A COLLABORATIVE INFORMATION SYSTEM FOR STAFF AND CUSTOMERS FOR A CLEARING AND FORWARDING FIRM.

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DECLARATION

I, GRACE M. KANSIIME do declare that this report and all its contents is in every aspect original and of my own initiative. I am absolutely sure and confident that this report has not been produced before in any institution of higher learning or training laboratory for the attaining of any qualification and therefore I take full responsibility for the report content and all the inconsistencies therein.

Date...02/01/12......

Signed......Kame..........

GRACE M. KANSIIME

APPROVAL

This is to certify that this research report entitled was conducted under my supervision and guidance and is now ready to be submitted to the school of computer studies for examination with my approval as the university supervisor

Date. 02|01|2012...........

Signed..................

MR. GRACE KAMULEGEYA

PROJECT SUPERVISOR

ABBREVIATIONS

ICO... Information Circulation Office

IS   .... Information System

SQL   .... Structured Query Language

DBMS....................................... Database Management System

ER   .... Entity Relation Model

DFD   .... Data Flow Diagram

RAM .... Random Access Memory

LAN   .... Local Area Network

MUD .... Multi-User Dungeon

WAN .... Wide Area Network

TABLE OF CONTENT

CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

Information is content generated to be used to reduce uncertainty on an issue or topic of discussion and goes beyond predictions for they are uncertain (Shannon CE, 1949)

An **information system** (IS) is typically considered to be a set of interrelated elements or components that collect (input), manipulate (processes), and disseminate (output) data and information and provide a feedback mechanism to meet an objective (Muhammad, 2007).

A **collaborative information system** is a system that allows partners, customers and organizations management to work together in order to achieve something especially the organizations goals. It is usually associated with individuals or organizations not physically co-located, but instead working together across an internet connection. It can also include remote access storage systems for archiving common use data files that can be accessed, modified and retrieved by the distributed partner members (Wikipedia).

There are three aspects of a Collaborative Information system.

- *Conversational interaction* – Clearing and Forwarding firms are supposed to use this aspect to freely exchange information between staff and clients. Communication technology such as telephones, instant messaging, and e-mail are generally sufficient for conversational interactions.

- *Transactional interaction* – Clearing and Forwarding firms carry out transactions with clients' and associate firms. One participant exchanges money for goods and becomes a customer. Transactional interactions are most effectively handled by transactional systems that manage state and commit records for persistent storage.

- *Collaborative interactions* - Clearing and Forwarding firms use real collaboration technologies to deliver the functionality for many associates to augur a common deliverable. Record or document management, threaded discussions, audit history, and other mechanisms designed to capture the efforts of many into a managed content environment.

1

From the above discussion it's clear that Collaborative Information Systems tie into the general flow of data in a Clearing and Forwarding to function to its full capacity. All the aspects of a collaborative information system can be fully integrated into a day to day business activity of the firm, provided they have the right technology to do so.

1.0.1 CASE STUDY

This research is based on Bemuga Forwarders LTD. A reputable fast growing Clearing and Forwarding firm located at Bemuga House, Plot 137, Bukoto Kampala.

It's a firm registered under the business Act, Uganda Revenue Authority (URA) and Uganda Freight Forwarders Association (UFFA). Their main branch is located at the above address though their other offices are distributed over East Africa (Bemuga Forwarders LTD)

Bemuga Forwarders LTD was founded in June 1999 and is operational until today. They offer a wide range of services, below is a breakdown;

- **Goods clearance**

They handle the preparation of all customs documents requisite for payment of taxes (if applicable) and the release of goods for final delivery from the terminal of origin. These services are enhanced by their associates in different ports around the world and their offices at border posts in East Africa.

- **Warehousing**

They arrange/provide warehousing services of goods which are not due for use immediately depending on the size of the cargo. They could store them in a warehouse or in yards.

- **Transport**

They provide/arrange a wide range of transportation of goods to both local and international destinations either by road, sea or air. They have associates who own fleets of trucks that they subcontract to provide the above service under close supervision.

- **Insurance**

Due to the risk of loss of goods on transit or any other emergency surprises, upon request they can arrange for marine insurance for your goods until arrival or other insurance covers such as those against fires, theft etc.

Reason for choosing Bemuga Forwarders LTD as Case study

- The fact that the firm has been around for some time and has to compete with giant freight firms as it grows to make its own name.
- In its daily activities communication, collaboration and transactions with associates and customers are shown clearly.
- In its quest to make a name the challenges they face are more real than already established firms that they compete with.
- They already have a functioning website that only provides e-mail service and static content

1.2 BACKGROUND OF THE STUDY

Clearing and Forwarding firms are responsible for handling logistics on goods for their clients.

Logistics is the management of the flow of goods and services between the point of origin and the point of consumption in order to meet the requirements of customers. Logistics involves the integration of information, transportation, inventory, warehousing, material handling, and packaging, and occasionally security. Logistics is a channel of the supply chain which adds the value of time and place utility (Wikipedia)

Logistics management is that part of the supply chain which plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customer and legal requirements.

Lack of a platform that allows for interactive communication and collaboration to integrate information from their staff, customers and business partners could be a big challenge to complete their intended services. Clearing and Forwarding firms today still use the traditional systems to communicate and perform their transactions. Only a few have embraced technology this could be attributed to the initial installation costs but those who have installed them are already seeing their benefits.

If you take a look at a multinational firm like DHL they have offices all over the world and without such a system they have a very hard time to manage their services. From their website

3

they attribute their success to their efficient information system called LOGIS. This is a clear indicator that the use of excel Sheets does not really help but need a more sophisticated system.

Logistics as mentioned above involve many tasks. Human errors on lead to severe loses to the managing firms. That's why some Clearing and Forwarding firms outsource these services to third party logistics firms to preserve their integrity and competency. The third party logistics firms handle the goods on their behalf.

For upcoming Clearing and Forwarding firms that don't have a large network of their own, they need to partner with other firms so as to make their services efficient. They may subcontract truck owners or even other Clearing and Forwarding firms where they come in handy.

The use of information systems could help integrate all the above processes from the ordering stage through to the completion of the transportation stage and handing over of the goods with the recording of every activity. It also provides both the firm and customers with up to date information on the progresses made regarding goods they are handling.

1.3 STATEMENT OF THE PROBLEM

Clearing and Forwarding firms have a hard task of collecting all the relevant information, integrating all that information in a location secure from intruders and proper collaboration software capabilities to facilitate effective communication and necessary negotiations with other firms and customers.

1.4 GENERAL OBJECTIVES

The objective of the study was;

- To develop an information system to improve communication and collaboration between clearing and Forwarding firms and their customers
- To enhance information collection, processing, storage and distribution within Clearing and Forwarding firms, their associates, and their customers
- To reduce on security threats to information the organizations deals with on day to day basis concerning mainly customers records and customer transactions
- To increase the use of networks (LANs, Intranets, Extranets and internet) for setting up of collaborative software that increases on the clearing and forwarding firm's capabilities to communicate with their associates and customers

4

- To strengthen ties between the firm and its customers by use of collaboration information systems that allow for interactive exchange of information.

1.4.1 SPECIFIC OBJECTIVES

The specific objectives were;

- To establish a communication and collaborative portal that allows for communication between staff and customers. This portal provides adequate information for decision making for the organizations management.

- Design and building of a central database to store customer and staff communication data.

- Design and building of a Clearing and Forwarding firm website that provides customers and staff and partners a communication portal. A website that bases more on customer management and feedback mechanism.

- Building of dynamic website that pulls its contents from a database and provide real time communication functionalities to the users. It's also used to provide visitors with real time information on their transactions.

1.5 RESEARCH QUESTION

Would the new information system improve on the business-to-customer interaction thereby reducing on the organizations costs of communication?

1.6 SCOPE OF THE STUDY

The system has covered the staff-customer communication process as this is currently a cumbersome process in the clearing and forwarding business.

1.7 SIGNIFICANCE OF THE STUDY

1. This project is useful to Clearing and Forwarding firms that have multiple branches for they need to send, receive and share data and information with partners and clients in the most efficient way possible.
2. Organizations are able to reduce on the costs of staff-customer communication.
3. Organizations management are able to make informed decisions for they have all the information they need in regard to their customers

4. They say that customer is king and he/she is always right, organizations that provide their clients and partners with an audience or a chance to make criticisms, provide comments and complaints have a feel of what others want or think hence improving on their service delivery.

5. By the use of the website the organization gets a worldwide coverage and also worldwide market. This is important on the improvement of the organizations client base and also potential partners

1.8 JUSTIFICATION OF STUDY

Scattered communication information in business could fall onto the hands of competitors who could use it to destroy the organization, below are the consequences of ignoring this situation;

- Organization which does not embrace the use of the present technology are doomed to extinction since during this information age all organizations need information to thrive and is not reliable or even available on their manual systems.

- Organizations that don't use such systems only serve a limited market leaving a large market out there, hence losing out on profits.

- Lack of proper customer care services or mechanisms makes customers lose trust on the organization hence lose of customers.

- Lack of organizations from embrace this information age is that they don't gain any competitive advantage over other organizations.

CHAPTER TWO
LITERATURE REVIEW

2.1 BACKGROUND

Clearing and Forwarding firms are responsible for handling logistics on import and export goods for clients in and out of the country respectively. This process involves many other tasks to make their quest a success.

Logistics is the concept of how to manage the movement of goods between the place of origin to their final destination. The movement must meet the customer's request. Not only should it meet the request of the right time, right place, and right product, but also it must meet the requested cost and condition. The core of logistics is to minimize the cost, the cost here referring to: the handling cost, shipping cost and the cost caused by container delay or other mistakes. If the handling and shipping cost is more than the profit that the product can make, it is not a good logistics solution, even if the product arrives at the right place and time (Bowerso & Cross, 1996).

Clearing and Forwarding firms are engaged in the activities mentioned below in their daily activities

- Customer record keeping and management
- Transit goods, Cargo record keeping, tracking and management
- Asset management
- Finance management such as invoicing, Payment handling (Account payable and receivable) etc.
- Report generation
- Communication to company branches and partners
- Exchange of documents facilitating the clearance of goods
- Marketing
- Information security

From the above list it's clear that it's practically impossible to handle all the above activities manually. Clearing and Forwarding firms need an Information System to integrate all the above activities together to increase production and reduce delays.

7

Customer records need to be stored in a database to reduce redundancies and to improve on accessibility to other distant branches. Database management systems like Mysql, Microsoft SQL server and Oracle are good for such purpose. They are accessible online via the websites or via Virtual Private Networks or Local Area Networks.

Communication and exchange of files between branches of the firm could be eased by the use of real-time communication technologies and Electronic Data Interchange for file transfer respectively. Online chats, video conferencing and Instant messaging services could come in handy while communicating to distant partners, customers and company branches. This way the message is clear and straight from the source without any distortion. Electronic exchange of files could be conserve of document integrity and originality for no changes can be made.

Since the firm has property such as vehicles, warehouses and other assets it is wise to have a system to track and record the use of these resources. This has streamlined complexity of management and proportional allocation of resources within the firm. Marketing of the firm could also be important so as to reach many clients.

The main job of Clearing and Forwarding firms is to manage and track goods they are handling from their place of origin to their destinations successfully. To make this task even more complicated, these goods take different forms of transport and packaging. Some goods are transported by sea, others by road or rail and others by air. Take this scenario where you are handling about a thousand cargos spread over the above mentioned transport forms; it is a nightmare trying to track each cargo. An information system to handle this service could solve the problem

Each firm or company requires funds to prosper and grow. Clearing and Forwarding firms need to collect payments from clients and pay for their expenditures. Accounting for each of the above is great task and with the sensitivity that money is attached to, a great deal of precaution must be taken while handling cash. Human beings can't be trusted with these fully hence an information system could help them handle these activities.

Security of information concerning the goods beings handled is important. Papers in a file are not secure enough Electronic content about transactions and other information can be well safeguarded by the use of an information system.

From all the transaction handled daily the management requires reports to summarize a day's activity or such. Human errors could lead to wrong reports and hence poor decision making from wrong information and due to the magnitude of the activities involved the reports may not be timely. An information system could be put in place and timely reports can be generated when required

Clearing and Forwarding firms have a choice to implement information system that fully integrates all their services or apply different application for each of their services. The market today provides these firms with these applications (Software design consulting group, 2003) (Yuan, 2010).

2.2 COLLABORATIVE INFORMATION SYSTEMS OVERVIEW

Collaborative Information Systems (also referred to as **groupware, workgroup support systems** or simply **group support systems**) is computer software designed to help people involved in a common task achieve their goals. It is usually associated with individuals not physically co-located, but instead working together across an internet connection. It can also include remote access storage systems for archiving common use data files that can be accessed, modified and retrieved by the distributed workgroup members (Wikipedia).

There are three primary ways in which humans interact: conversations, transactions, and collaborations. Collaborative information systems integrate the functionalities listed below in one package.

1. Communication

Communication is the transfer of a message from the sender to the receiver via a transmission media (Microsoft Encarta Dictionary, [Electronic media], 2009).

The research topic is about developing and the use of collaborative information system to enable efficient and accurate communication systems to facilitate transactions between staff and clients of a Clearing and Forwarding firm. Clients need to negotiate prices, make orders or make enquires regarding services and other details concerning previous business deals. Phone calls and e-mails may not fully utilize the capacity of the firm to exchange information with its clients. Real-time communication technologies are the way to go to facilitate faster and authentic communication. It's estimated that by July 1999 the market penetration of mobile

9

devices for freight companies in California stood at a staggering 42% (Amelia & Thomas, 1999).

2. Transactions

Cash transactions among others are part of a daily activity within a Clearing and Forwarding firm. Since most of the transactions involve large sums of money, banks and other organizations are involved, an information system to integrate all the firms is required. Apart from money transactions, the firms may have other firms' that they have sub-contracted or partnered with. Therefore effective transfer of documents and cash between them is paramount.

It's estimated that by July 1999 the market penetration or Electronic Data Interchange for freight companies in California stood at 11% (Amelia & Thomas, 1999).This could be an underestimation of the exact value at that time but it shows that EDI was less used maybe due to its expense of installation maintenance and integration.

3. Collaborations

This is the act of working together with one or more persons or companies in order to achieve something (Microsoft Encarta Dictionary, [Electronic media], 2009).

In most times Clearing and Forwarding firms only deal with the handling of documents for goods they have been given to transport. Sometimes they don't own vehicles therefore they sub-contract other firms to provide those services. These means therefore they need to have good relations with their partners to make their business a success (Yuan, 2010).

The discussion above looks at the aspects of a collaborative information system and the role they could play in the daily business activities in a Clearing and Forwarding firm. Communication bit is the most important, since business transactions originate here. Therefore the provision of several channels and efficient ones for that matter could translate t better customer relation and increased production.

2.2.1 EXISTING EXAMPLE – DHL AMERICA

DHL is an American Clearing and Forwarding firm and courier service provider that covers the almost the whole world. It has the world's most advanced e-logistics solutions, making the administration of your supply chain faster, easier and more reliable

"LOGIS revolutionized transport information systems and continues to evolve, providing the infrastructure to support DHL Global Forwarding logistics services. Our global network supplemented by the use of the Internet, reaches into every DHL Global Forwarding facility, major supplier and customer.EDI and direct communication links transmit and receive purchase order, inventory, shipping/transportation and invoice information. Our P.O. management service enables customers to outsource overseas management of procurement logistics related activity, while retaining local control. With a combination of modules, LOGIS extends to customers visibility of their inventory while in the DHL Global Forwarding process and can eliminate buildup and maintenance of inventory[1]".

"Interactive is a suite of robust, online applications that provide immediate access to the information you needed to make intelligent and cost-effective business decisions. These applications are supported by our proprietary logistics information system linking your back-office systems with data and communications resources throughout your supply chain, from purchase order to final delivery. By exchanging logistics data directly with customer and vendor accounts and processes, LOGIS streamlines the flow of information and automatically generates required documents."

From the two quotes above, it's clear that to enhance complete customer collaboration you need an effective information system.

LOGIS Information system

"LogIS is a web-based IT system. Its applications enable the management of all ship-related documents and are divided into modules. This system is a crucial tool for all those involved in the port community's shipping, port and logistics activities, including the Harbor master's Office, Shipping Agents, Freight Forwarders, Pilots and Terminal Operators."

"A fully integrated tool available in LogIS allows the online generation of customs documents for exporting containers. Users can access the system at all times to retrieve the information

needed to fill in the Outbound Cargo Manifest (MMP) and ensure that containerized goods to be exported can be made ready for customs."

"Part of LogIS is specifically dedicated to the port's activities: for example, it enables the management of information on the companies working in the port, their workers, training, qualifications, roles in the company, and much more."

"All the components of LogIS are integrated into a single platform. As a result, LogIS acts as the Port of Venice's "single window".

"In addition, LogIS has been designed to talk with other third party applications thanks to a specific EDI (Electronic Data Interchange) component. As a result, it can easily integrate into the port operators' management systems" (Port of Venice, 2010. **LOGIS**[2])

2.3 COLLABORATIVE TECHNOLOGIES

2.3.1 ELECTRONIC COMMUNICATION TOOLS

These are technologies that facilitate the sending of messages, files, data, or documents between people facilitating information sharing. E-mails, faxing, voice mail and web publishing lie under his category (Wikipedia).

Clearing and Forwarding firms are today using this systems especially e-mails. A computerized faxing system is now in place to replace the old system. Such a system could be useful for the staff to send documents like invoice to their clients. Voice mails could be useful for customers who call in late and a voice mail service could attend to them as if it was a person. Web publishing could be useful to provide clients with the latest developments in service delivery and other advancements.

2.3.2 ELECTRONIC CONFERENCING TOOLS

These are technologies that facilitate the sending of messages, files, data, or documents between people facilitating information sharing in real-time. Internet forums, online chat, instant messaging, video-conferencing, data-conferencing, and electronic meeting systems lie under his category (Wikipedia).

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[2] Logistics Information System) retrieved on 26 June 2011 from
http://www.port.venice.it/en/logis-logistics-information-system.html

Clearing and Forwarding firms need these tools to facilitate effective business communication between staff and clients. E-mails take time to reply to and may be cumbersome to deal with if they are in bulk. There are faster tools like online chats that could be very useful especially for enquiries and other text-based messages. Conferencing is the in thing today. Clients or partners in distant location could login and communicate with the firm via a video feed instantly.

2.3.3 COLLABORATIVE MANAGEMENT (COORDINATION) TOOLS
These are tools that are used to facilitate and manage group activities. They may include electronic calendars, project management system, workflow systems, extranet systems etc. (Wikipedia). These tools could be used by Clearing and Forwarding in planning for customer appointment bookings and other timetables that involves customer services.

The above mentioned tools are majorly web-based and can be used concurrently as long as they are programmed to do so. Websites that support electronic conferencing tools need a good bandwidth to be able to support the high amount of traffic from audio and video contents transmitted.

2.4 REVIEW OF A CIS IN CLEARING AND FORWARDING FIELD

The market today offers a variety of applications to support collaborative services to Clearing and Forwarding services. Below is a sample software's used in the market today.

2.4.1 MAGAYA CARGO SYSTEM - FREIGHT MANAGEMENT SOFTWARE
"Magaya Cargo System is a Logistics Software designed for international freight forwarders, NVOCCs, consolidators and Forwarding agents, couriers, warehouse providers, and cargo airlines who require a complete and accurate warehouse management system combined with a fully-integrated accounting system. The user-friendly interface with interactive screens reduces the amount of work for the user." (Magaya Logistics software Solutions, 2010)

Available functionalities

- Inventory Control
- Product Distribution
- Integrated with the Shipping Process
- Air, Ocean, and Ground Shipments & Consolidations

- Proof of delivery (POD)
- Bar-Coding, Labeling, and Shipment Verification, International Trade Documentation

Over 70 documents available (Air Waybill, Cargo Manifest, and Bill of Lading included)

- AES_Software and AMS Software_fully integrated into the Magaya Cargo System

Work on documents in actual format and customize them to your needs

Attach pictures, Word and Excel documents, or any document to consolidations

- Fully-Integrated, Multicurrency Accounting System
- Real-time Cargo Tracking using Magaya LiveTrack
- Remote access to your data from any place in the world via Magaya OnTheGo
- Send instant messages to clients, employees, and overseas agents using the Magaya Network
- Automatic Billing
- Bar-Coding, Labeling, and Shipment Verification

Weakness

- The provision for customers staff communication functionality is limited to those using the Magaya Platform for their services

- Most of the other services are based on the Magaya Framework like online tracking this may result to a lot of incompatibilities.

Most software solutions present in the market today are designed to solve a certain problem such s freight management, warehousing etc or the major business function departments of Clearing and Forwarding firm such as Finance and accounting. Very few of the applications integrate customer feedback services within them.

From this judgment, customers have to rely on common communication channels such as phones, verbal conversations, one-on-one meetings etc which may not be very convenient to both parties. Other computerized services like e-mails are useful but the fact that a bulk number of them could lead to a delay in their answering, leaves Clearing and Forwarding with only one choice, which is the investment in other faster and real – time systems to handle their busy business days.

The cost of this implementation may not be very expensive since, existing websites can be upgraded to support real-time communication systems. Purchase of web-conferencing equipments such as cameras, projectors and other related devices can be acquired. Little training is required for the use of the new system for the staff or even the clients.

2.5 APPLICATION OF CIS TECHNOLOGIES IN CLEARING AND FORWARDING

- The research proposal is meant to serve customer and staff of a Clearing and Forwarding firm with a collaborative information system that provide efficient communication. Customer feedback systems are not integrated in those systems in most cases. This leaves the customers with options such as phone calls and e-mails that may not be very reliable. Below are suggestions of technologies that could be incorporated in those systems to provide effective customer feedback;

- **E-fax** – the electronic sending of transaction documents to the customers automatically after transactions for record keeping purposes.

- **Online Chatting and other Real-time Communication technologies** – to provide the customer with a feel of involvement in the transaction and also for accountability purposes and for quick and effective negotiations.

- **Web feeds** – means by which the firm could send updates to the customer on the progress of their goods with regard to transport or payments this way they are up to date with the progress made and also reminded of their obligations such s payments.

- **E-mail and Instant Messaging** – sending of text and images via the internet to recipient, this could be useful, to provide customers with information on inventory and any offers there is.

- **Dynamic content** – away by which the firm's websites contents changes according to the requests made by the user such as tracking a good on transit online.

The above mentioned technologies are very useful to complete the user staff collaboration need for they;

- Send both the customer and the firms staff up to date information regarding transactions currently being handled

- Allow for the customer to actively participate in the whole transaction process despite distance or geographical differences.
- Allow for active collection of information from the customer and the staff as well to enhance business transactions and processes.
- Instill confidence into the customer about the firm for they are actively involved in the process
- Increase in the good customer relation and communication.

2.6 SUGGESTED SYSTEM

This research proposal is aimed at coming up with a web-based tool that makes communication between the staff of a Clearing and Forwarding firms and their clients come true.

The researcher came up with a website that provides almost all the staff-customer communication especially online feedback. Clients can create accounts on the website, and then on login they can be allowed to access these services.

THIS WEBSITE WAS DEVELOPED ON A CMS CALLED JOOMLA WHICH ALLOWS ONE TO INTEGRATE MODULES TO PROVIDE THE ABOVE MENTIONED SERVICES INCLUDING CONTENT MANAGEMENT.

CHAPTER THREE
METHODOLOGY

3.0 INTRODUCTION

Methodology defines step-by step activities for each phase, individual and group roles in each activity, deliverables and quality standards for each activity and tools and techniques to be used for each activity. It is physical implementation of the logical life cycle of system development. Methodology ensures that a consistent, reproducible approach is applied to all projects. Therefore reducing the risk associated with shortcuts and mistakes (Wikipedia).

3.1 RESEARCH DESIGN

We used qualitative research design to develop the staff-customer collaboration system. *"Researchers must weigh the quality of the data they can gather (and whether they can gather any data at all) against principles such as confidentiality, privacy, and truth-telling. Although internal value constraints, research ethics, can be distinguished from more conventional Issues of warrant, they are nonetheless clearly relevant to evaluating the goodness, that is, the acceptability or legitimacy of research designs and procedures"* (Kenneth & Margaret, 1990).

3.2 SAMPLE SELECTION

The researcher collected information from system administrators, sales executives, PR (public relations) officers and managing directors. These persons mentioned are closer to the customer than other employees and handle a great amount of data concerning transactions and other related areas. If allowed customers at the premises could be invited for a session to collect their side of view

Sales executives, PR officers and managing directors mainly found at the firms' headquarters where most of the clients come to get their services. They therefore have the expertise to deal with the customers. Due to the large amount of data they handle they had exciting ideas on how to treat customers favorably. System administrators are the ones in charge of the implementation and management technology and other computer resources that were used to complete business transactions. They therefore have ideas on new technologies that could be incorporated to enhance certain activities and how to implement them.

As mentioned above, customers were involved with the permission of the firm. Otherwise the information collected from the parties mentioned above were regarded as accurate for dealing with customers directly in a day to day basis.

3.3 Data Collection

The researchers employed several data collection techniques these include both qualitative and quantitative in order to come up with meaningful information.

3.3.1 FORMAL INTERVIEWS

The researcher used formal interview method by arranging interviews with the secretary's and Administrators.

Advantages

a. The interviewer does not get out of the topic of interest by wandering in other topics that may arise as the interview progresses

b. Ability to seek for clarification of information incase of any misunderstandings

Disadvantages

a. The interviewee may not be at ease answering formal questions for they may be complicated or not understandable.

b. Some questions may not so comfortable with some of the interviewee and wrong

How

- Letters from the faculty were acquired to introduce the researcher and their topic to the Clearing and Forwarding firm
- Appointment dates were set with the firm to officially get on with the interviews
- All the proceedings of the interviews were recorded for later scrutiny
- Judgments of the data collected were confirmed after conducting the observation

3.3.2 DIRECT OBSERVATION

This involves the use of full sense of watching, identifying and recording various data concerning library usage. Observations provided the researchers with an opportunity to gather data while capturing a variety of interactions.

Advantage

a. First hand data is collected directly from the people and at the environment of work this is assuming all the factors for the other business days remain constant.

Disadvantage

a. This method is prone to personal judgments and biases hence sometimes the data collected may not be accurate

Observation is necessary on the occasion where the firms' staff handle customers and how they respond to their needs. Here you could collect general areas of complaints and the difficulties staff faces handling the situation. The general process of handling the customer could be documented using this method, this is important while trying to identify the stages and steps service is delivered to the customer.

Protocol

Observing of people working could be very uncomfortable to the staff involved. Hence the researcher may assume a role in the transaction processes to see how they do their things. Otherwise a company tour cloud do the trick, where the management could take you through their daily activities with the guide explaining what they do to handle each situation as it arises.

19

How

- Letters from the faculty were acquired to introduce the researcher and their topic to the Clearing and Forwarding firm
- Appointment dates were set with the firm to officially get on with the interviews
- Selection of activities to observe especially those concerning customer and staff communication
- Recording of those activities for later scrutiny

3.3.3 CONTENT ANALYSIS

Here the researcher goes through already existing documents or publications to get information regarding to his research topic.

Advantages

a. Documentation of the said business activities could be confirmed through the perusing of written documents.

Disadvantages

a. Gaining Access to some of these documents could be a hard task for, some are confidential.

This method was necessary to get a closer look at the kinds of documents staff and customers of Clearing and Forwarding Company used on a normal transaction. It also capture how these documents are transferred between the two parties

Protocol

During or after conducting of the above mentioned data collection techniques, the researcher went through documents to support all the business transitions and other activities that are important to his/her research with the permission of the firm.

How

- Letters from the faculty were acquired to introduce the researcher and their topic to the Clearing and Forwarding firm
- Appointment dates were set with the firm to officially get on with the interviews
- We asked for documents that are relevant to the research.
- We were asked not to make copies unless authorized to
- We collected relevant information and informed the firm of what we were looking for in those documents to avoid conflict
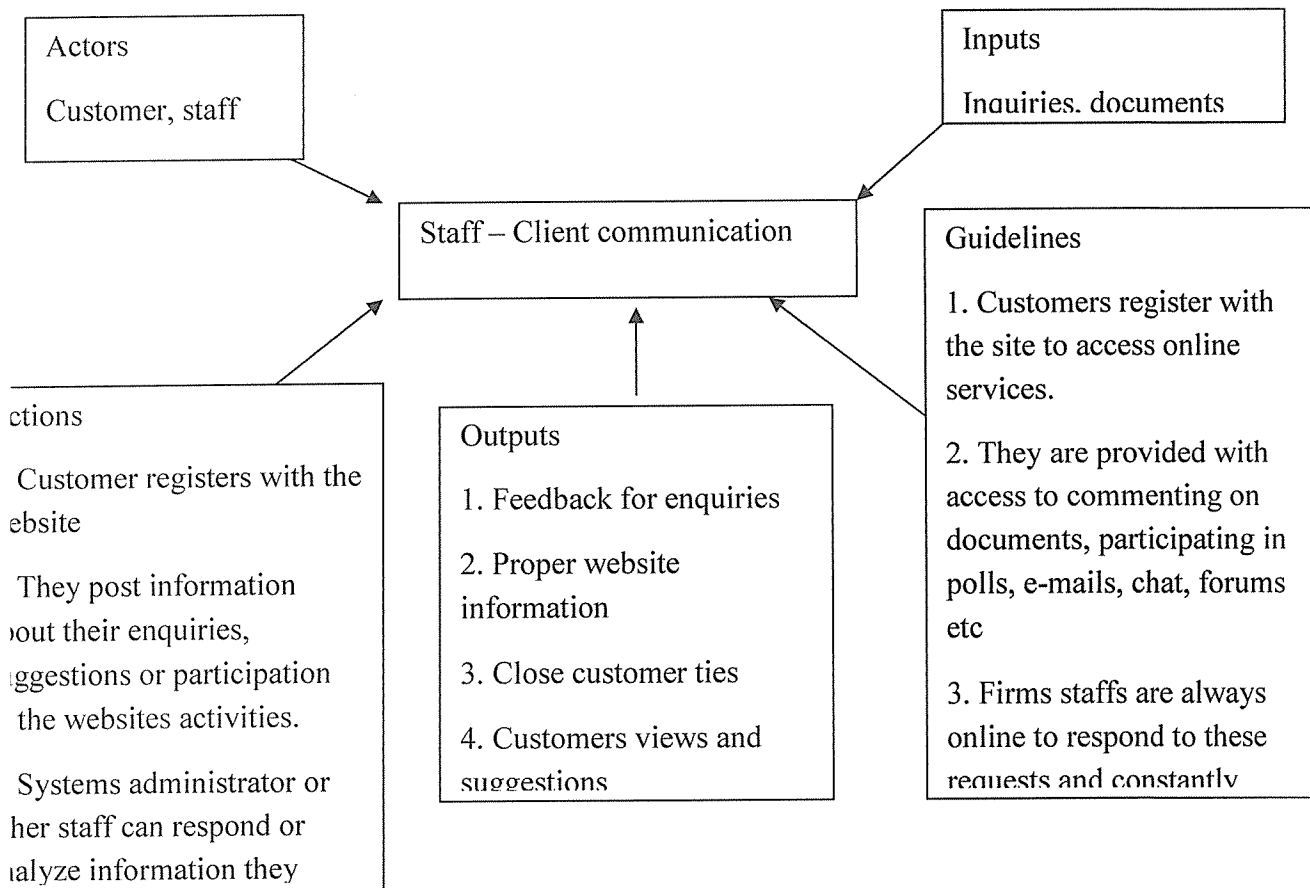
CHAPTER FOUR
SYSTEM DESIGN

4.0 INTRODUCTION

This section is concerned with the planning and building of a framework that was used as a blueprint for the system building process. The system designer has to made a skeleton of the system using standard procedures from the data collected.

4.1 CONCEPTUAL DESIGN

A description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave, and look like, that is understandable by the users in the manner intended.

4.1.1 BUSINESS PROCESS REFERENCE MODEL

Actors

Customer, staff

Inputs

Inquiries. documents

Staff – Client communication

Guidelines

1. Customers register with the site to access online services.

2. They are provided with access to commenting on documents, participating in polls, e-mails, chat, forums etc

3. Firms staffs are always online to respond to these requests and constantly

ctions

Customer registers with the ebsite

They post information ›out their enquiries, ‹ggestions or participation the websites activities.

Systems administrator or her staff can respond or ‹alyze information they

Outputs

1. Feedback for enquiries

2. Proper website information

3. Close customer ties

4. Customers views and suggestions

Figure 1.0: diagram showing the main business process and its elements (inputs, outputs, guidelines, and actors)

4.1.2 BUSINESS PROCESS DEFINITION

Client

○ ○

Customer needs → Enter details → Pending enquiries → Use other website functionalities that are instant e.g. chats or forums

Staff

○ ○

Client

○ ○

Assess enquiries → Process response → *<<Semi-automatic>>* Send out response

mer → Search content → View content ← Update content ← Staff ○ ○

View content → Participate in website activity
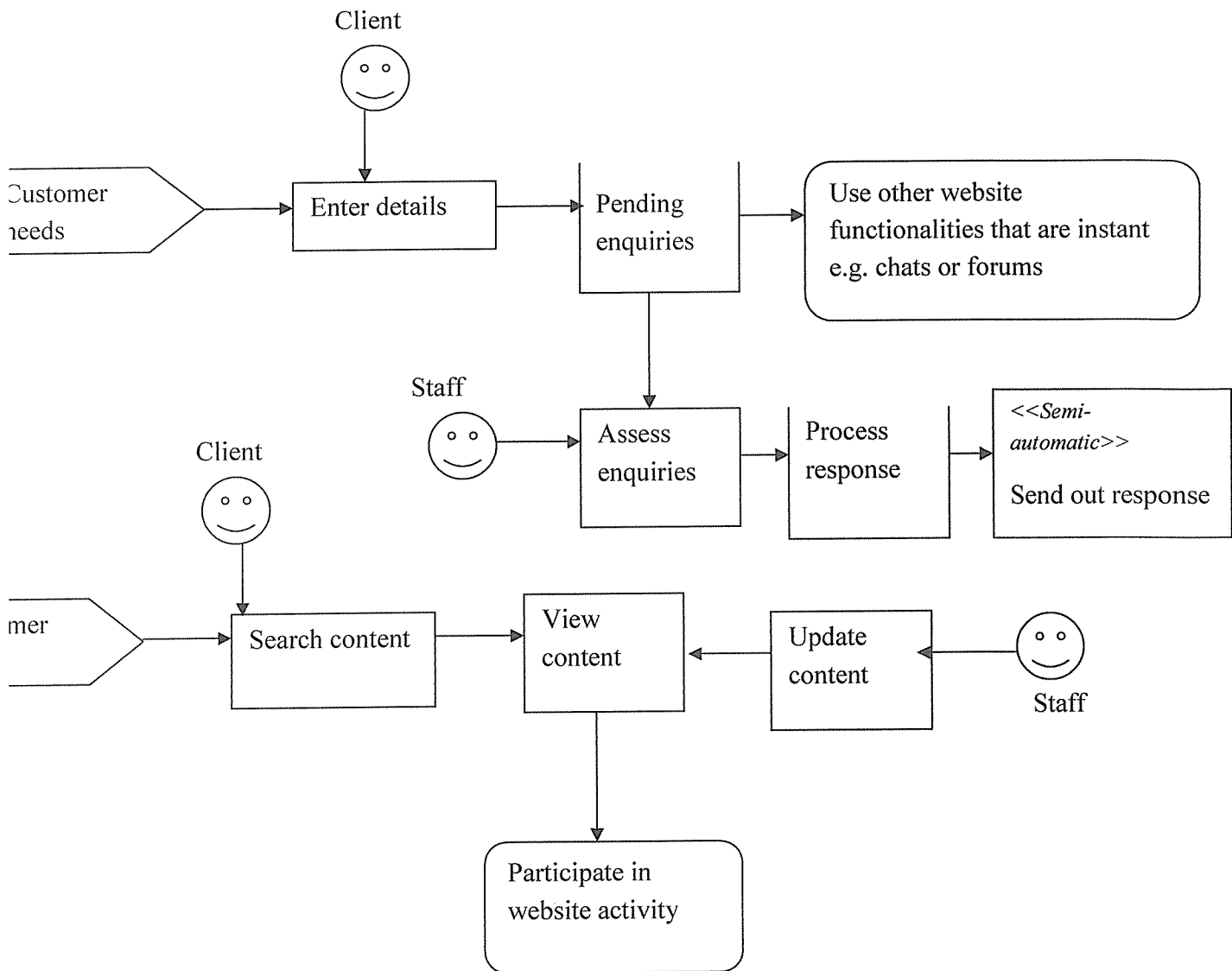
Figure 2.0: Diagram showing the main business processes, their triggers, actors, and activities

4.1.3 SOFTWARE ARCHITECTURE

Client – server architecture was implemented to come up with working software
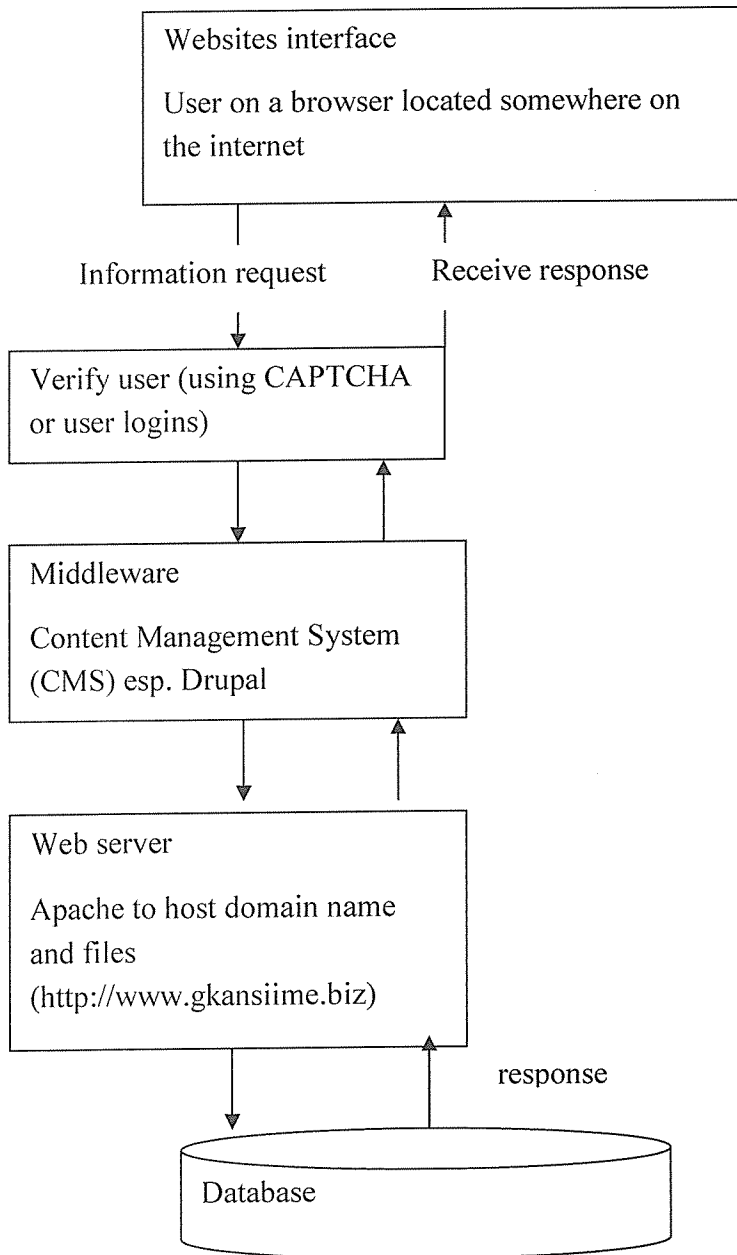
Figure 3.0: Diagram showing the keys layers, components and interface for the application

4.1.4 TECHNOLOGY ARCHITECTURE

Lists of tools, languages, middleware, operating system, standards and protocols

Technology	Use
Programming language (e.g. PHP 5)	Server side scripting language to provide database connectivity to web pages
HTML and HTML 5	Hypertext markup language for writing web pages
Database (e.g. MySQL)	RDBMS to provide database tool to the application
Text editor (e.g. Dreamweaver)	Edit web pages
Local server application (e.g. WAMP)	Serve PHP WebPages to the client computer
Operating system (e.g. Windows XP)	Provide a platform for programming
Web browser (e.g. Firefox)	An application to view web pages
FTP clients (e.g. filezilla)	File upload to file hosting server
Web hosting (using commercial domain (http://gkansiime.biz)	To make the file available all over the internet via internet
HTTP	Protocol that uses hypertext to transfer content
FTP	File transfer protocol used for file upload
WWW	Network o computers using hypertext links to share information.
Middleware (e.g. Drupal)	Content management system to ease the creation of the website
Picture editor (e.g. Adobe Photoshop)	To edit pictures before hosting

Table 1: List of technologies used to realize a fully functional website

4.1.5 NETWORK ARCHITECTURE

Model of the distribution /deployment of the software
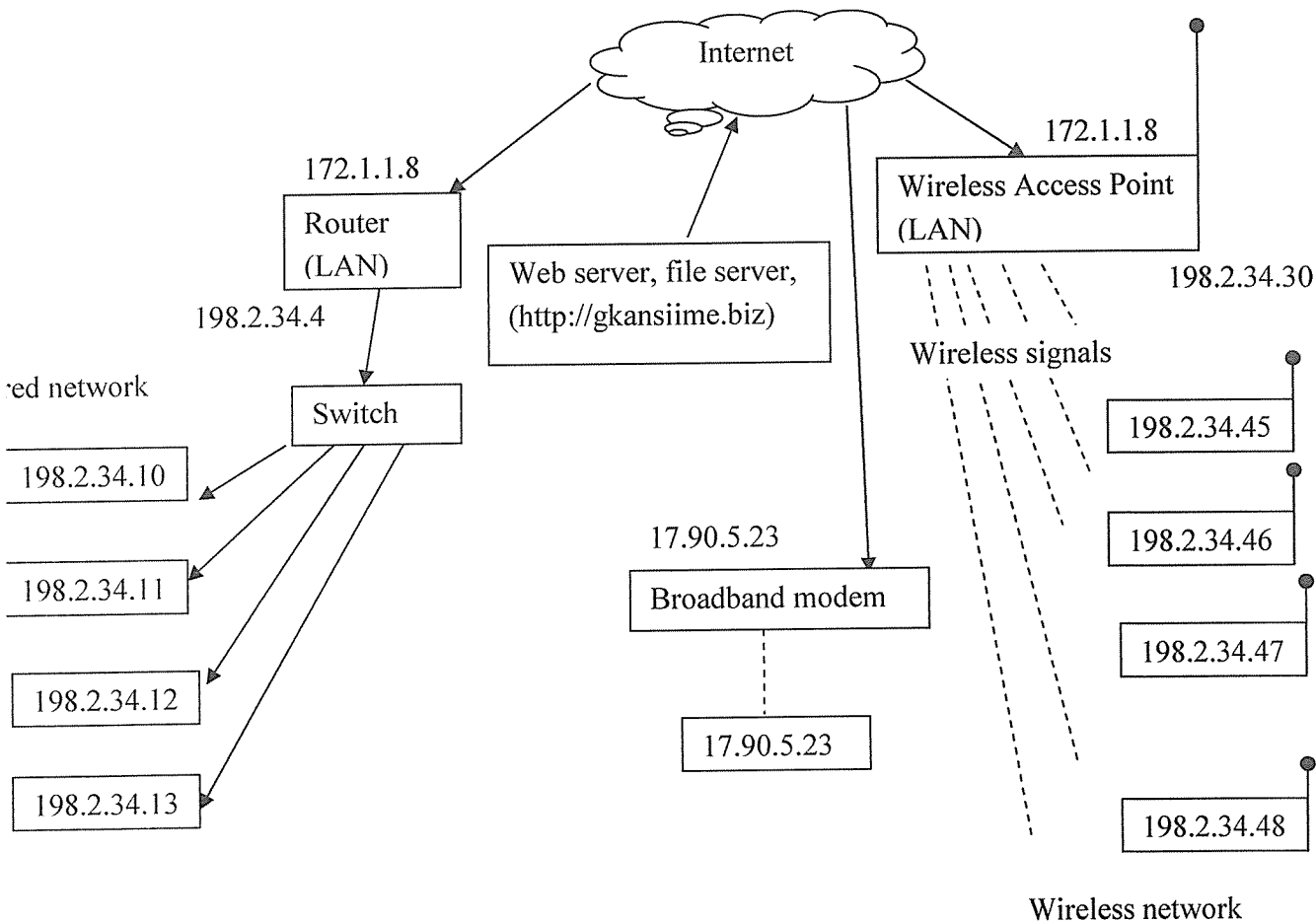
Figure 4: illustration of the deployment model for the software

4.1.6 SYSTEM ARCHITECTURE

Internet provides for the capabilities for multiple connectivity

Internet

172.1.1.8

Router (LAN)

172.1.1.8

Wireless Access Point (LAN)

198.2.34.4

198.2.34.30

Web server, file server, (http://gkansiime.biz)

Host files and database

Wired network

Switch

Wireless signals

Request files and other services

198.2.34.10

198.2.34.45

Request files and other services

17.90.5.23

198.2.34.46

198.2.34.11

Broadband modem

198.2.34.47

198.2.34.12

17.90.5.23

198.2.34.13

198.2.34.48

Wireless network

Figure 5: Model of the system with regards to its deployment showing the interrelationships between its components.

4.1.7 CLASS DIAGRAMS

Customer
-name: String -tel: Number -adress: String -username:String -password: String
+UpdateProfile(): Boolean +AddComment(): Boolean +AddChat(): Boolean +SendEmail: Bolean

Staff
-name: String -tel: Number -adress: String -username:String -password: String
+UpdateProfile(): Boolean +AddComment(): Boolean +AddChat(): Boolean +SendEmail: Bolean +PostForum: Bolean

Content
-title: String -datein: Date -author: String -body:String -status: String
+UpdateContent(): Boolean +AddComment(): Boolean +AddPoll(): Boolean

Figure 7.0: illustration showing the main business objects
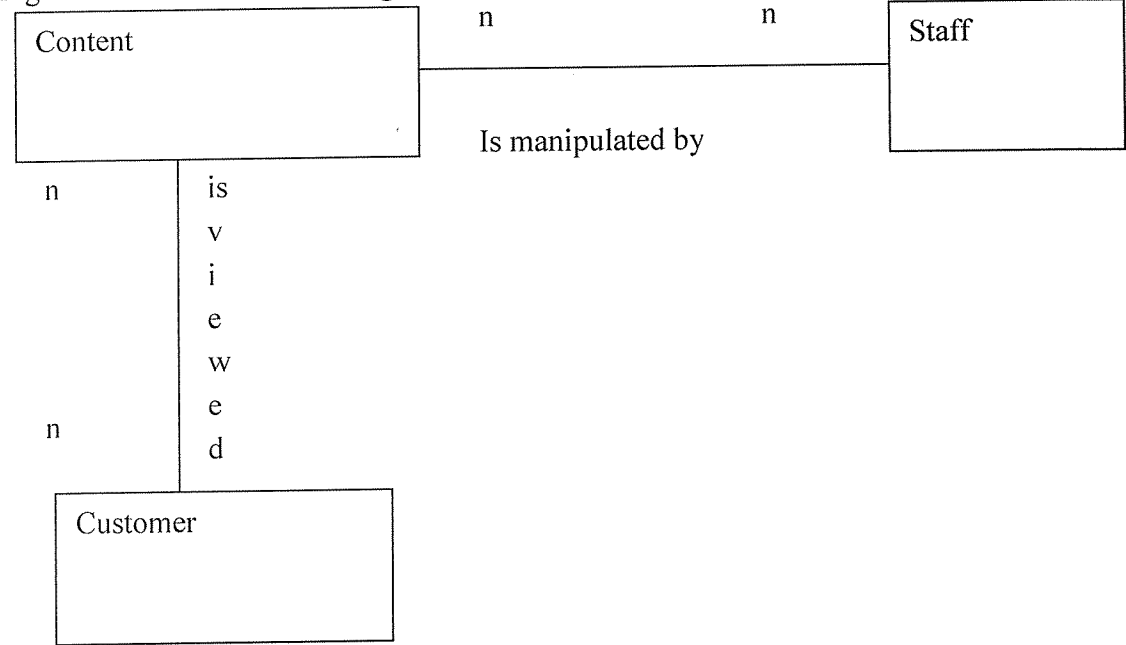
Figure 8: illustration showing the relationships between the business objects

28

CHAPTER FIVE

SYSTEM IMPLEMENTATION AND TESTING

5.0 SYSTEM IMPLEMENTATION
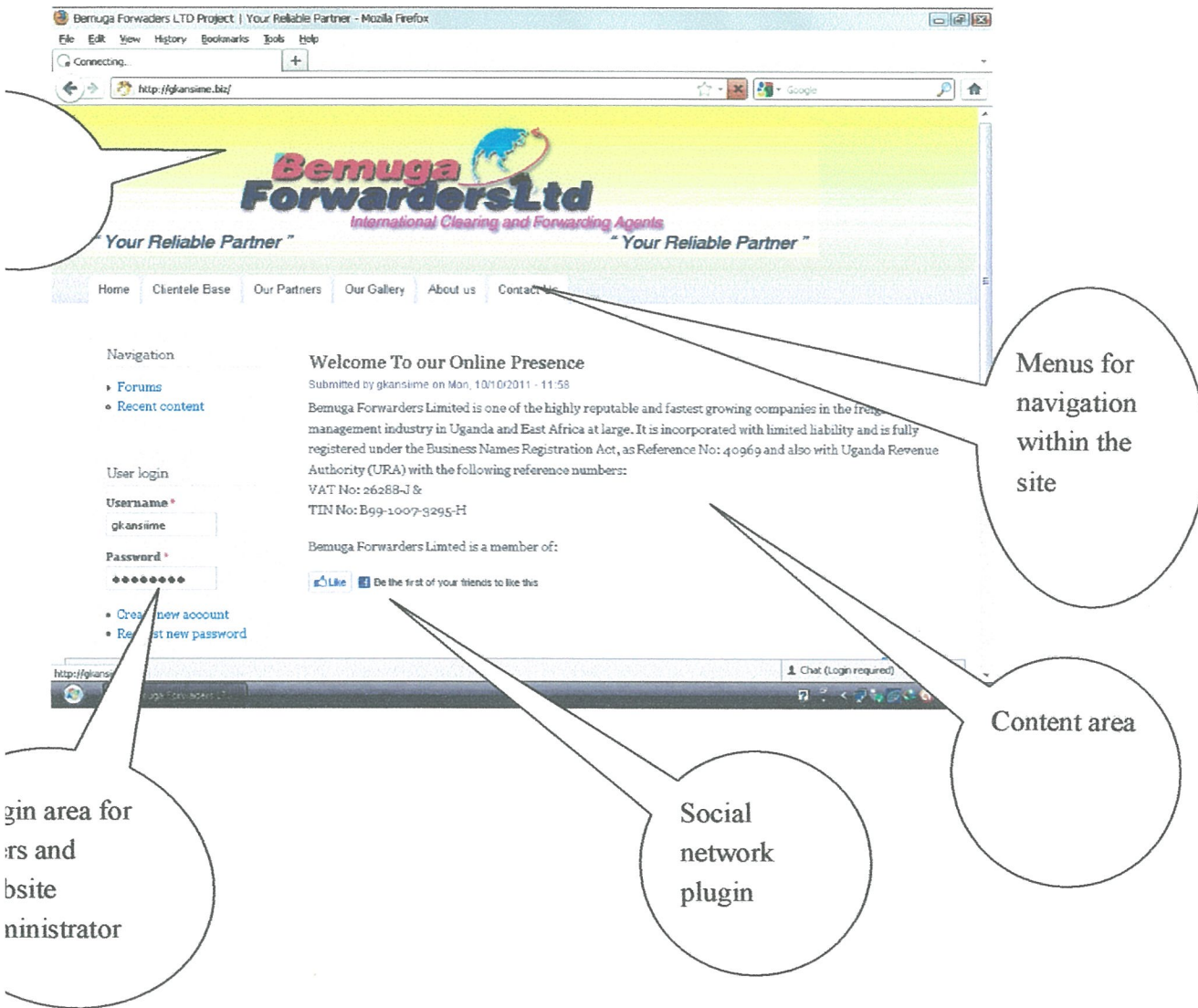
Figure 9.0: illustration of the website from the user end

Figure 10.0: illustration of the home screen on login for users and website administrator
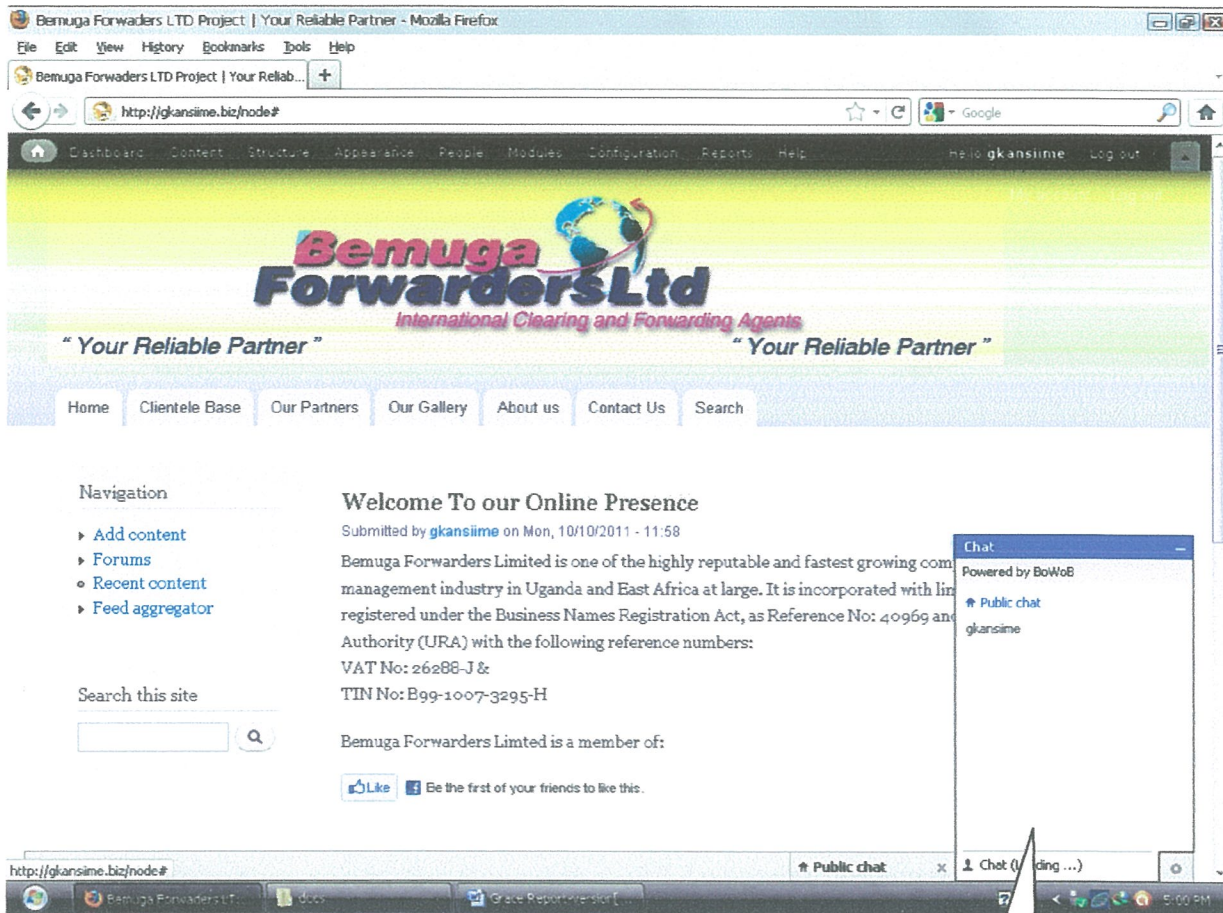
Figure 11.0: illustration of an open chat window ready for a chat session
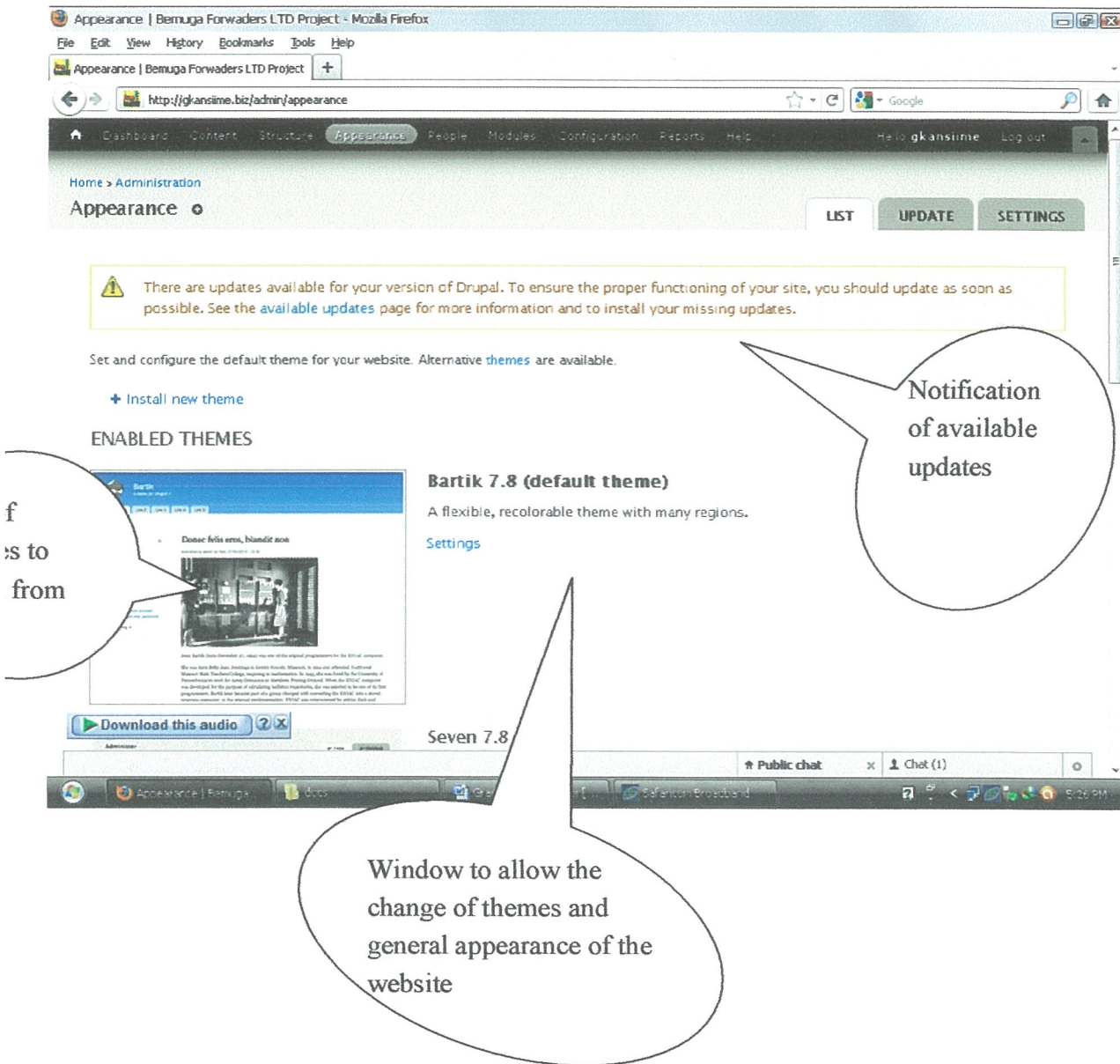
Figure 12.0: Illustration of window to edit the appearance of the website

Figure 13.0: Illustration of listed modules that support the website
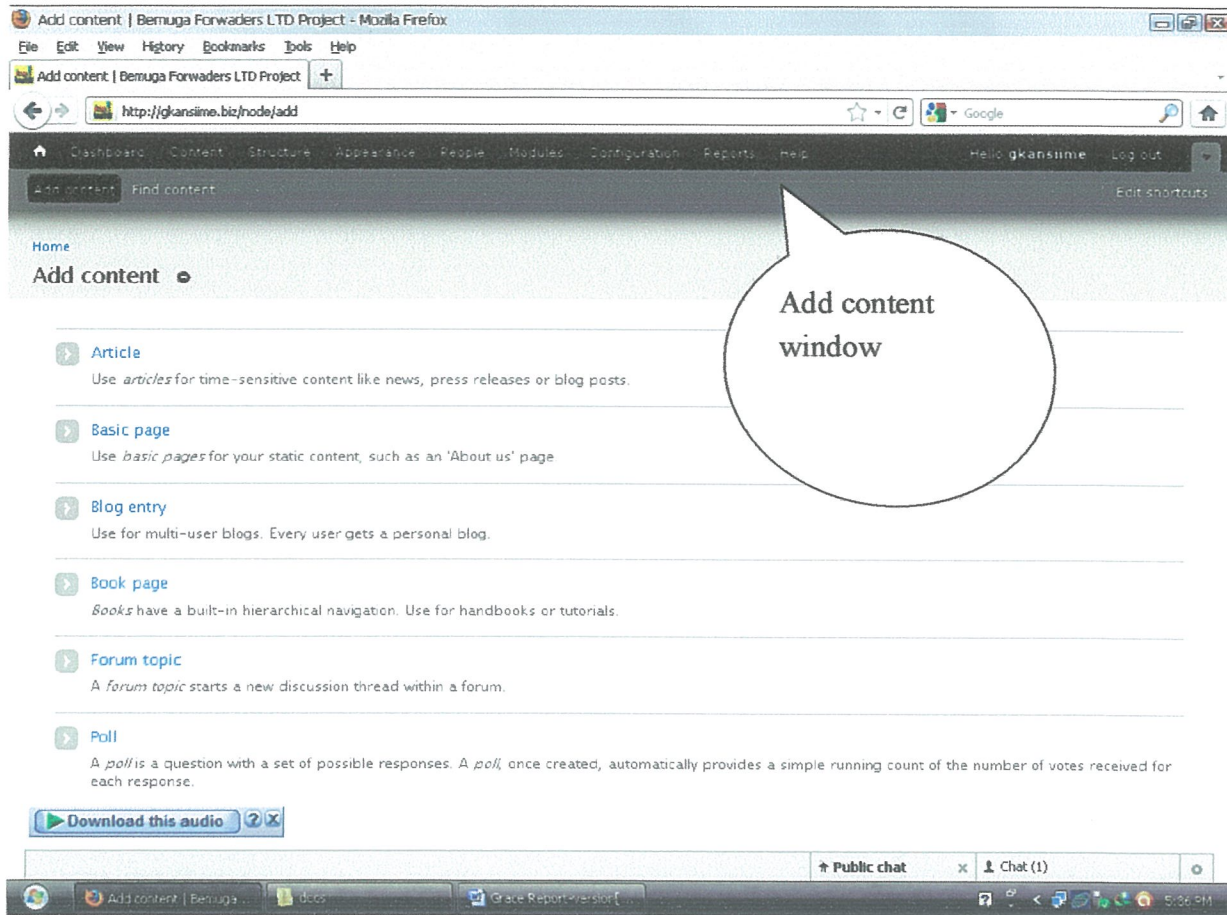
Figure 14.0: Illustration of a window to allow one to add new content to the website
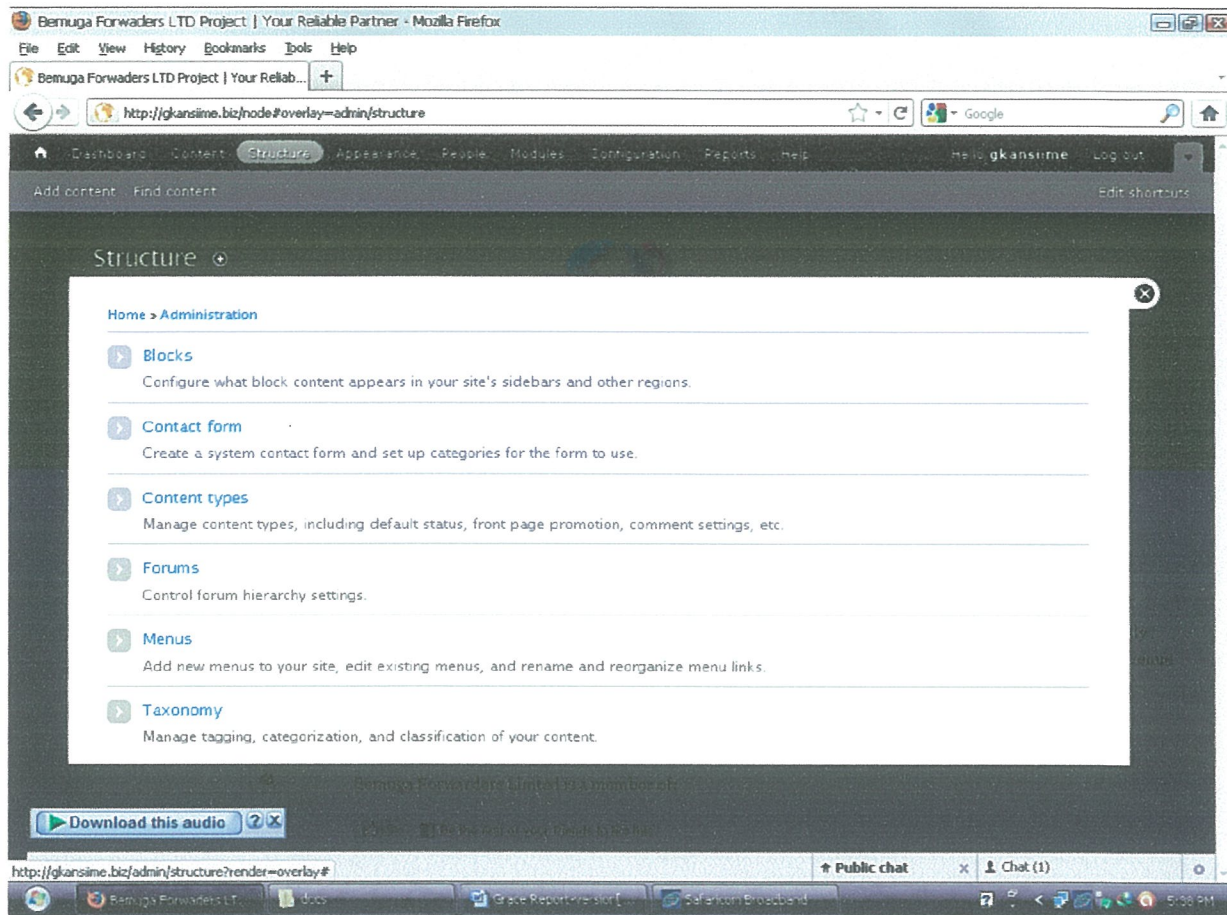
Figure 15.0: Illustration of a list of areas on the website that are editable

Figure 16.0: User management control panel for the website
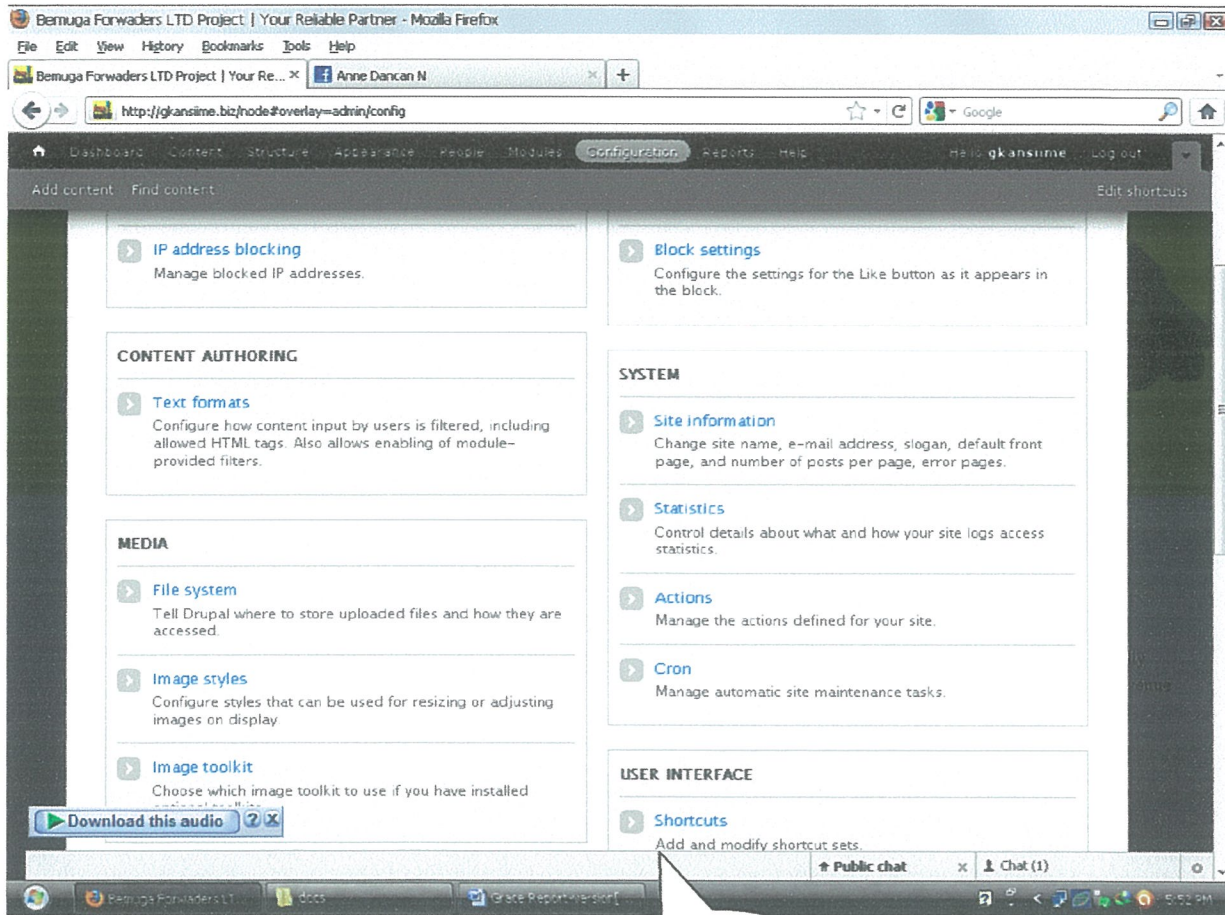
Figure 17.0: Illustration of the configurations panel

5.2 SYSTEM TESTING

Test type	Test case	Test input	Test output	Required output
Unit testing	Integrating of chat clients	Server details of chatting API, chat module files, multiple user login	Maximum capacity of users is ten, only registered users can use the chat client	Handle chatting between users of the website
Stress testing	Multiple users of the system	User request, multiple content requests	Handles unlimited users	To handle unlimited number of requests
Scalability testing	Ability to integrate multiple functionalities to the website	New modules and themes	Compatible to versions equal or in the same range to version of the CMS core	Ability to add new modules and themes
Availability testing	How accessible is the website	Request the websites via a URL	Website is available	Website is available as long s the domain name is active
Installation testing	Installation of the website	Database dump file, website files	Runs on an apache server and a MySQl database	Installation on an apache server and MySQL database
Coexistence	Check	Website files and	No errors occur	Successful

testing	interference of the website to other applications	database dump files		coexistence of the website with other applications

Table 2: list of the types of testing and the activities involved in each

CHAPTER SIX
CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

6.0 CONCLUSIONS

The application developed provides the clearing and forwarding with a rich ground for collection of information. With the installed capabilities such as forums, polls, chats and dynamic contents the firm has an ultimate tool to establish fruitful communications between the customers and the firms' staff. Since this is a development model, some of the features installed may not be at their peak in performance since some of the integrated modules require purchase of rights and privileges to use them fully. The website provides for users to created account with the website and therefore they could access certain features not available from the front end e.g. Web chats are for registered users only. They could also get mass communication from the website via their website accounts from the website administrator.

6.1 RECOMMENDATIONS

Other firms can adopt this template of the website to provide collaborative capabilities to the websites in order to add on to their customer care service capabilities. With the increase in the usage of computer technology they are be able to cater to their customer from different angles. The information collected from such a website is also very valuable for: trends of customers could be studied and analyzed regarding to their activities on the site. With the support of other surveys then they could draw conclusions on the best way forward. Collaboration between the customers and staff of the firm has boosted by a very big margin if the customers are told to use his service to ease communication.

6.2 FUTURE RESEARCH
1. Integration of SMS gateways to provide SMS functionalities to the website

2. Integration of video conferencing capabilities in the website

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APPENDIX A: BUDGET FOR THE GRADUATION PROJECT 2012

ITEM	UNIT PRICE	TOTAL COST
Typing and printing of the first proposal	20 Pages*500/=	10,000/=
Communication & Transport with Supervisor(Proposal Only)	At least 5 Travels plus Air time	100,000/=
Editing and printing of the second proposal	20 Pages*500/=	10,000/=
Printing of Final proposal	20 Pages * 500/=	10,000/=
Preparing of Questionnaires	100 Questionnaires*500/=	100,000/=
Transport and Internet surfing used during Research		100,000/=
1st Draft of project	60 Pages*500/=	30,000/=
2nd Draft of Project	60 Pages*500/=	30,000/=
Printing of the final project	60 Pages*500/=	30,000/=
Buying wamp server		500,000/=
Buying licensed Programming Software		1,500,000/=
Binding	3 Books*20000	60,000/=
TOTAL		3,020,000/=

APPENDIX B: SCHEDULE OF THE PROJECT ACTIVITIES

No	ACTIVITY	TIME
1.	Proposal writing	March 2011
2.	Proposal Writing and corrections	Early April 2011
3.	Final Corrections of Proposal	Mid April 2011
4.	Preparation of instruments	Early May 2011
5.	Data Collection	Late May 2011
6.	Data analysis and interpretation	Late May 2011
7.	Corrections of 3 Chapters	June 2011
8.	Chapter 4	July 2011
9.	Chapter 5 and 6 plus Design of the system	August 2011
10.	First draft Final research report	Early September 2011
11.	Writing of final report and Submission	Late September 2011

APPENDIX C: DATA DICTIONARY

Term	Meaning
Slack time	Grace period to cross-check the project progress