Hansole Client Management System

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By

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Abstract

The main objective of developing a Client management system was triggered by the need to improve and manage client more effectively. The current system shows several bottlenecks which include Hansole Investments failing to remind all its clients to make payments whenever these payments are due to be paid since they keep records about payments manually. There is no effective contact between the client and the company. A feasibility study was carried out to determine if the system cloud be developed and the results shows that it was viable to develop. The system was developed us C# programing language Asp.net since it is a web based application Parallel changeover strategy was used to implement the system so that the old system and the new system can work together until the new system is fully stable and users fully appreciate how it works. Maintenance of the system will be conducted as an on-going process to correct all errors that may arise while the system is in use. The system can be further developed in the future by incorporating integrating it with other system that are available such as bulk SMS bulk mailer and domain main account.

Declaration

I, Lincoln G Chananuka do declare that this project titled Hansole Client Management System is a testimony of original work I have done under the supervision of Dr. T .Tsokota. I therefore authorize Midlands State University to lend this documentation to anyone who may need it for purposes of scholarly research.

Signature: …………………………………

Date: ……………………………………….

Approval

This dissertation entitled **Hansole Client Management System** for Hansole investments by **Chananuka Lincoln G** meets the regulations governing the award of the Information Systems, Honors Degree at the Midlands State University, and has been approved for the contribution it has to knowledge and literal presentation.

Supervisor: ………………………………..

Date: ……………………………………….

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My heartfelt gratitude are extended to the Lord almighty whose love and mercy endures forever. It was through His Grace that this project was a success. My credits goes to all the people who contributed in the making of this project.

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Lastly, my gratitude goes to my parents for the encouraged they gave me during the course of coming up with this project. They are the ones who carried all the financial burden of coming up with this project. Without their support, this project might have never been a success.

Dedication

I Chananuka Lincoln hereby dedicate this project to my dear parents Mr and Mrs Chananuka. They were by my side always and they supported me financially, morally and spiritually. All financial burdens of this project were for them and they kept me in their prayers every single day. I am grateful and very much honored to have such parents with unmeasurable love. My parents are the most important people in my life and this project, I dedicate it to them. My parents funded the purchase of a laptop, and other needs.

Contents

List of Acronyms

CD……………………………………………………..Context Diagram

DFD…………………………………………………….Data Flow Diagram

HCMS………………………………………………….Hansole Client Management System

HTML………………………………………………….Hyper Text Markup Language

PC……………………………………………………..Personal Computer

List of Figures

List of Tables

List of appendices

Chapter 1: Introduction

1.1 Introduction

Client Management System is a system that assist Hansole Investments' clients with little human effort to some extend nun. The system will allow clients to open their account for easy assistance. It assist in choosing domain name extension for different people who are operating in different environments. Registration, website development, transaction summary. This will also have a dash board for the administration team to easily communicate with clients and it will make clients to have a personal contact with the company. Client Management System will produce report on payments made by clients over months and years. These will be then used to help some departments like marketing for example to analyze which product is bringing more revenue and decide where to put much resources.

1.2 Background of the organization

Hansole Investments is an information technology (IT) company which was formed in 2008. Hansole Investments was initially formed by Engineer Jacob Kudzayi Mutisi with the objective of only hosting domains and provide the bulk short message service (SMS) platform to various people. The company was established in Harare at Avondale shopping center. When this company started they knew that its strength was going to come from the database that they should make, the company collected as much database as they could through newspapers, business cards, magazines and through verbally. The company continue to do database collecting up to date. In 2009, they found that it was necessary to start developing some website for their clients who would have register their domain names with their company and Hansole Investments found it as an opportunity and added it as a product.

In 2011, people responded very well to bulk SMS platform that was offered by Hansole Investments this is when Hansole Investments thought of starting bulk e-mailing platform to offer it as a product to its clients hence bulk e-mailing was introduced in 2011.

The company started to introduce its new products such as bluetooth marketing so that they can increase its revenue, the company also start to market its products so that they will get much customers and to increase its revenue for it to expand more.

In 2012, the company moved from Avondale to Belvedere where it is currently situated. During this year Hansole Investments found that they was a high penetration rate of android mobile phones hence the company found that it was good for it to start to develop mobile applications that will interact direct with their respective website this gave it competitive advantage on the market. During 2013, Hansole Investments discovered ways of turning books into mobile applications which was compatible on android phones hence it created many hymnbooks including the Anglican hymnbook, the Zimbabwean constitution and criminal codification.

1.2.1 Focus

Hansole Investments mainly focuses on domain registration and hosting, website design and development, mobile application development and providing services such as bulk SMS, bulk emails and IT consultancy.

1.2.2 Organizational Structure

Organizational structure is a hierarchical arrangements of lines of authority, communication, rights and duties of an organization Bruce Jewel (2000). The Hansole Investments adopted the tree structure for its management. A tree structure is were by all the heads of departments report to the more superior and goes like that until it reaches the top. However this method lacks communication strength as compared to the flat organization structure. The figure below (1.1) shows the Hansole Investments organizational structure starting with the chairman as the head of the company.
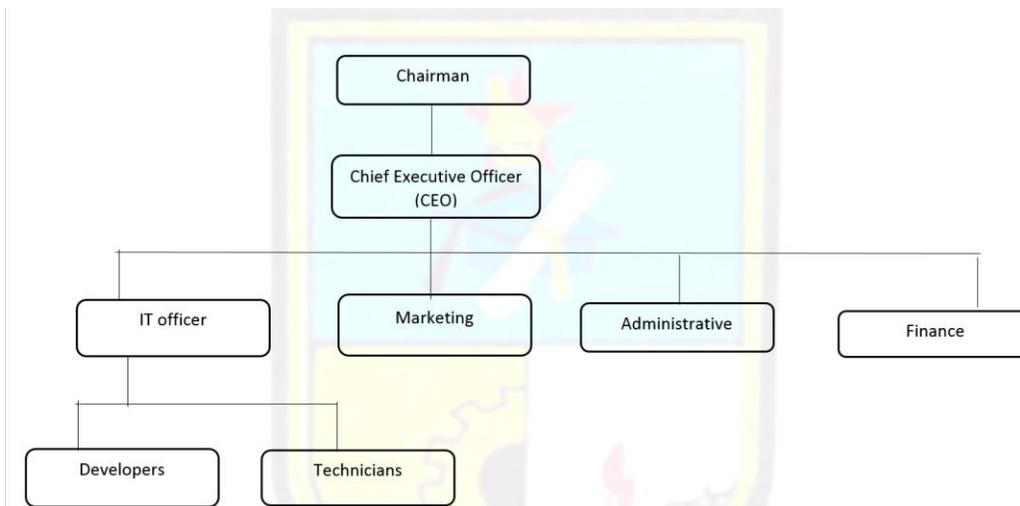
Figure 1.1 Hansole Investments organizational structure

1.2.3 Vision

Hansole Investments vision is to bring cost effective website sand mobile technology solutions to African businesses.

1.2.4 Mission

To maintain our position as the only company that offers a fast, efficient and low cost way of website and mobile/cellular broad casting and Dissemination of information.

1.3 Problem Definition

Hansole Investments is failing to remind all its clients to make payments whenever these payments are due to be paid. This will lead to less income for the company hence this is eventually leading to loses since some of its clients' needs a constant reminder about payments which need to be done. The company also incur unnecessary cost in calling clients to remind them about payments which are due but not yet paid.

There is less personal contact between the company and its clients because they have a large number of clients hence the few workers cannot satisfy every client requirements. This is leading to other clients leaving Hansole Investments and move to other service providers since they don't feel the direct contact from Hansole Investments.

It is time consuming for the management to analyze the revenue inflow and which product is bringing more revenue or less revenue to the organization.

It is difficult for the company workers to see the domains or any service that that are about to expire or to know the number of days that are left for a domain or a service to be paid on a specific time to expire.

Therefore, the problem addressed is that the current system does not provide an online platform that support its clients

1.4 Aims of the research

Aim is to design and develop a system that will help Hansole clients to make decisions on products they wants to acquire without help from Hansole team, the system will remind the clients on payments due but not paid as well it will allow online payment for their products and Hansole team members will be allowed to see different income revenue trends for different products and service graphically.

1.5 Objectives

The objective is to create a web based system that will communicate and help Hansole Investments clients on 24hr basis with very little human assistance. The proposed system seeks to achieve the following objectives:

- To offer a platform that allow clients to make payments online.
- To automatically remind clients about domain renewal through the use of emails.
- To advise clients on which type of domain he or she should register after a client answered few questions for example .co.zw, org.zw
- To generate excel sheet that will be used for other systems such as bulk SMS which requires an excel sheet.
- To highlight payments which are due but not yet paid by the client.
- To determine which product bring more revenue.
- To allow online discussion forum between administrator and the client.

1.6 Instruments

- SQL Server. Widely used database management system for storing data in small to large chunks of data.
- Microsoft Windows 8.1 Pro for the development platform.
- Microsoft visual studio 2015. A widely used code editor with support for several programming languages.
- IIS Express- A free application which comes bundled up with visual studio and which will allow the testing of the web application easy.
- C# – a general purpose language that will be used as the back end language for the system.
- Razor View and angular.JS-as frond end languages.
- Bootstrap-A rapid development framework which contains many cascading style sheet classes for developing websites.

1.7 Justification

The system will help Hansole Investments to retain its clients as the system will be giving instant responses to clients who used the system. The system will lead to increased profits and consistency as the system will be sending automatic reminders to clients about payments which are due for payments. Effective communication will be assured by the system as it provide online service for

24hours and it provide the company with client data base to ensure communication between the client and the company. The system will enhance quality decision making through its provision of information on form of graphs and tables. The system is enabling easy direct contact between Hansole workers and its clients as it allows clients to open account and have a direct chat with support team.

1.8 Conclusion

The problems have been carefully uncovered and clearly noticed. The developer identified the aims of coming up with a system that will try to save the organisation from its current situation. All the materials that will be used to come up with this system where noted which include Microsoft Visual studio and SQL Server as the database.

CHAPTER TWO: THE PLANNING PHASE

2.1 Introduction

This chapter will basically discuss the reasons for developing the new system, its value to the organisation and the various feasibility studies as well as the cost benefit analysis (CBA). The writer will be answering the question the system in question going to benefit the organisation or not? In this chapter this is when the organisation will opt for the proposed system.

2.2 Business Value

Business value is the effectiveness and efficiency of the proposed system and its ability to accomplish a specific task. Business values will include client's values, organisational value and employee value. The main thrust for developing any system is for that system to add value to the organisation. As much as the organisation need to do away with the manual system to adopt the newly coming technology the organisation has to computerise its system. The computerised system will definitely give value to the organisation and its goodwill as Hansole investment's clients would know that Hansole Investments has online client management system. This will as well increase effectiveness and efficient of Hansole Investments. Increased good communication between the organisation and its clients due to its convenience that is it will be accessed by all without travelling costs.

2.3 Feasibility Analysis

According to Berrie (2014) Feasibility is the measure of how beneficial or practical the development of the proposed system is going to be to an organization. Feasibility study is a controlled process for identifying problems and opportunities, determining objectives, describing situations, defining successful outcomes and assessing the range of costs and benefits associated with several alternatives for solving a problem. This therefore explains the workability and the viability of the proposed system that is if it can comply with the expectations of the organisation and its workers. There are few major sub categories or elements of feasibility which includes economic feasibility, operational feasibility, technical feasibility and social feasibility.

2.3.1 Technical Feasibility

This will determine whether the proposed system to be developed would be practically workable. An assessment level where a project would be implemented installed and monitored by the IT

experts. Technical feasibility will consider the availability of IT infrastructure. To be more précis these infrastructures could be either the software or hardware.

Table 2.1 Hardware and Software Requirements

Description	Specification	Required	Available
Main saver	20 Gig RAM, 1 TB HDD, corei5 processor	1	1
Personal computer PC	4 GB RAM, 320 GB HDD, dual core	4	10
Database sever	4 GB RAM, processor corei5	1	1
Network switch	CISCO switch 24 port	2	2
Epson Printer	Dot matrix	4	6
Ethernet cable	50m	1	1
System software	✓ Microsoft office 2013 ✓ Visual studio 2013 ✓ Java script ✓ Microsoft SQL sever ✓	✓ Microsoft office 2013 ✓ Visual studio 2013 ✓ Microsoft SQL sever	✓ Microsoft office 2013 ✓ Visual studio 2013 ✓ Microsoft SQL sever
Antivirus software	Esset no de	Esset no de	Norton

2.3.1.1 Technical Expertise

Ii is the direct or indirect abilities and capabilities of the available personnel to work with the developed system successfully without any challenges. There for the student has observed closely and fully acquainted with Hansole Investments personnel's capability to operate and to use the proposed system. All staff members are highly computer literate hence this gives an upper hand in using the system. The developers department has personnel who are professionals in hardware and software part.

2.3.2 Economic Feasibility

Economic feasibility is the measurement of the cost effectiveness of the system to be developed. This there for give adequate understanding of the proposed system worthiness of being built and implemented against its costs. It is a tradition for all organisations that need to come up with a new project to look at the viability of the new project economically. The following techniques will be taken into consideration:

- Return on Investment (ROI)

- Payback Period

- Net Present Value (NPV)

2.3.2.1 Development Cost

According to Cashman (2014) he says development costs are referred to as those costs that any institution or organisation pay for during the development and implementation of its new system. Therefore, in order to come up with Hansole client management system, there will be development costs that will be incurred such as purchase of hardware and software and of implementation. These costs are shown below.

Table 2.2 Development Costs

Item number	Item	Item description	Cost US$
6	Personal computer	4GB RAM, 1.8 Ghz processor, 500 GB HDD	2 000
1	1 TB HDD	Sata	100
2	Development Labour		800
50 meters	Rjs45 cables	Network cables	100
2	Printer	Dot Matrix	1 200
Total cost			4 200

2.3.2.2 Operational Costs

This refers to the day today costs or expenses that an organisation faces during the implementation of the system, its maintenance and all repairs during working progress. The table below summarise some of the costs to be incurred.

Table 2.3 Operational Costs for the proposed system

Cost(year)	2016	2017	2018	2019
Computer usage		500	1 000	2 000
Maintenance software		100	250	350
Stationary	1000	1 500	2 000	3 000
Maintenance		1 000	2 000	3 000
System Analyst programmer	2000	3 000	3 500	4 000
Total	3000	9 100	12 250	16 350

2.3.2.3 Benefits

During the life time on the system within the organization, the organization will benefit as it uses the system. These benefits are categorized as tangible and non-tangible which would be foreseen by an organization.

2.3.2.4 Tangible Benefits

These are benefits can be easily converted or transformed into cash without hustles.

Table 2.4 Tangible Benefits

	Item Description	Monetary Value in US$
1	Reduction in Transport Costs	600
2	Reduction in Printing and postage costs	350
3	Reduction in telephone bills costs	400
	Total	1 350

2.3.2.5 Intangible Benefits

Keizer (2015) says these are benefits that cannot be easily measured and inconvertible to monetary value.

Table 2.5 Intangible Benefits

Year ⟶ Description	2016 (USD)	2017 (USD)	2018 (USD)	2019 (USD)
Goodwill	18 000	17 500	17 500	17 000
Enhance customer satisfaction	8 000	7 500	7 000	8 000
Improved employee productivity	4 000	3 000	4 000	4 000
Total	30 000	28 000	28 000	28 000

2.3.2.6 Cost Benefit Analysis

According to Phelps (2014) define cost benefit analysis as the systematic approach to estimating the strengths and weakness of alternatives and it is used to determine options that provide the best approach to achieve. It refers cost benefit analysis to thorough determination and comparing of costs that an organization is incur during the development and implementation new system and the benefits that will be enjoyed or realized completed and fully working. The CBA uses several methods or techniques and one of it is highlighted below.

Table 2.6 Cost Benefit Analysis

Year	2016	2017	2018	2019
Benefits				
Intangible benefits	$5000	$10000	$15000	**$15000**
Tangible benefits	$30000	$28000	$28000	**$28000**
Total Benefits	**$35000**	**$38000**	**$$53000**	$53000
Costs				

10

Total Developmental Costs	$20080	$6000	$6000	**$6000**
Total Operational Costs	$4000	$2200	$2500	**$4500**
Total Costs	**$24080**	**$8200**	**$8500**	$10500
Net Benefits	$10920	$29800	$44500	$42500

Feasibility of the project can be evaluated by cost benefit methods outlined below:

- Payback period.
- Net profit.
- Return on investments.

2.4.2.4.1 Payback Period

It is the amount of time it takes to return the initial capital. The breakeven point is calculated using this technique. The payback period for the project was:

Payback period year 1= (4080) + 3000= (1080) = 1year

Year 2= (1080) + 9100= 8020= 1months 4days

= 1 year 1 months 4 days

Advantages of using the Payback period:

- Simple to calculate.
- Less forecasting errors.

Disadvantages of using the payback period:

- It does not look at the overall profitability of the project.

Comment

The payback period of this project is very favorable since it will only take on year and one month for the project to break even. This reduces the funding period of the project.

2.4.1.2 Net Profit

It is the difference between gains and expenses for a certain period of time. The first three year's net profits have been incorporated in the above table. Once of development costs cause the overall profit for the opening year to be negative if the expert system have been employed, and rises in the following years of the system usage. As the project is hypothetically profitable as time progresses, inviting vast earnings at a small space of time, it's satisfactory as this decrease the period at which the project will be subsidized.

Rewards of employing the net profit

- It is very simple to compute.
- It values the project's major goals of existence in business that is cost-effectiveness.

Drawback

- It ignores the time worth of currency.

2.4.1.3 Return on Investment (ROI)

$$ROI = (\frac{average\ annual\ profit}{total\ investment}) \times 100$$

Average annual profit = ($10920+$29800+$44500+42500)/4

$$= \$31930$$

Total investment = $48780

$$ROI = (31930/48780) * 100$$

$$= 65.4\%$$

Benefits of ROI

- It is a modest method of computing the return on investment.

Disadvantage of ROI

It does not consider the time value of money.

2.3.3 Social Feasibility

According to Bently (2015) refers social feasibility as "the impact and the behavior derived by the developed system in relation to its stakeholders." This usually does not affect the organization neither does it affect its shareholders but, to the project team.

- There is increased morale of the stakeholders who would only visit the website to check for new stands, successful applicants without visiting the premises which is a high cost.

- The stakeholders would be motivated by the online housing allotment system which would also increase the organization's goodwill.

- The staff that would be trained would be acquainted with knowledge and expertise which would also increase efficiency and effectiveness.

2.3.4 Operational Feasibility

According to Benjamin (2014) it is the measure of how well a proposed system solves the problems and take advantage of the opportunities identified during the scope of definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

System users have different way they operate and understand system and their effectiveness in operating the new system is referred to as operational feasibility. It is thorough study and scrutiny after system has been implemented to check whether or not the new system is usable by the intended users without any difficulty. At Hansole Investments the following would aid to the alignment of the operational feasibility with the goals and objectives.

- All the workers at Hansole investments they are computer literate since it is a digital marketing company it is the requirement of all the workers to be highly computer literate hence this reduces faults when operating the system.
- The cost of training workers on how to operate the new system is reduced since all the workers are highly computer literate and they are all it experts.
- The company uses windows 8 as their operating system hence there will be no challenges in using the system since it operate best on windows 8 computers.
- There are no costs of printing the application, session and other forms since it would be done online which also serves time.

2.4 Risk Analysis

Hubbard (2014) simply define risk as the science of risks and their probabilities and evaluation. Risk analysis is anything, factors, facts or opinions that has an adverse effect during the ongoing project and its maintenance. It is very important for system developer to identify and note risks that are associated with a project being undertaken, then try to avoid or rectify such risks. Below are technical risks that are identified with in an organization.

2.4.1 Technical Risks

According to Peterson (2015) it is the risk that is associated directly with the knowledge base being employed and it is technical aspect. Technical risk is risks which come from ignorance of expertise on how to operate the system in play. Some of technical risks identified are shown below.

- One of the risks is that the system may not meet the expectations of the user in terms of the user interface. This is because the user will be using various systems with different user interfaces hence they will be having different expectation on newly introduced system hence they might not accept the system.

- The might face challenges in keeping the system up and running all the time and or restore the system in the case of a break down or a crush. Since it is a new system there is a need of a backup facility so that it can be easily recovered if it crash at a given point in time. There will be also system maintenance or support in the first couple of months. This will be done until the system is stable.

- During the development of the system there will be parallel conversion as the system will be implemented. This means that these two systems will be used during the same time until the risk of failure is very low. The parallel conversion will assure that is there is any failure in the system being implemented there will be no absolute loss of data as the old system will be operation as a backup facility.

2.4.2 Economic Risks

- The cost of software and hardware, which keeps on increasing, may jeopardize the completion of the project and this may put the project at a risk of being terminated. The organization has to budget or put money aside to encounter such variation and shortfalls in costs of hardware and software in the development. The organization has to acquire and

some of the hardware and software during the beginning of the project so that they will not be affected by variation in prices.

2.6 Project Work Plan

Hogan (2002) defined it as the notion of creating documentation which aims to provide and list the activities to be carried out from the alpha and omega of the project in terms of time but using charts. The time can be in days, weeks months or years.

2.6.1 Project Schedule

According to Harold (2016) defined it as the part of project management which relates to the use of schedules such as Gantt charts to plan subsequently report progress within project environment.

Table 2.7 Project Schedule

Phase	Start	End	Duration(weeks)
Proposal	01/08/2016	25/08/2016	3
Planning	26/08/2016	15/09/2016	3
Analysis	16/09/2016	30/09/2016	2
Design	01/10/2016	15/11/2016	6
Implementation	20/02/2017	03/03/2017	2
Maintenance	03/03/2017	Ongoing	1+
Documentation	01/08/2016	Ongoing	19+

2.6.2 Gnantt Chart

A Gantt chart illustrates the project's time interval of each activity to be done. Gantt chart is viewed as a time-scaled graphical representation of various tasks of any project.

Table 2.8 Gantt chart

Activity Period(weeks)	2	4	6	8	10	12	14	16	18
Proposal	■								
Planning		■	■						
Analysis				■					
Design					■	■			
Implementation							■	■	
Maintenance									■
Documentation	■	■	■	■	■	■	■	■	■

2.7 Conclusion

The chapter highlighted the reasons for building the system. It has been viewed that the system to be developed is feasible and that the benefits outweighed the costs with the minimum risks identified which would be rectified through economical and technical expertise. Then the project was well planned with each activity time-framed through the project schedule and Gantt chart. Thus the planning phase finished and the next chapter is the analysis stage which gives the in-depth of the existence of the current system.

CHAPTER 3 ANALYSIS PHASE

3.1 Introduction.

System analysis describes fully or gives a clear diagram on how the current system operates and functions. This phase will point out what is required by the users in the proposed system. It shows a highlight of the operation of the current system, the processes which are linked on the currents system as well as how the processes will be linked or joined in the proposed system. Various methodologies of collecting data will be used to find out how the current system really works. After collecting data, the data will be scrutinized and it will reflect the strength and weakness of the system and will solutions to weakness reflected will be evaluated.

3.2 Information Gathering Methodologies

3.2.1 Questionnaires

Questionnaires   these are methods which are used for data collection. They consist or they have a series of questions that are used to prompt why we are collecting information from the respondent. Questionnaires they are used by the researcher to gather information about the old system which was used at Hansole investments. When these questionnaires are presented to the current user of the system then they will respond giving the weakness and the strength of the system as well as the recommendations to the proposed system. These questionnaires were presented or given to the clients accountant and customer care.

Advantages

¾ It is was fast to use questionnaires to collect data for example the student gave many people questionnaires to respond to my questions at once without waiting for each one to answer first and then go to the other.

¾ It was easy to compile data from despondence since the answers were provided in a standardised format.

¾ The student got precise information from the workers on how to use their system actually works since the majority of my questions where closed ended questions hence they gave the student what he was really looking for.

Disadvantages

¾ The questionnaires did not give the respondents enough room to fully explain other points since the majority of these points were close ended questions hence the researcher found the need of interview to clear these grey areas.

¾ Other respondents failed to interpret the question correctly and these lead them to leave many gapes the researcher faced this challenge from the Hansole investments clients since somewhere facing challenges in understanding other IT terminologies however, the researcher clarified these questions so that he will have correct information.

¾ As the researcher issued out the questionnaires some of the respondents did not like the idea of writing however, the researcher asked them to answer verbally and managed to complete the questionnaire.

3.2.2 Interviews

An interview can be defined as a purposeful conversation between two or more were we can have people asking questions verbally and others will be answering these questions. Basically there are two main category of interview which include structured and unstructured interview. Interviews can lead to exploration of other thoughts which were not planned for since one will be having the liberty to ask follow up questions. The student did a structured interview to gather the required data were the researcher chose the area to discuss and wrote down the facts to be collected hence he used a variety of questions.

Advantages

¾ The researcher managed to get clarification of answers from Hansole investments workers on how the current system works as he was able to ask follow up questions.

¾ The use of body language enables the researcher to fully understand the respond from the interviewee this was very effective when interviewing the clients as they were failing to explain other technical questions.

¾ It provided immediate response hence there was there was time serving.

¾ It was very flexible since answers were obtained spontaneously and the researcher managed to carry the interviews on groups such as two or mere clients and other departments such as developers department this also help to reinforce the answers

Disadvantages

¾ A lot of time was consumed to interview various workers hence the researcher decided to carry out group interviews for example the researcher carried out departmental interviews

¾ Minor arguments occasionally occurred in the process, especially when the researcher was carrying out group interviews with Hansole investments workers since others did not like to disclose other information hence this resulted in minimal meaningful information interchange however, the researcher decided to take some of the workers individually so that they can disclose some of the information.

¾ It was costly organizing of free board rooms and carries some interviews over the table the researcher however, the researcher carried the interview outside the building and managed to get the information required.

¾ Some information could not be disclosed for security reasons and fear of job loss.

3.2.3 Observation

Observation is simply involves physically watching people working with the existing system to see how people interact and work with the current system as well as how the system actually works. Kumar (2015) says observation seeks to gain insight about what is actually done, not just what is documented or explained.

Advantages

¾ As the researcher was collecting information he did not interrupt with the work of Hansole investments hence this gave the opportunity for the workers to do their work without being interrupted at the same time the researcher was collecting his information.

¾ The researcher got first-hand information about how Hansole assist their clients and the researcher chooses the information that was only contributively to the development of the proposed system.

¾ It uses basic equipment hence the researcher has an understanding of the processes, functions and operations on how the current system is working without any bias being achieved

¾ Can get data which is context sensitive

Disadvantages

¾ Some workers under observation tend to change their normal attitude when they realize that they are under observation in wrong and biased way hence the researcher strategically positioned himself so that Hansole workers would work as if there were not watched.

¾ It is demanding in terms of personal commitment.

3.3 Analysis of the existing system

Clients at Hansole investments they are currently using the manual system instead of using the computerized systems this system involves clients who are making their payment to organization manually that is they will go to pay physically which result incurring transport costs

The organization is still reminding its clients about payments which are due but not yet paid through calling individual clients about these payments. This will result in lack of efficiency since other accounts will end up not reminded because other workers would have omitted the name of a client or will deliberately not remind all clients as pressure continuously mount on her leading to losses.

Clients they suffer transport costs or cost of phoning in order for them to understand which type of domain to register for that is choosing which domain name extension suits his or her organization perfectly

3.4 Process Analysis

According to Charles (2014) it is a step-by step break down of the phase of a process, used to convey the inputs and outputs and operation that take place. An activity diagram illustrates the dynamic nature of a system by modelling the flow of control from activity to activity. It reviews all the processes and activities that are undertaken and how data is moving among the processes. This analysis of process will is helpful to the management team to improve how their business activities work. Activity diagram is the appropriate method that can be used to represent processes, data inputs and outputs of the current system

3.4.1 Activity diagram for the existing system

An activity diagram   shows the stepwise activities and actions with support for choice, iteration and concurrency. The diagram below helps illustrate the processes that take place when a client visits Hansole investments
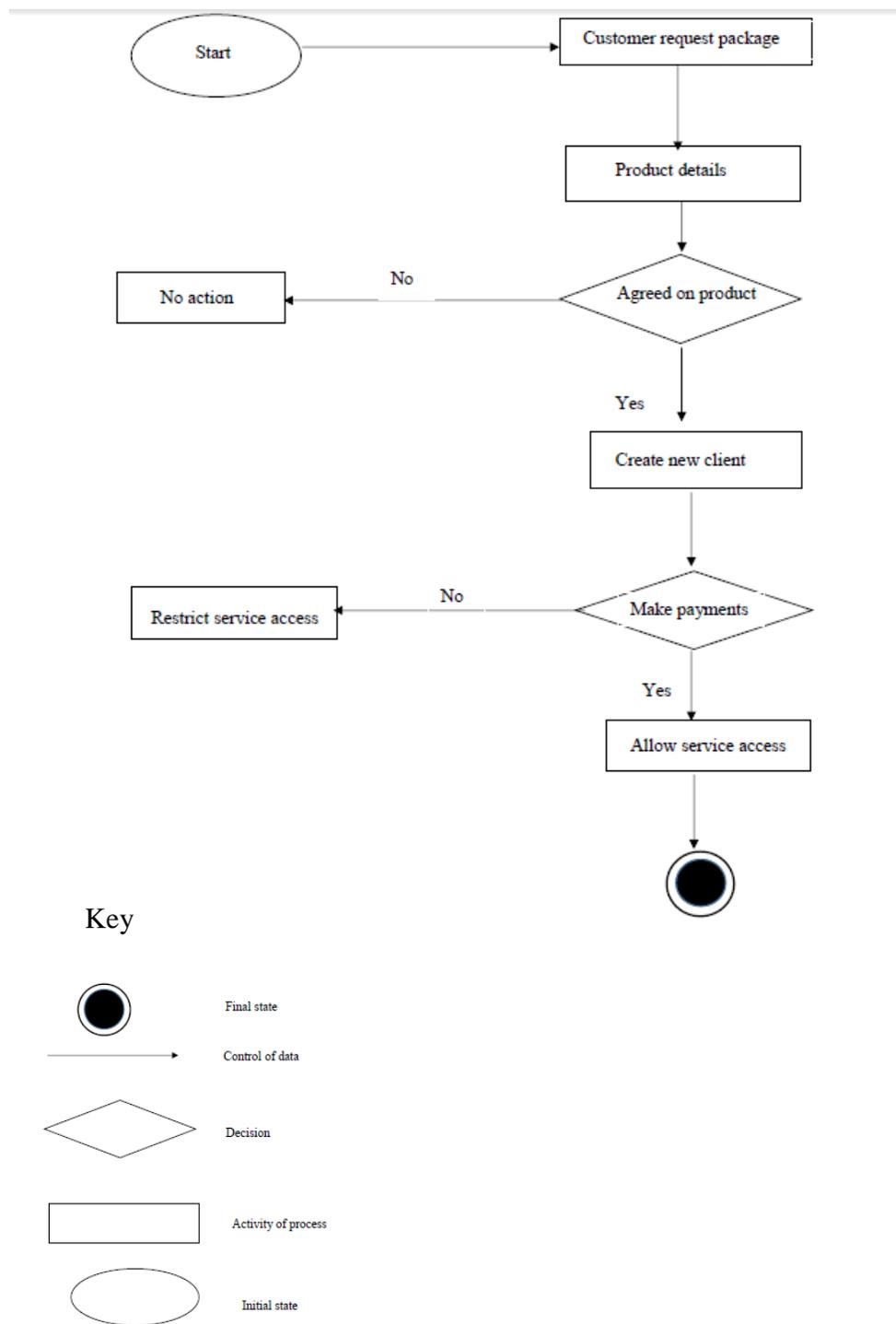
Fig 3.1 Activity diagram

3.5 Data Analysis

Data analysis involves various methods that will assist to explain facts, detect sequence, test hypothesis and develop explanations. According to Hair (2015) data analysis is a process of

inspecting, cleansing, transforming and modeling data with the goal of discovering useful information, suggesting conclusions and supporting decision making. Analysis of data is used to cleaning, transforming, inspecting and modeling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. The major aim of this section is to thoroughly explain of highlighting vital information, supporting decision making and suggesting conclusions. This will show the process system that is taking place in the current system. This stage will also constitute two diagrams which are context diagram and the dataflow diagram DFD.

3.5.1 Context Diagram

The context diagram is an outline of the system boundaries. Alexander (2014) defined context diagram as a diagram that defines the boundary between the system or part of a system, and its environment. It reflects the degree to which the system relates to the external environment.
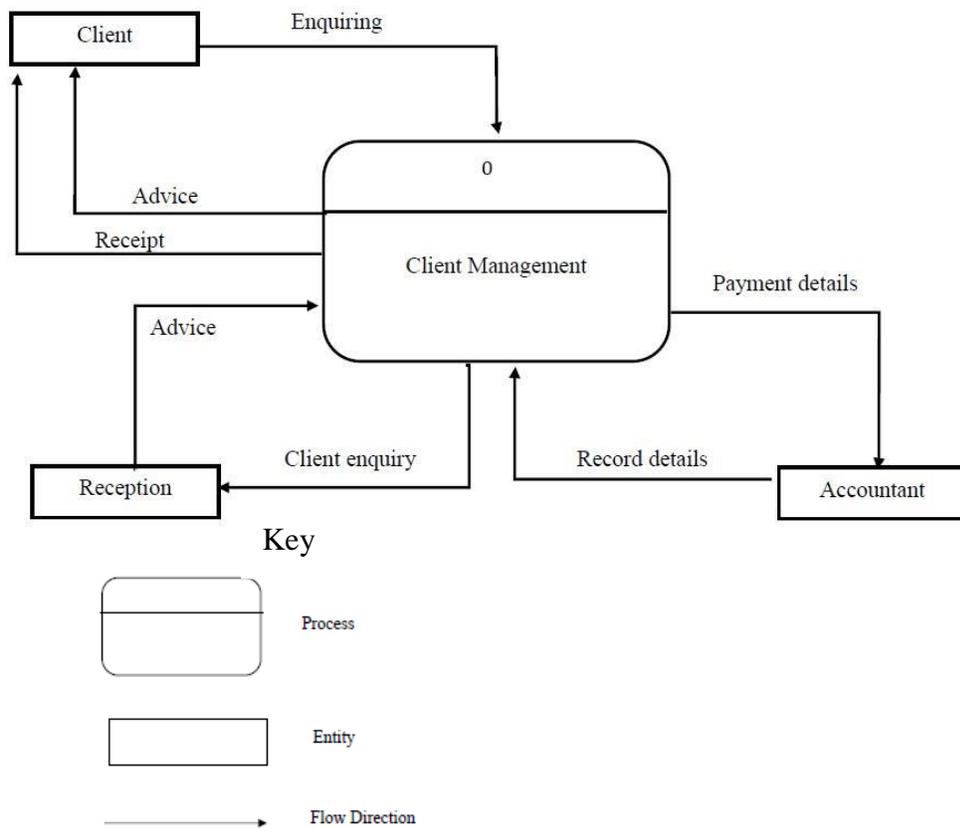
Fig 3.2 Context diagram of existing system

22

3.5.2 Data Flow Diagram

It is   a primary tool that is used for structured analysis that graphically shows the components of a system and how the information flows between these components. They are mainly used to present a clear diagram on an organization function. According to Bruza (2014) it is a graphical representation of the flow of data through an information system, modeling its process aspect a data flow diagram (DFD) is a tool for functional analysis that clearly shows the general flow of information through a system or program.

Key

Process

Entity

Flow Direction

Data Store
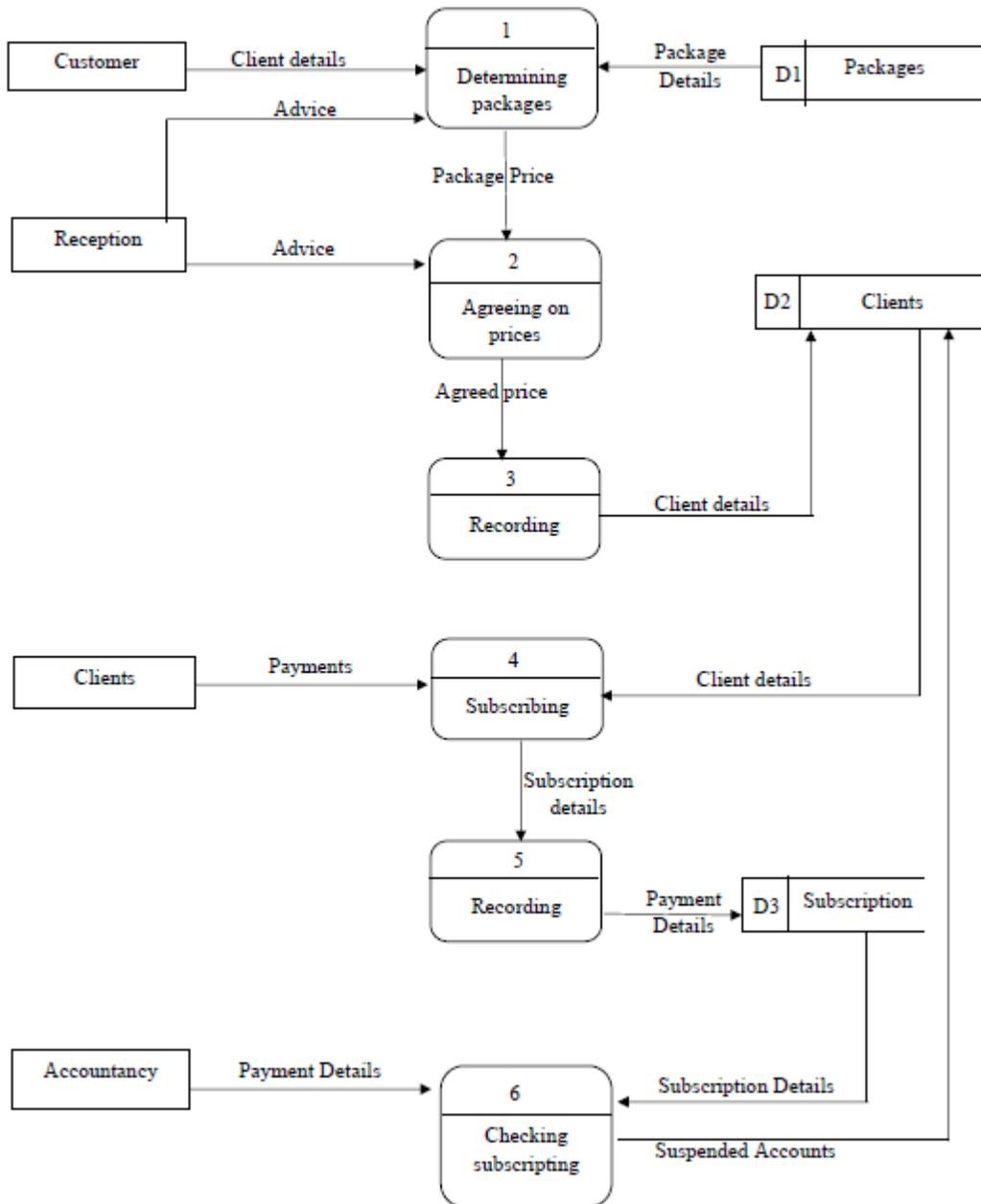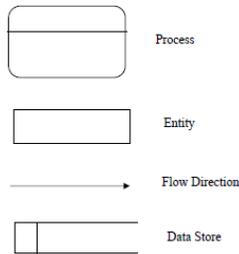
Fig 3.3 Data flow diagram of existing system

3.6 Weakness of the existing system

¾ Evaluation and analysis of data is difficulty and almost impossible since there is no effective way of making people make payments hence other people will continue to use the system eve if they have not paid for the service

¾ Probability of losing and missing important document is high due to poor security of the system archives where the data documents are stored.

¾ System is not cost effective since a lot of stationary is used and this includes the cost of paper, manual files and pens.

¾ The data is stored manually in files, yet each file is stored individually. Due to the large volume of information being handled, files have become too many and are easily getting lost.

¾ Clients are encountering high costs of transport to make payment and they are highly unconvinced.

3.7 Evaluation of Alternatives

Besides developing the system there are several options that would have been taken into consideration and such options or alternatives are to be revised now in this sections:

- Outsourcing.
- Improvement.
- Development.

3.7.1 Outsourcing software

This involves contracting out of business processes Oliver (2014). In this case software development company. With outsourcing the company has to ask another company to come up with a system that they can use. The following are the advantages of outsourcing.

Advantages

¾ No development costs incurred.

¾ Less technical staff is required

Disadvantages

¾ Outsourcing may result in increased risk of information leakage, reduce confidentiality, as well as introduce additional privacy and security concerns.

¾ There is also a challenge of not being able to control some aspects of the company, as outsourcing may lead to delayed communications and project implementation.

¾ Results in more cots being incurred because of high maintenance

¾ Organizations that outsource IT services run a risk of receiving poor quality work.

¾ High charging rates.

¾ The company might not provide software that meet the expectations of the works hence leading to rejection of the system

3.7.2 Improving the current system

This is a process whereby the existing system is being upgraded buy adding new module and functionalities to the system. This process is only applicable to those organizations that have a system that is operating already and that can be easily improved.

Advantages

¾ The organization will save on financial resources because the development of the new system, which would be time consuming, and resource straining was avoided.

¾ The introduction of a dedicated employee to monitor the training plan make work lighter.

Disadvantages

¾ Possibility that the upgrade will worsen the product. A product can also be worsened subjectively by upgrading.

¾ Upgrades of hardware involve a risk that new hardware used will not be compatible with other pieces of hardware in a system.

¾ New bugs can be encountered, some of which could even stop you from using older data files.

¾ More expensive than developing a new system.

3.7.3 In house development (Developing a new system)

In house development this is when the system is developed by the IT department of the organization. The organization might hire an experienced technician to assist during the process of system development. This involves the organization pulling out funds to finance system development (development costs).

Advantages

¾ Reduces data redundancy

¾ Offers control over system development

¾ Legal costs are reduced significantly like licenses and training costs incurred if the system outsourced.

¾ Greater and better functionality since the analyst is more acquainted with the business needs and environment.

¾ Implementation will be easier since the personnel responsible for the system development will be readily available.

Disadvantages

¾ Resistance from employees might be faced

¾ Time consuming that id development of the system will take time as compared to other alternatives.

¾ It is expensive to develop the system.

The table 3.1 below shows the comparisons of alternatives discussed above (outsourcing, improvements of the current system and in house development) in terms of cost.

Table 3.1 Comparison of alternatives

Alternative	solutions Cost ($ US)	Amount saved
Outsourcing	9000	-
Improvements	6500	2500
In-house development	4000	5000

Having considered the above advantages and the amount which will be saved if the system is designed in-house, the company has dropped all the other options.

3.8 Requirement analysis

Shonnon (2014) said requirements analysis encompasses those tasks that go into meet for a new or altered product or project taking account of the possible conflicting requirements of the various stakeholders, analyzing, documenting validating and managing software or system requirements. The purpose of Requirements Analysis is to obtain and establish a thorough and detailed understanding of the business need and to break it down into discrete requirements, which are then clearly defined and reviewed. Requirement analysis can be categorized into two phases namely:

- ¾ Functional requirements
- ¾ Non-functional requirements

3.8.1 Functional requirements

These are statements of services the system should provide, how the system should react to particular inputs, and how the system should behave in particular situations.

3.8.1.1 Use Case Diagram

According to Shelly (2013) they described a use case diagram as a diagram that visually represents the interaction between users and the information system. Use cases are used during the analysis phase of a project to identify and partition system functionality. They separate the system into actors, use cases and associations. Associations between actors and use cases are indicated in use case diagrams by solid lines.

An association exists whenever an actor is involved with an interaction described by a use case. Associations are modeled as lines connecting use cases and actors to one another, with an optional arrowhead on one end of the line. The arrowhead is often used to indicating the direction of the initial invocation of the relationship or to indicate the primary actor within the use case. Actors represent roles that are played by users of the system. Those users can be humans, other computers, pieces of hardware, or even other software systems. Use cases describe the behavior of the system when one of these actors sends one particular stimulus. This behavior is described textually. It describes the nature of the stimulus that triggers the use case the inputs from and outputs to other actors, and the behaviors that convert the inputs to the outputs.

3.8.2 Non-functional requirements

The plan for implementing non-functional requirements is detailed in the architecture. In general, functional requirements define what a system is supposed to do whereas non-functional requirements define how a system is supposed to be. Non-functional requirements are often called qualities of a system. Other terms for non-functional requirements are constraints, quality attributes, quality goals, quality of service requirements and non-behavioral requirements. Non-functional requirements can be divided into two main categories:

1. Execution qualities, such as security and usability, which are observable at run time.

2. Evolution qualities, such as testability, maintainability, extensibility and scalability, which are embodied in the static structure of the software system.

Security:
- ¾ Login requirements - access levels.
- ¾ Password requirements - length, special characters, expiry, recycling policies
- ¾ Inactivity timeouts – durations, actions

Audit:
- ¾ Audited elements – what business elements will be audited?
- ¾ Audited fields – which data fields will be audited?
- ¾ Audit files characteristics - before image, after image, user and time stamp.

Compatibility:
- ¾ Compatible with shared applications – What other systems does it need to talk to?
- ¾ Compatible with 3rd party applications – What other systems does it have to live with amicably?

¾ Compatible on different operating systems – What does it has to be able to run on?

¾ Compatible on different platforms – What are the hardware platforms it needs to work on?

Maintainability:

¾ Conform to architecture standards – What are the standards it needs to conform to or have exclusions from?

¾ Conform to design standards – What design standards must be adhered to or exclusions created?

¾ Conform to coding standards – What coding standards must be adhered to or exclusions created?

Usability: the system is supposed to:

¾ Look and feel standard - screen element density, layout and flow, colors, UI metaphors, keyboard shortcuts.

¾ Internationalized / localized requirements – languages, spellings, keyboards, paper sizes.

Documentation:

¾ Required documentation items and audiences for each item.

3.9 Conclusion

At the end of evaluating alternatives, and gaining clear picture of the current system's loopholes, the only favorable choice was to develop a new system in order to replace the old system which is currently being used. The developer has gained from the information obtained from analysis and have come up with a system with appropriate user requirements. The design phase is the next stage which the developer will now go into.

CHAPTER 4: SYSTEMS DESIGN PHASE

4.1 Introduction

This chapter mainly focuses on the system to be developed and how the system is going to be developed. The design will replace the manual system of assisting and managing client's payments. There is also need to define the components of the developed or proposed system which are the interfaces modules and there is need to meet the requirements which are specified.
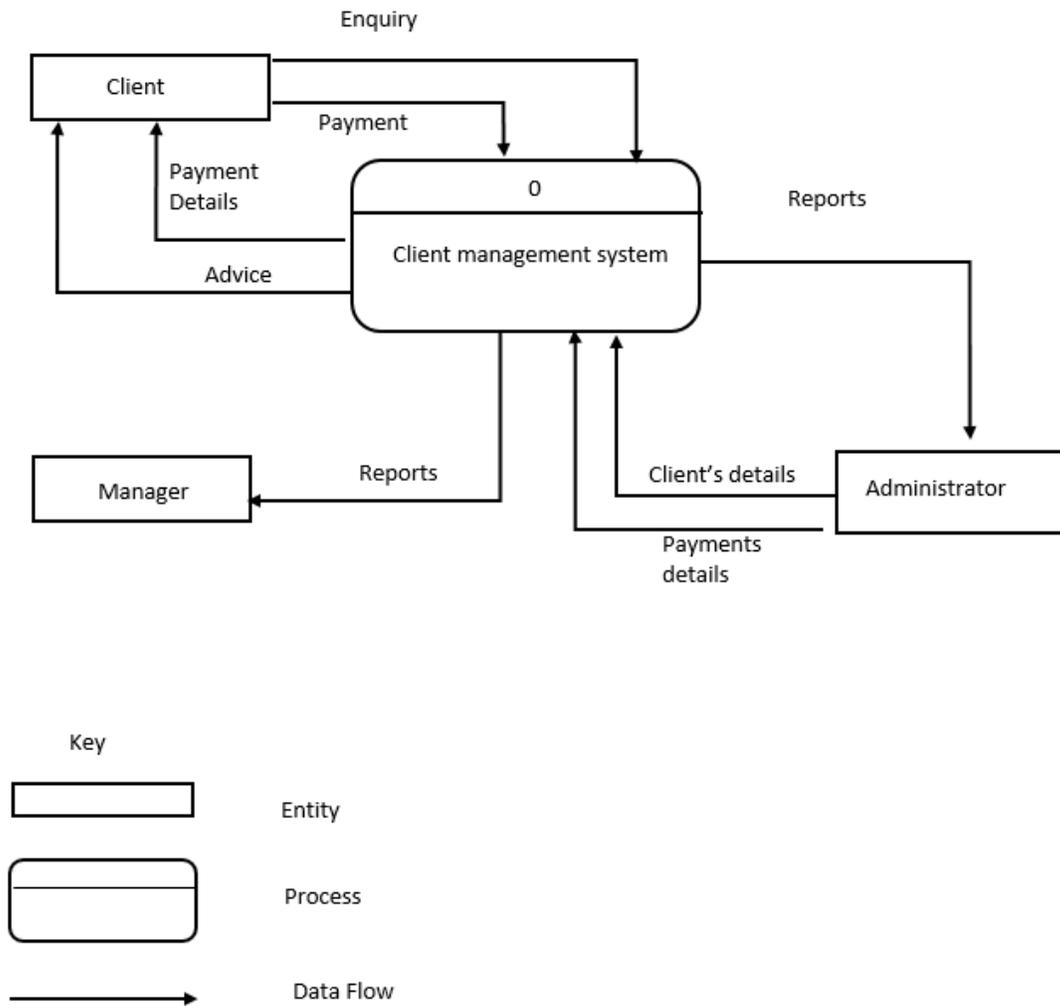
4.2 System Design

The system   design is all about how we are going to come up with the proposed system or how we are going to develop Hansole client assistant system. This system will have various number of functionalities which are listed below:

The system design is about how the proposed online balance enquiry system is going to be developed and function. The proposed online balance enquiry system will have a list of functionalities which are listed below:

- ¾ Account balances online for the customer.
- ¾ Capture and registration of new clients.
- ¾ Updates of account balances by the accountant.
- ¾ Report generation for the manager.
- ¾ Improving security for accounts by providing a username and password for each account.
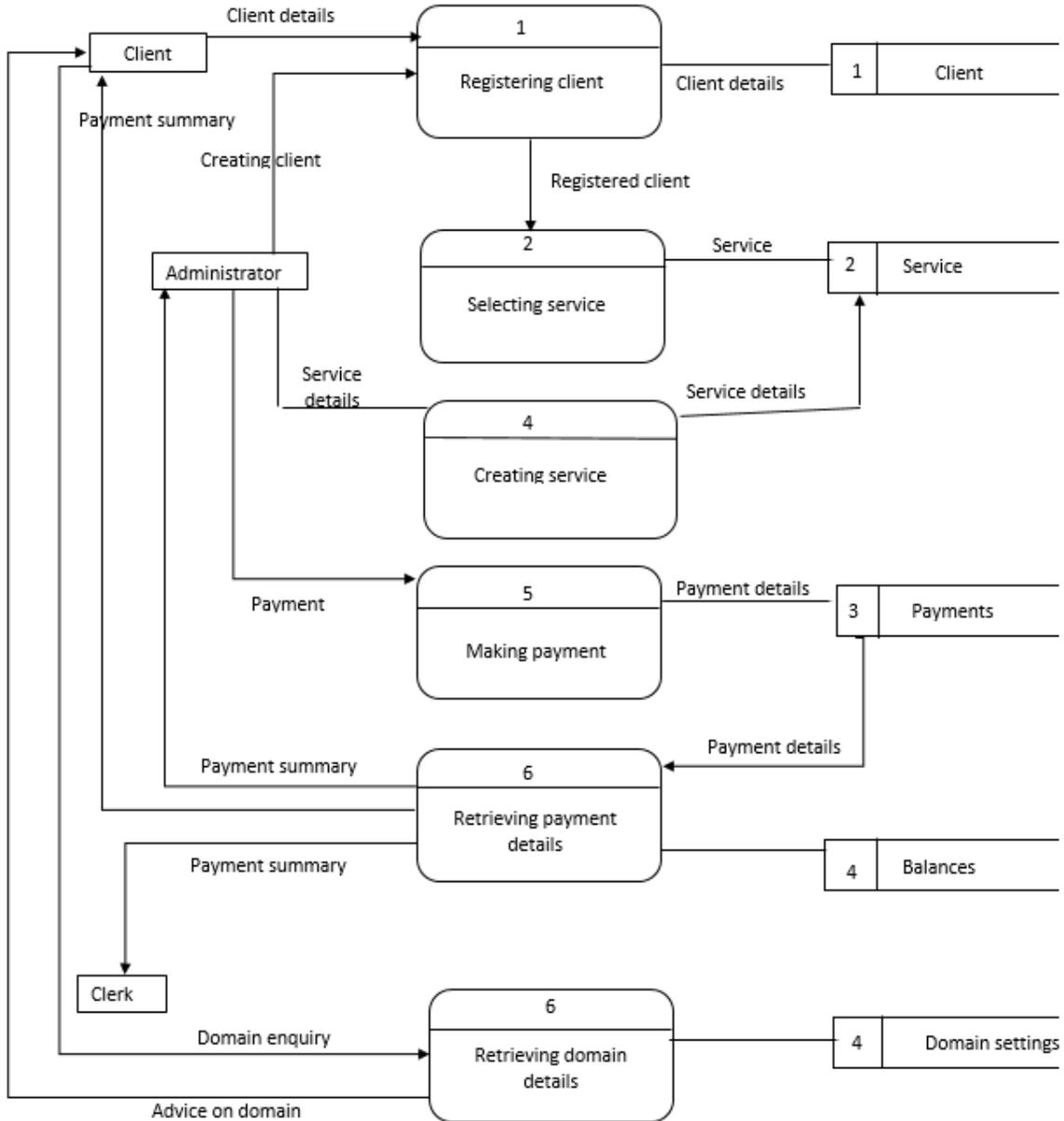
4.2.1Context diagram

Fig 4.1: Context Diagram

4.2.2 Data flow diagram

The diagram fig 4.2 shows a data flow diagram for the proposed system

Fig 4.2: Proposed System Data flow diagram

4.3 Architectural Design

Kendall and Kendall (2005) states that architectural design deals with how the configurations and hardware setup of the online balance enquiry system are to be done and it clear shows how the connections of the major components are to be carried out, this clearly gives the environment in

32

which the new system is going to operate. Architectural design gives a clear description of the hardware and software which is required for the new system to operate. The design of the database is spelled at this stage and the communication nodes which are of the system. The requirements of this design are as follows:

Hardware Requirements

Client machines these computers will be used to operate or access the proposed system after we have placed it on sever.

Server this is will be the one on which we are going to host our proposed system so that each and every client computer will freely access the system as long they are connected to internet. And this is robust hence it will be up on a 24hrs basis to ensure service to client computer.

Printer this will be used to print out reports in form of tables and graphs so that it will be presented to the management and anyone who requires the system.

Router it will be used to ensure network so as to facilitates the connection between client computers and sever.

Network cables will enable internet connections among the client computers and connection to sever as well as network cables tend to provide fast internet connections as compared to wireless connection.

Software Requirements

- ™ Microsoft Visual Studio 2013.
- ™ Microsoft SQL Server.
- ™ IIS Express- A free application which comes bundled up with visual studio and which will allow the testing of the web application easy.

4.4 Physical Design

The physical design of the system will clearly show how the hardware or the physical components are going to be placed or laid out to allow effective communication. For effective communication there is going to be a central data base on which all the client's computers from different places and branches will be connected to it hence this will give real time update as the data will be

showing the current state of the system. The physical design of the system will be shown in the diagram below.
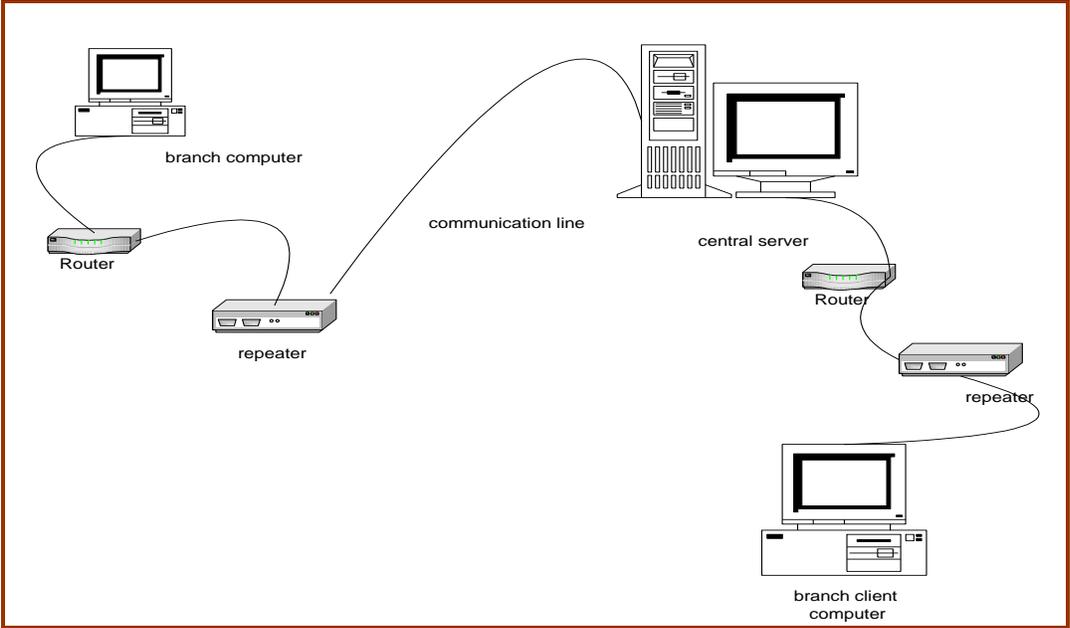
Fig 4.3: Physical design

4.5 Database Design

  According to Torey (2014) Data base design is the process of producing a detailed data model of database. This data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a data definition language which can be then used to create data base.
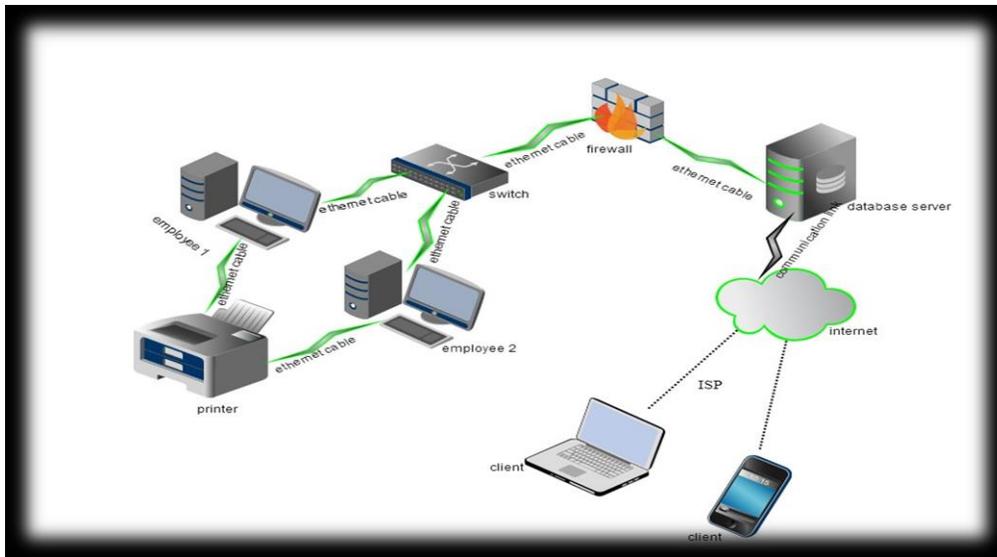
Fig 4.4: Database Architecture.

4.5.1.1 Application level

This is the view level since this is how the users will view the database. In this level, users can make modifications to data in the database. Security of the database is ensured through allowing information only pertaining to its intended user (Somerville, 2008).

4.5.1.2 Conceptual level

The conceptual level views the data as a single unit and it shows relationships existing amongst the units of data (Wesley, 2005). Since this level represents how the database is logically structured, hence called community view. The level shows the type of information to be stored in the database. A global view as well as the hardware and software needed for running the database is provided. It provides a global view of the database, as well as the hardware and software necessary for running it.

4.5.1.3 Internal level

Is the lowest level intended for physically representing the data within the database that is how stored data is represented to a user. This level shows exactly how the data is stored and organized for access on your system (Somerville, 2008). The internal level is the most technical which consists of presuming out the rightful space allocations, therefore compressing the data, security and encryption is also enhanced within this level.

4.5.2 The Enhanced Entity relationship diagram (EERD)

Lucia (2000) defines an entity relation diagram as "a graphical representation of entities and their relationships to each other typically used in computing in regard to the organization of data within databases of information systems."
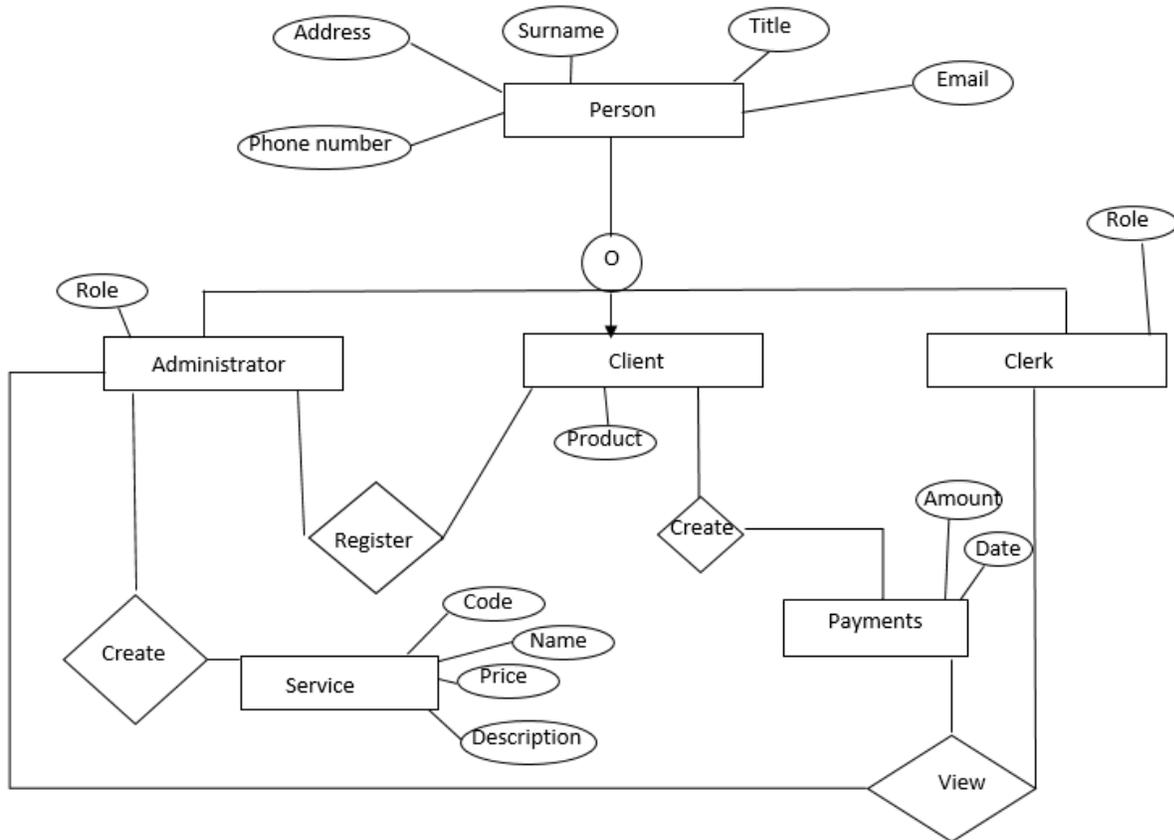
Key

Fig 4.5: Enhanced Entity Relationship Diagram.

4.5.2 Relational model of the database

4.5.3 Tables

These are a collection of interrelated data which is in organized form in the database. The form consists of rows and columns. Below are the tables accessible in the system database.

Clients table

Field	Data Type	Description
Client ID	int	Client identity
Name	varchar	Client first name
Surname	varchar	Client surname
Title	varchar	Client title
Email	varchar	Clients email
Gender	varchar	Client sex
Date	date time	Date on which a client is added
Address	varchar	Physical address of a client
Phone	varchar	Clients phone number
company Name	varchar	Company name

Table 4.1 table showing client

Services table

Field	Data Type	Description
Service ID	int	Identity for a service
Name	varchar	Name of a service
Price	double	Price of a service
Code	varchar	Service code
description	varchar	Description of a service
required Month	varchar	Show is a service is paid on monthly basis or not

Table 4.2 showing services

Domains table

Field	Data Type	Description
domain ID	int	Identity for a domain type
Extension	varchar	Showing domain extensions such as .co.zw
Domain Type	varchar	Type of a domain
location	varchar	Show if a domain ids an international or local

Table 4.3 showing domain extensions

Payments table

| Field	Data Type	Description
payment ID	int	Payment id
amount Paid	double	Amount paid by a client
Client ID	int	Id of a client (foreign key)
Service ID	int	Id for a service that a client is paying (foreign key)
Date	date time	Date on which a payment is made

Table 4.4 showing payments

4.6 Program Design

Dennis (2012) defines program design as a method for designing and documenting methods and procedures in software. This relates to how the code of the proposed system is unified to produce modules and programs. Package, class and sequence diagrams will all be used to illustrate program design.

4.6.1 Package Diagram

It is a group of logically linked components which illustrate the relationship of different software modules which are normally in classes, to form packages (Somerville, 2008). The package diagram below shows how the proposed system's components are linked.
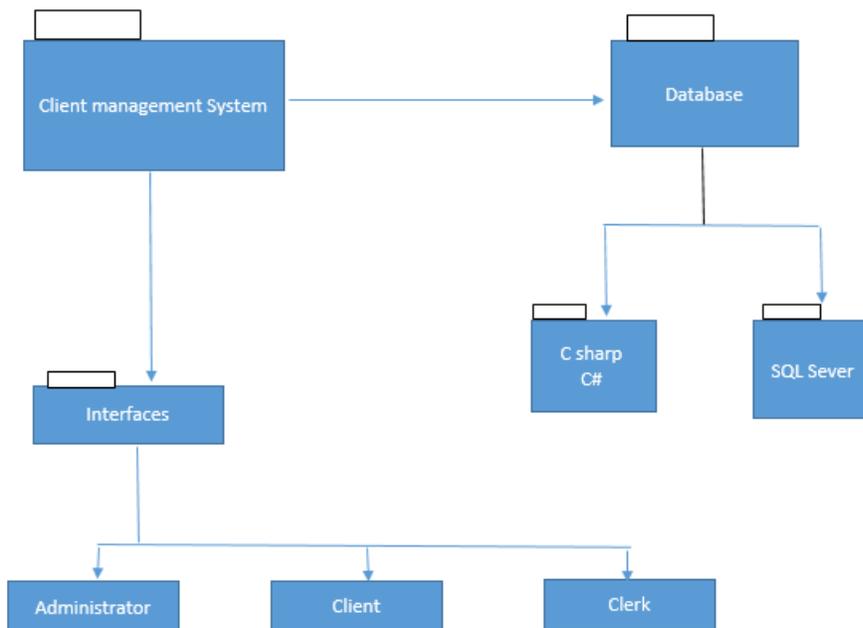
Fig 4.6: Package Diagram

4.6.2 Class Diagram

A class diagram shows a static view of the system in the form of classes that is their attributes, their operations and how they interact. The class diagram below illustrates the Ministry of ICT Smart E-tutor in the form of classes and attributes.
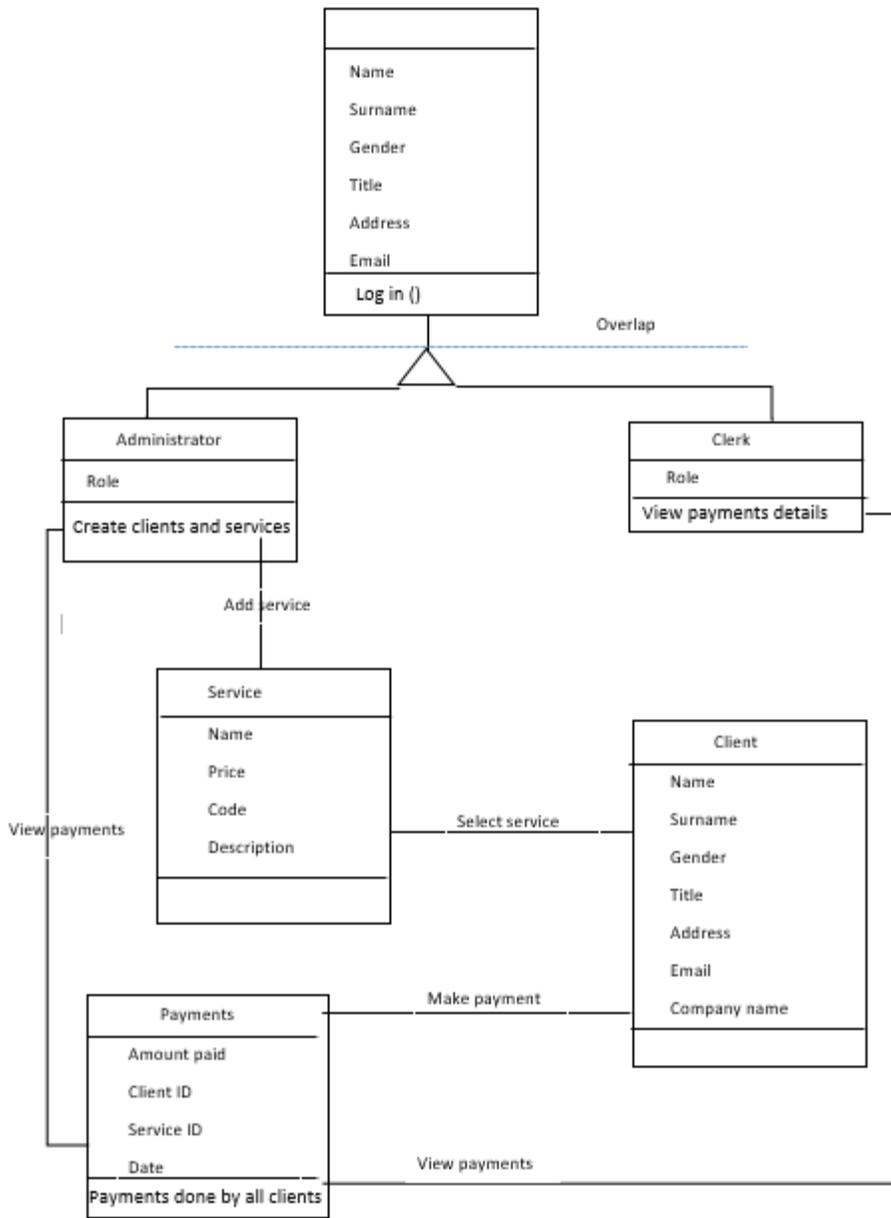
Fig 4.7: Class diagram

4.7 Interface Design

An interface is boundary that is shared by two or more components of a computer and users it allow these components to share information. Any computer interface should be very easy to use that is it should be easy to interpreted through the use of names and used of images for a user to easy manipulate data from the data base the proposed system is comprised of the following user interfaces.

4.7.1 Menu design

The new system has a main platform that is the main page of the system which acts as the control as it will link the other system pages. All main processes start from this platform. A username and password are a prerequisite so that one can get access to the menu of the system. Sub menu will also be at that page thus enabling ease of access.
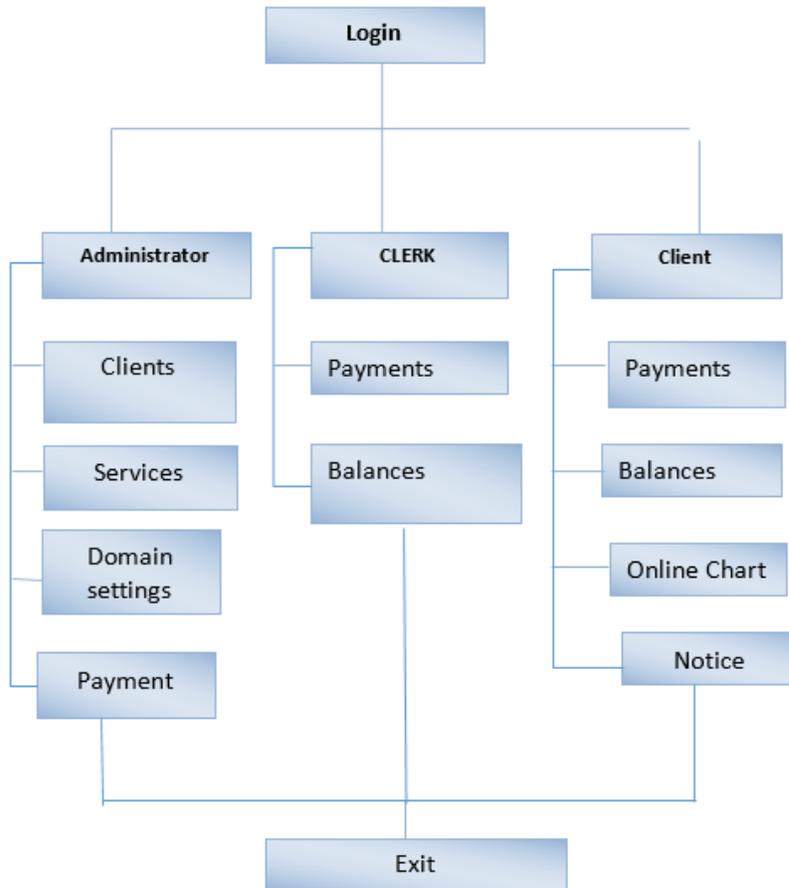
Fig 4.8: menu design

Log in form

Log in form is used to authenticate a user to enter the system through the use of a password so that only authorized users should be allowed to enter into the system. The login form will have two textboxes the one for will accept the username (email) the other one will accept the password.
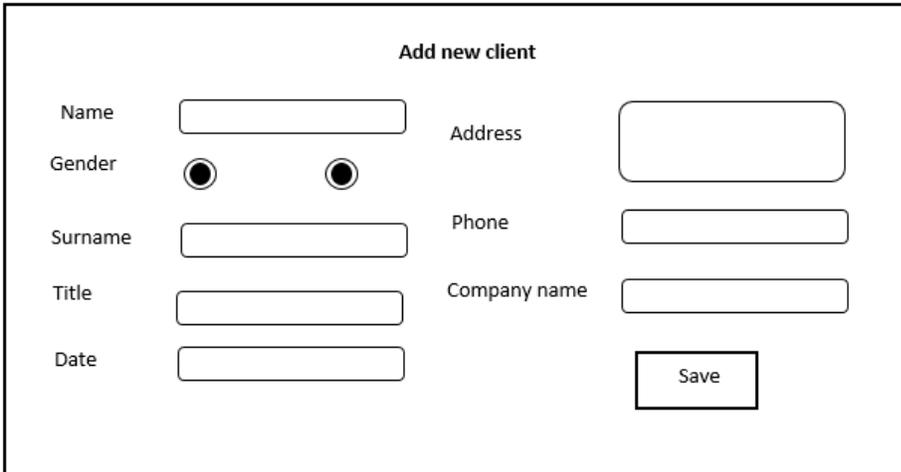
There will be two labels that will show the user the textbox for Username and that of a password. There will be one button that will be used to authenticate the details that one would have entered in text boxes that is the username and the password. By clicking the login button the system will know if the user is an administrator or the user is a client

Fig 4.9: login form

Input forms

Add new client form. This form is used to add a new client into the system this form is to be designed using six textboxes to collect all the necessary information about the client. Labels will be used to indicate information that is required by every textbox on the interface. There are buttons which are going to be used for example radio buttons will be used to enter information into the system about the gender. Text area will be used to collect the address of a user. A button to save the information will be available.

Fig 4.10: adding client form

Add new service form. This form will be used to add new services into the system. The interface will provide a textbox to add product name its price and product description labels will be used to highlight were a user should put required data.
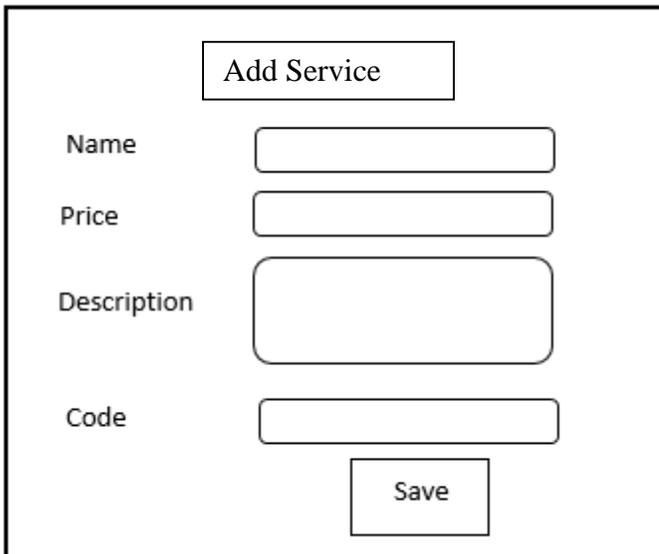
Fig 4.11: adding service form

Add payment form this will be used to allow the user to record payments made by the clients into the system. This form will contain one textbox to allow the user to enter payments. There will be also one drop box that will allow the client to select a service that a client is paying for.

Fig 4.12: make payment form

4.7.3 Output Design

Output design is the creation of a general structure of forms delivering output to the user. Output is the result delivered to the users as an end product after the system has processed the data that the user inserted. Outputs can be soft copies like electronic reports, microforms, audio or hard copies like printed reports.

Payment summary form this will allow the users (client and Hansole investments) to view information about their payments that they would have entered. The\data will be presented to the user in form of tables for easy readability.

Name	Surname	Service	Balance	Service code	Days left	Days used
Lincoln	Chananuka	Domain hosting	$54	2000	24	6
Takudzwa	Tongoona	Domain hosting	$60	2000	228	50

Fig 4.12: payment summary form

Service statistics form. This form will allow the user to view which product is bringing more revenue than the other. This will be used thru the use of a table. Date pickers will be provided to make it easier for the user to see revenue patterns for a specific period as required by the user labels will be used to make it easier for a user to navigate around the interface.

Fig 4.14: service form

4.8 Pseudo Code

Pseudo code shows algorithms which represent the logical movement of the program as it executes in simple structured English statements. This is also called the programming phase where the researcher converts the program specification into computer understandable language. The algorithms to be used in the system are as follows:

User login

Open connection

　　　Enter username and password

　　　　　If reader if false the

　　　Display no user found

Else

　　　Hide login form and display main menu

End if

Add clients

　　　Start

45

Display Interface or form to enter input

Accept user input

Validate as necessary

If input is valid

      Open Database connection

      Open record set using current database connection

      Save record in database

      Close Connection to database

Else

Display error message

Display Interface or form

Accept user input

Validate as necessary

End if

Stop

View Records

  Start

Display interface

Display Primary key list

Accept user input

If no error occurred

      Open Database connection

      Open record set using current database connection

Display Record details

Else

Display error message

End if

Stop

Update Record

Start

Display interface

Accept user input

Open Database connection

Open record set using current database connection

If record exists

Accept changes

Validate changes

Update changes in data

Close Connection to database

Else

Display error message

End if

Stop

Remove user

Enter username and check username in database

If reader is false then

Display no record found

Else

Ask if the user is sure about the operation

If user is positive

Delete record highlighted

Else

Do nothing

End if

4.9 Security Design

Security design is a way that is used to make protect a system from malicious attacks and from vulnerabilities that are exposed to the systems. In order for us to avoid such situations, there are several precautionary measures that are used to avoid it best programming practice among many can be used to protect our system from such attacks.

4.9.1 Physical security

Hughes and Cottrell (2014) propounded that physical security is the protection of physical assets (tangible assets) from different harm such as theft, or natural disaster as well as unauthorized entrance and access to information stored in computers databases. Basically this security system prevent harm to the physical assets. There are several physical security measures that are used. These measures start by putting all computer gadgets into a room which is secure that is the use of lock, burglar bars and security guards. We can also make of CCTV (closed circuit television) to monitor people entering and leaving the room.

4.9.2 Network security

Brian, (2014) defined network security as an action that is put in place to secure the integrity of a given network and data as well as integrity. A very effective network security is responsible for managing the access to the network.

Brian, (2014) delimit network security as any activity designed to protect the usability and integrity of a network and data. Effective network security manages access to the network. It targets a variety of threats and stops them from entering or spreading on an organization network. Network

security consists of the policies and practices adopted to prevent and monitor unauthorized access, misuse, modification, or denial of a computer network and network-accessible resources. It also encompasses the authorization of access to data in a network, which is controlled by the network administrator. So as to ensure network security, users choose or are assigned an ID and password or other authenticating information that allows them access to information and programs within their authority. Moreover, maintaining a strong firewall through making sure that the firewall is hardened and is supported by virus protection software.

4.9.3 Operational security

Kendall and Kendall (2014) defines operational security as vulnerabilities that are likely to cause harm to the proposed system during its operational life time. These threats can be within the organization's operation environment therefore, it is of great importance that people are ensured on the operations of the system during its operation. Moreover the responsibilities of those directly linked to the system are supposed to be clearly outlined. Other solutions to operational security include automation and authorization. Full authorization should not be given to everyone besides the administrator as he is responsible for the maintenance of the system. Automated processes are also less likely to make mistakes, although if a mistake does happen, it is often systematic and therefore easily detectable.

4.8 Conclusion

This Phase mainly outlined the specifications of the design concept of the system that is to be implemented. The system's architectural and physical specifications of the system were outlined with special emphasis on satisfying functional requirements. The developer specified categorically the input and output development for the proposed system hence comes implementation of the proposed system which is the implementation phase.

Chapter 5: Implementation Phase

This chapter deals mainly with the implementation of the developed system at Hansole investments. It will also include testing of the system, screen shots are going to be included from different web pages, and installation of the system will be included on this chapter. Since there are various change over strategy this chapter will indicate the best or recommended change over strategy for this system. It will also show the maintenance strategy that suits the developed system. At the end of this chapter we will give the recommendations for future development and this will mark the end of the project.

5.2 Testing

After a developer has finished with system development (coding) the system has to be thoroughly checked to see if it is working as per its requirements and to check whether it is meeting the intended objectives. This process of checking whether the system is working properly is called testing. (2004) "defined it as a procedural process of monitoring the system's processes in meeting the goals and objectives to which it was designed for" the diagram below fig5.1 shows the stages that are involved in testing the system and the proposed system has to undergo all these stages of testing before it is actually implemented.
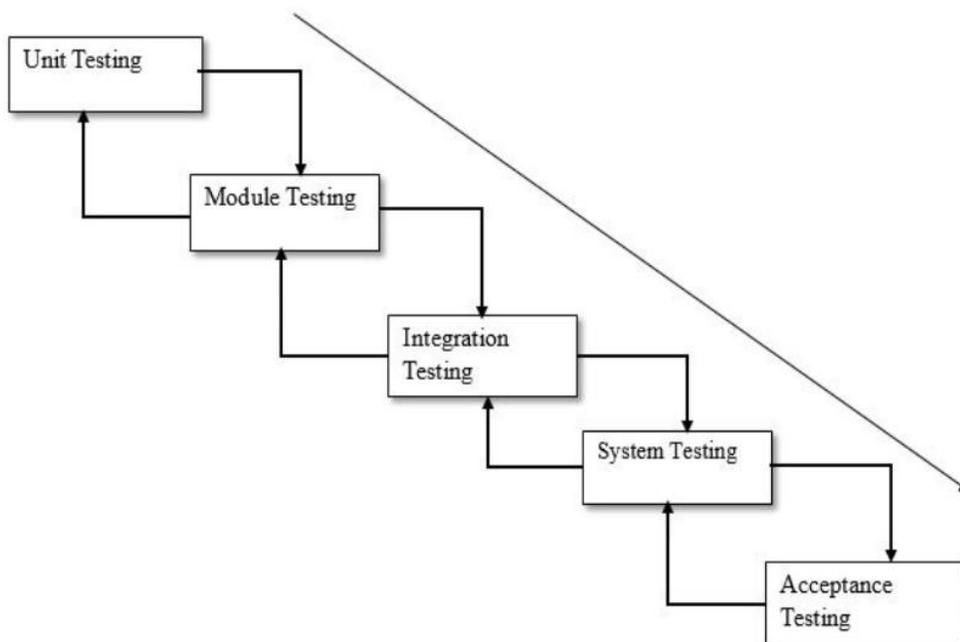

Fig 5.1 Testing process flow

5.2.1 Unit Testing

Unit testing is defined as a process of checking errors in which every single unit or single part of a system will be tried or tested for its performance and effectiveness. It can also be defined as the examining of units and sub units of a given system. These parts will be will be thoroughly examined so that we will maximise the system performance. It will ensure high performance and functionality of the system for example we can test all the data base connections and login modules to authenticate users into the system. Unity testing can be with box or back box testing and there are explained below.
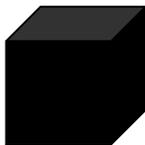
5.2.1.1 White Box testing
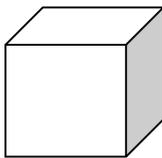
Fig. 5.2 White Box testing

White box testing can be also be called logical testing. White box testing is basically more focused on inside functionality the project and these functionality will be difficult to figure out using black box testing. To some degree the system might seem as if is working very well but internally there will be some errors or bugs that will need to be aired out.

5.2.1.2 Black box testing

Fig. 5.3 Black box testing

Black box testing can also be called functional testing. Unlike the white box testing this will mainly focus on the input of data and the output of data only that is it will find if the output of data is corresponding to the input on data. This is comprised of a number of inputs that will defines several procedures working on the proposed system. This will not consider the internal operation of system.

5.2.2 Module testing

Module testing is a program that is designed to test the consistence and the coherence of different modules within a system. The system will have to be braked down into different modules and then

test these modules individually hence detecting errors within these modules of the system. The main purpose this testing is to show the interconnection among several modules that will initially tested individually and the combined together.

The developer of the system (Hansole investment client management system) managed to test several form of the system to see if the functionality is up to standard

5.2.3 Subsystem testing

Sela (2015) postulated that sub system testing this integrate several related modules of a system together to form up a subsystem integration. Subsystem testing can also be called link testing as it will connect several related modules. The developer success fully tested the models of a system among other modules and the subsystem was successfully tested.

5.2.4 System testing

System testing as a process which integrates various programs into a number of systems and not incorporating such to different programs for testing. It is a process of verifying and validating the functionalities of a system and its capabilities in studying if they can perform as required and desired, (Sela, 2009). All aspects that required testing were tested and the proposed system passed system testing. Dawn (2013) postulated that various integrated modules and components have to undergo system testing for the identification of faults which may be a result of subsystem communication.

5.2.5 Acceptance testing

Acceptance testing happens to be the final stage of testing flow. Of all the other testing they are done by the analysts and the management, except acceptance testing which is done by the system users who would want to know whether the system meets user requirements and performs as per the expectations. Somerville (2014) explained acceptance testing as a process of checking the system acceptability through the testing by use of customer data. It is normally done solely by system users who ensure some validations meets their expectations (Brezhen, 2014). Acceptance testing can be either alpha testing or beta testing.

5.2.5.1 Alpha Testing

Pressman (2014) defined alpha testing as a testing method carried out by the customer right on the system developer's site. Alpha testing seeks to answer the question; is the software developed, right? It is used in testing for some errors and all defects for the maximum rectification so as to

meet end-user requirements. Alpha testing should ensure the rightful implementation of some functionality to the proposed system.

5.2.5.2 Beta Testing

According to Dennis (2013) beta testing is a testing method in which the processes and procedures occur when the system developer has no control in the occurrence of the processes. This happens to be the final testing stage of the testing process flow and passing this final stage then the system is ready for implementation. Unlike alpha testing, beta testing is done at the site of the client which implies the adoption, full implementation and installation of it if it passes this testing.
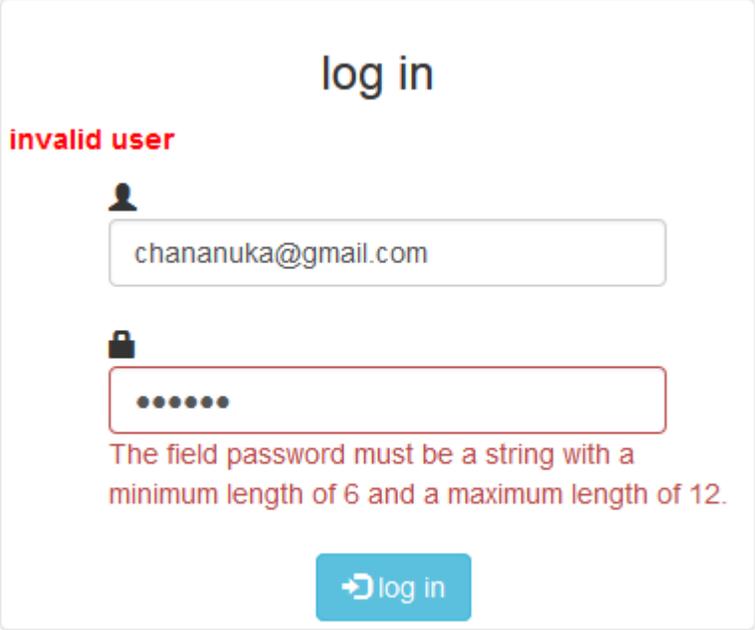
5.2.6 Verification

Rosenblatt (2013) exclaimed that verification often takes some routine checks on the accuracy and correctness of the developed system for it to be considered right. Of course, all fields can be validated, comparing input and output data but if the system does not meet user requirements and expectations then there is no verification and by such the system would be rejected. Tran (2013) explained verification as the process of checking whether the developed system congruent the user defined objectives. The Hansole investments proposed system was verified and it tallied with the user specifications, requirements and expectations, therefore it was adopted and implemented since it solved the problems defined in chapter one under problem definition.

5.2.7 Test cases

The table 5.1 below shows the cases were tested by the developer as to see if the system is performing up to the expected standards.

Table 5.1 show Test case

Case number	Description	Screen short

1	Password field must have a length of 6 characters and a maximum of 12 characters	
2	All fields must be filled in with details both the password and the email text fields	
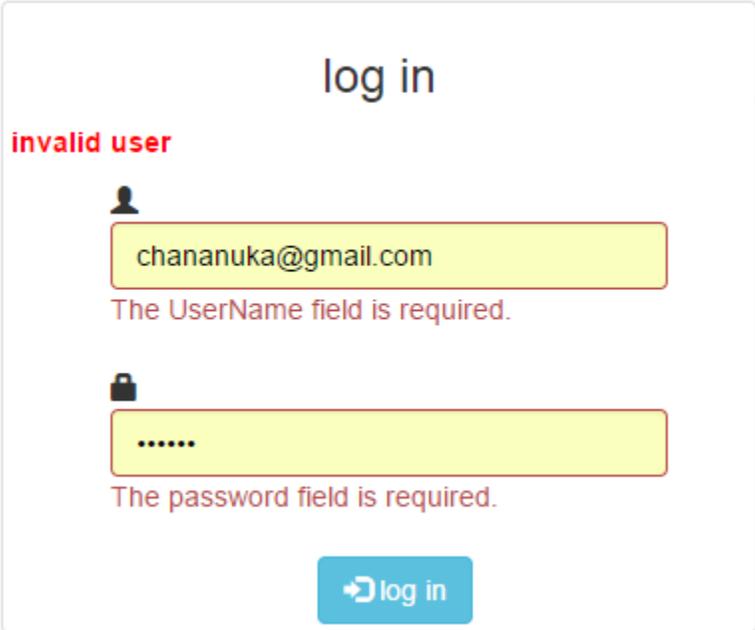
3	The user must enter valid password and email to be granted access to the system	
4	The user must enter every text field provided to enter service details	
5	The user must enter every text field provided to enter client details	
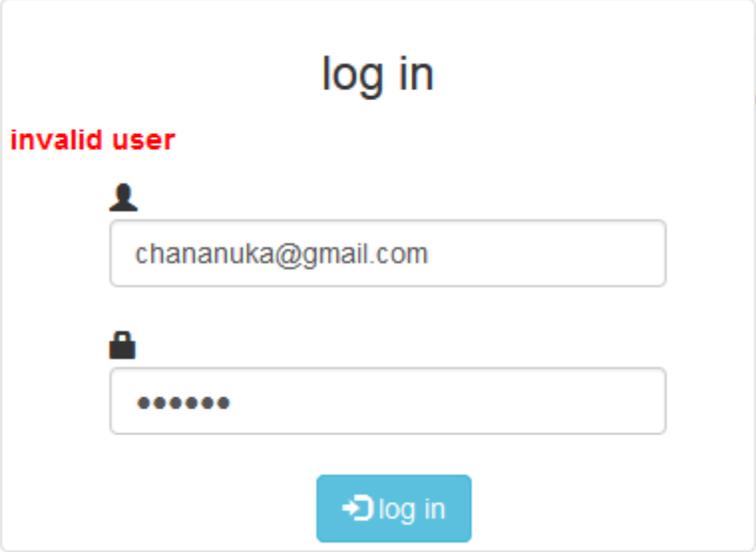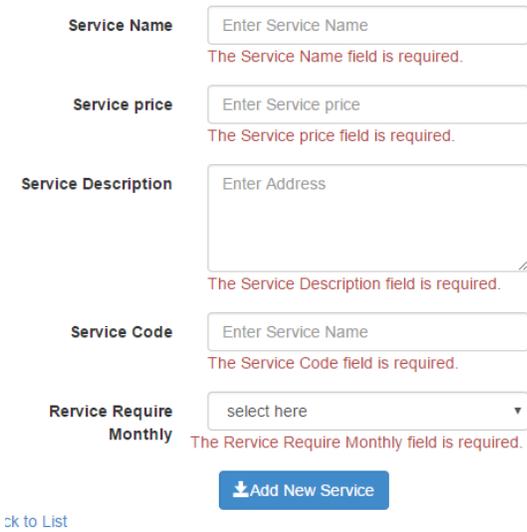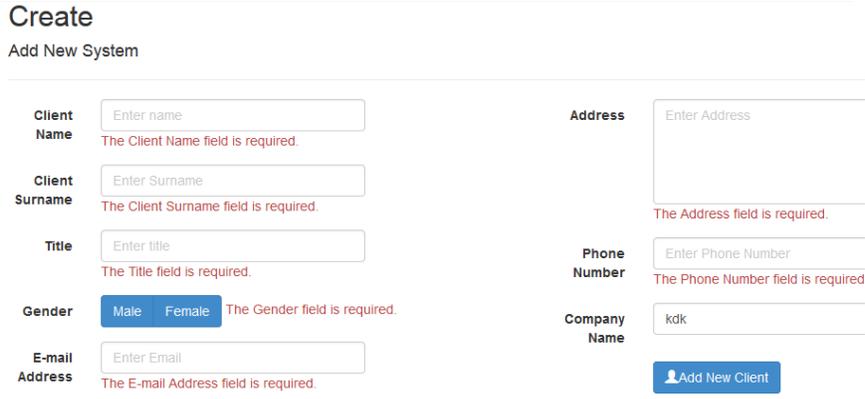
5.2.7 Validation

The validation of a system is comprised of thoroughly inspection and finding whether the developed system has been developed correctly. The developer validated the system by comparing the input of a system against its output and the developer tested several forms to make sure that the system is working properly. The proposed system is expected to work effectively and efficiently and should be valid and accurate as well. In this stage it is of paramount importance to fulfil the user expectations as well with his or her expectations. The diagrams below (fig 5.4, 5.5 and 5.6) will indicate this.
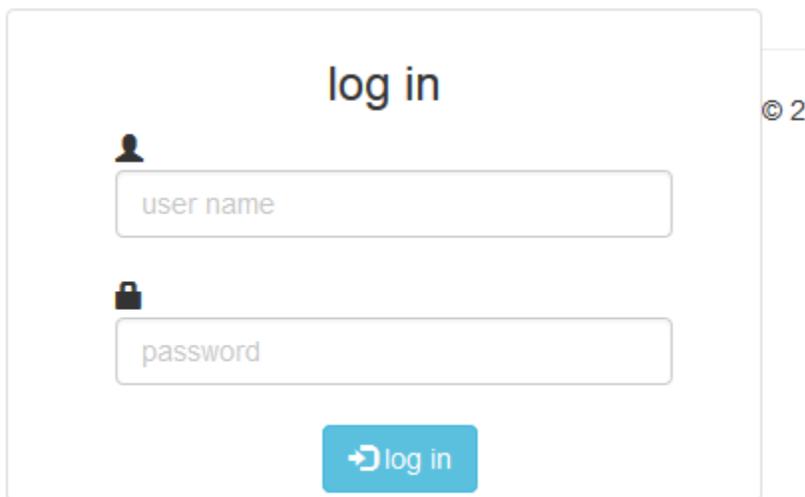
Fig 5.4 Empty text box
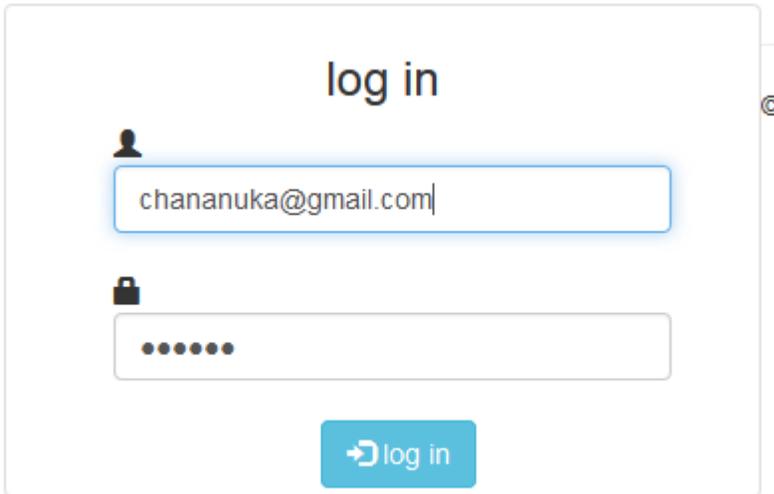
Fig 5.5 using wrong credentials
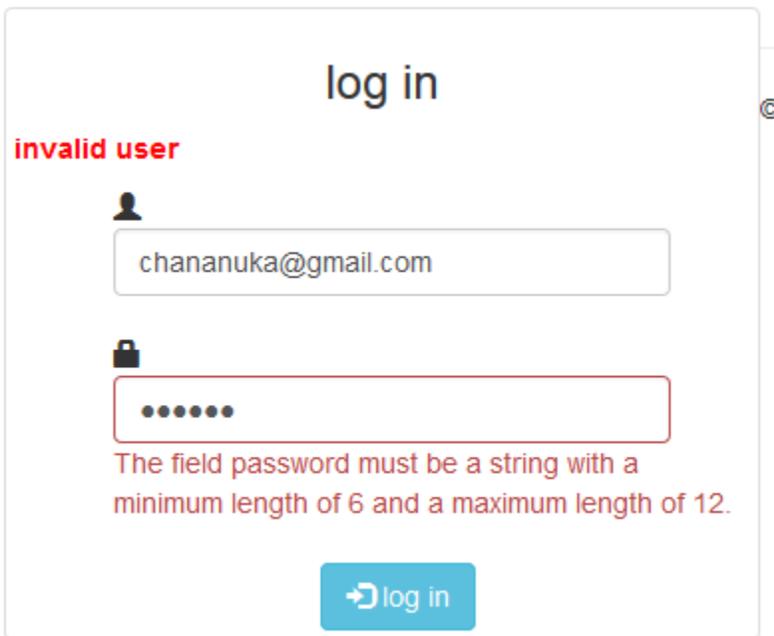
Fig 5.6 filling wrong format information

5.3 Installation

Installation is defined as a way of moving data including the conversions of the old system if any, to the new system. It can be defined as a special process of migrating or transforming from old system to new system. After all the above processes that is all the testing the necessary test the system has to be installed in order for uses to use the system.

5.3.1 Installation steps

1   We need to have a domain name to host the system and a windows sever that will host that domain

2   We have to log in into the sever log in into sever and use domain password and username to get access the system.

3   Open the public folder of your domain usually named as **public html** and the add system files that is model classes controllers and views of the system.

4   In the web configuration folder add a path that lead to the database include the data base name.

5   Using asp.net entity frame work the system will automatically create the database and all the tables

6   Last stage enter all the setting that are required to allow

5.3.1 User Training

It is very important for users to be well informed on how the system should work. The users has to be well acquainted with the system functionality. In order to achieve this users has to go through a training on how the system really works and to know how to operate the system. Therefore, a representative from Hansole investments will be there for such training. The table below (table 5.1) shows the training plan

Day 1:				
Time	Location	Topic	Trainer	Focal persons
10am-12 pm	Harare Belvedere	• Logging into system • Registration • Adding new worker and client as well as	It specialist	Administrators Data clerk

		editing deleting • How to make domain setting •		
Day 2				
10am-12 pm	Harare belvedere	• How to add a new service. Editing and deleting. • How to allocate each and every client a service • How to add a payment of a given product in a data base. • How to find different	IT Specialist	administrators

		revenue contributed by each product for specified time		

Table 5.1 training plan.

5.4 Conversion

There are several number of conversion methods that maybe used when implementing a system. All these types of conversion methods were taken into consideration and out of these conversions the best conversion for the proposed system was selected. These conversion methods include the following.

1. Direct conversion
2. Pilot conversion
3. Parallel conversion
4. Phased conversion

5.4.2.1 Direct conversion

Direct conversion is a method if implementing a system on which a new system will replace the old system of framework promptly just after the old system stopped working. This changing over strategy is about instantly abandon the old system instantly in adoption of the new system. The old system will instantly stop and it will not be available for use from that time.

The dangers or hazards that are associated with this conversion is that is the system fails to perform up to standard it will be difficult to detect that or to notice it since there will be nothing to compare the results with and the old framework will not be accessible for it to be used once more to compare the results.

Advantages

- It requires less human power since the system will not run in parallel.

- In terms of costs direct conversion is less costly as it will be directly implemented

Disadvantages

- It is not suitable for system which keeps sensitive information otherwise if the system fails in any way it will be difficult to recover data.
- It does not give enough time to users for system familiarization as it will be implemented instantly.

5.4.2.2 Pilot conversion

This is change over strategy is where by the new system or frame work is only initialized to the one in one branch and they will run both the current system and the proposed system together as other branches will be running the old system. If that branch which is running the old system found that the system is having problems the system will be corrected until it is running perfectly if the system is running perfectly then all other branches will then adopt the new framework.

Advantages

- Users of the system will have time to familiarize themselves with a system before it is fully implemented.
- It is suitable to use when dealing with sensitive information as it is easy to revert back and recover data.
- It less costly as compared to parallel run.

Disadvantage

- It is complex to manage and to implement using this conversion

5.4.2.3 Parallel conversion

This conversion is where by the new system of framework is used to be initialized to gather with the old system and these two system will run parallel. The client management system in this case will have to be initialized with the old system. The reason for this change over strategy is that they will be encountering the risk of failure form the new system that might lead to loses. Hence if these systems are working together they can easily recover the data from the old system. However, they is duplication of work as they will be repeating the same work on these two systems. These two

systems will run at the same time and if this proves to be working the old system will be left gradually until it is turned off totally.

Advantage

- It is less risk to use this conversion hence this conversion it suitable for critical data.
- Since parallel conversion the old system works with new system hence there is a chance to compare the outcome from both.
- No down time.
- Users will have enough time to get used to the system

Disadvantage

- Slows down production and its costly since both systems has to operate during the same time.

5.4.2.5 Recommendations for the conversion

The Hansole Client Management System has been developed successfully and installed. The researcher recommend the company (Hansole investment) to invest in systems like this and channel more resources towards projects like this. The system should be integrated with the current website so that it will be easier to access hence thus convenient. The system developer should be given access to the system if he need to make some improvements to the system so that it can meet some technological advancements. For this system to be implemented we recommend the parallel running conversion. We have recommended since it involved security of data. Data will not be lost if there is a failure of a system during the initial stages. All the employees of Hansole investments should be thoroughly trained before using the system. This conversion will also give the employees a chance to familiarise with the system. If there is a new worker he or she should be thoroughly trained in order to reduce errors on the system and the workers should constantly refer to the user manual if so that they know how to operate the system. To ensure security the system users should use passwords to enter in to the system and they should constantly change their passwords.

5.4.2.6 Reasons of choosing Pilot conversion method

¾ Pilot change technique will bring about low expenses being acquired on the grounds that the assets of running both the frameworks at the pilot site are focused on that site as it were.

¾ Risk is low as the reinforcement exists and hazard is just constrained on the pilot site not the entire association.

¾ Pilot change gives space for adding enhancements to the new framework before being executed to different destinations.

¾ Errors are effectively amended.

5.5 Maintenance

The maintenance stage that is often called the upkeep stage this is done after the proposed system has been implemented and well executed. The new system must be constantly checked so that we will know if the system is still working up to the standard. If there are few changes to the real world that affect the system, the system should be corrected so that it will meet what is happening in the real world.

Upkeep stage is the stage which is done after when the System has been effectively been executed. After the usage, there is requirement for surveys and these are done after a specific timeframe regularly on a month to month premise and later on a yearly premise. Framework upkeep ought to be done to ensure that framework runs in accordance with the particulars. On the off chance that the surveys uncover that the details or the earth has changed, a few adjustments must be done likewise to the framework in this way framework overhauling. Support process ought to be a constant procedure as it is activated by new administration and client necessities. Framework support is otherwise called framework survey. Framework support contains three upkeep sorts which are:

¾ Adaptive Maintenance

¾ Corrective Maintenance

¾ Perfective Maintenance

5.5.1 Corrective maintenance

Concentrates on the remedies made amid outline and execution stages. The remedial upkeep finds blunders, for example, coding mistake, plan blunders and necessities mistakes. Coding mistakes they are viewed as shabby when making amendments. Outline mistakes they are viewed and costly than the coding blunder since it includes reworking of many program segments. Prerequisite blunders this s the most viewed as costly mistake than different mistakes. It is costly to report as a result of broad framework upgrade.

Plan of action

Since this happens randomly and without knowledge there is need to constantly check system before any error occurs and it has to be checked modules by modules. If the system users detect an error they have to report as soon as possible.

5.5.2 Adaptive maintenance

The organization's environment in which it is operating might have some changes in future as the organization expands so this type of maintenance will be undertaken to cater for these changes that might arise in future.

Plan of action

Since the system was programmed using object oriented programming the majority of the modules will be easily changed so as to meet what its environment requires.

5.5.3 Perfective maintenance

Perfective maintenance emphasizes on continuous communication with the users so as to improve, add or modify the system's functionality. This is carried out so that the system continues satisfying and meeting user requirements.

Plan of action

This has to be scheduled during the installation of the system in order for workers to observe if there are grey areas on the system that may need improvements. At an interval of three months the system should be upgraded so as to meet the requirements of the users

5.6 Recommendations for future development

The Hansole client management has been effectively developed and implemented, the researcher recommends that the company has to organize its assets towards the advancement and maintaining of such system. The system developed has to be incorporated with the Hansole investments website for helpful purposes to the customers and administrative purposes. Every single new client who might go to the association must be first prepared before hands-on to the framework in order to diminish mistakes and client manual to be painstakingly utilized and returned to. For security reasons, all clients are supposed to keep private and classified to their client confirmation qualifications and the utilization of refreshed antivirus to be utilized on all PCs utilizing the

System.

5.7 Conclusion

 This was the last section which was concentrating on the Implementation of the System within the company. The Coding of the System has been completely clarified, the Testing of the framework has been done including the screen shots of various types of the System. Establishment of the System has been successfully clarified. Clients have been prepared on the most proficient method to utilize the System successfully. Information migration has been effectively done and the Pilot Changeover has been recommended as the best strategy. System maintenance has been clarified and various types of maintenance have been looked at so as to maintain the System in a good state.

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Appendices

Appendix A
Introduction

The user manual was created to assist and provide the user training to the users who will be authenticated to interact and familiarize with the system, for future reference and for further training of new users or during system maintenance.

About the system

Hansole client management system is a web based application that can run on any web browser. The system was constructed using Csharp (C#) html jQuery and visual studio as the developing tool with C# as a programming language and SQL server as a database.

How to start Hansole client management system web application requires access to internet in order to operate on it. The system begins from the home page which is accessible to everyone who visits the site.

Fig A1 home page

Login to the system

The system functionalities can be accessed only if the users provide the accurate credentials like password and email. Inputting correct information will lead the user to their portal. Below is a login form for Administrator and user followed by the portals they will be directed to if they successfully login to the system.

Fig A2 log in form

Adding a client

All clients are and users of the system added by the system administrator, the administrator is the one who have all the rights to use and view all the data in the entire system.

Fig A3 Adding a new user

Fig A4 Adding a new user

Adding new payment

For the waiting list applicants, when they make their payments it is recorded. This will assist in knowing who has made the payment which result in allocation of the stand. Therefore any new payment is accepted by filling the below form;

Fig A5 Adding new payment

After clicking make payment as highlighted above the window below will show, showing tow input box textbox to add payment and a combo box to select the payment he or she wats to enter **note: services that will appear are only those services that a client was allocated.**

After adding the respective data then you have to click Save

Fig A6 inserting payment

Allocate service to a client

Each client has to be allocated a service and the administrator will then have to allocate each client a service so that we will know statistics of clients and product, for example we will know number of clients on each service.

Fig A7 Allocating service
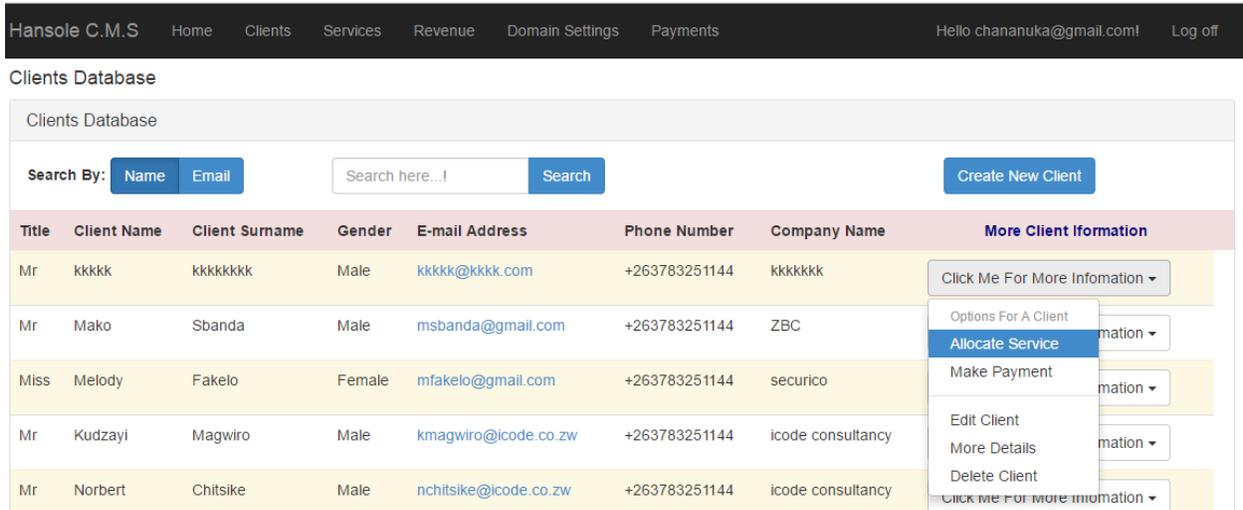
After clicking the allocate service the window below will popup and a list of all services saved in your system will appear and you have to click all the services that you want to allocate and is you are satisfied the click Allocate service

Fig A8 Allocating service
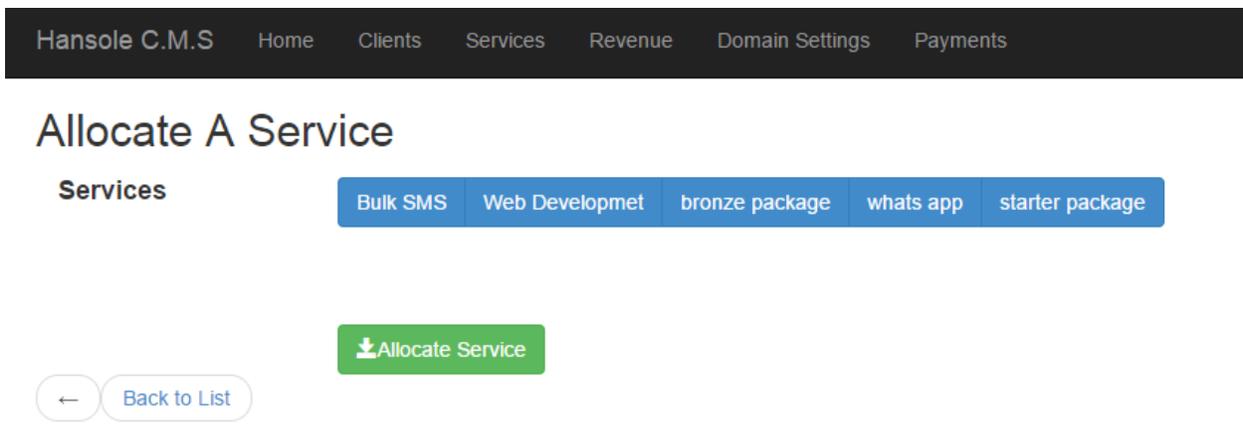
View services

To view services that are available the administrator has to click the link below named services

Fig A9 view services

Clik here

After clicking the link above the window below will pop up and it will show all services that are available. It will also prompt the user to edit delete of view details.

Fig A10 view service
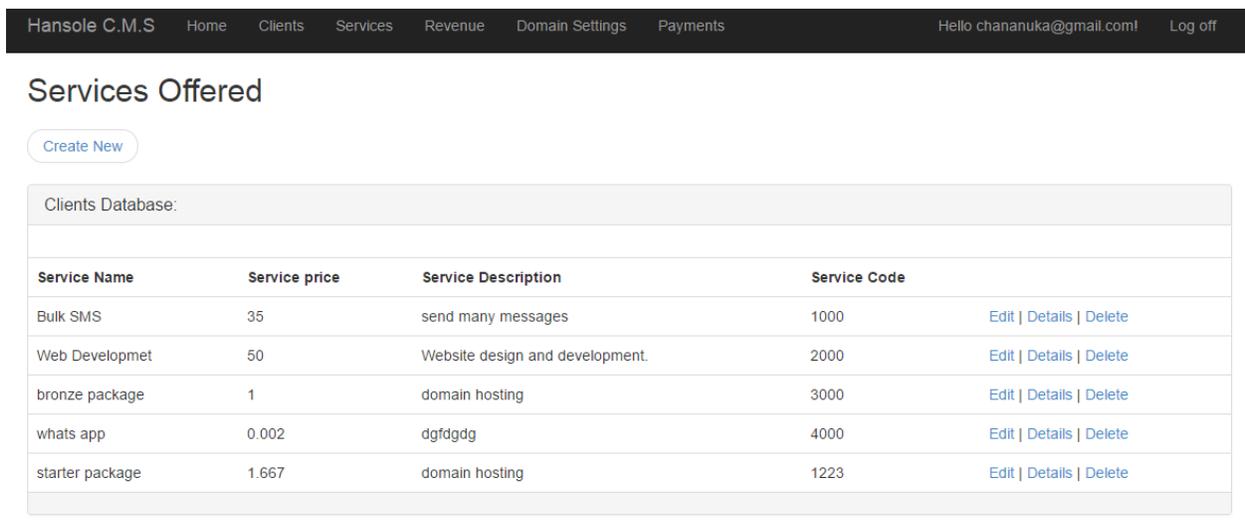
Add new service

This will allow you to create a new service that might have come up. After clicking a link for services the window below will appear allowing you to enter required details.

Fig A11 Adding new service

Create
service

Service Name	Enter Service Name
Service price	Enter Service price
Service Description	Enter Address
Service Code	Enter Service Name
Rervice Require Monthly	select here ▾

⬇Add New Service

Back to List

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View revenue from products

In order to view revenue brought by a product and their difference in revenue click the link below named Revenue

Fig A12 view revenue

Hansole C.M.S   Home   Clients   Services   Revenue   Domain Settings   Payments

Clik here
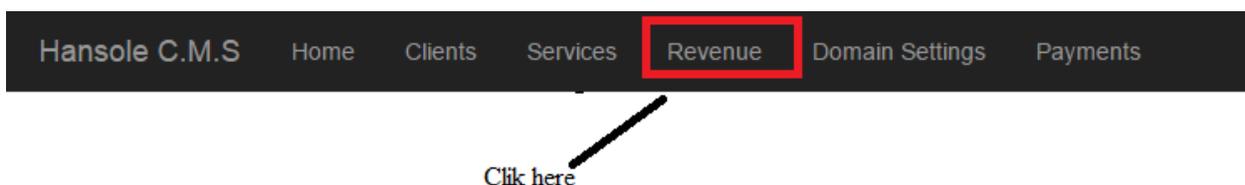
After clicking the link above the following window will appear. This will show revenue brought by each and every product in a specified time and it will show the percentage contribution of each product of different product to the total revenue.

Fig A13 viewing product revenue
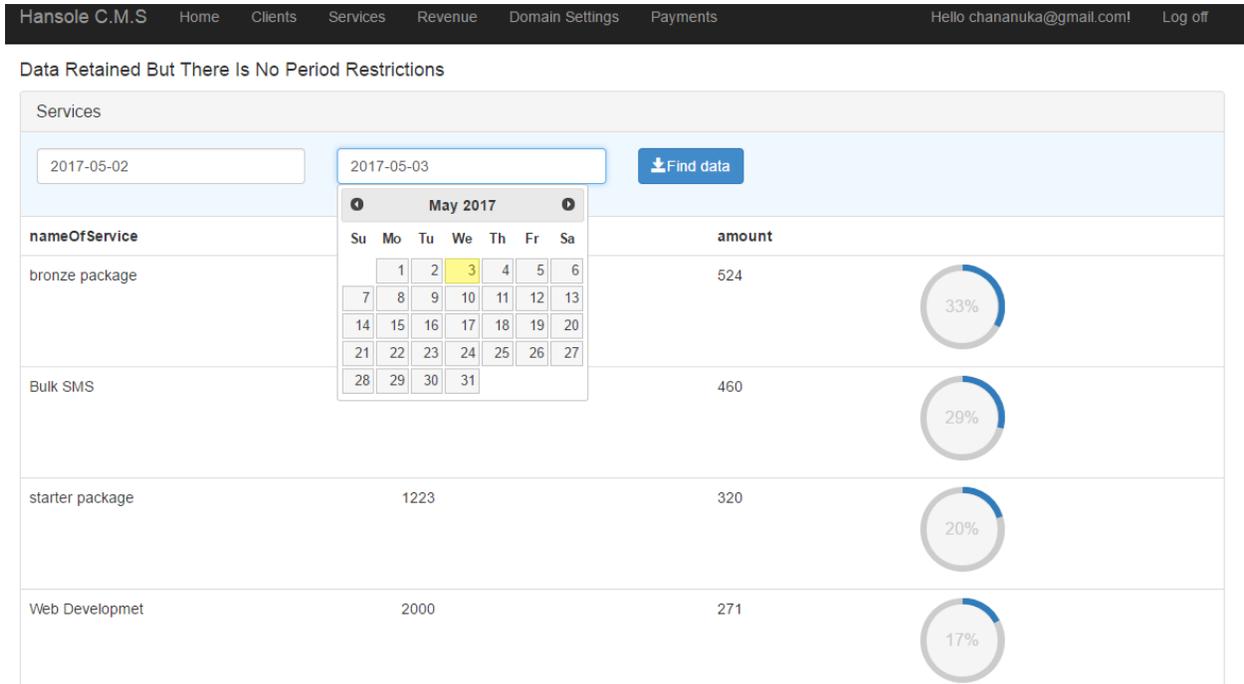
View balances from different products

If you want to see balances for different product that are paid on monthly basis you have to click the link below named balances.

Fig A14 view balances
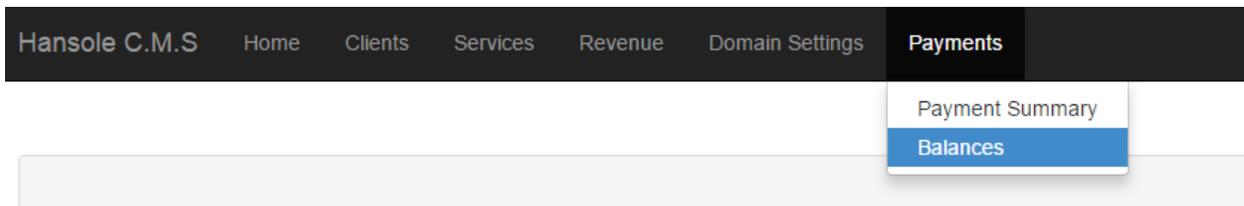
After clicking the link below the window below will appear showing days which are left and days used and if the payment is due but not yet paid it will highlight with a red color and will indicate that suspend the account.

Fig A11 view balances

Hansole C.M.S	Home	Clients	Services	Revenue	Domain Settings	Payments	Hello chananuka@gmail.com!	Log off

Client Balances

Client Name	Service	Balance	Last Paid On	Days Left	Days Left	Days Used
Takudzwa Tongoona	bronze package	$41.82	27-April-2017 17:09	42 Days left	42	6
Kudzayi Magwiro	bronze package	$41.41	25-April-2017 22:47	41 Days left	41	8
Norbert Chitsike	bronze package	$1.27	25-April-2017 22:29	1 Days left	1	8
Lincoln Chananuka	bronze package	$22.91	26-April-2017 13:44	23 Days left	23	7
munashe pande	bronze package	$73.11	27-April-2017 18:30	73 Days left	73	6
kkkkk kkkkkkkk	bronze package	$318.02	01-May-2017 16:20	318 Days left	318	2

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Appendix B: Interview

How does your current system works

1. Do you have any problems that you are facing with the current system?
2. What do you use recorded information for such as clients information?
3. Are there any security measure that u use to secure your data?
4. How many departments that are that are directly involved in dairy section?
5. How do you choose domain names for different companies for example profit making organization and non-profit making organization operating in different countries?
6. Which services do you offer to your clients?
7. Are u facing challenges in using the current system? Do you thing having a computerized system can solve the problem you have stated above?
8. What features do you expect to be on the computerized system?

Appendix C: Questionnaire

I am Lincoln Chananuka I am studying information systems at Midlands State University (MUS) doing a research on the client management at Hansole investments. I am doing my final year project on coming up with a client management system where the administrator will have to a plat form that he or she uses to manage clients and enable the client to be assisted on line through the system. Information from this study will be used solely for academic purposes only. Your assistance in filling this questionnaire is greatly appreciated.

Which system are you using?

A   Manual system   ☐   B   Computerized system   ☐

How do you save your database?

A   In a file   ☐   B   Using excel sheet   ☐

If excel sheet why?

_____

_____

_____

Do you like a computerized system?

A   Yes   ☐   B   No   ☐

If yes what are you expecting on the system?

_____

_____

_____

_____

Do you have services that are paid on monthly basis?

No

A Yes [ ]   B [ ]

If yes which payment systems do you use?

_____

_____

_____

If no do you want a payment system?

A Yes [ ]   B [ ]

Appendix D: Observation score sheet

Date: _____/_____/_____ (dd/mm/yy).

Time: _____

Meeting: _____

Observations:

_____

_____

_____

_____

_____

_____

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Conclusion:

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Recommendations:

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_____

Appendix D: Code snippet

```csharp
namespace Lincoln.Models
{
    public class client
    {

[Key]
        public int client_id { get; set; }
        [Required]
        [Display(Name = "Client Name")]
        public string name { get; set; }
        [Required]
        [Display(Name = "Client Surname")]
        public string surname { get; set; }
        [Required]
        [Display(Name = "Title")]
        public string title { get; set; }
        [Required]
        [Display(Name = "Gender")]
        public string gender { get; set; }
        [Required]
        [EmailAddress]
        [Display(Name = "E-mail Address")]
        public string email { get; set; }

        public string password { get; set; }
        public DateTime date { get; set; }
        [Required]
        [Display(Name = "Address")]

        public string address { get; set; }
        [Required]

        [Display(Name = "Phone Number")]
        public string phone { get; set; }
        [Required]
        [Display(Name = "Company Name")]
        public string companyName { get; set; }

        public ICollection<ClientToService> clientsToServices { get; set; }
        public ICollection<payment> paidServices { get; set; }
        public ICollection<PayCheck> checkPaid { get; set; }
    }
}

namespace Lincoln.Models
{
    public class service
    {
        [Key]
        public int service_id { get; set; }
        [Required]
        [Display(Name = "Service Name")]
        public string name { get; set; }
        [Required]
        [Display(Name = "Service price")]
        public double price { get; set; }
```

83

```csharp
        [Required]
        [Display(Name = "Service Description")]
        public string discription { get; set; }
        [Required]
        [Display(Name = "Service Code")]
        public string code { get; set; }
        [Required]
        [Display(Name = "Rervice Require Monthly")]
        public string requiredMnth { set; get; }
        public int days { get; set; }

        public ICollection<ClientToService> clientsToServices { get; set; }
        public ICollection<payment> payments { get; set; }
        public ICollection<PayCheck> checkPaid { get; set; }

        //for Payment View model
    }
}

namespace Lincoln.Models
{
    public class stuff
    {
        public int id { get; set; }
        [Required]
        public string title { get; set; }
        [Required]
        public string name { get; set; }
        [Required]
        public string surname { get; set;}
        [Required]
        public string pass { get; set; }
        [Required]
        public string position { get; set;}
        [Required]
        public int phone { get; set; }
        [Required]
        public string gender { get; set; }
        [Required]
        public string email { get; set; }
        [Required]
        public string address { get; set; }

    }
}

namespace Lincoln.Models
{
    public class domain
    {
        public int domainId{ get; set; }
        [Required]
        [Display(Name = "Domain Extansion")]
        public string extension { get; set; }
        [Required]
        [Display(Name = "Domain Category")]
        public int domainTypeId {set;get;}
        [Required]
```

84

```csharp
        [Display(Name = "Location (Local OR International)")]
        public string location { set; get; }
        public domainType domainType { get; set; }
    }
}

namespace Lincoln.Models
{
    public class payment
    {
        public int paymentId { get; set; }

        [Display(Name = "Amount Paid")]
        [Required]
        public double amountPaid { get; set; }
        [Required]
        public int client_id { get; set; }
        [Required]
        public int service_id { get; set; }
        [Display(Name = "Date Paid")]

        public DateTime date { get; set; }

        public virtual service services { get; set; }
        public virtual client clients { get; set; }

        //for Payment View model
    }
}

namespace Lincoln.Controllers
{
    public class ClientController : Controller
    {
        private Hansol1Context db = new Hansol1Context();

        // GET: /Client/
        public ActionResult Index(string searchby, string search)
        {
            if (searchby == "Email")
            {
                return View(db.clients.Where(x => x.email.StartsWith(search) || search ==
null).ToList());
            }
            else
            {
                return View(db.clients.Where(x => x.name.StartsWith(search) || search ==
null).OrderByDescending(x=>x.date).ToList());
            }

        }

        // GET: /Client/Details/5
        public ActionResult Details(int? id)
        {
            if (id == null)
            {
                return new HttpStatusCodeResult(HttpStatusCode.BadRequest);
```

```csharp
            }
            client client = db.clients.Find(id);
            if (client == null)
            {
                return HttpNotFound();
            }

            client cli = db.clients.Find(id);
            var Result = from s in db.services
                         select new
                         {
                             s.service_id,
                             s.name,
                             s.price,
                             s.discription,
                             Checked = ((from cs in db.clientsToServices
                                         where (cs.client_id == id) && (cs.service_id ==
s.service_id)
                                         select cs).Count() > 0)
                         };

            //loading view with client details
            var MyViewModel = new ClientViewModel();

            MyViewModel.client_id = client.client_id;
            MyViewModel.title = client.title;
            MyViewModel.name = client.name;
            MyViewModel.surname = client.surname;
            MyViewModel.gender = client.gender;
            MyViewModel.email = client.email;
            MyViewModel.date = client.date;
            MyViewModel.address = client.address;
            MyViewModel.phone = client.phone;
            MyViewModel.companyName = client.companyName;
            var MyCheckboxList = new List<CheckboxViewModel>();

            foreach (var item in Result)
            {
                MyCheckboxList.Add(new CheckboxViewModel { id = item.service_id, name =
item.name, Checked = item.Checked });
            }

            MyViewModel.Services = MyCheckboxList;

            return View(MyViewModel);

        }

        // GET: /Client/Create
        public ActionResult Create()
        {
            return View();
        }
        // POST: /Client/Create
        [HttpPost]
        [ValidateAntiForgeryToken]
```

```csharp
        public ActionResult
Create([Bind(Include="client_id,name,surname,title,gender,email,password,date,address,pho
ne,companyName")] client client)
        {
            client.date = DateTime.Now;

            Regex rx = new Regex("[+2637]{5}[7-8]{1}[0-9]{7}");

            if (ModelState.IsValid)
            {
                if (rx.IsMatch(client.phone))
                {
                    db.clients.Add(client);
                    db.SaveChanges();
                    return RedirectToAction("Index");
                }
                else
                {
                    TempData["phoneerror"] = "Phone Number Is Not Correct";
                    return View();
                }

            }

            return View(client);
        }

        // GET: /Client/Edit/5
        public ActionResult Edit(int? id)
        {
            if (id == null)
            {
                return new HttpStatusCodeResult(HttpStatusCode.BadRequest);
            }
            client client = db.clients.Find(id);
            if (client == null)
            {
                return HttpNotFound();
            }

            return View(client);
        }

        // POST: /Client/Edit/5
        [HttpPost]
        [ValidateAntiForgeryToken]
        public ActionResult Edit(client client)
        {
             Regex rx = new Regex("[+2637]{5}[7-8]{1}[0-9]{7}");

            if (ModelState.IsValid)
            {
                if (rx.IsMatch(client.phone))
                {
                    db.Entry(client).State = EntityState.Modified;
                    db.SaveChanges();
                    return RedirectToAction("Index");
                }
```

```csharp
                else
                {
                    TempData["phoneerror"] = "Phone Number Is Not Correct";
                    return View(client);
                }
            }
            return View(client);
        }

        // allocate a clients a service
        public ActionResult allocateS(int id) {

            client client = db.clients.Find(id);
            var Result = from s in db.services
                         select new
                         {
                             s.service_id,
                             s.name,
                             s.price,
                             s.discription,
                             Checked = ((from cs in db.clientsToServices
                                         where (cs.client_id == id) && (cs.service_id ==
s.service_id)
                                         select cs).Count() > 0)
                         };

            //loading view with client details
            var MyViewModel = new ClientViewModel();

            MyViewModel.client_id = client.client_id;


            var MyCheckboxList = new List<CheckboxViewModel>();

            foreach (var item in Result)
            {
                MyCheckboxList.Add(new CheckboxViewModel { id = item.service_id, name =
item.name, Checked = item.Checked });
            }

            MyViewModel.Services = MyCheckboxList;

            return View(MyViewModel);

        }

        [HttpPost]
        public ActionResult allocateS(ClientViewModel client)
        {
            if (ModelState.IsValid)
            {

                foreach (var item in db.clientsToServices)
                {
                    if (item.client_id == client.client_id)
                    {
                        db.Entry(item).State = EntityState.Deleted;
                    }
```

```csharp
            }
            foreach (var item in client.Services)
            {
                if (item.Checked)
                {
                    db.clientsToServices.Add(new ClientToService() { client_id =
client.client_id, service_id = item.id});
                }
            }

            db.SaveChanges();
            return RedirectToAction("Index");
        }
        return View();
    }


    // GET: /Client/Delete/5
    public ActionResult Delete(int? id)
    {
        if (id == null)
        {
            return new HttpStatusCodeResult(HttpStatusCode.BadRequest);
        }
        client client = db.clients.Find(id);
        if (client == null)
        {
            return HttpNotFound();
        }
        return View(client);
    }
```