CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and management
System Engineering and informatics
IT Project Management in Government Health Institution in Nigeria: (Case study of Maitama Hospital, Abuja)

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DIPLOMA THESIS ASSIGNMENT

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Thesis title

IT Project Management in Government Health Institution in Nigeria

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Objectives of thesis

The aim of the thesis is to determine and propose the implementation of an efficient IT project management system in Maitama district hospital and to describe in more detail the methodologies applied to achieve this goal.

Main objectives are:
1.The broad objective is project management in government health institutions in area if information technology (IT): a case study of Maitama district Hospital.
2. To determine the factors affecting the IT project management in government health institutions.
3.To assess the roles of Government in adoption of IT project management in government health institutions.
4.To determine the benefits of the new IT project management in government health institutions, and citizens perceptions about IT (information technology)

Methodology

A mixed research approach will be adopted to realize these objectives. The purpose of this method is to have a detailed view of the research problem faced as well as a generalization of the health services and adoption trend from health workers' and patients' perspectives. The primary data will be the use of questionnaires and short interviews with some medical personnel while the secondary data will be the use of collected data that have been computed like literature reviews.

The proposed extent of the thesis

60-80 pages

Keywords

Health institution, project management, analysis, Use Case

Recommended information sources

Mohd Yassin, N. A., Mat Norwani, N. M., & Osman, N. H. (2019). Online collaboration tools usage in healthcare project management. International Journal of Engineering & Technology, 8(1.2), 167-171.

Shafqat, S., Alahmari, A. M., & Alkhurayyif, A. H. (2021). The impact of project management software on the project management process in healthcare organizations. International Journal of Healthcare Management, 1-11.

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Declaration

I declare that I have worked on my diploma thesis titled " IT project management in government health institution in Nigeria" by myself, and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break the copyrights of any person.

In Prague, 29 November 2023

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Ifeanyi Christian Okwuigbo.

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Abstract

Information technology can be both a vital tool and a major necessity in the public health system. This diploma thesis discusses information technology management as a major government health institution project. One of the needs for setting information technology is to facilitate the growth and satisfactory health service delivery of government health institutions. Data are presented from a survey at Maitama district hospital evaluating the current state of the health facility, methods of service delivery, the roles of an effective IT project management will play in promoting the quality service delivery and factors limiting the adoption of IT project management in government health institution.

Additionally, diploma thesis also integrates information technology by proposing a conceptual design of hospital management system for Maitama district hospital to assist the advancement of patients' data collections and medical diagnosis that have caused severe negative impacts on patients' health. Further solving problems that affect government health institutions by providing innovative solutions, data storage and easy access, increase the speed delivery of medical reports, and advancing the delivery of proper healthcare to the public.

Abstrakt

Informační technologie zásadním nástrojem, v systému veřejného zdravotnictví. T diplomová práce se zabývá návrhem informačního systému pro zdravotnickou instituci, Jednou z potřeb pro nastavení informačních technologií je usnadnit růst a poskytování zdravotních služeb vládními zdravotnickými institucemi. Data jsou získána z průzkumu v okresní nemocnici Maitama.

Diplomová práce že navrhuje informační systém správy informací pro okresní nemocnici. Ten má napomoci rozvoji sběru dat pacientů a lékařské diagnózy. Další vlastnosti , které ovlivňují vládní zdravotnické instituce jsou poskytování inovativních řešení, ukládání dat se snadným přístupem, zvýšením rychlosti doručování lékařských zpráv a poskytování řádné zdravotní péče veřejnosti.

Table of Contents

List of figures

List of tables

1 Introduction

The use of Information Technology (IT) has become an essential tool for managing projects in government health institutions. Nigeria, like many other developing countries, has been struggling with issues of inadequate healthcare services due to a lack of efficient project management strategies (Adeleke et al. 2015). The integration of Information technology in project management as a critical aspect of healthcare delivery can improve the quality of healthcare services in Nigeria (Azogu et al. 2019).

Globally, every government is embodied with the responsibility of providing the citizens with the basic amenities which is a dividend of democracy. These dividends are carried out as a project and if not effectively managed lead to failure. With the advancement in information and communication technology (ICT) and its acceptance globally in solving problems, project management by the government has been integrated for effective management and productivity. Project management in government health institutions would not be left out (Adeleke 2020; Oyewumi 2021).

The need for effective project management of government health institutions cannot be overstated in Nigeria, a country located in the tropical region of west Africa with an estimated population of 211.4 million people in 2021, according to the most recent census figures and projections from Trading Economics. Many Nigerian states are grappling with health-care issues, particularly the effective management of patients' data, recording of health records, initiatives, and information, which has resulted in numerous flaws (Adegbuyi et al. 2019; Adebisi et al. 2021). While managing this field of health care among the populace, the government must focus on improving information management project management in public health institutions rather than just building facilities. As a result, it becomes an essential component when examining the types of initiatives that they tend to build in the health institution. There is a belief that health is wealth, but without accurate documentation of the patient's care and health history, mistakes are unavoidable. Several studies have found that IT project management can increase project performance in government-run health care facilities. Research by Shafqat et al. (2021), for example, found that using project management software improved the project management process in healthcare organizations (Adegbuyi et al. 2019; Adebisi et al. 2021).

Using Maitama District Hospital as a case study, this project aims to demonstrate the efficiency and efficacy of IT project management in government health institutions. According to WHO (1948), health institution is a place or organization that offers healthcare services, such as hospitals, clinics, health centers, and nursing homes.

Imperatively, every government is accountable for providing residents with basic necessities, which is a democratic dividend (World Bank 2019). These dividends are carried out as a project, and if not properly managed, they will fail. With the advancement of information and communication technology (ICT) and its global acceptability in problem resolution, government project management has been integrated for optimal management and productivity. Project management would not be overlooked in government health facilities (Oke 2015). A health institution is any organization, agency, or facility that delivers direct health care services to patients or the public, including hospitals, clinics, long-term care facilities, and community health centers (Abiiro et al. 2015). It can be public or private, for-profit or not-for-profit, and thus provides a wide range of services ranging from preventative and primary care to specialist care and treatment.

In Nigeria, the healthcare system constitutes of various institutions such as clinics, hospitals, primary care centers and other health facilities managed by the government, NGOs, or private establishments (Oyekanmi 2015). The emerging role of IT has created an enormous impact on healthcare, one of its benefits is that it has enhanced the quality of care and increases patient confidence, data protection and reduces operating and administrative cost.

The government health institution is a public system set to give health to the less privileged at a very affordable fee and most of the time it is free. In Nigeria, the healthcare institution is challenged by numerous factors such as inadequate funding, poor infrastructure, inadequate trained healthcare personnel, and defective health information management systems (Adeoye and Akintunde 2020). The lack of efficient project management strategies is also a significant challenge in the healthcare sector, leading to poor service delivery. According to Adeleke (2020), IT project management can improve project planning, execution, monitoring, and evaluation in government health institutions, which can lead to better health outcomes.

In the medical field, the term health is beyond getting physical treatment. Health can be defined as physical, emotional, social, mental, and spiritual well-being and is a basic human right necessary for sustainable human development hence it should not be neglected.

To achieve sustainable development goals, access to Health is a fundamental human right and very essential (United Nation 2015). There are several dimensions of health which includes physical, mental, emotional, social, and spiritual health. The Physical health refers to the body's ability to function properly, mental health relates to an individual's cognitive and emotional well-being, emotional health refers to an individual's ability to manage and express their feelings, social health refers to an individual's ability to interact with others and build relationships, and spiritual health refers to an individual's sense of purpose and meaning in life (Myers et al., 2015).

In relation to healthcare, health is measured by some indicators such as mortality rates, life expectancy, disease prevalence, and disability-adjusted life years (DALYs) (Aliyu and Bakare 2019). These indicators aid to assess the strain of disease and the effectiveness of healthcare interventions in improving health outcomes.

It is viewed by Akinwumi and Ayinde (2018) that health is a multidimensional concept that is influenced by various factors, including genetics, environmental factors, lifestyle behaviors, and access to healthcare services. However, improving health requires a comprehensive approach that addresses these several factors (Lalonde 1974). Hence, the government has a responsibility for the health of its citizens which can be fulfilled by setting up a proper good medical facility equipped with relevant information management technology that would help boost the services rendered and improve the medical staff's record keeping and delivering of necessary prescriptions to their patient(s).

Project management, on the other hand, is the process of planning, organizing, and coordinating resources to achieve a specific goal within a defined time-frame and budget (Oyewumi 2021). It involves applying various tools, techniques, and methodologies to initiate, plan, execute, monitor, control, and close projects.

Also, it is the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of

scope, cost, time, quality, and participation satisfaction (IPMA 2015) Project management has become increasingly important in the healthcare sector in Nigeria due to the complexity and diversity of healthcare projects. Its purpose is to resolve issues in the current operation and implement policies that can enhance patient care and foster positive relationships with stakeholders. Information management should be one of the government's major projects when establishing a health institution also known as “public healthcare” to aid maintain proper documentation of patient records, planning and storing vital data that will help maintain a smooth and efficient work operation.

The essence of useful information management in government health institutions like the Maitama District Hospital Abuja has become a necessity; this is because of its strategic location and the population coverage this hospital offers. Other institutions also face the same issues when it comes to keeping proper records. A proper analysis of the role of information technology in public healthcare should be one of every government's priority and on how well the health sector can be improved to meet the needs of people. Useful information management is a crucial part of a health institution in administration, prescription, accounting, and drugs supply chain in the institution.

Consequently, poor information management leads to poor functionality of the institution, inefficient drugs due to expiration and poor storage; it might lead to death of patients and medical personnels can be charged to court for bad medical conduct and misinformation. All this can be avoided with the right documentation and efficient use of the information management system.

However, with the introduction of health IT system, collection of data for quality management outcome reporting and public health disease surveillance will be more efficient. It also allows the easy flow of service production and increases monumental experience for both the staff and patients.

The intention of this research work is aimed at studying project management in government health institutions (information technology as a focus) with special reference to Maitama district hospital, Abuja.

1.1 Statement of problem

To an extent, government health institutions are faced with similar problems. This problem hinders the growth and development of the institution in Nigeria. The problem includes:

1. Poor information technology management leads to bad record keeping, outdated health materials and poor discharge of duties.

2. Poor service integration, service quality, and internet connected to medical services

3. Lack of data security and inadequate training of health workers.

4. Unsatisfied patients due to poor service delivery.

1.2 Research Questions

- What are the factors affecting IT project management in government health institutions?
- What are government's roles in adopting IT project management in government health institutions?
- What are the benefits of the new IT project management in government health institutions, and citizens perceptions about IT (Information Technology)?

1.3 Significance of Study

The study's significance is to bring to limelight the huge importance of the government paying attention to information technology as a major part of public health institutions. This study will point out why the government must adhere to managing important projects like information technology in health institutions. With the good knowledge of IT project management in government health institutions, health professionals can gain the necessary skills to leverage technology effectively, enhance patient care, optimize resource allocation, ensure data security, comply with regulations, and foster collaboration among stakeholders. These will also create an avenue for other states or nations to infuse information technology as a prerequisite when setting up their health institution for the public. It is also going to serve as a revelation to the importance of why the government must effectively manage and revive abandoned health institution projects. This leads to improved healthcare service delivery, patient outcomes, and overall efficiency in government health institutions.

1.4 Scope Of Study

The project management in government health institutions focuses on the area of information technology (IT), how it has been managed, the importance of IT in a health institution and how the government can infuse the right measures in IT. This study is based on government health institutions but due to time, school system and financial constraints, this research has selected samples from the population of health instructors.

The study sample selected for this study is the Maitama District Hospital in Abuja, and the study shall cover majorly on their information management technology, how effective it is, how the government has been able to sustain IT either by the implementation or upgrade of the system to suit to today's modern technology, data storage and update of medical approach and the management of the new conceptualized technology as a major project in the public healthcare system.

2 OBJECTIVE AND METHODOLOGY

2.1 Objectives Of Study

The objective of IT project management in a government health institution is to effectively plan, implement, and manage IT projects to support and improve the delivery of healthcare services.

This can be achieved through decisive leverage in technology to improve healthcare delivery, enhance patient outcomes, optimize costs, and comply with regulatory requirements, all while actively involving stakeholders throughout the project lifecycle.

The Objective of this study is based on two main objectives:

A. The broad objective is project management in government health institutions in area of information technology (IT): a case study of Maitama district Hospital.

B. The specific objective is the following:

- To determine the factors affecting the IT project management in government health institutions.
- To assess the roles of Government in adoption of IT project management in government health institutions.
- To determine the benefits of the new IT project management in government health institutions, and citizens perceptions about IT (information technology)

2.2 DEFINITION OF OPERATIONAL TERMS

Health institution: An organization set up to care for the health of people.

Project: A specific plan or design or scheme

Government: The body of people that constitutes the governing authority of a political unit or organization.

Management: The judicious use of means to accomplish an end.

IT (information technology): The study of the use of systems, especially computers and telecommunications for storing, retrieving, and sending information.

Invention: A device or process originated after study or experiments

Administration: Performance of executing duties.

Patients: Bearing pains or trials calmly or without complaints

CIO: Chief Information Officer

Hospitals: An institution where the sick or injured are given medical or surgical care.

Medicine: A substance us as a medication

3 RESEARCH METHODOLOGY

According to Dawson (2019), research methodology is the primary principle that will guide your research. It becomes the general approach in conducting research on your topic and determines what research method you will use. To this research, a mixed research approach involving primary and secondary data will be adopted to realize these objectives. This method's purpose is to have a detailed view of the research, problem faced, generalization of the health services and adoption trend from health workers' and patients' perspectives. The primary data will be the use of questionnaires with some medical personnel while the secondary data will be the use of collected data that have been computed like literature reviews.

3.1 Research Design

The research design selected for this study is a descriptive research design. A descriptive research design is appropriate for this study because it allows the researchers to gather data about the current state of IT project management in Nigerian hospitals (Maitama District Hospital).

This design involves describing the characteristics of a group or population without influencing the group. It enables the researchers to collect data from various sources such as questionnaires, interviews, and observations. The descriptive research design is also useful for determining the relationship between variables.

3.2 Population of Study

The term "population" refers to all elements being examined, including all individuals from a given group, association, and population. Although all administrative health facilities in Nigeria are included in this study's population, most of the research was conducted at Maitama District Hospital in Abuja due to time and financial constraints.

The review's population consists of IT professionals, non-professionals, and healthcare providers. However, there are also those practicing at the medical clinic as the population. Therefore, the population is about 92 respondents.

3.3 Data Collection Techniques

The primary data collection technique for this research will be the use of structured questionnaires.

The questionnaires will be designed to collect data on IT project management practices, challenges, and benefits. They will be distributed to IT project managers, Doctors, Nurses, and other relevant staff members of Maitama District Hospital. The questionnaires will be designed in a way that allows the researchers to gather quantitative data that can be analyzed using statistical software. The information was collected from questionnaires administered online through google forms.

3.4 Data Analysis Techniques

The data collected from the questionnaires and interviews will be analyzed using descriptive statistics. Inferential statistics such as correlation analysis and probit regression analysis are also used to determine the relationship between variables. The data was analyzed using statistical software. The analysis will provide insights into the current state of IT project management in Nigerian hospitals, the challenges faced by hospitals, and the benefits of IT project management as data analysis are used for the validity and reliability of data.

3.5 Limitation Of the Study

The absence of any empirical study on project management in government health institutions focusing on information technology in the Maitama District Hospital is a significant limitation to of study. The absence of existing bodies of study in this area poses a special problem in addition to the absence of previous references from scratch through administration of questionnaires and supply of secondary data. Some of the staff were conservative in responding to the questionnaire and giving detailed information on the current state of the health institution. However, financial limitation also presents profoundly serious constraints to the study since it will limit the researcher in collection of data materials and presenting real facts.

4 REVIEW OF RELATED LITERATURE

4.1 Information Technology Management

Information Technology (IT) has become an integral part of modern businesses and organizations, and managing IT resources effectively has become a key challenge for many organizations. Information Technology Management (ITM) is the practice of managing and utilizing IT resources to achieve business goals and objectives (Ma & Yang 2019).

Information Technology Management (ITM) is the application of technology to manage and support business operations. This field has become increasingly important in recent years, as organizations rely increasingly on technology to streamline their operations, enhance productivity, and compete in the global market. ITM encompasses a broad range of topics, including information systems management, enterprise resource planning, project management, and cyber security, among others. (Khan et al. 2017)

Information Technology Management (ITM) is a crucial area of study that involves the planning, organizing, and controlling of the resources necessary for the effective and efficient use of information technology (IT) in an organization. ITM has become a critical aspect of business management due to the increasing importance of technological organizations. (Kumar & Singh 2020)

One of the most prominent themes in ITM literature is the importance of aligning IT strategy with the organization's overall business strategy. IT strategy must be integrated with business strategy to ensure that IT investments are aligned with the organization's goals and objectives. He argues that IT should be viewed as a strategic asset that can enable an organization to gain a competitive advantage if managed effectively (Loo 2019).

In addition to aligning IT strategy with business strategy, the literature suggests that effective IT governance is also essential for successful ITM. IT governance refers to the framework of policies, procedures, and structures that are put in place to ensure that IT investments are managed effectively, and that IT is used in a way that supports the organization's goals and objectives. Effective IT governance involves four key areas: decision rights, accountability, performance measurement, and behavior (Vij & Kumar 2018).

Another important theme in ITM literature is the role of IT in innovation and business transformation. IT can be used to support innovation by enabling collaboration and knowledge sharing across different areas of an organization. He argues that IT can also be used to transform business processes by automating manual tasks, improving decision-making processes, and enabling real-time access to critical data (Ghezzi & Cavallo 2017).

Information Technology (IT) management is a critical function for organizations that rely on technology to achieve their business objectives. IT management involves the planning, implementation, and maintenance of an organization's IT infrastructure, applications, and systems. Effective IT management is essential for organizations to stay competitive in today's rapidly changing business landscape. In this literature review, we will explore some of the key issues related to IT management, including the role of IT in organizations, IT governance, IT strategy, and IT service management (Laudon & Laudon 2016).

Information Technology (IT) has become an essential component of modern businesses, providing organizations with the tools to enhance their operations, improve customer experience, and gain competitive advantage. As technology continues to evolve, IT management plays an increasingly crucial role in organizations' success (Armbrust et al. 2010).

Cloud Computing: Cloud computing has become a prevalent trend in IT management, offering organizations a more cost-effective and scalable way to manage their IT infrastructure. Cloud computing allows businesses to access IT resources on demand and pay only for the resources they use. This has led to increased efficiency, agility, and flexibility in business operations, allowing organizations to respond more quickly to changing market conditions (Bouwman et al. 2018).

Artificial Intelligence and Machine Learning: Artificial intelligence (AI) and machine learning (ML) have revolutionized the way businesses operate, providing organizations with tools to automate tasks, enhance decision-making, and improve customer experience. AI and ML are being used in various applications, including chatbots, predictive analytics, and recommendation engines. With the increasing availability of data, AI and ML are becoming more powerful, enabling organizations to gain impossible and to obtain insights (Davenport & Ronanki 2018).

Internet of Things (IoT): The Internet of Things (IoT) refers to the interconnectivity of devices, sensors, and objects through the internet. IoT has opened new opportunities for businesses to collect data, automate processes, and enhance customer experience. With the growth of IoT, organizations can collect and analyze data in real-time, enabling them to respond more quickly to changing market conditions. (Sivarajah et al. 2017)

Cyber security: Cyber security has become a major concern for organizations due to the increasing frequency and sophistication of cyber-attacks. Organizations are now investing in cyber security tools to protect their IT infrastructure, customer data, and intellectual property. With the growing reliance on technology, cyber security will continue to be a critical component of IT management (Naeem et al. 2019).

Blockchain Technology: Blockchain technology has gained popularity due to its ability to provide a secure and decentralized way to store and transfer data. Blockchain is being used in various applications, including supply chain management, digital identity verification, and financial transactions. With the potential to reduce fraud, increase transparency, and enhance security, blockchain is becoming an increasingly important technology in IT management (Sivarajah et al. 2017).

4.2 OVERVIEW OF PROJECT MANAGEMENT

Project management is a crucial aspect of any development initiative, including in Nigeria. It involves planning, organizing, and overseeing the resources required to successfully achieve specific project goals and objectives. Effective project management helps to ensure that projects are completed on time, within budget, and to the desired quality standards without having any negative impact (Amirkhanpour et al. 2017).

The concept of project management can be traced back to the construction of the Great Pyramids in Egypt, where project managers were responsible for overseeing the construction and delivery of the pyramids. However, the modern concept of project management emerged in the mid-20th century, with the development of various management techniques and methodologies. The development of the Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) in the 1950s and 1960s, respectively, marked a significant milestone in the evolution of project management (Maltzman 2015).

Project management in Nigeria has been gradually developing, and its importance has increased over the years. Nigeria is a developing country with a growing economy, and the need for effective project management practices has become vital to ensure the successful implementation of projects and resources provided by the government.

Effective project management is crucial for the success of any project, regardless of its size or complexity. Nigeria is a country with a high demand for infrastructure development, and project management is essential to ensure that these projects are completed on time, within budget, and to the required quality standards. Proper project management practices can also help to reduce project risks and ensure that resources are used efficiently.

The Nigerian government has recognized the importance of project management and has implemented several initiatives to promote its use. For example, the Nigerian government launched the Project Management Office (PMO) initiative in 2016, which aimed to enhance the management of public sector projects by providing a centralized approach to project management. Additionally, the Nigerian Institute of Project Management (NIPM) was established in 1992 to promote the development of project management as a profession in Nigeria.

While the Nigerian government has implemented several initiatives to promote project management, the use of project management practices in Nigeria is still not widespread. A study conducted by the Nigerian Institute of Management in 2018 found that only 24% of Nigerian organizations have a project management office. Additionally, the study found that there is a lack of project management training in Nigeria, and many organizations do not have a formal project management methodology.

However, the use of project management practices in Nigeria is gradually increasing, and several organizations have begun to recognize the importance of project management. For example, the Dangote Group, one of the largest conglomerates in Africa, has implemented project management practices to manage its construction projects successfully.

4.3 Overview of Maitama Hospital

Maitama Hospital is a leading health institution in Nigeria, located in the capital city of Abuja. It is known for providing high-quality medical services to its patients and is equipped with state-of-the-art medical facilities and technologies. The hospital was established with the aim of offering quality healthcare services to the people of Nigeria, particularly in the northern part of the country (Okeke & Uzochukwu 2016).

Maitama Hospital has a rich history, dating back to its establishment in the early 1990s. Over the years, the hospital has undergone several renovations and upgrades, which have significantly improved its infrastructure and facilities. Today, the hospital has a wide range of specialties, including cardiology, neurology, pediatrics, orthopedics, and gynecology. It is also equipped with a well-stocked pharmacy and a modern laboratory (Adeloye et al. 2018).

One of the key features of Maitama Hospital is its commitment to providing high-quality medical care to all patients. The hospital has a team of experienced doctors and nurses who provide the best possible care for every patient. The hospital also invests heavily in training and development programs for its staff, which helps to ensure that they are up to date with the latest medical practices and technologies (Nwameme et al. 2021).

Considering the range of medical specialties, including cardiology, orthopedics, neurology, and pediatrics in Maitama Hospital which allows the hospital to provide comprehensive medical care to patients of all ages and with a range of medical conditions. The hospital also has a modern diagnostic center equipped with advanced imaging technologies such as MRI, CT scans, and ultrasound tests, which helps doctors accurately diagnose and treat medical conditions (Osuala et al. 2019).

Facilities: Maitama Hospital has state-of-the-art facilities designed to provide patients with a comfortable and safe environment. The hospital has private rooms, semi-private rooms, and general wards, depending on the level of care required by patients. The hospital is also equipped with modern medical equipment, including ventilators, patient monitors, and dialysis machines (Adeyemo et al. 2020).

Medical staff: Maitama Hospital has a team of highly skilled and experienced medical professionals, including doctors, nurses, and support staff. The hospital invests heavily in

training and development programs for its staff to ensure they are up to date with the latest medical practices and technologies (Ezeoke et al. 2016).

Patient safety: Maitama Hospital places a strong emphasis on patient safety and infection control. The hospital has a comprehensive infection control program that includes regular cleaning and disinfection of facilities, hand hygiene protocols, and the use of personal protective equipment by staff (Umeano & Ogbonnaya 2018).

Accessibility: Maitama Hospital is in a central location in Abuja Nigeria, making it easily accessible to patients from all over the region. The hospital also provides transportation services to patients who require assistance getting to and from appointments (Ankomah et al. 2018).

Community outreach: Maitama Hospital is actively involved in community outreach programs aimed at promoting health and wellness in the local community. The hospital provides health education programs, free medical screenings, and other services to help improve the health of the local population (Gaidhane et al. 2016).

In addition to its medical services, Maitama Hospital also offers a range of support services to patients, including counseling, nutritional advice, and physiotherapy. The hospital also has a well-stocked pharmacy that provides patients with access to a range of prescription and over-the-counter medications (Amoo 2021).

Overall, Maitama Hospital is a leading healthcare provider in Nigeria that is known for its commitment to providing high-quality medical care to patients. With its modern facilities, experienced medical professionals, and comprehensive range of medical services, the hospital is well-equipped to meet the healthcare needs of the local population (Umeano & Okeke 2020).

In addition to its commitment to providing quality healthcare services, Maitama Hospital is also dedicated to training the next generation of healthcare professionals. The hospital has a strong relationship with several universities and medical schools in Nigeria, and it provides hands-on training opportunities to medical students and residents.

Despite its many strengths, Maitama Hospital faces several challenges in its efforts to provide quality healthcare services to the people of Nigeria. One of the major challenges is the shortage of qualified healthcare professionals, which can result in long wait times for patients and

decreased access to care. Additionally, the hospital faces significant financial challenges, as the cost of healthcare services continues to rise, and the government's ability to provide funding for healthcare services is limited (Sowunmi et al. 2020).

Despite these challenges, Maitama Hospital remains one of the leading healthcare institutions in Nigeria, and it continues to make significant contributions to the health and well-being of the people of Nigeria.

4.4 IT Management in Healthcare Industry

Information Technology (IT) has become an essential component of the healthcare industry in recent years. Integration of IT systems can enhance patient care quality, increase efficiency, reduce costs, and improve decision-making.

IT project management processes involve various stages, including project initiation, planning, execution, monitoring, controlling, and project closure. There is an impact of Project Management Offices (PMOs) on project management processes. It is found that PMOs can improve project performance by providing a centralized structure for managing project resources, enhancing communication, and increasing the visibility of project status (Kros et al. 2014).

IT management is crucial for the efficient operation of healthcare systems. It can be used to improve patient care, medical research, clinical decision-making, and administrative tasks such as billing and inventory management. Healthcare providers are increasingly adopting IT systems to improve patient outcomes, reduce medical errors, and increase productivity.

IT systems can help healthcare providers to:

- Store and access patient medical records electronically
- Manage patient appointments and schedules.
- Monitor patient health remotely.
- Enhance clinical decision-making with real-time data.
- Improve medication management.
- Automate administrative tasks.

- Enhance communication between healthcare providers.

The implementation of IT systems in the healthcare industry is still in its initial stages, but it is rapidly growing. Many healthcare providers have adopted Electronic Health Records (EHRs), which are electronic versions of patients' medical records. EHRs enable healthcare providers to access patient information quickly and efficiently, and they can be shared securely between different providers (Sogunro & Sogunro 2016).

A study by the Healthcare Information and Management Systems Society (HIMSS) found that the adoption of EHRs in the US has increased from 9.4% in 2008 to 96.9% in 2020. The study also found that the adoption of other healthcare IT systems such as Computerized Physician Order Entry (CPOE) and Patient Portals is also increasing (Marc Berg et al 2003).

Implementation of Electronic Medical Records (EMR) system: A project team can be set up to plan and execute the implementation of an EMR system in the hospital. The project team can include healthcare professionals, IT specialists, and project managers who can collaborate to ensure the successful implementation of the system. The project can be managed using project management software tools, and regular progress updates can be communicated to stakeholders, including hospital management, staff, and patients (Adekola & Ismail 2014).

Medical equipment inventory management: A project team can be set up to improve the management of medical equipment inventory in the hospital. The project team can develop a project plan, including a risk management plan, and work with hospital staff to assess current inventory levels, identify gaps, and develop strategies to address any issues. Project management tools such as Gantt charts, progress reports, and issue tracking can be used to manage the project effectively (Ogunsemi and Fatoye 2011).

Reducing hospital-acquired infections: A project team can be set up to implement initiatives aimed at reducing hospital-acquired infections. The project team can develop a project plan, including a risk management plan, and work with hospital staff to identify areas of concern, develop interventions, and implement them. The project team can use project management tools such as stakeholder analysis, progress tracking, and impact assessment to manage the project effectively (Ogunsanmi and Vaughan 2014).

Patient satisfaction improvement: A project team can be set up to improve patient satisfaction levels in the hospital. The project team can conduct surveys to assess patient satisfaction levels, identify areas of improvement, and develop interventions to address any concerns. Project management tools such as project scheduling, budgeting, and progress reports can be used to manage the project effectively (Oke 2015).

The project team can also work with hospital staff to improve communication with patients, enhance the quality of care, and develop programs aimed at promoting patient satisfaction. The team can regularly review and evaluate the success of the initiatives and make necessary adjustments to achieve the desired outcomes. The project's success can be measured through regular patient satisfaction surveys and staff feedback (Eneh et al. 2015).

The effective project management is essential for achieving success in Nigerian hospitals. While there are several challenges to its implementation, such as inadequate funding, lack of project management skills, and a lack of support from hospital management, there are also several benefits, including improved patient outcomes, efficient resource utilization, and increased accountability and transparency. To effectively implement project management in Nigerian hospitals, hospital management should prioritize project management initiatives, healthcare professionals should receive training in project management, a culture of accountability and transparency should be adopted, and technology should be leveraged to support project management initiatives (Abiola and Owolabi 2016).

However, IT project management in government health institutions in Nigeria is a critical area of study for anyone interested in the use of technology to improve patient outcomes and increase efficiency in the healthcare industry. With careful planning and execution, IT project management can help to ensure that healthcare services in Nigeria are delivered in an effective and efficient manner.

4.5 IT Project Management in Nigeria

According to a study by the Project Management Institute (PMI), West Africa is a region where project management is still developing, with varying levels of maturity across different countries. The report identifies Nigeria as the largest economy in the region and a country where project

management is increasingly being recognized as a critical business practice (Project Management Institute 2016).

The same PMI study also highlights some of the challenges that project managers in West Africa, including Nigeria, face. These challenges include inadequate project management skills, limited resources, and a lack of effective project governance structures. In addition, corruption and political instability are also major challenges that can hinder the successful implementation of projects in the region (Oke and Ibironke 2016).

Another study by the International Journal of Project Management identifies the need for project managers in Nigeria to adopt a more integrated approach to project management. The study emphasizes the importance of integrating project management with other management disciplines, such as strategic management, to achieve better project outcomes (Akintoye and MacLeod 2017).

Furthermore, a study by the Journal of Engineering, Project, and Production Management highlights the importance of stakeholder management in project management in Nigeria. The study argues that effective stakeholder management can help to address some of the challenges faced by project managers in the country, such as inadequate project funding and a lack of skilled personnel (Ike 2017).

IT management in the healthcare industry in Nigeria is becoming increasingly important, as healthcare providers seek to improve the quality of patient care, streamline operations, and reduce costs (Muhammad and Abubakar 2022). The use of technology in healthcare is still relatively new in Nigeria, but there is growing recognition of its importance (Abdulkareem (2021).

Several studies have been conducted on project management practices in Nigeria. These studies have highlighted the need for project managers to use standard project management methodologies and tools to increase the likelihood of project success. The project management practices in Nigeria are inconsistent and not well standardized. The study also found that Nigerian project managers often rely on intuition and experience rather than formal project management methodologies (Oke and Ojo 2018).

Nigeria is one of the largest economies in Africa and has experienced significant growth in recent years. As a result, project management has become an increasingly important field in Nigeria. The literature on project management in Nigeria covers a wide range of topics, including project management practices, project success factors, and challenges faced by project managers in the country (Oke and Adebanjo 2016).

The Nigerian government has made some progress in this area, implementing initiatives such as the e-health strategy to promote the use of technology in healthcare. Additionally, several private healthcare providers have started to invest in IT infrastructure to improve their operations (Adebisi et al. 2021).

Several studies have been conducted on the factors that contribute to project success in Nigeria. These studies have identified several key success factors, including effective project planning, stakeholder engagement, leadership, and team competency. The effective project planning is the most crucial factor for project success in Nigeria. The study also found that stakeholder engagement and project leadership are also crucial success factors (Okorie and Aremu 2017).

However, there are several challenges that have hindered the growth of IT management in the healthcare industry in Nigeria. One of the main challenges is the lack of infrastructure and resources, particularly in remote areas. The lack of infrastructure and resources can result in project delays and cost overruns. Additionally, the study found that cultural differences and communication barriers can also pose challenges for project managers in Nigeria. (Afolabi et al. 2021). In addition, there may be resistance to change from stakeholders, such as healthcare providers and patients, who may be used to traditional methods of care delivery (Onakoya and Ayeni 2021). Furthermore, a study by the Journal of Engineering, Project, and Production Management highlights the importance of stakeholder management in project management in Nigeria. The study argues that effective stakeholder management can help to address some of the challenges faced by project managers in the country, such as inadequate project funding and a lack of skilled personnel (Ike 2017).

Despite these challenges, some healthcare providers have started to adopt IT management practices. For example, the University of Nigeria Teaching Hospital has implemented an electronic medical record system to manage patient information (Oyebisi et al. 2019), while the Lagos State University Teaching Hospital has implemented a hospital management information

system to improve patient care and administrative operations (Babalola and Ajayi 2021). The Nigerian government has also made efforts to support the development of the IT industry, including the implementation of policies and programs aimed at improving the quality of IT project management in the country. This includes providing training and development opportunities for IT professionals and funding for IT projects (Olatunji and Aina 2020).

Also, there have been several initiatives aimed at improving project management in West Africa, including Nigeria. For example, the Nigerian Institute of Management (NIM) offers training and certification programs for project managers, while the African Development Bank has provided funding for projects aimed at improving project management skills in the region (Ogunlana et al. 2013).

The future of IT project management in Nigeria looks promising, as the country continues to develop its technology sector and invest in the development of its IT infrastructure. With the right support and investment, IT project management in Nigeria has the potential to play a key role in driving the country's economic growth and development (Adegbuyi et al. 2019).

4.6 The Role of Government in IT Project Management in Healthcare

The role of government in IT project management in healthcare is crucial as it plays a critical role in ensuring that the right systems, processes, and technologies are put in place to support the healthcare sector. The government's role in IT project management includes the development of policies and regulations that guide the implementation of IT systems in the healthcare sector, providing funding and other resources needed to support these projects, and overseeing the implementation of IT projects to ensure that they are delivered on time, within budget, and to the expected quality standards.

In Nigeria, the government has been actively involved in promoting the use of IT in healthcare to improve service delivery and enhance the quality of care provided to patients. For example, the Nigerian Federal Ministry of Health has launched several initiatives aimed at improving the use of IT in healthcare, including the development of a national health information management system and the creation of a digital health library (Abiola and Owolabi 2016).

Consequently, despite these efforts, the implementation of IT projects in the Nigerian healthcare sector has faced several challenges. Some of these challenges include a lack of skilled personnel

to manage IT projects, a lack of funding to support the development and implementation of IT systems, and the lack of standardization and coordination between different healthcare institutions.

To address these challenges, the Nigerian government needs to provide more funding and other resources to support IT projects in the healthcare sector, establish a more robust regulatory framework to guide the implementation of IT systems, and invest in the development of skilled personnel to manage IT projects. The government can also partner with private sector organizations and academic institutions to share knowledge and expertise in IT project management and to promote the development of best practices in this area (Okeke and Uzochukwu 2016).

The role of the government in IT project management in the Nigerian healthcare sector is critical to ensuring the success of these projects and improving the quality of care provided to patients but more work must be done as the duties and responsibilities of government is continuous.

4.7 Theoretical Framework

The theoretical framework for Information technology project management in government health institutions in Nigeria can be based on various theories, models and concepts from project management, information technology, and healthcare management. The following are some of the theoretical frameworks that can be used in building a sustainable information management system.

Project management frameworks such as PRINCE2, PMBOK, and Agile, provide a structured approach to project management and can be adapted to the specific needs of IT projects in government health institutions (Somasundaram and Srinivasan 2012).

Information Technology Management (ITM) frameworks such as COBIT, ITIL, and TOGAF, which focus on the governance and management of information technology in organizations and can be used to guide the management of IT projects in government health institutions.

Healthcare management theories such as Total Quality Management (TQM), Lean Management, and Six Sigma, which focus on quality improvement, efficiency, and patient satisfaction, and can be applied to improve the delivery of healthcare services through IT projects in government health institutions.

Theories of adoption and implementation of information technology in organizations, such as the Technology Acceptance Model (TAM), the Diffusion of Innovation theory, and the Innovation-Decision Process (IDP) model, which provide insight into the factors that influence the adoption and implementation of IT projects in government health institutions.

Traditional Project Management Theory: Traditional project management theory, also known as the "Waterfall" approach, has been around since the 1950s. It is a linear and sequential approach that involves breaking down the project into distinct phases such as initiation, planning, execution, monitoring, and closing. Each phase has a defined set of tasks and deliverables that must be completed before moving on to the next phase. This approach emphasizes the importance of planning, documentation, and control. However, it may not be suitable for projects with high uncertainty and complexity (Cooper 2014).

Agile Project Management Theory: Agile project management theory emerged in the early 2000s as a response to the limitations of traditional project management. Agile focuses on flexibility, collaboration, and continuous improvement. This approach involves breaking down the project into smaller, more manageable parts called sprints, which are typically two to four weeks long. At the end of each sprint, the team reviews the work done and adjusts the plan for the next sprint. Agile is well-suited for projects with changing requirements, high uncertainty, and complex environments (Schwaber and Sutherland 2017).

Lean Project Management Theory: Lean project management theory is based on the principles of Lean manufacturing, which is all about maximizing value and minimizing waste. In Lean project management, the focus is on delivering the most value with the least number of resources and effort. This approach involves identifying and eliminating non-value adding activities, reducing waste, and continuously improving the process. Lean project management is especially suitable for projects with tight budgets, limited resources, and short timelines (Reinertsen 2019).

Hybrid Project Management Theory: Hybrid project management theory combines elements of both traditional and agile project management. It allows project managers to tailor their approach to the specific needs of the project. For instance, a project may have some phases that require a Waterfall approach while others require an Agile approach. By using a hybrid approach, project managers can maximize the benefits of both methodologies while minimizing the limitations (Bhuiyan & Baghel 2015).

Critical Path Method (CPM): The Critical Path Method is a project management theory that focuses on identifying the sequence of activities that are critical to the project's success. CPM involves identifying all the activities involved in the project, their duration, and their dependencies. The critical path is the sequence of activities that determine the project's minimum completion time. CPM is often used in projects with complex interdependencies and time constraints (Meredith and Mantel 2021).

Prince2: PRINCE2 (Projects IN Controlled Environments) is a project management framework that provides a structured approach to project management. It involves dividing the project into stages, each with its own set of objectives, deliverables, and review points. PRINCE2 also includes clear roles and responsibilities, project management principles, and a focus on business justification (Office of Government Commerce 2021).

Six Sigma: Six Sigma is a project management theory that focuses on minimizing defects and errors in the project. It involves a data-driven approach to identify and eliminate sources of variation that may lead to defects. Six Sigma also involves continuous improvement through statistical tools and techniques (Harry & Schroeder 2020).

Scrum: Scrum is an Agile project management framework that focuses on delivering value through collaboration and iterative development. It involves breaking down the project into small, cross-functional teams that work together to deliver a product incrementally. Scrum includes daily stand-up meetings, sprint planning, sprint reviews, and retrospectives (Rubin 2012).

Overall, the choice of project management theory depends on the project's scope, complexity, timeline, and resources. Project managers should carefully consider the characteristics of their project before deciding which approach to use. It is also essential to stay open to adjustments and modifications throughout the project's life cycle to ensure the project's success (Pannu 2015).

The healthcare sector is a crucial aspect of any country's development, and effective information technology project management (ITPM) is essential in this field. The government plays a critical role in providing healthcare services, and the use of information technology in managing healthcare projects can lead to improved efficiency and effectiveness. In this literature review,

we will examine the theoretical frameworks that guide ITPM in government healthcare (Somasundaram and Srinivasan 2012).

Several theoretical frameworks guide the management of information technology projects in government healthcare. These frameworks offer guidelines that can assist in project planning, execution, monitoring, and evaluation.

Project Management Institute (PMI): The PMI framework is one of the most widely recognized theoretical frameworks for project management. This framework offers standard guidelines for managing projects applicable across various sectors, including government healthcare. The PMI framework consists of five project management process groups: initiation, planning, execution, monitoring, and control, and project closure. Each process group contains several sub-processes that are essential for effective project management (Shtub et al. 2015).

Health Information Technology for Economic and Clinical Health (HITECH) Act: The HITECH Act is a framework that was developed to promote the adoption of health information technology (HIT) in the United States healthcare system. This framework offers guidelines for the meaningful use of HIT, which refers to the use of electronic health records (EHRs) to improve healthcare outcomes. The HITECH Act provides incentives to healthcare providers that adopt and use EHRs effectively, and it also provides guidelines for data privacy and security (Blumenthal and Tavenner 2020).

Capability Maturity Model Integration (CMMI): The Capability Maturity Model Integration (CMMI) is a framework that provides guidelines for improving the processes and practices used in software development and project management. This framework has been widely used in government healthcare to improve the quality and effectiveness of healthcare information technology projects. CMMI provides a set of guidelines that can assist in identifying areas for improvement in project management processes and practices, as well as a roadmap for achieving higher levels of maturity in project management (Paulk 2015).

Information Technology Infrastructure Library (ITIL): The ITIL framework provides guidelines for managing IT service delivery and support. This framework offers a set of best practices for managing IT projects in government healthcare, including incident management, problem management, change management, and service desk management (Van 2021).

This IT framework refers to the monitoring and structuring of an association's data innovation frameworks, which include tools, programs, and organizations. The focus of IT executives is on how to make data frameworks function effectively. An IT environment is made up of a variety of hardware, organizational, and programming components, such as PCs, servers, switches, applications, microservices, and adaptable innovations. On-site IT foundations are possible. IT managers monitor and control IT systems to make sure they are consistently functional and accessible. IT leaders' commitments and obligations include:

- Deciding the business requirements for IT systems
- Monitoring IT budgetary goals and costs
- Observing uniformity and safety
- Regulating the security of the organization's framework
- Implementing new software, hardware, and information frameworks
- Providing specialist assistance or supporting job areas.

For this research, I adopted the Agile methodology. Agile methodology is a project management approach that values flexibility and collaboration. It is often used in software development but can also be applied to other types of projects, including in government health institutions. In Nigeria, the use of agile methodology in government health institutions can help to improve the efficiency and effectiveness of health care services (Kumar and Gautam 2016).

In an agile project management context, the focus is on delivering value to the customer through continuous iteration and improvement. The process typically involves the following steps:

- Requirements gathering and prioritization: The project team works with stakeholders to identify the most important needs and requirements for the project.
- Sprints and iterations: The project is broken down into smaller, manageable pieces, called sprints or iterations. During each sprint, the team works on delivering a specific set of functionalities.

- Collaborative decision-making: The project team and stakeholders work together to make decisions and prioritize work items. The team also meets regularly to review progress and adjust, as necessary.
- Continuous improvement: Throughout the project, the team continuously seeks feedback from stakeholders and uses it to improve the product or service being delivered.

In a government health institution in Nigeria, the use of agile methodology can help to improve the delivery of health care services by enabling the team to quickly respond to changing needs and priorities. It also encourages collaboration between different departments and stakeholders, ensuring that everyone is working towards a common goal. Also, the focus on continuous improvement can help ensure that the health care services provided are of the highest quality (Kumar and Gautam 2016).

4.8 Conceptualization and Design

4.8.1 Existing System

Maitama hospitals presently handle and store crucial information using a manual system with only a few sections of the health facility equipped with computers. There are also data repositories dispersed throughout the hospital management infrastructure, the current method necessitates many paper forms. Information is frequently unfinished or does not adhere to management standards. Forms frequently disappear while being transported between departments, necessitating a thorough auditing procedure to guarantee that no crucial data is lost. The hospital has many copies of the same data, which could cause discrepancies in the data across different data storage.

4.8.2 Proposing System

To cushion the negative impacts of the crude method of information management in the health facility (Maitama District Hospital) from my findings, it is advised to switch out their current manual paper-based system with the effective IT Hospital Management System. Transfer of patient information within the various sections and departments is the goal of the new system. Schedules for the staff, the operation room, patient bills, and room availability. With the aim of reducing the time and resources now needed for such tasks, these services must be supplied in an efficient, cost-effective manner.

4.8.3 Feasibility Study

For this research in this stage, the project's viability is evaluated, and a business proposal is presented with a very generic project plan and some cost projections. The proposed system's practicality is investigated during system analysis. This is done to make sure the hospital is not burdened by the planned system. Understanding the main system requirements is crucial for the feasibility analysis. The author considered the following crucial factors in the feasibility analysis in this research work:

4.8.4 Feasibility in the economic

This study is being conducted to determine the system's and organization's potential economic effects. The institution is required to invest a certain amount of money in the system's research and development. The expenses must be justified because most of the technologies are not freely available, the system to be adopted is also developed within the budget. Hence It is only necessary to approve customized management system for the health institution.

4.8.5 Technical Feasibility

This research is done to determine whether the system's technological requirements can be met. The technical feasibility of hospital management software refers to the assessment of whether the software can be developed, implemented, and operated within the technical constraints and capabilities of the hospital's existing infrastructure. The technical resources already available must not be heavily strained by any system designed. This will result in the hospital facing significant demand. The created system must have reasonable requirements because its implementation will only require minor or no adjustments. By assessing these technical feasibility factors, hospitals can determine if a proposed hospital management software aligns with their technical requirements, capabilities, and constraints. This evaluation helps in making informed decisions regarding software selection, implementation, and long-term sustainability.

4.8.6 Operational Feasibility

Examining the degree of user acceptability of the system is one of the study's objectives to take into consideration. This involves the procedure for teaching the user how to operate the system effectively.

The system should not make the user feel threatened; instead, they should see it as a need. Users' levels of acceptability completely depend on the techniques used to inform and acquaint them with the system. Proper training in an easy to navigate system is necessary to boost their confidence.

4.9 System Design

4.9.1 Unified Modelling Language (UML)

Using the Unified Modeling Language (UML), a standard language, the software system and its components may be designed, visualized, created, and documented. A vocabulary, norms, and meanings are all provided in this graphical language. The UML's primary objective is the conceptual and practical representation of the system. It encompasses the decisions and understandings pertaining to the systems that must be constructed. It is employed to understand, create, configure, maintain, and manage system information.

The UML language is used for:

- Visualizing
- Specifying
- Constructing
- Documenting

Visualizing: With UML, we can view or visualize an existing system and see how it will look once used. Without thinking, we are unable to act. UML aids in the visualization of how system components interact and communicate with one another.

Specifying: All key analytical, design, and implementation choices that must be taken when developing and delivering a software system are specified using UML. Specifying requires the development of precise, clear, and thorough models.

Constructing: Through the mapping of a model to a programming language like JAVA, C++, or VB, UML models can be directly connected to a range of programming languages. Through UML, forward and reverse engineering are both possible.

Documenting: In addition to the code, a project's deliverables include some artifacts that are vital for monitoring, managing, and conveying information about a system as it develops, including its requirements, architecture, desire, source code, project plans, tests, prototypes, and releasers.

4.9.2 UML Diagram

A diagram is a visual representation of a collection of elements; it is most frequently a connected network of vertices and arcs. Drawing a diagram is a projection into a system that allows you to see it from numerous angles. A diagram depicts an obfuscated perspective of the components of a system for all save the simplest systems. The same element might be represented by one or more diagrams, none, or all of them. Theoretically, a diagram might include any assortment of elements and connections. The five most practical viewpoints that make up the architecture of a software-intensive system are only partially compatible with the tiny number of typical combinations that occur. Nine similar diagrams are therefore included in the UML:

- The class diagram the
- object diagram
- A case study in use
- Sequence chart
- Collaboration flowchart
- Image of a state chart
- Activity flow chart
- Circuit diagram
- Flowchart for deployment.

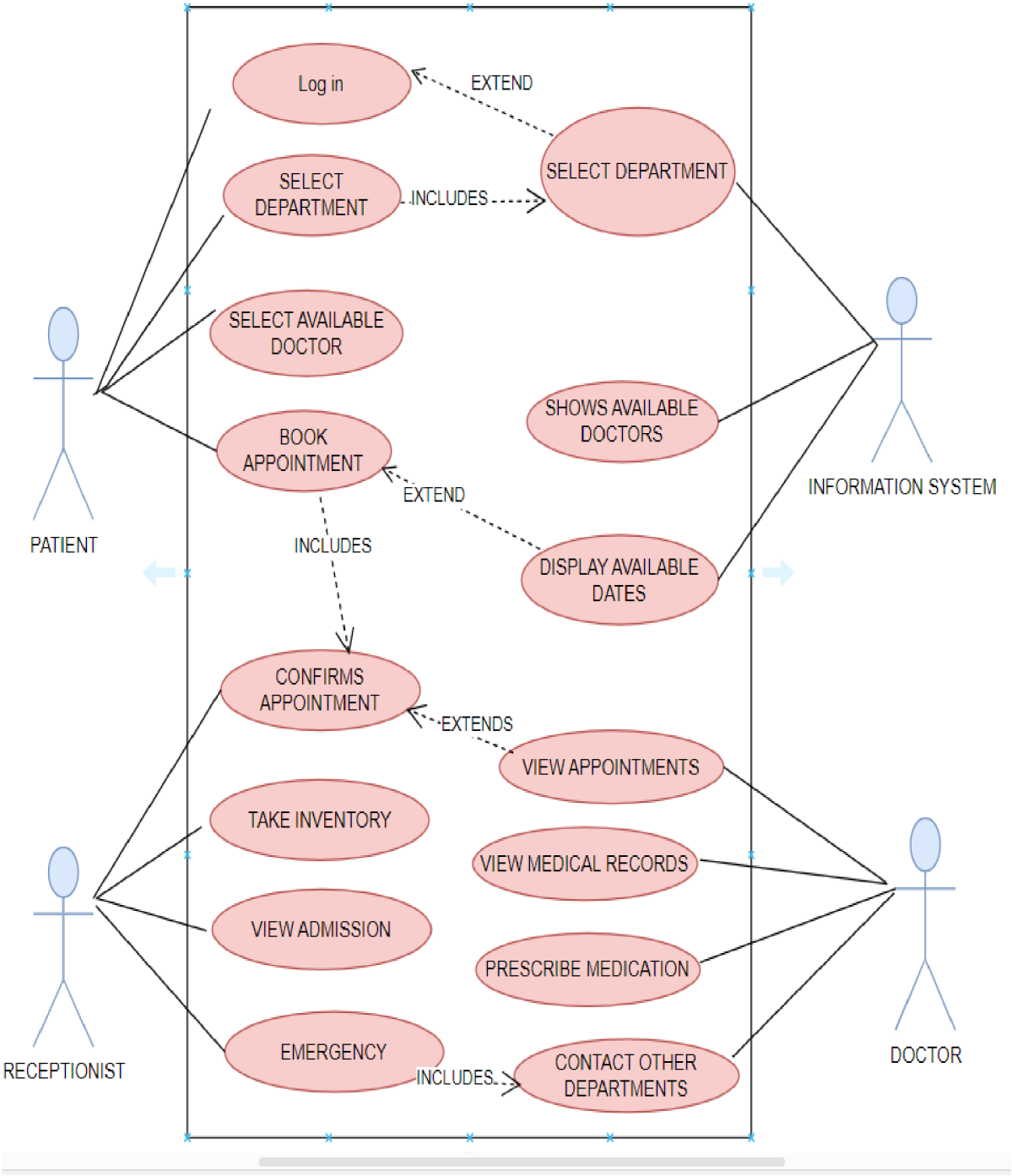
5 Practical Part

The practical part of this research is explained here. This part consists of the conceptual design of an effective Hospital Information management system for the Maitama district hospital with its relationship and realization using different programing languages. Hence, enabling proper understanding of the proposed new conceptualized hospital management system with its operational feasibility. Also, the author analyzed how the new system will improve service delivery within the unique hospital information management processes.

5.1 USE CASE DIAGRAM:

In this diagram, the "information system" provides the clinical and service departments, the available doctors for consultation and dates for scheduling appointments. It can also perform administrative tasks like add and remove doctor. The "Doctor" actor interacts with the system to manage the patient records, diagnoses, and prescriptions. The patient actor interacts with the system to access their scheduled appointments, medical records, prescriptions, and discharge summary. The receptionist actor confirms appointments, takes inventories, receives emergency calls and enters the admissions and discharge records hence maintains an intermediate communication between the doctor, other departments and the patient.

Figure 1Use case diagram of the proposed system.



(Source: Author)

Use case Description/Scenario.

Description of event: Patient receives medical prescription.

Primary Actors: Patient, Receptionist, information system, Doctor.

Basic flow of events:

A. Patient logs into the hospital system
B. Select the department to visit.
C. Select available doctor.
D. Book appointment
E. The receptionist confirms the appointment.
F. The doctor receives vital signs.
G. The doctor contacts the laboratory for more tests.
H. Doctor prescribes medication.
I. The accounting team continues to update the patients' bill payments and consider their health insurance as the case may be.
J. Doctor discharge patient.

Preconditions:

1. Patient has signed up or created account in the hospital management system.
2. Access to stable internet network.
3. The patient needs to be treated.

Post condition:

The patient receives optimum healthcare service and is discharged.

Alternative flows:

Ai. Login details not validated.

Ii. Payment not completed.

Ji. More tests required.

Description of event: Patients calls in emergency.

Primary Actors: Patient, Receptionist, information system, Doctor.

Basic flow of events:

A. Patients open the hospital system.
B. Contacts emergency line
C. The receptionist confirms the appointment.
D. The receptionist contacts the accident and emergency department.
E. Doctor views appointment.
F. Patient is admitted.
G. The doctor contacts the laboratory for more tests.
H. Doctor prescribes medication.
I. The accounting team continues to update the patients' bill payments and also consider their health insurance as the case may be.
J. Doctor discharge patient.

Preconditions:

a. Patient/relative has signed up or created account in the hospital management system.
b. Access to stable internet network.
c. The patient needs to be treated.

Post condition:

The patient receives optimum healthcare service and is discharged.

Alternative flows:

Iii. Payment not completed.

Jii. More tests required.

Source: Author

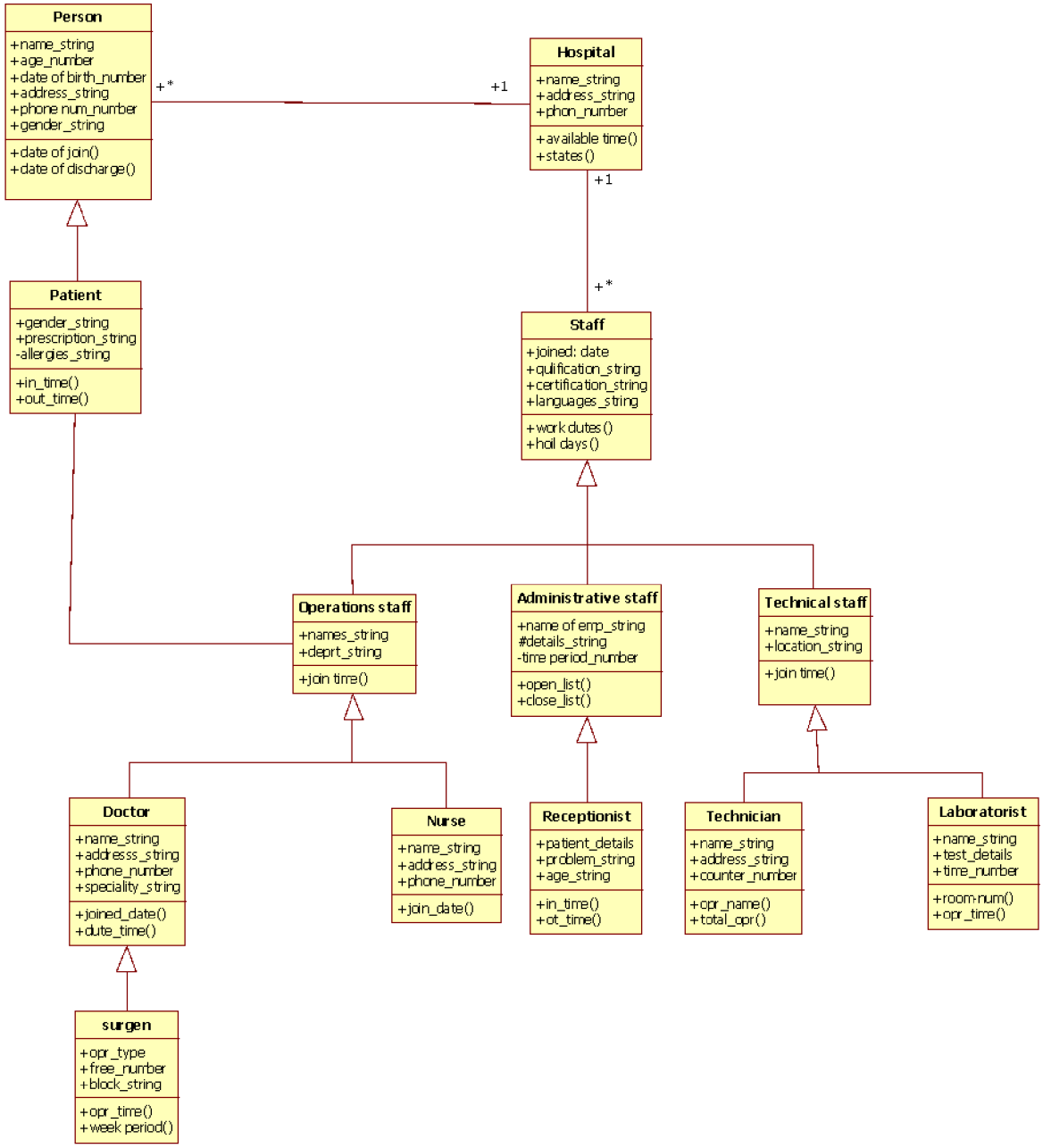
Class Diagram:

A Class is a category or group of entities that has similar attributes and common behavior. A Rectangle is the icon that represents the class. The upper most area contains the name, the middle; area contains the attributes, and the lowest areas show the operations.

In this Class diagrams below, the “Person” class represents the other visitors and patient entities with their attributes. The “Hospital” class represents the hospital entity with attributes such as name, address, contact number, available time (opening and closing time).

The “Staff” class represents the respective “clinical staff, “Administrative staff” and “Technical staff” sub-class entities, their various operational time, and attributes.

Figure 2 Class Diagram

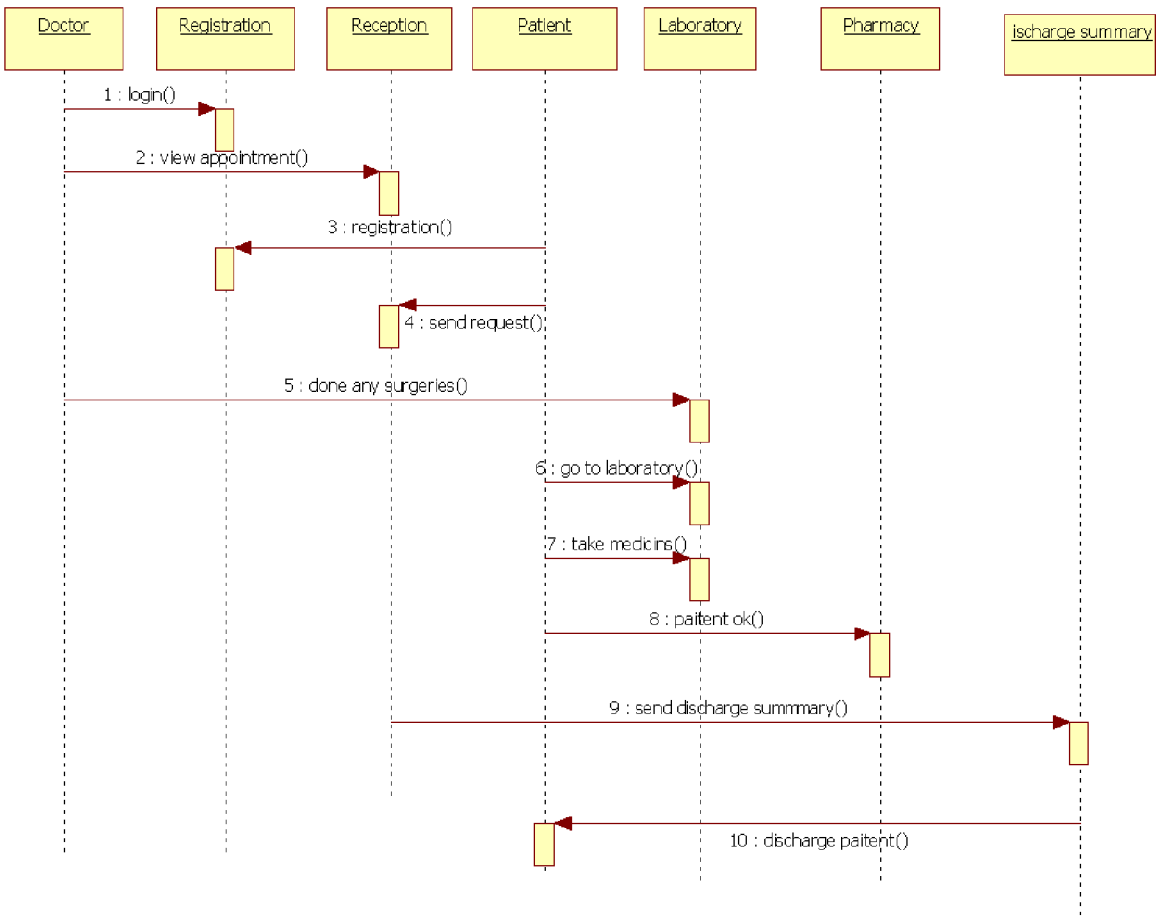


source: Author

Sequence Diagram

Sequence diagram is an interaction diagram that emphasis the time ordering of messages. This diagram shows the interaction between the "Doctor" object and the hospital management system. The doctor logs in, views the patient appointment and medical history by clicking "view patient history" method. The "patient" object can also send request to the doctor, reception in event of any further enquiries. Then, the doctor prescribes medicine with the patient registration ID. Hence the receptionist reviews the patients discharge summary if completely treated to make the bedspace available for next patients to be admitted. Sequence diagrams and collaboration diagrams are isomorphic, meaning that it can take one and transform it into the other.

Figure 3 Sequence diagram

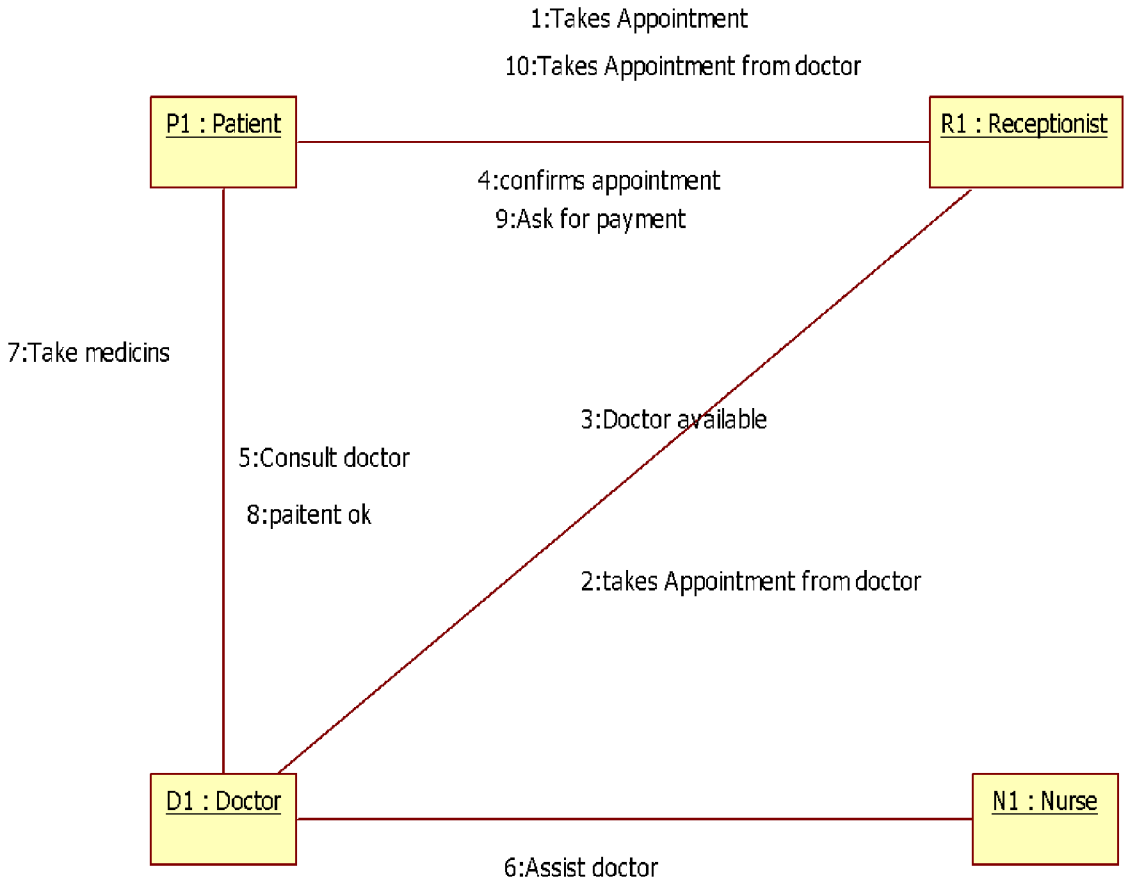


Source: Author

Collaboration diagram:

A Collaboration Diagram is an illustration of the relationships and interactions among software objects. According to the diagram, the "patient requests an appointment, the receptionist who views the request from the doctor schedule and availability. The doctor confirms availability and confirms appointment with the receptionist who communicates back to the patient. The patient now consults the doctor with the assistance of the nurse for vital science and patient record. The doctor prescribes medicine, hence clear the patient to be ok and proceed to make payment as the receptionist reviews patients' profile for payment receipt and confirms next appointment with the doctor as the case may be.

Figure 4 Collaboration diagram



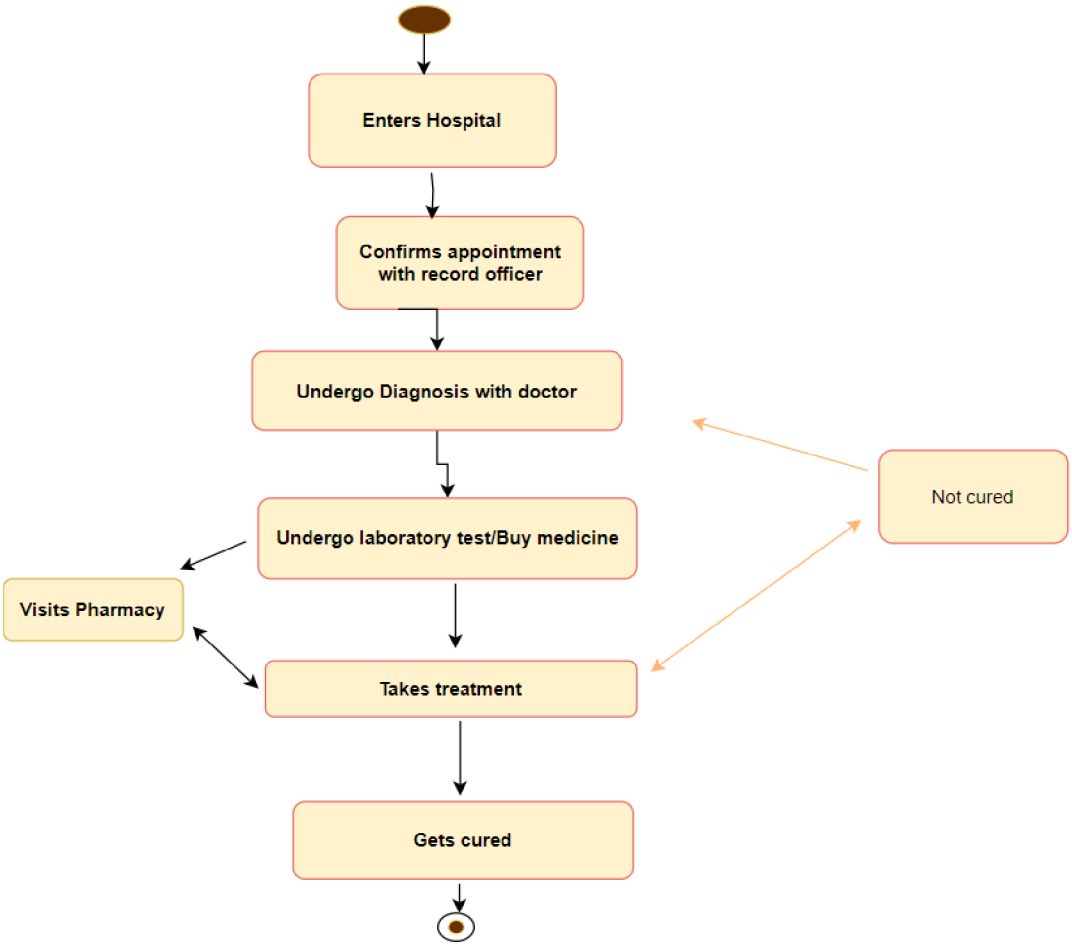
Source: Author

State chart Diagrams:

This shows the different states and transition that the object "patient" goes through during its cycle. Considering the state diagram, an arrow represents the transition from one activity to the next.

The activity diagram has a starting point of the "patient" represented by filled-in circle, and an end point represented by bulls' eye. The "Patient" object enters the hospital on appointment with the physician to see, then proceeds to undergo diagnosis and get treatment. If the patient does not get cured after initial treatment, more intensive tests with the Laboratory will be conducted. Whereas the patient gets cured, he/she, checks out of the hospital system.

Figure 5 State chart Diagrams

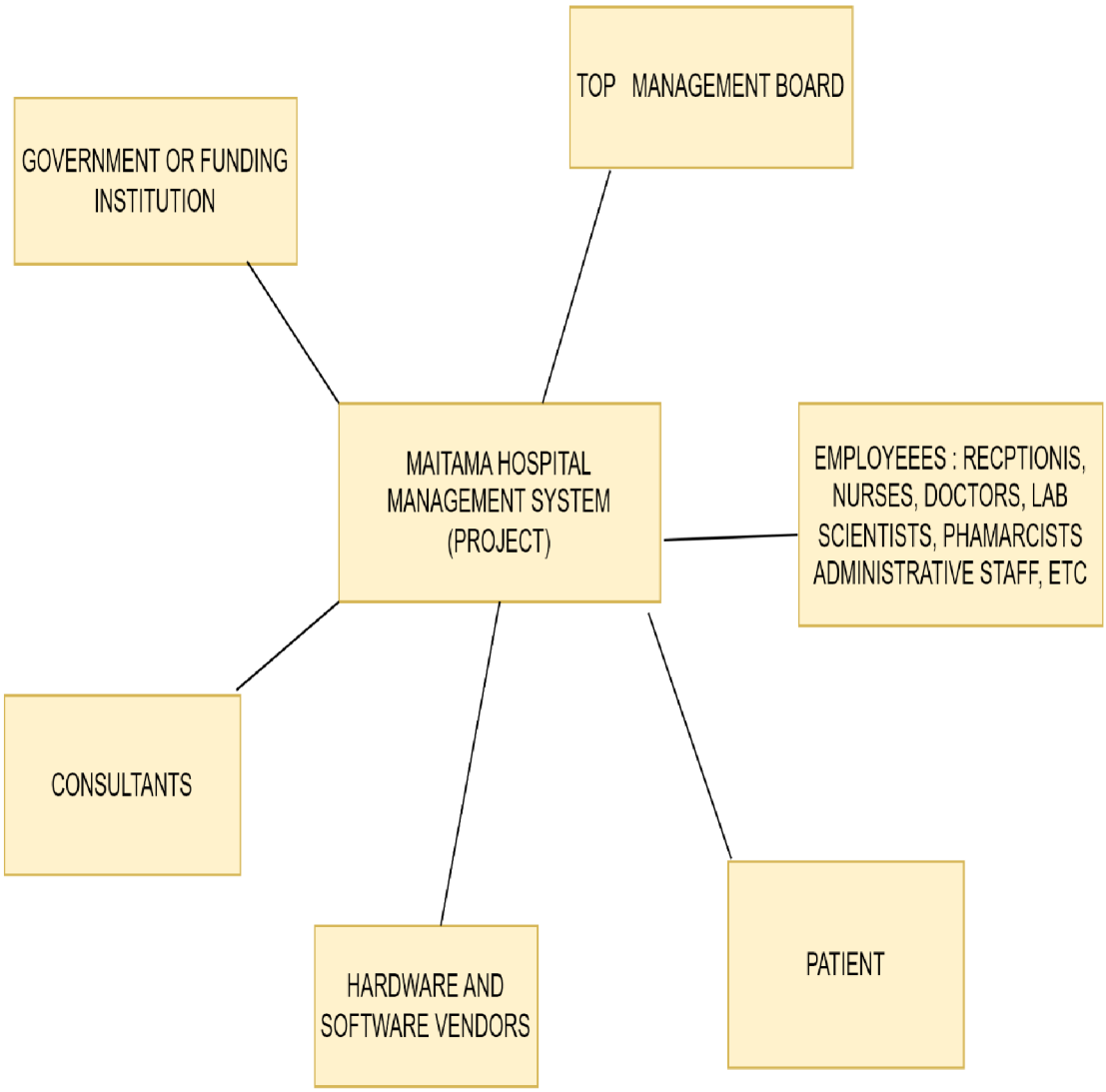


Source: Author

5.2 Stakeholders' Framework

The stakeholder's framework represents all those that has interest in the proposed hospital management system. Ranging from the funding institutions to the patients. Identifying and considering the needs and concerns of these stakeholders is essential for the successful implementation and ongoing management of a hospital management system. This ensures that the system meets the diverse requirements of the healthcare ecosystem while promoting efficiency, patient care, and compliance with regulations.

Figure 6 Stake holders' framework

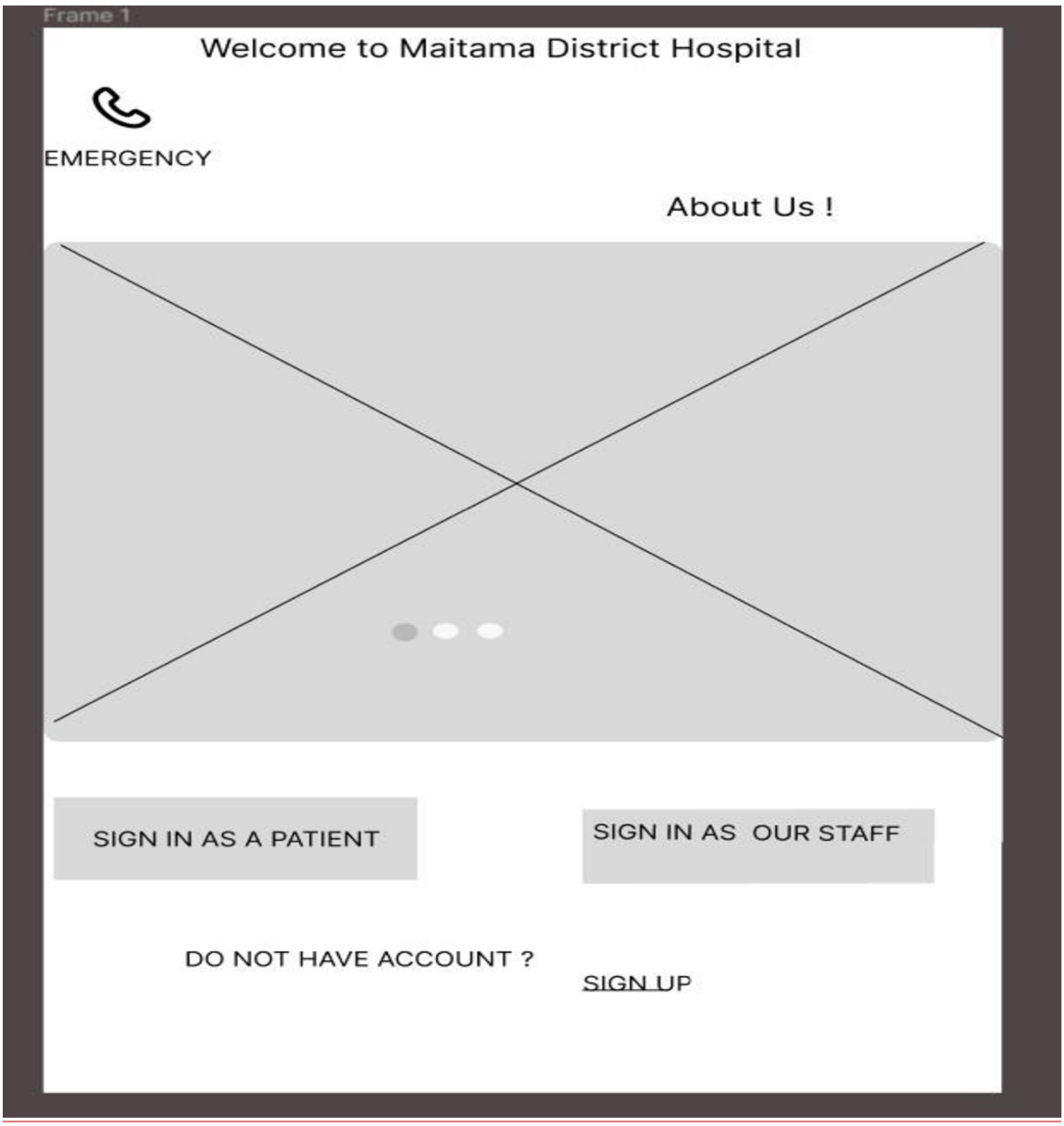


Source: Author

5.3 System Wireframe

The wireframe serves as a blueprint for the hospital management system's interface. It displays the welcome note on the site, emergency dial, brief introduction with picture of recent events or newsletter, then the sign up and sign in bar either as a patient or a hospital staff.

Figure 7 Welcome page Wireframe

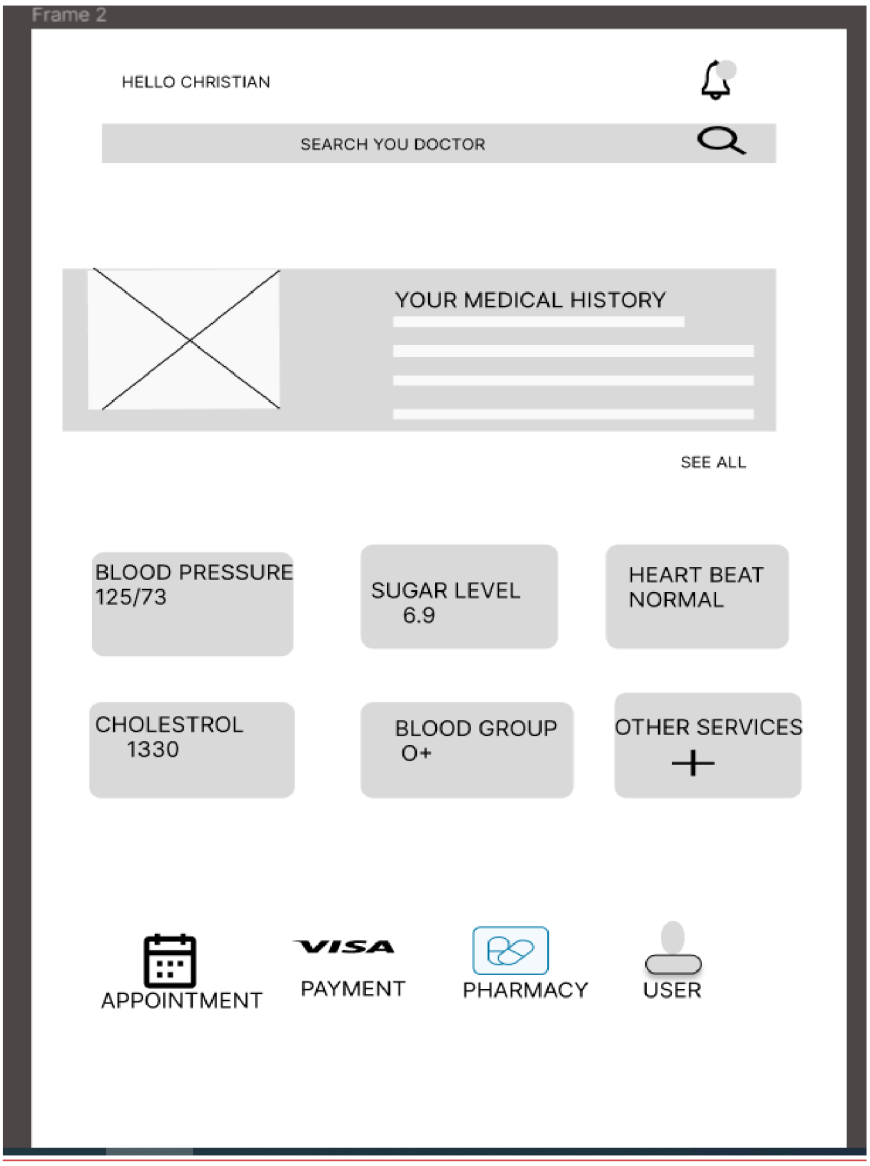


Source: Author

Patient wireframe:

This interface displays the dashboard of the patient Christian. This comprises of the search for doctor or department bar, medical history, and basic vital signs from the last visit to the hospital. Also, the appointment, payment, pharmacy, and user profile log respectively.

Figure 8 patients page Wireframe

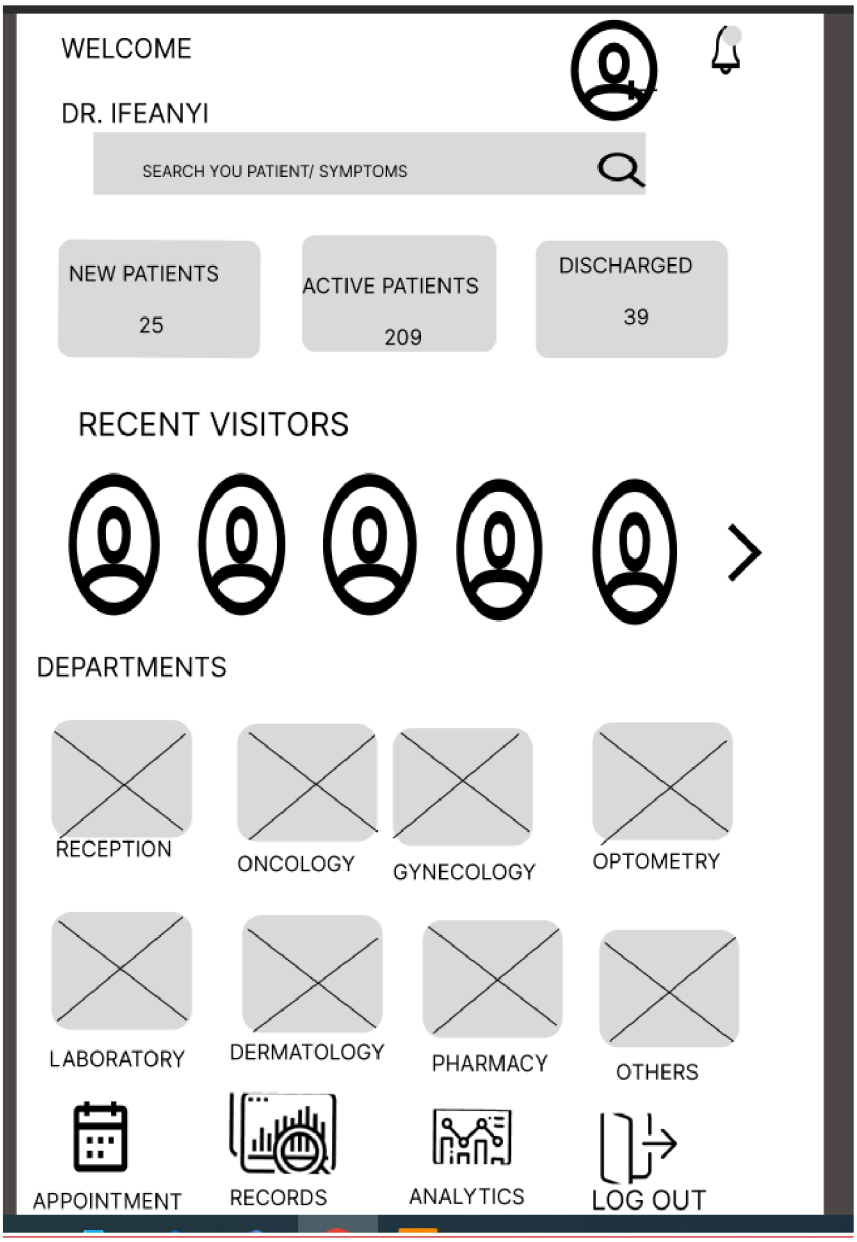


Source: Author

Doctors' wireframe:

Considering this interface, it shows Dr Ifeanyi's dashboard. Here he can search and access patient's medical record or various departments. He can also view the statistics of the active, discharged, and new patients with the various appointment schedules of the visitors. His profile and log out bar are also captured.

Figure 9 Doctors page Wireframe

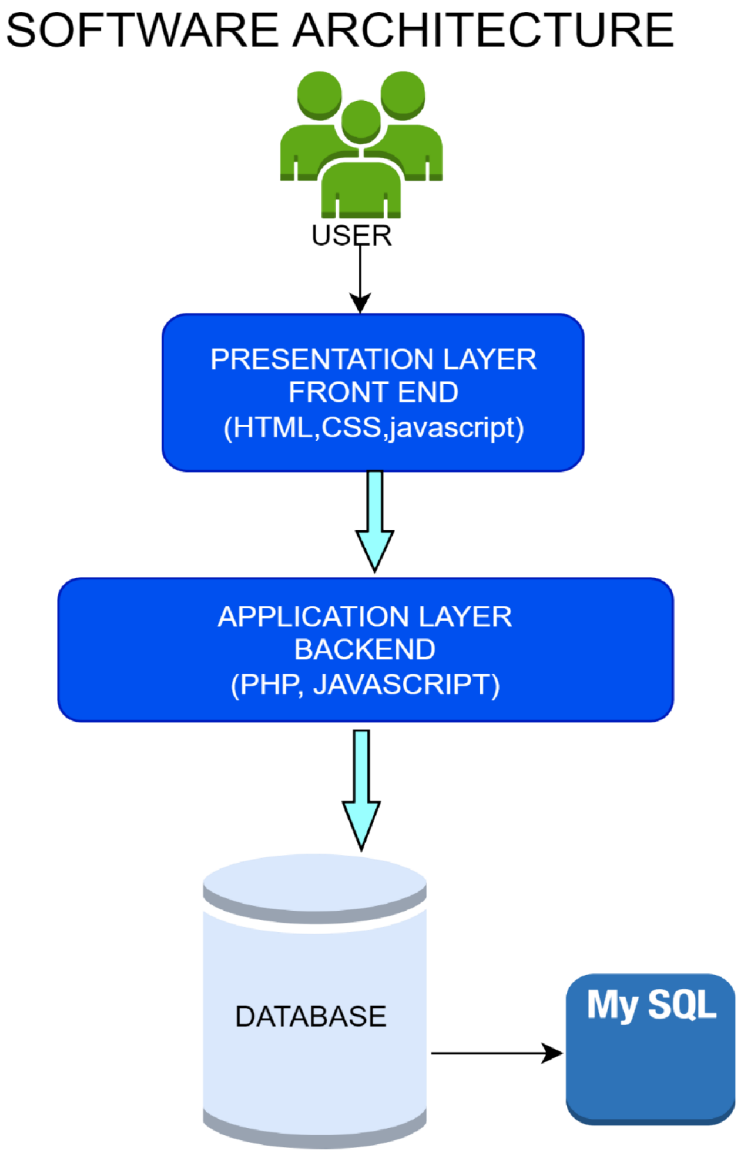


Source: Author

5.4 Software Architecture:

These technologies combined bring out a comprehensive hospital information management system which is very user-friendly and facilitates operationalized patients' care as well as enhances administrative tasks hence giving proper running of the Maitama district hospital.

Figure 10 Software Architecture



Source: Author

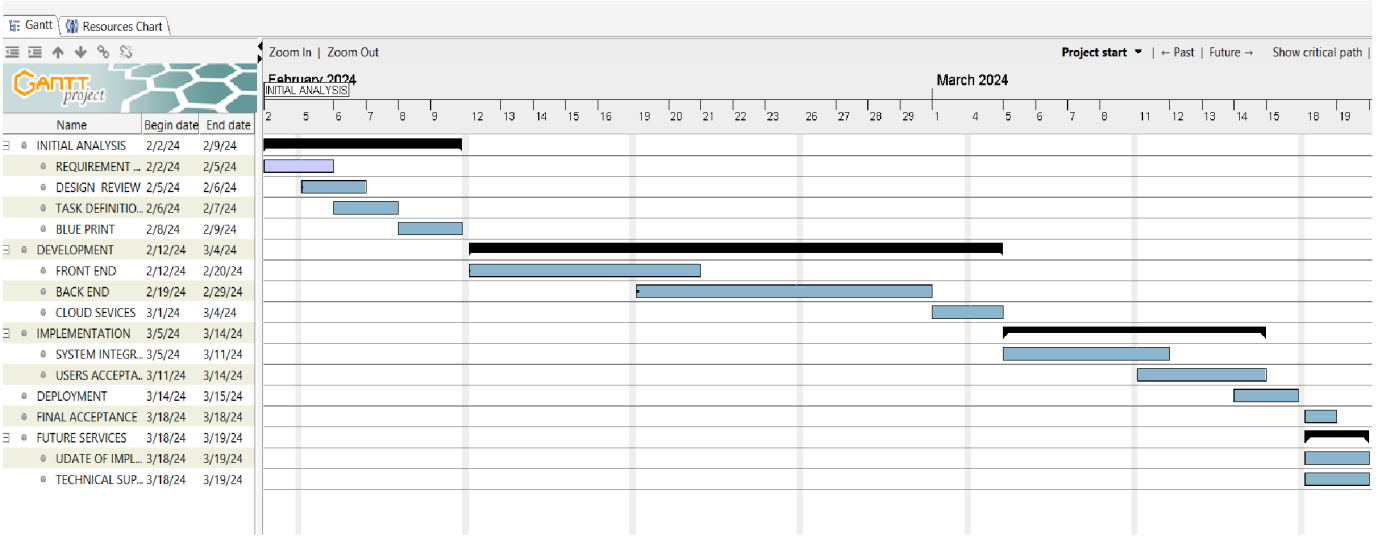
5.5 PROPOSED COST

The costing of this work is according to the current exchange rates of one(1) Euro equals to nine hundred and forty seven naira(947) and could be reviewed for optimum delivery of this project.

Table 1 proposed cost.

Number	Teams	Quantity	Days Required	Salary In Naira/DAY	Total cost in Naira	Euro equivalent
1	Analysis Team	2	60	60000	7,200,000	7603.2
2	Development Team	2	80	80000	12,800,000	13,516.8
3	Implementation Team	2	90	85000	15,300,000	16,156.8
4	Support Team	1	-	25000	2,000,000	2,112
5	Cloud-base charge	-	-	7000	2,555,000	2698.08
				Total	**39,855,000**	**42086.88**

Figure 11 Project progress Diagram (Gantt Chat)



Source: Author

5.6 Results and Discussion

Findings from Table2 show that the majority (56.51%) of the working population are below the age of 40 years, which implies that most of the working staff are young and able to be acquainted with Information Technology (IT). Result from the Table below demonstrates most of the working population (62%) has less than 20 years working experience which shows that they can easily reverse with proper training to the use on information technology in improving their experience in the job and be able to transfer the knowledge to the younger ones since they still have more years of service.

Also, from the table, results show that (45.65%) of the respondents are BSC/HND degree holders while (39.13%) of the respondents are postgraduate diploma holders. Hence, put together (84.74%), of the working population are literate enough to understand the application and use of information technology in health institutions.

Table 2. Revealed that majority of (52%) of the respondent were females. This imply that the health sector is dominated by female (E.g., Nurses and midwife). this agrees with the Taiwo et al (2022) research on Gender differences in work attendance among health care workers in Northern Nigeria during the COVID-19 pandemic. Who found that the number of female health workers is higher when compared to their male counterpart.

Table 2 Socio-economic characteristics of health workers (n=92)

Variables	**Items**	**Frequency**	**Percentage**
Age	25-30	20	21.73.
	31-35	16	17.39
	36-40	16	17.39
	41-45	12	13.07
	46-50	18	19.57
	>51	10	10.85

Gender	Male	40	43.48
	Female	52	56.52
Marital status	Single	24	26.67
	Married	66	73.33
Educational Qualification	SSCE	2	2.17
	NCE/Diploma	12	13.04
	Bsc/HND	42	45.65
	Postgraduate	36	39.13
Grade level	3-7	10	10.86
	8- 11	46	50
	>12	36	38.27
Years of working experience	1-6	26	28.27
	7-12	30	32.61
	13-18	6	6.52
	19-25	22	23.91
	>26	8	8.69
Career Path	Nurse	24	26.09

	Midwife	10	10.87
	Physician	12	13.04
	Administration	14	15.22
	Pharmacy	16	17.39
	Other	16	17.39
Knowledge of IT	Yes	61	66.70
	No	31	33.70

Source: Author

Considering the Table 3, about 61% (Strongly agreed 10.87% and Agreed 50%) agrees that the Nigerian government has been decisive in the adoption of Information Technology in Government health institution.

Moving further, all (Strongly agreed 71.74% and agreed 28.26%) agreed that Good and effective IT project management in government health institution helps to make timely decisions and appropriate actions towards operation of public healthcare. Furthermore, 95.66% (Strongly agreed 76.09 and Agreed 19.57%) agree that information technology helps in attending to our everyday needs and saved a lot of waiting time in documentation and emergency situations in the hospital. In the other responses, 89.65% (Strongly Agreed 72.26% and Agreed 17.39%) agree that the Information management technology system has helped in keeping track and records of patients' data, transfer of information, supplies of drugs and expiry of drugs and general hospital management. Additionally. 93.47% (strongly Agreed 63.04 and Agreed 30.43%) agree that an Effective Information technology management system ensures the availability of information when needed. 91.3% more (Strongly agreed 67.39% and agreed 23.91%) agreed that Lack of information technology systems can lead to the loss of patient's data, mix up of expired and unexpired drugs which can lead to death of patients.

In addition, 93.48% (Strongly Agreed 73.91 and Agreed 19.57%) agree that useful information technology management system helps to improve patients and customers satisfaction. Finally, 84.78% (Strongly Agreed 43.41 and Agreed 41.30%) agrees that Poor quality of information technology system leads to slack of patients' healthcare in the health institution.

Table 2 Health workers' perception of information technology adoption (n=92)

Variables	**Strongly agreed**	**Agreed**	**Neutral**	**Disagreed**	**Strongly disagreed**	**Mean**
Nigerian government has been decisive in the adoption of IT	10 (10.8)	46 (50.0)	20 (21.7)	16 (17.4)	- -	
Good and effective IT project management in government health institutions helps in decision making.	66 (71.7)	26 (28.3)	--	_ _	_ _	
The Information technology helps in attending to our everyday needs	70 (76.1)	18(19.6)	2 (2.2)	2 (2.2)	_ _	
Information management technology system has helped to track and record keeping	72 (72.3)	16 (17.4)	4 (4.4)	_ _	_ _	
Effective IT management system ensures availability of records	58 (63.0)	28 (30.4)	6 (6.5)	_ _	_ _	

Lack of information technology system can lead to data loss.	62 (67.4)	22 (23.9)	6 (6.5)	2 (2.2)	_
Good IT management system improve patients' satisfaction	68 (73.9)	18 (19.6)	6 (6. 5)	_	_
Mediocre quality of IT system leads to slack of patients' healthcare	40 (43.5)	38(41.3)	14(15.2)	_	_

*__Figures parenthesis is percentages__ Source: Author

In table 3. All the respondents agreed that corruption avoids record tracing in one of the factors affecting the implementation of information technology in government health institution. Also, 97.83% affirms that inadequate electricity supply is a factor affecting the effectiveness of IT project management in government health institutions. Furthermore, 52.17% of the respondents affirmed that lack of patients trust on the government with their data is one of the factors affecting IT usage in government health institution while 47.83% disagreed with the assumption. However, the inadequacies and lack of accountable leadership may have triggered this fear among the citizens which if properly tackled will facilitate good acceptance of IT in government health institutions by the patients. Additionally, 86.96% of the respondents acknowledged that lack of IT education among the populace is also one of the contributing factors affecting the IT project management in government health institutions. 95.65% of the respondents affirmed that inadequate training of staff and operators is also a limiting factor in the adoption of IT project management in government health institutions. Finally, 97.33% of the respondents maintain that poor government policies on information technology are a major factor affecting the adoption of IT project management in government health institutions.

Table 3 Marginal effects of determinants on IT among health workers in Nigeria (n=180)

variable	Marginal effect	Std. Err.
Age	0.025*	0.020
Gender	0.001	0.133
Years of working experience	0.006	0.018
Staff grade level	0.002	0.038
Marital status	0.450	0.184
Educational Qualification	0.102**	0.043
Government decisive effort toward adoption of IT	0.037	0.075
Timely provision of IT materials	-0.150	0.219
Perceived need for health documentation and emergency	0.106	0.265
Perceived need for patients' data transfer	-0.233	0.252
Perceived need for a comprehensive patient database	-0.189	0.234
Perceived need for record-keeping	-0.018	0.141
Easy to use	0.116*	0.249
Poor equipment	-0.023	0.106
Inadequate internet availability	-0.602***	0.410
Poor government policy	-0.114	0.443
Inadequate electricity supply	-0.651*	0.205
Corruption to avoid record keeping	-0.071	0.136
Inadequate staff training	-0.312	0.114
Constant	2.116***	1.351

Number of observations	92
Prob > chi^2	0.021
LR chi2(19)	14.21
Pseudo R^2	0.064
Log-likelihood	-103.69

Statistical significance: * = 10% level ** =5% level *** = 1% level **Source: own calculation**

Source: Author

The result of the Probit regression model in Table 4 revealed that age has a statistically positive significance on health workers' adoption of information in their health service delivery. Implying that as age increases so also those years of working experience and their ability to adopt information technology.

Furthermore, findings revealed that health workers' education qualification has a statistically positive effect on their adoption of information technology. This implies that as health workers become more educated, they are more likely to adopt information technology.

Easy to use the ability of technology has a positive significant effect on the adoption of information by health workers. Implying that the easier a technology application the more likely its adoption will be among health workers.

Inadequate internet service negatively affects the adoption of information technology among health workers. Meaning that when internet service is poor, it affects the adoption of information technology among health workers. Even when health workers have the desire to use technology the inadequate or absence of the internet will affect the adoption of any information technology.

Inadequate electricity supply negatively affects the adoption of information technology among health workers. Implying that poor electricity supply is likely to affect information.

Table 4 Constraints affecting the adoption of IT.

Variables	**Items**	**Frequency**	**Percentage**

Corruption to avoid record tracing	Yes	92	100
	No	-	
Inadequate electricity supply	Yes	90	97.83
	No	2	2.17
Lack of patients trusting the government with their data	Yes	48	52.17
	No	44	47.83
Lack of IT education among the populace.	Yes	80	86.96
	No	12	13.04
Inadequate Training.	Yes	88	95.65
	No	4	4.35
Poor Government policies on Information Technology.	Yes	90	97.83
	No	2	2.17

Source: Author

5.7 Benefits of Adopting IT Project Management in Government Health Institution.

Adopting IT project management in government health institutions offers several benefits that can significantly improve the efficiency, quality, and effectiveness of healthcare services.

Here are some key benefits:

i. Improved Patient Care and Outcomes: IT project management enables the implementation of electronic health records (EHRs), telemedicine platforms, and other technological solutions that enhance patient care. These systems provide accurate and up-to-date patient information to healthcare providers, enabling better diagnoses, treatment decisions, and overall patient outcomes.

ii. Efficient Data Management: IT project management ensures the implementation of robust data management systems that streamline the storage, retrieval, and sharing of patient data. This reduces the time spent on paperwork, minimizes errors, and enhances the accuracy of medical records.

iii. Enhanced Communication and Collaboration: IT solutions enable seamless communication and collaboration among healthcare providers, departments, and even different healthcare facilities. This leads to better coordination of care, faster decision-making, and improved patient handoffs.

iv. Optimized Resource Allocation: IT project management helps in managing resources such as staff time, equipment, and facilities more efficiently. Through accurate data analysis and forecasting, institutions can allocate resources based on real-time demands, reducing wastage, and ensuring optimal resource utilization.

v. Data-Driven Decision Making: IT systems provide the necessary tools for data analysis, helping healthcare administrators make informed decisions based on actual data rather than assumptions. This leads to improved planning, resource allocation, and quality control.

vi. Remote Access to Healthcare Services: With telemedicine and online patient portals, patients can access medical advice and services remotely. This is especially beneficial for patients in rural or underserved areas who might have limited access to healthcare facilities.

vii. Reduced Medical Errors: Implementing IT solutions like electronic prescribing and medication administration systems can significantly reduce medication errors by

providing accurate dosages and alerting healthcare providers to potential adverse interactions.

viii. Streamlined Administrative Processes: IT project management optimizes administrative tasks such as billing, appointment scheduling, and record-keeping. This reduces paperwork, minimizes administrative errors, and allows staff to focus on patient care.

ix. Compliance with Regulations: IT systems can be designed to ensure compliance with healthcare regulations, such as data privacy laws like HIPAA. This protects patient information and prevents legal issues.

x. Patient Empowerment: Through patient portals and health apps, patients can access their own medical information, lab results, and even schedule appointments. This empowers patients to take an active role in managing their health.

xi. Faster Response to Health Crises: During health crises, such as pandemics, IT systems enable rapid dissemination of information, resource allocation, and coordination of emergency response efforts.

xii. Long-Term Cost Savings: While implementing IT systems might have upfront costs, the long-term benefits, such as reduced paperwork, efficient resource allocation, and improved patient outcomes, often lead to cost savings.

6 Conclusion

6.1 Summary of Findings

This research investigates IT project management practices in government health institutions hence exploring the impact of IT projects on the efficiency and effectiveness of health service delivery.

Further findings reveal that IT project management in government health institutions has so many limiting factors including inadequate budgeting and fundings, inadequate training of staff, and poor communication and constructive collaboration between the government boards. Also, government must do more work in the adoption of information technology in government institutions, as the potential is numerous.

However, every successful project management is facilitated by the adoption of best practices, effective leadership, and stakeholder involvement hence, the medical staff are willing to adopt and improve themselves with knowledge of information technology. The proposed conceptual design, when developed and implemented, will solve the problem of manual transmission of files and data from one department of the hospital to another if properly adopted and implemented.

6.2 Implications of the Study

The implication of this study is that it will form a great tool for policy makers as its adoption will facilitate the smooth running of the government health institutions and other government institutions.

It will also improve the knowledge of the health workers in information technology for smooth running of government institutions.

The adoption of IT project management in government health institutions and user-friendly technology will improve the quality-of-service delivery in government health institutions.

6.3 Recommendations

This study recommends the following:

- The government should provide adequate electricity supply for the effective use of Information technology in government health institutions.

- There should be adequate provision of internet services in the health institution to facilitate transfer of data and information.
- Adequate training and retraining of staff on information technology use in diagnosis and other medical services in the government health institution.
- There should be further research including the patients and those receiving the service using technology.
- The government should invest more in information technology as it will improve the quality-of-service delivery and aid in the tracing of corrupt practices in its institutions.
- There is a need for enhanced collaboration and communication among stakeholders, increased investment in IT infrastructure, and the adoption of standardized project management methodologies.

If these recommendations are considered and put into practice, they will go a long way in improving the use and adoption of Information technology in Maitama district hospital as well as the federal capital territory and nation in general.

6.4 Conclusions

Information technology has played a significant role in improving peoples' lives, jobs, studies, and organizations. The impact of information technology is felt in every sphere of life hence its importance cannot be overemphasized.

This diploma thesis revealed the role of IT project management in government health institutions in Nigeria and the significant role the government must play in improving its institutions. The findings revealed that factors affecting the adoption of IT among Health workers includes poor infrastructural facilities, lack of training among workers, complex user interface software and corruption. As such, an emphasis on training the staff in information technology has become necessary to encourage its adoption among health workers. Specifically if the government provide them the adequate training and support by providing efficient power in the facility, good internet services and equipping the hospital with good project management procedures to ensure the efficient management of the provided information technology in Maitama district hospital.

The hospital management should be intentional to implement improvements in IT infrastructure, usage level and be aware of the abuses of Information Technology.

User friendly technology as proposed in this thesis would positively influence adoption of IT among health workers in Maitama general hospital Abuja, Nigeria. Also, the attitude, responsiveness, and experience of the staff is dependent on government adoption of effective project management theoretical and practical framework which will give a significant structure in the formulation of an effective hospital information management system.

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8. Appendix

Survey

I am Ifeanyi Christian Okwuigbo. A Master student of system engineering and Informatics department in the faculty of economics and management Czech University of Life Science Prague.

I am required to carry out this research on the topic" IT project management in government health Institution" as a partial fulfilment for the award of master's in informatics. This study is extended to examine the challenges associated with IT project management in Government Health institution (Maitama District hospital). And the result will enable me to access the role of Information technology in our present health institution. All information provided would be treated with strict confidence and for the purpose of this research work only.

Survey Questions.

i. Age

ii. Gender

iii. Years of Working experience

iv. Grade level

v. Marital status

vi. Highest level of education

vii. Career Path

viii. Do you have any knowledge about information technology?

ix. The Nigerian Government has been decisive in the adoption of Information technology in the management of government health Institutions?

x. Good and effective IT project management in government health institutions helps to make timely decisions and appropriate actions towards operation of public healthcare.

xi. Information technology helps in attending to our everyday needs and saves a lot of waiting time for documentation and emergency situations in the hospital.

xii. Information management technology system has helped in keeping tracks and records of patients' data, transfer of information, supplies of drugs and expiry of drugs and general hospital management.

xiii. An effective Information technology management system ensures availability of information when needed.

xiv. Lack of information technology system can lead to loss of patients' data, mix up of expired and unexpired drugs which can lead to death of patients.

xv. Useful information technology management system helps to improve patients and customers satisfaction?

xvi. Mediocre quality of information technology system leads to slack of patients' healthcare in the health institution.

xvii. Information technology impacts the prevention of outdated medical records prevalent in the government health institution.

xviii. Information technology should be adopted in all government institutions to ensure quality service delivery, sustainability, education, and job creation.

xix. Factors Affecting Adoption of IT in Government Health Institutions.

a. Inadequate Training.

b. Poor Government policies on Information Technology.

c. Corruption To Avoid Record tracing.

d. Inadequate Electricity Supply

e. Lack of trust by patients trusting the government with their data.

f. Lack of IT education among the populace.