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Purchase of travel insurance as an enterprise mobile service process

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PURCHASE OF TRAVEL INSURANCE AS AN ENTERPRISE MOBILE SERVICE PROCESS

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by Strathmore University or any other University. To the best of my knowledge, this dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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ABSTRACT

The insurance sector has been faced by several challenges, the main one being a slow uptake of individuals acquiring insurance products. With the population increasing, the Kenyan economy results in a situation where it is under-served, and its assets under-insured. The other challenge facing the insurance sector is the lack of an automated purchasing process. This results in a low market penetration and low insurance awareness.

Through the use of technology, most insurance companies' processes are automated in the way the main functions such as data capture, record keeping, and calculation of the costing for the services provided, are carried out. However, the use of technology as an extension of the enterprise service process has not been tapped into. By having a mobile process extend the already existing automated process, it would increase the correlation between the frequency of contact and customer satisfaction. It would also raise customers' expectation of simplicity and transparency, and also increase the speedy delivery of services to customers.

This dissertation provides a comprehensive study of the insurance purchase process, challenges facing the insurance purchase process and existing solutions, platforms and the enterprise mobile service process. Data was collected using observations and interviews, pointing out the challenges faced in the sector. System Development Life Cycle was adopted as a software methodology for the development of the mobile and web applications.

A mobile application as an extension to an already existing system was developed, as well as a web application that reflects on payment made by clients, that is the transaction and travel details. The mobile application makes a call reference to a payment API system, pesapal, to establish safety and security during payment. It also makes reference to an existing company's rating guide, so as to provide quotes for each service selected by the user. The final system was tested by random users at the Jomo Kenyatta International Airport to check if requirements were set. It was conducted by developers and potential users of the application.

TABLE OF CONTENTS

ABBREVIATIONS/ ACRONYMS

3G	–	Third Generation
4G	–	Fourth Generation
ASP	–	Active Server Pages
CA	–	Communications Authority
CGI	–	Common Gateway Interface
EDGE	–	Enhanced Data rates for GSM Evolution or Enhanced GPRS
FSD	–	Financial Sector Deepening
GDP	–	Gross Domestic Product
GPRS	–	General packet radio service
GSM	–	Global System for Mobile communication
IAIS	–	International Association of Insurance Supervisors
MADF	–	Mobile Applications Development Framework
SLA	–	Service Level Agreement
USD	–	United States Dollar
MPESA	–	Mobile money payment system in Kenya

DEFINITION OF TERMS

CGI	It is a set of standards that defines how a dynamic document is written, how data is input into the program, and how the output result is used(Forouzan&Mosharraf, 2008)
Cloud Computing	Cloud is a parallel and distributed computing system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements (SLA) established through negotiation between the service provider and consumer (Buyya et.al., 2011).
Insurance Agent	One who represents the insurer under an employment by it (Kalis et.al, 1997)
Insurance Broker	One who acts as a middleman between the insured and the insurer, soliciting insurance from the public under no employment from any special company, and upon securing an order, placing it with a company selected by the insured or with a company selected by himself or herself (Kalis et.al, 1997)

LIST OF FIGURES

LIST OF TABLES

LIST OF EQUATIONS

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First and foremost, I want to thank God almighty for giving me this opportunity to study Master in Mobile Telecommunication and Innovation at Strathmore University. It is by His grace, love, kindness and guidance that I have seen this dream come to pass.

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Thirdly, I must express my very profound gratitude to my parents, siblings and to my husband for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this dissertation. This accomplishment would not have been possible without them.

Finally, I must thank my classmates, year 2013 for their support in this journey. Thank you.

DEDICATION

I dedicate this dissertation work to my loving husband, Jack M. Njuguna, for the support he has given me. I will always appreciate what you have done.

I also dedicate this dissertation to my parents Sophia and Stephen Gachukia, and to my sisters Damaris Njuguna and Anne Njuguna for the endless love and support you have given me throughout my studies. You have taught me that a journey of a thousand miles, begin with one step. I would not have made it without you. You have been my best cheerleaders. May God richly bless you.

I dedicate this work and give special thanks to my friends Angela and Bethuel for their immense support throughout this journey. Your support will not be forgotten.

CHAPTER 1: INTRODUCTION

1.1 Background of the study

In the past seven years, the number of people owning mobile phones in the country has increased 37.7 million (Communications Authority, 2015). Out of this number, 2.8 million adults use the Internet (this is just over a sixth of the adult population), with two-thirds using their mobile phones to access the internet. Since 2006, according to Financial Sector Deepening, the number of formal prudential, (these are the individuals whose financial service use is through service providers which are prudentially regulated and supervised by independent statutory regulatory agencies such as the Insurance Regulatory Authority) has increased, with a higher number reported among the urban population, as compared to the rural population. However, the use of mobile phone financial services has increased to 15.1 million by 2016 (Financial Sector Deepening, 2016).

Despite the increase in the use of mobile phones to access financial services, the age group between 26 – 35 years is the largest in accessing insurance services at 49.5% (Financial Sector Deepening, 2016) by 2016. Even with this increase, the insurance subsector contributes 9.6% of the country's Gross Domestic Product (GDP), as compared to the banking subsector, which contributes 71.2% (Financial Sector Regulators Forum, 2014).This low contribution and slow uptake is attributed to low consumer demand, which is as a result of low insurance penetration and awareness.

This research looks into the possibility of having a mobile application that enables individuals to obtain quotes and purchase travel insurance. This will go a long way into increasing customer awareness (Misati et.al., 2012), especially to the youth between the ages of 18 – 25 and 26 - 35 years, since they have the largest recorded use of mobile phone financial service providers, at 70.4%. Accessibility and flexibility of obtaining travel insurance especially to those in the rural areas will also increase, since the uptake of insurance in the rural areas is still low, at 17.5% as compared to 36.1% in the urban population (Financial Sector Deepening, 2016). In turn the contribution to the country's Gross Domestic Product (GDP) will increase.

1.2 Problem Statement

According to (Kenya Vision 2030, 2007), the Kenyan economy is under-served and its assets under-insured. As the economy expands, the amount of insurable assets will also grow and Kenyans will demand more insurance. One of the challenges mentioned by (Mose, Kuloba, 2013) as a factor which slowed down the performance of the insurance industry in 2012 is low market penetration and low insurance awareness. (Misati et.al., 2012) recommend that financial services delivery should be enhanced by the adoption of mobile phone technology. Despite the increase in the uptake of formal prudential services from 15.0 % in 2006 to 42.3% in 2016, the uptake of insurance services by 2016 was still low, at 23.2% as compared to mobile financial services, at 71.4% (Financial Sector Deepening, 2016).

Therefore, this is the gap that the researcher aimed to fill, by providing a platform that will enable the purchase of travel insurance via mobile phones. More people using phones to access financial services will be targeted and this will increase the penetration of access. It will also increase insurance awareness and in turn, increase the contribution of the financial sector to our country's Gross Domestic Product (GDP).

1.3 Research Objectives

i. To identify requirements for obtaining travel insurance.
ii. To analyze the challenges for purchasing insurance cover.
iii. To review existing architectures, applications and models used.
iv. To design and develop a mobile application for the purchase of travel insurance.
v. To test and validate if the mobile application improves the purchase of travel insurance.

1.4 Research Questions

i. What are the requirements for obtaining travel insurance?
ii. What are the current challenges of purchasing a travel insurance cover?
iii. Which are the existing architectures, applications and models in use?

iv. How can a mobile application be designed and developed to purchase travel insurance?

v. How will the mobile application be tested and validated for insurance travel purchase and which insurance companies and groups of people should be targeted for this research?

1.5 Justification

The uptake of insurance among the youth between 36 - 35 years is high, but the rate at which the youth is accessing mobile phone financial services is very high at 15.1 million, as compared to those accessing insurance at 5.0 million users. This research will be helpful because, by making it possible to easily access travel insurance facilities through mobile phones, the youth will be targeted, increasing the target market at present. This will also increase public awareness and accessibility, and in turn, increase the number of people taking travel insurance, including those in the rural areas.

1.6 Scope

This research will focus on insurance companies within Nairobi County. This is due to the high availability of insurance companies' head offices. Also, as the capital city of Kenya, it is strategically placed as a central hub for major transport routes, both local and international destinations. The mobile application will enable an individual to enter details required to generate travel insurance quotes. Then he/she will receive the quote and will have an option to pay the amount via the mobile phone, and receive the insurance policy, download it to the phone, which can then be printed.

1.7 Limitations

One of the limitations of this research is that the information gathered on travel Insurance is from Nairobi only. Secondly, for the user to obtain insurance quotes via the mobile phone, one has to have access to the Internet. The application is also limited to one user purchase of the policy cover.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Insurance is a mechanism (or a service) for the transfer to someone called the insurer of certain risks of financial loss in exchange of an agreed fixed amount. The payment is due before the contingent claim is serviced by the insurer (Outreville, 1998). There are two types of insurance classifications, basically, life, and non-life (Gulati, 2007). Life insurance is the insurance of human life, and it is long term while non-life is the insurance of all other categories other than life. In 1994, the International Association of Insurance Supervisors (IAIS) was formed. This advanced the international cooperation among insurance regulators. The IAIS represents insurance regulators and supervisors of approximately 200 jurisdictions in over 140 countries (Kempler et.al, 2010). The IAIS has since issued a number of documentation aimed at standardizing the international approach to insurance regulation and to enhance international cooperation.

2.2 Insurance penetration in Africa

Insurance penetration in Kenya has however become a challenge. There is now an urgent need to be innovative and adoptive, to avoid being hopelessly left behind by a world that is so rapidly evolving technologically (Commonwealth Business Council, 2000).

Africa has a combined Gross Domestic Product (GDP) of approximately United States Dollar (USD) 2 Trillion (A.M. Best, 2014), nearly the equivalent of Canada, and greater than Australia, both resource-based economies. The report goes on further to state that, a number of African economies are growing at a rate between 5% to 10% and more, faster than the mature markets, with drivers such as energy, construction and mining projects. This has made them attractive to insurance groups in the United States and Europe, where growth is more limited. Africa's Gross Domestic Product is expected to increase at an average rate of 6% annually between 2013 and 2023.

2.2.1 Insurance penetration challenges in Kenya

A research done by the IRA in the implementation of the 2013 – 2018 strategic plan (Insurance Regulatory Authority, 2013) reveals the following as some of the weaknesses threats after a Strength, Weakness, Opportunities, Threat (SWOT) analysis

i. Limited automation of processes
ii. Conservative insurance industry that is resistant to change
iii. Lack of innovation
iv. Eroded/poor image of insurance industry

Despite the growth in premiums, affordability of insurance to poorer economies remains an issue. One notable factor however, that has improved the business environment is a new consumer class in Africa, which has become more educated and digitally savvy. There are significant opportunities for direct insurers and reinsurers in key markets in Africa, particularly in fast-developing sub-Saharan markets such as Kenya, Nigeria and Ghana. Also notable is that, with the adoption of mobile communication, and the fact that the cost of mobile phone ownership has decreased some companies are now selling their products on mobile platforms (A.M. Best, 2014). The current market is faced by an influence from international markets for the need to have a consumer driven market, and the gap between the insurer and the insured is reducing. Clients want faster response in service delivery and customer care. With technology, these services are slowly being integrated to provide services in a convenient, easy and fast way.

2.3 Financial services access in Kenya

The financial sector in Kenya is dualistic, and the rate at which the rural and urban sectors access financial services differ. The use of insurance services in the urban areas is more than the use of the services in rural areas, as indicated in Figure 2.1

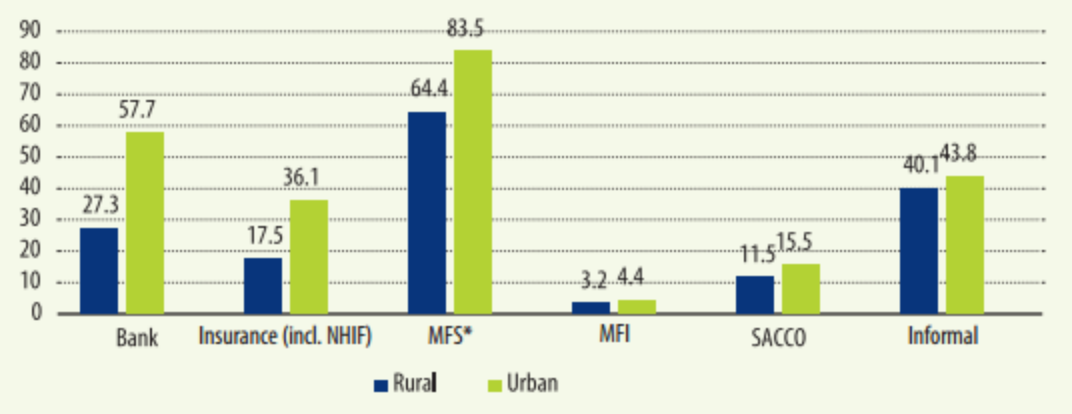

Figure 2.1: Insurance services access between the rural and urban areas (Financial Sector Deepening, 2016)

2.3.1 Financial services access by different age groups within Kenya

The use of insurance services further divides, when the age groups are put into consideration, as is indicated in the Figure 2.2. The highest level of insurance use is seen within the 26 - 35 years age bracket.

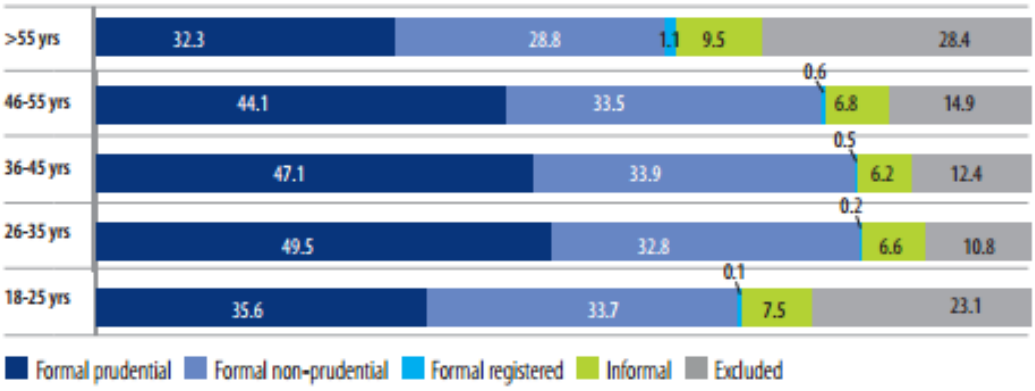

Figure 2.2: Different Age groups' access to insurance services (Financial Sector Deepening, 2016)

2.4 Mobile use penetration in Kenya

According to the quarterly sector statistics report for second quarter financial year 2015 – 2016 (Communications Authority, 2016), between December 2014 and December 2015, Mobile penetration reached 87.7 per cent up from 82.6 per cent, a gain of 5.1 per cent, as is indicated in figure 2.3. The number of mobile money transfer subscriptions dropped by 3.6 %

to 26.7 million subscriptions, down from 27.7 million registered during the previous period. Mobile subscriptions declined by 0.1 percent to stand at 88 percent, down from 88.1 percent recorded in the previous quarter. Pre-paid mobile subscriptions were recorded at 36.7 million down from 36.8 million subscriptions recorded during the previous quarter whereas Post-paid subscriptions were recorded at 1.0 million up from 989,889 subscriptions registered last quarter. Despite the decline, this report shows that, a huge number of people can be targeted through their mobile phones as more people have mobile phones, and access the internet using the mobile phones.

Mobile data subscriptions also increased by 10.2% from 21.5 million subscriptions recorded last quarter to 23.7 million subscriptions. The growth is attributed to the increased affordability of internet bundles as a result of fair competition in the data/internet market. The growth of e-commerce services and social networking sites has also a factor that has led to the increase of internet/data usage. The use of utility services such as online mobile banking, online research on mobile devices by most Kenyans has also fuelled the uptake of internet/data services.

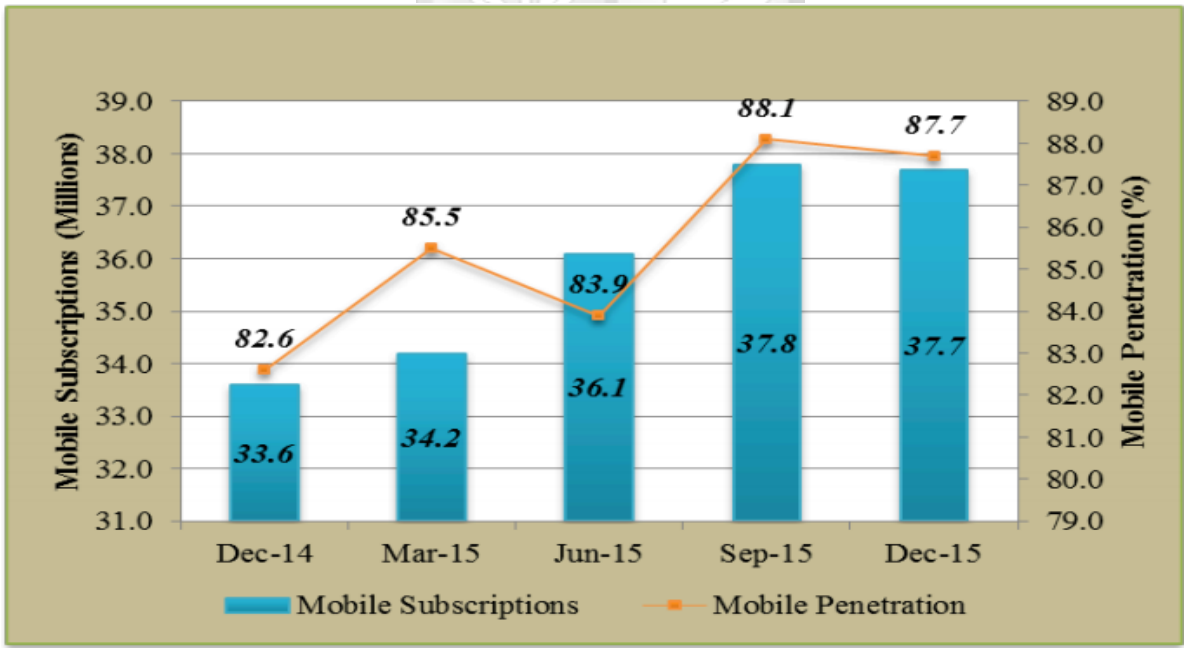

Figure 2.3: Mobile subscriptions and Mobile penetration form December 2014 – December 2015 Quarterly Sector Statistics Report for Second Quarter Financial Year 2015-2016 (Communications Authority, 2016)

2.4.1 Access of Internet services using various means in Kenya

As the number of people having mobile phones increase in the country, so does the number of people accessing Internet service via the mobile phones as is indicated in figure 2.4.

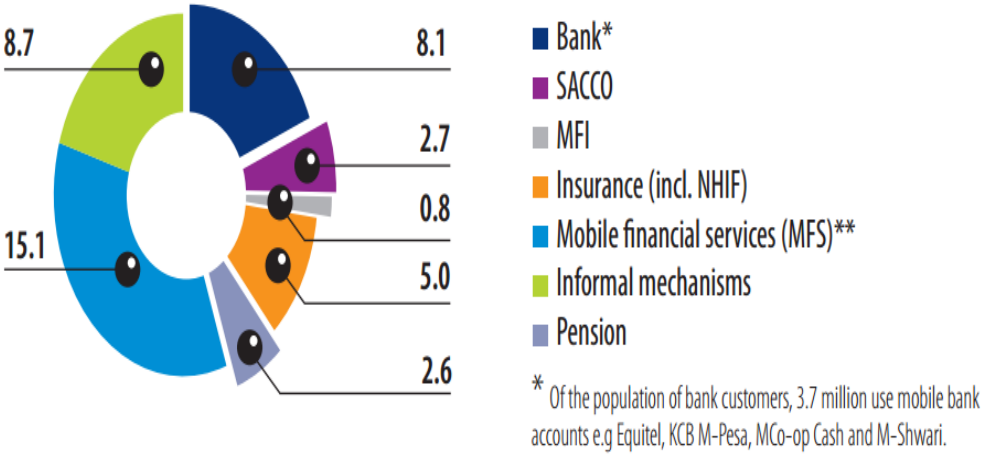

Figure 2.4: Individuals using different service providers (Financial Sector Deepening, 2016)

According to (Financial Sector Deepening, 2016), the number of people accessing mobile financial services is 15.1 million, as compared to those accessing insurance services at 5.0 million. However, there is still a large disparity in access between rural and urban areas (Souter, Makau, 2012). Internet use in Kenya is largely concentrated in Nairobi and significant action is still needed to address issues of access outside of the capital. If the insurance services can be provided as a mobile financial service, then more people will be exposed to insurance services.

2.5 Insurance Process Flow

The process of insurance provision is complex because of the need to integrate the different modules with external systems. For example, factors like the communication of the different modules (broker modules, health check modules or user communication modules),

security implementation, payment systems and scalability. The need to have a system that accommodates these is therefore very critical. This brings about the need for a business process, which is defined as consisting of a set of activities that are performed in coordination in an organizational and technical environment. These activities then jointly realize a business goal (Weske, 2012). Figure 2.5 indicates the general process flow for a business process in insurance underwriting (Walker, 2006). It has been categorized into four sections, Origination, where a broker gathers data and he or she discusses it with the customer. The details are then entered into a data Order System of an insurance company by the broker, who keeps on checking for the status. Once the data has been accepted, third party services for paramedics are involved, to examine the customer and the results sent back to the order system. This happens in the new business category. Once the results are out, the underwriter verifies that the policy is within compliance, within the underwriting category. Then, in the fulfillment category, the customer is issued with the policy, if the policy is within compliance.

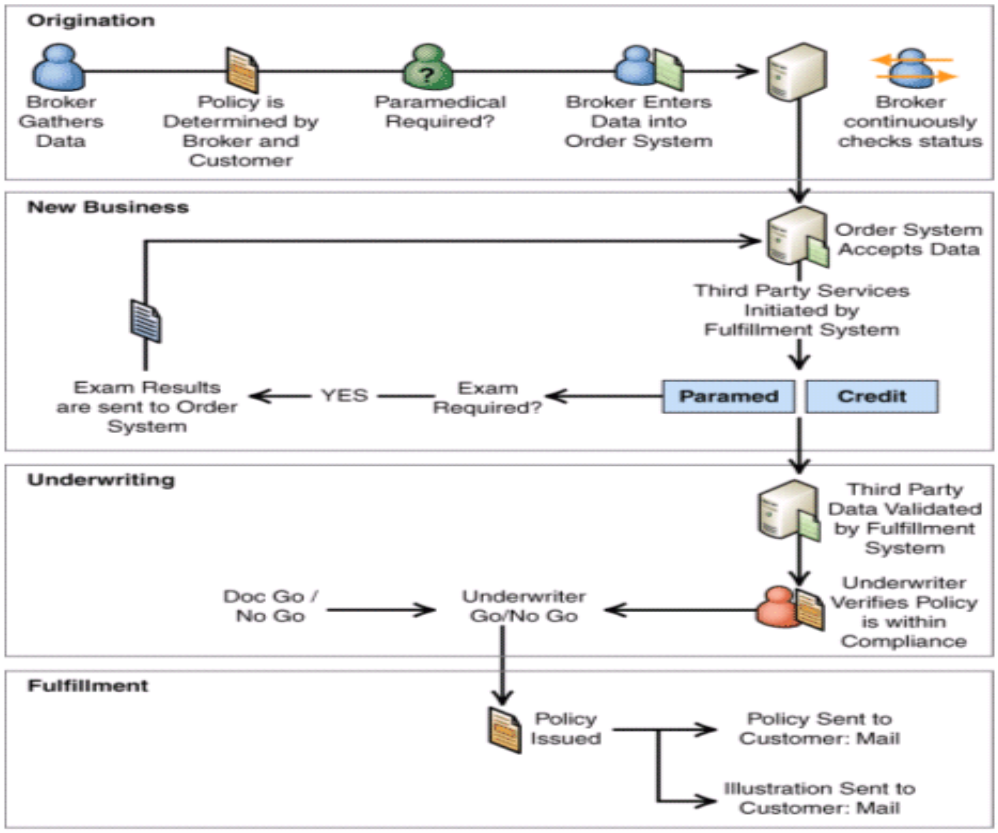

Figure 2.5: General Insurance underwriting business process (Walker, 2006)

2.6 Algorithms in insurance

Insurance underwriting is a complex process due to the factors that need to be put into consideration so as to strike a balance between the insured and the insurer in term of financial remittances for the insured and to make a profit for the sake of the insurer. The need to have this process happen within a very short time and also eliminate mistakes, calls for the need to have algorithms, which can effectively be applied. At Genworth Financial (Aggour et. al, 2006), an end-to-end system was created to automate the underwriting of long-term care (LTC) and life insurance applications, between 2002 and 2004. The automation relied heavily on artificial intelligence techniques. A fuzzy logic rules engine encodes the underwriter guidelines and an evolutionary algorithm optimizes the engine's performance. Fuzzy logic is a superset of conventional Boolean (true/false or 1/0) logic, allowing truth values to be equal to any real number in the interval [0,1], with intermediate values denoting a "partial degree of satisfaction" of some statement or condition. Each rule represents fuzzy constraints at the boundaries between different rate classes for each input, such as cholesterol, blood pressure, or body-mass index. The engine then makes decisions through a three-step process. First, rule evaluation through fuzzy membership functions, second, aggregation evaluation and threshold application and third, assignment of final decision (defuzzification).

2.7 Mobile Application Architectures

There are three main features to be considered when developing applications for the mobile devices (Fertalj, Horvat 2002). The first is the screen size. The graphics and text should be such that, they have clarity and the user is at ease using the device or the same application with different screen sizes. Hardware and software improvements to enhance the clarity and visibility are however improving with every generation of mobile devices. Even though the processor memory storage, the durability of the battery and the processor, they improve with every generation of mobile devices. The third feature is mobile device connectivity. At least nowadays GPRS, EDGE, 3G/4G mobile devices with significant larger bandwidth are available. Other connectivity means include Bluetooth and infrared. It is also important to look

at mobile applications considerations, which can majorly be classified into four, application applicability, architecture, functionality and range.

2.7.1 Application

Application applicability refers to how a mobile application can be applicable to only one specific mobile device (platform-specific), or the mobile application can be independent of the platform type (platform-generic). This is highly dependent on the user group being targeted to use the mobile application. For instance, if the target group is a particular company, then, the application can function on only one mobile device type whereby, all members of that company will use that specific device type. But if the target group is non-members of a particular group, then the application will have to be independent of the platform type so as to reach its target audience.

2.7.2 Architecture

The second classification is architecture. Applications have complex client/server architecture with several layers of business logic on the server (Fertalj, Horvat 2002). According to (Subhash, Sanjay, 2009), the client/server architecture can largely be divided into clients and servers, each with distinct purposes, whereby, the client initiates communication by sending requests to the servers and the servers service the requests made by clients. Examples of clients are laptops, mobile phones, desktop computers. Figure 2.6 depicts the relationship between the mobile phone, the application logic and the server, which is an example of client-server architecture.

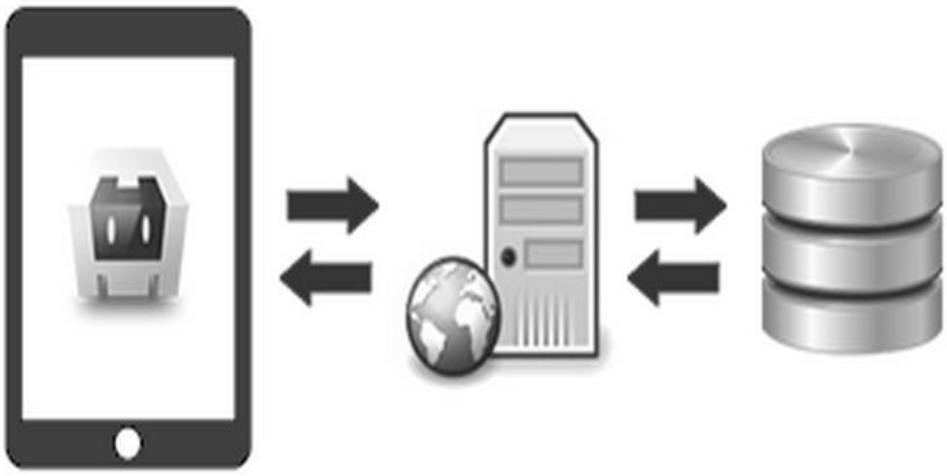

Figure 2.6: Client - server architecture (Trice, 2013)

Clients can further be distinguished according to functionality and the amount of load they process. There are basically two types of clients:

i. Fat Client - devices that are powerful and fully featured enough to operate with limited dependence of their server counter parts.
ii. Thin Client - have limited functionality and are heavily dependent on their server counter parts.

The business logic layers are divided into three and they consist of:

i. Presentation Logic – responsible for presenting the results of a computation to system users and also colleting user inputs. This is what is seen by the client on the mobile devices.
ii. Application Processing Layer - responsible for processing commands, making logical conditions, performing calculations and coordinating the application. It consists of scripts that issue command requests from the mobile device and relays them to the database logic layer for execution.
iii. Database Logic Layer – responsible for managing the underlying databases. It services the requests, and relays them to the presentation layer, through the application processing layer.

Figure 2.7 shows the three layers of the business logic, the mobile support infrastructure which consists of the database and other services needed by the application that are external to the mobile application, as well as other features like security, configuration, connectivity and communication that should be put into consideration across business logic layers.

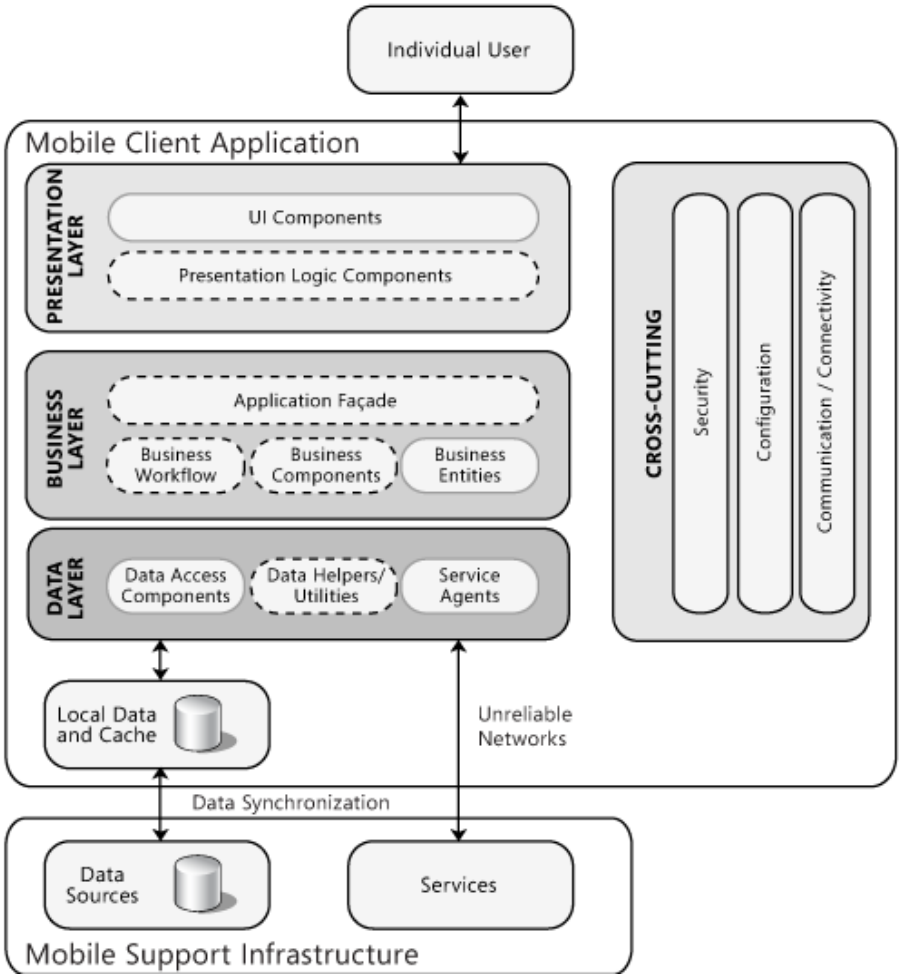

Figure 2.7: Business Logic Layers (Subhash, Sanjay, 2009)

2.7.3 Functionality

Functionality is the third classification. In this case a mobile application can be divided into three functionalities. The first one is *messaging systems* where the user and the system exchange textual information. This kind of functionality only supports textual user interfaces. The second functionality is the *web-based* system, which has more capable interfaces that

support text, bitmaps, text boxes, option buttons and hyperlinks. Pages of a *web-based* system can either be static or a representation of a multi-layered system and thus dynamic. The third functionality is where the application is *desktop-like*, in this sense, the application will support progress bars, text boxes, buttons, lists, dates, and calendar controls, labels, keyboard events, images and message boxes, which are optimized for mobile phones because of the small screens.

2.8 Mobile Enterprise Application Platforms in Insurance Underwriting

2.8.1 Data Visualization platform

Different insurance companies have different ways of handling their business processes. However, there are some similarities that the businesses share at the platform level. One such platform is the single underwriting desktop architecture, also called a Data Visualization Platform by Denodo technologies, which seeks to provide a unified view of risk and underwriting data from internal and external source systems to enable faster and more informed underwriting decisions (Denodo Technologies, 2015).

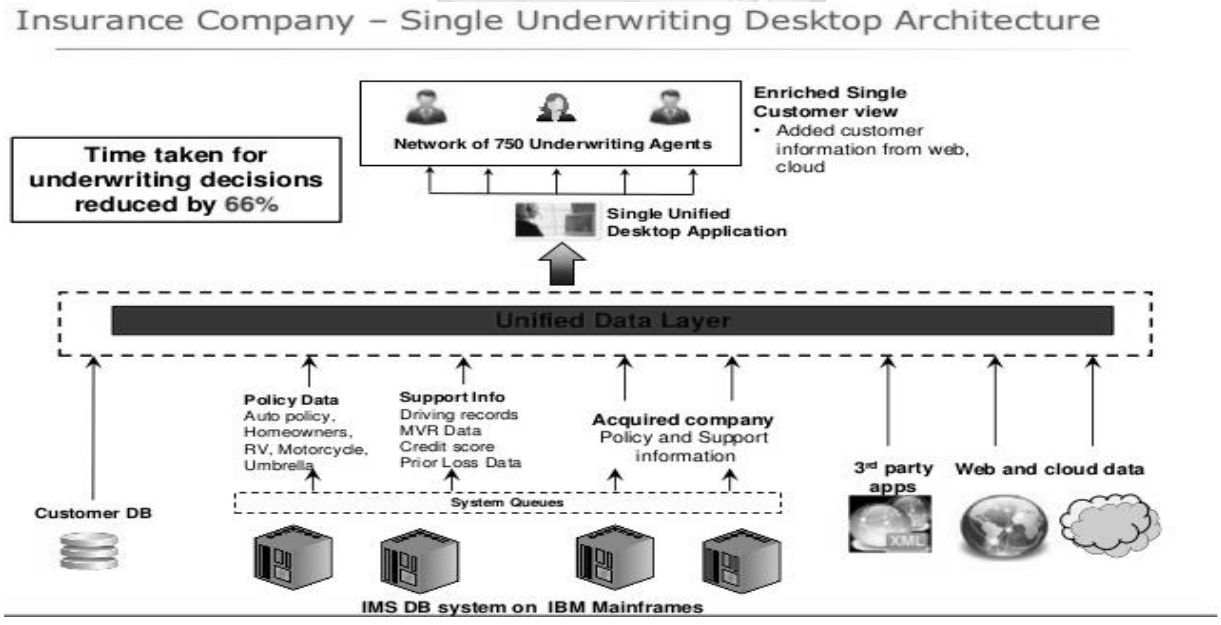

Figure 2.8: Single Underwriting Desktop Architecture (Denodo Technologies, 2015)

Figure 2.8 shows the architecture used to unify the components necessary for a complete underwriting process. It consists of a Unified Data Layer, which acts as a link between the system users and the underlying databases, and third party applications, and also data from the web and cloud. The Unified Data Layer abstracts the underlying source complexity and presents disparate data as if from a single source. This reduces the underwriting decisions by 66 %. Figure 2.9 shows the different layers of the data visualization platform (Single Underwriting Desktop Architecture), as well as the consumers of the data.

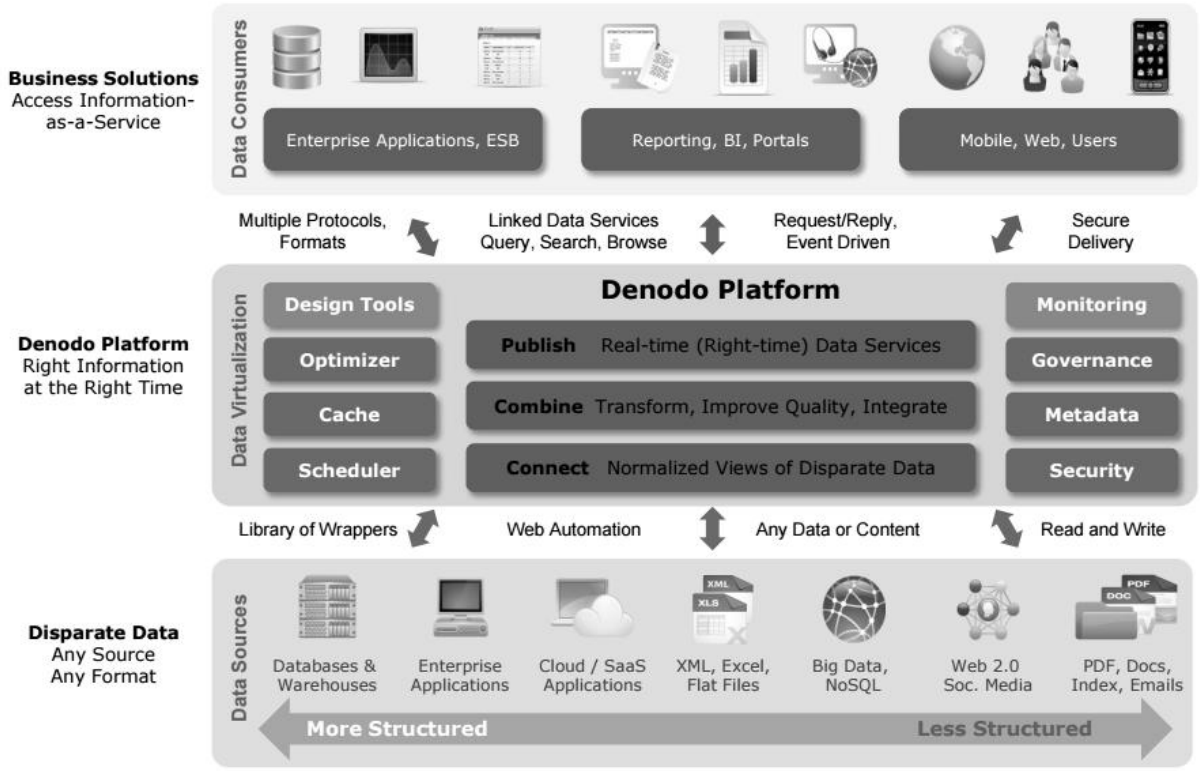

Figure 2.9: Visualization platform (Denodo Technologies, 2015)

The business solution layer consists of enterprise application, Reporting and Business Intelligence portals, and web or mobile users. The Data Visualization platform mainly publishes data services, connects normalized views of disparate data and improves quality, integrate and transform data visualization for publishing.

2.8.2 Mobile Enterprise Architecture

Mobile enterprise architecture incorporates location and time independence, refinement of content management, reliability and security of wireless transmissions issues provide the flexibility required by developers for end user mobile applications. By studying the mobile Enterprise architecture, the researcher aimed to understand the aspects to consider when implementing a mobile enterprise system. A good mobile system is therefore based on patterns of business processes, network configurations and software development (Unhelkar, 2009). Mobile service oriented architecture, as is indicated in Figure 2.10 enables applications to offer services through network connections. A user, through a mobile browser accesses the server using scripts, for example, Active server pages (ASP) or Common Gateway Interface (CGI) scripts. The server hosts the application program. The database server then accesses data or information from the content management system. This data is then processed by applications on the application server and sent to the end user. Such architectures provide support for managing queues, message distribution and also help in location management (Unhelkar, 2009).

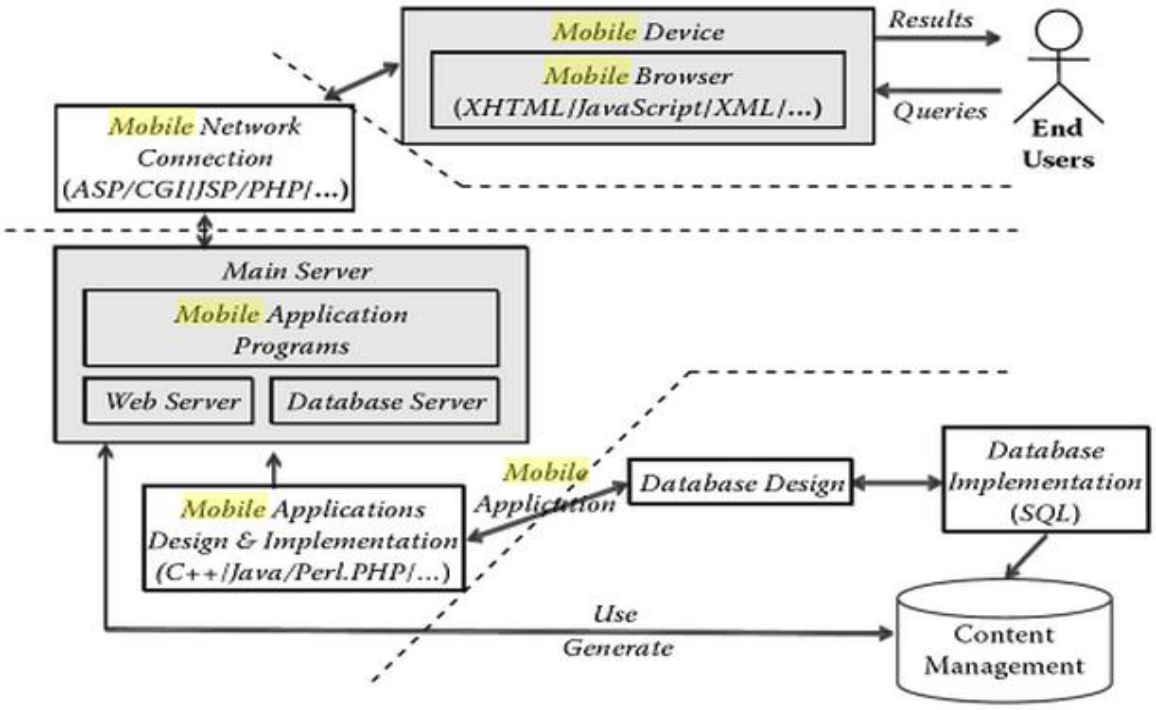

Figure 2.10: Mobile Service Oriented Business Architecture (Unhelkar, 2009)

2.8.3 Enterprise Mobile Service Process

The enterprise mobile service process is an extension of the enterprise service process in mobile integration. It can be defined as a set of composed and managed services, executed in mobile platforms and environments, and consumed by mobile devices for completing a complex business process. Mobile service process can enable real-time, contact aware and adaptive workflow. The basic steps for mobile-enabling existing enterprise service process include (Ramanathan & Raja 2013):

i. Adding mobile devices as consumers of existing enterprise service process
ii. Standardizing mobile interfaces and definitions to existing activities
iii. Enabling service delivery mechanism and service connection for each activity
iv. Addressing issues related to mobility, adaptability, performance, availability and security

For an already existing enterprise solution like insurance, the application of a mobile platform can then be implemented as an extension, and improve on results in a speedy response manner to users, still based on the security platform of the existing enterprise system, enhance customer experience, resulting in a convenient and easy means and also increase the number of users due to the ubiquitous nature of mobile phones.

2.9 Mobile Application Development Framework

Even though mobile technologies and applications present many new opportunities for enterprises, they face challenges such as deployment, whereby, the deployment of the applications must converge with the computing and communication paradigms (Unhelkar, Murugesan, 2010). Some applications must determine a user's location, so as to adapt to services and information accordingly. Other challenges include incorporating the required level of security, reliability and quality of service. Mobile application development frameworks assist developers in tackling these challenges. One such framework that offers a systematic comprehensive solution to mobile application development and maintenance is the enterprise Mobile Applications Development Framework (MADF).

The layers of this framework include information, middleware and binding, applications, presentation, and security. The security layer lies orthogonally, covering all other layers. This layered framework brings together elements of software architecture and design and the required supporting communication infrastructure (network and protocols) and different types of information accessed from multiple sources.

2.10 Challenges Facing Purchase of Insurance Cover in Kenya

Challenges facing the insurance sector today after a review of existing solutions can be categorized into the following;

i. Demand for mobility and speed of services.

   Due to the poor image of the insurance industry Kenya has had over the years (Insurance Regulatory Authority, 2013), the lack of mobility and the agility in the delivery of services lacks, majorly due to a central based process that lacks an extension service to automate the process to its clients. This requires clients to walk over to the insurance company to enquire and complete the purchase process.

ii. Customer expectations of simplicity and transparency.

   The customer expects a simple process in obtaining an insurance cover, where everything is transparent with no hidden charges that are revealed by the insurance company later on after the purchase of insurance (Insurance Regulatory Authority, 2013).

iii. Positive correlation between frequency of contact and customer satisfaction.

   The ability of users to interact with their mobile phones anywhere, anytime, gives insurers the opportunity to deliver a uniquely personal, real-time, customer-centric experience, build loyalty and improve on services delivered (Brigitte Parent, 2014). This however lacks in the Kenyan market, due to the manual, slow, contact between a customer and the insurance process steps that have to be put into consideration so as to make the client happy (Insurance Regulatory Authority, 2013).

2.11 Travel Insurance Applications

2.11.1 Aviva Travel Application

This application allows its users, Singapore residents, to obtain travel quotes and buy travel insurance. It also allows its users to access frequently asked questions and obtain help concerning claims. The application also contains details on how to contact their users in case of general insurance, which includes car, home and travel. It is a personalized application, since its users can access help from their insurer at the click of a button, and also have profiles and view different kinds of policies they have bought from their insurer, Aviva. This application however, is only for users who buy insurance from Aviva Company in Singapore. Figure 2.11 shows the main screenshots of the Aviva Mobile travel application.

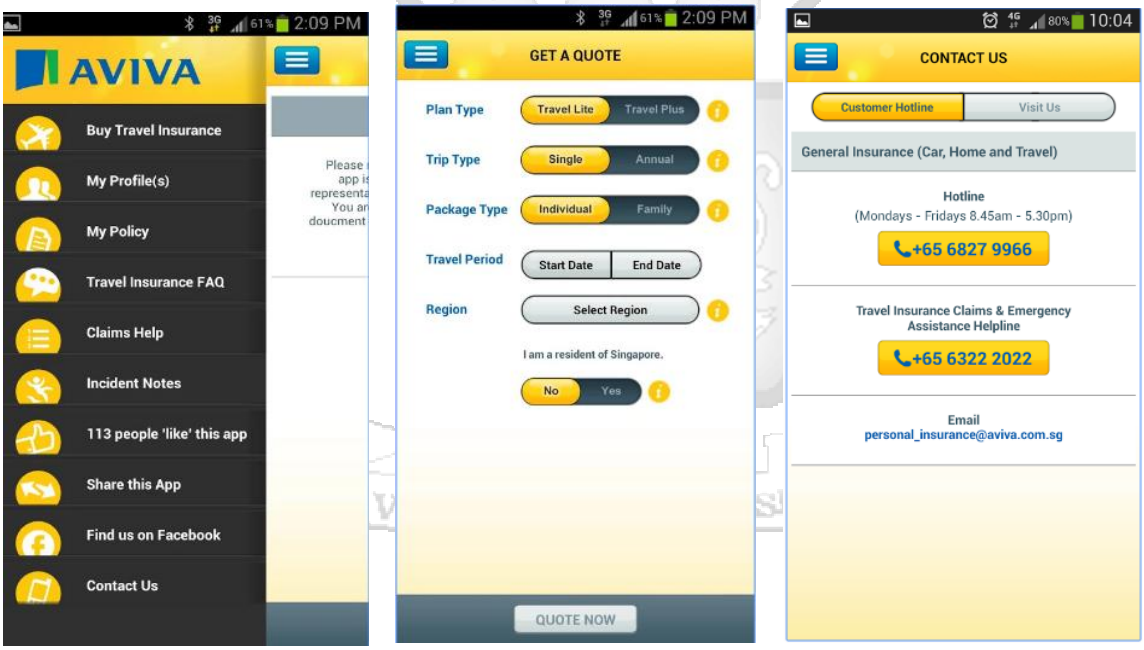

Figure 2.11: Aviva Travel Mobile Application

Source: https://play.google.com/store/apps/details?id=com.aviva.travel&hl=en

2.11.2 Sompo TravelJOY Mobile Application

This application enables customers to make 'last – minute' travel insurance purchases just before departure. However, the insurance is available to Singapore residents and for

destinations originating from Singapore only. Figure 2.12 shows the screenshots for the Sompo TravelJoy mobile applications. Its basic steps include, a customer selects the desired TravelJoy plan coverage, travel destination, travel period, and a quote will be provided for, for payment. Once the client is ready to make the purchase, s/he is redirected to a secure website where they can be able to make the purchase via credit card. The application also provides for creation of personal profiles, making it easier for customers not to re-enter personal details during the next purchase of insurance, and it also allows you to view purchased plans via the application.

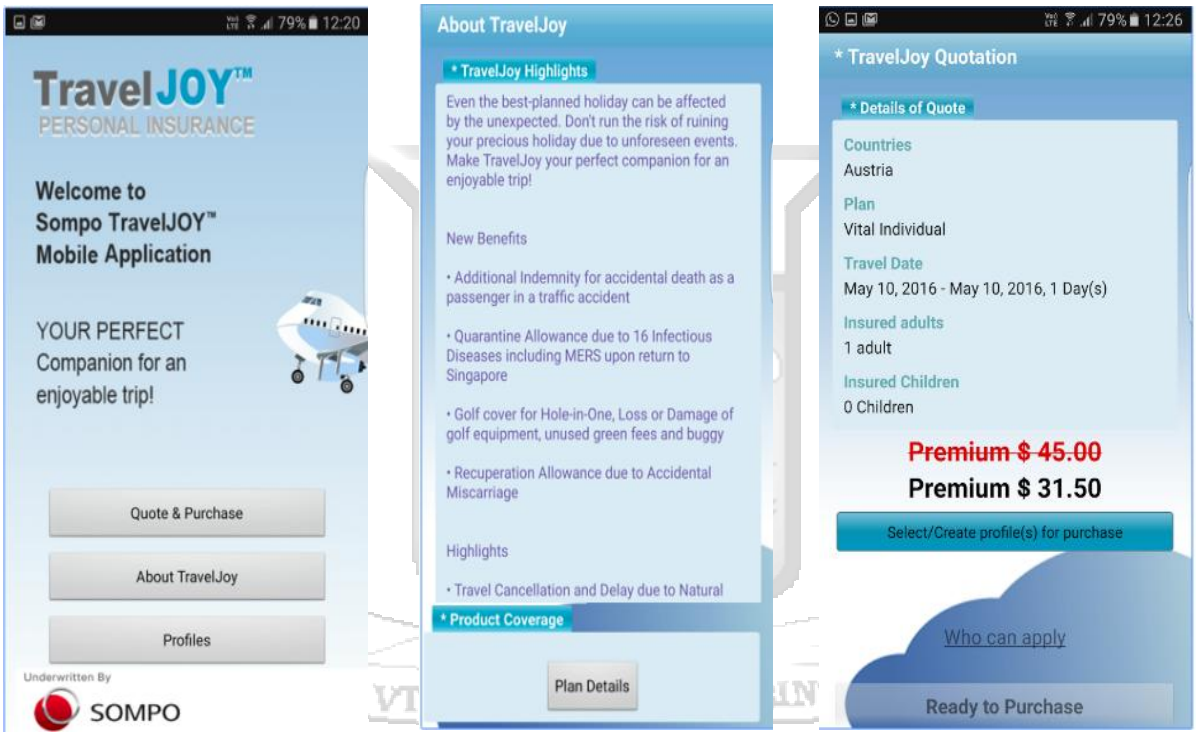

Figure 2.12: Sompo TravelJOY Personal Insurance Mobile Application

Source: https://play.google.com/store/apps/details?id=com.app.traveljoy

2.11.3 The Mobile Travel Kit Mobile Application

Specifically for British Columbia and Yukon residents, this application allows a customer to choose a desired plan, add trip cancellation and baggage insurance, then enter travel details to get an instant quote and purchases can be made. Other features associated with this application include the storage of policy within your phone, so that a customer can review

the benefits at their convenience, save personal profiles to ease the next purchases, and a first aid kit with information on common conditions facing travelers. Figure 2.13 displays the major screenshots in the mobile application.

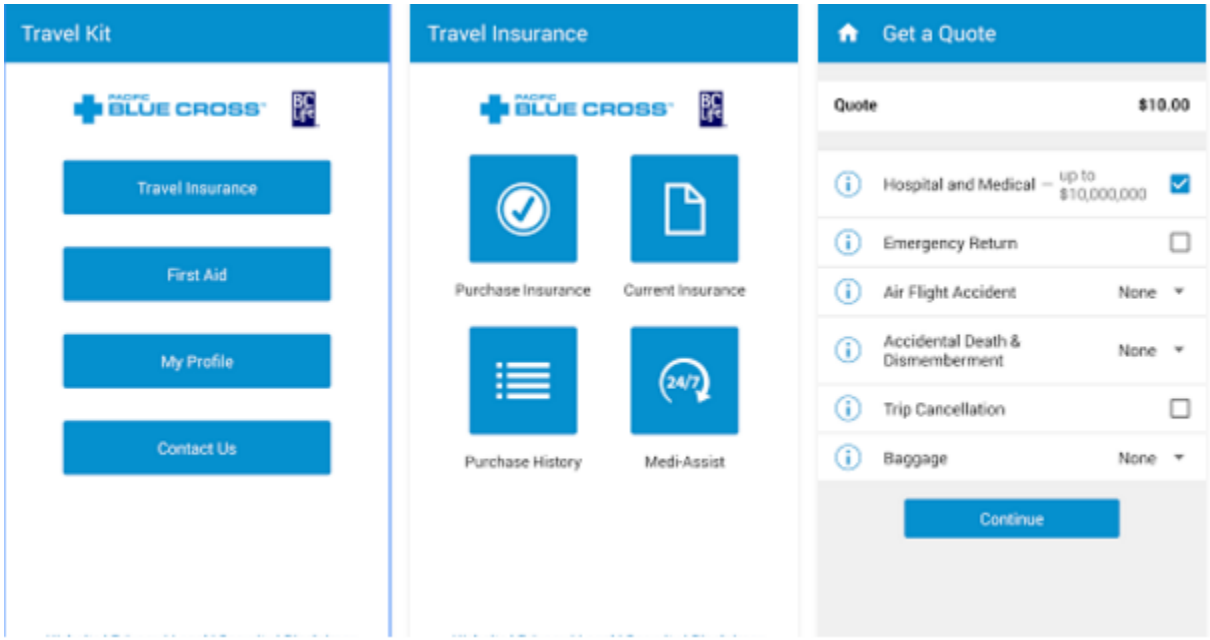

Figure 2.13: The Mobile Travel Kit Mobile Application

Source: https://play.google.com/store/apps/details?id=com.PacificBlueCross.app

2.11.4 TravelSmart Mobile Application

This application found in the android market stores, allows its users to select emergency contact numbers or view the hospital locations, depending on the location of the user's visit and also allows in app calls. Figure 2.14 shows the screenshots for the mobile application. The application also contains a drug dictionary, whereby, depending on the kind of drug one is looking for, in a certain location; they can get a translation for it in the local language or its international name. It also includes a translation for the first aid terms, as well as a list of hospitals to contact depending on the user's location of travel. In this case, the application is linked to a database that contains the different names of drug names as well as a first aid terms, in various languages. The database also includes lists of hospitals in the various countries, where the users' can visit or call in case of emergencies.

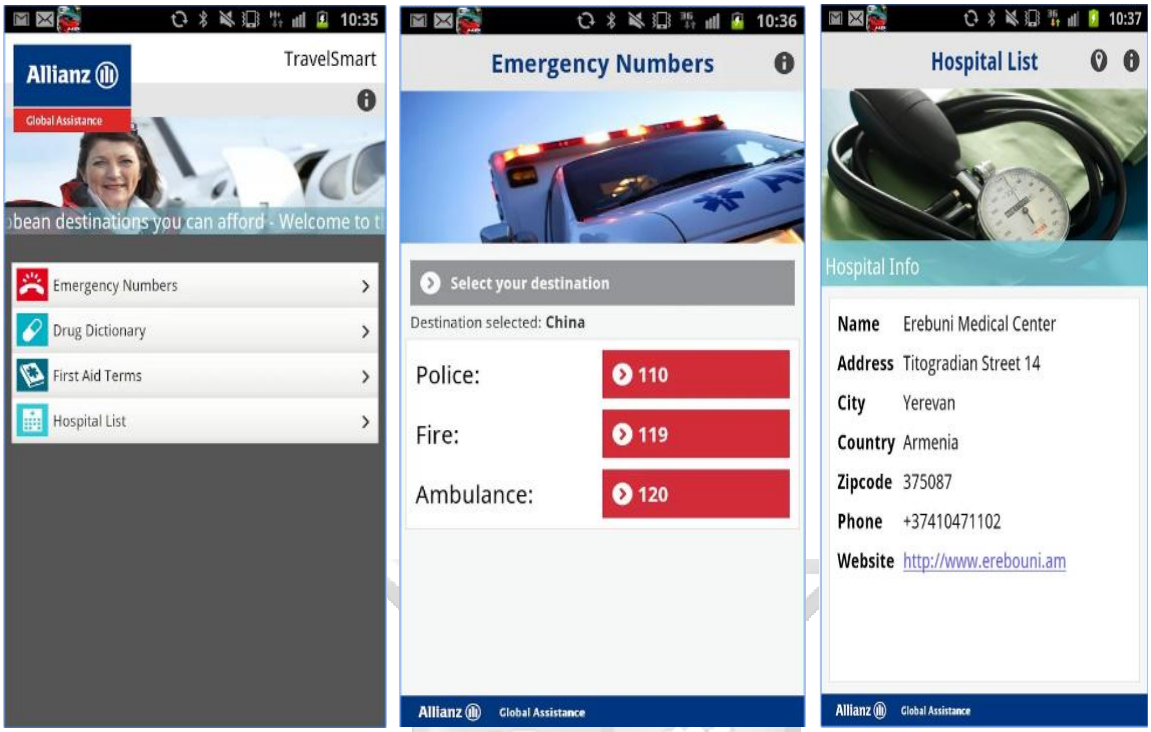

Figure 2.14: TravelSmart Mobile Application

Source: https://play.google.com/store/apps/details?id=com.aga.travelaid.us&hl=en

2.12 Gaps identified in the purchase of travel insurance

Customers demands. This is lacking as customers want investments translated into mobile and interactive technologies for multimedia content creation and distribution as well as transactional capabilities across multiple digital platforms. At the moment in Kenya, from the previous research, customers are forced to oblige to the already existing process that is complex, resulting in slow response and communication between the insurer and the customer.

Also, simplicity and transparency also lacks. This is because the already established purchase process is complex, with some information like hidden charges not being told to the customer in advance. Having a mobile system that is an extension of this established system will foster innovations in product/service design and delivery. This will lead insurers to get better at targeting customers and customizing product and service attributes to meet their specific needs, amassing greater customer surplus.

2.13 Conclusion

Having looked at the different architectures that have been applied to solve the complexity of insurance processes, as well as the general business process that could be used in an insurance company perspective, the researcher acknowledges the significance of having a mobile application system, as an extension of an insurance enterprise service process. Putting into perspective the threats and weaknesses the Insurance Revenue Authority in Kenya faces in a bid to improve insurance uptake, the researcher would like to establish a mobile system, as an enterprise mobile service process where users can easily purchase travel insurance via their mobile phones. Putting into consideration the mobile enterprise service process recommended for such a purpose, the researcher is confident that a mobile system based on the mobile service oriented process architecture would suffice. Such an application would inject innovation into the current insurance systems in Kenya, enhance automation of the underwriting process and improve the insurance image. It will enable users to obtain insurance cover via their mobile phones, as packaged by a particular insurance company. The convenience, ease and efficiency in the use of the mobile system would in turn increase the number of people purchasing insurance, as well as improve awareness of an insurance company's travel products.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter looks into the software methodology that to be used in the development of the system. It consists of the following major sections: system analysis, system design, implementation and testing methods.

3.2 Software Methodology

The software methodology used is the System Development Life Cycle (SDLC). This is a series of identifiable stages that a software product undergoes during its lifetime (Mall, 2009). This methodology concentrates on the technical aspects of building a software product (Schaffer, 2004).

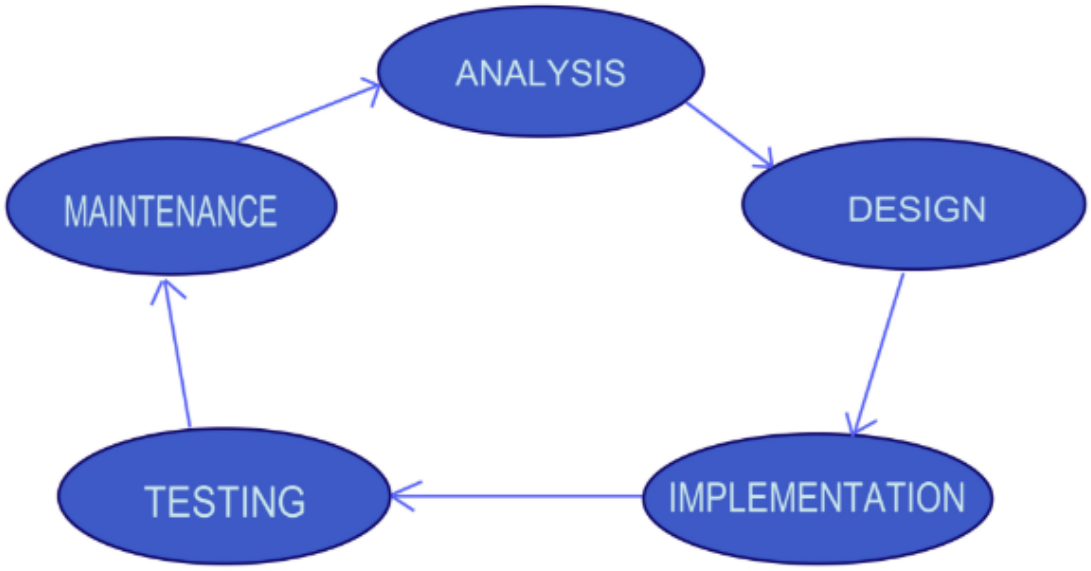

Figure 3.1: System Development Life Cycle Process

Source: http://cis1.towson.edu/~cssecinj/modules/cs0/secsdlc-cs0-java/

System Development Life Cycle

The system is made up of the following phases;

i. System Analysis

In this phase, the location and sample size of the study is determined. User requirements are also determined and documented. What users expectations are for the system and how it should perform.

ii. System Design

Once the system requirements have been understood, an overall system design can be done to determine how the system will look like and how it will function. A detailed system will thus be produced, that should meet all the requirements.

iii. System Implementation

In the implementation phase, the system is ready for deployment and installation into the users' premise. Training may be required for end users.

iv. System Testing

The testing phase includes testing done by real users, or a team of specialized testers. This will ensure the outcomes are equal to the predicted and desired outcomes, and thus, the tests performed can either be automated or systematic.

v. System Maintenance

In this phase, the entire process and the system developed are evaluated and maintenance takes place. The validity and reliability of the system are checked, and also if the system satisfies the users' initial requirements and objectives.

3.3 System Analysis

In this phase, user requirements are identified and analyzed. The results in the outcome will be used to answer the research questions and also be used in the design of the proposed system.

3.3.1 Feasibility Study

This will be done through literature reviews on methods used in the purchase of insurance in Kenya as earlier stated in the research objectives.

3.3.2 Research Design

Research design is the conceptual structure within which the research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data. The function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. Research purposes are grouped into four categories, exploration,

description, diagnosis and experimentation (Kothari, 2004). There are generally three methods in the context of research design in the case of exploratory research studies. They are the survey of concerning literature, the experience survey and the analysis of "insight-simulating" examples. The researcher settled for the experience survey, because the research was based on surveying a group of people who have had practical experience with the problem being studied, which is travelling. For such a survey people who are competent and can contribute new ideas may be carefully selected as respondents to ensure a representation of different types of experiences.

The purpose of this research is exploratory. The researcher therefore took an exploratory approach to guide in the development of interview questions and questionnaires, that would help in obtaining accurate information from the stake holders of travel insurance, this being insurance companies in Kenya and the Kenyan population at large. This information would be helpful in guiding the researcher on how the application system would be designed and developed.

3.3.3 Location of the study

The researcher chose to carry out the research in Nairobi County. This is because a large number of insurance companies in Kenya have their head offices in Nairobi and the researcher needed to obtain crucial information necessary for the research from the departments that handle the sale of travel insurance policies. Secondly, Nairobi city is the capital of Kenya. This makes it the central hub for travelers, both local and international destinations.

3.3.4 Target Population

Nairobi had a population of 3.375 million people in the last census, 2009 (Nairobi Cross Sectional Slums Survey Report, 2012). It typifies the rapid urbanization and population explosion in sub-Saharan Africa. It is the largest and capital city of Kenya. This research targeted individuals who travel for various reasons, be it business or pleasure. Because of cost and time constraints, the researcher settled for Jomo Kenyatta International Airport as its target population. This is because, by interviewing people waiting to board planes, the researcher would get an unbiased population in terms of choice of insurance and the insurer as well as different experiences. Jomo Kenyatta International Airport was designed and constructed in

1978 to serve about 2.5 million passengers every year, but this capacity has shot to over 6 million passengers per year (African Development Bank Group, 2015).

The researcher also interviewed officers who sell insurance cover. These were also selected from a few insurance companies within Nairobi. This was important because they are stakeholders of the insurance market and are looking to offer better services to their clients as well as create awareness for their products.

3.3.5 Sampling

A population can be defined as a collection of entities for which we have an interest in at a particular time or as the largest collection of values of a random variable for which we have an interest at a particular time. A sample on the other hand, is simply a part of a population (Daniel, 1999). Sampling is therefore a process of obtaining information about an entire population by examining only a part of it (Kothari, 2004). In this case, the target population for this research roughly 6 million in a year, which translates to 500,000 in a month and approximately 16,667 people every day. The researcher settled on random sampling so as to obtain results that were a true representation of the population of Nairobi.

From the population of 16, 667, a sample was arrived at, and was calculated using confidence interval and confidence level, so as to have the population well represented. In simple random sampling, each unit of the population has an equal and independent chance of being included in the sample (Asthana, Bhushan, 2007). A sample size 197 was arrived at using the formula in Equation 3.1(Daniel, 1999) by use of an online calculator (Nainget.al, 2006).

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Equation 3.1: Formula for calculating sample size

Where = sample size

Z = confidence level 95%

P = Expected proportion 0.5

d = Precision or Confidence Interval of +/- 7

3.3.6 Data Collection

The methods used by the researcher to collect data included interview method, document review and use of questionnaires. The interview method was selected because the researcher wanted to obtain more information and in great depth into the process of issuing travel cover, and also take advantage and avoid the possibility of misinterpretation of questions. Questionnaires were also selected as a means of data collection, this is to ensure that respondents that are not easily approachable are reached conveniently, and therefore results could be more dependable and reliable.

i. Interviews

The group targeted was insurance companies within Nairobi County. This is because they are better placed to give accurate information concerning the processing of clients requests for travel cover, as well as approving the requests. They are also knowledgeable as to the extent to which routes and means of travel to issue cover for. The interview was based on the following open ended questions;

i. What is the process of obtaining travel cover for your clients?
ii. How do you raise awareness of your insurance products?
iii. How do you think a mobile application system would improve the process of obtaining cover for your clients?
iv. How do you obtain feedback from your clients?
v. What would you like to have to improve the process of your service delivery?

ii. Questionnaires

The target group in this case was the possible client of an insurance company, who would purchase insurance cover. The Questionnaire was composed of both multiple choice questions and open ended questions. A list of questions was also prepared to determine if the mobile application provided a solution to the challenges posed and from the findings, a conclusion was drawn on what to improve on or eliminate from the system, so as to have a better application.

iii. Document Review

A review of existing documents addressing insurance industry and mobile technology was done. The aim for this was to understand the insurance industry, its history, present and future and its impact in society with regard to technology. Documents used included journal articles on financial services in Kenya, insurance services in Kenya, statistical reports on mobile and internet usage in Kenya.

3.4 System Design

In the system analysis and design phase of the project development, the researcher used Object Oriented Analysis and Design. This is because the use of objects often reflects entities in the application systems, making it easier to come up with classes in the design. It increases productivity through reuse of existing software, it makes it easier to accommodate changes and also the ability to isolate changes, encapsulate data and employ modularity, thus reducing risks that night be involved in the system development process (Dathan & Ramnath 2011). The Unified Modeling Language (UML) (Eriksson, 2004) provides industry standard mechanisms for visualizing, constructing and documenting software systems. According to (Lano, 2009), among the notations used include use cases, context diagrams, data flow diagrams, design class diagrams and entity relationship diagrams. The researcher used the following, to represent the system;

i. Use Case Diagram
ii. Context Diagram
iii. Data Flow Diagram
iv. Entity Relationship Diagram
v. System Sequence Diagram
vi. Design Class Diagram
vii. Database Schema

3.4.1 Use Case Diagram

A use case diagram describes how actors interact with processes, in this case, use cases, in the system (Mishra & Mohanty 2012). In this case, the actors involved are the client seeking an

insurance cover, the insurance company officer or clerk, and the insurance company administrator.

3.4.2 Design Class Diagram

A class diagram is fundamental in design modeling. It provides a static description of system components and structures in terms of classes and their relationships. It is used to refine a use case diagram and define a detailed design of a system (Mishra & Mohanty 2012). In this case, the class diagram contains objects like travel details, payment details, policy, feedback, as well as how they relate with each other.

3.4.3 Database Schema

The Entity Relationship Diagram will enable the researcher to create a database schema which has the actual relationships in real life. It represents the logical view of the entire database, showing how data is organized, and how relations among them are associated, formulating the constrains to be applied on the data.

3.4.4 System Architecture

System architecture refers to systems components, their relations to each other and their environment, and principles guiding its design and evolution (Lamm et.al 2016). It contains three layers, the presentation layer, business logic tiers and the data layer. The system will also be connected to the PesaPal API payment system, which is an ecommerce platform focused on Kenya that is built to seamlessly work with mobile payment services. This will provide a secure and safe means of payment for the insurance plan of choice for the client.

3.5 System Implementation

In the application development, the system will include a mobile application and a web application, both connected to the same database. The application will have the following;

i. **Mobile Application**

   The mobile application will be Android based. JavaScript Object Notation (JSON) will be used as a web service that will provide the interface between the Android application and the database. Android is open source and there is online support for development. The mobile application will be attached to an external payment system for security reasons.

ii. Web Application

As for the web application, it is developed using CodeIgniter, which is based on Hypertext Preprocessor (PHP). The hosting of the website will be done on an Apache HTTP server. PHP is also open source, there is online support for development, it is an independent platform which supports all major platforms.

iii. Database

MySQL, an open source relational database management system will be used to develop the database. This is because of the numerous online development support and compatibility with other platforms, as well as security features like the use of passwords and authorized access that it makes use of.

3.6 System Testing

The system will go through functional tests, to test the functional and non-functional tests. Compatibility tests to test the compatibility of the mobile application to the different android devices and the web application on different browsers. Then finally tests to measure user satisfaction and feedback will be collected to help in validating the system.

3.7 System Evaluation

The system will be evaluated by the users and developers, to establish if it was valid, and if the research objectives stated earlier were met. This will be essential, as it will show if the system will improve the insurance purchase process.

CHAPTER 4: SYSTEM DESIGN AND ARCHITECTURE

4.1 Introduction

The mobile application system was developed with the intention of easing the purchase of travel insurance by bringing on board the convenience, ease and efficiency that comes with the use of mobile phones. This would in turn, aim at improving the insurance image by having an efficient underwriting process. The application system has two interfaces, the mobile application and the web interface. The mobile application is developed on the android platform, while the web interface has been developed by Code Igniter, which is an open source rapid development web application framework. The mobile application allows users to purchase travel insurance, as well as send feedback to an insurance company. Users can also make a group policy purchase, whereby, once the quote has been generated, if the policy belongs to more than one individual, then at the registration screen, the client has to enter details for the respective individuals to be covered by that cover bought. That way, the policy generated will include details of every person covered, and the same will remain in the database, for tracking purposes and other future use, like claiming, in case of indemnification.

4.2 System Design

System design defines the architecture, components, modules and interfaces and data for a specified system, to fit specific requirements. The following actors were also put into consideration; the potential insurance client, an insurance clerk or officer and an insurance company's system administrator. The below sections include notations used to describe the system.

4.2.1 Context Diagram

A context diagram is used to specify the details of a system design. It represents all external entities that may interact with a system. It shows inputs and outputs to/from external factors. A context diagram helps in understanding the context in which a system is part of (Gupta et. al, 2010). Figure 4.1 shows the mobile application system's context diagram.

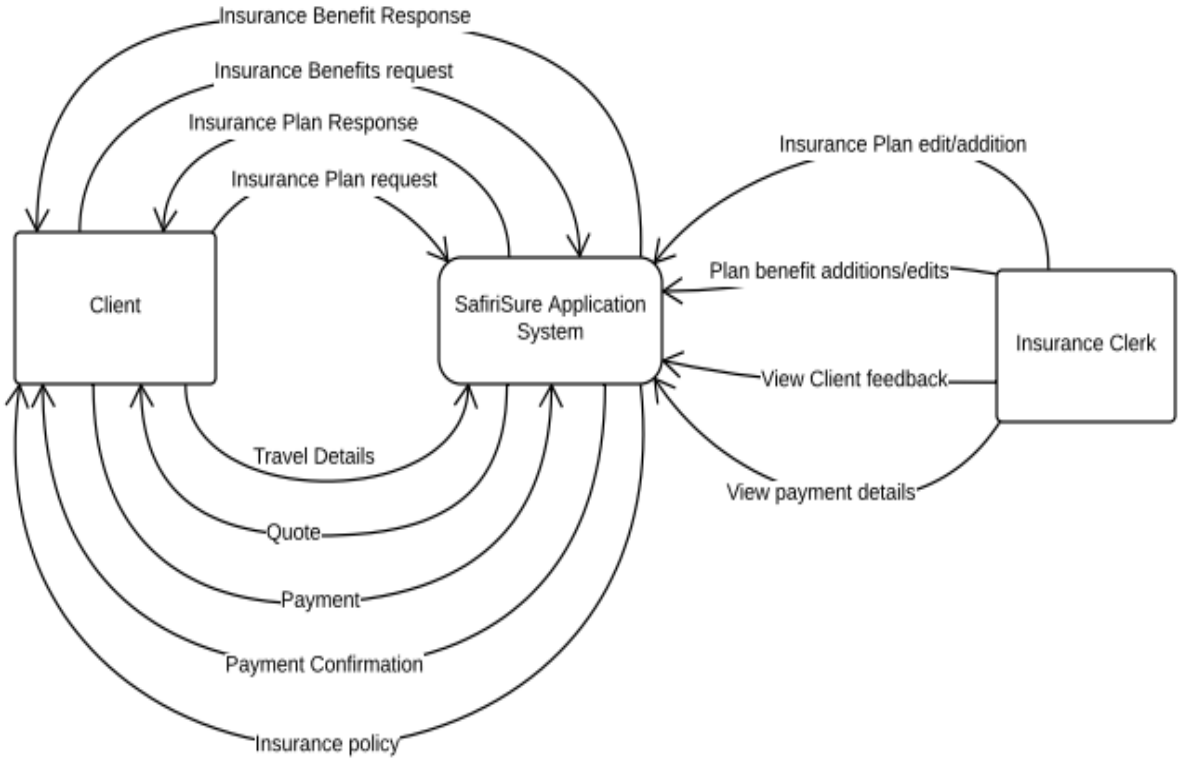

Figure 4.1: Context diagram

4.2.2 Data Flow Diagram

A data flow diagram is a pictorial representation of all aspects of the logical data flow (Singh, 2011). It helps in the analysis of the proposed system, to determine if the necessary data and processes have been defined (Joseph & Mohapatra, 2014). Figure 4.2 shows the application system's level two data flow diagram.

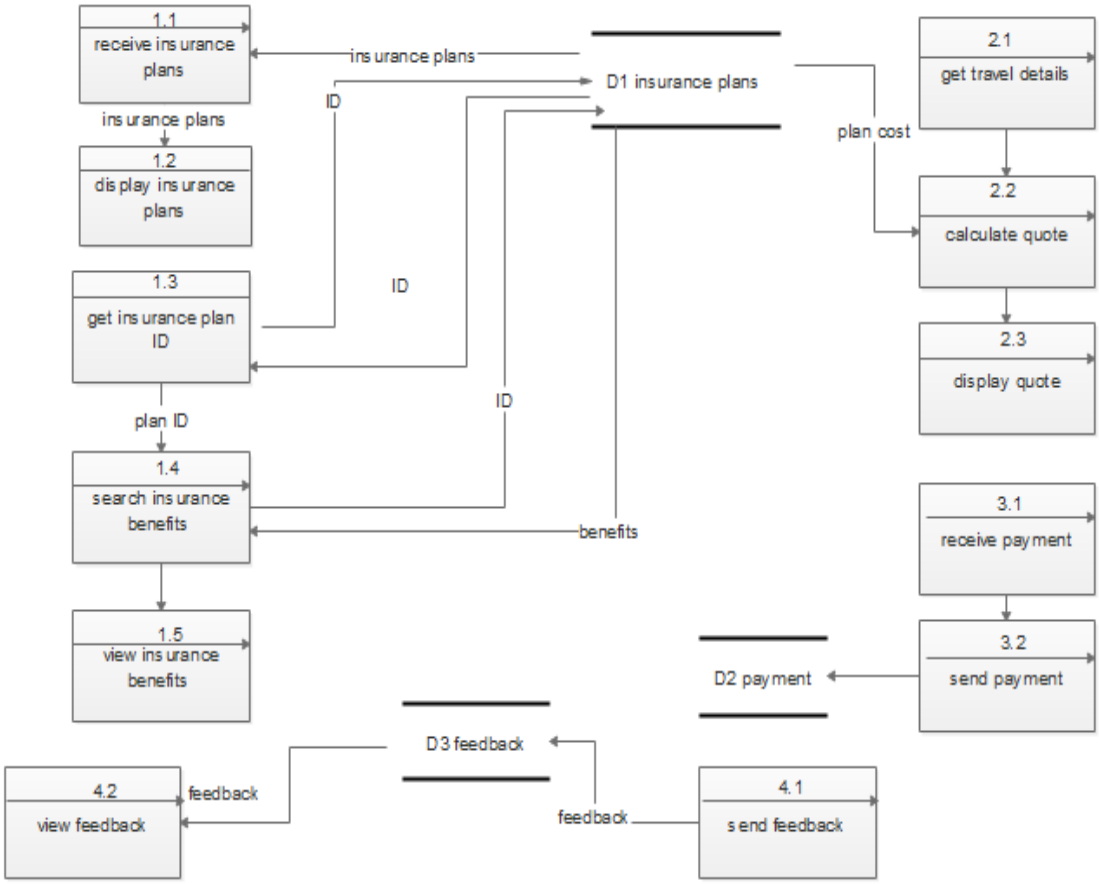

Figure 4.2: Data Flow Diagram – Level Two

4.2.3 Entity Relationship Diagram

An entity relationship diagram (ERD) provides a graphical representation for the logical structure of a database. An ERD can be readily translated into relational tables, which can be used to quickly build databases (Bouchrika, 2014). Figure 4.3 shows the system's entity relationship diagram.

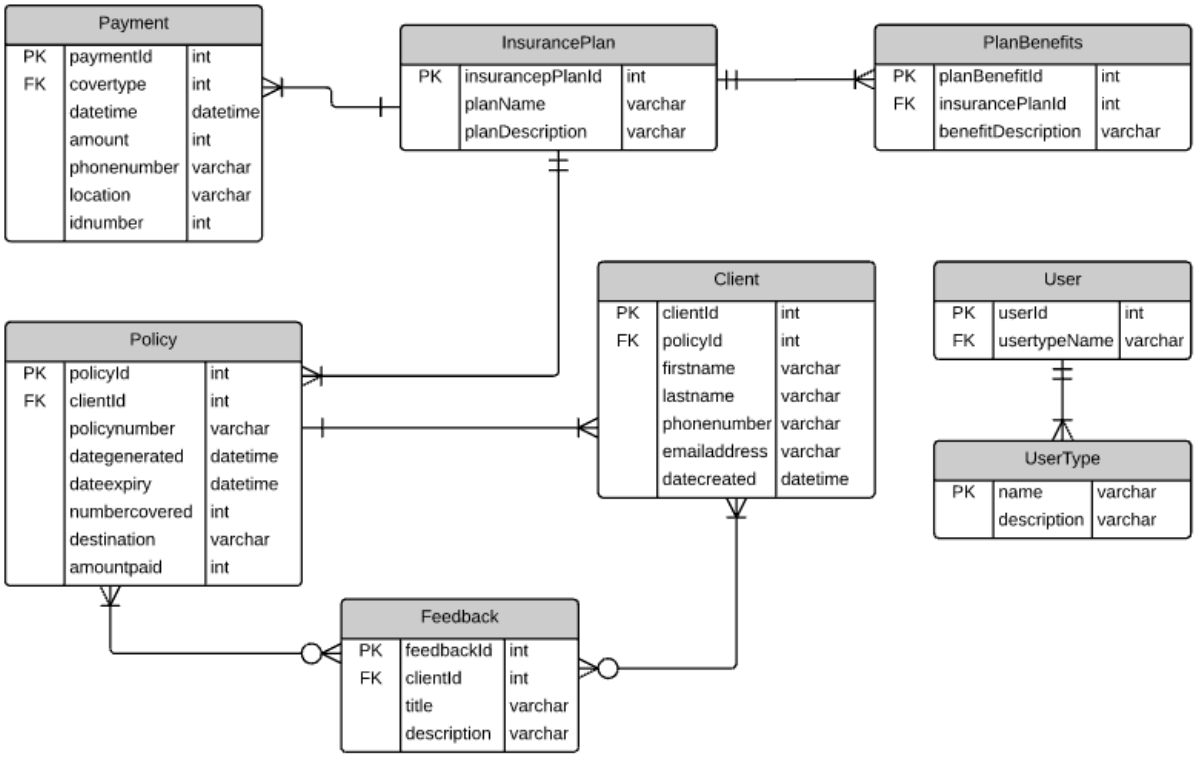

Figure 4.3: Entity Relationship Diagram

4.2.4 Database Schema

Figure 4.4 shows the database schema, which shows the logical view of the database, how data is organized, how relations are associated as well as constrains applied on data.

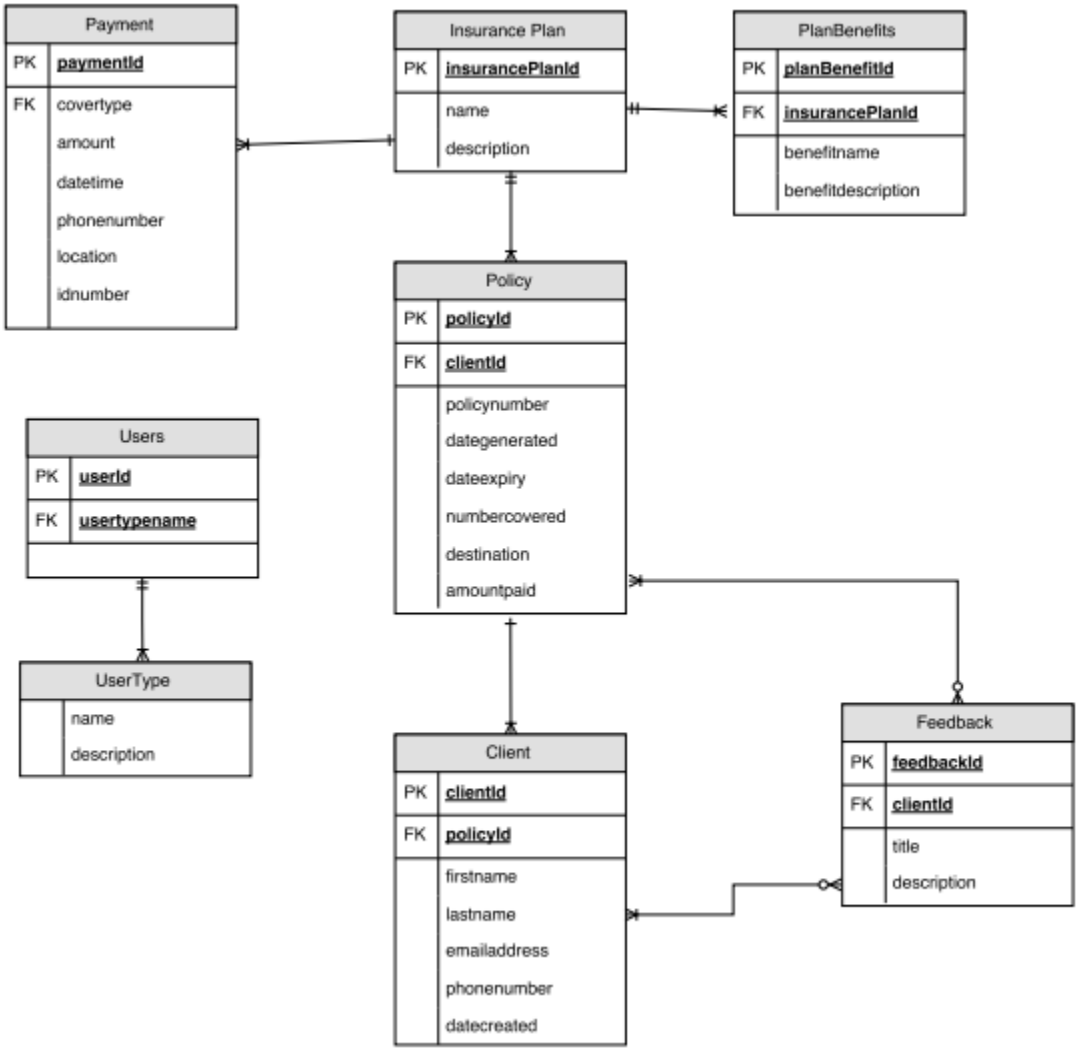

Figure 4.4: Database Schema

4.3 System Model

This includes inputs, processes and outputs of a system. The UML notation used to describe the system model in this case include a use case diagram, system sequence diagram, class diagram and a design class diagram.

4.3.1 Design Class Diagram

A design class diagram defines the actual class attributes and methods to be implemented (Laplante et. al, 2004). They represent a source of logic specification for the implementation of a class file within a programming logic (Marrer, 2009). Figure 4.5 shows the system's design class diagram.

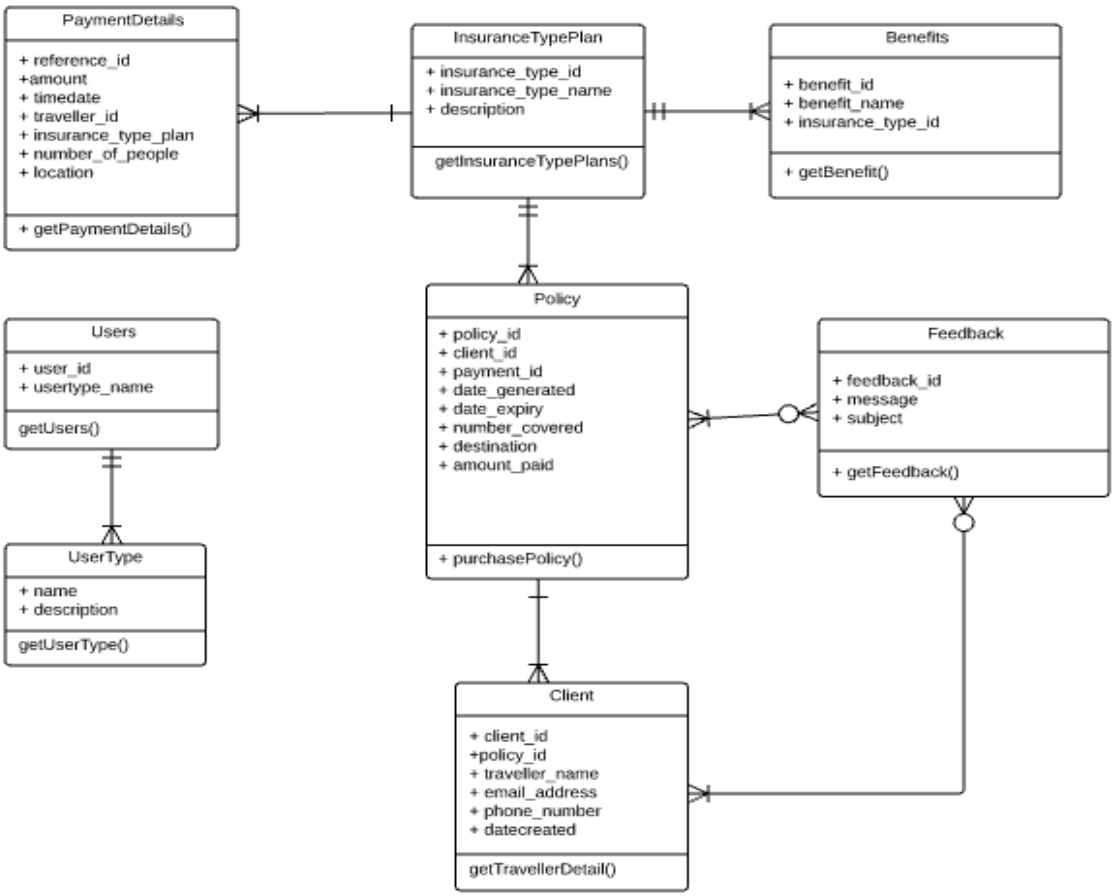

Figure 4.5: Design Class diagram

4.3.2 Use Case Diagram

A use case diagram visually represents the interaction between a user of a system and the system, or between another system and the system under observation. This captures the

functional aspects of a system (Aggarwal, 2005). Figure 4.6 illustrates the use case of the mobile application system.

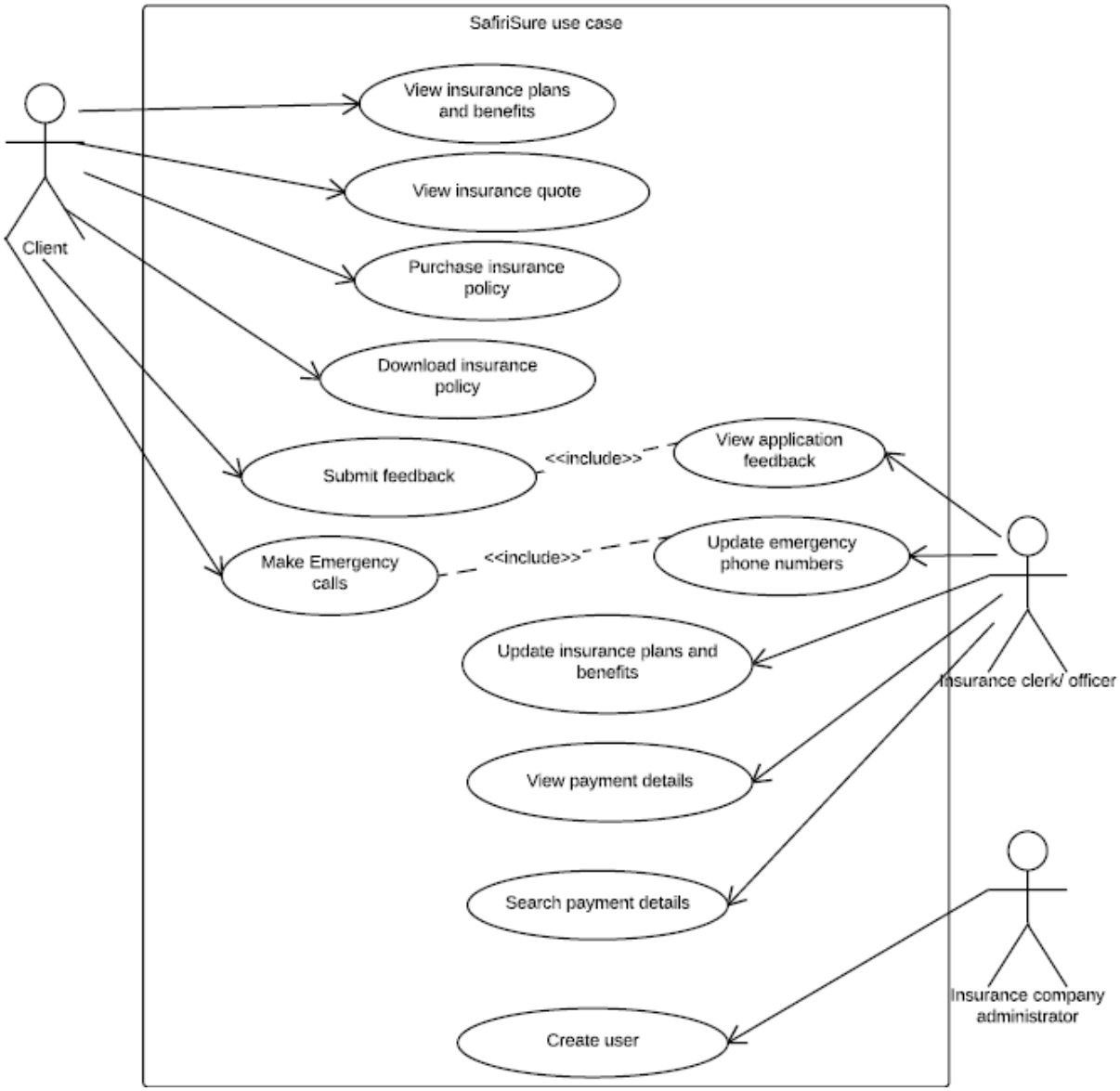

Figure 4.6: Use case diagram

4.3.3 Sequence Diagram

A sequence diagram shows events that external actors generate their order and inter-system events. (Larman, 2002). Figure 4.7 is a sequence diagram, which shows how objects interact with each other.

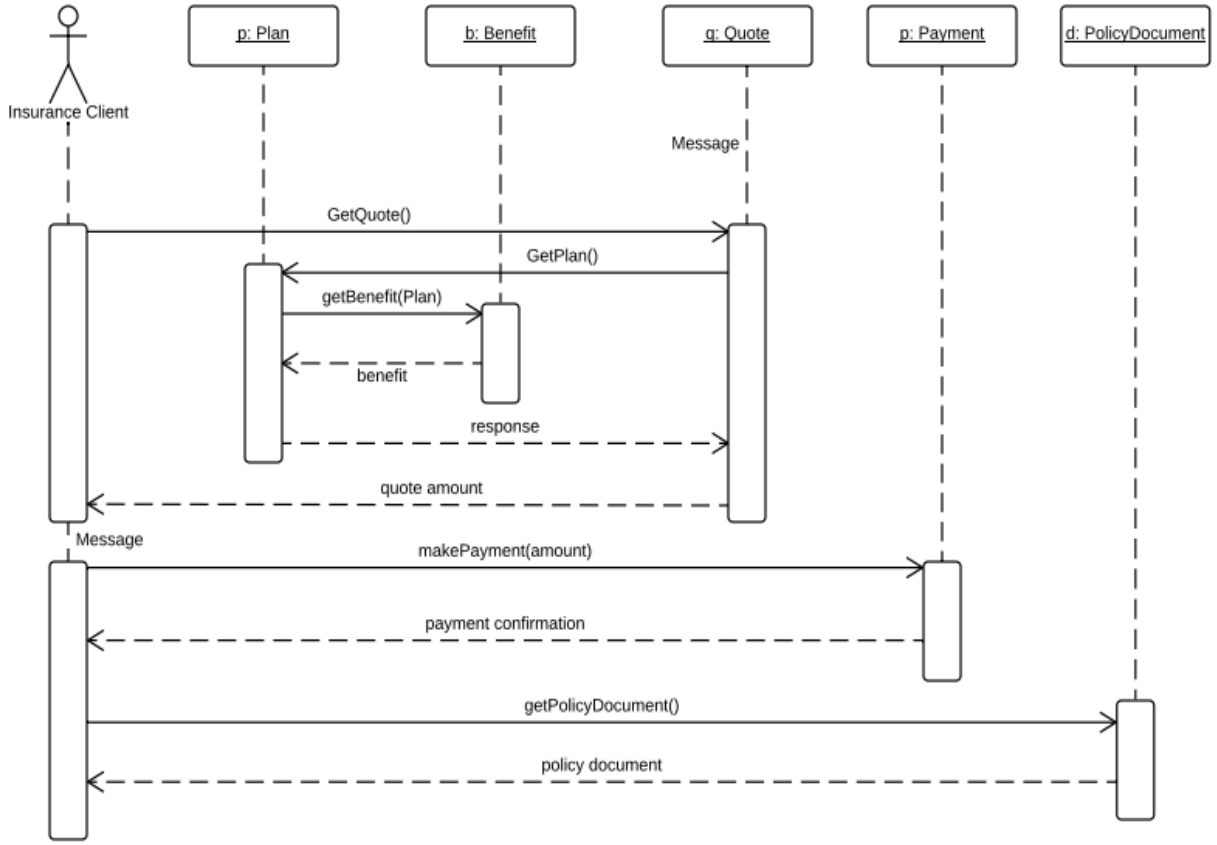

Figure 4.7: Sequence diagram

4.4 System Architecture

The application will be available for android based phones. The web portal will be accessible from different devices that can access web pages, that is, on desktops, tablets, laptops and mobile phones. The portal allows an insurance company officer to update insurance plans and benefits as well as view clients' feedback. It also allows the administrator to create other users of the system, these being company officers or other administrators. The company officer and the administrator have different access rights.

This is a three – tier architecture, in which the presentation layer resides the client. The business logic tier is where all the logic in the system lies. Logical decisions and calculations take place here. The third layer, called the data layer is where storage of persistent data, the databases exists. In this case, the client can access data stored persistently in the database via a mobile phone, and the same content can be accessed by an insurance clerk via HTML on

another device that can access web applications. The information viewed is also restricted, based on user rights. Figure 4.8 shows 3-tier system architecture.

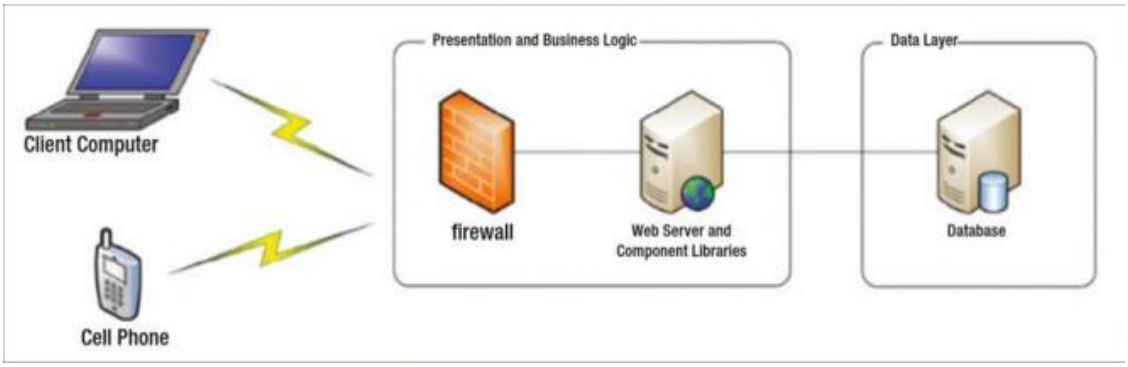

Figure 4.8 System Architecture (Crookshanks, 2015)

4.4.1 Security

The mobile application makes a call to the pesapal API to allow for payment process. The pesapal API brings with it security for the transfer of money for the clients, transactions are also securely carried out and it is simple to use pesapal as a payment system. This is because, pesapal has partnered with banks, mobile network operators, and credit card companies to give clients as many payment options as possible. The payment transactions are then saved to the database. This is handled by a Hypertext Preprocessor (PHP) script that handles communication between the mobile phone, the pesapal API and the database.

4.5 User Interface Design

The wireframes give a picture of how the system will look like after development. Figure 4.9 and 4.10 show the wireframes for the mobile application. It shows the stages from selection an insurance plan, to obtaining a quote, registration of the client, making payment via the pesapal API framework, after payment is a success, the client can then download the policy to their phones for viewing and printing.

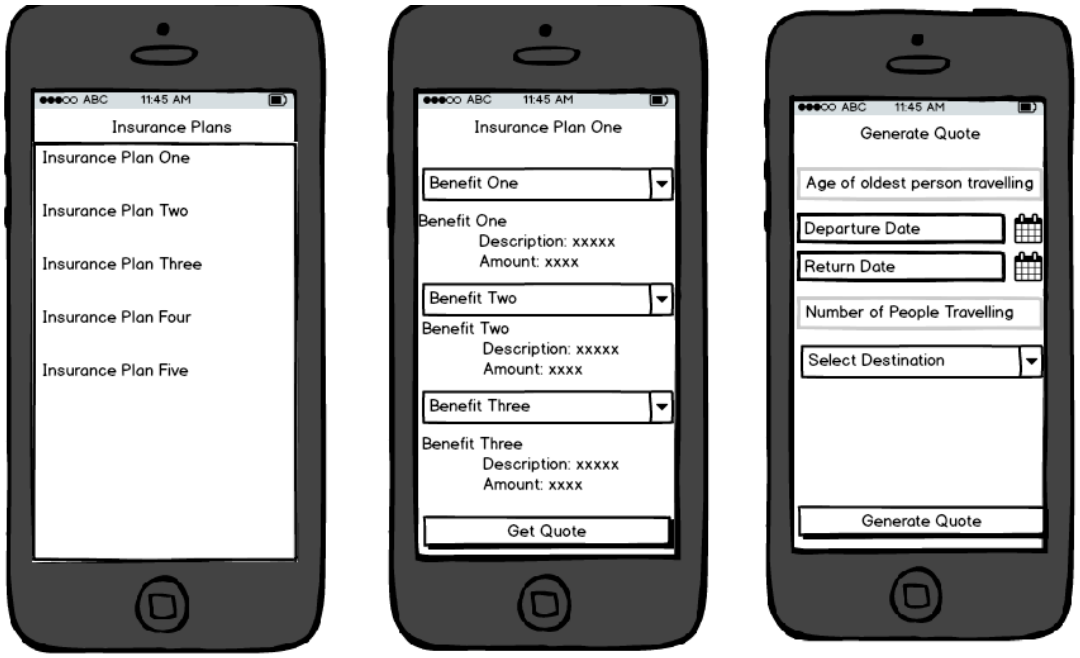

Figure 4.9 Mobile Application Wireframes

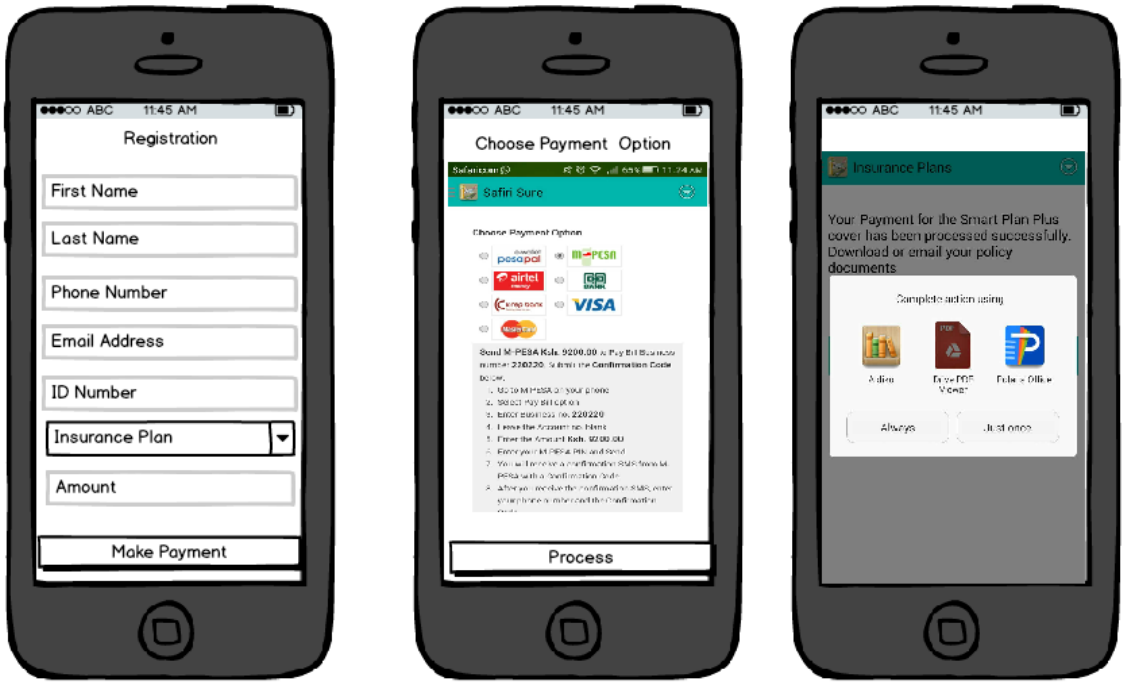

Figure 4.10 Mobile Application Wireframes

CHAPTER 5: SYSTEM IMPLEMENTATION AND TESTING

5.1 Introduction

The insurance system developed is meant to aid clients in the purchase of travel insurance via mobile phones. This brings about convenience, ease and efficiency. It will assist an insurance company to enhance its automation of the underwriting process. This aims at increasing travel insurance sales and improves awareness of travel insurance packages. Clients using the mobile application can also be able to make in app calls to the insurance company, as well as send feedback. The mobile application has been tested by 197 participants who gave feedback on it. An insurance company will also have a backend portal, where the system administrator can view, edit and add insurance plans, benefits and costs. They can also view clients' payment details as well as the selected insurance type plan and the policy number.

5.1.1 SafiriSureHome Page

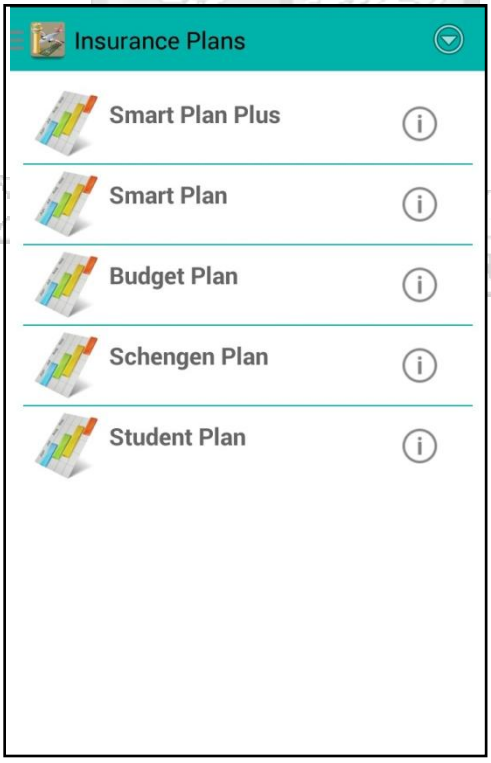

Figure 5.1: SafiriSure Home Page

Figure 5.1 shows the home page for SafiriSure mobile application. It consists of a list of insurance type plans provided by an insurance company. Insurance Type Plans are the packaged services provided to carry with them specific benefits that an insured benefits from, and the company pays for in case of indemnification. The listing options are clickable, and they give more detail in terms of expenses covered in each insurance type plan. This screen is important because it allows the user to see the variety of insurance plans provided by an insurance company. By selecting a particular insurance plan, the user can see the benefits provided for each insurance plan as well as the cost associated with each plan.

5.1.2 Get Quote Page

In this screen, the user is required to fill in the age of the oldest person travelling, the departure and return dates, the number of people travelling, (this caters even for group travel) and finally the destination. This screen is important, since, once the user has selected the kind of plan to pay for, they will need to know how much it costs. After filling in the required details, the expected amount to be paid is displayed as is indicated in Figure 5.2

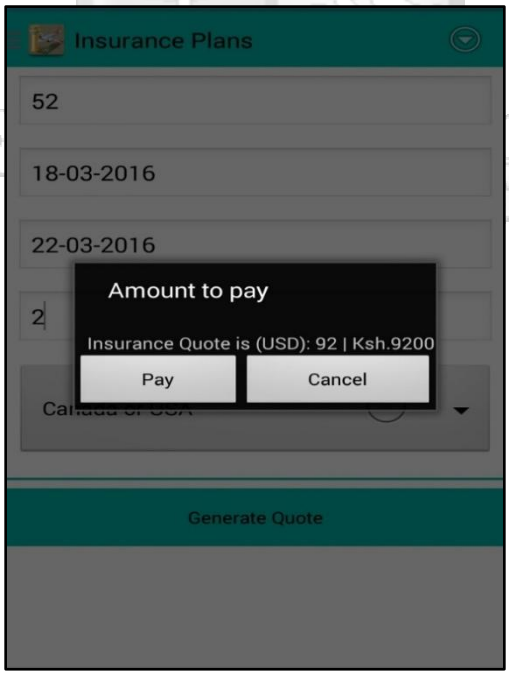

Figure 5.2: SafiriSureGet Quote Page

5.1.3 Payment Page

This screen is important because it enables a user to make payment for the selected insurance plan. This brings about ease of payment as well as convenience, because the user does not have to travel to the insurance company to make payment or make a bank deposit. Payment is made from the convenience of the user's location. Figure 5.3 shows the pesapal payment page. This is displayed after a user registers into the system, so that it is easy to track a payment to an individual who has used the system.

Figure 5.3: SafiriSure Payment Page

5.1.4 Get Documents Page

This is an important page since, once payment has been made, the user will need a travel policy document. From this screen, the user is able to download it to his/her phone, and thus print it or save it for later. Figure 5.4 displays the Get Document Page.

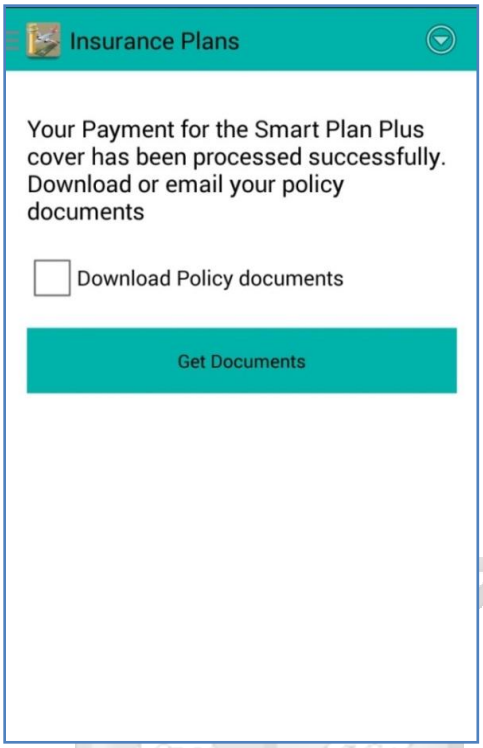

Figure 5.4: SafiriSure Get Documents Page

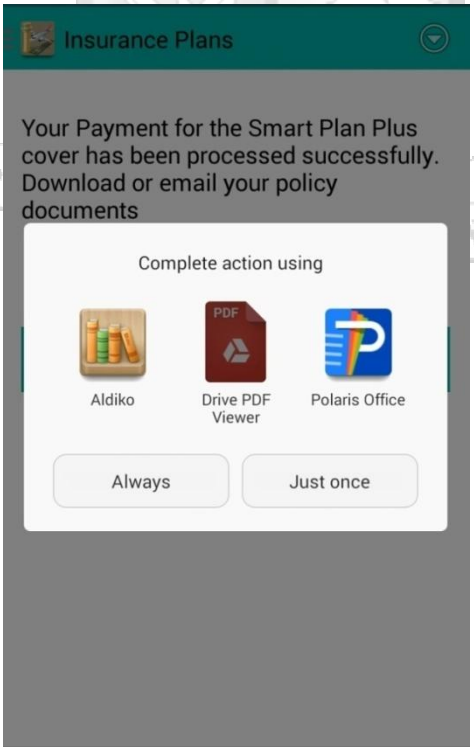

Figure 5.5: SafiriSure. User can be able to read the downloadable policy document

5.2 Safirisure Backend System

The website for an insurance company has been developed using CodeIgniter framework. Codeigniter is an open source PHP framework, which uses the model-view-controller architectural pattern. It easily allows third party plugins for additional functionality. It easily integrates with the database, thus allowing an insurance company to view details concerning clients payment. Insurance plans as packaged by an insurance company are also added to the database via this website, and are dynamically updated to the clients' mobile devices. The backend is accessed by insurance clerks and the insurance company's system administrator. The backend system was helpful to the insurance company in several ways. The system has a log in point, where one could log in as a system administrator or as an insurance clerk. When logged in as an administrator, the system allows you to set passwords for the insurance clerk. When logged in as an insurance clerk, the system provided for the following major functionalities;

i. Insurance purchase analysis – This functionality provides the insurance company with a presentation of the collected data. It provides the insurance company with details of how a specific insurance type plan performs as compared to the rest of the plans, therefore, which plan clients buy more of. It also provides the details of how many clients exist, and which of the plans they have bought, as well as comparing the locations in which more insurance is purchased by the clients. This information is helpful because it allows the insurance company to know how to better package their services in terms of cost and location, so as to attract more clients and therefore make more profits.

ii. View Payment transactions – since the payment details are collected via the mobile application, they are recorded and can thus be viewed by the insurance clerk, who can thus verify that a particular payment has been made, can search through the payment records, as well as print the payment records.

iii. Add/Edit Insurance plans – The system allowed an insurance clerk to add new insurance plans, its benefits and costs, as well as edit them in case of any changes afterwards. This is a powerful functionality, since the market demands are dynamic and an insurance company will need to adjust its package offers to meet the clients' changing demands.

iv. User management – From this functionality, a system administrator can create, edit or suspend users and also give them different user rights.

Figure 5.6 shows the insurance plan back end system, where the clerk can view the available insurance type plans and their descriptions. This is important since a clerk can add, edit or delete insurance plans and also add benefits associated with each insurance plan.

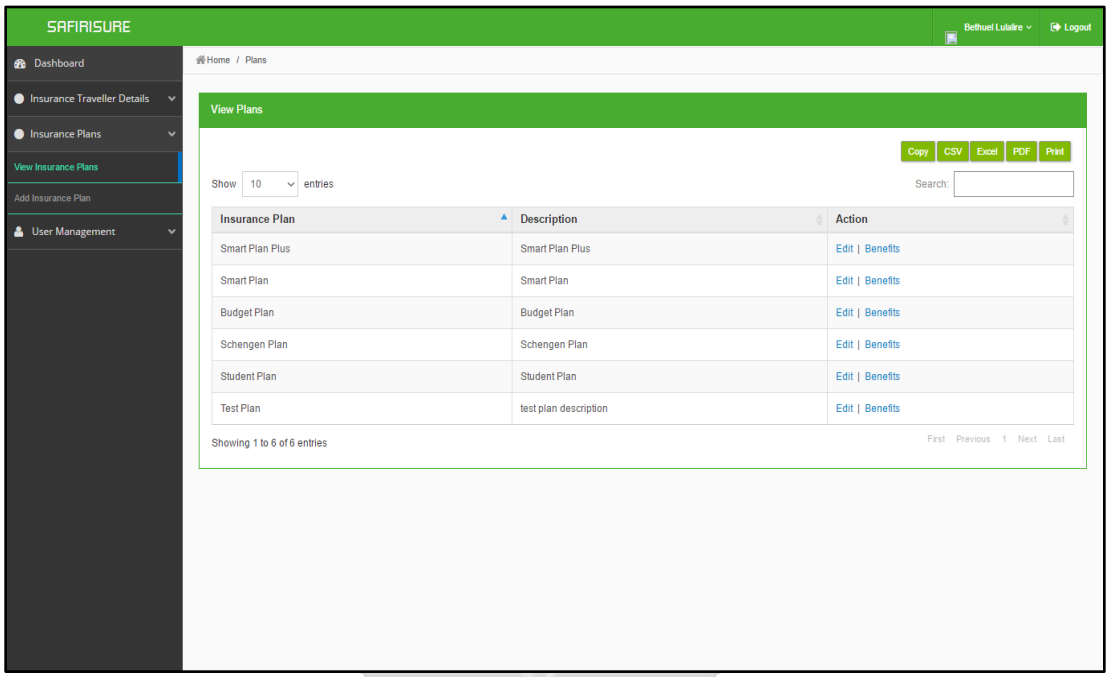

Figure 5.6: SafiriSure insurance plan back end screen

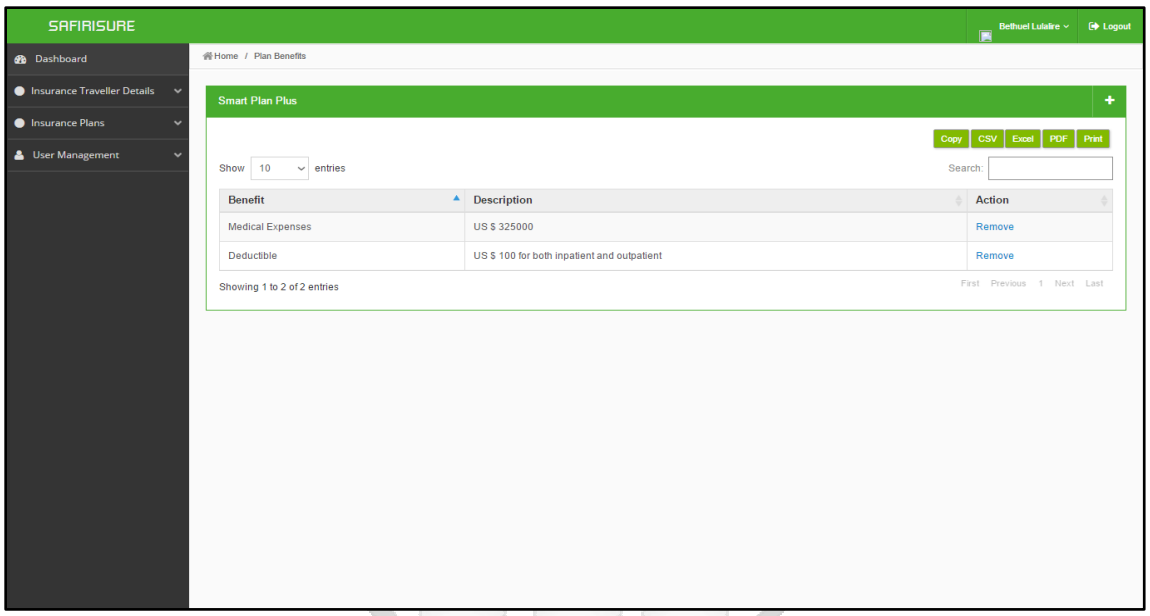

Figure 5.7: SafiriSure insurance benefits back end screen

The insurance clerk can also be able to fill in benefits, and descriptions in the benefits. Also, one can delete a benefit. This is indicated in Figure 5.7.

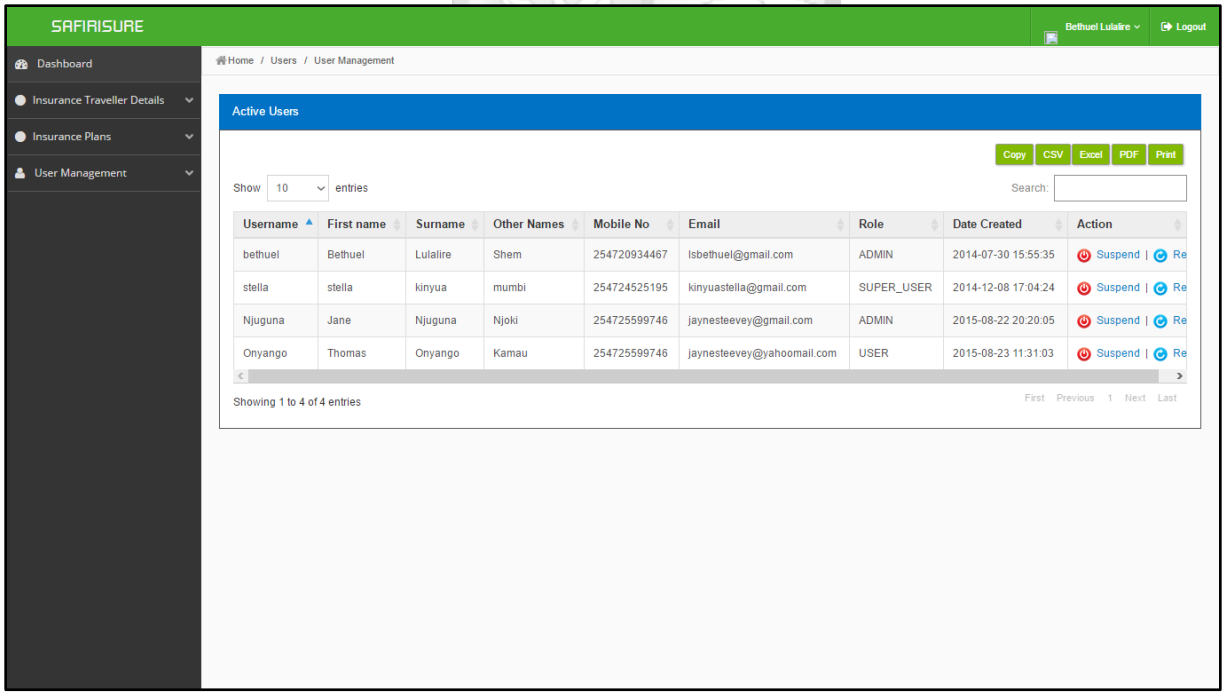

Figure 5.8: SafiriSure user management back end screen

The backend system also has a user management system, where users can be created, particulars edited and given different user rights. This is done by the administrator of the system. The user management functionality also provides the ability to search, and export users in the system.

5.2.1 Insurance Plans Analysis

The back end system has an analysis screen on the dashboard, where the insurance clerk can view the number of people who have bought the various kinds of insurance plans available. Figure 5.9 shows the number of insurance plans bought.

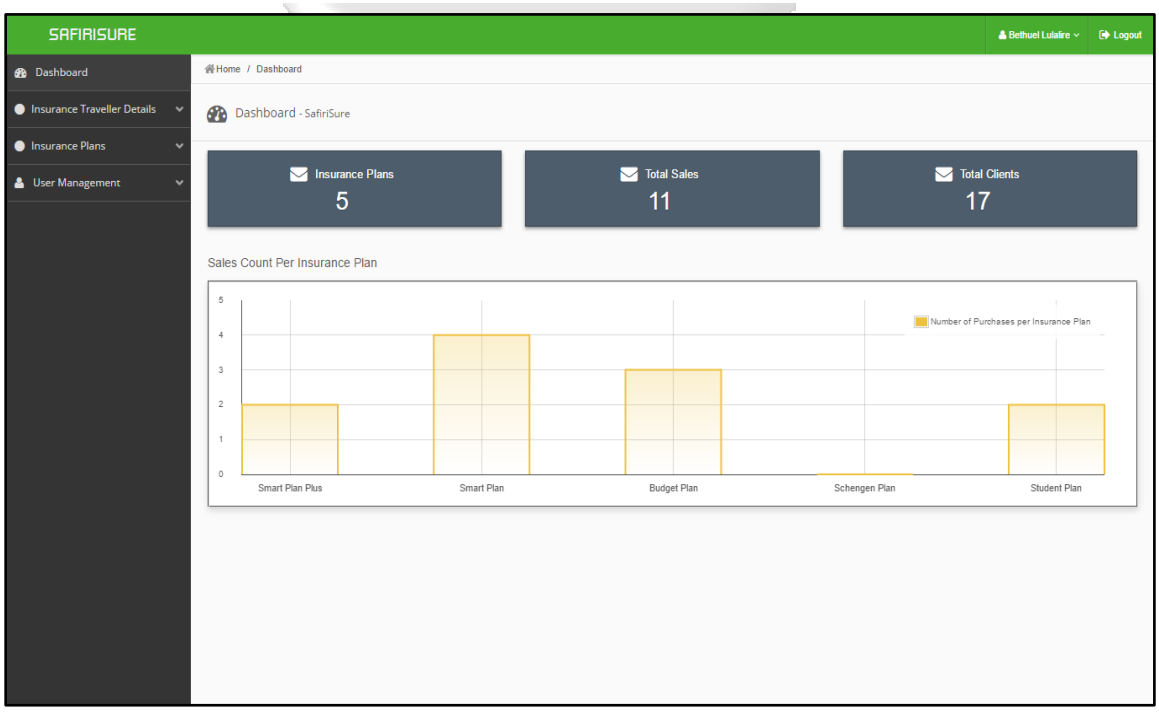

Figure 5.9: SafiriSure analysis of the number of insurance plans bought

According to how an insurance company has planned their cost per number of days travel, which insurance covers are preferred as compared to others, and the location to which their clients prefer to take covers for. This information is very important to an insurance company for the purpose of future decision making and planning. It goes a long way into aiding an insurance company on how to package their insurance products in a manner to attract

more clients and at the same time, improving on their service delivery. Figure 5.10 contains a summary in terms of percentages, of insurance plans purchased as compared to an 8 day plan. Figure 5.11 show the insurance plans bought as with respect to an 8 day cost plan in percentage terms. It further describes the locations in which more insurance is purchased. For example, the schengen plan is bought more for other countries excluding USA and Canada. While the Smart Plan Plus is preferred for countries that include USA and Canada. All this is within an 8 day cost plan.

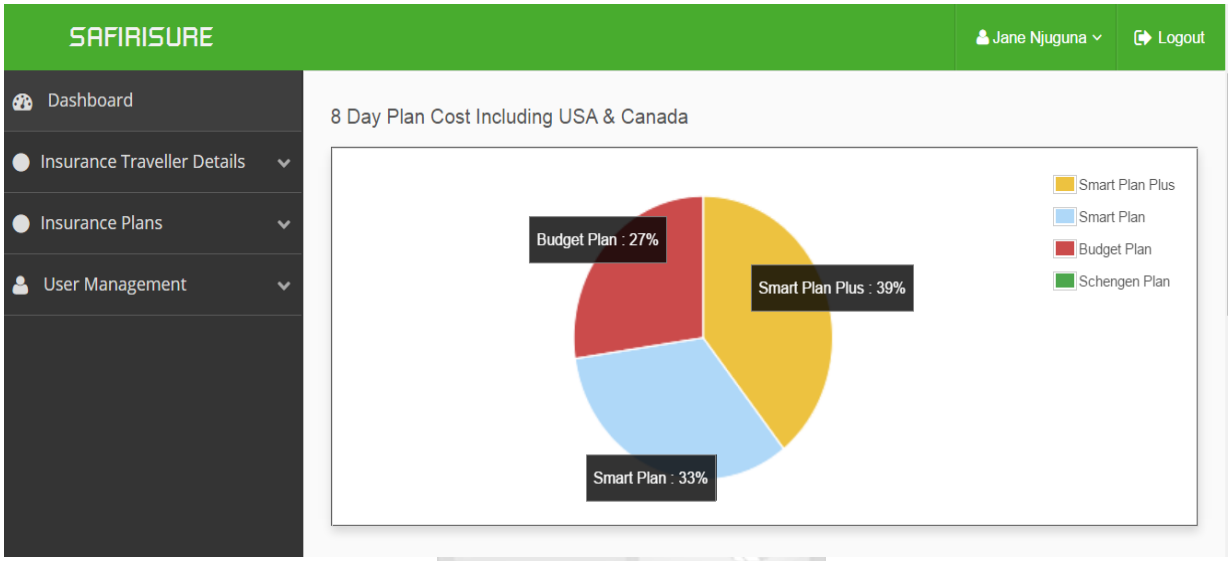

Figure 5.10: SafiriSure insurance plans bought with regard to an 8 day cost plan for countries including USA and Canada

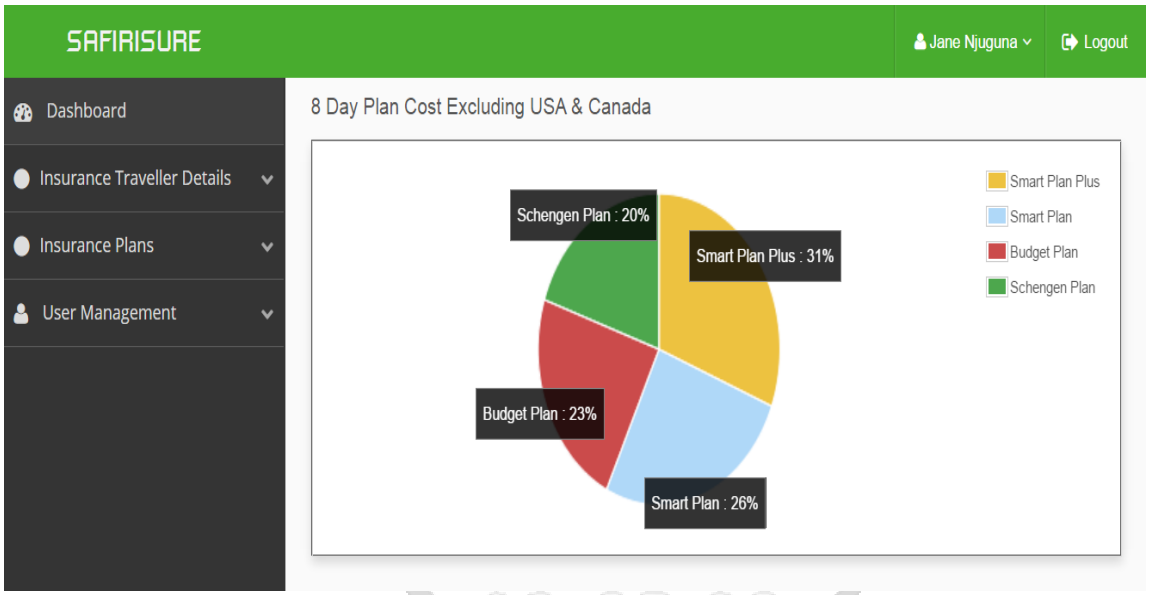

Figure 5.11: SafiriSure analysis of the insurance plans bought with regard to an 8 day cost plan for countries excluding USA and Canada

5.3 System Testing

It was important for the researcher to test the application. The aspects looked at was the efficiency, navigation, user experience, speed and effectiveness. This was done by a sample of 179 respondents as earlier calculated. The respondents differed in terms of age, occupation and employment as shown in Table 5.1.

Personal Information	Response	Total
Age	18 – 35	67
	35 – 55	97
	55 and above	33
Gender	Male	117
	Female	80
Occupation	Employed	125
	Unemployed	72

Table 5.1: Respondents interviewed

5.3.1 Respondents Demographics

Among the respondents interviewed by the researcher, 63% were employed. This was important because they have a high purchasing power as compared to the unemployed. The age

was also important since most people travelling were between the age of 18 and 55. Also put into consideration was the gender, where 65% of the respondents were male. Figure 5.6 indicates the age brackets of the respondents interviewed.

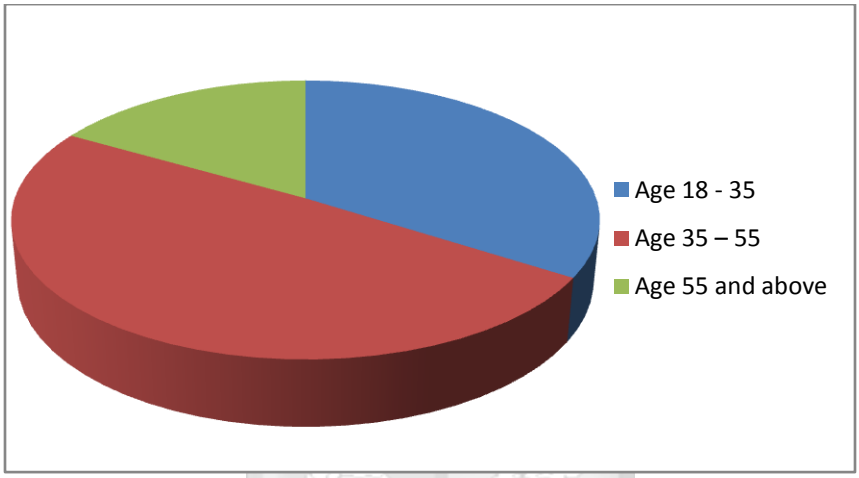

Figure 5.12: Age bracket of respondents

5.3.2 Testing Results

Testing was focused on individual features of the application, and also the entire application in terms of efficiency, effectiveness, navigation, and user experience. Figure 5.7 shows the general response given by the respondents about the use of the application in terms of efficiency, navigation, user experience and effectiveness. 135 of the respondents felt the application was effective. This was attributed to the fact that it was more flexible and preferred to make payment via mobile phones. 116 users felt the navigation from one screen to the next was good because of the flow for payment then download of the document, and also the contact page where they could make in app calls to the insurance companies. 91 felt the user experience was good, while 90 felt it was efficient.

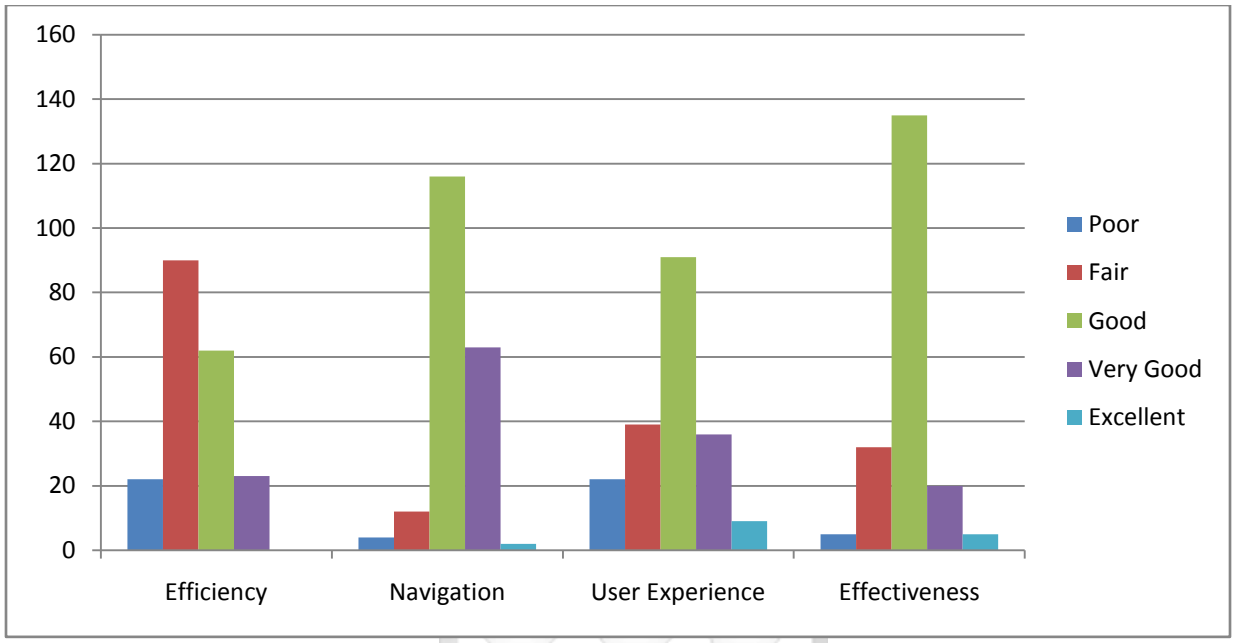

Figure 5.13: General use of the application

The application's modules were also tested. The results per module were generally good per module, as is indicated in Figure 5.8. However, for the payment module, 92 respondents felt it was fair in terms of performance. This is attributed to the fact that in case the respondent's internet strength was weak and therefore took more time for the application to complete the payment process, they would have to repeat the process of selecting an insurance plan again. They suggested a further improvement on the payment process. 123 respondents felt the insurance type module was good, while 15 and 5 felt it was fair and poor respectively. This is because depending on the type of users' phones and whether they were using data bundles or wireless connection for internet, speeds differed and therefore the screen took different times in terms of seconds to load insurance type plans for different users.

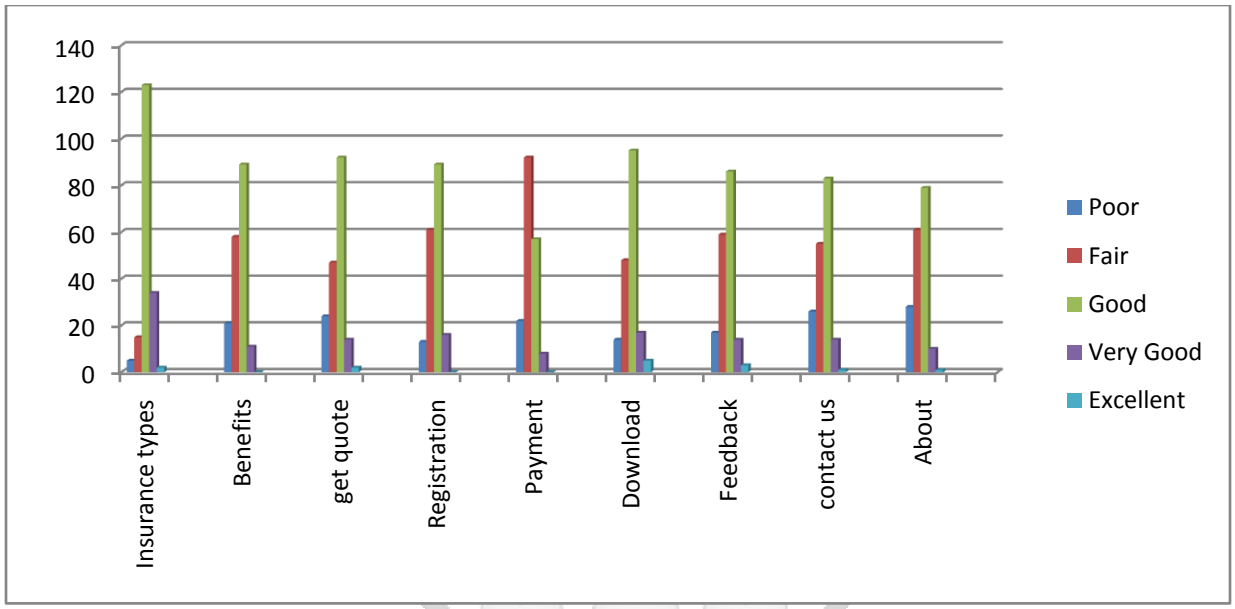

Figure 5.14: Application module performance

Each module was also tested in terms of speed. This is how fast a respondent was able to perform a particular function. Figure 5.9 shows registration and get quote modules being fast, according to 109 and 107 respondents respectively. Contact us module had 111 respondents feeling it was fast. This is because they were able to make phone calls by clicking on the displayed numbers, instead of having to copy the numbers and pasting them in the dialing section of the phone to make a phone call.

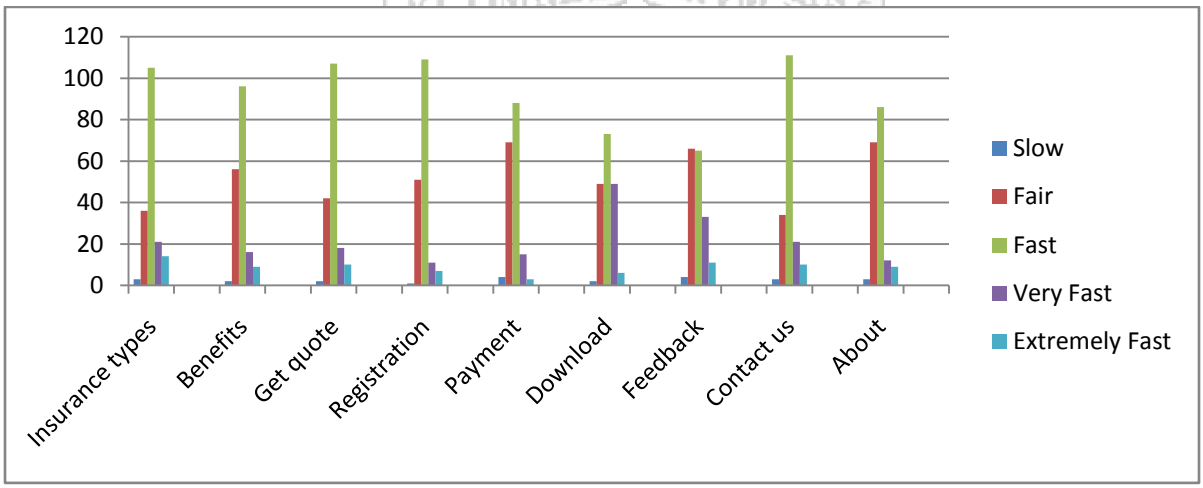

Figure 5.15: Application modules speed performance

5.4 Summary

The feedback given by the respondents were extremely important to the researcher. The application is important in the insurance industry because of the flexibility and ease of making payment for the travel packages. It brings about convenience, in that the users do not have to travel to make payment and obtain policy documents for travel and they have an option to call in case of an emergency.

The challenges brought up by respondents included an improvement on the payment module, so that the user does not lose the transaction details to be accessed, either due to a slow internet connection, of a user cancelled the transaction accidentally. The slow loading of screens' data also happens to the other screens, because the user must be connected to the internet to use the application.

The respondents also suggested more variety in terms of the payment options. This, they suggested would increase convenience and flexibility among the payment options. The application would be improved by putting into consideration suggestions provided by the respondents. The objectives of the research were met by trying to fit the reviewed systems into the local context.

CHAPTER 6: DISCUSSIONS OF RESEARCH FINDINGS

6.1 Introduction

A careful analysis of the data collected by the researcher achieved its objectives as earlier outlined in chapter one. The literature review also revealed the basic insurance flow process during insurance underwriting. It also revealed the weakness and challenges of insurance penetration in Kenya, as well as services with high and low consumption in the insurance sector. It revealed insurance as being amongst the least consumed.

The review of insurance penetration in Africa revealed the urgent need to be innovative and adoptive in Kenya, so as to avoid being left behind by a world that is rapidly evolving technologically (Commonwealth Business Council, 2000). With drivers such as energy, construction, and mining projects in Africa, insurance groups are attracted to offer services. It also revealed a market whose clients want a faster response in service delivery and customer care.

The systems architectures, frameworks and models reviewed were also important in the research. A look into mobile enterprise application platforms revealed some similarities shared at the platform level. The study also revealed that a good mobile system is therefore based on patterns of business processes, network configurations and software development (Unhelkar, 2009). Mobile service oriented architecture enables applications to offer services through network connections. It is these aspects that the researcher put into consideration in the later stages of the system development.

The literature review was able to show the need for a mobile application system as an extension of an insurance enterprise service process in Kenya. Putting into consideration the threats and weaknesses the Insurance Revenue Authority in Kenya faces in its attempt to improve insurance uptake and provide better services. Such an application would inject innovation into the current insurance systems in Kenya, enhance automation of the underwriting process and improve the insurance image. The convenience, ease and efficiency in the use of the mobile system would in turn increase the number of people purchasing insurance, as well as improve awareness of an insurance company's travel products. These

favorable factors that enhance an ongoing service process led to the researcher developing a mobile application for the insurance travel industry.

6.2 Mobile Application

The respondents who tested the application were very helpful in the research. Majority said the application was good and they would prefer to use it as opposed to the current process they use in obtaining travel insurance. They however noted that a lot more needed to be done to enhance a wholesome experience, especially when it came to compensation and reimbursement in case of loss of property especially and hospital bills paid out of pocket during the travel respectively.

The modules most appreciated by the respondents were;

i. The payment module; this was especially important because they could make payment via their mobile phones, irrespective of their location. This proved to be convenient since they would receive acknowledgement of the payment and even download the policy document necessary for travel, thus no need to visit the insurance company to collect it or confirm payment.
ii. The Contact us module was also very much appreciated because of the need to contact your insurance company in case of questions or clarifications at whatever level of the policy process one was at. This proved to be convenient at bringing the client closer to the provider, instilling confidence and reassurance.

6.2.1 General Application Feedback

Some of the questions asked during this testing phase were how the respondent would rate the application, and which were their favorite modules or functions in the application. Table B.1 in the appendix section shows the overall feedback in terms of efficiency, navigation, user experience and effectiveness. 116, 91 and 135 of 197 respondents felt it was good in terms of navigation, user experience and effectiveness respectively. This represents 58%, 46% and 68% of the respondents. However, 45% felt it was fair in terms of efficiency, and therefore needed improvement. This is 90 out of 179 respondents. The efficiency especially in the payment module which would force them to repeat the process by selecting

the insurance types again, in case there was a network problem and the payment confirmation was not received on the phone.

6.2.2 Individual Modules Assessment

During testing, individual modules of the application were also tested. 123 of the respondents, which represent 68%, felt the insurance plan module was good as compared to the rest. However, 92 out of 197 respondents, which are 51%, felt that the payment module was fair and it needed improvement to make it more efficient. 53% felt the download module was good, while 46% and 48% felt the contact and feedback modules respectively were good. However, 48 respondents out of 197, which represents 26% felt the download module was fair and suggested email as an alternative means of obtaining the policy document instead of downloads to phone. Since this would allow them to respond to the insurance company in case they wanted to ask questions or seek further clarification about the policy. Table B.2 in the appendix section displays the results of the testing on per module performance.

6.2.3 Modules Assessments in terms of Speed

The respondents were generally comfortable with the insurance plan module's speed as compared with the rest. This is indicated in Table B.3 in the appendix section. 105 respondents out of 197 felt it was fast. This translates to 58% of the test population. However, 38% and 36% felt the payment and feedback modules respectively were fair in terms of speed. This information was essential in determining how fast information was sent between the mobile device and the servers and thus, see on which modules to improve on, so as to have a better product

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The purpose of this research was to look into the underwriting process of insurance as well as the requirements for obtaining travel insurance in Kenya. How important insurance provision is to a society, and the challenges facing the Insurance Regulatory Authority in Kenya in an attempt to ensure more people are insured as they go about their normal lives. The strategic plan by the Insurance Regulatory Authority in 2013 (Insurance Regulatory Authority, 2013) revealed limited automation of processes, lack of innovation and an insurance industry that is conservative and resistant to change as some of the weaknesses and threats facing the insurance industry in Kenya.

In the literature review, existing platforms, models and architectures were looked into, which helped the research in determining the best approach to automating the underwriting process and with it, bringing in ease, comfort, flexibility into an already established process, without hindering its performance, but enhancing it. From the testing results gathered from the respondents, it became evident that the application was generally rated fair and thus more work needed to be done to improve on it. This is particularly on the efficiency in general and navigation.

7.2 Recommendations

From the research findings, the following came out as the recommendations;

i. The application should be developed for other platforms, these includes iOS for the mac devices, J2ME for the low end devices as well as windows platform for windows phones.
ii. The payment options to be made available, not just MPESA. This gives the application more flexibility
iii. The application should be made available for several insurance companies, not tailor made for only one insurance company. This would allow more people to use the application

7.3 Further Research Suggestions

The ability of users to interact with their phones anywhere and everywhere gives an opportunity for insurers to deliver real time customer-centric experience. Most insurance companies in Kenya have established processes, whether automated or manual. The use of innovation in technology to enhance the already existing systems brings about an improvement on service delivery and also builds loyalty. In the Kenya market, the insurance industry is of a conservative nature and resistant to change. However, more and more people are using mobile phone technology for more than basic calls and short messages. This brings about an opportunity to tap into and deliver the service to clients and improve on the image of insurance in Kenya.

Apart from the underwriting process, another aspect of the insurance industry that could be looked into, and that was also mentioned by a few respondents was enhancing the insurance companies to be able to indemnify its clients in case of a loss in an efficient manner. One of the factors contributing to users shying away from insurance purchasing is the slow inefficient process involved in compensation. The use of technology to improve on these services would greatly improve the confidence in the Kenyan market as it would improve on loyalty and also reduce the gap between the insurer and the insured.

Overall, customer expectations of simplicity and transparency need innovation in service design and delivery. This would lead insurers to get better at targeting customers and customizing product and service attributes to meet their specific needs, amassing greater customer surplus. Therefore, research into how to achieve this would be highly recommended.

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APPENDICES

Appendix A: Mobile Application Questionnaires

Research Questionnaire

- The researcher is conduction a research on how effective a mobile application will be in the purchase of travel insurance.
- All the information collected will be treated with utmost confidentiality and shall not be shared without the prior authorization of the respondents.

PART A: PRE – TEST QUESTIONAIRE

Part 1: Demographics
(*Please tick appropriately*)

1. Age:
   18 – 35 ☐ 18 – 35 ☐ 55 and Above ☐

2. Gender:
   Male ☐ Female ☐

3. Occupation:
   Employed ☐ Unemployed ☐

Part 2

4. Do you have a smart phone?
   Yes ☐ No ☐

5. Is your phone Android based?
   Yes ☐ No ☐

6. Do you purchase travel insurance cover?
   Yes ☐ No ☐

a. If Yes, how is the experience for purchasing one?

Takes too long to purchase one (too many processes) ☐

Excellent ☐

Other ☐

If Other, kindly explain further _____

_____

b. If No, why?

I do not know how to obtain one ☐

It is a lengthy process ☐

Other ☐

If Other, kindly explain further _____

_____

7. Will a mobile application that enables you to purchase insurance be helpful? Explain briefly _____

_____

PART B: POST TEST QUESTIONNAIRE

Part 1: Mobile Application Testing

In application testing, ask the user to do the following test;

1. View insurance type plans
2. View benefits associated with a selected insurance plan
3. Enter travel details
4. View insurance quote
5. Enter registration details
6. Make payment
7. Download and view travel document
8. Interact with feedback feature
9. Interact with contact us feature

Type Plan;

Task 1: This module enables the user to view insurance type plans

Test Metric 1: Ease of loading the list of insurance type plans

Benefits;

Task 1: This module enables the user to view the specific benefits and amounts attached to each benefit, depending on the type plan selected in the Type Plan Module.

Test Metric 1: Ease of loading the respective benefits

Test Metric 2: Ease of viewing the amount attached to each benefit once a benefit is clicked

Insurance Quote;

Task 1: This module enables the user to enter travel details to be used to generate the travel quote

Test Metric 1: Ease of filling in the required travel details
Test Metric 2: Ease of viewing the required amount to pay

Registration;

Task 1: This module collects user's personal details

Test Metric 1: Ease of filling in user's personal details

Payment;

Task 1: This task enables one to select a payment option and submit payment details

Task Metric 1: Relevance of the information in the page
Task Metric 2: Clear instructions on how to make payment
Task Metric 3: Ease of submitting payment details

Download Policy;

Task 1: The task contains provision for downloading the policy document to one's phone

Task Metric 1: The ease of downloading the policy documents to the phone and viewing

Feedback;

Task 1: This task enables the user to give feedback to the insurance company

Task Metric 1: Ease of filling in and sending the feedback

Task Metric 1: Receiving the appropriate notification after sending the feedback

Contact Us;

Task 1: This task contains phone numbers the user can use to contact the insurance company

Task Metric 1: Ability to make an in app call

About Module;

Task 1: This task has information about the application

Task Metric 1: Relevance of the information in the page

Part 2: Post Application Testing

1. Generally, how would you rate the application?

	1	2	3	4	5
Efficiency					
Navigation					
User experience					
Effectiveness					

5 – Excellent, 4- Very Good, 3 – Good, 2 – Fair, 1- Poor

2. How would you rate the system in performing the following functionalities?

	1	2	3	4	5
Insurance types					
Benefits					
get quote					
Registration					
Payment					
Download					
Feedback					
contact us					
About					

5 – Excellent, 4- Very Good, 3 – Good, 2 – Fair, 1- Poor

3. Which feature did you like most in the application and why?

_____

4. Which feature did you dislike most in the application and why?

_____

5. What improvements would you suggest for the application?

_____

6. How would you rate the easiness of learning how to use the following features?

	1	2	3	4	5
Insurance types					
Benefits					
Get quote					
Registration					
Payment					
Download					
Feedback					
Contact us					
About					

5 – Excellent, 4- Very Good, 3 – Good, 2 – Fair, 1- Poor

Appendix B: Post Application Test Questionnaire Responses

Table B.1 indicates the general response from respondents on the efficiency, navigation, user experience and effectiveness during the testing phase.

	Efficiency	Navigation	User Experience	Effectiveness
Poor	22	4	22	5
Fair	90	12	39	32
Good	62	116	91	135
Very Good	23	63	36	20
Excellent	0	2	9	5

Table B.1 General Response on the mobile application

Table B.2 shows the response based on the modules in the application. It is a reflection of how they felt when interacting with each module.

	Poor	Fair	Good	Very Good	Excellent
Insurance types	5	15	123	34	2
Benefits	21	58	89	11	0
get quote	24	47	92	14	2
Registration	13	61	89	16	0
Payment	22	92	57	8	0
Download	14	48	95	17	5
Feedback	17	59	86	14	3
contact us	26	55	83	14	1
About	28	61	79	10	1

Table B.2 Response on per module performance

Table B.3 shows the general assessment of how fast each individual module would complete a function as compared to the rest.

	Slow	Fair	Fast	Very Fast	Extremely Fast
Insurance types	3	36	105	21	14
Benefits	2	56	96	16	9
Get quote	2	42	107	18	10
Registration	1	51	109	11	7
Payment	4	69	88	15	3
Download	2	49	73	49	6
Feedback	4	66	65	33	11
Contact us	3	34	111	21	10
About	3	69	86	12	9

Table B.3 Response on per module speed performance

Appendix C: Turnitin Report

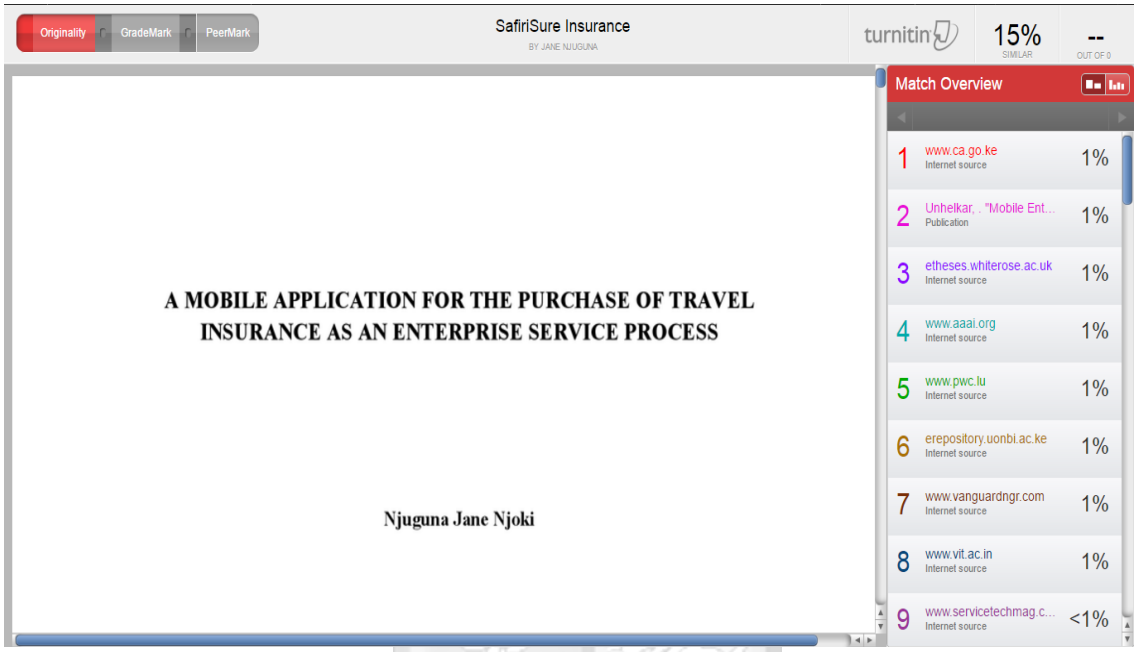

Figure C.1 shows the researcher's turnitin report, containing the similarity analysis