

**IMPROVING EFFICIENCY AND COST EFFECTIVENESS IN
TRANSACTIONAL PROCESSING SYSTEMS IN UGANDA USING A WEB
BASED APPROACH**

Case Study – Nakana Coffee Factory Limited

By



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Declaration

I, **Florence Namugeye**, declare the work herein presented is original and has not been submitted to any other university or institution for any award whatsoever.

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Approval

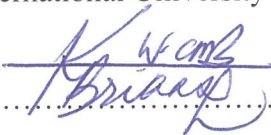
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Dedication

This thesis is a result of pure sacrifice from my Dad Mr. George William Kawooya and Mum (Mrs. Gladys Nansamba Kawooya) family and friends. They often give me valuable advice, reminders and wisdom about life, when I had a hard time understanding. However they always give me room to explore and make mistakes.

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Abstract

This research was set out to design a dynamic website for Nakana Coffee Factory to enable both staff and clients interact with information in an accurate and efficient form.

The principles and steps exposed to information systems design were followed.

The researcher used Object Oriented Analysis methodology, where OO design was found lacking, and principles espoused to structured system analysis were considered. Data collection was through interview and reading.

The data collected were analyzed using UML for conceptual drawing and user interface requirements.

System design was done in two phases, user interface design using macromedia Dreamweaver, and database design using MySQL database.

The complete system runs or was tested with the help of Apache server and implemented.

The prototype system running however could be improved using ORACLE in case the database grows bigger.

CHAPTER ONE

INTRODUCTION

1.0 General Introduction

Nakana Coffee Factory limited started in 1990 with only a processing plant in Buwama Mawokota in Mpigi district. It later opened up a grading plant in Kataza off old Port bell road. This factory processes and exports both Robusta and Arabica coffee to countries like Japan, China, Switzerland and many others.

1.1 Background of the study

Nakana Coffee Factory is located 64 kilometres along Kampala-Masaka road situated in Buwama trading centre in Mpigi district. Initially it had one branch in Buwama where the processing plant is and as business expanded, it opened up a branch in Kataza off old Port bell road in Kampala district. The processing plant in Buwama is where coffee is processed and cleaned. That is to say, coffee husking and a bit of cleaning are done in the processing plant.

They buy Fair Average Quality (FAQ) coffee from their local customers for processing and grading. Nakana coffee factory grading plant is found in Kataza off old Port bell road which thoroughly cleans the coffee by putting it in a hopper, then to a pre-cleaner, then to a destoner and finally into a grader.

The factory exports coffee to more than five countries per month which include China, Switzerland, Japan, Sudan and so on. On average Nakana loads 40 containers of coffee for export per month. Nakana uses a lot of paper work in its information systems including documents like delivery books, invoices and many others. The company has not been so inefficient in its advertising and at the factor of profit maximization which really necessitated the researcher to simplify and increase the company's profits by coming up with a web-based services transaction processing. Nakana has many clients within and outside Uganda who really appreciate its long history of sustainability, innovation and success and most of all welcomed the web-based application system innovation.

1.2 Problem statement

Nakana coffee factory uses fax facility and telephone contacts in the run of its business which is not cost effective. That is to say, the company incurs a lot of costs on specifically papers, fax and telephone bills.

Nakana has several clients abroad to whom it exports its coffee and due to the need for market, profit increments and quick service for such a big international company, the implementation of a web-based services system is considered necessary. The benefits of such a system are mainly in terms of speed and cost effectiveness of operations.

1.3 Objectives

1.3.1 General Objective

The main objective of this study is to investigate the current technologies applied at Nakana Coffee Factory Limited, model and design a web-based service system as a substitute to the current technology.

1.3.2 Specific Objectives

- i. Review the demand for web-based services system with Nakana Coffee Factory clients.
- ii. To develop a web-based service system that would enable company clients view key details about the factory or company like location, services provided, activities done, coffee prices for Nakana at a time, countries to which coffee is being exported and so on.
- iii. To develop a web portal that enhances interactivity between stakeholders Nakana Coffee factory information system.
- iv. To implement the system
- v. To test the developed system.

1.4 Scope of the Study

1.4.1 Geographical scope

This research covered the two branches of Nakana Coffee Factory. It is located 64 kilometres along Kampala-Masaka road situated in Buwama trading centre in Mpigi district. It initially had one branch in Buwama where the processing plant is and as business expanded, it opened up a branch in Kataza off old Port bell road in Kampala district where the grading plant is. So they are two branches dealing with different activities.

1.4.2 System scope

The research covered especially the information processing department where all transactions are made such as, payments orders, buying and selling, issuance of invoices, delivery receipts and so on.

It also covered company activities and administrative staff due to the fact that everyone is capable of learning more about computer literacy if not already computer literate.

1.5 Justification of the study

The justification will include the following below:

- i) A web-based application would improve the company's marketing costs. This is because more clients would view the website thereby getting the details about the Factory and either do take action or do not for the betterment of the company.
- ii) It would also improve the company's cost effectiveness since use of telephone calls and paperwork would be limited. The application would also improve the company's competitive advantages over other coffee factories.
- iii) The exchange of non-competitive information concerning factory compliance would be facilitated, and audit fatigue through the sharing of compliance data between brands and retailers would be reduced.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter different information about web-based applications is reviewed.

2.1 Web-based information system architecture

An information system following a definition of Langefors (1995) is a technologically implemented medium for recording, storing, and disseminating expressions of information, as well for drawing conclusions from such expressions.

Development of a web-based information system lies on the architecture of the three levels: global, local and atomic level.

The Global level is used to describe the web-based information system as a whole, the Local level is used to describe each website and the Atomic level deals with each specific resource. Each of the three levels can be viewed as either isolated from its higher levels or in relationship with them. Each of these levels can still be viewed from three different perspectives, that is to say, Conceptual, Logical and physical.

i. Conceptual model

Conceptual model describes information in a way very close to the perception of the user.

ii. Physical model

This deals more or less with the details of storage and access of the information.

iii Logical level

Between the above two extremes, this level hides several implementation issues but can be directly represented in a computer system in order to be able to both give an intuition of the data organization to the users and be close to the physical details of the organization.

2.2 Core benefits of web based applications.

1. Cross platform compatibility

Most web based applications are far more compatible across platforms than traditional installed software. Typically the minimum requirement would be a web browser of which there are many. (Internet Explorer, Firefox, Netscape to name but a few). These web

browsers are available for a multitude of operating systems and so whether you use Windows, Linux or Mac OS you can still run the web application.

2. More manageable

Web based systems need only be installed on the server placing minimal requirements on the end user workstation. This makes maintaining and updating the system much simpler as usually it can all be done on the server. Any client updates can be deployed via the web server with relative ease.

3. Highly deployable

Due to the manageability and cross platform support deploying web applications to the end user is far easier. They are also ideal where bandwidth is limited and the system and data is remote to the user. At their most deployable you simply need to send the user a website address to log in to and provide them with internet access. This has huge implications allowing you to widen access to your systems, streamline processes and improve relationships by providing more of your customers, suppliers and third parties with access to your systems.

4. Secure live data

Typically in larger more complex systems data is stored and moved around separate systems and data sources. In web based systems these systems and processes can often be consolidated reducing the need to move data around.

Web based applications also provide an added layer of security by removing the need for the user to have access to the data and back end servers.

5. Reduced costs

Web based applications can dramatically lower costs due to reduced support and maintenance, lower requirements on the end user system and simplified architecture. By further streamlining your business operations as a result of your web based application additional savings can often be found.

2.3 Information technology and information systems

According to Jeffrey L.W. et-al (1999, p 11-15) the fundamental characteristics of information system is to distinguish this approach from the previous older traditional approach of file processing. By making a single repository of data, one can be able to maintain this approach by defining the data once and yet make it accessible.

In traditional file processing, the structure of data files is embedded in the access programs thus making many changes to the file may require changing all the programs that access this file. This gives the system an element of program data in dependence.

The many users of the system may require a different perspective or view of the system because of the variety of applications that may be used to view this data. A defined protocol is used for defining the multiple applications and also hides the way in which data is derived and stored from the many users.

By controlling redundancy, every user group maintains its own files as this reduces on multiplication of same data and also wastage of storage space. This data can be retrieved from any type of computer connected to the internet.

The creation of a successful system lies in the special challenges and situations that are encountered when building a system. This increases the adaptability and flexibility of the system. Brian k.w.(2001, p 28-29) defines the technological convergence, also known as the digital convergence as the technological merger of several industries through various devices that exchange information through electronic or digital format used by computers.

The online information access is the connectivity that provides the foundation for the latest advances in the digital age. The connectivity has made possible many activities including the development of this system. Other online activities that have emerged as a result of these advances include:

Email- enables posting of messages electronically.

Telecommuting- this is where one works from home and communicates with the office using a computer at the telecommunication end.

2.4 Middle ware

According to Luke Welling and Laura Thompson (2001), server side scripting is the way today's web pages are run. Websites (no dynamics) that just have information and no interactivity with server programs are becoming less of the norm. It is no longer a huge financial burden to pull off dynamic content. There are many free servers that allow you to write scripts to the server, PHP is one of them.

2.4.1 PHP

PHP belongs to a class of languages known as middle ware. It stands for hypertext preprocessor. Most commercial Web application developers as well as a large number of small and medium sized business love PHP. PHP has mainly managed to grow so so rapidly due to its advantages that makes it a highly regarded program.

- i. It's easy to learn and the available support for it is abundant. The web is all about creating resources for the web community so that everyone gets equal access to those resources. Therefore, PHP is fully supported on the web through readily available and free tutorials.
- ii. More and more host servers are supporting PHP; chances are you can find a good free or cheap host for your site that will allow you to run a dynamic PHP site.
- iii. PHP is also free of charge, that you can download it without a cost for the software. It is also easy to install and set it up for development. PHP is easy to debug.

2.4.2 Scripting or Business logic

i. Php

PHP is a server-side scripting language designed specifically for the Web. Within an HTML page, you can embed PHP code that will be executed each time the page is visited. Your PHP code is interpreted at the web server and generates HTML or other output that

the visitor will see. PHP belongs to a class of languages known as middleware. It stands for hypertext preprocessor. Most commercial Web application developers as well as a large number of small and medium sized business love PHP. PHP has mainly managed to grow so rapidly due to its advantages that makes it a highly regarded program.

(i) It's easy to learn and the available support for it is abundant. The web is all about creating resources for the web community so that everyone gets equal access to those resources. Therefore, PHP is fully supported on the web through readily available and free tutorials.

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(iii) PHP is also free of charge, that you can download it without a cost for the software. It is also easy to install and set it up for development. PHP is easy to debug.

ii. MySQL

MySQL is a very fast, robust, relational database management system (RDBMS). A database enables you to efficiently store, search, sort, and retrieve data. The MySQL server controls access to your data are to ensure that multiple users can work with it concurrently, to provide fast access to it and ensure that only authorized users can obtain access.

MySQL is a multi-user, multi-threaded server. It uses SQL (Structured Query Language), the standard database query language world wide. MySQL is now available under an Open Source license, but commercial licenses are available if required.

2.4.3 Why use PHP and MySQL?

In this system, the middleware language chosen is PHP and MySQL. When building a web application there are always many products that you could use. You will need to

choose hardware for the web server, an operating system, web server software, a database management system and a programming or scripting language.

Some of these choices will be dependent on the others. For example not all operating systems will run on all hardware, not all scripting languages can easily connect to all databases and so on. Hardware specifications and software requirement must be strictly observed here.

The most striking features of PHP are that it is available for Microsoft windows, for any versions of UNIX and with any fully functional Web server. MySQL is similarly versatile.

2.5 Databases

According to Randy J. (et al), the key to developing an active website is data. Data is basically unstructured information such as a name, address or user preference (a hobby, for example). When you think about it, as information technologists all we do is move data from one place to another and present it in different formats.

There are many different types of data, including numbers, strings, and dates. For example, the number 30 might represent age, the strings “Jason Butler” might present a name, and 1/1/2000 might represent a date.

The main power behind a dynamic website is a database. This is where information –that is, a collection of related data elements- is stored, modified, and retrieved. There are very many databases on the market, including Microsoft Access, SQL server, and Oracle. The type of database you choose as the back end (or database that supports an application) for your site ultimately depends on the size and security requirements of your company, as well as your budget.

There are two types of data: (1) relational and (2) non-relational. The difference between the two is how the data is organized. Relational data is stored in Relational Database Management System (RDBMS). The information in relational databases is often presented in tables. Tables are created by grouping, related data in columns and rows. When necessary, tables are related back to each other by the RDBMS.

2.5.1 Relational Database Server

A relational database server stores whatever information the application requires. Finally, it uses a language to resolve requests between the web server and the database server: and it is also used to perform programmable tasks on the information that comes to or comes from the web server: all this is possible with the help of the operating system (OS). The web server, programming languages and database server you use must work well with the operating system, so that the data base can be placed online for everyone to use.

2.5.2 Data Transactions and access

To be of use to the users, data must be accurate, accessible and it must conform to the needs of users. Users should be able to respond to, and act upon the information presented to them. The tool that makes this flexibility possible is the database, an important element in today's web applications.

2.6 Web database technologies

The internet is changing our expectations about the availability of information. What we expect from the internet and from the web is changing as well. As online commerce and electronic publishing become increasingly common, sites that provide a high level of interactivity will replace those that simply present information. Interactivity and complexity call for information to be stored in a way that makes it easy to manipulate and modify. This is the central role of the database in today's applications.

2.6.1 Why a web database?

Randy J. (et la) (2002) continue to explain what makes the web such a good mechanism for accessing database. When you use a data management solution as part of your site, you reap the following benefits:

Ease of deployment: World Wide Web is a cheap and practical alternative for traditional client/server application deployment, and good for implementing a dynamic web database solution.



Database standards: the components that enable web database access are built on proven standards. Web pages can access data from a variety of sources. Such as MySQL Server or any database compliant with Open Database Connectivity (ODBC) Operator.

Data security: by using Microsoft component services, you automatically gain the data protection and operational integrity provided by a distributed transaction coordinator. MySQL implements security by granting privileges to users of the databases. The SQL keywords like select, update, drop, insert etc are allocated in a hierarchical manner to secure the data in the database.

2.6.2 Examples of database

There are lots of database systems out there. The ones that are used very extensively to run dynamic websites are Microsoft's SQL Server, Oracle and MySQL. The below sections provide a look at these two and briefly describe other relational database systems.

2.7 MySQL

MySQL is a very fast, robust, relational database management system (RDBMS). A database enables you to efficiently store, search, sort, and retrieve data. The MySQL server controls access to your data are to ensure that multiple users can work with it concurrently, to provide fast access to it and ensure that only authorized users can obtain access.

MySQL is a multi-user, multi-threaded server. It uses SQL (Structured Query Language), the standard database query language world wide. MySQL is now available under and Open Source license, but commercial licenses are available if required.

2.7.1 Advantages of MySQL

Randy J. (at la) (2002) explain some of SQL's advantages. Multithreading is as a key feature supporting MySQL's performance design goals. It is the core feature around which MySQL is built. Other features include:

- i. **Openness:** MySQL is open in every sense of the term. Its SQL dialect uses ANSI SQL2 as its foundation. The database engines countless platforms, including windows 2000, Macintosh, OSX, linux, FreeBSD, and solaris.
- ii. **Cross and outer-database joins:** you can construct MySQL queries that can join tables from different databases (cross-joins) and also, MySQL supports both left and right outer joins using both ANSI and ODBC syntax.
- iii. **Internationalization:** MySQL supports several different character sets, including ISO-8859-1, Big5, and shift-JIS. It also supports sorting for different sets and can be customized easily. Error messages can be provided in different languages as well.
- iv. Above all else, MySQL is cheap and fast. Other features of MySQL may attract you, but cost and performance are its greatest benefits.

2.8 Importance of information technology

- i. Speeds up problem solving tasks.
- ii. Allows sharing of applications and other resources
- iii. It facilitates the production and transmission of usable and vital information
- iv. By inputting data into digital format allows transmission of texts, sounds, graphics and animations.

2.9 Internet as a tool for an online transaction processing

The internet is a world wide collection of computer networks that communicate and exchange information among each other.

The internet has qualities that create new possibilities because distance has no meaning and makes information available to the world. Also, with the aspect of quick searches, the audience is able to choose between a wider range of online services that are of interest and that can be viewed. Therefore by putting enthusiasm in the subject matter (transaction processing) chances are that we can get other people interested in the coffee too.

2.10 Nakana Coffee Factory Report for the month of February 2006

According to Uganda Coffee Development Authority, a total of 165,762 60-kilo bags worth \$ 16.1 million were exported, representing a drop of 22.6% in volume and a rise in value of 30.1% over the same month last year. (URL:<http://www.uce.co.ug> retrieved 04 September, 2008)

Coffee exports in the first 5 months (Oct/Feb) of the coffee year 2005/06 fell by 15.1% from 1,035,061 bags to 879,097 bags. The corresponding value however went up by 40.7% from US \$ 52.8 m to \$ 74.2 m compared with the same period the previous year. The improvement in value is in tandem with global trends. (URL:<http://www.uce.co.ug> retrieved 04 September, 2008)

There was a drop in volume compared to last year which is attributed to a small crop in 2005/06 arising from bad weather that led to poor bean formation due to defoliation¹ and the situation was made worse by the nationwide political campaigns, which caught the traders attention, resulting in poor procurement.

The following table (1.0) gives a comparative view of the coffee export performance.

Table 2.1 Shows a summary of two years Nakana coffee factory performance as per February 2006

MONTH	Year 2005/06		Year 2004/05		% - Age Change	
	Qty	Value \$	Qty	Value \$	Qty	Value
OCT.	121,696	9,280,808	185,933	8,241,652	(34.55)	12.61
NOV.	182,501	14,408,247	182,881	8,301,451	(0.21)	73.56
DEC.	180,344	14,835,974	237,406	12,369,677	(24.04)	19.94
JAN.	228,794	19,607,334	214,723	11,455,547	6.55	71.16
FEB	165,762	16,113,588	214,118	12,390,484	(22.58)	30.05
TOTAL	879,097	74,245,951	1,035,061	52,758,811	(15.07)	40.73

Source: URL:<http://www.uce.co.ug> retrieved 04 September, 2008

2.11 Exports by Type and Grade

Robusta coffee exports totaled 91,107, which was 55.0% of total export while Arabica was 74,655 bags (45.0%). Robusta and Arabica exports in the 5 months (Oct to Feb 2005/06) were 573,109 bags (65.2%) and 305,988 bags (34.8%), respectively. This represents a drop of 30% in Robusta and a rise of 38.5% in Arabica from recorded in a similar period. The rise in the proportion of Arabica is due to a good harvest in the Mt. Elgon area, which coincided with the improvement in prices.

(URL:<http://www.uce.co.ug> retrieved 04 September, 2008)

Table (2.2) breaks down coffee exports in the month of February by type, grade and value.

TYPE/GRADE	QTY		Value \$	PRICE \$ /Kilo
	60-Kilo Bags	% - AGE		
GRAND TOTAL	165,762		16,113,588	1.62
ROBUSTA	91,107	100.0	6,893,281	1.26
Organic Robusta	664	0.73	55,966	1.40
Washed Robusta	300	0.33	22,619	1.26
Screen 18	6,497	7.13	559,215	1.43
Screen 17	320	0.35	27,090	1.41
Screen 15	57,724	63.36	4,659,292	1.35
Screen 14	1,970	2.16	151,656	1.28
Screen 12	9,537	10.47	700,622	1.22
BHP 1199	5,580	6.12	288,817	0.86
Other Rob. ¹	8,515	9.35	428,002	0.84
ARABICA	74,655	100.0	9,220,307	2.06
Organic Okoro Arab	2,810	3.8	404,577	2.40
Bugisu AA	12,875	17.2	1,770,545	2.29
Bugisu A	1,140	1.5	148,057	2.16
Bugisu B	740	1.0	103,757	2.34
Arabica – PB	2130	2.9	319,026	2.50
Arabica AB	11,670	15.6	1,553,539	2.22
Arabica – ACP	700	0.9	103,103	2.45
Arabica – ACPB	350	0.5	43,797	2.09
Arabica – CPB	1,050	1.4	139,144	2.21
Wugar	8,515	11.4	1,186,500	2.32
Drugar	26,014	34.8	3,038,839	1.95
Mixed Arabica	640	0.9	57,567	1.50
Other Arabicas	6,021	8.1	351,857	0.97

Source: URL:<http://www.uce.co.ug> retrieved 04 September, 2008

2.12 Performance of Individual exporters

The number of registered exporters for coffee year Oct/Sept 2005/06 reached 25, comprising 22 renewals and 4 new entrants: Kaginda Coffee Exporters Ltd, Uganda Medium Industries Ltd, Kaweri Coffee Plantation Ltd ²exported their first container of washed Robusta directly from their farm.

Table 2.3 Performance of each individual exporter in the month of February in terms of quantity traded, market share and cumulative market share.

	EXPORTERS	Qty 60-kg Bags	Percentage Market Share	
	GRAND TOTAL	165,762	Individual	Cumulative
1	Kyagalanyi Coffee Factory	34,254	20.66	20.7
2	Ugacof Ltd..	27,883	16.82	37.5
3	Kawacom (U) Ltd.	25,878	15.61	53.1
4	Pan Afric Impex Ltd.	16,310	9.84	62.9
5	Great Lakes	11,528	6.95	69.9
6	Olam (U) Ltd.	6,700	4.04	73.9
7	Job Coffee	6,528	3.94	77.9
8	Ibero (U) Ltd..	6,170	3.72	81.6
9	Nakana Coffee Factory	5,156	3.11	84.7
10	Wabulungu Multipurpose	4,555	2.75	87.5
11	MTL Main Trading	4,180	2.52	90.0
12	Savannah Commodities	3,580	2.16	92.1
13	Kampala Domestic Store	3,400	2.05	94.2
14	Union Export Services	2,930	1.77	96.0
15	Lake Land Holding Ltd	2,610	1.57	97.5
16	Mbale Importers & Exporters	2,240	1.35	98.9
17	Bakwanye	640	0.39	99.3
18	Gumutindo	600	0.36	99.6
19	Sitanida Agencies Ltd.	320	0.19	99.8
20	Kaweri Coffee Plantation	300	0.18	100.0

Source: URL:<http://www.uce.co.ug> retrieved 04 September, 2008

2.13 Local Situation

Farm-gate prices within the Ugandan market for kiboko ranged between Shs. 850 per kilo and Shs. 950 per kilo, a drop of Shs. 50 – 150 per kilo compared with what obtained in February. Similarly, FAQ prices dropped from a range of Shs. 2,050-2,100/= in January to Shs. 1,850 –1,950 per kilo in February. And Arabica parchment in the Mt. Elgon zone was at Shs. 2,400 – 2,500 from 2,600 per kilo.

Coffee deliveries to export grading facilities have dropped tremendously largely due to tapering off of the season. Coffee harvesting and marketing are virtually over in most parts of the country. Farmers are looking at the fly crop in May/June while traders are laying strategies for the main crop in southwestern Uganda although it has been hit by the dry spell that has been on since December.

2.14 Global Situation

Both terminal markets – LIFFE³ & CSCE⁴ - experienced a slight fall in prices during the month, largely due to technical corrections. Otherwise supplies are slowly getting thinner in major origins. LIFFE opened at US\$ 1,258 and 1,274 a tonne for the March and May contracts while it closed at US \$ 1,208 and \$ 1,226 a tonne, respectively. Representing a drop of 4.0% and 3.8% for March and May respectively (URL:<http://www.uce.co.ug> retrieved 04 September, 2008)

At the Coffee Sugar Cocoa Exchange in New York, prices opened at 118.20 ct/lb and 121.00 ct/lb. for the March and May and closed at 111.8 ct/lb and 113.7 ct/lb at the end of the month, depicting a drop of 5.4% and 6.0%, respectively. (URL:<http://www.uce.co.ug> retrieved 04 September, 2008)

The composite average price dropped from 101.2 cts/lb in January 2006 to 97.4 cts/lb in February, which was 3.9% down. Compared to February last year when the composite stood at almost 60 cts/lb, the prices in February 2006 were 2.7% up.

(URL:<http://www.uce.co.ug> retrieved 04 September, 2008)

2.15 Uganda Coffee Exporters by Destination

The quantity of coffee to EU countries totaled 107,730 bags (65.0%) down from 184,096 bags in January. Although coffee exports to Africa went to only Sudan, as opposed to last month when some went to Egypt and Morocco, there was an improvement in quantity of 30.8% from 35,560 bags in January to 46,520 bags.

Table 2.4 Gives the main destination of Uganda coffee in the month of February 2006.

	EXPORTERS	Qty 60-kg Bag	Percentage Market Share	
			Individual	Cumulative
	GRAND TOTAL	165,762	100	-
1	EU ⁵	107,730	64.99	64.99
2	SUDAN.	46,520	28.06	93.06
3	SWITERZLAND.	5,482	3.31	96.36
4	USA.	3,600	2.17	98.53
5	CHINA	990	0.60	99.13
6	JAPAN	600	0.36	99.49
7	CANADA	320	0.19	99.69
8	AUSTRALIA	300	0.18	99.87
9	TAIWAN	220	0.13	100.00

Source: URL:<http://www.uce.co.ug> retrieved 04 September, 2008

2.16 Uganda Coffee Buyers

The top 5 held a market share of 58.5%, a further concentration from 55.8% realised in the previous month.

Table 2.5 below shows the main buyers of Uganda coffee during the month of February 2006 in terms of quantity, individual and cumulative market shares.

	BUYERS	Qty	% -Age Market Share	
	GRAND TOTAL	165,762	Individual	Cumulative
1	Ecom Agro Industrialists	25,878	15.61	15.6
2	Cofftea..	23,100	13.94	29.5
3	Sucafina.	21,201	12.79	42.3
4	Louis Dreyfus	14,825	8.94	51.3
5	Drucafe	12,010	7.25	58.5
6	Socadec	9,755	5.88	64.4
7	Aldwami	7,320	4.42	68.8
8	ABACO	5,950	3.59	72.4
9	Volcafe	5,940	3.58	76.0
10	Icona Cafe	5,671	3.42	79.4
11	Others	34,112	20.60	100.0

Coffee Outlook for March 2006

Source: URL:<http://www.uce.co.ug> retrieved 04 September, 2008

Coffee harvesting of the main crop in the Central and Eastern Regions is almost over with little left with farmers. Traders shall be clearing their warehouse as they plan relocation to Masaka and South-western regions where the main season is due to start in April-May. March exports are therefore conservatively pegged at 150,000 bags.

QA76.545
.N1746
2008



2.17 Web Application

In software engineering, a web application is an application that is accessed via web browser over a network such as the Internet or an intranet. It is also a computer software application that is coded in a browser-supported language (such as HTML, JavaScript, Java, etc.) and reliant on a common web browser to render the application executable.

Web applications are popular due to the ubiquity of a client, sometimes called a thin client. The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity. Common web applications include webmail, online retail sales, online auctions, wikis, discussion boards, weblogs, massively multiplayer online role-playing games and many other functions. (URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

2.18 History

In earlier types of client-server computing, each application had its own client program which served as its user interface and had to be separately installed on each user's personal computer. An upgrade to the server part of the application would typically require an upgrade to the clients installed on each user workstation, adding to the support cost and decreasing productivity.

In contrast, web applications use web documents written in a standard format such as HTML (and more recently XHTML), which are supported by a variety of web browsers.

Generally, each individual web page is delivered to the client as a static document, but the sequence of pages can provide an interactive experience, as user input is returned through web form elements embedded in the page markup. During the session, the web browser interprets and displays the pages, and acts as the universal client for any web application.

In 1995, Netscape introduced a client-side scripting called JavaScript, which allowed programmers to add some dynamic elements to the user interface that ran on the client side. Until then, all the data had to be sent to the server for processing, and the results were delivered through static HTML pages sent back to the client.

In 1996, Macromedia introduced Flash, a vector animation player that could be added to browsers as a plugin to embed animations on the web pages. It allowed the use of a scripting language to program interactions on the client side with no need to communicate with the server.

In 1999, the "web application" concept was introduced in the Java language in the Servlet Specification version 2.2. [2.1?]. [1][2] At that time both JavaScript and XML had already been developed, but AJAX had not still been coined and the XMLHttpRequest object had only been recently introduced on Internet Explorer 5 as an ActiveX object. [3]

In 2004, Web 2.0 was coined, and it was proposed to use the Web as a platform, [4] as opposed to simply developing applications that used Internet to communicate with the server.

In 2005, AJAX was coined, and applications like Gmail started to make their client sides more and more interactive. ([URL:http://en.wikipedia.org/wiki/Web_application](http://en.wikipedia.org/wiki/Web_application) retrieved 26 September, 2008)

2.18.1 Interface

Webconverger operating system provides an interface for web applications. The web interface places very few limits on client functionality. Through Java, JavaScript, DHTML, Flash and other technologies, application-specific methods such as drawing on the screen, playing audio, and access to the keyboard and mouse are all possible. Many services have worked to combine all of these into a more familiar interface that adopts the appearance of an operating system. General purpose techniques such as drag and drop are also supported by these technologies. Web developers often use client-side scripting

to add functionality, especially to create an interactive experience that does not require page reloading (which many users find disruptive). Recently, technologies have been developed to coordinate client-side scripting with server-side technologies such as PHP. Ajax, a web development technique using a combination of various technologies, is an example of technology which creates a more interactive experience.

(URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

2.18.2 Technical considerations

A significant advantage of building web applications to support standard browser features is that they should perform as specified regardless of the operating system or OS version installed on a given client. Rather than creating clients for MS Windows, Mac OS X, Linux, and other operating systems, the application can be written once and deployed almost anywhere. However, inconsistent implementations of the HTML, CSS, DOM and other browser specifications can cause problems in web application development and support. Additionally, the ability of users to customize many of the display settings of their browser (such as selecting different font sizes, colors, and typefaces, or disabling scripting support) can interfere with consistent implementation of a web application.

Another approach is to use Adobe Flash or Java applets to provide some or all of the user interface. Since most web browsers include support for these technologies (usually through plug-ins), Flash- or Java-based applications can be implemented with much of the same ease of deployment. Because they allow the programmer greater control over the interface, they bypass many browser-configuration issues, although incompatibilities between Java or Flash implementations on the client can introduce different complications. Because of their architectural similarities to traditional client-server applications, with a somewhat "thick" client, there is some dispute over whether to call systems of this sort "web applications"; an alternative term is "Rich Internet Application" (RIA). (URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

2.18.3 Structure

Though many variations are possible, a web application is commonly structured as a three-tiered application. In its most common form, a web browser is the first tier (presentation), an engine using some dynamic Web content technology (such as ASP, ASP.NET, CGI, ColdFusion, JSP/Java, PHP, embPerl, Python, or Ruby on Rails) is the middle tier (application logic), and a database is the third tier (storage). The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface. But there are some who view a web application as a two-tier architecture. ([URL:http://en.wikipedia.org/wiki/Web_application](http://en.wikipedia.org/wiki/Web_application) retrieved 26 September, 2008)

2.18.4 Business use

An emerging strategy for application software companies is to provide web access to software previously distributed as local applications. Depending on the type of application, it may require the development of an entirely different browser-based interface, or merely adapting an existing application to use different presentation technology. These programs allow the user to pay a monthly or yearly fee for use of a software application without having to install it on a local hard drive. A company which follows this strategy is known as an application service provider (ASP), and ASPs are currently receiving much attention in the software industry.

([URL:http://en.wikipedia.org/wiki/Web_application](http://en.wikipedia.org/wiki/Web_application) retrieved 26 September, 2008)

2.18.5 Writing web applications

There are many web application frameworks which facilitate rapid application development by allowing the programmer to define a high-level description of the program. In addition, there is potential for the development of applications on Internet operating systems, although currently there are not many viable platforms that fit this model.

The use of web application frameworks can often reduce the number of errors in a program, both by making the code simpler, and by allowing one team to concentrate just on the framework. In applications which are exposed to constant hacking attempts on the

Internet, security-related problems caused by errors in the program are a big issue. Frameworks may also promote the use of best practices such as GET after POST. (URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

2.18.6 Web application security

The Web Application Security Consortium (WASC) and OWASP are projects developed with the intention of documenting how to avoid security problems in web applications. A web application security scanner is specialized software for detecting security problems in web applications. (URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

2.18.7 Applications

Wikipedia application running in Mozilla Firefox. Browser applications typically include simple office software (word processors, online spreadsheets, and presentation tools), with Google Docs being the most notable example, and can also include more advanced applications such as project management, computer-aided design, and point-of-sale. (URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

2.18.8 Benefits

Browser applications typically require little or no disk space on the client, upgrade automatically with new features, and integrate easily into other web procedures, such as email and searching. They also provide cross-platform compatibility (i.e., Windows, Mac, Linux, etc.) because they operate within a web browser window.

2.18.9 Disadvantages

Standards compliance is an issue with any non-typical office document creator, which causes problems when file sharing and collaboration becomes critical. Also, browser applications rely on application files accessed on remote servers through the Internet. Therefore, when connection is interrupted, the application is no longer usable. Google Gears is a platform to ameliorate this issue and improve the usability of browser applications. (URL:http://en.wikipedia.org/wiki/Web_application retrieved 26 September, 2008)

CHAPTER THREE

METHODOLOGY

3.0 Introduction

In this chapter, the methods that were used for collecting data, analyzing the data, designing the system as well as testing are described. User centered approach to software development was used because it directly involved the people who are going to use the system.

3.1 Study area and population

The research was carried out at Nakana Coffee Factory Limited in Kataza off old Port bell road. The company has one hundred and twenty four (124) staff members and (47) forty seven customers who use the services of the company

3.2 Data collection tools

The data collection tools used in this study includes interview, observation and Joint application development.

3.2.1 Interview

An interview was carried out to find out the problems of the operations of the company. About 14 (fourteen) people including data entry staff personels, manager of Nakana coffee Factory and the financial controller were interviewed.

3.2.2 Observation

Physical observation of what takes place in the company was also done. Many of the clients came to the factory to find out the specialties of the products for the factory, the current prices, and many others. Sometimes clients would make calls from abroad to find out the prices, specialties of products, and to inquire how they could place orders.

3.2.3 Joint application development

Joint application development (JAD) method was also deployed in areas where technicality was expected like the storage system, gateway configurations and security

setups. Joint application development (JAD) is a popular fact-finding technique that brings users into the development process as active participants.

3.3 Requirement analysis

This is a crucial stage in any software development process. This determines the requirements for the entire project. All successful projects must have gone through the stage of the requirement analysis.

The data collected using the above methods was then scientifically analyzed using Unified Modeling Language Design and Poseidon was the Software of choice for this analysis. This was so because UML Design is the Perfect Design for implementation of Php, MySQL and Dreamweaver. The results of the UML design were translated into database tables and user interface requirements for the new system.

3.3.1 Non functional

These are requirements which are not directly concerned with the specific functions delivered by the system. There are constraints on the services of functions offered by the system.

- i. Data integrity is solved by the use of validation rules.
- ii. Administrators of Nakana coffee factory should not be able to make any changes on the system.
- iii. Access is restricted to only authorized users.

3.3.2 Functionality

This comprised of assembling all functionality requirements of the system to accomplish the goals and potential needs of the users.

3.3.3 Other requirements (system requirements)

This is summarized description of the functional and non-functional requirements so that they are understandable by system users who don't have detailed technical knowledge, and also specify external behaviors of the system. The system should provide the following user requirements:

- i. The user must provide his or her user name and password in order to access the system resources.
- ii. The user must not be able to alter anything on the system.

3.4 Software architecture

Software architecture is a set of decisions a software architect makes. Software architecture is commonly defined in terms of component and connectors. Components are identified and assigned responsibilities that client components interact with through “contracted” interfaces. Component interconnections specify communication and control mechanisms, and support all component interactions needed to accomplish system behavior.

3.5 Database design

i. UML – use case diagrams

Use case diagrams are used during the analysis phase of a project to identify and partition system functionality. They separate the system into actors and use cases.

Actors represent roles that are played by users of the system. The users can be human, other computers, pieces of hardware or even the 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.

ii. UML – data flow diagrams

Data flow diagrams are a well known approach to visualize the data processing in business analysis field. A data flow diagram is strong in illustrating the relationship of processes. That is to say, data stores and external entities in business information system.

3.5.1 User interface design

i. Dreamweaver

This is a powerful WYSIWYG authoring software from macromedia enabling easy creation of sites containing graphics and multimedia elements. It is one of the best programs for creating JavaScript and HTML animations.

ii. Flash / fireworks

This application was used to design company logos and animations to be used on the website or the front end/interface

a. System design

i. Database design-MySQL from UML

A logical design of the information was developed using MySQL from UML specifications to design the interface with the input and output forms, and later a logical connection to the database where the database tables were established.

ii. Interface design-html, Php and dreamweaver

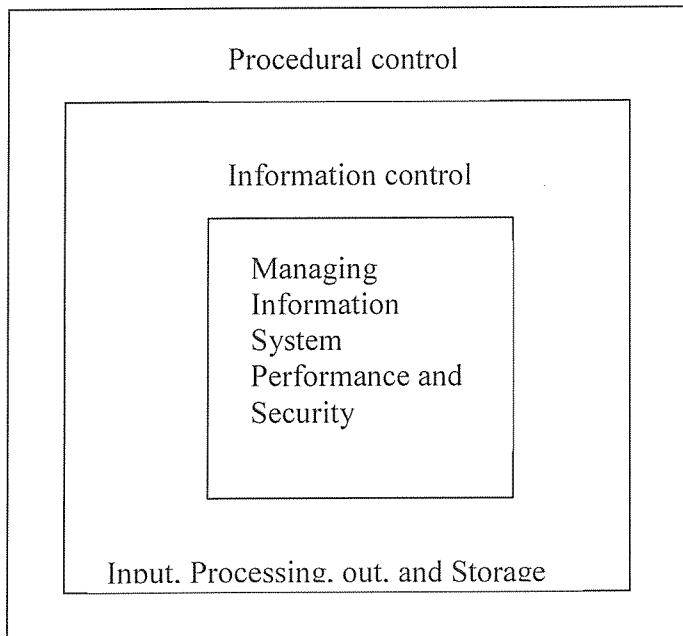
This focused on supporting the interaction between the end users and their computer based applications which resulted on the design of attractive and efficient WebPages for users input and output.

iii. Apache server

The Apache HTTP Server project is an effort to develop and maintain an open source HTTP server for modern operating systems including UNIX and Windows NT. The goal of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards.

3.7 System security

Some of the security controls considered to provide the system was procedural and information system controls illustrated below.



System security

Information controls were developed to ensure proper data entry, processing techniques, storage methods and information output. These monitor and maintain the quality and security of input, processing, storage, and output activities.

Input controls

When a user enters invalid data such as entering currency instead of data, the system should generate an error signal. However, sensitive information entered is not encrypted. To access the system, the user is asked to enter the password in order to gain access to the system backup (duplicate files of data stored of the premises, that is, in a location away from a computer room)

3.7 Implementation and testing

3.7.1 Unit testing

Unit testing verifies that the individual units of source code are working properly. A unit is the smallest testable part of an application.

Testing was performed to ensure that the software was working correctly and efficiently. Testing was generally focused on two areas, internal efficiency and external software which were functioning according to top system design, and that it was performing all the required functions. The objective of internal testing was to make sure that the computer code was efficient and well documented.

The application was tested at each stage of module development. Each module was tested individually to ensure quality and compatibility and to establish whether each module performed the required function.

3.7.2 System testing

System testing is performed on the entire system in the context of a functional Requirement Specification (s) (FRS) and or a system Requirement Specification (SRS). It is an investigatory testing phase, where the focus is to have almost a destructive attitude and test not only the design, but also the behavior and even the believed expectations of the customer. It is also intended to test up to and beyond the bounds defined in the software/hardware requirements specification(s).

The main objectives were:

- (a) To ensure that all system programs were error free.
- (b) Make sure the end-user could interact freely.
- (c) To establish whether the system components were correctly operating to achieve the required objectives.
- (d) To ensure that the system had adequate documentation and instructions to operate.
- (e) To ensure that the modules were compatible and that they were functioning as intended. At this stage of system testing some errors that occurred were corrected.

There was also an element of effective interaction between the end user and the system. This was also tested, in addition to testing the system's ability to handle the required amount of information needed by the company in the right time and the system interface operating capability.

Testing was done using both live and artificial data: the data used was both valid and invalid. The error element in the tested data was needed, for testing the validation and control procedures.

For example invalid data tested; entering date instead of credit card number, entering employee ID that had more characters than specified, entering a future date for requisition date (earlier date).

3.8 System Implementations

Implementation is the process of converting from current system to the proposed system. The system implementation will be on the web. It will be hosted and updated regularly. The system will be performed in parallel format. It will be allowed to operate alongside the current system until the whole is installed as an entity and the old system will be discarded.

CHAPTER FOUR

SYSTEM ANALYSIS AND DESIGN

4.0 Website design for web-based systems

Globalization has fastened the pace of peoples thinking. The world has changed rapidly in terms of technology and needs of people. People are currently no limited to what is available in their neighborhood or long information has been the reserve of those with resources in terms of information gathering but also look beyond the horizon. For a long time information has been the reserve of those with resources especially money and time.

4.1 Systems Analysis

(a) Description of the existing system

Nakana Coffee Factory Limited operates its business by use of fax machines and telephone call. Clients either come to the factory or make calls to inquire about the prices, available specialties, and whatever they may want to know.

When it comes to especially paper work and documentation, the fax facility is maximally used especially for selling purposes of the products.

(b) Problems of the existing system

- i) Company clients incur a lot of cost before they get what they really want from the company.
- ii) The company incurs a lot of cost especially on fax and telephone bills though at times they may not do without them which are not cost effective.
- iii) The company misses out a lot on market and profit maximization since they do not look at marketing as a major factor.

(c) The proposed system

The proposed system is intended to as much as possible minimize cost and maximize profits. That is, due to the fact that clients will have to browse the nakana website at a low cost, get to know about the company, find out the prices of specialties, know the specialties, and even order online without incurring much cost and labour.

(d) Requirements determination and analysis of the proposed system

4.2 Logical design

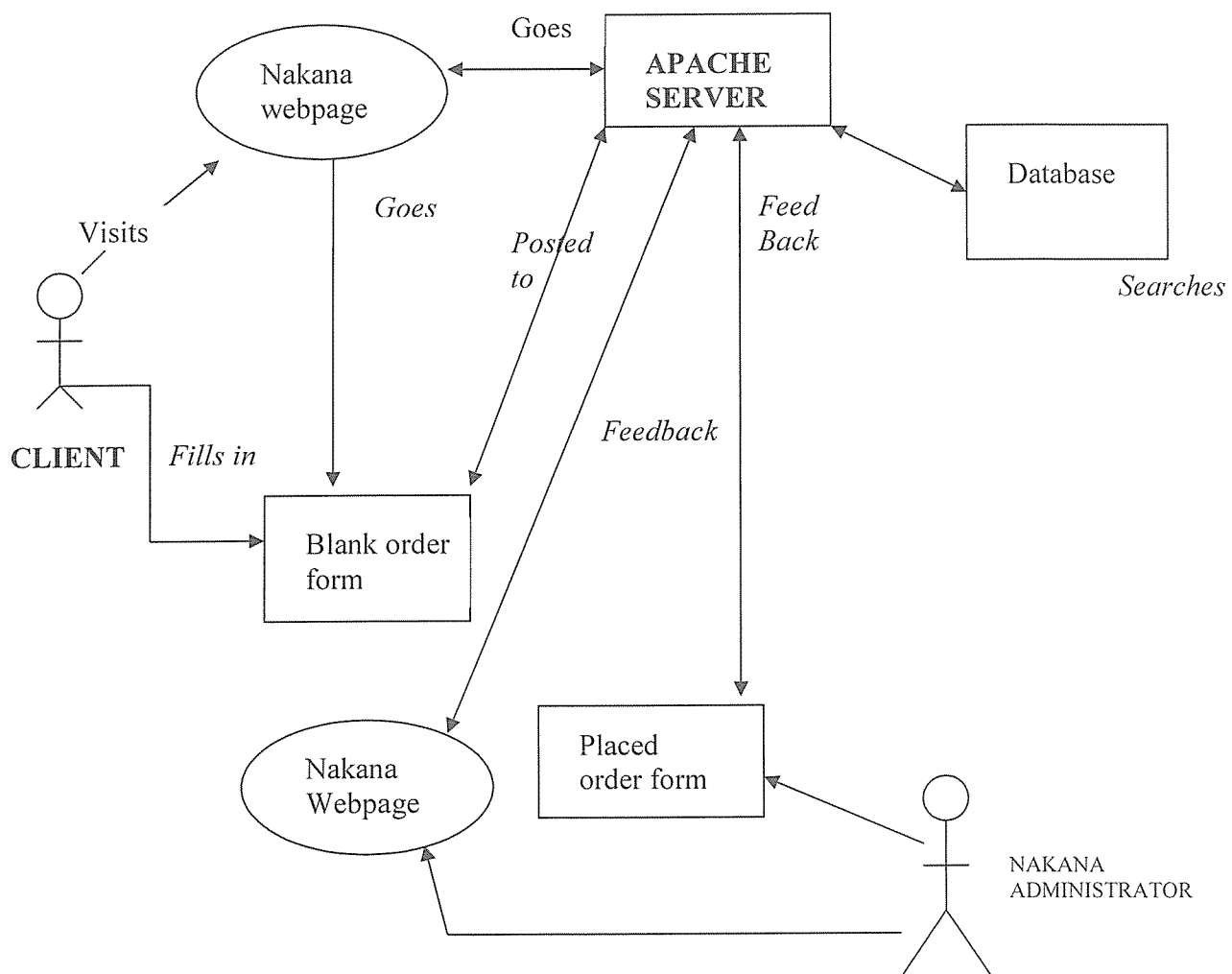
This covers what the system will do, describe the functional requirements and also conceptualize what the system will do to solve problems that were identified in the analysis.

4.2.1 Process modeling

This goes for modeling of the system processes using a use case diagram.

Figure 4.1 Use case diagram for Nakana Coffee Factory

USE CASE

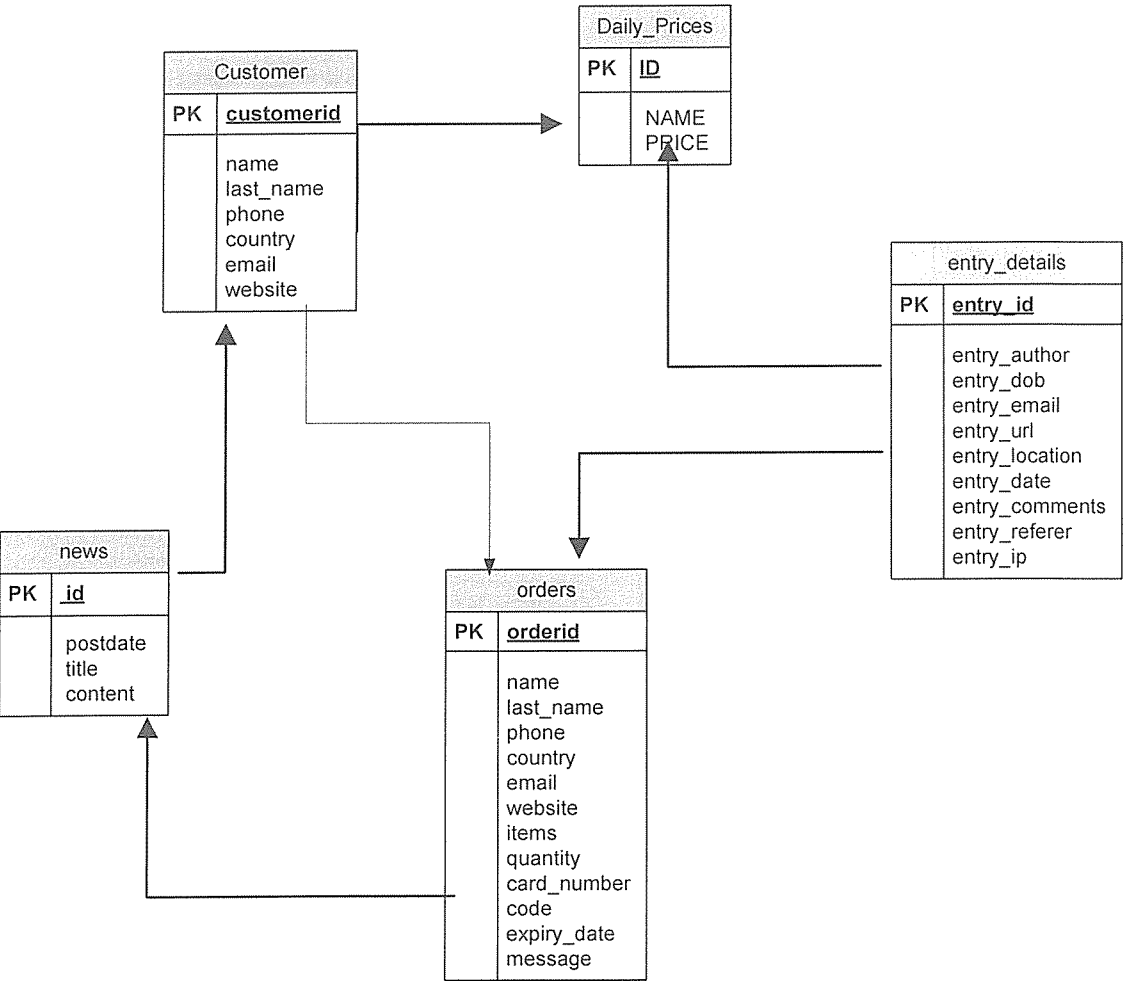


The use case diagram above explains how the client browses on to the Nakana Coffee Factory web page, chooses to order online by filling in an order form, which order form is viewed by the Nakana administrator to take action immediately. The administrator contacts the applicant regarding the order and shipment is arranged

4.2.2 Conceptual data modeling

Conceptual data modeling was done using an Entity Relationship Diagram as shown below:

Figure 4.2 Entity relationship model used to design the database



4.3 Physical design

Entailed in here is how system components are interrelated in order to work together so as to achieve the business processes while maintaining the business rules. It displays the derivatives of the Entity Relational Model into what is termed as the relational model that defines the physical data files as represented in the relational database schema below:

Viewers'/ Clients Details

Customer (Customer_ID, Name, Last_name, Phone, Country, Email, Website)

Orders (Order_ID, Name, Last-Name, Phone, Country, Email, Website, Items, Quantity, Card_Number, Code, Expiry date, Message)

Entry Details (Entry_ID, Entry_author, Entry_dob, Entry_Email, Entry_URL, Entry_Location, Entry_Date, Entry_Comments, Entry_Referer, Entry_Ip)

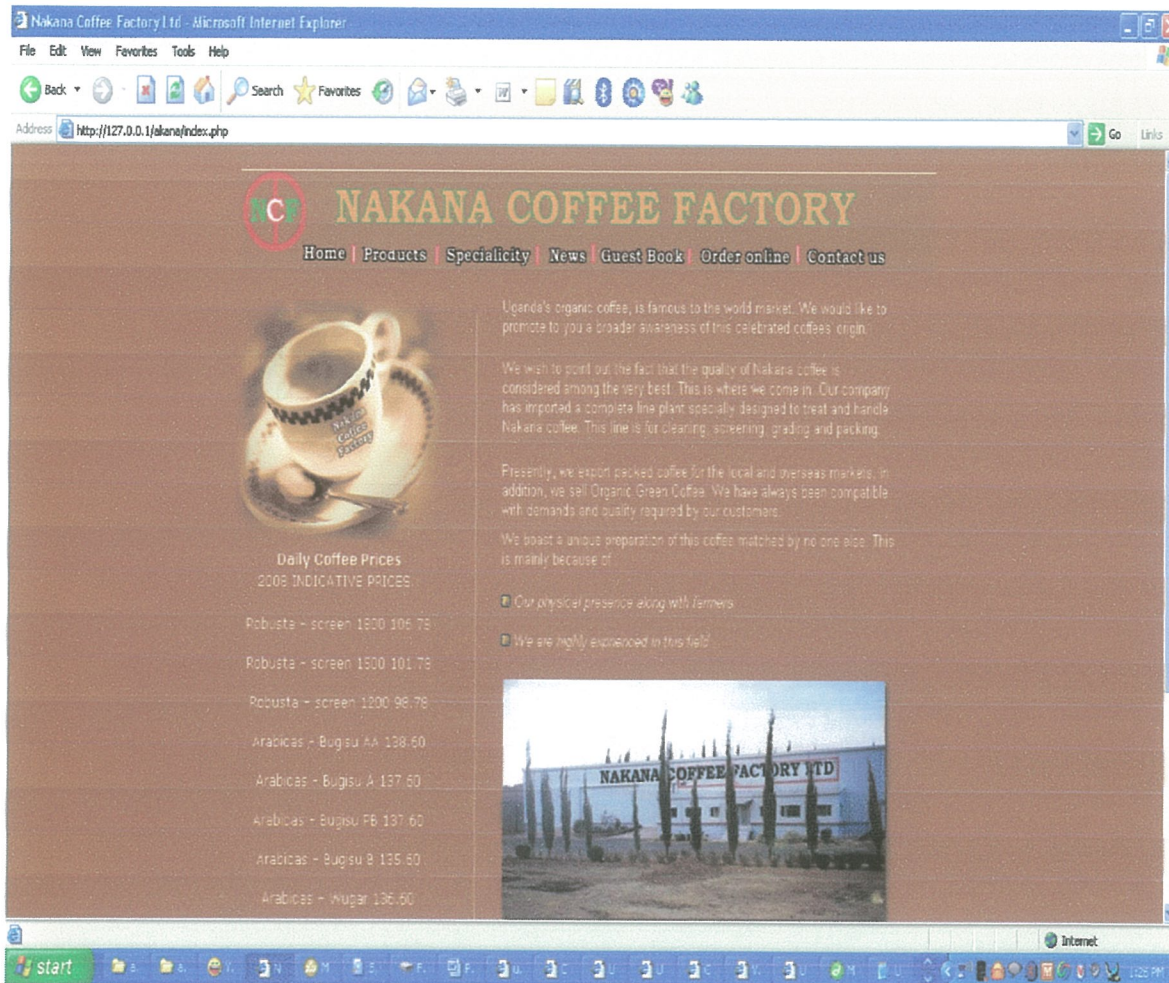
Daily Prices (ID, Name, Price)

News (ID, Postdate, Title, Content)

4.3.1 Interface Design

This covers the input and output design of the forms. The interface (Front End) is what the user uses to interact with the database (Backend). The interface was designed in Dreamweaver and php so as to create a dynamic site that can perform search on the database and display results to the user.

Figure 4.3 A screenshot of the home page of the Nakana website is below:



The screenshot above shows the different windows to be viewed on the Nakana coffee Factory home page. That is the products form, specialty form, News form, order online form, and a few others.

Figure 4.4 A screenshot of Nakana Coffee Factory online contact form

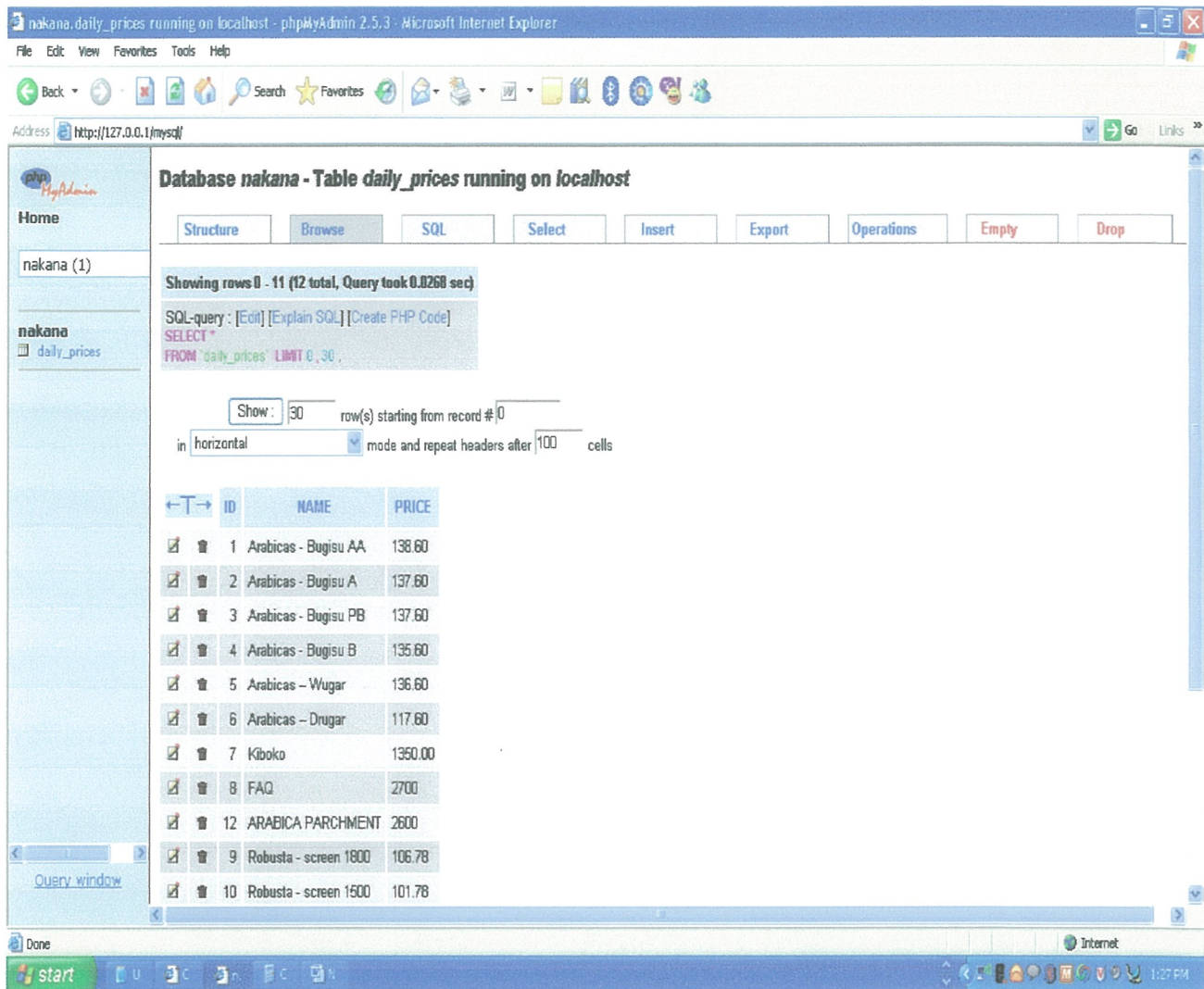
The screenshot shows a web browser window titled "Nakana Coffee Factory Ltd - Microsoft Internet Explorer". The address bar displays "http://127.0.0.1/ekana/contact.php". The website has a brown background. At the top, there is a logo with a red 'C' and the text "NAKANA COFFEE FACTORY". Below the logo is a navigation menu with links: Home, Products, Speciality, News, Guest Book, Order online, and Contact us. On the left side, there is an image of a coffee cup and saucer with the text "Daily Coffee Prices" below it. The main content area is titled "OUR ONLINE CONTACT FORM" and contains several input fields: Name, Last Name, Phone, Country, Email, Website, and a large text area for Message. Below these fields are "Submit" and "Reset" buttons. At the bottom, there is a section titled "CONTACT INFORMATION" with the text "NAKANA COFFEE FACTORY" and "P. O. BOX 33049 - MPIGI, UGANDA". The Windows taskbar at the bottom shows the start button, several open applications, and the system clock displaying "10:03 PM".

The screenshot above shows the online contact form where clients fill in their details to be contacted in case of any inquiry or response to whatever message they'll have left in the message box on the form.

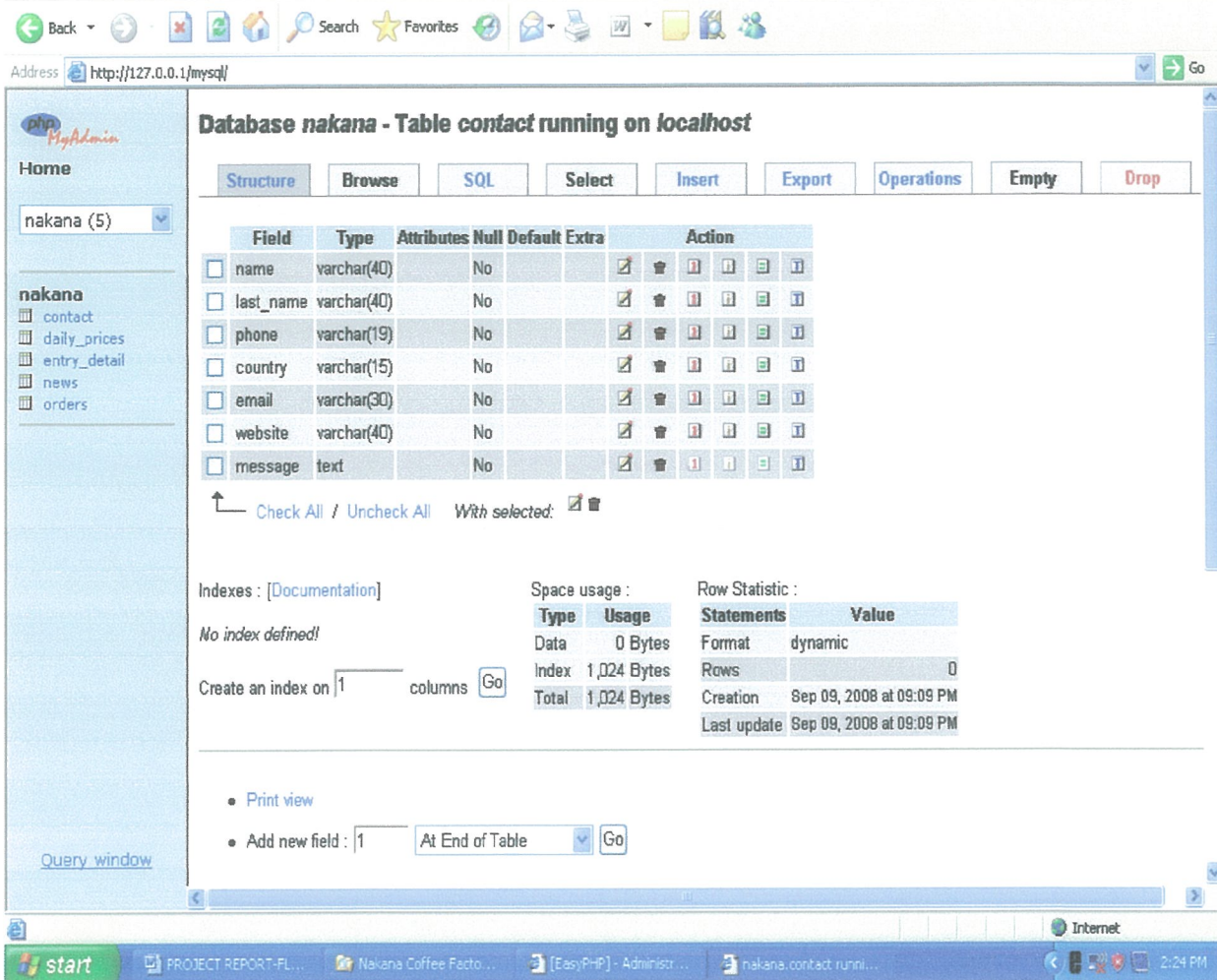
3.2 Database and files design

This covers the creation of database forms running on local host using MySQL and Php my admin

Figure 4.5 A screenshot of the MySql database creation Daily prices is below



The screenshot above shows the creation of daily prices in the database.



The above screenshot shows the creation of database contact form using MySQL and Php my admin.

4.5 Limitations

The researcher envisaged the following limitation to the smooth completion of the research.

Considering the time frame that was given between the start of the research and expected time of completion, it was evident the issue of lack of enough time would hinder the perfect completion of the research.

The researcher also envisaged a lot of cost constraints since the project was self sponsored and considering the loads of both software and hardware requirements that were to be put in place.

Since part of the research interacts with real life data from coffee factories, the researcher also envisioned lots of resistance from the people who were concerned with this information.

However, the researcher had plan B of developing the software prototype based solely “concocted data” other than that of the factory.

CHAPTER FIVE

SYSTEM IMPLEMENTATION

5.0 Program Implementation

Php and MySQL language were used to design the system because when building a web application there are always many products that you could use.

5.1 PHP

The most striking features of PHP are that it is available for Microsoft windows, for any versions of UNIX and with any fully functional Web server. MySQL is similarly versatile. PHP is a server-side scripting language designed specifically for the Web. Within an HTML page, you can embed PHP code that will be executed each time the page is visited. Your PHP code is interpreted at the web server and generates HTML or other output that the visitor will see.

- (i) It's easy to learn and the available support for it is abundant. The web is all about creating resources for the web community so that everyone gets equal access to those resources. Therefore, PHP is fully supported on the web through readily available and free tutorials.
- (ii) PHP is also free of charge, that you can download it without a cost for the software. It is also easy to install and set it up for development.
- (iii) PHP is easy to debug.

5.1.2 MySQL

MySQL is a very fast, robust, relational database management system (RDBMS). A database enables you to efficiently store, search, sort, and retrieve data. The MySQL server controls access to your data are to ensure that multiple users can work with it concurrently, to provide fast access to it and ensure that only authorized users can obtain access.

MySQL is a multi-user, multi-threaded server. It uses SQL (Structured Query Language), the standard database query language world wide. MySQL is now available under and Open Source license, but commercial licenses are available if required.

5.2 Features/Workability of modules

i) Home Page

This is a page that connects to the rest of the pages on the Nakana website to be accessed. For example News page, Contact page, Order online page and many others.

ii) Products Page

Products page displays all the Products of Nakana Coffee Factory.

iii) About us Page

This is the page where we find the Nakana Coffee factory details like background, vision, mission and so on.

iv) News Page

The News page gives daily news about the factory especially the daily prices.

v) Guestbook Page

On the guestbook page clients fill in their details or whoever visits the website.

vi) Order online Page

This is where clients access the order online form to be filled in case they want to place orders.

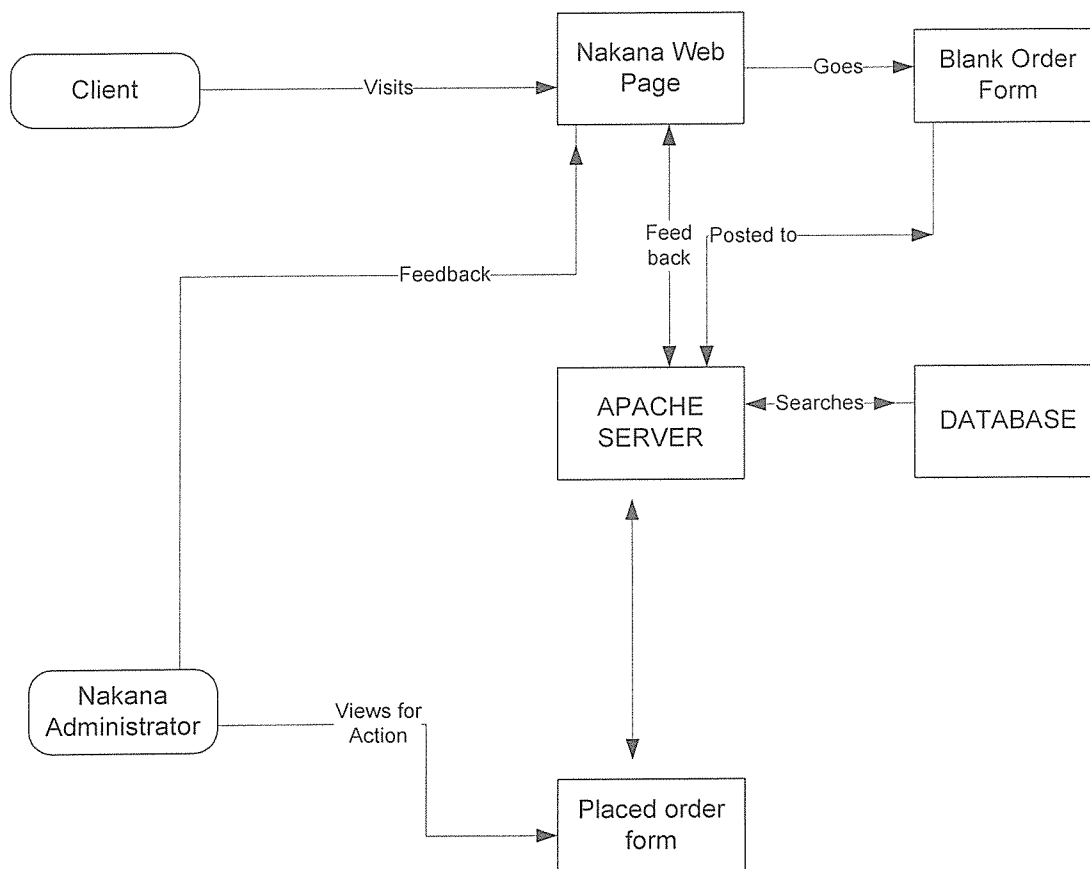
vii) Online contact Page

This is where clients give their details for contact purposes about the factory.

5.3 Program flowchart

The program flow chart illustrates the information flow of information from one point to another as indicated below.

Figure 5.1 Program flow chart



Client

The following activities will be performed by the client:

- (i) The client will check for coffee availability and the prices.
- (ii) Place an online order and give his details (content)
- (iii) Sign the guestbook
- (iv) Read News from the News page.

Administrator

The administrator will check orders and respond to them and also make queries to the database.

5.4 Sample test Data

The system was fully tested and below is samples of the tested data in the entry detail table on the contact form of the Nakana website.

Figure 5.2 Tested data on the contact page





The screenshot shows the phpMyAdmin interface for the 'nakana' database. The 'entry_detail' table is selected, and the 'Structure' tab is active. The table contains 5 rows of test data. The SQL query shown is 'SELECT * FROM `entry_detail` LIMIT 0, 30'.

entry_id	entry_author	entry_dob	entry_email	entry_url	entry_location	entry_date	entry_time
1	Florence		florence@yahoo.com	http://	Mpigi	2008-09-07 17:58:09	Test
2	Ndawula	8-8-1975	ndawula@gmail.com	http://ndawula.com	Kampala	2008-09-10 12:02:56	Good
3	OJ	07-07-1910	oj@oj.com	http://kampala.com	Kampala	2008-09-10 12:04:26	test
4	Justin	12/04/1970	nyeko@yahoo.ca	http://	Mbuya	2008-09-16 16:15:07	good
5	Berna Kawooya	11-09-2008	bemathan@yahoo.com	http://	kampala	2008-09-24 14:25:49	Its a gr

The screenshot above shows a list of people who visited the site and filled the contact form

Figure 5.3 tested data on the Order online Page

The screenshot shows the phpMyAdmin interface for a database named 'nakana'. The 'orders' table is selected, and the SQL query 'SELECT * FROM `orders` LIMIT 0, 30' is executed. The table displays two rows of client data. The interface includes a sidebar with navigation links, a top menu bar, and a status bar at the bottom.

	name	last_name	phone	country	email	website	items	quantity	card_num
 	Fred	Kawooya	0774891709	Uganda	kifreddie@softwarelab.com	http://softwarelab.com	robusta screen 15	1000 tonnes	01210028
 	Mathias	Kabuye	0782772369	Kenya	Kabmat@gmail.com	http://www.kab.com	robusta screen 18	299 tonnes	02208383

The screenshot above shows a list of clients, who visited the Nakana website successfully placed their orders online.

5.5 Change over methods

System implementation was done on the web. It was hosted and updated regularly. The system will be performed in parallel format. It will be allowed to operate alongside the current system until the whole is installed as an entity and the old system will be discarded.

Some of the activities that will be carried out include the following:

- (a) Acquiring or developing hardware and software.
- (b) Training the people to operate and use the system.
- (c) Testing the system
- (d) Converting to the new system

CHAPTER SIX

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

The aim of this architecture was to use component architecture to create a web-based information system for providing Nakana Coffee Factory Limited with information using content management systems (Joomla and Mambo with the help of Apache Php and MySQL database) by using these technologies, reusability and extensibility issues could be achieved to evolve the system. User interfaces could adapt to the changes by modifying the components or modules of the website. Although the time that was spent on designing and implementing components was longer than traditional design and implementation, the time spent on future changes would be saved. This is one of the advantages of building a web-based information system using component architecture.

6.1 Discussion of objectives, problems and challenges

The objectives of this project were to:

- i. Review the demand for web-based services system with Nakana Coffee Factory clients.
- ii. To design a web-based service system that would enable company clients view key details about the factory or company like location, services provided, activities done, coffee prices for Nakana at a time, countries to which coffee is being exported and so on.
- iii. To assess the role of Open Source Software in developing Nakana Coffee Factory Limited information system.
- iv. To develop a web portal that enhances interactivity between stakeholders Nakana Coffee factory information system.

Objective 1 and 4 were successfully achieved while the rest were partially completed in this project. Capturing requirements were achieved and presented in use case diagram in chapter three.

The major challenges of this project were:

- i. Designing a normalized MySQL database to support the system.
- ii. Integrating components to make a database driven working system.
- iii. Balancing between the project and other responsibilities because the project or research was an additional work to usual duties.

6.2 Recommendations

- i. There is need for a system administrator to be in charge of the whole system for the smooth run of the business. There should be some one to respond to all mails and act accordingly for cost effectiveness and efficiency.
- ii. Further research should be conducted into how Nakana administrators can adapt to the web-based system and integrate the system with PDA's for easy access.
- iii. To add high database functionalities and more content
- iv. To use or apply ORACLE in case the database grows bigger.

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APPENDIX : DOCUMENTATION

Table 'Contact'

```
CREATE TABLE `contact` (  
  `name` VARCHAR( 40 ) NOT NULL ,  
  `last_name` VARCHAR( 40 ) NOT NULL ,  
  `phone` VARCHAR( 19 ) NOT NULL ,  
  `country` VARCHAR( 15 ) NOT NULL ,  
  `email` VARCHAR( 30 ) NOT NULL ,  
  `website` VARCHAR( 40 ) NOT NULL ,  
  `message` TEXT NOT NULL  
);
```

Setup-code

```
<?php  
include("lib.php");  
$link = mysql_connect($host,$username,$password);  
if (!$link) {  
  die('Could not connect: ' . mysql_error());  
}  
$db_selected = mysql_select_db($db, $link);  
if (!$db_selected) {  
  die ("Can't use $db : " . mysql_error());  
}  
$sql = "CREATE TABLE IF NOT EXISTS `orders` (`name` VARCHAR  
(40) , `last_name` VARCHAR (40) , `phone` VARCHAR (40) , `country` VARCHAR  
(40) , `email` VARCHAR (40) , `website` VARCHAR (40) , `items` VARCHAR  
(40) , `quantity` VARCHAR (40) , `card_number` VARCHAR (40) , `code` VARCHAR  
(40) , `expiry_date` Date , `message` TEXT , PRIMARY KEY(`email`))";  
$result = mysql_query($sql);  
if (!$result) {
```

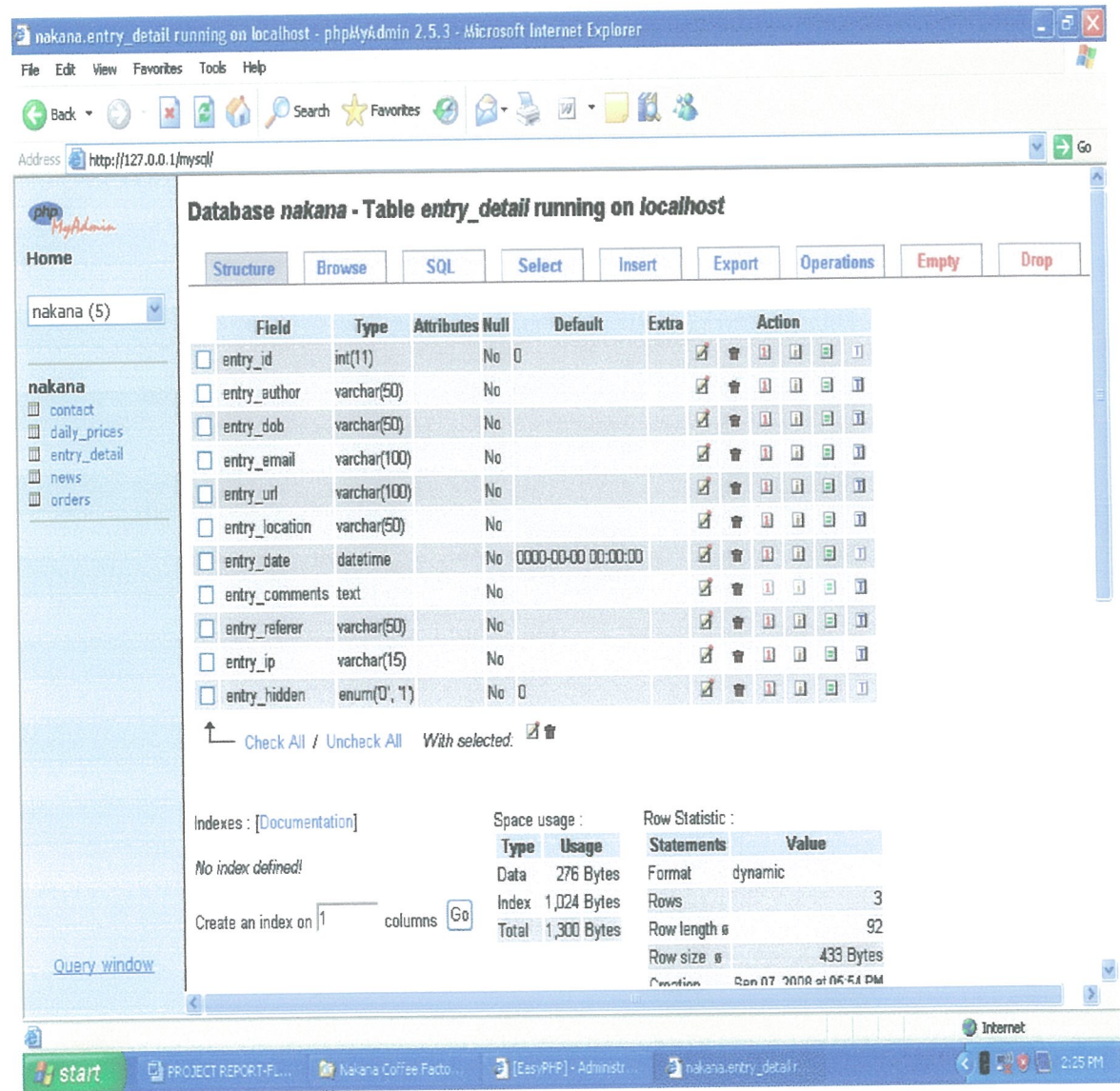
```

die('Invalid query: ' . mysql_error());
}
echo "Table created successfully";

?>

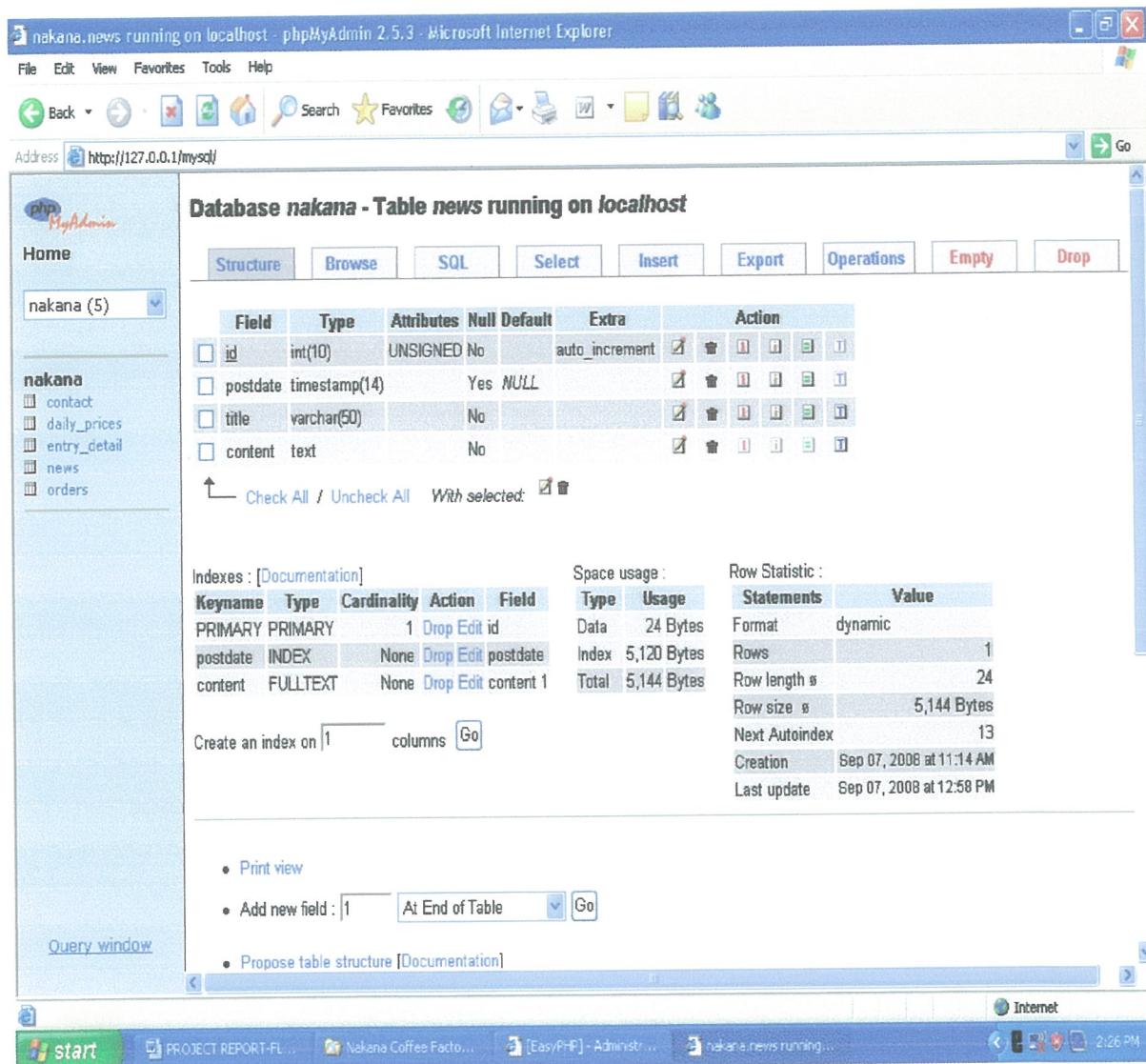
```

Figure 4.9 A screenshot of the MySQL database creation for Entry details is below



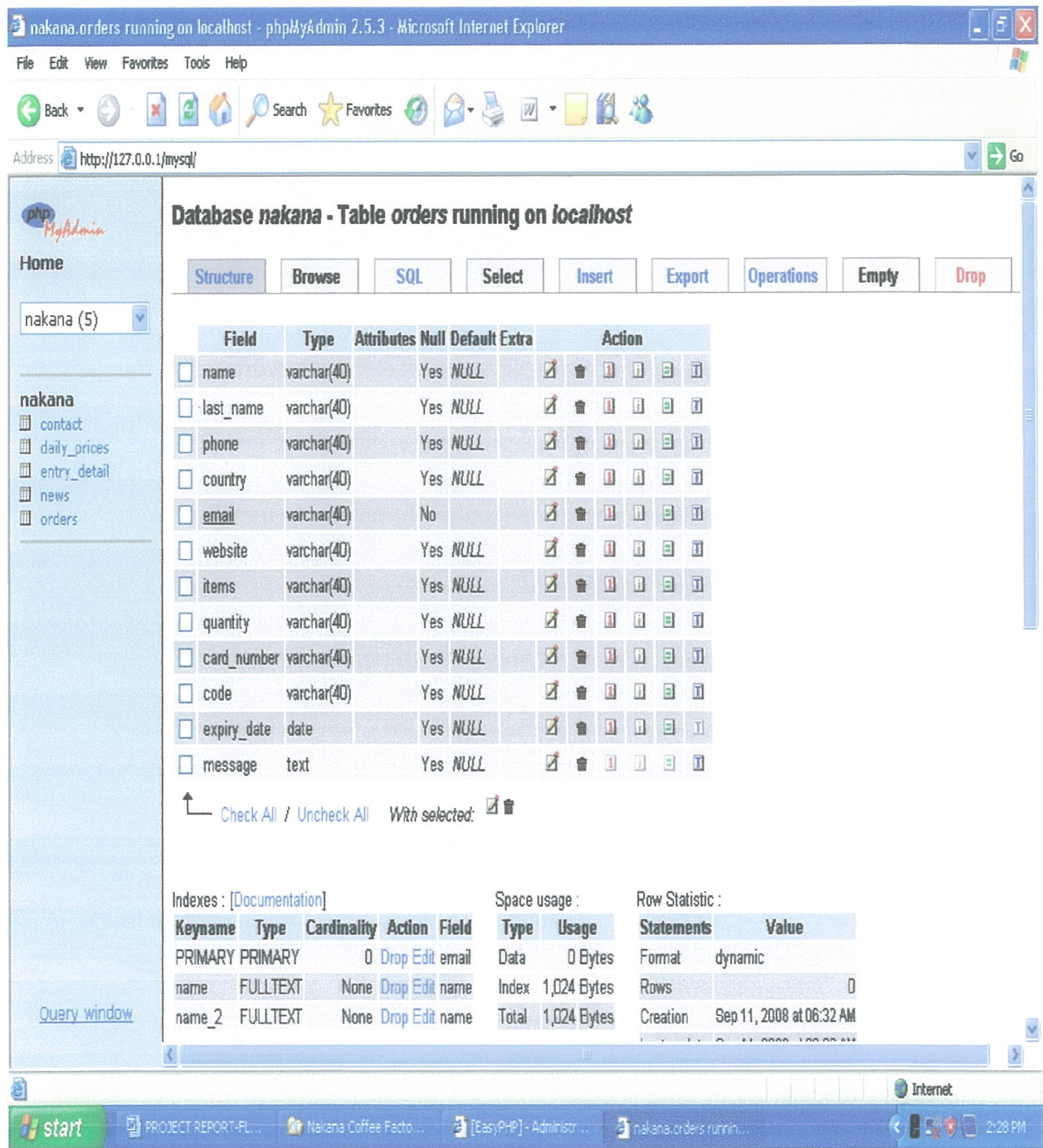
The screenshot above shows the creation of details entry database using MySQL and Php my admin.

Figure 4.10 A screenshot of the MySQL database creation for News form is below



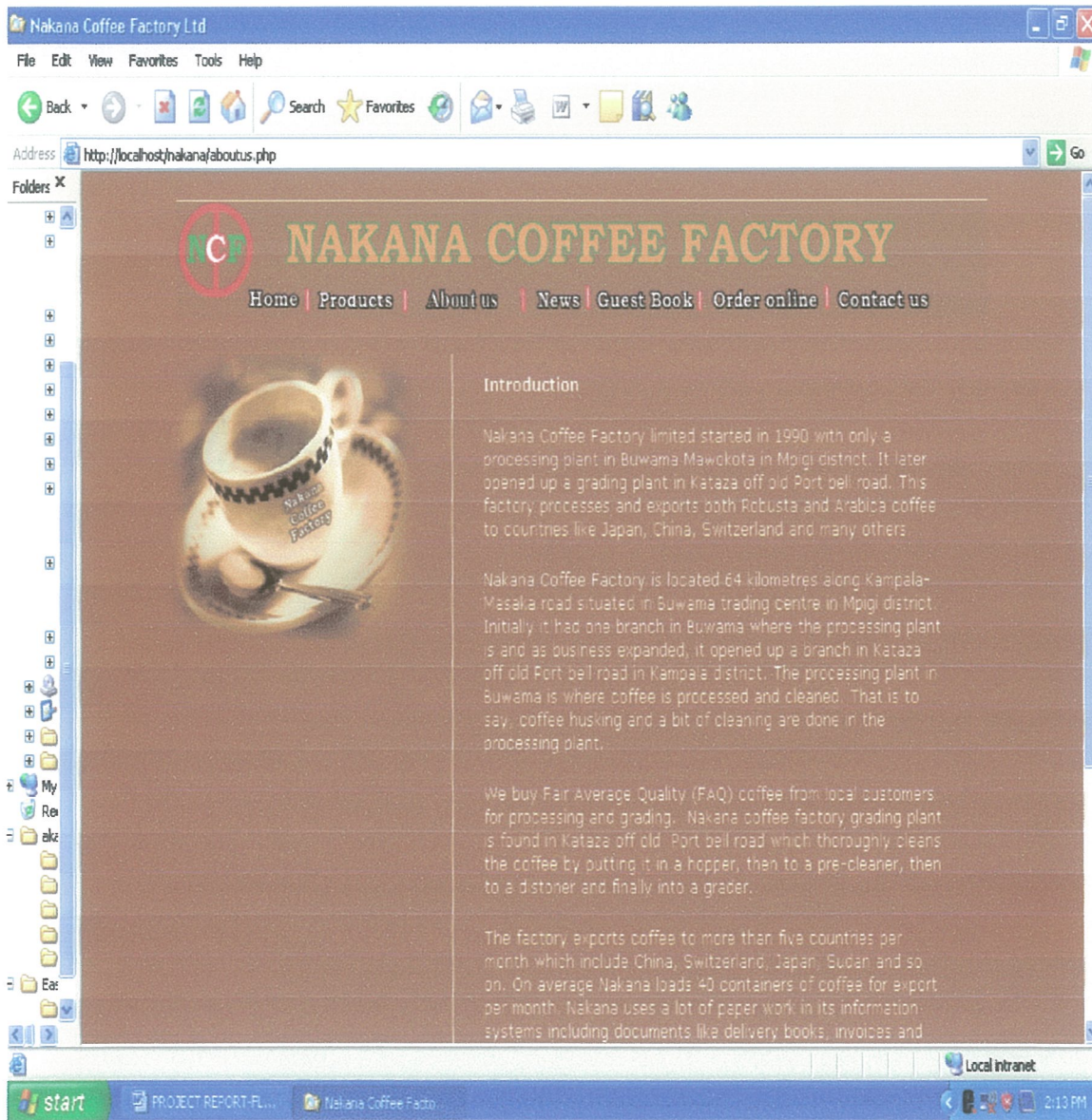
The screenshot shows the creation of MySQL and Php News form database

Figure 4.11 A screenshot of the MySQL database creation for Online Orders form is below



the above screenshot shows the database creation of order online form using MySQL and Php my admin.

Figure 4.3 A screen shot Nakana Coffee Factory background/introduction (About us)



The screenshot above shows the Nakana coffee factory introduction details web page that describes the background and how work is carried on there.

Figure 4.4 A screenshot of Nakana Coffee Factory online contact form

The screenshot shows a web browser window titled "Nakana Coffee Factory Ltd - Microsoft Internet Explorer". The address bar displays "http://127.0.0.1/nakana/contact.php". The website has a brown background. At the top, there is a logo with a red 'C' in a circle and the text "NAKANA COFFEE FACTORY". Below the logo is a navigation menu with links: Home, Products, Speciality, News, Guest Book, Order online, and Contact us. On the left side, there is an image of a coffee cup and saucer with the text "Daily Coffee Prices" below it. The main content area is titled "OUR ONLINE CONTACT FORM". It contains the following fields: Name, Last Name, Phone, Country, Email, Website, and a large text area for Message. Below the Message field are "Submit" and "Reset" buttons. At the bottom, there is a section titled "CONTACT INFORMATION:" with the text "NAKANA COFFEE FACTORY" and "P. O. BOX 33043, MPIS: UGANDA". The Windows taskbar at the bottom shows the start button, several open applications, and the system clock displaying "10:03 PM".

NAKANA COFFEE FACTORY

Home | Products | Speciality | News | Guest Book | Order online | Contact us

Daily Coffee Prices

OUR ONLINE CONTACT FORM

Name:

Last Name:

Phone:

Country:

Email:

Website:

Message:

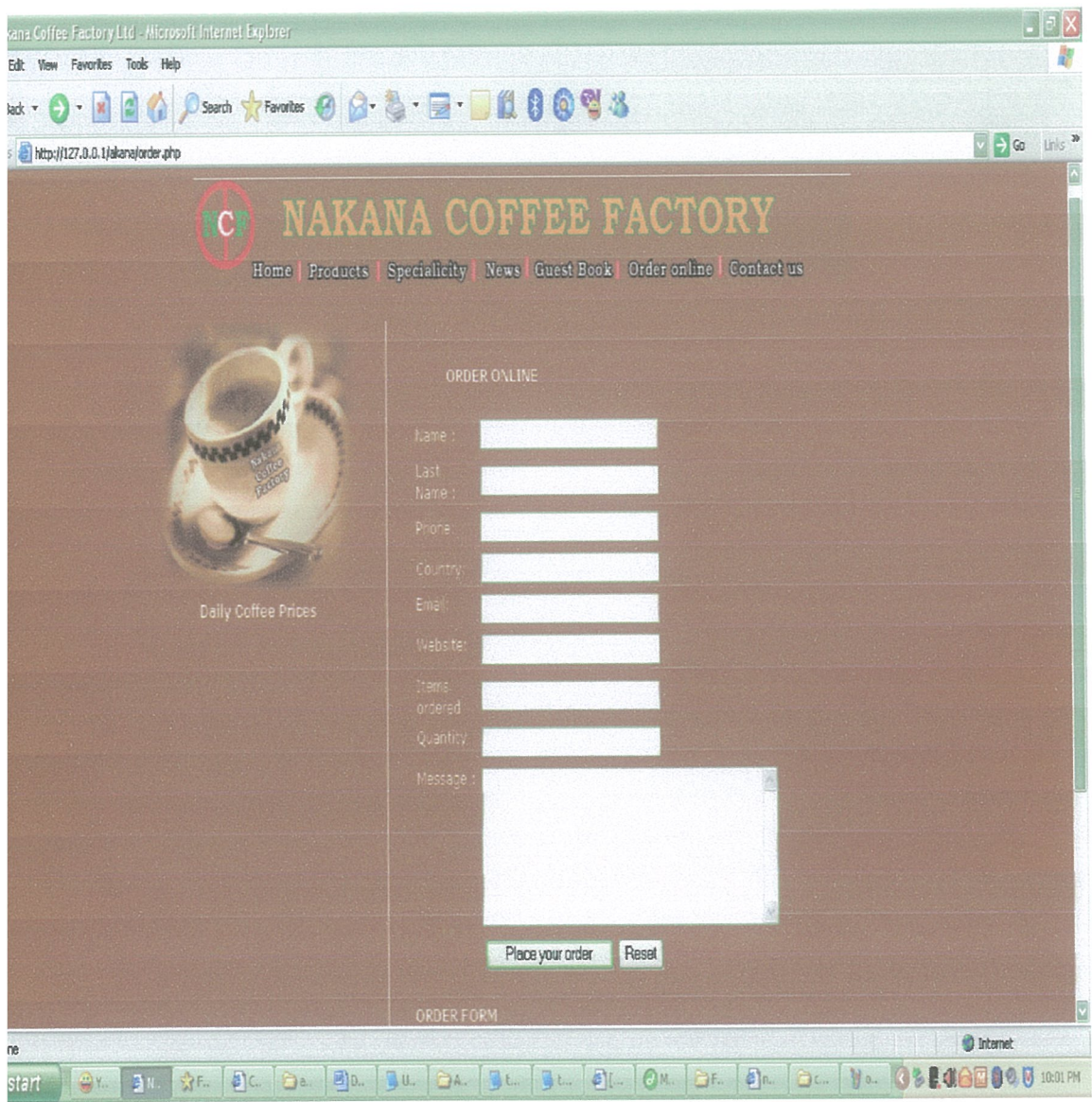
Submit Reset

CONTACT INFORMATION:

NAKANA COFFEE FACTORY
P. O. BOX 33043, MPIS: UGANDA

The screenshot above shows the online contact form where clients fill in their details to be contacted in case of any inquiry or response to whatever message they'll have left in the message box on the form.

Figure 4.5 A screenshot of Nakana Coffee Factory online order form



ie screenshot shows an online order form where clients fill in and place orders awaiting
sponse.

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