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Health Underwriting Information System, A Case of Britax Insurance Company Kisumu

Kwama Leonard Ogweno[1], Ratemo Makiya Cyprian[2], Ondolo Ann Atieno[3]
[1]*Maseno University, School of Computing and Informatics, Department of I nformation Technology, Private Bag, Maseno, Kenya*

Executive Summary: *This project sought to investigate the practices in health/medical insurance underwriting and supervision in Britax insurance, Kisumu and to establish how information technology can be used to enhance the supervisory role of health/medical insurance underwriting. Britax insurance is a small company that was incepted in 2007 and has a staff of 23 personnel. The Company faces major problems in data collection of client's details, loss of records, delayed premium calculations and delayed preparation of policies. The project intends to improve service delivery at the company and ensure that volatility is reduced on the claims. Main objectives of the study were to design, develop and test a working prototype of the health / medical insurance underwriting system. Objectives were achieved by obtaining data from Britax Company which were conducted through observation and interview of staff members. The project would guarantee accurate reports, calculates premiums, faster data collection and preparation of policies and store clients information accurately. The project made an extensive review of literature in the domain of insurance underwriting regulation and data gathered at the Britax company so as to establish trends and determine the need for an information technology based health / medical underwriting system. The structured approach of waterfall methodology was used in the study in which progress flows steadily downward through phases. The project findings revealed that an integrated information sharing platform could provide great improvements to the manual and paper based processes used in health insurance underwriting and regulation.*

I. Introduction

Insurance companies are legal entities that cover the financial impact or part of it that derives from the occurrence of certain unexpected insured events affecting the insured. They offer this benefit in exchange for payment of a predetermined amount of money called premium. By

Pulling similar risks together insurance companies transform the unpredictability of the occurrence of an event to an individual into expected events affecting any one of the insured participants. (Wehrhahn, 2008).

(Macedo, 1998) Insurance companies can only create value by reducing the volatility of the claims if their portfolio consists of homogeneous risks, or at least if there is a sufficiently large number of similar risks and these are treated as one portfolio. Companies do accept risks that have different risk profile but the acceptance of those risks is done under different conditions, like charging an extra premium, applying exclusions or waiting periods to restore the necessary risk homogeneity in the portfolio.

The health underwriting process begins when you fill out an application. On that application, you are asked a variety of questions that will help the company you have applied to decide whether or not they are willing to insure you. Your application then goes to the people who make insurance decisions, called "underwriters." The underwriting process consists of three steps. First, they decide how much of a risk to their profits you present. Second, they decide whether your level of risk is acceptable by figuring up how much you might cost them in claims, based on that risk assessment. (If they anticipate your claims will cost them too much, then life or disability underwriters will reject your application.) And third, if they decide that yes, they will insure you, then they determine how much they will charge you for their insurance.

Underwriter's and agents play the important role in insurance companies of selecting and accepting risks that behave similarly or assessing the necessary acceptance conditions to those risks that differ to maintain the homogeneity of the portfolio. As an example, a person undergoing surgery will only be granted life coverage after a waiting period that according to the underwriter is necessary to classify the risk as a normal risk. The central role of the underwriter thus is to help the insurance company in creating homogeneous portfolios by evaluating the risks and accepting them under conditions that make them behave similarly (Society of Actuaries, 2010)

What is an Underwriter?

An underwriter is a professional that has the ability to understand the risks to which the underwritten object is exposed to. The job of the underwriter is to protect the insurance company from acquiring non profitable business. But this cannot mean that every risk should be declined and the decision has to be balanced with the necessity of accepting well understood risk to grow the business. (http:www.Finweb.Com, Insurance your Health)

What is an Agent?

An insurance agent, also called an insurance broker in some instances, is the local representative of any number of insurance companies. He or she is authorized to call on policyholders to deliver and explain policy, to analyze insurance program and suggest additions or changes, or to change beneficiaries, calculate premiums and establish payment method, customize insurance programs to suit individual customers. (http:www.Finweb.Com, Insurance your Health.

II. A Review Of Internet Technology Adoption Literature

Underwriters analyze risk and exposures of those risks to potential clients. Underwriting is based on guidelines which are different depending on the insurance company in question. However due to the emergence of brokerage firms there has been the need to standardize these guidelines to underwriting as the brokerage firms do underwriting for many insurance companies and use of different guidelines for each company will make the process complex and time consuming. A standard method of underwriting can help avoid this. (Bureau of Labour Statistics, 2006)

According to Dr.Guray A. Wickland (Wickland, 1987) Quality of service is probably the only differentiator in the insurance underwriting industry, where products have been reduced to commodities because of intense competition. Since many tasks involved with the new business and underwriting process are done manually, the average time to move a policy from application to issue is 30-45 days. Robeta M.Roth ((Roth, 1988) added that this time lag is something no insurance company can afford if they want to get new business and retain customers. And even worse, the sales force has to spend valuable time collecting application data – time it could have spent in the field turning prospects into clients. What carriers need, therefore, is insurance automated health underwriting software that speeds up the process. Since automated underwriting is the backbone of policy placement, automation of the underwriting process is the key to unlocking the goal of straight-through processing.

Risk management is the cornerstone of underwriting. Yet, insurance carriers of all types and sizes are unable to assess risk accurately on a consistent basis. A combination of manual practices, disjointed processes, legacy systems where rules are hard-coded or decentralized and lengthy implementation cycles impact carriers' ability to reduce exposure to risk. Perception of risk is highly influenced on the amount and relevance of information collected and a standardized system that collects the information needed and is essential in the decision making process. (Shaun S. Wang, 2010)

According to (Deaver, 2007) the underwriting process adheres to the following steps to work on a policy or claim, Agents submit applications and claims, the request is run through a scoring engine, with three possible outcomes, if it's approved it is passed on to the rating engine that develops a quote and automatically delivers it to the agent. This, of course, is the desired outcome for as many submissions as possible that ultimately would have been approved. If the request is flagged as an exception, it must be handled by someone in underwriting who performs a more manual analysis and more additional information may be needed. But often they are able to approve or reject the request based on the information provided, which represent opportunities to improve the performance of straight through processing. Insurance underwriting companies analyze all requests, all results of the straight through process.

(Myers and Cohn, 1986) , Companies have found that when a new policy request is flagged as an exception and requires more manual underwriting, it not only costs the company more money, it slows the process to the point where often the company misses out on an attractive opportunity.

Well designed insurance underwriting management systems have made underwriter's, insurance companies to be successful in offering services to their clients and has made them to be dedicated to making it work and be strong users within their practice to aid the transition from paper based underwriting records to electronic records. In other words technology facilitates but does not in itself bring about change. (Roth, 1988)

Adverse selection are said to exist when a risk (an individual) or group of risks that are insured is more likely than the average corresponding group to experience a loss. As a basic example, let's say that in a randomly-selected group of 1,000 people, 25-year-old individuals, only two might be expected to die in any given year. However, human nature is generally such that many healthy 25-year-old young adults do not typically regard the need to buy life insurance, and therefore prefer to spend their money on other things. It's usually only those 25-year-olds who are ill or perhaps employed in dangerous occupations that are likely to

purchase insurance. The underwriter's job is to ensure that an inordinate number of these poorer-than-average risks aren't accepted or the insurance company will lose money. (Linel Macedo, 2009)

According to (Actuaries and Underwriters, 2009) the underwriter has a number of resources that can be called upon to provide the necessary information for the risk selection process. These sources include the policy application, medical history and examinations, inspection reports and the producer or insurance agent. The application is an absolutely crucial document because it's usually attached to and incorporated as an integral part of the insurance contract. The producer must therefore take special care with its accuracy in the interests of both the insurance company and the insured. The application is divided into sections, with each designed to obtain specific types of information. Although the form of the application may differ from one company to another, most provide for submission of the following data, Part 1 (General Information), Part 2 (Medical Information), the Agent's Statement or Report, and the proper signatures of all contractual parties. Part 1 of the application requests the insured's general or personal data, such as name and address, date of birth, business address and occupation, Social Security number, marital status, and other insurance that may be owned. Part 2 of the application is designed to provide information regarding the insured's past medical history, current physical condition, and personal morals. If the proposed insured is required to take a medical examination, Part 2 is usually completed as part of the physical exam. After reviewing the medical information contained in the application and the medical exam, the underwriter may also request an attending physician's statement, or APS, from the proposed insured's doctor.

The Agent's Statement, which is part of the application, requires that the insurance agent provide certain information regarding the proposed insured. This generally includes information regarding the agent's relationship to the insured, data about the proposed insured's financial status, habits, general character, and any other information that may be pertinent to the risk being assumed by the insurance company. (Actuaries and Underwriters, 2009)

The producer signs the document as a witness to the applicants' signatures. Additionally, the application will also contain information regarding the policy owner's choices for the mode of the premium (monthly, semiannually, annually, etc.), the use of any dividends, and the designation of beneficiaries (Actuaries and Underwriters, 2009).

To supplement the information on the application, the underwriter may order an inspection report on the applicant from an independent investigating firm or credit agency, which provides financial and moral (or lifestyle choices) information. This data is used only to help determine the insurability of the applicant. If the amount of insurance being applied for is average, the inspector will typically write a general description about the applicant's finances, health, character, occupation, hobbies, and other habits. When larger amounts of coverage are requested, the inspector will provide a more detailed report. This information is based on interviews with the applicant's associates at home (including neighbors and friends), at work, and elsewhere. Such "investigative consumer reports" may *not* be made unless the applicant is clearly and accurately told beforehand about the report in writing. This consumer report notification is usually part of the application. At the time that the application is completed, the producer will separate the notification and present it to the applicant. Much of the information reported on the document becomes the basis upon which to accept or reject the proposed risk. Furthermore, as previously stated, a signed and witnessed copy of the application also becomes part of the policy, the legal contract between the insurer and the insured. (Harring & Niehaus, 2000)

The most essential element of this process for the producer is the display of accuracy, thoroughness and honesty when completing the application. Answers to questions must be recorded with exactness and totality, along with frankness and sincerity. The producer may not omit pertinent information or report it inaccurately in order to facilitate the policy's issuance. The ethical conduct of the producer with regard to the underwriting process must be, in all instances, above reproach. Additionally, the producer can also help to expedite the underwriting process by the prompt submission of the application, by scheduling the applicant for any necessary physical exams, and by assisting the home office underwriter with other requirements (such as obtaining an Attending Physician's Statement), as needed. (Chen & Lee, 1999)

Finally, if the applicant is rated or declined for coverage, it's the producer's role as a field underwriter to explain the reasons for the underwriting action. Seldom is an individual totally declined for life insurance, but it does happen that he or she may be classified as substandard and thus receive a rated (or substandard) policy in place of the one originally applied for. When this occurs, the producer must be prepared to not only explain the reasons for the substandard rating but also to explain the rated policy that the company has countered with. (Haley, 1995)

In Kenya the underwriting business is one of the highly affected sections of business that has changed to suite the customer needs by customizing policies and satisfying the boom as people want to avoid risks. Most of the insurance companies, the underwriting process is still manual where top management has to manually verify the work done by the agents before issuing policies,this shows lack of delegation and that organizations in the business still implore a tall structure which is not healthy for the current business sector. This has led to

the need for an automated system that managers can rely on to give outputs and accuracy of operations to help meet these needs of the customers within the shortest time possible.

2.1 Review of Related Work

From statistics few underwriting management systems have been developed, the project reviewed three of underwriting systems which were related to it.(F.Cannisiui, 1985) and (C.Nance,West Indies, 1985) Faculty of Engineering University of West Indies city of Trinidad developed FIS which was used to cover financial losses and disease caused by flooding .

Trinidad is an archipelagic state stretching from the tip of Florida in the United States to the north eastern coast of Venezuela in South America. Trinidad is situated at the southernmost end of the Caribbean island chain located at Latitude 10.5° N, Longitude 61.5° W and is approximately 5126km^2 in size. The climate of Trinidad is tropical wet and monsoonal type affected mainly by factors such as latitude, oceans, size of landmass and topography (Bryce 2007). Being in a tropical climate zone with average rainfall of 2200mm (WRA/MIN. Env. 2001), Trinidad is prone to high intensity rainfall resulting in frequent flooding.

In Trinidad flood is one of the major hazards affecting the country every year during all seasons (Ramroop 2005) and in recent years the number of flood occurrences has been increased throughout the country. Other than common causes, factors contribute to flooding in Trinidad are particularly indiscriminate dumping into streams and improper or illegal hillside land development and agricultural practices (WRA/MIN. Env. 2001). Damages caused by flood are physical damages to houses and infrastructure, causalities of people and livestock as a result of drowning and spreading of dreadful diseases, scarcity of clean drinking water because of water contamination and damages to food crops (Mileti 1999). According to Mileti (1999) the flood hazard causes drastic damages therefore it severely impedes country's economy. Trinidad's estimated damage of flood events in 1993, 2002 and 2006 are US$ 580,000, US$ 3,300,000 and US$ 2,500,000 respectively (WRA/MIN. Env. 2001, Brakenridge et al. 2003, Brakenridge et al. 2007). Individuals inhabit in flood prone areas are often affected by the flood and experience financial losses due to the property damages which are significant amount of estimated yearly damages.FIS was integrated to develop a private household flood insurance system for Trinidad to calculate premium based on household exposure to flood risk and speed up underwriting process to benefit the parties in the insurance market. In flood insurance, insured transfers potential financial loss triggered by flood to insurer in exchange for premium and compensation. The insurer insures again by transferring all or part of risk in a contract to a new contract with reinsurer as shown in their insurance model.

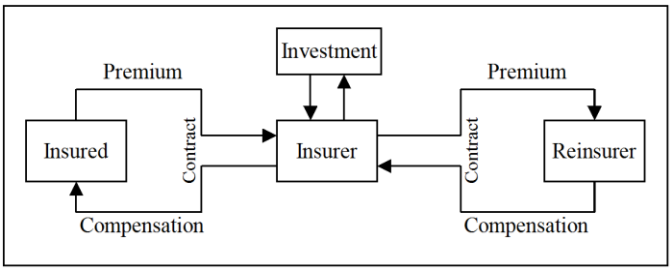


Figure 1: Insurance Model for Trinidad

Source: (www.urisa.org/files/canisius)

Flood insurance system(FIS) uses a private household insurance form to key in client's personal information and client provided information of house. The system assigns unique client ID for each client and at the end of the process system prints valid client ID card with photograph to prove that he/she is a holder of the particular insurance policy as well as issues flood insurance policy certificate. In regard to private house information the system assigns unique policy number for each house that is being insured. Then system allows user to enter address of the house in which system checks entered address against database. When system finds address it passes retrieved ID of particular address as a parameter to the ArcView avenue script to identify flood risk class using GIS data as shown in figure 2.

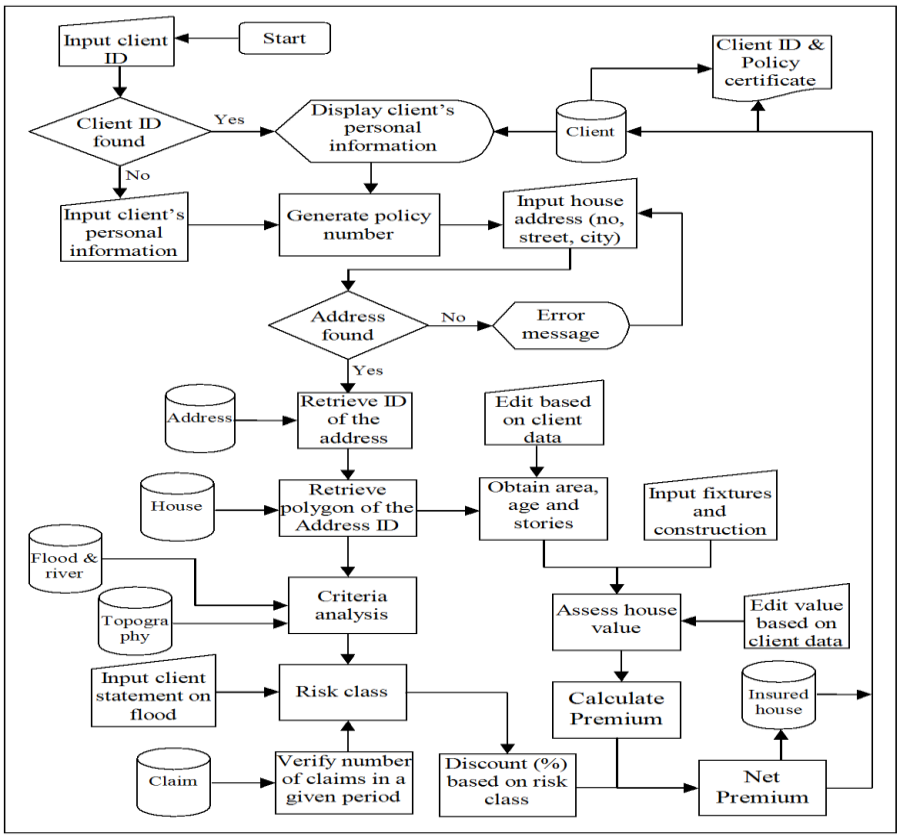


Figure 2: Trinidad Insurance underwriting flowchart diagram

Source: (www.urisa.org/files/canisius)

(Christopher Payne, 1996) Developed **ARU** to offer casualty insurance coverage in North America with services which were custom designed to benefit the members. ARU has a unique group captive model that is working with many different group captive insurance companies. The ARU approach minimizes volatility while maximizing profit potential. The group captives offer middle market companies coverage for worker's compensation, commercial auto, and general liability coverage's, property and other lines of commercial insurance are considered as well. All ARU captives provide ownership of all investment income and underwriting profit to the insured members. It employs a sophisticated underwriting and rating approach to qualify potential members. Once potential members are thoroughly underwritten based upon their loss experience, safety programs, and financial condition , they are submitted to the group captive new business committee for final approval. The premiums for the members are based upon their own loss experience plus expenses for reinsurance and fixed costs as shown in figure 3.

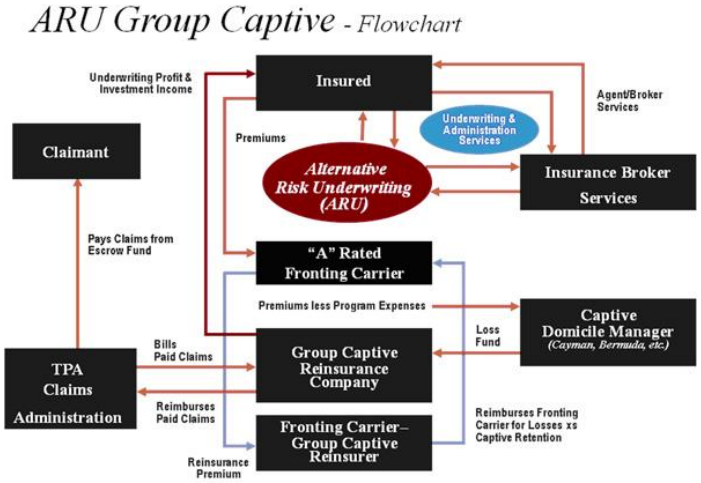


Figure 3: ARU group captive underwriting flowchart

Source: (www.aru111.com)

(Ajwang,2006) Makerere University Uganda developed a prototype web enabled Life and motor insurance database (WELD) to capture data by insurance companies in Uganda. The motor insurance database provided statistical data on motor third party insurance in Uganda, which was used by the insurance players to analyze trends, compute industry loss ratios and calculate premiums commensurate with the risks. The data was analyzed by Uganda insurance Company (UIC) in order to supervise the underwriting practices of insurance companies and to ensure they adhered to recommended premium rates and legal requirements. In addition, the Uganda Police also queried and used the motor insurance database as the first source of information in investigations involving motor vehicles, with the potential of expediting motor related police investigations as shown in figure 4.

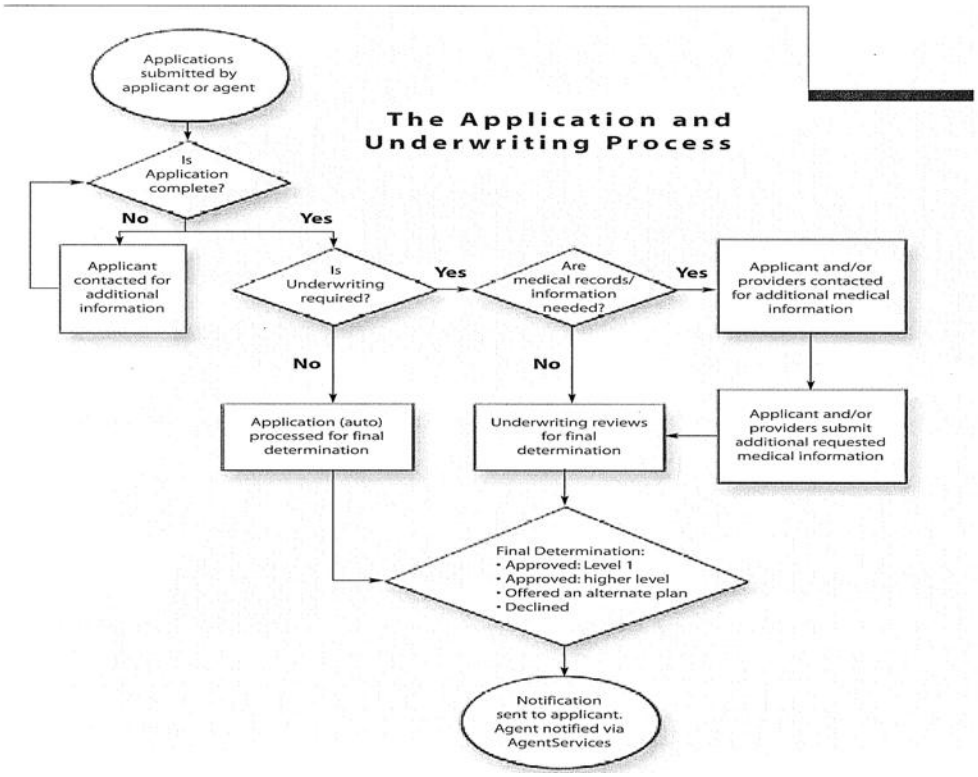


Figure 4: Web Enabled motor underwriting Systems

Source:(dspace.mak.ac.ug)

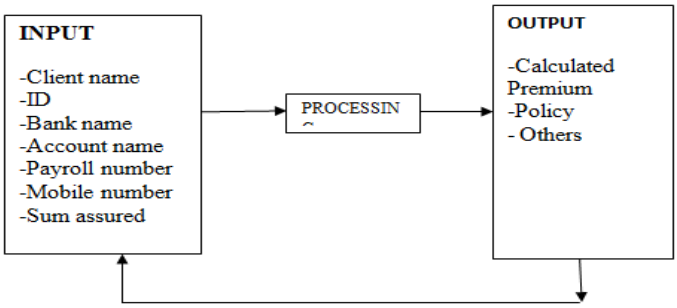
2.2 Conceptual Framework

The system assumed a very simple framework which involved the following sections:

Input: This includes clients / customers information captured by agents both at the field and within the company.

Processing: The system clusters and processes the input data into meaningful information that will be used for premium calculation.

Output: The captured data once processed is used to generate accurate premiums that will be given back to clients enabling to know how much they will contribute towards the risks they insured against and other decision making. This can be summarized in a simple diagram as follows:



Reports

Figure 5: Conceptual frame work

The system conceptual framework includes all the vital components of the proposed System. The workflow will be initiated from the user login menu. The following diagram shows the various conceptual components of the proposed system.

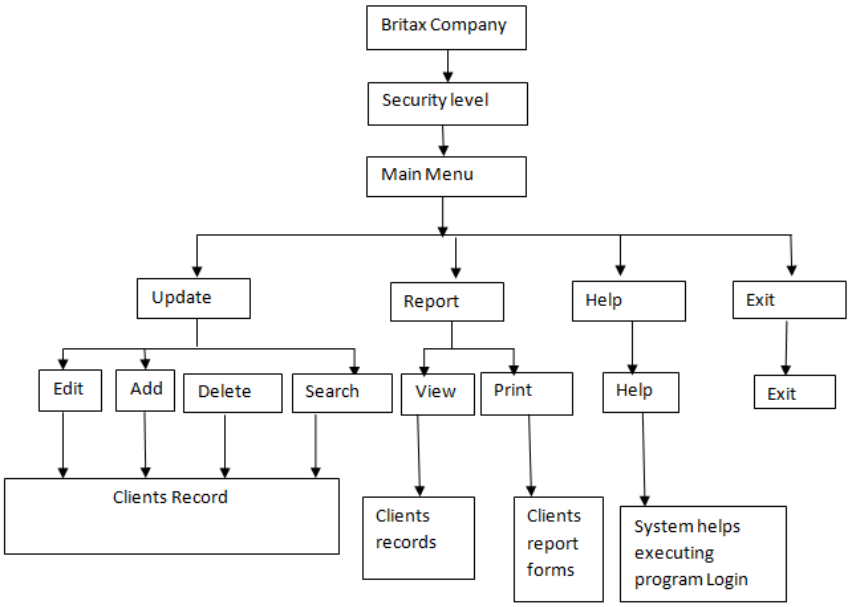


Figure 6: Components of conceptual framework

2.2.1 Summary of the Framework

The system will improve on speed of operations which is a key factor to succeeding in the change required in the business. The prototype will do the underwriting repeatedly with no chance of error and finally it serves to provide specifications for a real, working system rather than a theoretical one.

The project has attempted to analyze / review scholarly issues that have been raised in the domain insurance underwriting in most parts of the world. The absence of a wide Variety of scholarly material in the use of information technology in the Kenyan insurance underwriting supervision posed a challenge to the project.

III. Design

Methodology refers to the strategy or plan of action that links methods to outcomes (Creswell, 2002). For the purpose of the study, waterfall model has been adopted as it is very simple to understand and use. In a waterfall model, each phase must be completed fully before the next phase can begin. At the end of each phase, a review takes place to determine if the project is on the right path and whether or not to continue or discard the project and finally in waterfall model phases do not overlap. Below is the general view of the waterfall model

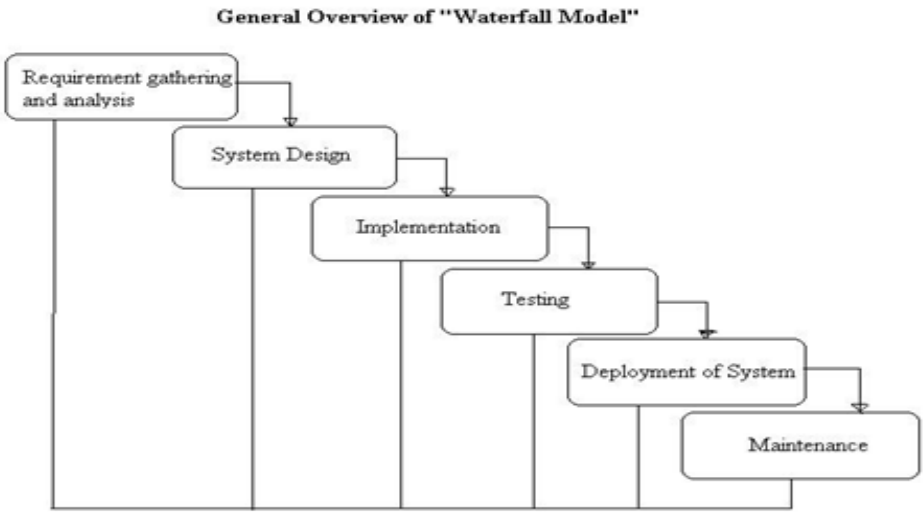


Fig 7. Waterfall Model

Source:(www.wikipedia.com)

Requirement Analysis: Analysis gathers the requirements for the system. This is where detailed study of the user needs and specification will be carried out. Data was gathered from users of the Britax insurance company which consists of 23 staff members. Data collection instruments included structured questionnaires, observation and interviews.

Design: The project focus much on high level design, i.e. the kind of system needed and how users will interact with it. The study included interface design and data design. Implementation: In this phase the designs will translate into codes that are understood by the hardware. Object oriented programming best suited the study, the program will then be put into real world operations.

Testing: This was carried out based on the functional units then all of the units were consolidated to form a complete system. It was tested to ensure that interfaces between modules work (integration testing).This was also done to ensure that the system works on the intended platform and with the expected volume of data (volume testing) and that the system will perform as expected by the end users (acceptance/beta testing).

System Deployment: This was the final commissioning of the system. It involved actual installation of the system on to user's machines and training of the users on how to use the system.

Maintenance: This was based on need and additional user requirements or to mitigate bugs or any other changes that may be desired from time to time. Change could also happen because of some unexpected input values into the system.

3.1. Data Collection Technique

Britax Company consists of 23 staff members who were of great help in data collection, the most accurate fact gathering method that was used included Oral interviews and Observation in order to get information. The process involved watching the work flow at the company and discussing with the underwriters to understand their full requirements.

3.1.1 Interviews

An interview is a fact finding technique whereby information is collected from individuals through face to face interaction (Whitten and Bentley, 2008). An interview permits the direct exchange of ideas, opinions, or information between the interviewer and the interviewee. The main target of the interviews was meant to gain a deeper understanding of the requirements for an integrated health insurance underwriting system. See appendix 1.

3.1.2 Observation

Time was taken to observe the staff and the technical underwriter's conditions in their natural state. This made it very easy in getting the insight of the daily flow of work at the company.

3.1.3 Questionnaires

Structured questionnaires were issued to the selected sample. The delivery was physical hand delivery for a section of the population, but for those who provided their e-mail addresses, online delivery was employed. Online distribution helped to cut down the costs associated with printing multiple questionnaires and physical delivery (e.g. time and transport). It also made it easy for the collection of filled up questionnaires. For those questionnaires delivered physically, the driving reason was that the e-mail addresses of the respondents were unknown. Comparatively, it was observed that online delivered questionnaires were submitted faster than physically delivered questionnaires. See appendix 2.

3.1.4 Document Analysis

This involved consultation of printed documents in the health insurance underwriting company as well as literature on the domain of interest to the research. This was used to fill the gaps of information or facts overlooked or missed by the other data collection tools. It proved beneficial in revealing some issues that the respondents were not willing to divulge e.g. due to fear of victimization or fear of deception.

3.2 System Architecture

According to Whitten and Bentley (2008), A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. It is a formal description and representation of a system, organized in a way that supports reasoning about the structure of the system which comprises system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them, and provides a plan from which products can be procured, and systems developed, that will work together to implement the overall system. From the architectures that were reviewed in the literature, that is the ARU from North America, GeoFis from West Indies, and WELD from Uganda, they were complex systems architectures that could not fit in the environment of application and as a result customized the Geofis to fit into application environment depending on the user needs of BRITAX insurance company Kisumu as shown in figure 8.

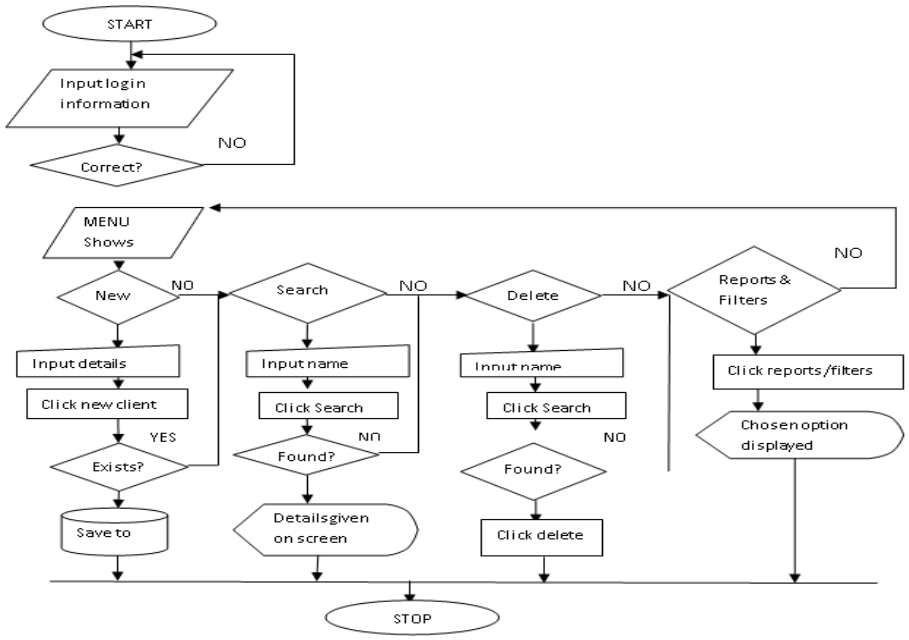


Fig 8 Systems architecture

IV. System Documentation

4.1 Systems Analysis

Systems analysis is the study of a business problem domain to recommend improvements and specify the business requirements and priorities for the solution (Whitten and Bentley, 2008). Systems analysis requires working closely with system users to clearly define business requirements and expectations for any new system that is to be developed. System design is undertaken once the business requirements have been established, and is concerned with the specification or construction of a technical, computer based solution for the business requirements identified in a systems analysis. System design is undertaken once the business requirements have been established, and is concerned with the specification or construction of a technical, computer based solution for the business requirements identified in a systems analysis.

Analysis of Results of Interviews and Questionnaires

Existing Practices in Health/ medical Underwriting

The annual report of the Britax health underwriting system shows that the two most common methods of medical underwriting are known as moratorium underwriting, a relatively simple process, and full medical underwriting, a more in-depth analysis of a client's health information. The use of medical underwriting may be restricted by law in certain insurance markets. Where allowed, the criteria used should be objective, clearly related to the likely cost of providing coverage, practical to administer, consistent with applicable law, and designed to protect the long-term viability of the insurance system. It was also shown that 13% of those who applied for individual health insurance were denied coverage after undergoing medical underwriting. Declination rates increased significantly with age, rising from 5% for individuals 18 and under to just under a third for individuals aged 60 to 64. The same study found that, among those who received offers for coverage, 76% received offers at standard rates; 22% were quoted higher rates. The frequency of increased premiums also increased with age, so for applicants over 40, roughly half were affected by medical underwriting, either in the form of denial or increased premiums

Measuring the percentage of applicants who were denied coverage does not capture any effect that occurs before an application is submitted. If individuals with serious health conditions never apply because they expect that they will be denied coverage, they will not show up in the declination rate. Conversely, if they apply with multiple insurers in hopes of finding one that will issue them a policy, they will be over-represented in the declination rate.

4.1.2 Need for an Integrated Health Underwriting Database

The respondents who were company staff unanimously stated that automating the health underwriting system would improve efficiency and accuracy of data. However, various challenges were identified and ranked as posing a serious threat to the success of the database and this include suspicion, insurer's technical capacity, legislative framework and internet use.

These findings imply that the insurance companies had misgivings about the technical and human capacity of the Britax company to manage such an industry wide initiative. Suggestions were raised that the Company should put in place independent information technology function, and recruit competent professionals to administer the medical / health insurance database. Suspicion among competing companies was felt to be of lesser significance, with respondents arguing that the underwriting database would provide benefits to all players in the industry irrespective of their positions. However, it was observed that there was need for a mandatory legal framework to oblige insurers to share information on a regular basis. It was also noted that the low levels of internet penetration could affect the use of the health underwriting database among certain places that like electricity. From the interviews, there was a general consensus that the Britax health / medical underwriting company should:

i. Establish a database to which the insurance companies submit detailed data of their underwriting and claims statistics;

ii. Be at the forefront of setting premium rates for health underwriting, and should use scientific and actuarial basis in this regard, which can only be obtained by maintaining a database of historical data in the industry.

iii. Staff in underwriting and claims departments will have to be trained on the new requirements of the health underwriting database. These are transitional requirements that should be considered before implementing the Health underwriting database.

4.2 System Requirements

The purpose of systems requirements is to obtain a thorough and detailed understanding of the business need and to break it down to discrete requirements (New York State, 2005).Systems requirements are generally categorized as either functional or non-functional. Requirements that specify what the system must do are referred to as functional requirements (Whitten and Bentley, 2008), while non-functional requirements usually specify overall characteristics such as cost and quality (Wikipedia, 2008). For the purpose of this report, requirements were analyzed against the following categories proposed in the New York State Project Management Guidebook (New York State, 2005):

i. Functional requirements – requirements that define those features of the system that will specifically satisfy a consumer need, or which the consumer will directly interact.

ii. Technical requirements – requirements that identify the technical constraints or define conditions under which the system must perform

iii. Operational requirements – requirements that define the functions that are needed to keep the system operational over time.

iv. Transitional requirements – requirements that define those aspects of a system that must be addressed in order for the system to be successfully implemented in the production environment.

The detailed requirements analysis arising from these sessions is summarized in the table below:

Functional requirements

Screen layout

Reports The system should hold all the health medical underwriting operations and provide customized access to the company workers, clients and the public.

Should be accessed through Graphical user interface (GUI)

Should provide reports on loss ration by insurance company, class of insurance, gross premium by insurance company, class of insurance

Technical Requirements

Accessibility

Operating environment

On standalone computers

Strong password required to ensure data integrity, confidentiality and ensure that only authenticated users access the system.

Should adopt open source and open standard in selection of software

Operational Requirements System performance and responsive should be available, it should provide transaction logs, success and failure logs.

Transitional requirements Data should be managed by IT managers of insurance company

Provide user manuals and system help facilities to guide system users.

Functional requirements **Screen layout** **Reports**	The system should hold all the health medical underwriting operations and provide customized access to the company workers, clients and the public. Should be accessed through Graphical user interface (GUI) Should provide reports on loss ration by insurance company, class of insurance, gross premium by insurance company, class of insurance
Technical	On standalone computers

Requirements Accessibility **Operating environment**	Strong password required to ensure data integrity, confidentiality and ensure that only authenticated users access the system. Should adopt open source and open standard in selection of software
Operational Requirements	System performance and responsive should be available, it should provide transaction logs, success and failure logs.
Transitional requirements	Data should be managed by IT managers of insurance company Provide user manuals and system help facilities to guide system users.

Table 1:Requirements analysis

4.2.1 Modeling System Requirements

In order to successfully plan, analyze, design, construct and deploy an information system, the systems analyst must first understand the needs of the stakeholders and why the system must be developed, a process referred to by Whitten and Bentley (2008) as "user centred development". By focusing on the users of the system, the analyst can concentrate on how the system will be used and not how it will be constructed.

Use case modelling is an approach that facilitates usage-centred development and describes a system's functional requirements in terms of use cases (Wikipedia, 2008). Use cases consist of all the actors of the system and all the various use cases by which the actor interacts with the system, thereby describing the total functional behaviour of the system.

In modelling the system, the actors were defined as the insurance company, Britax, the users and the general insuring public. The use cases were defined as the major activities that take place in the system, i.e., insurance companies and users upload data to the system, which is then extracted, loaded and transformed by the systems administrator at the Britax, after which the database is updated to allow report generation and database queries.

4.3 Data Modelling and Analysis

System models play an important role in systems development. Data modelling is a technique for organizing and documenting a systems data. One of the most common data modelling approaches is the use of entity-relationship diagrams. An entity relationship diagram is a data model utilizing several notations to depict data in terms of the entities and relationships described by that data. An entity refers to a class of persons, places, objects, events or concepts about which we need to capture and store data. Every entity has attributes which describe it. Entities may have relationships, a natural association between one or two entities (Whitten and Bentley, 2008).Once the entities and their attributes and relationships were identified and a preliminary entity relationship diagram (ERD) sketched, it was further normalized to eliminate redundancy and optimize the data model. Normalization was done up to the third normal form. The figure below shows the resulting ERD for the Britax health underwriting database.

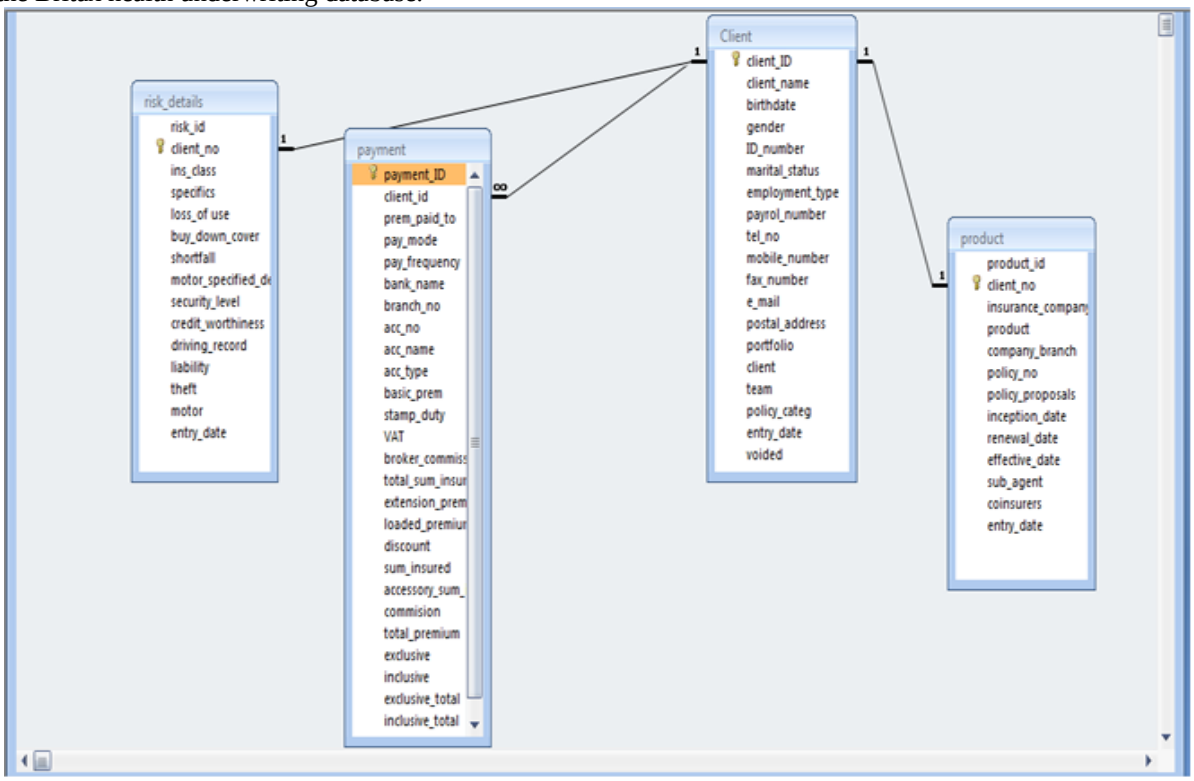


Figure 10: Entity Relationship Diagram for Health Insurance underwriting Database

4.4 System Implementation

4.4.1 Login Screen

This is the first window that the user will be presented with. Login screen offers security feature and ensures that only authenticated users gain access into the system. There are two roles that may be assigned to a user. Admin users have all the privileges while void user roles have some limitations. Users with administrative roles may choose to login or to add new users into the system. The following shows the user login screen.

Login Screen

4.4.2 Main Menu

After successful login, the system will open the main menu from where the user will be able to choose various functions. The user or underwriter is presented with specific menu items from where he/she will be able to perform specific operations. The menu comprise of five option as shown in the figure below.

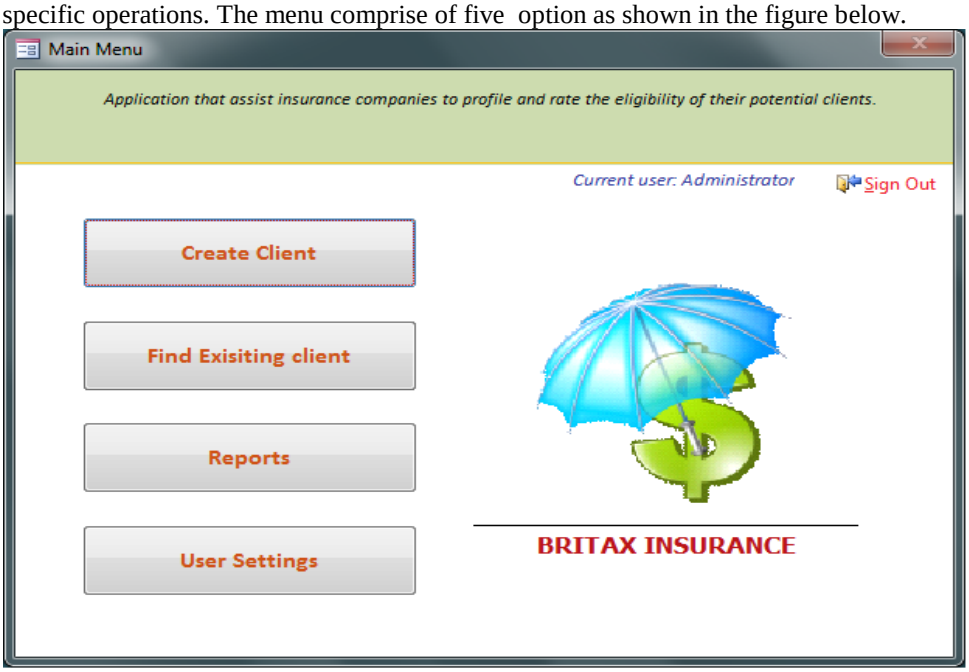


Figure 12: Main menu

Create client: Used for creating client details and storing them in the system. Find existing client: Opens up a window where existing clients are searched by specifying their clients ID, click OK and then the details for the clients are displayed.

Report: This takes the user to a simple reporting option screen from where the user pay specify the type of reports to display.

User setting: This is a user management panel that is used for creating system authorized new users.

-**Sign out:** Can optionally be used by the user to shut down the application environment.

4.4.3. Patients Dashboard

Patient dashboard provides a summarized view of the clients details. It includes all details of payments by clients , risks they are insured against, product and also provides option of editing the details. The following figure shows a screenshot of the patient dashboard.

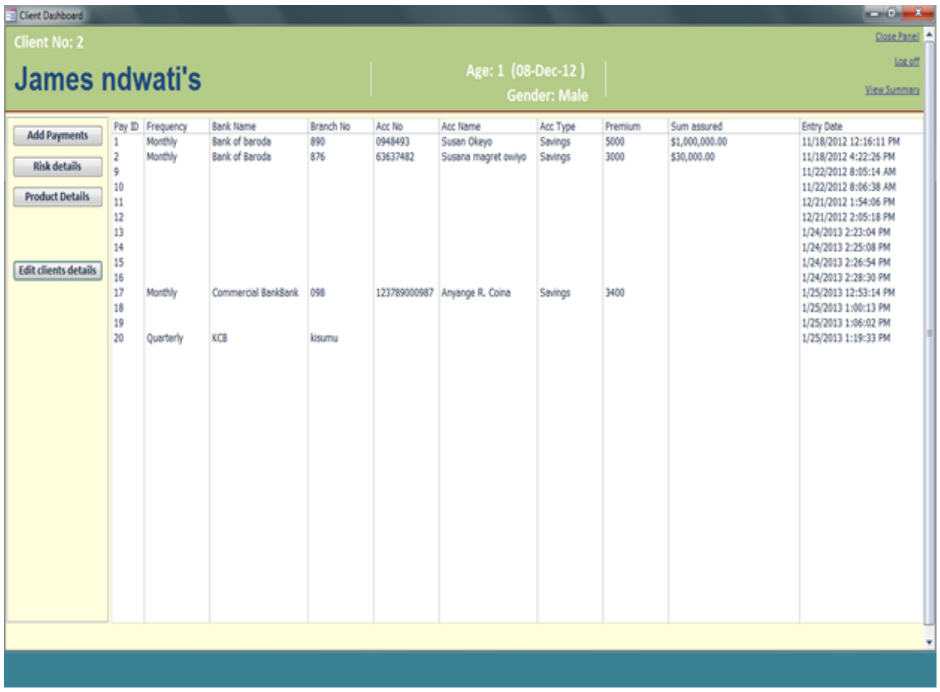


Figure 13 : Patients dashboard

4.4.4 Reports

The health insurance underwriting database allows users and the industry regulator to generate various reports that can aid decision making. The reports provided in the prototype include:

i. Loss ratios by insurance company – loss ratio in insurance are the ratio of total loses paid out in claims plus adjustment expenses divided by the total earned premiums. Overly low loss ratios are seen as evidence that an insurance company is overcharging and making excess profits. Overly high loss ratios are seen as evidence that an insurance company is in poor financial health.

ii. Claims costs by company – claims costs are computed by summing the total claims paid to the insured, other expenses paid to assessors, loss adjustors, advocates and doctors, plus the outstanding claims reserve. Claims cost can help determine loss ratios and overall solvency of an insurance company.

iii. Gross revenues by company – in motor insurance, gross revenue include the premium charged for third party cover, plus the sticker fee and the stamp duty amount.

iv. Motor insurance certificate usage by company – this provides a detailed listing of insurance certificates that have been issued by an insurance company in a given duration.

V. System Documentation

The following sections include useful information about using the Laboratory IMS.
Minimum Hardware and Software Requirements are as follows:

- Windows NT/XP/Vista/Win7/Win8 - 32/64 bit OS or higher version
- 512MB Memory or higher for best performance
- 40GB HDD Space
- CPU 2.10GHz or higher

The following is an easy to read user manual that will help any new employee to use this system to perform the following;

- Logging onto the system on startup,
- Working with various controls.
- Initial systems setups
- Configuring various tests and test groups
- Creating patient and updating existing patients,
- Recording tests and test result
- Deleting patients records*
- User configurations,
- Generating and printing reports.

5.1 System Installation

Before running the system, the user will need to have the system installed on his/her, machine. The installation process begins by running the executable file on the setup disk. The installation should be done by accepting all the default options whenever prompted. Installation is estimated to take less than five minute

5.2 Operating the System

Users will access the system by opening the system icon on the desktop or under the program files.
Once the program is completely loaded, the user will be prompted to log in.
Note: Only registered users will gain access to the system. The user must login by submitting Username and Password. The login credentials will be matched with the pre-recorded details and access shall only be granted where the information match.

VI. Conclusion

The purpose of the project was to investigate the practices in health insurance underwriting and supervision in Britax Company Kisumu, and how information technology can be used to enhance the supervisory role of the health underwriting. The research revealed that an integrated information sharing platform could provide great improvements to the manual and paper based processes in use in health insurance underwriting and regulation in the country. This chapter presents some conclusions, recommendations and areas of further research to enhance the health insurance database and ensure success of any future operational implementations.