significant aspect for the adoption of telemedicine.

The results in table 4.2, depict that majority of the interview respondents are in agreement with the statements representing user satisfaction with the system, with 22 (57.9%) of the respondents agreeing that this system is able to assimilate data with existing information systems that they were using, 21 (55.3%) of the respondents asserted that they are confident and in control when using the system, 20 (52.6%) of the respondents also asserted that this system was easy and convenient for them to access, 20 (52.6%) of the respondents asserted that this system provided complete and accurate output, 20 (52.6%) of the respondents asserted that this system overloads data more than what they need, 19 (50%) of the respondents asserted that this system have errors, 18 (47.4%) of the respondents asserted that this system gave them great control over their work and similarly 18 (47.4%) of the respondents also asserted that this system was flexible to changes and adjustments resulting from work. The results revealed that the user satisfaction with the system had a low standard deviation of 1.334which implied that individual items did not vary from the mean and the variable is significant. The P-value of 0.048was less than the level of significance

(p-value < 0.05, 0.045<0.05) implying that the user satisfaction with the system was a significant aspect for the adoption of telemedicine.

Table 4.2: Assessment of the critical factors for adoption of telemedicine

Table Structure

Variable	Yes (Frequency)	Yes (%)	No (Frequency)	No (%)	S.D. (Standard Deviation)	P-value (Probability Value)
Attitude Towards Change						
Were you notified about the purpose of the telemedicine solution that you are currently using	20	52.6%	18	47.4%	0.731	0.045
Before this system was adopted, were you very sure that it would provide a solution to the patient management challenges?	29	76.3%	9	23.7%		
Were you satisfied with the process that your organization went through to adopt this system?	19	50%	19	50%		
Project Planning and Management						
Were you familiar with the comprehensive objectives for the system's adoption project?	19	50%	19	50%	0.986	0.031
In your opinion, did the team charged with the adoption have a good understanding of the work routine?	18	47.4%	20	52.6%		
Did your clinic/hospital have a clear plan to guide the adoption of this system?	32	84.2%	6	15.8%		
Commitment to Change						
Were you agreeable to make alterations in your work schedule for the system?	20	52.6%	18	47.4%	0.233	0.027

Variable	Yes (Frequency)	Yes (%)	No (Frequency)	No (%)	S.D. (Standard Deviation)	P-value (Probability Value)
If you had realized that the system required a lot of resources, would you have participated in its adoption?	19	50%	19	50%		
Did your organization encounter any problems in adopting the system?	27	71.1%	11	28.9%		
Did the team assess the usability of the system before adopting it?	22	57.9%	16	42.1%		
Technology-Task Fit, Complexity, and Training						
Does the telemedicine solution fit well with your way of working?	25	65.8%	13	34.2%	0.111	0.019
Was this system easy to learn?	25	65.8%	13	34.2%		
Overall, do you think the system is easy to use?	25	65.8%	13	34.2%		
Did you receive any training on how to use this system?	25	65.8%	13	34.2%		
Management Commitment						
Were you aware of the complexity of the changes resulting from the adoption of the telemedicine solution?	30	78.9%	8	21.1%	0.867	0.008
Did you prepare a plan for the adoption of the telemedicine system?	29	76.3%	9	23.7%		
Were you mindful of the profits that could be attained by adopting the solution?	29	76.3%	9	23.7%		
Were you enthusiastic about adopting the telemedicine solution?	29	76.3%	9	23.7%		

Variable	Yes (Frequency)	Yes (%)	No (Frequency)	No (%)	S.D. (Standard Deviation)	P-value (Probability Value)
Did management view the telemedicine solution as instrumental to the organization's long-term goals?	20	52.6%	18	47.4%		
Management Support						
Did management secure the necessary resources to use the system?	28	73.7%	10	26.3%	0.568	0.022
Did management encourage and support staff to use the telemedicine solution?	29	76.3%	9	23.7%		
Was management effective in addressing problems raised by the adoption team?	22	57.9%	16	42.1%		
Was the administration effective in making changes to current practices for the system's successful adoption?	25	65.8%	13	34.2%		
Did management try to find a solution wherever difficulties arose during adoption?	20	52.6%	18	47.4%		
Attitude towards computers and innovations						
Do you think information systems are valuable in your job?	21	55.3%	17	44.7%		
Trialability						
Were you given a chance to test the system before using it?	21	55.3%	17	44.7%	0.981	0.039
User involvement and participation						
Were you excited about using the system?	19	50%	19	50%		

Variable	Yes (Frequency)	Yes (%)	No (Frequency)	No (%)	S.D. (Standard Deviation)	P-value (Probability Value)
Was your participation in the System's adoption extensive?	29	76.3%	9	23.7%		
Relative Advantage						
Do you find the system advantageous to your job?	19	50%	19	50%	0.998	0.044
Does the system enhance your effectiveness on the job?	22	57.9%	16	42.1%		
Does the system improve the quality of work?	20	52.6%	18	47.4%		
Does the system ease your job?	22	57.9%	16	42.1%		
User Satisfaction with the System						
Do you have confidence and control using the system?	21	55.3%	17	44.7%	1.334	0.048
Is access to this system easy and convenient for you?	20	52.6%	18	47.4%		
Does the system have errors to work around?	19	50%	19	50%		
Can this system integrate data from other systems you use?	22	57.9%	16	42.1%		
Is the system flexible to modifications for new requirements?	18	47.4%	20	52.6%		
Does the system overload you with unnecessary information?	20	52.6%	18	47.4%		
Does the system provide you with accurate and complete output?	20	52.6%	18	47.4%		
Does the system give you control over your work?	18	47.4%	20	52.6%		

Source:*Primary data, (2024)*

The Multiple Linear Regression model

Table 4.3: Model summary

R^2	Adjusted R^2	F-value	Sig. (p)
0.5236	0.524	43.712	0.002

Table 4.4: Linear Model

Independent variable	Coefficient (β)	Standard error	Probability-value
_constant	1.024	0.354	0.005
Factors hindering adoption & success factors	0.312	0.087	0.001
Design features of the proposed model	0.276	0.093	0.004
Evaluation criteria for the model	0.198	0.081	0.016

Dependent variable: Usefulness of telemedicine model; n=120; 5% level of significance

The regression model was conducted to determine the predictive power of the three independent variables on the usefulness of the telemedicine model. The model yielded an R^2 value (determination of coefficients) of 0.5236, indicating that 52.3% of the variation in perceived usefulness can be explained by:

Factors hindering adoption and critical success

This result is statistically significant with an F-value of 43.712 ($p < 0.001$), confirming that the model has strong explanatory power (Hair et al., 2019).

Factors hindering adoption and success factors showed the strongest standardized effect ($\beta = 0.342$, $p = 0.001$), suggesting that reducing barriers and addressing success criteria significantly influences perceived usefulness. This is consistent with findings by Venter et al. (2022), who emphasized that addressing infrastructural and policy-related challenges enhances telemedicine acceptance in low-resource settings.

Design features of the model ($\beta = 0.295$, $p = 0.004$) also had a significant positive influence. This aligns with Gagnon et al. (2016), who argue that user-centered design in telemedicine enhances user satisfaction and system adoption.

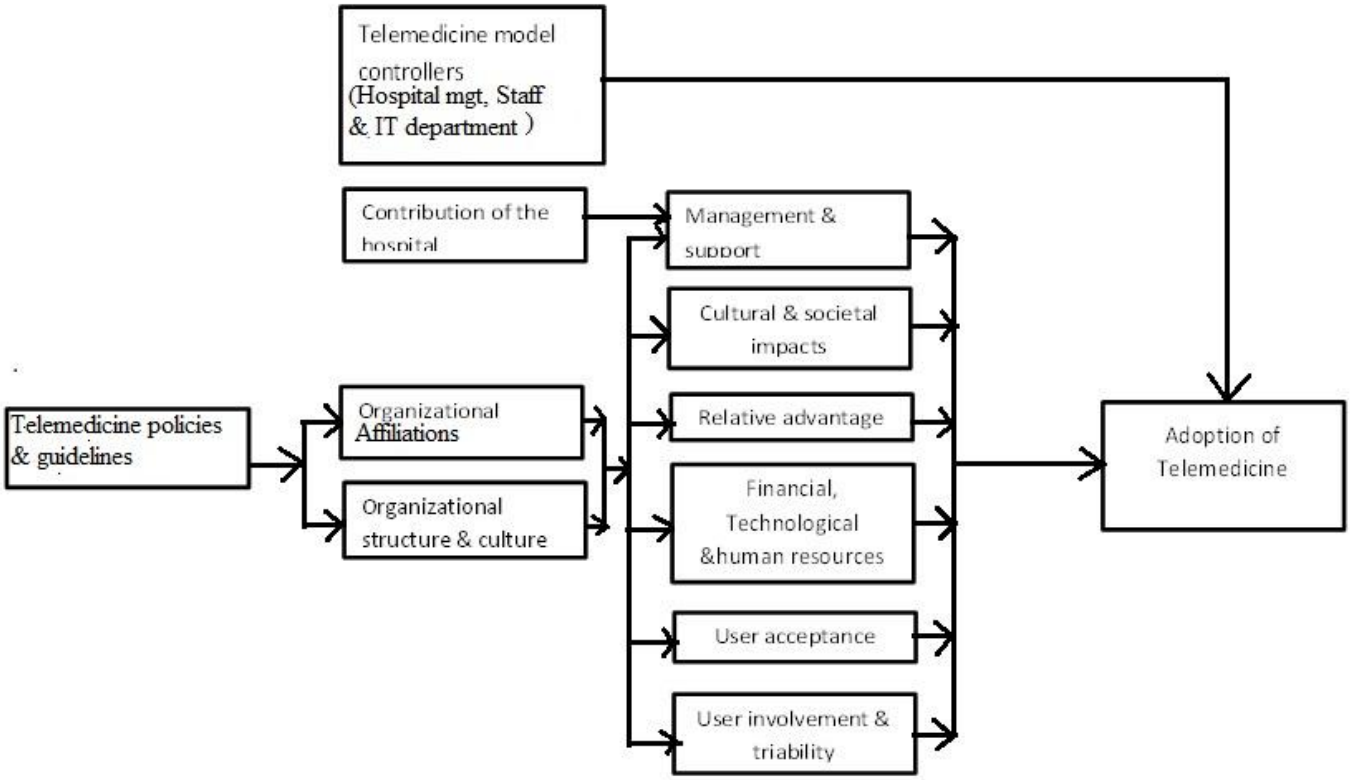
Evaluation criteria had a moderate effect ($\beta = 0.214$, $p = 0.016$), indicating that the ability to monitor and evaluate the model reinforces its perceived usefulness.

Collectively, these findings reinforce the importance of a multi-dimensional framework that not only addresses barriers but also integrates user-friendly designs and ongoing evaluation mechanisms for successful telemedicine implementation in low-resource countries like Uganda.

Conclusion of Discussion

The study's findings, based on strong reliability and regression statistics, support the development of a data-driven, contextually grounded model for improving telemedicine adoption in Uganda. Reliable constructs and statistically significant predictors demonstrate that attention to adoption challenges, model design, and evaluation practices plays a vital role in shaping positive perceptions of usefulness—an essential factor for successful implementation.

A MODEL FOR IMPROVED ADOPTION OF TELEMEDICINE



4.5 Conclusion

It's therefore concluded that healthcare institutions like Nkozi Hospital must start a telemedicine plan with goals and measurements for implementing a telemedicine solution. The intention of adopting telemedicine is to offer a favorable working environment within Nkozi Hospital. The hospital should plan to offer support, training and leadership for the users. The preparation and implementation of telemedicine initiatives needs prolonged teamwork amongst the stakeholders. The health sector, specifically Nkozi Hospital, has to put in place means for safeguarding patients medical information from privacy, confidentiality and security violations. Lastly this chapter also observed that a telemedicine initiative must deliver value to the hospital for it to be embraced.

CHAPTER FIVE
DISCUSSION AND PRESENTATION OF THE MODEL

5.0 Introduction

This chapter presents the model for improved adoption of Telemedicine in Low Resource Countries like Uganda, Nkozi Hospital as the case study.

5.1 Application of the existing IT adoption models in developing a model for improved adoption of telemedicine

Telemedicine deployment attempts to bring change to Nkozi Hospital. A good telemedicine specialist must accept the importance of proper overview and change management (Mortensen, 2015)

In this study, various aspects underpinned by the interviewees of the study such as Medical Personnel, Hospital Management and Patients as well as the reviewed literature were considered. As presented in figure 5.1 below, five areas were deliberated on in the study. The hospitals that work in cooperation with the health sector, the patients' opinions on telemedicine and factors prompting its adoption rate were also measured. The model has three major parts i.e., the left side where the inputs of the healthcare providers is presented, the main part of the model where the aspects of the hospital are presented as recognized from the interaction with respondents of this study (Medical Personnel, Hospital Management and Patients) and the existing literature. The results of the model such as effectiveness of the health care system, reliability of the system, responsiveness to patients needs among others will be well defined after evaluation of the developed telemedicine model for Nkozi Hospital.

Discussion of the constructs of the adoption model

Policies and guidelines

These refer to the policies and guidelines governing the use of telemedicine both within the institution operating the telemedicine solution and with other partnering institutions. Telemedicine involves the use of ICTs to share patient data among different parties. This definitely raises legal and ethical issues such as patient data privacy (Hassibian *et al.*, 2016). There is, therefore, need to have proper guidelines and policies in place to improve adoption of telemedicine (Isabalija *et al.*, 2011).

The Hospital Administrator of Nkozi Hospital intimated that the lack of proper guidelines and policies was a major hindrance to the adoption of telemedicine. *"It is difficult to operate a new*

system without proper guidelines on how to operate it, especially one that handles something as sensitive as patient data. People can sue us if their patient records ended up in the media. How do we govern and control the sharing of such information? However, once that is sorted out, I think telemedicine would be a very powerful system".

Organizational Affiliations

Organizational Affiliations are formal relationships established between otherwise independent organizations. Telemedicine can be set up as a patient-hospital communication channel and/or hospital-hospital communication channel. Wootton *et al.* (2008), Isabalija *et al.* (2011), Hassbian M. R. *et al.* (2016) among other scholars have highlighted the impact of funding on the successful adoption of telemedicine solutions. Lack of adequate skills has also been reported as one of the major causes of low adoption of telemedicine (Kifle *et al.*, 2014).

The Medical Director of Nkozi Hospital cited the challenge of funding. *"When the funder and implementer of the project stopped funding, the hospital found it hard to sustain the project given the costs of maintenance and sustenance. I think with solid organizational affiliations, Nkozi Hospital would be at a very big advantage considering the location of the hospital and the clients we serve".*

Organizational affiliations are necessary for several aspects of telemedicine like training of users, funding the project, technological advancement, benchmarking among others.

Organizational Structure and culture

Organizational structure is a system that outlines how activities are directed and carried out in order to achieve the goals of the organization.

Organizational culture can be defined as the underlying beliefs, assumptions, values and ways of interacting to contribute to the unique social and psychological environment of an organization. The absence of an official structure to provide telemedicine services remains one of the greatest obstacles to the adoption of telemedicine in low resource countries. Telemedicine, being a mixture of several disciplines, requires the cooperation of all possible participants of the healthcare delivery system. The absence of this cooperation amongst the participants converts to a hindrance in the adoption of telemedicine (Milton *et al.*, 2015; Hassibian *et al.*, 2016).

The In-Charge of the General Ward had this to say about organizational structure and culture *"Nkozi Hospital has an organizational structure. However, when the telemedicine project was implemented, we hadn't considered how this would fit into the existing structure and culture. As such, we didn't make the necessary adjustments to accommodate it. As a result, the adoption of*

this was affected. It is, therefore, evident that without a clearly defined organizational structure and culture encompassing telemedicine, the adoption of the same can be affected".

Management Commitment and Support

Management commitment and support is the degree to which the management of the institution ensures that the telemedicine solution is successfully adopted. This includes, but is not limited to, training and sensitization of users, provision of necessary equipment, bridging the gap between the developers/implementers and users. Wamala D. S. *et al.* (2013), Liezl (2014) both agreed that management commitment to and support of the telemedicine project was key in the improved adoption of telemedicine. Furthermore, the interviewees i.e. an average of 67.5% agreed that management commitment and support of the project positively impacts the adoption of telemedicine.

A staff member, who was interviewed on condition of anonymity, said *"The hospital management was not entirely committed and supportive of telemedicine. The general attitude from management was that the project funder should run the project and the responsibility of testing and adoption was entirely left to the hospital staff who were part of the piloting. Look where this got us; the project failed. If management doesn't work with the funder/implementer and the hospital staff, the chances of successfully adopting are very minimal"*.

Relative Advantage

This is the degree to which a product or solution is considered superior or more attractive to its users than similar existing products or solutions. According to 57.9% of the interviewees, for telemedicine to be adopted successfully, it must be considered a more superior option than the current work processes. A superior and more attractive solution can also reduce the resistance to change that has continued to hinder telemedicine adoption (Isabalija *et al.*, 2011; Olayele *et al.*, 2016). A superior telemedicine solution should be economically feasible to the institution, easy to use i.e., not complex to learn, useful to the adopting institution, compatible with prevalent values and norms, and address most of the issues arising from the cultural and societal impacts.

The researcher interacted with a nurse who had this to say; *"I had a chance of interacting with the telemedicine system and I generally felt like the system slowed down my work by adding another step. For example, I have to see the patients who walk into the hospital and then also attend to those who have reached out through the system"*. When interviewed further, the nurse accepted that if the system had the relative advantage, it would help the hospital reach out to more patients.

Cultural and Societal Impacts

Social norms can be defined as combined depictions of tolerable group conduct and personal insights into particular group conduct.

Cultural norms can be defined as the common outlooks and rubrics that influence the behavior of people.

Several scholars have stated the impact that cultural and societal norms have on the adoption of telemedicine. Kifle *et al.*, in 2010, created a model to improve adoption of telemedicine assuming a homogenous culture for all the respondents of the study. They, however, acknowledged that culture, even in a single country may not be homogenous. The varying cultural and societal norms in a country have an evident effect on the adoption of telemedicine (Kifle *et al.*, 2010; Venkatesh *et al.*, 2011; Hassibian *et al.*, 2016; Khalid *et al.*, 2016).

According to one of the hospital staff the researcher interacted with, "*the way our society views a development such as a new system greatly impacts the use of the system. If our society views the system as inefficient and insecure, then we are forced to abandon the system to continue serving our clients comfortably".*

Financial, Technological and Human Resources

Financial resources are simply the monetary funds required to kick start and sustain the project. Technological resources are IT infrastructure required to run the system. These could include computers, smart phones, internet connections, servers among others. Human resources are the people required to interact with and operate the system. The high preliminary cost, which is often related to the building of telemedicine solutions, high, inadequate technological infrastructure, limited skilled staff training among others are some of the challenges facing the adoption of telemedicine (Isabalija *et al.*, 2011; Suhaiza *et al.*, 2014; Mayeh *et al.*, 2014; Scott *et al.*, 2014, Molfenter *et al.*, 2015). Furthermore, 65.8% of the respondents highlighted the need for adequate technological and human resources for the successful adoption of telemedicine.

A group of staff members that the researcher interacted with had this to say; *"A hospital like ours cannot afford most of the IT equipment on our small budget. The hospital doesn't have enough IT skilled staff to run the system, training or hiring of skilled staff is also hindered by financial constraints. The patients we serve are mostly illiterate. These are some of the things that affected the initial deployment of telemedicine so unless they are addressed, we shall still fail to utilize the system"*

User involvement and triability

User involvement and triability is the degree to which users are involved in the project planning and system development process as well as experimenting with the system on trial basis before committing to the use of it. 76.3% of the interviewees agree to the importance of triability. According to Mitchell (1995), early involvement of all stakeholders, conducting a needs analysis, plainly outlining goals and intentions, developing a project plan with clear roles and responsibilities, regular feedback sessions, developing a clear operational management system, monitoring methods to measure the achievement of objectives, setting of smaller milestones and making use of proper project management tools such as Gantt charts in order to track progress easily can all positively impact the adoption of telemedicine.

The researcher interacted with some of the nurses in the outpatients. They had this to say; *"We are the ones who receive the highest number of patients and would most likely benefit the most from the telemedicine system. However, we were not consulted or even informed about the system when it was first deployed. Since we are the ones who interact with most of the patients, we would be in a better position to encourage these patients to adopt the usage of the system to reduce the money they spend on transport to and fro here. This system has great potential to improve our service delivery and also improve the patients' welfare. We believe that it is important to involve as many users as possible in the development and testing of the system to get more feedback and improve the solution. If the hospital staff do not accept the system, how can you expect them to convince the patients to use the system?"*

User acceptance

User acceptance is the extent to which all potential users of the system i.e. patients, medical personnel, hospital management accept to use the system. According to Milton *et al.* (2015) and Surya (2018), the speed of development and adoption of these technologies by the populace remains slow. 76.3% of the interviewees agree that a user's attitude towards change can greatly impact their eventual use of the system. 57.9% of the interviewees also agree that the user satisfaction with the system can greatly impact their eventual use of the system. Kamal S. A. *et al.* (2018)'s model did not put into consideration the importance of all potential users' acceptance of the. Cultural and societal impacts can also affect user acceptance (Kifle *et al*., 2010; Liezl, 2014; Milton *et al.*, 2015; Cockroft & Hendy, 2018).

The hospital administrator, when asked about the importance of user acceptance to the adoption of telemedicine, had this to say; *"If the hospital management does not accept the system, how do*

you expect them to convince the hospital staff to adopt it? Furthermore, if the hospital staff do not accept the system, how do you expect them to convince the patients to use the system? It is very important that all stakeholders accept and use the system if it is to be fully adopted".

5.2 Evaluation of the developed telemedicine adoption model for completeness by expert opinion

The researcher contacted 15 health informatics experts asking them to participate in the evaluation of the proposed model for improved adoption of telemedicine in LRC that had been developed by this study. Of the 15 contacted, 4 were telemedicine experts and 11 were medical practitioners. The expert evaluation questionnaire was sent to all the 15 experts. These experts had been involved in the process of developing and implementing telemedicine solutions in Uganda. Given that the target setting for this study and model was Low Resource Countries, Uganda was chosen as a source for the evaluation experts because it fit the context well. The experts contacted have been involved in telemedicine development, implementation and adoption for over 5 years. The two most experienced had an experience of 7 years each. The 3rd most experienced had an experience of 5 and a half years. Of the remaining 12 experts, 5 had a working experience of 4 years, 4 had a working experience of 3 years while 3 had a working experience of 2 years. There was a total of 57 and a half years of experience amongst the 15 experts contacted.

The questionnaire that was given to the experts is as indicated in appendix II. They were required to answer 1. Strongly agree, 2. Agree.3. Neutral i.e. neither agree nor disagree, 4. Disagree.5. Strongly Disagree. The frequency of their responses was measured using Likert's 5 Level rating scale as indicated in the table below

Evaluation of the model

Evaluation results on a scale of 1-5 how important the experts regard the following factors for the successful completion of Architectural view, architectural requirements and preliminaries construct.

Table 5.1: Evaluation results

Factor	**Frequency of the expert responses as per the five-level Likert scaling method**										**Total**	**Mean**
	SA(5)		**A(4)**		**N(3)**		**D(2)**		**SD(1)**			
Organizational Affiliations	9	60%	3	20%	2	13.3%	1	6. 7%	0	0%	15 (100%)	**4.333**
Management Commitment and Support	3	20%	10	67%	0	0%	2	13.3%	0	0%	15 (100%)	**3.933**
User involvement and trial ability	3	20%	8	53%	0	0%	4	26.7%	0	0%	15 (100%)	**3.67**
Policies and guidelines	10	67%	3	20%	1	6. 7%	1	6. 7%	0	0%	15 (100%)	**4.5**
Technological Resources	7	47%	5	33%	2	13.3%	1	6. 7%	0	0%	15 (100%)	**4.2**
Financial Resources	8	53%	5	33%	2	13.3%	0	0%	0	0%	15 (100%)	**4.4**
Human Resources	4	27%	6	40%	2	13.3%	2	13.3%	1	6. 7%	15 (100%)	**3.67**
Cultural and societal impacts	10	67%	3	20%	1	6.7%	1	6.7%	0	0%	15 (100%)	**4.5**
User acceptance	9	60%	3	20%	0	0%	2	13.3%	1	6. 7%	15 (100%)	**4.133**
Organizational structure and culture	1	13%	11	73%	1	6.7%	1	6. 7%	1	6. 7%	15 (100%)	**3.67**

Relative Advantage	12	80%	2	13%	0	0%	0	0%	1	6. 7%	15 (100%)	**4.6**
Hospital Management and staff	7	47%	1	6. 7%	0	0%	5	33.3%	2	13%	15 (100%)	**3.47**
IT department of the hospital	8	53%	0	0%	6	40%	0	0%	1	6. 7%	15 (100%)	**3.93**
Nkozi Hospital Telemedicine Model Outcomes	12	80%	3	20%	0	0%	0	0%	0	0%	15 (100%)	**4.8**
Average of the Means: 4.13 Key: SA = Strongly Agree, A = Agree, N = Neither, D = Disagree and SD = Strongly Disagree												

Source: Primary Data (2025)

Scores for SA and A were grouped to represent health informatics experts that agree while D and SD scores were grouped to represent health informatics experts that disagree. In addition, N represents health informatics experts whose opinion was undecided. The mean < 3.00 (less than 3.00) reveals disagree scores and that above >3.00 (greater than 3.00) reveals agreement.

According to the results in table 5.1, 12 health informatics experts i.e. 80% of all the respondents who were the majority agreed with organizational affiliation being an important aspect of model instigation while only 1 respondent i.e. 6.7% of all the respondents disagreed with organizational affiliation being an important aspect of model instigation and the remaining 2 respondents i.e. 13.3% of all the respondents were not sure whether organizational affiliation is an important aspect of model instigation or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.333 implied that the majority of the health informatics experts believed that organizational affiliation was an important aspect of model instigation in adoption of telemedicine since 4.333 > 3.0.

The results in table 5.1, 13 health informatics experts i.e. 87% of all the respondents who were the majority agreed with Management Commitment and Support being an important aspect of model adaptability while only 2 respondent representing 13.3% of the total number of respondents

disagreed with Management Commitment and Support being an important aspect of model adaptability and none of the health informatics experts was sure whether Management Commitment and Support is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 3.933 implied that the majority of the health informatics experts believed that Management Commitment and Support was an important aspect of model adaptability in adoption of telemedicine since 3.933 > 3.0.

The findings reveal that, 11 health informatics experts i.e. 73% of all the respondents who were the majority agreed with user involvement and triability being an important aspect of model adaptability whereas only 4 respondents i.e. 26.7% of all the respondents disagreed with User involvement and triability being an important aspect of model adaptability and none of the health informatics experts was sure whether User involvement and triability is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 3.67 implied that the majority of the health informatics experts believed that User involvement and triability was an important aspect of model adaptability in adoption of telemedicine since 3.67> 3.0.

The study established that 13 health informatics experts i.e., 87% of all the respondents who were the majority agreed with policies and guidelines being an important aspect of model instigation while 1 respondent i.e., 6.7% of all the respondents disagreed with policies and guidelines being an important aspect of model instigation and also 1 respondent of respondents was not sure whether Policies and guidelines is an important aspect of model instigation or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.5 implied that majority of the health informatics experts believed that Policies and guidelines was an important aspect of model instigation in adoption of telemedicine since 4.5> 3.0.

According to the results in table 5.1, 12 health informatics experts i.e., 80% of the respondents who were the majority agreed with technological resources being an important aspect of model adaptability while only 1 respondent i.e., 6.7% of the respondents disagreed with technological resources being an important aspect of model adaptability and 2 respondents of the respondents were not sure whether technological resources is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.2 implied that the majority of the health informatics experts believed that Technological Resources was an important aspect of model adaptability in adoption of telemedicine since 4.2> 3.0.

The results in table 5.1, 13 health informatics experts representing 86% of the total number of respondents who were the majority agreed with Financial Resources being an important aspect of model adaptability while none of the health informatics experts disagreed with Financial Resources being an important aspect of model adaptability and only 2 respondents of the respondents were not sure whether Financial Resources is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.4 implied that the majority of the health informatics experts believed that Financial Resources was an important aspect of model adaptability in adoption of telemedicine since 4.4> 3.0.

The findings reveal that 10 health informatics experts representing 67% of the total number of respondents who were the majority agreed with Human Resources being an important aspect of model adaptability while 3 respondents i.e., 20% of the respondents disagreed with Human Resources being an important aspect of model adaptability and only 2 respondents representing 13.3% of the respondents were not sure whether Human Resources is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 3.67 implied that the majority of the health informatics experts believed that Human Resources was an important aspect of model adaptability in adoption of telemedicine since 3.67> 3.0.

According to the study, it was established that 13 health informatics experts i.e., 87% of the respondents who were the majority agreed with Cultural and Societal impacts are an important aspect of model instigation while 1 respondent i.e., 6.7% of the respondents disagreed with Cultural and Societal impacts being an important aspect of model instigation. 1 of the respondents was not sure whether Cultural and Societal impacts is an important aspect of model instigation or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.5 implied that the majority of the health informatics experts believed that Cultural and Societal impacts was an important aspect of model instigation in adoption of telemedicine since 4.5> 3.0.

This study also established that 12 health informatics experts i.e. 80% of the respondents who were the majority agreed with User acceptance of telemedicine being an important aspect of model adaptability while 3 respondents i.e. 20% of the respondents disagreed with User acceptance of telemedicine being an important aspect of model adaptability and only 2 respondents i.e. 13.3%

of the total number of respondents were not sure whether User acceptance of telemedicine is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.133 implied that the majority of the health informatics experts believed that User acceptance of telemedicine was an important aspect of model adaptability in adoption of telemedicine since 4.133> 3.0.

According to the results in table 5.1, 12 health informatics experts i.e. 86% of the respondents who were the majority agreed with Organizational structure and culture being an important aspect of model Instigation while 2 respondents i.e. 13.4% of the respondents disagreed with Organizational structure and culture being an important aspect of model Instigation and only 1 of the respondents was not sure whether Organizational structure and culture is an important aspect of model Instigation or not. The total number of health informatics experts that responded was 15 (100%). The mean of 3.67 implied that the majority of the health informatics experts believed that Organizational structure and culture was an important aspect of model Instigation in adoption of telemedicine since 3.67> 3.0.

The results in table 5.1, 14 health informatics experts i.e., 93% of the respondents who were the majority agreed with Relative Advantage being an important aspect of model adaptability while only 1 respondent i.e. 6.7% of the total number of respondents disagreed with Relative Advantage being an important aspect of model adaptability and none of the health informatics experts was unsure whether Relative Advantage is an important aspect of model adaptability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.6 implied that the majority of the health informatics experts believed that Relative Advantage was an important aspect of model adaptability in adoption of telemedicine since 4.6> 3.0.

The findings also revealed that 8 health informatics experts i.e., 53.7% of the respondents who were the majority agreed with Hospital Management and staff being an important aspect of model Usability while 7 respondents i.e., 46.3% of the respondents disagreed with Hospital Management and staff being an important aspect of model Usability and none of the health informatics experts was unsure whether Hospital Management and staff is an important aspect of model Usability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 3.47 implied that majority of the health informatics experts believed that Hospital Management and staff was an important aspect of model

Usability in adoption of telemedicine since 3.47> 3.0.

The results in table 5.1, 8 health informatics experts i.e., 53.7% of the respondents who were the majority agreed with IT department of the hospital being an important aspect of model Usability while only 1 respondent i.e., 6.7% of the respondents disagreed with IT department of the hospital being an important aspect of model Usability and 6 of the respondents were not sure whether IT department of the hospital is an important aspect of model Usability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 3.93 implied that the majority of the health informatics experts believed that the IT department of the hospital was an important aspect of model Usability in adoption of telemedicine since 3.93> 3.0.

This study finally established that 15 health informatics experts representing 100% of the respondents who were the majority agreed with NH Telemedicine Model Outcomes being an important aspect of model Usability while none of the health informatics experts disagreed with NH Telemedicine Model Outcomes being an important aspect of model Usability and none of the health informatics experts was sure whether NH Telemedicine Model Outcomes is an important aspect of model Usability or not. The total number of health informatics experts that responded was 15 (100%). The mean of 4.8 implied that the majority of the health informatics experts believed that NH Telemedicine Model Outcomes was an important aspect of model Usability in adoption of telemedicine since 4.8> 3.0.

According to the findings of this study, it was established that six primary aspects and some secondary aspects influenced the telemedicine adoption lifecycle in Nkozi Hospital.

Relative advantage is the degree to which adoption of telemedicine is perceived as better than the lack of it. The degree of relative advantage may be measured in economic terms, but social-prestige factors, convenience and satisfaction are also often important components.
The respondents asserted that the telemedicine model should be compatible with the existing work flows and processes.

According to the respondents of the study, adoption of the telemedicine model and completeness of the model relies on the aspect of complexity, this is the degree to which the NH telemedicine is perceived as difficult to understand and use. Some telemedicine systems are readily understood by most members of the hospital system; others are more complicated and will be adopted more slowly.

Respondents asserted that ideas that can be tried on the installment plan will generally be adopted more quickly than telemedicine ideas that are not divisible, therefore triability of NH telemedicine is prudent, this is the degree to which a telemedicine maybe experimented within a limited basis,

According to the findings of the study, completeness of the model relies on the degree to which the outcomes of a telemedicine solution are noticeable to the hospital management, medical personnel and patients of the hospital. The easier it is for people to see the outcomes of a telemedicine solution the more probable they are to adopt.

To achieve this, the suggested features must be deliberated throughout the implementation of telemedicine to improve the chances of acceptance by the stakeholders. However, respondents cited that telemedicine is a rather costly venture to implement and a single organization is likely to encounter problems in financing it.

5.3 Conclusion

In conclusion, healthcare institutions like Nkozi Hospital need to establish a telemedicine adoption model to improve adoption of telemedicine systems. Telemedicine programs are very beneficial to both the hospital staff and the patients. Telemedicine, when implemented and utilized properly, will provide a good and effective work environment with Nkozi Hospital. Attention should be paid to training, effective support, management commitment, ease of use, extended collaboration among stakeholders, information security, patient data confidentiality among others in order to increase the chances of adoption of the telemedicine solution.

6.1 Summary of findings

The findings in chapter four answered the specific objectives of the research i.e. the researcher successfully found out the factors hindering adoption of telemedicine in Nkozi Hospital and Uganda generally, the study determined the critical success factors for adoption of telemedicine, application of the existing IT adoption models in developing a model for improved adoption of telemedicine and also endeavored to evaluate the developed telemedicine adoption model for completeness. Although there were some discrepancies between our findings and literature, especially on the factors hindering adoption of telemedicine and the critical success factors for adoption of telemedicine, the findings generally were in line with literature on the suggested

requirements for application of the existing IT adoption models in developing a model for improved adoption of telemedicine in Uganda.

6.2 Conclusions of the study

According to the findings of this study, it's vivid enough that the design and adoption of Telemedicine framework improves the medical practice in health facilities, specifically NH and other health facilities in Uganda. But the study also established that the utmost hindrance to adoption of telemedicine systems was lack of awareness about the telemedicine, its uses and profits to all stakeholders. Most of the interviewees also cited the fact that the government of Uganda has a key role to play in the advancement of telemedicine in the country by initiating pilot projects and providing financing of telemedicine projects.

This study that further examined telemedicine adoption in NH also explored its level of utilization overall by the regional referral hospital. Adoption of telemedicine in NH and Uganda is still low, with very few departments of NH using telemedicine. Nkozi Hospital is still characterized by high centrality and population density of patients, therefore the use of telemedicine is still low and its relative use compared to the number of outpatient visits is also still low. This study therefore provided new insights regarding the uptake of routine telemedicine delivered in a hospital setting.

6.3 Recommendations of the study

The following are the most significant recommendations that were made by the interviewees during the research process;

1. Ministry of Health and Government Agencies

Develop and enforce a national telemedicine policy framework that addresses regulatory, legal, and ethical standards for telemedicine services.

Increase public health funding and investment in telemedicine infrastructure, especially in underserved and rural regions.

Support the integration of telemedicine systems into the national health information system to ensure data flow, monitoring, and continuity of care.

Promote local innovation and adoption by providing grants or tax incentives to local startups and health innovators developing telemedicine solutions.

2. Healthcare Institutions and Hospital Administrators

Provide continuous training and digital capacity building for healthcare workers to ensure they are proficient in using telemedicine platforms.

Establish telemedicine leadership committees or focal points within hospitals to oversee implementation, evaluate progress, and resolve emerging challenges.

Ensure user-centered design of systems that cater to the workflows and needs of local clinicians, patients, and technicians.

Monitor and evaluate performance metrics regularly to improve service delivery, identify bottlenecks, and optimize telemedicine usage.

3. ICT Stakeholders and Technology Developers

Design low-bandwidth telemedicine systems that are compatible with Uganda's internet infrastructure and affordable for end-users.

Integrate multilingual and culturally appropriate interfaces to ensure inclusivity and better usability in diverse communities.

Implement strong data security measures to protect patient privacy and ensure compliance with data protection laws.

Partner with telecom companies to subsidize internet/data packages for healthcare workers and rural health centers offering telemedicine services.

4. Academic and Research Institutions

Incorporate telemedicine modules into medical, public health, and nursing curricula to prepare future professionals for digital health environments.

Conduct ongoing research on the effectiveness, challenges, and impact of telemedicine solutions in Uganda and similar contexts.

Collaborate with government and health sectors to test and validate new digital health models, using real-world data and community feedback.

5. Development Partners and Donor Agencies

Support pilot projects and capacity-building programs aimed at expanding telemedicine to last-mile communities.

Facilitate knowledge-sharing platforms that allow stakeholders from different countries or regions to share telemedicine best practices and tools.

Invest in cross-sector collaborations that bridge health, ICT, and education sectors to ensure sustainability of telemedicine programs.

Conclusion

All stakeholders should work collaboratively to operationalize the proposed telemedicine adoption model, ensuring it is adapted to Uganda's unique socio-economic, cultural, and technological

realities. This multi-stakeholder approach is critical for building resilient, inclusive, and effective digital health systems.

Having a long-term hospital plan for financing the project is of utmost importance. The interviewees also observed that the hospital should start with utilization, the hospital telemedicine program will fail.
The Nkozi Hospital a concrete plan highlighting all the steps to end taking into consideration the "critical path" issues (Vander, 2004).

The researcher further recommended that the general hospital work environment should be appropriate. The services and tools should be deployed and accessible where they are most required.
The respondents also recommended that teamwork, involvement and training are key attributes to the successful adoption and sustenance of telemedicine services in Nkozi Hospital.
Nkozi Hospital Should focus on high utilization; therefore, application should be emphasized for any telemedicine initiative. Short of
should regard training as a critical factor, the hospital should create a training plan to help the health professional understand how to effectively use the telemedicine services.
The respondents also recommended that NH should venture into marketing the availability of telemedicine services, this helped the hospital get new patients and extend its services.
Finally, telemedicine services should aim at bettering the current health services rather than contest them.

6.4 Suggestions for Further Research

The researcher recommends that further research should be conducted in the areas of establishing the impact of Telemedicine on the performance of health centres in Uganda specifically considering a case of Nkozi Hospital.

Longitudinal Studies on Telemedicine Adoption

While this study develops a model for improved adoption of telemedicine in low-resource countries, it primarily relies on existing frameworks, literature, and contextual analysis. Future research should conduct longitudinal studies to track the implementation of the proposed model over time. Such studies would help to evaluate how adoption factors evolve and how sustained

usage can be achieved in dynamic healthcare systems with changing policies, technologies, and socio-economic conditions.

Comparative Studies Across Low-Resource Contexts

The adoption of telemedicine may vary across different low-resource countries due to differences in infrastructure, healthcare policies, cultural practices, and financing mechanisms. Further research should compare the applicability of the model across multiple regions, such as Sub-Saharan Africa, South Asia, and Latin America, to identify context-specific adaptations and shared enablers.

Integration of Emerging Technologies

This study emphasizes telemedicine adoption using established ICT frameworks. However, future research could examine how emerging technologies such as artificial intelligence (AI), machine learning, blockchain, and Internet of Medical Things (IoMT) can be integrated into the adoption model to enhance trust, data security, personalization, and efficiency of telemedicine solutions in low-resource settings.

Patient-Centered Adoption Studies

Much of the existing literature focuses on healthcare providers, policymakers, and technology developers. Further research is needed to investigate patients' perceptions, trust, digital literacy, and willingness to adopt telemedicine in low-resource environments. Understanding patient-driven factors could refine the adoption model to better align with community needs and cultural preferences.

Economic and Cost-Benefit Analyses

Telemedicine adoption in low-resource countries is often constrained by financial limitations. Future research could focus on economic evaluations of the model by conducting cost-benefit analyses, return on investment (ROI) assessments, and sustainability studies. This would provide governments and stakeholders with evidence to guide resource allocation and financing strategies for telemedicine initiatives.

Policy and Regulatory Frameworks

Although this study acknowledges the role of policy and governance in telemedicine adoption, further research should critically analyze regulatory environments across different jurisdictions.

Comparative policy studies could help identify best practices for data protection, licensing, cross-border care, and legal liability frameworks that enhance the adoption of telemedicine.

Capacity Building and Training Models

Research is also needed on how best to develop structured training programs for healthcare workers and patients in low-resource contexts. Future studies could evaluate the effectiveness of various training approaches—such as blended learning, mobile-based training, or community-based capacity building—in enhancing telemedicine readiness.

Resilience and Crisis Response

The COVID-19 pandemic demonstrated the value of telemedicine in crisis management. Future research should explore how the proposed adoption model can be adapted to strengthen health system resilience during pandemics, natural disasters, or humanitarian crises in low-resource countries.

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APPENDIX

Appendix I: Interview Guide

Dear Respondent,

I am Nassaazi Sarah, a student undertaking a study aimed at development of a model for improved adoption of Telemedicine in Low Resources Countries like Uganda considering a case of Nkozi Hospital. The study is in partial fulfillment of the requirements for the award of a postgraduate degree of Master of Science in ICT Management, Policy and Architectural Design in the School of Post Graduate Studies and Research of Uganda Martyrs University.

I kindly request you to answer the questions sincerely as your responses will only be used for academic purposes and treated with maximum confidentiality.

Thank you for your kind cooperation.

Yours faithfully,

Nassaazi Sarah

(Reg: 2022-M142-20748)

Researcher

FOR HOSPITAL MANAGEMENT

Attitude towards change

1. Were you notified about the purpose of the telemedicine solution that you are currently using in your organization before it was adopted?
   a) Yes
   b) No (Skip to Qn.3)

2. If yes, how were you notified?

3. If not, why do you think you were not notified?

4. What are some of the challenges your Hospital was facing before adopting this system?

5. Before this system was adopted, were you very sure that it would provide a solution to the patient management challenges that your organization was facing then?
   a) Yes
   b) No (Skip to Qn.7)

6. If yes, what made you sure that this system would help solve the patient management challenges that your organization was facing then?

7. If not, what made you hesitant about the system's ability to solve the patient management challenges that your organization was facing then?

8. Were you satisfied with the process that your organization went through to adopt this system?
   a) Yes
   b) No (Skip to Qn.10)

9. If yes, what contributed to your satisfaction to the process that your organization went through to adopt this system?

10. If not, what aspects of the adoption process weren't you satisfied with?

Project Planning and Management

1. Were you familiar with the detailed objectives that were defined for this system's adoption project?
   a) Yes
   b) No (Skip to Qn.3)

2. If yes;
   i) How did you learn about the systems adoption plan, schedules and the steps that the project was supposed to go through?
   ii) Who provided you with this information?

3. If no;
   i) Were you satisfied with the level of information you had about the proposed adoption of this system?
   ii) Do you think that if you would have more information about the adoption process the results of this system use would be different?

4. In your opinion, did the team that was charged with the adoption of this system have a good understanding of the organization's work routine?
   a) Yes
   b) No (Skip to Qn.6)

5. If yes, how important was it that the team that was charged with this system's adoption process had a good understanding about your work routine?

6. If No, how do you think the results of this system use would be different if the team that was charged with its adoption had a better understanding of organization's work routines?

7. Did your hospital have a clear plan to guide the adoption of this system?
   a) Yes
   b) No (If No, skip to 9)

8. If yes, how helpful was it that there was a plan to guide the adoption of this system?

9. If No, do you think that the results of this system use would have been different if there had been a clear adoption plan that was available to everybody?

Commitment to Change

1. Were you willing to make the necessary changes in your work routines that were important for the system to work?
   a) Yes
   b) No (Skip to Qn.3)

2. If yes, how difficult was it for you to make changes in your work routines that were necessary for the telemedicine solution to work?

3. If No, why were you not committed to make necessary changes in your work routines that were important for the system to work?

4. If you had realized at the beginning that using this system required a lot of resources (i.e. time, people), would you have participated in its adoption?
   a) Yes
   b) No (Skip to Qn.6)

5. If Yes, why would you not change your decision about the adoption of this system no matter how much resources (time, people) it required?

6. If No, why would you have changed your decision about the adoption of this system?

7. Did your organization encounter any problems in the process of adopting this system?
   a) Yes
   b) No (Skip to Qn. 11)

8. If Yes, what problems did your organization encounter?

9. How were these problems handled by the team that was in charge of adopting this system?

10. If No, why do you think there were no problems encountered in the adoption of this system?

11. How effective was the team charged with the adoption of this system in mitigating the anticipated risks that the project faced?

12. Did the team that was charged with the adoption of this system at any one time try to assess its usability before taking the decision to adopt it?
    a) Yes
    b) No (Skip to Qn.14)

13. If Yes, how was this done?
14. If No, why do you think that the adoption team did not try to assess the usability of this system before adopting it?

15. In your opinion, do you think that work routines and procedures should have been an important consideration in assessing the usability of this system? (Kindly give a reason for your answer)

Technology- task fit, complexity and training

1. Does the telemedicine solution fit well with your way of doing work at your organization?
    a) Yes
    b) No (Skip to Qn.4)

2. If Yes, what makes the system fit well with your work routines and the way you like to work?

3. How would you describe the time and effort required to alter your process flow to align with the process built into the system?

4. If No, what aspects of your work routines are not compatible with this system?

5. Was this system easy for you to learn?
   a) Yes
   b) No (Skip to Qn.7)

6. If yes, what made the system easy for you to learn?

7. If not, what aspects of this system were difficult for you to learn?

8. In your opinion, what should have been done to make the system easy to learn?

9. Overall, do you think that this system is easy to use?
   a) Yes
   b) No (Skip to Qn.11)

10. If yes, what makes the system easy to work with?

11. If not, what makes the system difficult to work with?

12. Did you receive any training on how to use this system?
   a) Yes
   b) No (Skip to Qn.14)

13. If yes,
   i) How were you trained in the use of this system?
   ii) In your opinion, what made the training you received on the system's use sufficient and effective?

14. If not, how were you able to use this system without any training?

Management Commitment

1. Were you, as the hospital management, aware of the complexity of the changes that would result from the adoption and use of the telemedicine solution?
   a) Yes
   b) No. (Skip to Qn.3)

2. If yes, how familiar were you with what this system could do for your Organisation?

3. If No, what in your opinion, do you think management should have done better to prepare for changes that would result as a consequence of this system adoption?

4. Did you, as management, take an active role in preparing a plan for the adoption of the system that you are currently using?
   a) Yes
   b) No (Skip to Qn.6)

5. If yes,
   i) Did management consult with other staff members regarding the adoption plan?
   ii) Were you able to make any changes to the adoption plan incorporating the results from the consultation?

6. If no,
   i) Why didn't you, as management,take an active part in the preparing of an adoption plan for the telemedicine solution?
   ii) In your opinion, how different would the results of adoption have been had management taken an active role in preparing an adoption plan?

7. Were you, as management, aware of the benefits that could be achieved if the telemedicine solution was adopted?
   a) Yes
   b) No (Skip to Qn.9)

8. If yes, how familiar were you with what the telemedicine solution could do for your organisation?

9. If no,
    i) In your opinion how important was it for management to be aware of what benefits the telemedicine solution would bring to the organisation?
    ii) Do you think that the results of the adoption of the telemedicine solution would be different if management knew well how the system would contribute to the organisation?

10. Were you, as management, enthusiastic towards the adoption of the telemedicine solution?
    a) Yes
    b) No (Skip to Qn.12)
11. If yes,
    i) How would you describe the level of management involvement in the adoption process?
    ii) Do you feel that management had a good understanding/knowledge about the adoption process?
    iii) Did management agree with the adoption team on how to adopt the telemedicine solution?

12. If no,
    i) What were the reasons why you, as management, were not enthusiastic about the telemedicine solution adoption?
    ii) Do you think that the results of the telemedicine solution adoption would be different if management put more interest in it?

13. From the start, did management view the telemedicine solution as being important to their organisation's long-term goals?
    a) Yes
    b) No (Skip to Qn.15)

14. If yes,
    i) Why do you think management viewed the telemedicine solution as being important to the long-term goals of your organization?
    ii) Do you think that management's belief about the telemedicine solution's importance to the organization contributed to your decision to use the system?

15. If no,
    i) Why do you think management did not view the telemedicine solution as being important to the long-term goals of your organization?
    ii) Did management's position regarding the telemedicine solution influence your decision about using the system in any way?

Management Support

1. At the time of adoption of the telemedicine solution, did management secure the necessary help and resources to use the system?
    a) Yes
    b) No (Skip to Qn.3)

2. If yes, how important was this for the telemedicine solution' success?

3. If no,
    i) How do you think the results of the telemedicine solution adoption would have been different if enough resources had been secured?
    ii) In your opinion why were there insufficient resources pooled into the project?

4. Did management encourage and support other staff members to use the telemedicine solution?
    a) Yes
    b) No (Skip to Qn.6)

5. If yes,
    i) How did management support and encourage other staff members to use the system and to participate in the adoption efforts?
    ii) Do you think that was important for the success of the project?

6. If no,
    i) Why do you think that management did not support and encourage other staff members to use the system and to participate in its adoption efforts?

ii) In your opinion as management, do you think the staff members' decision about the system use and participation in the adoption efforts would have been different if management had supported and encouraged them to use the telemedicine solution and to participate in its adoption efforts?

7. Was management very effective in addressing problems raised by the telemedicine solution adoption team?
   a) Yes
   b) No (Skip to Qn.9)

8. If yes, how do you think management's ability to communicate effectively with the systems adoption team contributed to the successful adoption of this system?

9. If not, why do you think that management was not effective in addressing problems of the systems adoption team?

10. In your opinion, do you think that management was effective in supporting changes in existing routines and processes that were critical to the successful adoption of this system?
    a) Yes
    b) No (Skip to Qn.12)

11. If yes,
    i) How did management support the new changes in existing routines and processes?
    ii) How do you think management's support contributed to the telemedicine solution acceptance?

12. Did management try to find a solution wherever difficulties arose during the adoption phase of this system?
    a) Yes
    b) No (Skip to Qn.14)

13. If yes, how effective was management in handling these difficulties?

14. If no, why do you think management was not able to handle problems that arose during the adoption phase?

Attitude towards computers and innovations

1. Do you think that information systems and services are important and valuable to you in the performance of your job?
   a) Yes
   b) No (Skip to Qn.)

2. If yes,
   i) How would you describe your organization's computer environment and its impact on your effectiveness and productivity in your job?
   ii) Why do you find information systems and services an important and valuable aid to you in the performance of your job?

3. If no, why do you think computer systems and services are not an important and valuable aid to you in the performance at your job?

Triability

1. Before committing to the use of this system, did you have a chance to experiment with it on a trial basis?
   a) Yes
   b) No (Skip to Qn.3)

2. If yes,
   i) How important was it for you to try it out first?
   ii) Did it help you to make a decision about whether or not you would continue using it?

3. If no, how do you think the use of this system at your organisation would be different if you had an opportunity to experiment with it on a trial basis before committing to its use?

User Involvement and Participation

1. As a prospective user of this system, were you interested and excited about it?
   a) Yes
   b) No (Skip to Qn.3)

2. If yes, did you feel that this system would be both important and personally relevant to you?

3. If not, why weren't you excited and interested in this system adoption effort?

4. Was your participation in the adoption of this system extensive?
   a) Yes
   b) No (Skip to Qn. 6)
5. If yes,
   i) In what ways did you participate in this system's adoption process?
   ii) Why did you participate in this system adoption process?
   iii) How did it influence your decision to continue using it?

6. If no,
   i) Why didn't you participate in the adoption process of this system?
   ii) How do you think your system use would be different if you took an active part in this system's adoption process?

Relative advantage

1. Do you find using the current system more advantageous to your job?
   a) Yes
   b) No (Skip to Qn.3)

2. If yes, in what ways does this system enable you to accomplish tasks more quickly?

3. If not, why does this system not help you to accomplish tasks more quickly?

4. Does this system enhance your effectiveness on the job?
    a) Yes
    b) No (Skip to Qn.6)

5. If yes, how does this system enhance your effectiveness on the job?

6. If not, why doesn't this system enhance your effectiveness on the job?

7. Does this system improve the quality of work that you do?
    a) Yes
    b) No (Skip to Qn.9)

8. If yes, how does this system improve the quality of the work that you do?

9. If not, why doesn't this system improve the quality of work you do?

10. Does this system ease your job?
    a) Yes
    b) No (Skip to Qn. 12)

11. If yes, what aspects of this system makes it easy for you to do your job?

12. If not, why doesn't this system ease your job?

User Satisfaction with the System

1. Do you have a high level of confidence and control when working with this system?
    a) Yes
    b) No (Skip to Qn.3)

2. If yes, to what do you attribute the high level of confidence and control you have while working with the system?

3. If no, what makes you lack the feeling of confidence and control while working with this system?

4. Is access to this system easy and convenient for you?
   a) Yes
   b) No (Skip to Qn.6)
5. If yes, what makes the system easy and convenient to access?
6. If not, what makes the system hard and not convenient to access?

7. Does this system have errors that you have to work around?
   a) Yes
   b) No (Skip to Qn.9)

8. If yes,
   i) How has that affected your work effectiveness?
   ii) Was it hard to figure out how to work around those errors?

9. Does this system have the ability to integrate data with other information systems that you are using if any?
   a) Yes
   b) No (Skip to Qn.11)

10. If yes, how convenient and easy is it for you to integrate data from this system with other systems that you use in your day-to-day work?

11. If not, how important is it for you that this system would have the ability to integrate its data with other systems you use?

12. Is this system flexible to changes and adjustments that result from new conditions, demands, or circumstances at your work?
    a) Yes
    b) No (Skip to Qn.14)

13. If yes, what makes this system easy to do what you want?

14. If not, what makes this system difficult to adjust to the changes in the way you work and new conditions at your job?

15. Does this system overload you with more data than what you need to do your work?
    a) Yes
    b) No (Skip to Qn.17)

16. If yes,
    i) Why do you think this happens?
    ii) In what ways is this irritating to you?

17. Does this system provide you with output that is complete and accurate?
    a) Yes
    b) No (Skip to Qn.19)

18. If yes, how satisfied are you with this output?

19. If not, why is it that the output of this system does not fit what you require?

20. Does this system give you great control over your work?
    a) Yes
    b) No (Skip to Qn. 22)

21. If yes, how does this system give you greater control over your work?

22. If not, why doesn't this system give you greater control over your work?

FOR MEDICAL PERSONNEL

Attitude towards change

1. Were you notified about the purpose of the telemedicine solution that you are currently using in your organization before it was adopted?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes, how were you notified?

3. If not, why do you think you were not notified?

4. What are some of the challenges your organisation was facing before adopting this system?

5. Before this system was adopted, were you very sure that it would provide a solution to the patient management challenges that your organisation was facing then?
   c) Yes
   d) No (Skip to Qn.7)

6. If yes, what made you sure that this system would help solve the patient management challenges that your organisation was facing then?

7. If not, what made you hesitant about the system's ability to solve the patient management challenges that your organisation was facing then?

8. Were you satisfied with the process that your organisation went through to adopt this system?
   c) Yes
   d) No (Skip to Qn.10)
9. If yes, what contributed to your satisfaction to the process that your organisation went through to adopt this system?

10. If not, what aspects of the adoption process weren't you satisfied with?

Project Planning and Management

1. Were you familiar with the detailed objectives that were defined for this system's adoption project?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes;
   iii) How did you learn about the systems adoption plan, schedules and the steps that the project was supposed to go through?
   iv) Who provided you with this information?

3. If no;
   iii) Were you satisfied with the level of information you had about the proposed adoption of this system?
   iv) Do you think that if you would have more information about the adoption process the results of this system use would be different?
4. In your opinion, did the team that was charged with the adoption of this system have a good understanding of your work routine?
   c) Yes
   d) No (Skip to Qn.6)

5. If yes, how important was it that the team that was charged with this system's adoption process had a good understanding about your work routine?

6. If No, how do you think the results of this system use would be different if the team that was charged with its adoption had a better understanding of your work routines?

7. Did your clinic/hospital have a clear plan to guide the adoption of this system?
   c) Yes
   d) No (If No, skip to 9)

8. If yes, how helpful was it that there was a plan to guide the adoption of this system?

9. If not, do you think that the results of this system use would have been different if there had been a clear adoption plan that was available to everybody?

Commitment to Change

1. Were you willing to make the necessary changes in your work routines that were important for the system to work?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes, how difficult was it for you to make changes in your work routines that were necessary for the telemedicine solution to work?

3. Why were you not committed to making necessary changes in your work routines that were important for the system to work?

4. If you had realized at the beginning that using this system required a lot of resources (time, people), would you have participated in its adoption?
   c) Yes
   d) No (Skip to Qn.6)

5. If yes, why would you not change your decision about the adoption of this system no matter how much resources (time, people) it required?

6. If not, why would you have changed your decision about the adoption of this system?

7. Did your organization encounter any problems in the process of adopting this system?
   c) Yes
   d) No (Skip to Qn. 11)

8. If yes, what problems did your organization encounter?

9. How were these problems handled by the team that was in charge of adopting this system?

10. If not, why do you think there were no problems encountered in the adoption of this system?

11. How effective was the team charged with the adoption of this system in mitigating the anticipated risks that the project faced?

12. Did the team that was charged with the adoption of this system at any one time try to assess its usability before taking the decision to adopt it?
    c) Yes
    d) No (Skip to Qn.14)

13. If yes, how was this done?

14. If not, why do you think that the adoption team did not try to access the usability of this system before adopting it?

15. In your opinion, do you think that work routines and procedures should have been an important consideration in assessing the usability of this system? (Kindly give a reason for your answer)

Technology- task fit, complexity and training

1. Does the telemedicine solution fit well with your way of doing work at your organisation?
    c) Yes
    d) No (Skip to Qn.4)

2. If yes, what makes the system fit well with your work routines and the way you like to work?

3. How would you describe the time and effort required to alter your process flow to align with the process built into the system?

4. If not, what aspects of your work routines are not compatible with this system?

5. Was this system easy for you to learn?
    c) Yes
    d) No (Skip to Qn.7)

6. If yes, what made the system easy for you to learn?

7. If not, what aspects of this system were difficult for you to learn?

8. In your opinion, what should have been done to make the system easy to learn?

9. Overall, do you think that this system is easy to use?
    c) Yes
    d) No (Skip to Qn.11)

10. If yes, what makes the system easy to work with?

11. If not, what makes the system difficult to work with?

12. Did you receive any training on how to use this system?
    c) Yes
    d) No (Skip to Qn.14)

13. If yes,
    iii) How were you trained in the use of this system?
    iv) In your opinion what made the training you received on the system's use sufficient and effective?

14. If not, how were you able to use this system without any training?

Management Commitment

1. Was the management of your organisation aware of the complexity of the changes that would result from the adoption and use of the telemedicine solution?
    c) Yes

d) No. (Skip to Qn.3)

2. If yes, how well do you think management was familiar with what this system could do for your organisation?

3. If No, what in your opinion do you think that management should have done better to prepare for changes that would result as a consequence of this system adoption?

4. Did the management of your organisation take an active role in preparing a plan for the adoption of the system that you are currently using?
   c) Yes
   d) No (Skip to Qn.6)

5. If yes,
   iii) Did management consult with you regarding the adoption plan?
   iv) Were you able to make any changes in the adoption plan?

6. If no,
   iii) Why do you think that management did not take an active part in the preparation of an adoption plan for the telemedicine solution?
   iv) In your opinion how different would the results of adoption have been if management had taken an active role in preparing an adoption plan?

7. Was management of your organisation aware of the benefits that could be achieved if the telemedicine solution was adopted?
   c) Yes
   d) No (Skip to Qn.9)

8. If yes, how well do you think your organisation's management was familiar with what the telemedicine solution could do for your organisation?

9. If no,
   iii) In your opinion how important was it for management to be aware of what benefits the telemedicine solution would bring to your organisation?

iv) Do you think that the results of the adoption of the telemedicine solution would be different if management knew well how the system would contribute to your organisation?

10. Was the management of your organisation enthusiastic towards the adoption of the telemedicine solution?
    c) Yes
    d) No (Skip to Qn.12)

11. If yes,
    iv) How would you describe the level of management involvement in the adoption process?
    v) Do you feel that management had a good understanding/knowledge about the adoption process?
    vi) Did management agree with the adoption team on how to adopt the telemedicine solution?

12. If no,
    iii) Why wasn't your organisation's management enthusiastic about the telemedicine solution adoption?
    iv) Do you think that the results of the telemedicine solution adoption would be different if management put more interest in it?

13. From the start, did management of your organisation view the telemedicine solution as being important to their organisation's long-term goals?
    c) Yes
    d) No (Skip to Qn.15)

14. If yes,
    iii) Why do you think management viewed the telemedicine solution as being important to the long-term goals of your organisation?
    iv) Do you think that management's belief about the telemedicine solution's importance to the department contributed to your decision to use the system?

15. If no,

iii) Why do you think management did not view the telemedicine solution as being important to the long-term goals of your organisation?

iv) Did management's position regarding the telemedicine solution influence your decision about using the system in any way?

Management Support

1. At the time of adoption of the telemedicine solution, did management provide you with the necessary help and resources to use the system?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes, how important was this for the telemedicine solution' success?

3. If no,
   iii) How do you think the results of the telemedicine solution adoption would have been different if enough resources had been secured?
   iv) In your opinion why weren't enough resources pooled into the project?

4. Did management encourage and support you to use the telemedicine solution?
   c) Yes
   d) No (Skip to Qn.6)

5. If yes,
   iii) How did management support and encourage you to use this system and to participate in the adoption efforts?
   iv) Do you think that was important for the success of the project?

6. If no,
   iii) Why do you think that management did not support and encourage you to use this system and to participate in its adoption efforts?
   iv) Would your decision about the system use and participation in the adoption efforts have been different if management had supported and encouraged you to use the telemedicine solution and to participate in its adoption efforts?

7. Was management very effective in addressing problems raised by the telemedicine solution adoption team?
   c) Yes
   d) No (Skip to Qn.9)

8. If yes, how do you think management's ability to communicate effectively with the systems adoption team contributed to the successful adoption of this system?

9. If not, why do you think that management was not effective in addressing problems of the systems adoption team?

10. In your opinion, do you think that management was effective in supporting changes in existing routines and processes that were critical to the successful adoption of this system?
    c) Yes
    d) No (Skip to Qn.12)

11. If yes,
    iii) How did management support the new changes in existing routines and processes?
    iv) How do you think that contributed to the telemedicine solution acceptance?

12. Did management try to find a solution wherever difficulties arose during the adoption phase of this system?
    c) Yes
    d) No (Skip to Qn.14)

13. If yes, how effective was management in handling these difficulties?

14. If not, why do you think management was not able to handle problems that arose during the adoption phase?

Attitude towards computers and innovations

1. Do you think that information systems and services are important and valuable to you in the performance of your job?
   c) Yes
   d) No (Skip to Qn.)

2. If yes,
   iii) How would you describe your organization's computer environment and its impact on your effectiveness and productivity in your job?
   iv) Why do you find information systems and services an important and valuable aid to you in the performance of your job?

3. If not, why do you think computer systems and services are not an important and valuable aid to you in the performance at your job?

Triability

1. Before committing to the use of this system, did you have a chance to experiment with it on a trial basis?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes,
   iii) How important was it for you to try it out first?
   iv) Did it help you to make a decision about whether or not you would continue using it?

3. If not, how do you think your use of this system would be different if you had an opportunity to experiment with it on a trial basis before committing to its use?

User Involvement and Participation

1. As a prospective user of this system, were you interested and excited about it?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes, did you feel that this system would be both important and personally relevant to you?

3. If not, why weren't you excited and interested in this system adoption effort?

4. Was your participation in the adoption of this system extensive?
   c) Yes
   d) No (Skip to Qn. 6)

5. If yes,
   iv) In what ways did you participate in this system's adoption process?
   v) Why did you participate in this system adoption process?
   vi) How did it influence your decision to continue using it?

6. If no,
   iii) Why did you not participate in the adoption process of this system?
   iv) How do you think your system use would be different if you took an active part in this system's adoption process?

Relative advantage

1. Do you find using the current system more advantageous to your job?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes, in what ways does this system enable you to accomplish tasks more quickly?

3. If not, why does this system not help you to accomplish tasks more quickly?

4. Does this system enhance your effectiveness on the job?
   c) Yes
   d) No (Skip to Qn.6)

5. If yes, how does this system enhance your effectiveness on the job?

6. If not, why doesn’t this system enhance your effectiveness on the job?

7. Does this system improve the quality of work that you do?
   c) Yes
   d) No (Skip to Qn.9)

8. If yes, how does this system improve the quality of the work that you do?

9. If not, why doesn’t this system improve the quality of work you do?

10. Does this system ease your job?
    c) Yes
    d) No (Skip to Qn. 12)

11. If yes, what aspects of this system makes it easy for you to do your job?

12. If not, why doesn't this system ease your job?

User Satisfaction with the System

1. Do you have a high level of confidence and control when working with this system?
   c) Yes
   d) No (Skip to Qn.3)

2. If yes, to what do you attribute the high level of confidence and control you have while working with the system?

3. If not, what makes you lack the feeling of confidence and control while working with this system?

4. Is access to this system easy and convenient for you?
   c) Yes
   d) No (Skip to Qn.6)

5. If yes, what makes the system easy and convenient to access?

6. If not, what makes the system hard and not convenient to access?

7. Does this system have errors that you have to work around?
   c) Yes
   d) No (Skip to Qn.9)

8. If yes,
   iii) How has that affected your work effectiveness?
   iv) Was it hard to figure out how to work around those errors?

9. Does this system have the ability to integrate data with other information systems that you are using if any?
   c) Yes
   d) No (Skip to Qn.11)

10. If yes, how convenient and easy is it for you to integrate data from this system with other systems that you use in your day-to-day work?

11. If not, how important is it for you that this system would have the ability to integrate its data with other systems you use?

12. Is this system flexible to changes and adjustments that result from new conditions, demands, or circumstances at your work?
    c) Yes
    d) No (Skip to Qn.14)

13. If yes, what makes this system easy to do what you want?

14. If not, what makes this system difficult to adjust to the changes in the way you work and new conditions at your job?

15. Does this system overload you with more data than what you need to do your work?
    c) Yes
    d) No (Skip to Qn.17)

16. If yes,
    iii) Why do you think this happens?
    iv) In what ways is this irritating to you?

17. Does this system provide you with output that is complete and accurate?
    c) Yes
    d) No (Skip to Qn.19)

18. If yes, how satisfied are you with this output?

19. If not, why is it that the output of this system does not fit what you require?

20. Does this system give you great control over your work?
    c) Yes
    d) No (Skip to Qn. 22)

21. If yes, how does this system give you greater control over your work?

22. If not, why doesn't this system give you greater control over your work?

FOR PATIENTS

Attitude towards change

1. Were you notified about the purpose of the telemedicine solution that is currently being used at this organization before it was adopted?
    e) Yes
    f) No (Skip to Qn.3)

2. If yes, how were you notified?

3. If not, why do you think you were not notified?

Commitment to Change

1. Were you willing to make the necessary changes in your routines that were important for the system to work?
   e) Yes
   f) No (Skip to Qn.3)

2. If yes, how difficult was it for you to make changes in your routines that were necessary for the telemedicine solution to work?

3. Why were you not committed to making necessary changes in your routines that were important for the system to work?

4. If you had realized at the beginning that using this system required a lot of resources (time, people), would you have participated in its adoption?
   e) Yes
   f) No (Skip to Qn.6)

5. If yes, why would you not change your decision about the adoption of this system no matter how much resources (time, people) it required?

6. If not, why would you have changed your decision about the adoption of this system?

7. In your opinion, do you think that work routines and procedures should have been an important consideration in assessing the usability of this system? (Kindly give a reason for your answer)

Technology- task fit, complexity and training

1. Does the telemedicine solution fit well with your way of getting treatment at this organization?
   e) Yes
   f) No (Skip to Qn.4)

2. If yes, what makes the system fit well with your treatment routines and the way you like to receive treatment?

3. If not, what aspects of your treatment routines are not compatible with this system?

4. Was this system easy for you to learn?
   e) Yes
   f) No (Skip to Qn.7)

5. If yes, what made the system easy for you to learn?

6. If not, what aspects of this system were difficult for you to learn?

7. In your opinion, what should have been done to make the system easy to learn?

8. Overall, do you think that this system is easy to use?
   e) Yes
   f) No (Skip to Qn.11)

9. If yes, what makes the system easy to work with?

10. If not, what makes the system difficult to work with?

11. Did you receive any training on how to use this system?
    e) Yes
    f) No (Skip to Qn.14)

12. If yes,
    v) How were you trained in the use of this system?
    vi) In your opinion what made the training you received on the system's use sufficient and effective?

13. If not, how were you able to use this system without any training?

Management Commitment

1. Was the management of this organization aware of the complexity of the changes that would result from the adoption and use of the telemedicine solution?
    e) Yes
    f) No. (Skip to Qn.3)

2. If yes, how well do you think management was familiar with what this system could do for this organization?

3. If No, what in your opinion do you think that management should have done better to prepare for changes that would result as a consequence of this system adoption?

4. Was the management of this organization aware of the benefits that could be achieved if the telemedicine solution was adopted?
    e) Yes
    f) No (Skip to Qn.9)

5. If yes, how well do you think the management was familiar with what the telemedicine solution could do for this organization?

6. If no,
    v) In your opinion how important was it for the management to be aware of what benefits the telemedicine solution would bring to this organization?
    vi) Do you think that the results of the adoption of the telemedicine solution would be different if management knew well how the system would contribute to this organization?

Attitude towards computers and innovations

1. Do you think that information systems and services are important and valuable to you while accessing quality healthcare services?
   e) Yes
   f) No (Skip to Qn.)

2. If yes,
   v) Why do you find information systems and services an important and valuable aid to accessing quality healthcare services?

3. If not, why do you think computer systems and services are not an important and valuable aid to accessing quality healthcare services?

Triability

1. Before committing to the use of this system, did you have a chance to experiment with it on a trial basis?
2. Yes
3. No (Skip to Qn.3)
4. If yes,
   v) How important was it for you to try it out first?
   vi) Did it help you to make a decision about whether or not you would continue using it?

5. If not, how do you think your use of this system would be different if you had an opportunity to experiment with it on a trial basis before committing to its use?

User Involvement and Participation

1. As a prospective user of this system, were you interested and excited about it?
   e) Yes
   f) No (Skip to Qn.3)

2. If yes, did you feel that this system would be both important and personally relevant to you?

3. If not, why weren't you excited and interested in this system?

Relative advantage

1. Do you find using the current system more advantageous to you in accessing treatment at this organization?
   e) Yes
   f) No (Skip to Qn.3)

2. If yes, in what ways does this system enable you to acquire quality healthcare services quickly?

3. If not, why does this system not help you to acquire quality healthcare services quickly?

4. Does this system enhance the effectiveness of the hospital staff?
   e) Yes
   f) No (Skip to Qn.6)

5. If yes, how does this system enhance the hospital staff's effectiveness on the job?

6. If not, why doesn't this system enhance their effectiveness on the job?

7. Does this system improve the quality of services you receive at this organization?
   e) Yes
   f) No (Skip to Qn.9)

8. If yes, how does this system improve the quality of services you receive at this organization?

9. If not, why doesn’t this system improve the quality of services you receive at this organization?

10. Does this system ease your treatment process?
    e) Yes
    f) No (Skip to Qn. 12)

11. If yes, what aspects of this system makes it easy for you to receive treatment at this organization?

12. If not, why doesn't this system ease your access to quality healthcare services?

User Satisfaction with the System

1. Is access to this system easy and convenient for you?
    e) Yes
    f) No (Skip to Qn.6)

2. If yes, what makes the system easy and convenient to access?

3. If not, what makes the system hard and not convenient to access?

4. Does this system have errors that you have to work around?
    e) Yes
    f) No (Skip to Qn.9)

5. If yes,
    v) How has that affected your work effectiveness?
    vi) Was it hard to figure out how to work around those errors?

6. Does this system provide you with output that is complete and accurate?
    e) Yes
    f) No (Skip to Qn.19)

7. If yes, how satisfied are you with this output?

8. If not, why is it that the output of this system does not fit what you require?

9. Does this system give you great control over your work?