



Adoption and Utilization of ICT in Nigeria Hospitals (Government Owned)

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<p>Information and Communication Technology (ICT) is growing rapidly in Nigeria and has had a great effect on businesses and individuals. We can easily say ICT has not penetrated everywhere in the society. Nigeria comprises of 36 states and it is located in the western part of Africa. Nigeria has a population of about 158 million people. The three tiers (federal, state and local) of government share the responsibilities of providing adequate health services to the people.</p> <p>This thesis will focus on why Nigeria Health sector have not being using ICT in their various health centers. The focus of the thesis is to transform from the paper based approach to electronic health records that will fasten data collection from multiple health centers.</p> <p>An electronic health record (EHR) is an official health record for an individual that is shared among multiple facilities and agencies. Digitized health information systems are expected to improve efficiency and quality of care and, ultimately, reduce costs.</p>	
<p>Keywords Electronic health record, Nigeria Health care, and IT infrastructure</p>	

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1 Introduction

Information and Communication Technology (ICT) is growing rapidly in Nigeria and has had a great effect on businesses and individuals. We can easily say ICT has not penetrated everywhere in the society which is understandable due to many reasons. Without any doubt Internet is the fastest growing communication technology today (Dlodlo & Sithole, 2001). It took only four years for the internet to achieve the same mark as the television revolution, which took 13 years to reach 50 million viewers (Molosi, 2001).

Nigeria health sector has been disintegrating for years and have suffered due to negligence. One can easily say keeping records of an institution like the health sector is very important and crucial to the development of the sector as well as the patients. My study will focus on why the health sector is in its present state and what can be done to improve the sector. I will focus on the crossover from the paper based approach to an electronic means, which we can all say is more effective and efficient. In general Nigeria health sector has not fully utilized the benefits of ICT in the health sector and can be seen as backward development for a country that is adopting ICT rapidly. The patients records are normally stored on a paper which can either be misplaced or useless when visiting another health center. As we all know sloppiness can cause a great deal of damage to many things most importantly the health of an individual.

If there is a system in place that can be shared both by the private and public health center, there will be more improvement to the sector as well as the patient because it will fasten the treatment of diseases, understand what kind of medicine the patient is allergic to, what should be the next level of treatment, what drug was administered to the patient before and so on. By knowing all this, more lives will be saved as well as cost; it will increase the life span of the patient. In the system, there will be fully disclosed records of the patient in order to know the next step to take, what is the patient's reaction to the medicine administered.

A country like Nigeria has some many diseases due to the environment, negligence, different seasons (dry and raining seasons), each season has its own illness and predicament. In various health centers across the country, there is no system in place

where you can make appointment in advance which is really bad, it is just the matter of who comes first that is being used except cases of emergency. There is always a queue due to this fact and often leads to problem because doctors are much fewer than the patients. With a good system in place, the doctors can work effectively and can attend to more people in lesser time.

With the insurance claims always comes a problem because there is no concrete evidence that a patient has visited a clinic since there is no clear explanation or any records to show for it. There are various examples to back up the fact that Nigeria health sector needs an Information system to help improve results and save more lives in the process.

Sharing of the patient information can be best achieved through the use of a common database that can be provided by a Multi-tiered architecture; a server can use services from other servers in order to provide its own services. These will ensure that the data is reliable and can be shared among the various departments in the health care sector. The single data entry will ensure the consistency of the patient information and gives the appropriate users an edge and of course provides a more suitable system to manage their patient information. A lot of things can be managed through the system such as prescriptions, previous diagnosis, lab test, blood type, family diseases and so on. With the new system, the timeframe will be minimized and more lives will be saved.

The importance of this study is to show how the information communication technology (ICT) can help tremendously to achieve a better health care within few years and how they can expand their reach. The studies will emphasis on Nigeria health sector and ways in which they need to improve through the use of ICT.

Background Information

Nigeria comprises of 36 states and it is located in the western part of Africa. Nigeria has a population of about 158 million people. According to the United Nations, the population of Nigeria is expected to reach 258.5 million by 2050 (World Population,

UN). The three tiers (federal, state and local) of government share the responsibilities of providing adequate health services to the people. In most cases the federal government is responsible for providing policy, drug regulations, diseases control, vaccinations, and most cases trainings. The federal government also runs the management of teaching, orthopedic and teaching hospitals.

The country is in need of medical supplies and equipment. Some pharmaceuticals are manufactured in Nigeria. In 2000, 57% of the population had access to safe drinking water and 63% had adequate sanitation. As of 1999, total health care expenditure was estimated at 2.8% of GDP (Advameg, 2012).

According to the World Health Organization, the life expectancy of the country is low and about 20% of children die before the age of 5 (Health care system, Wikipedia). While the CIA World factbook believes that the life expectancy at birth for male is 48.95 and female is 55.33 years of age (FactBook, CIA). With all this facts and figures there is no argument that the need for improvement is needed effective immediately. With Different climate change, there is always a different type of diseases; the common ones are malaria and fever. A population of over 170 million people with most of its citizen attending a public hospital (Government owned) should have a more advanced way of attending to people and give them proper care. As the study has stated earlier that paper based approach is commonly used in the health sector instead of the database approach which is faster and more accurate.

2 Methodology

Research Method

According to the evidence which was derived from interviews and survey, it shows that the health care system in Nigeria is in bad shape; both the private and public health center. Although most of the interviewed personnel shares different views and objectives concerning the state of health care system in the country.

The interviews was carried out through the use of phone and email; With the use of phone specific date and time was selected according to the schedule of the health center personnel. The questions were presented to the health care personnel according to his/her positions; doctors, nurses, secretary, and clerk of the health care center.

The answers of the questionnaire was recorded and jotted down for references, the same process was repeated for the other health center that was interviewed during this project. The objective was to understand how the health center functions in order to have a clear view of what was needed and the best way of approach.

According to the informations I got from the staff of the various health centers, there is a lot of work to be done in order for an improved health care.

Research Objectives

The aim of the project is to find and understand the reason behind the failure of the health sector in Nigeria and also to find solutions to the problems.

The goal of the research is to emphasis the need of a computer based system that will help to improve the health system. A system which can be done with the use of Visual studio; ASP.Net, MVC3, Database Server. With the use of all this the system will be achieving the following:

- A well-organized database using stored procedure
- A graphical interface that can be understood easily by the user
- Eliminates performance problems of scripted or interpreted environments

- Final coding done using different methods.

A system like this should be user friendly and should work perfectly in order to achieve results. This should be done based on the current situation of the sector and also by the present situation of the information technology infrastructure of the country. In order to achieve the stated goals various interviews had to be carried out in order to understand how to best deal with the whole process.

Research Questions

A research question is a formal statement of the goal of the study. The research questions states clearly and openly what the study will attempt to prove or investigate. In this case, the main question will be what they think about implementing ICT in the health sector in the country. Other question goes thus:

What is their opinion concerning changing from paper based system to a computer based system?

How do they handle the patient information?

What are the measure taken for the confidentiality of the patient?

What are the ways in which they perform their operations?

Can they perform better with the use of ICT?

3 Challenges and the situation of the health sector

Challenges of the health sector

One of the biggest challenges facing the health sector in Nigeria is proper management of resources and lack of development. The states of infrastructure are in their worst state and nobody is doing anything about it due to negligence and corruption. With diseases like Malaria, AIDS, Cholera and so on becoming epidemic in a country as big as Nigeria; new measures must be taken in order to tackle these problems. Another issue would be how would they tackle it and how trained are the people tackling it.

The so called professionals most of the time are not well trained due to the quality of the institutions they were being trained. Most institutions lack basic tools and laboratory to train their students. With internet becoming more common among people in Nigeria, they tend to do their research on their own rather than trusting medical practitioners. It is the proposition of this study that if the government implement the use of ICT in our health sector, information can be shared among various health centres and they can help patients faster. In addition, problem of dissemination and familiarity of the system, however, the same process must be implemented in various schools so that the student will be familiar with the systems and familiarise themselves with the way in which the system is being used. Another problem is the growing concern with the method of treatment and the relationship between the patients and the medical doctors.

Factors that contribute to the decay

After Nigeria independence Nigeria health sector had its ups and downs just like other sectors of the country. Problems like the private sector not contributing to its development, lack of professional order and best practices, bad infrastructure, as well as inconsistency from government budget and policy, mismanagement of funds to name a few.

It is quite sad that after 53 years of independence, the health sector is struggling to deliver the basic care to its people. One can expect by now that the health sector would

have achieved Universal health coverage with all her citizens having access to affordable and quality healthcare.

The following are the major factors that contribute to the decay

Corruption and infrastructure decay: Corruption is the biggest factor affecting the development of the sector and it has eaten it up to the highest level. Government officials don't care about the sector because they can afford to go abroad for better healthcare. In terms of infrastructure decay, the state of some of the health center are nothing to write home about, they are in their worst state and nobody is doing anything about it because the funds are shared among few political elites.

Lack of information system: Every sector in every part of the world always review what they are doing right and wrong and how to improve them with time which is essential to the development of any organization. Nigeria health sector needs information system which can help improved and create a lot of good result that can help transform the current state of the sector.

Policy inconsistency: Different government wants a different approach or policy to implement which does not correspond with the existing one, these causes confusion to determine the direction they tend to follow.

Lack of commitment: Political leaders are not determined to do anything about it because they are not affected by it and they seem to overlook many things through negligence. Recent records show they have suffered from their negligence as well.

Professionalism: The state of the educational system which the doctors are being trained is not in the best condition which is one of the problems being faced by the sector. Adhering to best practice is important as well in order to achieve results.

Poor implementation: Many health policies are implemented wrongly and are shabbily done by the authorities responsible for it. More efforts is needed to change things around.

Worsening poverty and low level of health coverage for all Nigerians: The poverty level in the country is getting worse with each passing day. Lack of commitment and the level of corruption is the major cause of these problems.

Working condition: The infrastructures are in their worst state and it affects the working condition of the workers. Salary issue for the workers can be another problem here where they are being paid less thus causing lack of motivation.

Private health sector: The private sector contribution to the development of the health sector in Nigeria has been minimal due to lack of investment.

Poor state of social and physical infrastructure such as power supply, roads, and ambulance service.

Quack doctor: Quack doctors are increasing by the day and it is causing more harm and danger to the health of the citizen because of the punishment attachment to the crime, if the punishment of the offence is being increased by the regulatory body there will be less quack doctors.

With all the stated problems we can see why the life expectancy of a Nigerian is extremely low and it is a cause for concern.

4 Literature Review

Why the health sector needs ICT

There are many benefits that come with the use of ICT in modern day business. We can say that every organization needs ICT in their endeavors in order to flourish and achieve its potentials. With the stated problems above, Nigeria health sector needs to adopt a change in their system and implement a lasting approach that will eradicate bad and unprofessional practices.

Health sector needs to invest and consider ways in which they can improve their organization. ICT awareness is also a good approach to achieve success among the members of the organization (end users).

Health Management Information System

According to World Health Organization (2004, 3.), It is an information system that is specifically designed to assist in the management and planning of health programs, as

opposed to delivery of care. It helps in the maintenance and record keeping of patient information in hospitals, health insurance companies, health department, and specialist clinics and other facilities that provide health care services. With these things changing from a paper based approach to a more electronic approach. Health centers tends to use information to keep health records and other information sources such as health informatics, administration use, health center human resources and so on.

Improving Access to Information

Support the medical professionals in getting higher productivity and better accuracy in their critical tasks. It also allows continuous monitoring of the health status of patients rather than episodic checks during the ambulatory visits (Chiron, 2013).

Enable connected care

According to (Microsoft, 2013) Interoperable, flexible, extensible infrastructures and processes based on industry standards so care teams can communicate, share information, and work together

Linking patients and service users with information and support networks

Instead of coming to the clinic for information about a particular illness they can find information on the health center website and can apply it. This will reduce long queue in the health center and it will give the doctors more time to attend to more patients and carter for their needs.

Improved monitoring of patient conditions

Provide collection and analysis of a large quantity of data related to the specific patient and to previous clinical studies (knowledge-based medicine) (Chiron, 2013)

With the use of ICT you can monitor and administer drugs to your patients by checking their chart. This is more consistent and can help improve health care center and give them more sustainability.

5 Empirical study

Nigeria Health sector popularly known has Nigeria General hospital is a government owned organization with its basic responsibility of taking care and safe guarding of people's health and social well-being. The government role in the health sector is coordinating the affairs of the teaching hospital and making sure there is transparency in the organization. There are private owned health center as well which is quite expensive for ordinary people, equipment in this kinds of hospital are minimal because of the level of investment and coordination.

4.6% GDP is the total expenditure on health care, while the percentage of federal government expenditure on health care is about 1.5%.

The health sector has suffered tremendously over the years and risk shutdown from time to time due to unpaid salaries as well as unfulfilled promises from the government. With the rapid improvement from the government ICT can help modernize the sector and embark on the 21st century millennium goal.

Interviews and survey was carried out among people with different background and a lot of problems were listed to determine what they think the major problem of the health sector is and a lot of people choose ICT as well as corruption but there were a lot of people that choose ICT. Interviews were carried out to determine health professional's perspective about the need of ICT and they had different response to the questions. I interviewed health professional that comprises of doctors, Health Management officials, Nurses, and Clerics.

Survey Data

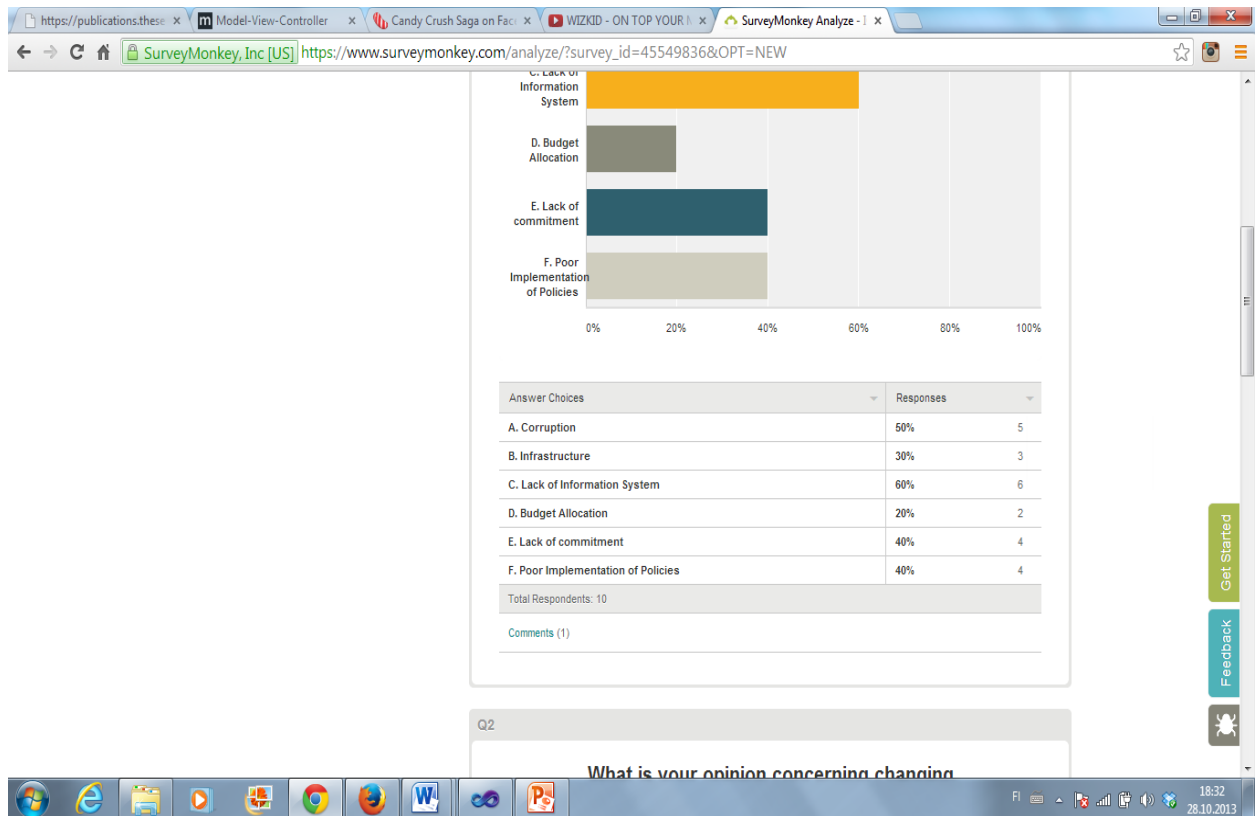


Figure 1 Survey data

First Interview

The first interview was with Dr. Gbenga Olanipekun who is a medical doctor at the Abuja National hospital. He has being a doctor for twenty years and has a vast experience about the health sector in Nigeria.

From the interview I had with him the following were deduced about his opinion on the research questions.

- Changing from a paper based system to a computer based approach will be a fantastic idea because it will go a long way to securing patient information and keeping it safer in case of fire or any emergency to the facilities. In term of what it will mean to the patient, it will be a source of information for them as well as a place where they can book appointment and avoid long queues. As for the doctors, prescriptions and medical records can be accessed easily and in a timely manner without going through lots of file to achieve that and there will be co-operation among various hospitals in the country.

- Patient information at the moment is written on papers for safe keeping and reference purposes. It is a lot of work to access that kind of information because there is a lot of patient and each file has is placed according to alphabetical order in a shelf. There is a lot of risk involved in keeping vital information like that. Although patient confidentiality is handled as discretely as possible and can only be shared if the patients permit the doctors.
- Patient satisfaction is the main reason hospital are created and if I am honest there are mixed feeling among the patient due to the services that are being rendered by the hospitals. Patient has to go through long queues, moving from one hospital to another is another problem for the patient because their medical records are unmovable or in most cases they go through a lot of process before they can attain their records.
- With the use of ICT many problems will be solved and there will be better service for the patient. The chance of survival will be high and adequate care will be given to people because there is more information about them that will hasten the doctor's work.

Second Interview

The second interview was with a nurse Titilayo Agboola. She has being working for five years at the University of Ilorin Teaching Hospital. From the conversation I had with her the following information was given by her based on the research questions

- Changing to computer is a good idea and it will help the nurses and the doctors as well as to perform their duties much better. Instead of the patients bringing paper note to them as a medicine prescription, they can use the patient ID to check the prescription made by the doctors themselves. It will strengthen the organization and give more confidence to the people.
- It is recorded in files and is being kept in the shelves for safe keeping. It is the most common practice among hospitals in the country. It will go a long way if another system is put in place to change the present idea.

- There are different kinds of things to consider when we are talking about patients satisfaction's because there are different kinds of patient and different kinds of complain in their services. Most complain about time spent on waiting for their turn, some complain about missing cards and files, others complain about lack of information and so on. There is always room for improvement in order to satisfy the patients
- Well, we can and our system should be changing to match people around the world. Can we sustain it? Honestly I don't think so because of our maintenance culture. The training and the usage of the system might be another factor to consider.

Third Interview

This was carried out with the use of Skype and he has being in the health organization for a while. He has contributed immensely to the development of the organization. I asked him the research question and he gave some interesting replies.

- Changing to a modern day technology is a good idea and it will help improve the general outcome of the health sector but there are a lot of other things to consider when thinking about a project of this nature. Things like budget allocation, training and so on might cost a lot.
- Information are kept in a journal for safe keeping and we have being using this process for many years
- As far as the Government is concerned, we are not satisfied with the coverage at the moment and we are trying to expand our reach. The customers are satisfied with the care that is being given to them.
- It will be a good idea and it will improve our goal of getting more perfect and it will improve our ultimate goal, which is saving more life.

6 Testing

Prototype

This chapter will give a sample design and some functional requirement which will be Use to demonstrate the concept of an Information Technology that can be used in the Health care system in Nigeria. MVC was used to carry out the functionality of this project. MVC separate the functionality of this project into three main components.

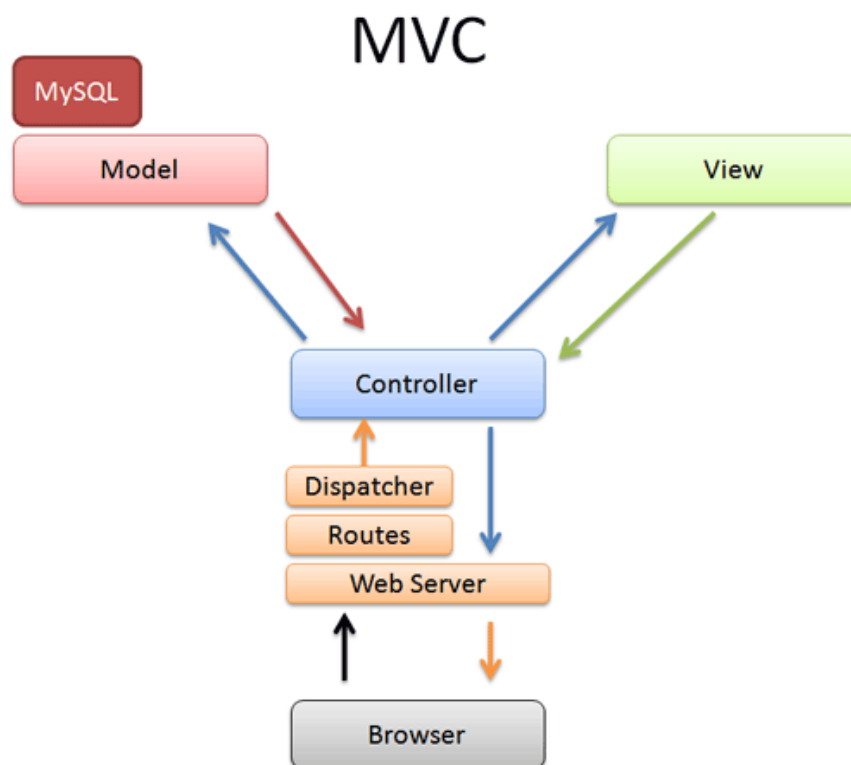


Figure 2 Showing MVC

Model: The model manages the behavior and data of the application domain, responds to request for information about its state (from the view), and responds to instructions to change the state (from the controller). (Microsoft, 2013)

View: The view manages the display of information

Controller: The controller interprets the mouse and keyboard inputs from the user, informing the model and/or the view to change as appropriate. (Microsoft, 2013)

Implementation

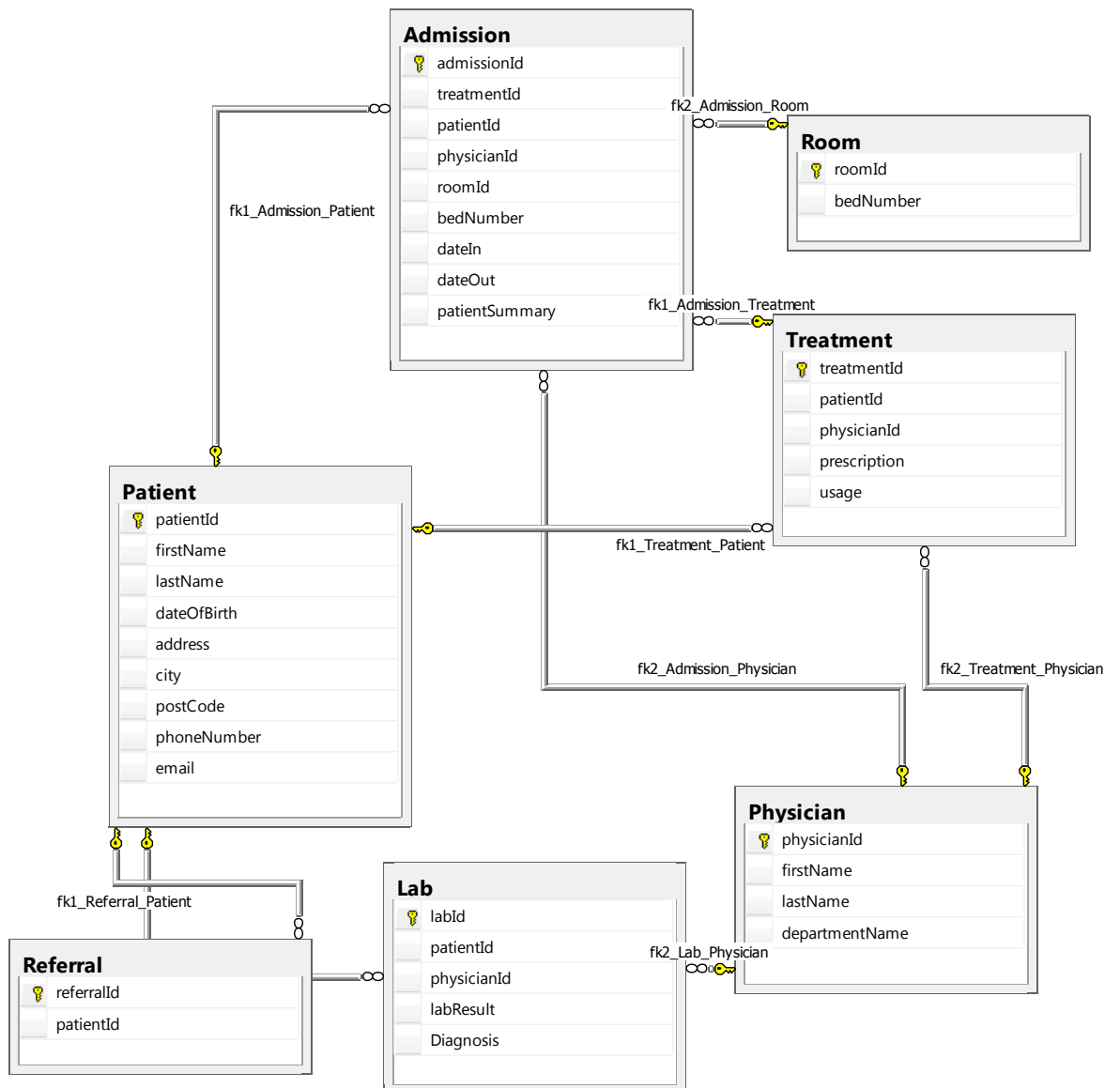


Figure 3 Database Diagram

Few Illustrations of Software source code

```
using System;  
using System.Collections.Generic;  
using System.Runtime.Serialization;
```

```
namespace HealthSector_Thesis.Models  
{
```

```

public partial class Admission
{
    [DataMember]
    public int admissionId { get; set; }
    [DataMember]
    public int treatmentId { get; set; }
    [DataMember]
    public int patientId { get; set; }
    [DataMember]
    public int physicianId { get; set; }
    [DataMember]
    public int roomId { get; set; }
    [DataMember]
    public string bedNumber { get; set; }
    [DataMember]
    public System.DateTime dateIn { get; set; }
    [DataMember]
    public System.DateTime dateOut { get; set; }
    [DataMember]
    public string patientSummary { get; set; }

    [DataMember]
    public virtual Patient Patient { get; set; }
    [DataMember]
    public virtual Treatment Treatment { get; set; }
    [DataMember]
    public virtual Physician Physician { get; set; }
    [DataMember]
    public virtual Room Room { get; set; }
}

public partial class Lab
{
    [DataMember]
    public int labId { get; set; }
    [DataMember]
    public int patientId { get; set; }
    [DataMember]
    public int physicianId { get; set; }
    [DataMember]
    public string labResult { get; set; }
    [DataMember]
    public string Diagnosis { get; set; }

    [DataMember]
    public virtual Patient Patient { get; set; }
    [DataMember]
    public virtual Physician Physician { get; set; }
}

public partial class Patient
{
    public Patient()
    {
        this.Admissions = new HashSet<Admission>();
        this.Labs = new HashSet<Lab>();
        this.Referrals = new HashSet<Referral>();
        this.Treatments = new HashSet<Treatment>();
    }

    [DataMember]
    public int patientId { get; set; }
    [DataMember]
    public string firstName { get; set; }
    [DataMember]

```

```

        public string lastName { get; set; }
        [DataMember]
        public System.DateTime dateOfBirth { get; set; }
        [DataMember]
        public string address { get; set; }
        [DataMember]
        public string city { get; set; }
        [DataMember]
        public string postCode { get; set; }
        [DataMember]
        public string phoneNumber { get; set; }
        [DataMember]
        public string email { get; set; }

        [DataMember]
        public virtual ICollection<Admission> Admissions { get; set; }
        [DataMember]
        public virtual ICollection<Lab> Labs { get; set; }
        [DataMember]
        public virtual ICollection<Referral> Referrals { get; set; }
        [DataMember]
        public virtual ICollection<Treatment> Treatments { get; set; }
    }

    public partial class Treatment
    {
        public Treatment()
        {
            this.Admissions = new HashSet<Admission>();
        }

        [DataMember]
        public int treatmentId { get; set; }
        [DataMember]
        public int patientId { get; set; }
        [DataMember]
        public int physicianId { get; set; }
        [DataMember]
        public string prescription { get; set; }
        [DataMember]
        public string usage { get; set; }

        [DataMember]
        public virtual ICollection<Admission> Admissions { get; set; }
        [DataMember]
        public virtual Patient Patient { get; set; }
        [DataMember]
        public virtual Physician Physician { get; set; }
    }

    public partial class Physician
    {
        public Physician()
        {
            this.Admissions = new HashSet<Admission>();
            this.Labs = new HashSet<Lab>();
            this.Treatments = new HashSet<Treatment>();
        }

        [DataMember]
        public int physicianId { get; set; }
        [DataMember]
        public string firstName { get; set; }
        [DataMember]

```

```

public string lastName { get; set; }
[DataMember]
public string departmentName { get; set; }

[DataMember]
public virtual ICollection<Admission> Admissions { get; set; }
[DataMember]
public virtual ICollection<Lab> Labs { get; set; }
[DataMember]
public virtual ICollection<Treatment> Treatments { get; set; }
}

```

Figure 4 Get and Set methods

Some screenshots from the Nigeria Health sector prototype

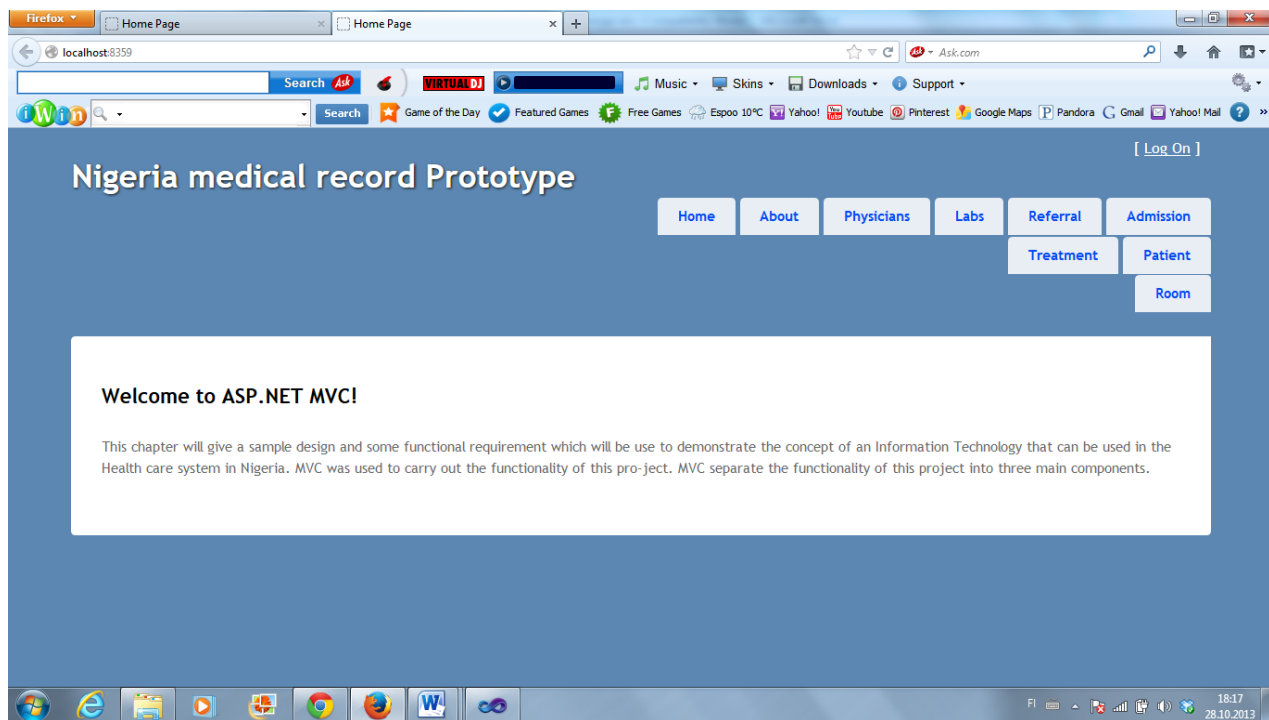


Figure 5 HomePage

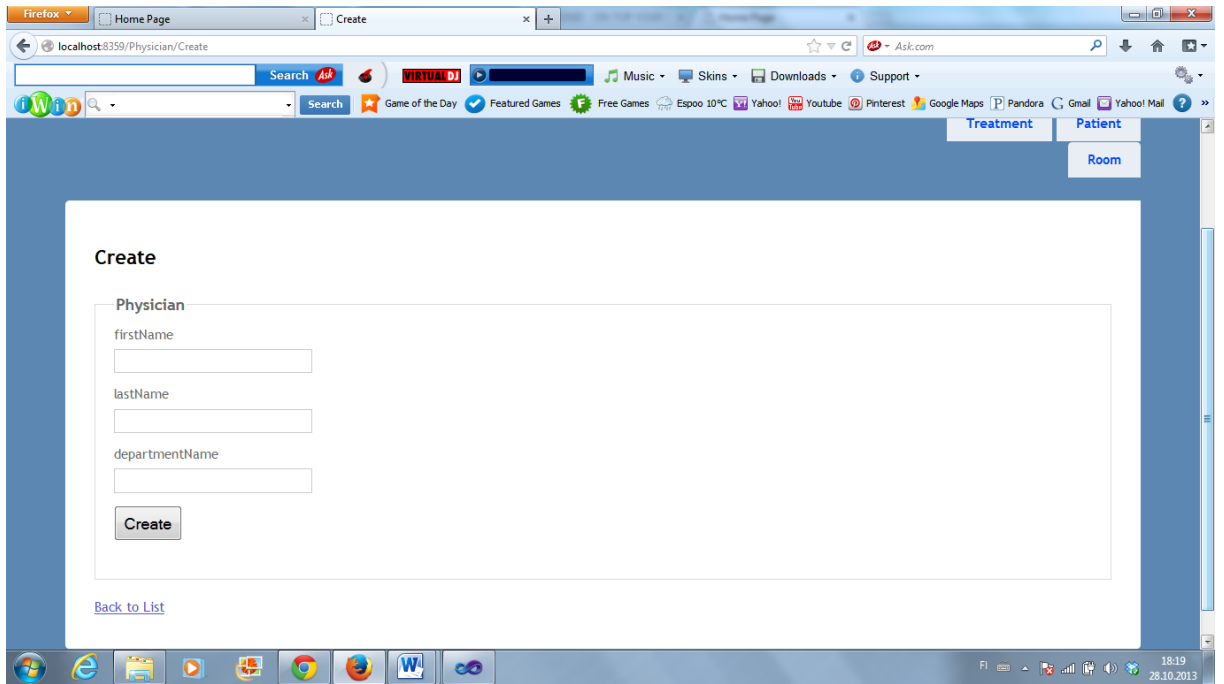


Figure 6

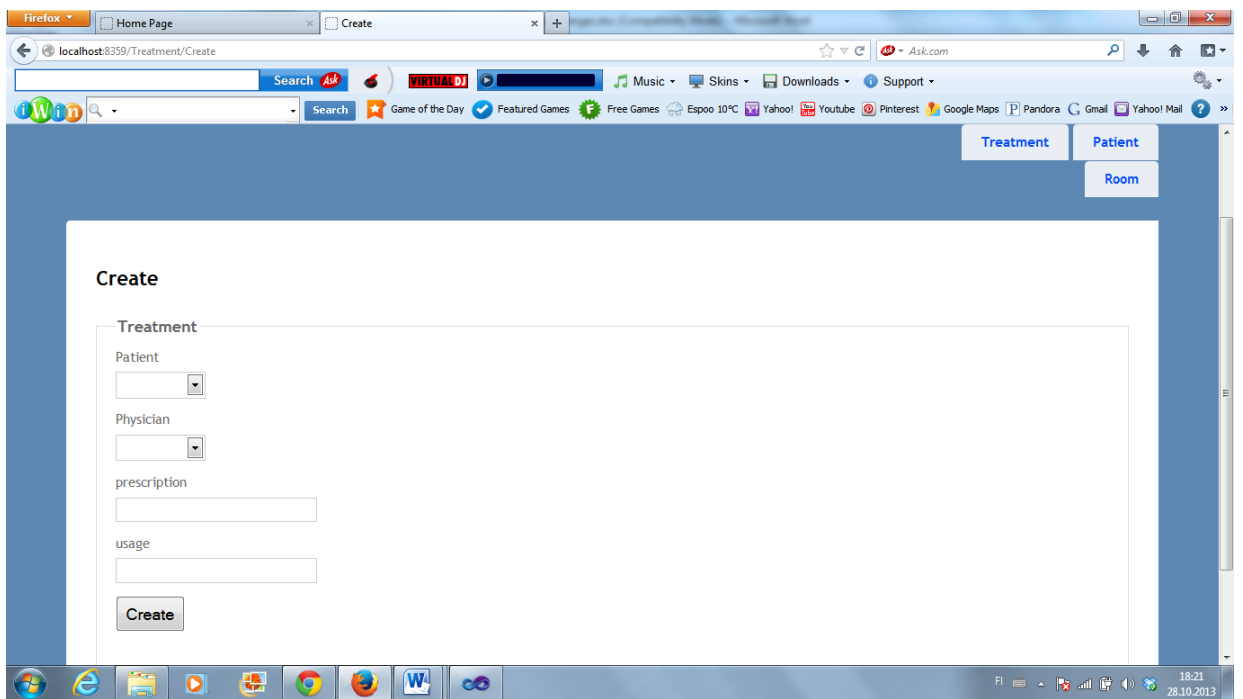


Figure 7

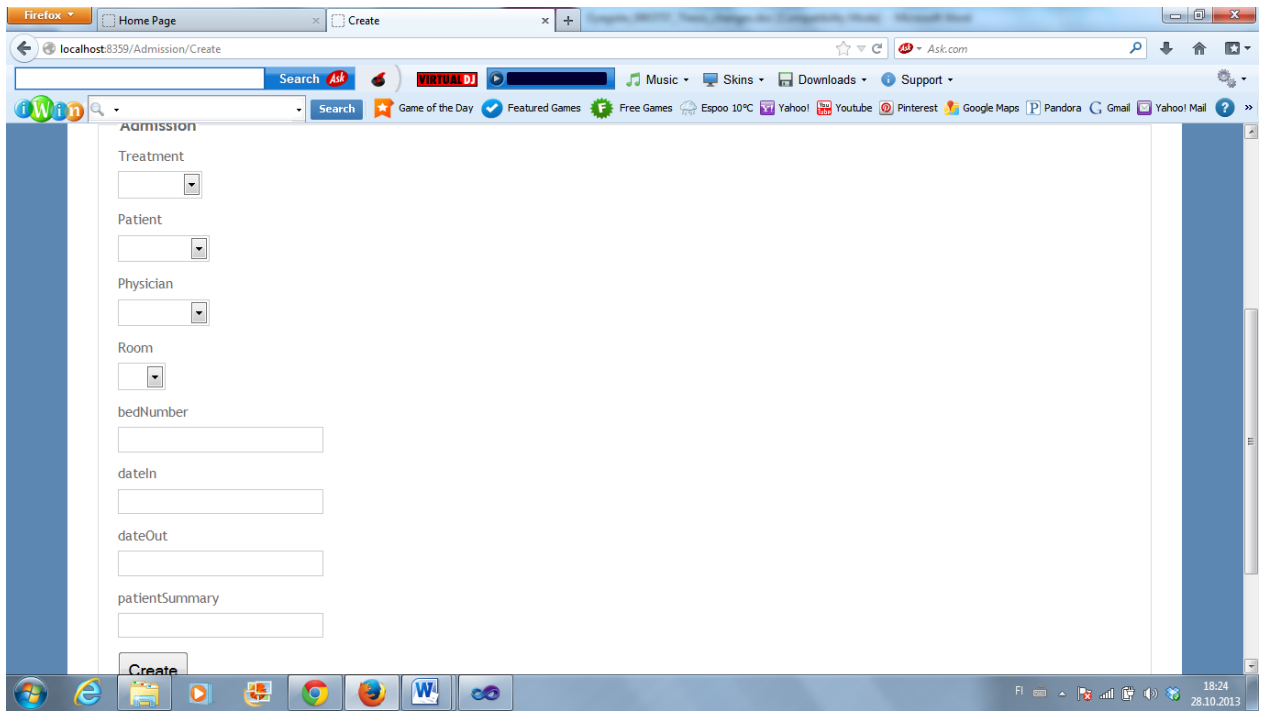


Figure 8

7 Project Management Approach towards developing a software

Project management is important for ICT implementation because building an information system is part of project management, and the likely questions that comes to mind is, has it being used in the past and what are the results? Are they still using it? Applying project management principle and tools across the organization, however, should be part of methodology.

A lot of companies have used the principles and tools of project management to IT projects. Success or failure of an IT project depends on the project team and how they handle the project but in some cases it depends on the set of processes and infrastructure in place for the project.

Reasons project management support IT projects

Resources: Developing an Information system requires a lot of cash and the organizations resources as well. Project must be estimated correctly, cost and schedules must be controlled effectively. To avoid deviation or delay proper tools, techniques, methods, and controls are in place to serve as regulations for the projects. The resources in this case will be generated by the federal government.

Expectations: In today's business, IT professionals are expected to do their work diligently and deliver quality product and services in a timely manner. Time to time update is required as well as sound project management practices.

Competition: Organizations decides whether they want to keep their IT framework in the company or they want to outsource it based on the cost and effectiveness of providing IT services.

Efficiency and Effectiveness: Efficiency is doing the thing right and effectiveness is doing the right thing. Many companies believe project management helps to reduce costs, shorten development time, and higher quality.

Project

A project is a temporary endeavor undertaken to accomplish a unique purpose. (Jack, 2003)

Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project. (Jack, 2003)

Attributes of a project

Attributes are the things that comes together to make a project

Time frame: The beginning and ending of a project should be defined because project is temporary process. Estimation is needed for the starting and the ending time of a project. The reason for estimation is because some projects completion date are unmovable. The time frame of a project is about 3 month plus depending on the size of the project in order to achieve results.

Purpose: Purpose of a project is to achieve something. An IT project can comprise of software package, a system and the result must add value to the company. A project must have a goal to drive the project in terms of defining the work to be done, its schedule, and its budget, and to provide the project team with a clear direction. (Jack, 2003) The purpose of the project is to develop a working database that can be used to store patient information.

Ownership: The project must add value to an organization after its completion. The owner of an IT project must be known from the beginning in order not to cause conflict between different groups. In most cases, the project is always owned by the stakeholders. The government is the owner of the project because they are the one providing the funding.

Resources: According to (Jack, 2003) IT projects require time, money, people and technology. Resources provide the means for achieving a project's goal and also act as a constraint.

Roles: IT project require different skill set and different individual are responsible for different things.

- **Project manager:** He is the team leader and he is responsible for the progress of the time. He ensures all the project management and technical development processes are in place and are being carried out according to requirement, defined processes, and quality standards.
- **Project Sponsor:** A representative from the organization that owns the project, it can be an individual as well. It gives the team whatever is needed to complete the project e.g. companies resources, directives.
- **Subject Matter Expert(s) (SME)** – A Subject Matter Expert is an individual who understands a business process or area well enough to answer questions from people in other groups who are trying to help. It is most commonly used to describe the people who explain the current process to IT and then answer their questions as they try to build a technology system to automate or streamline the process. (John .F. , 2013)
- **Technical Expert(s) (TE)** – Technical expert is essential to provide technical solution to an organizational problem. Technical expert are responsible for defining, creating, and implementing the technical and organizational infrastructure to support the product of the IT project.

Risks and Assumptions: Assumptions are what we believe will or should be enough to finish a project such as schedule, scope, and budget. Risk is a part of any business and some projects risk is higher than others. Problems can arise from internal or external sources to a project team. Internal risks include time estimation, a person leaving the team due to some reasons. External risks can occur when the resources needed is from other sources such as vendors, this might be a problem because the vendor might have insufficient resources at that moment. Risk and assumptions must be known in a project before/during a project because it can impact an IT project.

Interdependent Tasks: Many tasks in IT project are sub divided into many tasks which has to be completed before another task can be started. These may be a problem if a particular task is delayed and it is not finished on time. It may affect the project schedule if these occur and it might change the time frame of the project.

Organizational change: One of the purposes of an IT project is to change the structure of an organization. These changes must be understood in order not to cause confusion with the purpose of the project.

Operating in an environment larger than the project itself: Organizations choose projects for a number of reasons, and the project chosen can impact the organizations (Laudon and Laudon 1996). It is important to understand the size of the company, their culture, and politics. The organizations value will influence what kind of project should be done and how it will best affect changes.

Project Life Cycle

Project life cycle (PLC) is the collection of logical stages or phases that maps the life of a project from its beginning to its end in order to define, build, and deliver the product of a project – that is, the information system. Each phase should provide one or more deliverables. (Jack, 2005)

A deliverable is what is expected during a project i.e. a report that is verifiable e.g. design, specifications, project plan, delivered system and so on. Deliverable at the end of each phase serve to define the resources and work needed for each phase. It is always advisable that a project should be broken down into different phases in order to check the milestone of the project.

Phase exists, stage gates, or kill points are the phase-end review of key deliverables that allow the organization to evaluate the project's performance and to take immediate action to correct any errors or problems. (Jack, 2005)

Before proceeding to another phase, the deliverables must be reviewed and accepted, fast tracking can sometimes reduce the project schedule.

Define Project Goal

The project goal should be the first step that needs to be taken into consideration. The project goal should provide an insight on how it will improve/add value to the company. A well-defined project goal gives the project team a clear direction, focus and drives the other phases of the project.

Characteristics of a project

- The cost is low at the beginning of a project, but increases as the project progresses and then decreases at the end as the project is completed.
- Risk and uncertainty is the highest in the beginning of a project but as soon as the project goal is defined and the project progresses, the success rate should increase as well.
- Stakeholders ability to influence cost is high in the beginning of a project. As soon as the project starts the cost of changing scope and correcting errors becomes more expensive.

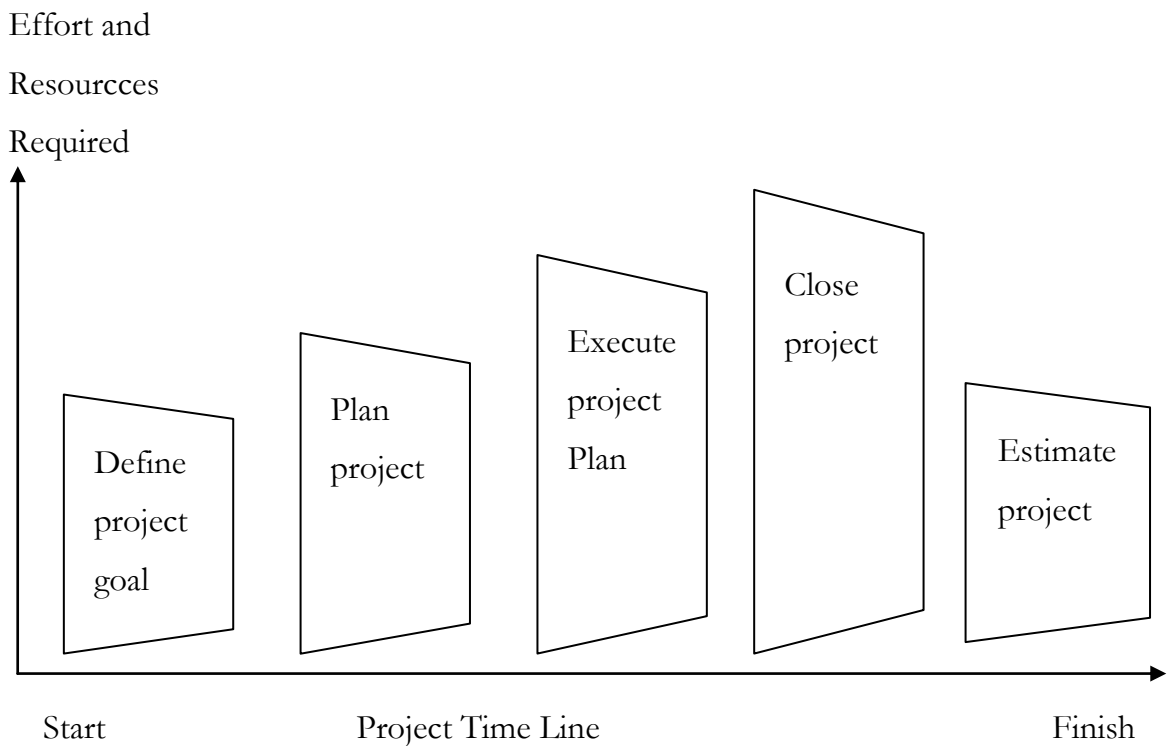


Figure 9 A generic Project Life Cycle

Plan Project

As soon as the project goal is defined the rest is much easier because we know the focus of the project. The following questions are what determine the project plan.

- What are we going to do?
- What value will it add to us i.e. why?
- Budget and estimations?
- Schedule of the project?
- How is the project going to be done?
- Who will be involved in the project?
- How to determine if the project is successful?

There should be chart that shows the progress of the project and can be used throughout the project life cycle.

Execute Project Plan

After everything is in place, it is time to start the project. As work in the project progresses, scope, schedule, budget, and people must be actively managed to ensure that the project achieves its goal. The project's progress must be documented and compared to the project's baseline plan. (Jack, 2005)

It is important to communicate the progress of the project with the organization that owns the project in order to change anything on time.

Close Project

Every project has a beginning as well as a closing period. The closing phase of a project makes sure that everything that needs to be done during the project is completed according to the organizations specifications. The closing is often completed with the presentation of the documentation of the project.

Evaluate Project

Evaluation of a project is sometimes achieved after the system has being implemented because the organizations need to see the difference before and after the system was

implemented. A third party might be called to evaluate the project to determine whether the project was well managed, and achieved its deliverables.

The IT Product Life Cycle

Although projects follow a project life cycle, information systems development follows a product life cycle. The most common product life cycle in IT is the System Development Life Cycle (SDLC), which represents the sequential phases or stages an information system follows throughout its useful life. (Jack, 2005)

There are five basic phases in system development life cycle which includes planning, analysis, design, implementation, and maintenance.

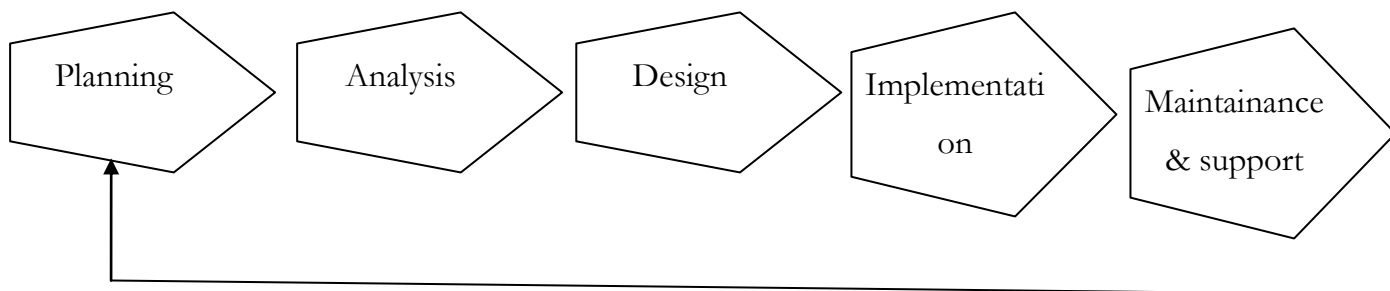


Figure 9.1 Systems Development Life Cycle

Planning: It involves identifying, fixing problems as well as identifying new opportunities. Formal planning process ensures that the following are in place for the project: goal, timetable, scope, budget, technology, and methods.

Analysis: It gives a full insight on problems or opportunity. System analysts give reasons why there is need for change to the existing system. Requirement analysis breaks down the specific needs and requirement for the new system which will be documented.

Design: Design phase is responsible for the design of the project, which will show the graphical representation of the system which includes, the database structure, hardware, network, user interface and so on.

Implementation: This is where the system is implemented according to the previous phases. The development, testing and installations of the project are done in this phase. In case of training, support, and documentation it will be represented in this phase.

Maintenance and Support: Sometimes the project team is responsible for the maintenance and support of the system which will be essential to its existence.

Changes to the system, in the form of maintenance and enhancements, are often requested to fix any discovered errors (i.e. bugs) within the system, to add any features that were not incorporated into the original design, or to adjust to a changing business environment. (Jack, 2005)

Support will be available in terms of having a call center or help desks to help people on a daily basis.

8 Information Management

Information and Technology; both resources are increasingly important as organizations seek to improve their performance. Information and technology resources coupled with human resources help deliver value to organizations in many different ways. Applying information and technology offers new ways to do business, increases the efficiency of business processes, reduces costs, and provides the performance measures used to control improvement. (Steve, 2005)

Ultimately, value is delivered not through technology, but through applying information; by improved flow of information which require less resource; by better-quality information and knowledge sharing which improves decision making.

Using information to support processes

Business processes: Information is vital to all organizations since all business processes that make up an organization's operations and management make extensive use of in-

formation. Organizational performance is improved by reviewing how well processes work and making adjustments to make them operate more efficiently and effectively. (Steve, 2005)

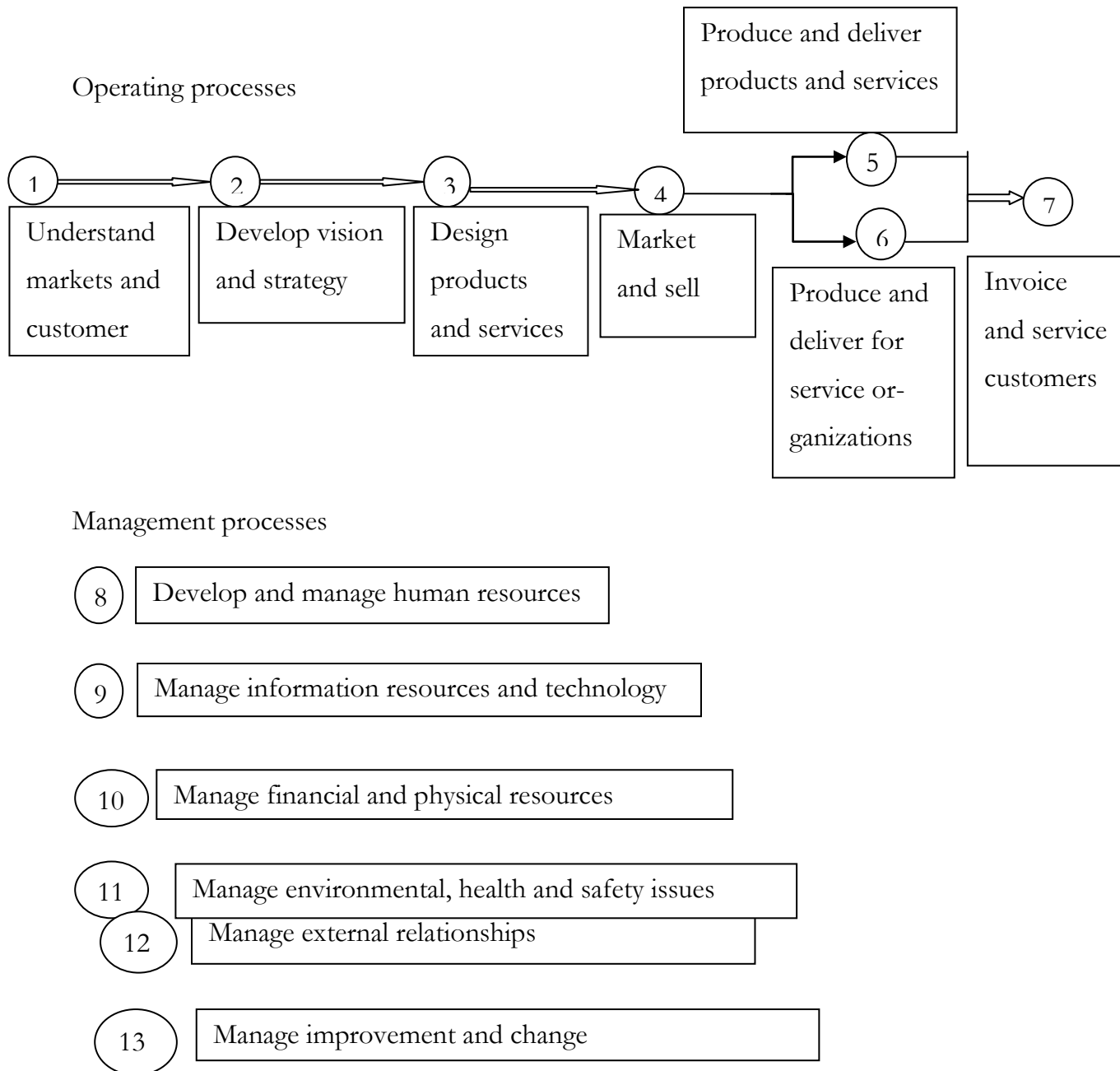


Figure 10 Generic organizational operating processes and management processes (PricewaterhouseCoopers, 2002)

Creating value using information

Business information management is vital to supporting the operation of organizational processes and improving organizational performance and how organizations need to counter information overload. But, perhaps the most critical reason for the study and practice of business information management is its strategic importance to organizations. The information management capabilities of organization impact their position in the markets in which they operate. (Steve, 2005)

There are various ways in which information can create value to an organization but to start with what is an organization?

Organizations are bodies of people that come together for a particular set of purposes. Sometimes they are brought together by an entrepreneur who sees an opportunity to meet an unfulfilled need in the market place and to become rich in the process. Sometimes they come together spontaneously to fight poverty or injustice. (Adrian and Alison, 2001)

Ways information create value to an organization

Add value: Value can be added by providing better services to their customers. In terms of the health sector in Nigeria, there will be better health facilities and their structure, more value can be added in terms of good health and they can be more sustainable.

Information can be used to better understand customer characteristics and needs and their level of satisfaction with services. (Steve, 2005)

Reduce Costs: Cost can be reduced significantly if all the business processes shown in Figure 10 is being followed accordingly. Cost reduction is quite important when it comes to the health sector because the more money they can save the more research they can do. With an efficient Information Technology system the patient can book appointment online, pay their invoices online as well. Doing all this will reduce long queues at the health center, less staffs will be required. Efficiency is derived by using information to create market and deliver services using fewer resources than previously. (Steve, 2005)

Manage risks: Risk management is a well-established use of information within organizations. Marchand (2000) note how risk management within organizations has created different functions and professions such as finance, accounting, and auditing and corporate performance management. Risk management in the health sector can be effective with the use of information because different patient's records can be used to determine epidemic diseases that are spreading around in the community and they can warn them immediately and tell them the precautions they need to take.

Create new reality: This simply means that the way forward, new measures that will be taken, ways in which new technologies can be used to innovate. In other words, ways in which new products or services can be developed.

The health sector can use this medium to research further about cures for diseases and test their hypothesis.

If all the four approaches to using information are followed there will be a better and improved result. With the use of the said approaches an organization can reduce cost and manage their risk efficiently.

9 Discussion

An electronic health record (EHR) is an official health record for an individual that is shared among multiple facilities and agencies. Digitized health information systems are expected to improve efficiency and quality of care and, ultimately, reduce costs.

(TechTarget, 2012)

EHR gives the physicians an edge in order to achieve a more productive and efficient results, with this the physicians can spend more time on improving the quality of care. With an EHR which is recorded in a digital format that is theoretically capable of being shared across different health care settings. An EHR is designed according to your specialties and gives countless benefits for medical practice.

Benefits of EHR

The diagram below represents a typical EHR benefits and responsibilities.

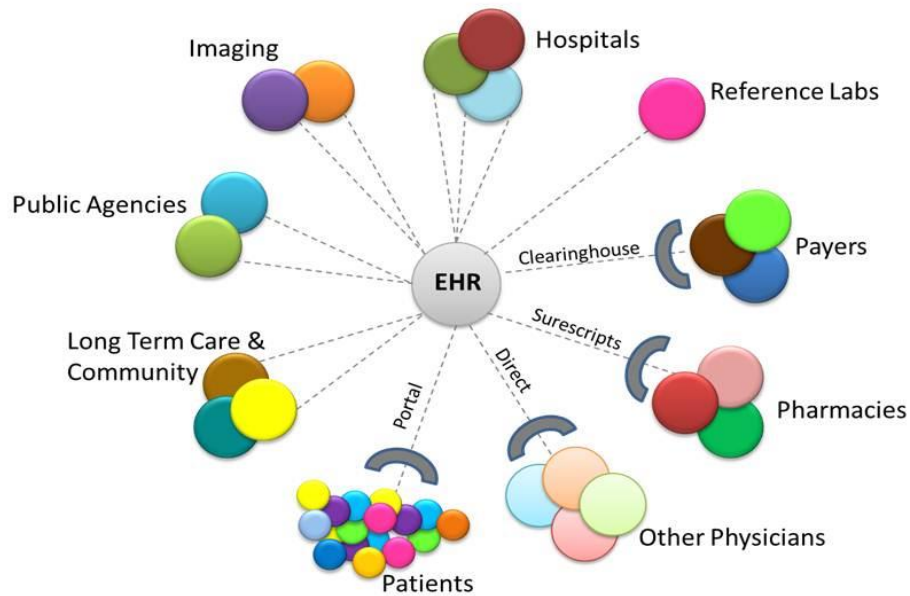


Figure 1: Classic EHR

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- Before a patient is being examined you can manage patient registration information, scheduling, insurance status, health history
- During the patient's visit you can type in you present diagnosis of the patients, prescribe medication, order for tests and labs
- After the patient's visit you can communicate with the labs and pharmacies, communicate with the payers, and give directive on what the patient has to do next.

10 Recommendation

The following measures can be taken to achieve better results in order to see further development in the health sector. The following illustrate what needs to be done in order to get results.

Implementation of poverty reduction scheme: If there is less poverty in the society people can afford basic health care and these will go a long way to help reduce death rate in the country.

Good leadership: Leadership is a big factor in the organization; there are few credible people that manage the organization. If people with good credibility are elected to govern the organization there will be good development in the sector.

Government commitment: Government should be stricter in terms of the progress of the organization. They should make sure all the policies of the organization are carried out in a timely manner.

Accountability: People should be held accountable for what they are supposed to do and there should be a punishment if people fails to abide by the law and the regulation of the organization

Adequate training: Staffs of the health center must be trained from time to time to know what is new in the world and their environment in order to tackle all the problems they might encounter.

National Health Insurance: Government must implement policies that will help the poor and take care of their medical needs. This will substantially reduce catastrophic health expenditures by Nigerians and improve their overall standard of living.

Modern facilities: New health centers are required and the old one needs infrastructure development. Maintenance is another factor that affect growth because old and new clinic needs time to time maintenance to enhance its growth

With all this taken into consideration, there will be a better development and the healthcare delivery system will be better.

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