

# **INTEGRATED ONLINE DELTA BEVERAGS ACQUISITION SYSTEM**



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**R111090E**

**Title**

**Integrated Online Delta Beverages Acquisition System**

**By**

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## **ABSTRACT**

The purpose of the project entitled “Integrated Online Delta Beverages Acquisition system” was to help Delta Beverages in offering its clients an outstanding service and also paying attention to the health of the business and that of the clients. The system was also meant to offer unswerving, faster and efficient means to assist Delta clients in getting better assistance than what the current system has been offering. Henceforth, the system provided a booking facility such that the client just has to log into Delta account and order for the products he or she wishes to purchase without physically attending to the organization’s premises. A feasibility study was performed to check whether the new system was feasible in all aspects (that is socially, economically, technically and operationally) to undertake. The researcher used different research methodologies that are interviews, questionnaires, observations and decision groups to confirm the operations of the old system and check the need of a new system. The findings indicated the need to develop a new system thus, the developer went on to develop the system which have been implemented. The documentation thus involved the proposal, planning, analysis, system design and system implementation phases.

## DECLARATION

I declare that “**Integrated Online Delta Beverages Acquisition System**” is my own work and it has not been submitted before for any degree or examination in any other university. I declare that all sources I have used are quoted and have been indicated and acknowledged as complete references. I authorize Midlands State University to lend this dissertation to other institutions or individuals for purposes of scholarly research only.

Tambirai Blessed Chimbwanda

October 2014

Signature ..... Date .....

## **APPROVAL**

The dissertation/thesis entitles “**Integrated Online Delta Beverages Acquisition System** “ by **Tambirai Blessed Chimbwanda** meets the regulations governing the award of the degree of Bachelor of Information Systems Honors Degree of Midlands State University, and is approved for its contribution to knowledge and literal presentation.

Supervisor ..... Date.....

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## **DEDICATION**

I dedicate this work to my parents Johnson and Margaret Chimbwanda, my sisters (Edah, Evangelista and Ester) and my best friend Prosper .T.Gumbeze for working tirelessly to afford me the foundation upon which my achievement is built. These people are special for they could give consistency and solid support without giving up. I say special thanks to you all and may the dear Lord bless you.

## **LIST OF ACRONYMS**

CCD	Customer Collection Depot
CD	Compact Disk
DA	Database Administrator
DB	Database
DBMS	Database Management System
DFD	Data Flow Diagram
DPD	Defect profile Document
ERD	Entity Relationship Diagram
HTML	Hyper Text Markup Language
ID	Identity number
IODBAS	Integrated Online Delta Beverages Acquisition System
ISP	Internet Service Provider
IT	Information Technology
LAN	Local Area Network
MB	Megabytes
NPV	Net Present Value
RSD	Requirements Specifications Document
SDLC	Software Development Life Cycle
SRS	Software Requirements Specifications
WAN	Wide Area Network

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# CHAPTER 1: INTRODUCTION

## 1.1 Introduction

**Integrated Online Delta Beverages Acquisition System** is a system that is mainly focused on instigating and designing an informational business system that is going to support Delta Beverages CCD (Customer Collection Depot) in serving their customers during their process of procuring their desired products. Delta Beverages Customer Collection (CCD) Depot is where customers procure their products (that is fizzy drinks like fanta, coca cola, super maheu and bottled mineral water among others). The term ‘**integrated**’ means that this system is going to involve the merging of all the stages that the customer undertakes to acquire the required product that is from the booking stage, the payment facilities and also the delivery stage as well as the work that the sales clerk undertakes in serving the clients. This system is going to assist Delta Beverages to manage and meet all the customers’ purchase requirements by allowing them to order for the products they want to obtain. In addition, the system is going to show all the transactions made by the client to the organization concerning the products procured. The utmost thrilling part of the system is that it is going to allow clients to book for the delivery vehicle and it will reflect all the vehicles that are available for the sales clerk to be able to allocate vehicles to their destinations.

## 1.2 Background

This section explains the history of Delta Beverages that is its origin (where it came from) and where it stands at this current moment. It also involves the activities that it undertakes.

### 1.2.1 Organization’s background

Delta Beverages is a Zimbabwe-based corporation mainly involved in the production, manufacture and trading of beverages (<http://www.delta.co.zw> Accessed 4 August 2014). Delta Beverages has got four major activities that are:

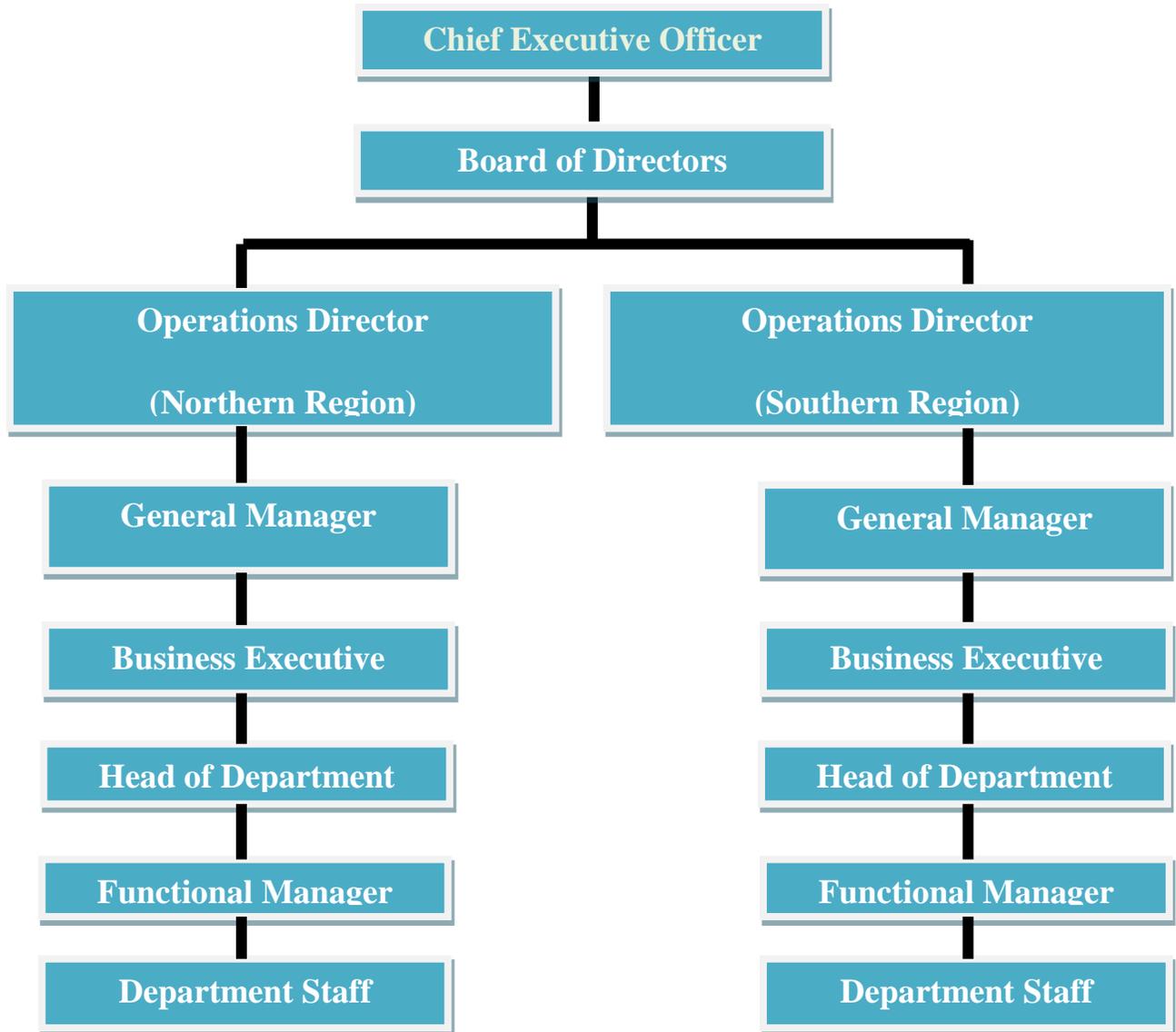
- Castle Lager (beer) business - which elaborates and engages in brewing, fermenting and distilling lager beers.
- Traditional (beer) business- which engages in brewing sorghum and also producing maheu.
- Delta Sparkling beverages business- which is involved in the production and bottling of soft drinks (that includes fizzy drinks like Fanta and Coca-Cola).
- Transport services and distribution business- it includes the distribution of Delta products to different locations as well as the maintenance of all delivery trucks

Delta Beverages is a holding organization that mainly focuses on lager beer, traditional beer, mineral water, transport servicing and soft drink manufacturing in Zimbabwe. Louis Susman, Thomas Meikles and Adolph Rosenthal were the first individuals to establish Delta Beverages in 1898. This group came into existence after a competition that was undertaken with South African Breweries (SAB) in 1952. The organization is one of the top listed companies on the Zimbabwe Stock Exchange (ZSE) of which it was first listed in 1946. Delta Beverages has now expanded to incorporate many beverages activities that is it now involves the bottling of carbonated and non-carbonated soft drinks, retailing of furniture and supermarket, traditional and sorghum beer brewing, lager beer, various agro-industrial operations and tourism.

The organization is still continuing expanding its business portfolio and producing diversified products that includes mineral water, beer and carbonated drinks. Moreover, Delta Beverages has been developing into major profitable and industrial company through diversifying its brewing base and expansion of its portfolio. Africa Sun, Pelhams and OK used to be a merger with Delta Beverages, but after their de-merger Delta Beverages is now an active, effective and real successful company with associated businesses. Also since then the organization is embarking on different processes of un-bundling or getting rid of non-core day-to-day operations to maintain only the beverage operations. Such a move has left the group without any hotel and retail businesses and it was viewed as a constructive improvement as it has given the organization a chance to put more focus on its most important businesses and this has allowed Delta to concentrate much on their clients and thus winning the market share in the country. Delta has got a branch that specialises with its customers only called Customer Collection Depot (CCD) that is where the new system will be implemented. Delta Beverages CCD involves different

departments that are the transport services department, the selling and distribution department, the stock management department and also the cash and sales department.

### 1.2.2 Organizational structure



*Figure 1.1: Organizational structure*

### 1.2.3 Vision of the organization

According to Hill et al (2008) a vision is the capability to consider and plan the future with imagination and wisdom, bringing out together the major important goals of a company. Delta Beverages pursues to remain an incorporated full beverage business governing and dominating many different areas and parts of the country and also internationally.

- To build a vibrant team that is stimulated, enthused and motivated at the same time that pursues after success.
- To make transport services a best delivery class that will be preferred by the clients and viewed as the best.
- Aims to contribute completely and positively to the society and the environment by removing all dangerous and harmful practices in all the operations performed.

#### **1.2.4 Mission statement of organization**

Chowdory (2008) stated that a mission statement is a printed declaration with agreements of an organization's core resolution and emphasis that normally remains genuine over time. They went on to state that properly crafted mission statements serve as sifters to distinct what is essential to the organization from what is not, clearly stating which markets to target and serve thus enlightening a sense of intended direction to the entire organization.

Hence, Delta Beverages mission statement is:

**“To continue increasing the business value in actual terms on a maintainable foundation.”**

To achieve this through offering customers outstanding service and through rigorous attention to the health of the business at all times. Thus seeking to enhance the value created for all stakeholders (<http://www.delta.co.zw> Accessed 4 August 2014).

#### **1.3 Problem definition**

According to Chowdory (2008), a problem definition is a matter or situation that is unwelcome as well as harmful that has risen in the organization that needs to be dealt with and overcome. Thus, Delta Beverages' clients are complaining due to inconveniences (longer queues and delays in being served) brought by the physical attention to the company premises (Delta Beverages' CCD). At the present state there is no system in place that helps Delta clients to acquire faster and consistent courtesy since they wait in queue for a long time before they are served, they have to wait for a longer time to order for their desired products, no delivery facility provided and also it takes time for their goods to be verified by the security, leading to cliental frustration.

Another problem is that at CCD there is no booking facility that can allow the clients to order for their products such that it can allow them to come and collect products at a later date. The process is too long for one to acquire a booking form because clients are supposed to physically

attend to the organizational premises and get an approved letter from the Sales and Distribution Manager who is based at another branch (Sparkling Beverages, Graniteside) resulting in transport costs. After the form has been approved the customer will be given some days to allow the form to be handed over to the sales clerk resulting in long customer service turnaround time.

Because of long queues, the cases of theft are increasing since customers will be moving around with their cash. This results in more complaints from the clients since they are not comfortable moving with their cash around to buy their products. Likewise, the clients are not able to view some of their previous transactions they would have made before with the organization in order for them to know where they stand with the organization.

**Just to summarize the problems being encountered:**

- There is no system that allows clients to order for their products in advance hence they have to wait long queues than expected.
- There is no proper system that allows clients to check their transactions they would have made. Also the current system does not offer a credit limit facility to the clients.
- Furthermore, there is no facility that provides delivery of customer's goods to their respective areas because there is no trace of the available trucks that can deliver client's products. The trucks available only deliver products for the big companies and not for individual clients.
- Lack of proper stock management such that the sales team is not be able to provide accurate information of the stock available at a given time (automated report generation). Ability to provide clients with accurate inventory information, it improves the clients' perception about the organization as well as clients' loyalty.
- Some cliental queries are not attended to because there is no system that is available to attend to their queries.

**1.4 Aim**

According to Nielsen (1999), an aim is a far-reaching statement of an organization's desires and outcomes and what it seeks to attain. Nielsen (1999) went on further to clarify that an aim emphasizes what is to be accomplished (not how it is to be accomplished).

Therefore, the aim of the system to be designed and implemented is to provide fast, efficient and reliable solutions that manage and meet the customers' needs by allowing them to order for the desired products they want to purchase.

To give clients the ability to view all the transactions they make with the organization every time they procure their products.

To track and reflect the trucks that will be available to deliver any products purchased by the clients. Thus the system is going to allow clients to order even for the delivery vehicle and it will reflect all the vehicles that are available and hence the sales clerk will be able to allocate vehicles to their destinations.

## **1.5 Objectives**

According to Chowdory (2008), objectives are specific results that a system and an organization seeks to achieve within a given time frame and with available resources. Objectives must be highly focused and realistic, address the more immediate project outcomes, make accurate use of concepts and also must be sensible and precisely described.

### **The following are the system's objectives:**

- The system should give allowance to those customers who want to order for the acquisition of drinks and it must respond to the inquiries of the customers as soon as the inquiries are received.
- The system should be able to reflect stock that is available in the system and also show the stock's prices.
- To show all trucks that are available for delivering clients' products whenever there is need for delivery.
- The system should be able to assist and display responses to all cliental queries.
- To allow the clients to trace (track) all the transactions made in procuring the products and update payments made by the client.
- To display and track client's batch sales after procuring the products from order to delivery.

## **1.6 Tools**

Microsoft Windows 7, MySQL, HTML-PHP and also Microsoft Office Visio for the diagrams are the development tools that were used in this project.

Microsoft Windows 7 is compatible that is its flexibility allows users to be capable of tracking almost any software that is Windows compatible, McNaughton.D, (2000), and it is the development platform that was used for the system.

MySQL (in the back-end) and HTML-PHP (in the front-end) were used for creating dynamic webpages that were to interact with the user offering customized information and also it is fast, higher degree of stability, high level of security, easy to use and open source (free), Hughes K. et al. (2005).

Microsoft Visio was used for diagrams because of its complete flexibility of getting productive work quickly using standard templates, Chowdory (2008). These tools were very much easy to use and were powerful tools for writing interactive and dynamic web programs that do almost everything.

## **1.7 Justification and rationale of the study**

Delta Beverages CCD's present system is not automated hence the benefit of carrying on with the system is that minimal additional costs are going to be incurred as there is minimal material that will be purchased.

Additionally, because of the lack of automation, it takes time to produce reports that the management need in order to make decisions that is if the sales assistant needs to know about the clients' inquiry's status they have to manually check the queue and also manually check the suggestion box for the clients so as to identify cliental queries which have been attended to and those still to be given attention, which is time consuming. Hence the system will be able to cater for that.

The proposed system is beneficial to the clients' side since they will be able to procure and order for their products easily without physically attending to the organization's premises. It will be

also beneficial to the organization since there will be less complaints from the clients because of inconveniences they will be facing when they physically attend to the organizational premises.

Though this might seem to be costly, it is a good investment and is also cheaper in the long run since the internal IT staff will be developing and maintaining the equipment, thus lower maintenance charges and also security of the organization's information. Therefore, if there is need for improvements or upgrades, this can be easily done through the addition of the required functionalities internally. It is also of great advantage as there are limited costs of outsourcing or hiring additional IT resources. Developing a new system entails the utilization of the internal IT resources expertise thus no much costs since the resources are already on the company's payroll.

## **1.8 Conclusion**

Therefore, there is need to have a computer-based automated system that will enhance an easy process of procuring Delta products by the clients, allowing the clients to order for the acquisition of drinks wherever they are, indicate the delivery trucks that will be available as well as identify stock that is available for the clients. Finally, the management needs an efficient and effective tool to make certain strategic and operational decisions that will enable the organization to gain a competitive advantage since many competitors are now rising from within the country. This will help in offering better services to Delta stakeholders as well as improve its relations with its clients.

## **CHAPTER 2: PLANNING PHASE**

### **2.1 Introduction**

The planning phase will be explaining the reasons why the system needs to be implemented, the time span the project is going to take, the risks that are going to be realized as well as the feasibility study in relation to the development of the project. This phase will take into consideration the business value of the new system that is going to be implemented, check the profitability of the system to the organization and also the benefits or returns it will offer to the organization if it is implemented. Moreover, in this chapter more detailed information about the viability of the system basing with the current resources that are available in the organization as well as the time available to undertake the project will be taken into account. Additionally, the returns of the system to the organization will be reflected in this phase.

### **2.2 Justification of the system**

Delta Beverages company as a well-known multi beverage business that governs the beer and the sparkling beverages, needs to continue to be an integrated total beverage business dominating all sectors of the cold beverage market in Zimbabwe. Thus, for it to achieve this it has to offer its clients an outstanding service and also give rigorous attention to the health of the business and that of the clients. Thus, the proposed system is meant to offer unswerving, faster and efficient means that will assist its clients in getting better assistance than what the current system is offering. There are many complaints being brought about by the clients because of the inconveniences they are facing at Delta Beverages Customer Collection Depot that is some clients wait for long hours before they get assistance since the sales clerk will be busy attending to other clients. Henceforth, the system will provide a booking facility such that the client can just log into his or her account and order for the products he or she wishes to purchase without physically attending to the organization's premises.

At the same time the proposed system is going to allow the clients to view all their transactions they would have made with the organization such that they will not need to go and see the accounts department to view their statements and where they stand with the organization. Therefore, the system will show all transactions the clients made to the organization and the most

exciting part of it is that the client will not need to visit the organization's premises but can just log into his or her account wherever he or she is as long as there will be internet access.

Furthermore, this system is going to allocate trucks to the clients that will deliver the products to the clients' destinations and also reflect the available products in stock. Thus, it helps in the managing and controlling of stock since the sales clerks will be able to identify which products need to be added in stock so that the organization will not run out of stock. At the same time they will be able to know the available trucks that will deliver clients' products.

Additionally, the proposed system will show all bookings made and those still owing attention such that the clients will not have to wait longer for the sales clerk to confirm the bookings made. Hence, in this case the cliental inquiries are attended to on time and faster.

Moreover, the current system lacks automation and as a result the sales clerks have to spend more time to produce reports that will be needed by the management. That is if the sales assistant needs to know about the clients' inquiries status they have to manually check the queue and also manually check the suggestion box so as to identify cliental queries which have been attended to and those still to be given attention, which is time consuming. Hence the system will be able to cater for that.

### **2.3 Identification of business value**

Business value is the term that describes all forms of assessment that regulate the well-being, comfort and welfare of all the stakeholders of the organization as well as the activities being undertaken in the organization in the long run, (McNaughton.D, 2000). The new computerized system that is going to be developed shall provide real convenience in supporting and assisting the employees (for instance sales clerks and management), the organization (Delta Beverages) as well as the organization's clients.

The main strategic areas of benefit are:

#### **Organizational value**

According to McNaughton. D (2000), organizational value is what the organization believes in that will indicate the type of behavior that is essential to the employees when they are acting on

their operations of the organization and also, what the clients expect to get from the organization without any difficulties or complications.

Delta Beverages will be able to bring back most of their clients that is those clients they lost due to inconveniences caused by the physical attention to the company since some were offended because of long queues and they might have shifted to other products offered by the organization's competitors. Likewise, the organization will save time since they will serve their clients online and not manually.

### **Operational value**

Chowdory (2008) stated that operational value is the guidance, improvements and evaluations that makes an organization operate in more strategic and exciting part that will lessen burden on the employees and clients. With the new system, the client will take less time to carry out the whole process of procuring his or her desired products since there will be less inconvenience caused and also the client will be able to purchase the desired products wherever he or she may be located. The sales clerks will also be able to serve the clients automatically and reports will be produced easily.

### **Managerial value**

Managerial value is what the organization considers to be of more help and relevance to the management of the organization, (McNaughton. D 2000). This new system will assist the management to offer the best and valuable services to the organization's clients as well as the internal and external stakeholders of the company. Likewise, there will be an increase in market share and brand recognition as Delta Beverages will continually be viewed as a technological reputable organization that improves its image through good relations with clients (especially in the case of online booking that is going to be provided by the new system).

### **Security value**

Security is very vital and of greater importance and especially in big organizations like Delta Beverages they need to make sure that their information is secured because they have many competitors. There is going to be confidentiality of the clients' inquiry status as well as transaction status. Likewise, the organization will secure all the cliental information better

compared to the current system. Moreover, the organizational information will be accessed automatically hence ease of access.

### **Employees' value**

One of the most important resources in the organization is the human resource, hence for an organization to continue to be successful it needs to value the work of the employees and make sure that they have increased morale. Thus the proposed system will reduce all the workload done by the employees for example there will be no longer any need for the sales clerks to manually serve the clients and compile all their queries since the system will cater for that. This will actually increase the morale of the employees' and also there will be time to carry out other important business activities.

## **2.4 Feasibility Study**

Chowdory (2008) stated that feasibility study is an investigation of the capability to complete a defined project scheme magnificently, effectively and successfully considering the technical, economic, social, organizational and operational factors. He went on further to state that this study will be intending to address the question: 'Is it practical, viable or worthwhile to continue with the project and also does the organization has the anticipated resources including time to carry out the project?' Therefore, feasibility study gave Delta Beverages a hint in determining whether or not they must proceed with the project. In a case were the benefits are greater than the costs the system will be considered as feasible, (Kendal 2005). This study (feasibility study) involves the operational feasibility, social feasibility, technical feasibility and the economic feasibility and these will be explained as follows:

### **2.4.1 Technical feasibility**

Chowdory (2008) indicated that technical feasibility is scrutinizing the convenience, availability and the competence of the company to acquire the required hardware resources, software resources and the human technical know-how on a certain project. It has been noted that Delta Beverages already has most of the relevant hardware and software resources that are of great importance in this system though there is need for some additional equipment. The better part of it is that some of the software needed to carry out the project such as the Mozilla Firefox internet browser and VMware VSphere Client are open source and thus no costs were incurred on these

software. Below is a table that shows the list of technical items, hardware and software required to develop the system:

### **Hardware and software required**

<b>Quantity</b>	<b>Item</b>
5	Computers (client) (HP Pro 3400 Series MT)
1	Internet Explorer, Mozilla Firefox (browser)
2	Wamp Server, EsXi Installer (software packages)
2	Patch Panel- 16 Port (Networking material)
4	25m Unshielded Twisted Pair cable Category (UTP CAT), 30 Fly Leads patch RJ 45- codes
2	Dell PowerEdge R610 - Database server

*Table 2.1 Hardware and software requirements*

### Application Server (Dell PowerEdge R610) and Database specification

	Minimum	Recommended
Memory	620 MB	4GB
Processor	2.5GHz	450MHz , Pentium II class
Cache Processor	248KB	612 KB
Network Card 3com	20/100	20/100
DVD/CD r/w Drive	50x Read,14x Write	56xRead, 48x Write
Hard Disk Drive	200GB	400GB

*Table 2.2: Application server and database specifications*

### Client Computer (HP Pro 3400Series MT) Specifications

Item	Minimum	Recommended
Hard Disk Drive	100 GB	1400 GB
Network Cards	20/100	20/100
Processor	2.19GHz	1,5GHz Intel P4
Memory	512MB	4GB

*Table 2.3: Client Computer Specifications*

#### 2.4.2 Economic feasibility

According to Hughes K. et al. (2005), economic feasibility is the study of comparing the anticipated costs and the benefits to be incurred with the available budget set for the new project. For a system to be considered economically feasible (viable), the allocated budget for the system

should outweigh the costs that are going to be incurred. The costs that were incurred during the project implementation included the software costs, hardware costs, implementation costs as well as development costs. The method that was used to determine the costs and benefits incurred during project development and implementation was Cost and Benefit Analysis. Therefore, the benefits outweighed the costs incurred and then it was considered as economically feasible and it was worthwhile to carry on with the implementation.

Kendal (2005) stated that economic feasibility study also involves intangible benefits and tangible benefits. The costs have been categorized into two that is developmental costs (costs incurred during the development of the system) and operational costs (costs that are to be incurred during the operation of the system such as maintenance of the system).

### **Developmental costs**

<b>Description</b>	<b>Amount (USD)</b>
Windows server	400
DELL Power Edge R610	9 400
Patch Panel- 24Port	5 000
20m UTP CAT 35 Fly Leads patch RJ 45- codes	40
Wamp Server ,ESXi Installer, VMware viclient,	9 000
Total	<b><u>24 390</u></b>

***Table 2.4: The development costs of the project***

According to Chowdory (2008), operational costs are continual costs incurred after every expense has been accounted for. These are costs that continue to be incurred when the system is now in operation.

## Operational costs

Description	Amount (USD)
User training	11 500
System maintenance per year	7 000
Stationary and other computer consumables	3 600
Total	<b><u>22 100</u></b>

*Table 2.5: Operational costs*

## Tangible benefits

According to Mingers (2001), tangible benefits are benefits that can be directly and easily quantified in monetary terms such as increase in productivity, low operating cost among other costs. The following are the tangible benefits that will be brought by the project:

## Tangible benefits

Description	Amount (USD)
Reduced paperwork costs	8 500
Labour Cost Reduction	15 000
Increased Clientele base	15 500
Improved staff productivity	150 000
Total	<b><u>189 000</u></b>

*Table 2.6: Tangible benefits*

## Intangible benefits

Mingers (2001) cited that intangible benefits are benefits that cannot be easily measured in monetary value for example improved organizational planning and increased employee morale in a formal way. The following are the intangible benefits that were realized:

- Brand (Delta Beverages) acknowledgement.
- An improvement in employees' self-esteem.
- Brand (Delta Beverages) acknowledgement.
- Improvement in the management of time.
- Improved work presentation, performance, efficiency and productivity in business activities.

### Cost and Benefit Analysis

In Cost and Benefit analysis, comparison was made between the costs that were going to be incurred and the benefits realized, thus for the project to be considered feasible the benefits have to be greater than the costs, Lucey (2002).

#### Cost benefit analysis

Costs and Benefits	Estimated Value (USD)	Total (USD)
Tangible Benefits	189 000	
Intangible benefits	15 000	
Total benefits		<b>204 000</b>
Development costs	24 390	
Operational costs	22 100	
Total costs		<b>(46 490)</b>
Net Benefits		<b><u>157 510</u></b>

*Table 2.7: Cost benefit analysis*

## **Capital Investment Analysis**

Payback period, Return On Investment as well as Net Present Value are the major capital budgeting appraisal techniques that were used.

### **Net Present Value**

Mingers M.A. (2001) cited that the NPV (net present value) is the difference between the present-day value of the cash inflows as it will be in future and the initial present-day investment values. This is an ideal method for determining on whether to continue with the project or to stop immediately since it will be considering the future values that will be realized after undertaking the project.

### **Advantages**

NPV includes and explains the time value for money meaning that the organization will be able to know the future values that will be enjoyed after the project has been implemented and it articulates those future values into the present or current value.

It tells whether the investment will increase the firm's value - With NPV it is possible to vary the discount rates to reflect the changing investment possibilities of a capital investment over its life, thus more preferred over the IRR, (Northcott 2006). As a result, the NPV is consistent with the shareholder wealth maximisation as added NPV are represented in higher stock prices.

NPV also considers the risk of future cash flows (through the cost of capital) – NPV indicates whether the proposed investment will yield the investor's required rate of return.

### **Disadvantage**

It is too complex and difficult to compute, and it also expressed in terms of dollars rather than as a percentage - The most problematic input in NPV is the determination of an appropriate risk adjusted discount rate, of which the choice of the discount rate crucial to the outcome of the NPV analysis, <http://www.efinancemanagement.com> , accessed 15 August 2014. On the same note, many people find it difficult to work with a dollar return rather than a percentage return.

**Formula:**

$$NPV = [(Total\ Benefits\ for\ the\ year) / (1+r)^n]$$

Where: r = discount factor                      n= number of years

In this case a rate of 10% was used as a discounting factor. 10% rate was recommended because it is an average rate and if a rate higher than 10% was used it would have resulted in unrealistic values that would make it more difficult to compare the productivity of the project.

**Net present value**

Year	Cash Flow	Discount Factor 10%	Present Value (USD)
0	(46 490)	1	(46 490)
1	175500	0.909	159530
2	182000	0.826	150332
3	193200	0.684	132149
Net Present Value			<b><u>395 521</u></b>

*Table 2.8: Net present value*

**Comment**

A positive NPV of \$395 521 indicated that the project development was economically feasible to undertake and it was worthwhile since it contributed much to the wealth of the organization and its shareholders.

## **Payback Period**

According to Mingers M.A. (2001), payback period is the period at which a certain project takes to repay the initial capital that would have been initially invested to start the project. Usually it is expressed in years. It can also be thought of as the time, it takes for the cash income from a capital investment project to equal the initial cost of the investment. Normally, when investment analysts or the systems analysts are making a choice between two or more projects, they accept the one that provides the shortest time to recoup the initial investment.

## **Advantages**

It is not difficult to compute compared to Net Present Value. The payback period is the simplest method to calculate in the capital project investment concepts as it only requires the division of the cash flows with the initial outlay invested in a project.

Provides some information on the risk of the investment –payback period can be a measure of risks that are inherent in a project investment. The cash flows that occur later in a project's life are considered to be more uncertain thus the payback period provides an indication of the cash flows certainty of the project.

Provides a crude measure of Liquidity – payback period provides a good ranking of projects that would return money early, which is ideal for companies that are facing liquidity problems. Surveys have suggested that some businesses use payback as their primary decision mechanism, although it is uncommon for firms to make investment decision solely based on the payback.

## **Disadvantages**

Payback period does not consider the time value-value for money like NPV.

Payback period ignores cash flows beyond the payback period – The use of the payback period by capital investment analysts as a decision making tool penalizes projects with inherently long lives and promotes those investments or projects which produce rapid high returns even though such returns may be modest and short-lived. Some projects may produce low returns in the short

run but in the long run they will reap enormous returns yet the payback period calculation would have not taken them into account.

### **Payback period**

<b>Year</b>	<b>Cash Flow (USD)</b>	<b>Balance (USD)</b>
0	(46 490)	(46 490)
1	175 500	129 010

*Table 2.8: Payback period*

Therefore  $\frac{129\,010}{175\,500} \times 12$  months

175 500

= 0.8 years /8 months

### **Comment**

As illustrated by the table above (Table 2.9) the initial capital invested in the project was going to be paid back in eight (8) months which was a fair period. Therefore this meant that the project to be undertaken was considered as feasible and it was worthwhile to continue with it. Delta Beverages only considers projects that have a payback period of one and half years (1 year 30 months), thus this in case meant that the project was automatically accepted by Delta Beverages.

### **Return on Investments (ROI)**

Return on Investments expresses the net benefits compared with the total costs to be realized as a percentage.

$$\begin{aligned}
\text{Returns on Investments (ROI)} &= \frac{\text{Net Benefits} \times 100}{\text{Total costs}} \\
&= \frac{157\,510 \times 100}{46\,490} \\
&= \underline{338.8\%}
\end{aligned}$$

The project was considered as economically feasible because there was a favorable Return on Investment that is 338.8%.

ROI is not so difficult to calculate, but however it does not reflect and show the time value of money like NPV and also it does not show the payback period for the investment like payback period.

Delta Beverages recommends payback period analysis because they consider the time that a project takes to recoup or pay back the initial capital that has been invested to carry out the project since all they want is to enjoy the benefits brought by the project earlier. In addition because payback period does not take time to calculate.

However, I recommend Net Present Value because it takes into consideration the time value of money such that an organization will be able to tell its future returns after undertaking the project. In addition since the goal of Delta is to make best use of the wealth of the investors on investment, this method will be quite relevant to use.

Furthermore, I recommend Net Present Value because it tells whether the investment will increase the firm's value and also it is possible to vary the discount rates to reflect the changing investment possibilities of a capital investment over its life, (Northcott 2006).

### **2.4.3 Social feasibility**

According to Chowdory (2005), social feasibility is determining whether the system to be developed will be acceptable to the society or community that surrounds the organization. This study reveals whether the new system is accepted by the individual who will be using it. The system was considered as socially feasible because it did not pose any threat to the society but rather it induced a clear environment which was good for the societal health. It also eliminated all the paper work that used to be done and ended up being littered around because everything was being done automatically.

Furthermore, the system was also considered as socially feasible because of positive externalities recognized since there was going to be less inconveniences caused by the physical attention to the company's premises by the clients. This is so because it is an online system that allows everyone to use it at any time and any place as long as there is internet access.

The new system was considered feasible because no one was going to lose his or her job but rather they were to be trained and resulting in lessening the burden of carrying out their jobs manually.

### **2.4.4 Operational Feasibility**

According to Mingers M.A. (2001), operational feasibility is proving whether the system is going to function and operate as intended and requested by the user at the same time studying the impact it has on the users of the system. Integrated Online Delta Beverages Acquisition system is meant to eliminate any human effort that is currently running the manual way. Instead the system had to lessen the sales clerks' burden of doing everything manually thus, leaving them with more time to carry out other business activities

Integrated Online Delta Beverages Acquisition System is a user \_friendly system because it shows a simplified User Interface and it is not difficult to understand and to operate with. Hence, the users of the system were much convinced that the system is operational feasible since it operated the way they intended it to do and less training was carried out.

Moreover, the system is also operational feasible because the extraction of the management reports will not take too long to be extracted since the system extracts the reports automatically.

Also access to all cliental information (for example transactions made by the clients) was made much easier than what they were doing with the current system.

## **2.5 Risks Analysis**

According to Mingers M.A. (2001), risk analysis is a practice that is used to ascertain and identify features and factors that may endanger the accomplishment of a project. Consideration has been made on all possible risks and obstructions that might transpire throughout the development of the new system, the likelihood actions that can avoid the occurrence of these risks as well as finding out correct measures to deal with the risks if they transpire. There are different types of risks that might occur and these are explained below:

### **2.5.1 Technical risks**

Kendal cited that technical risks are risks that are interrelated with the technical knowledge of the users and the system developer. This means that there are some cases when the user is not able to use the system or does not have more knowledge about the system especially the first time when the system has been introduced.

On the other hand the system developer might fail to authenticate, verify and even validate the system because he or she might not be well informed about how the system operate the first time it is to be implemented in the organization.

The best measure that was used in solving the technical risk was to allow a thorough training for all the users of the system, hence by so doing it boosted up their confidence in working on with the system. Whereas, on the system developer's side there were some consultants that were authorized to assist her whenever there was a need.

### **2.5.2 Time constraint risk**

Time is a very important resource and according to Mingers M.A. (2001). Time constraint risk is when the system developer is not able to deliver the system at an agreed finishing time because of some complex demands experienced with the system.

The best measure that was used in solving this risk was flexing the developer's time such that she was able to work on the challenges that arose during the implementation of the new system.

### 2.5.3 Other risks

The system requires electricity for it to function properly and effectively, but however with the current economic situation power cuts were also a limiting factor during the development of the system because desktops and printers were used during the implementation of the new system .

**A counter measure** - the organization was able to acquire auto switch generators and Uninterruptable Power Supply (UPS) which made it easier to secure any unsaved information and it reduced data loss by the time the power was transferred from ZESA electricity to auto switched generators.

### 2.6 Development of work plan

Since the project was considered feasible and has been proved to be a profitable one in future, it was advisable now to prepare a Development of work plan that was going to show the tasks, start date, end dates and the duration of all the tasks that were to be carried out. The following is a work plan that was prepared for the project Integrated Online Delta Beverages Acquisition system.

<b>Task</b>	<b>Start date</b>	<b>End date</b>	<b>Duration (weeks )</b>
Documentation	24-07-14	16-10-14	12
Project Proposal	24-07-14	30-07-14	1
Planning and feasibility study	31-07-14	12-08-14	2
System Analysis phase	13-08-14	26-08-14	2
Design Phase	27-08-14	26-09-14	4
Implementation	27-09-14	09-10-14	2
Evaluation and Maintenance	10-10-14	16-01-14	1

***Table 2.9 Development of work plan***

The Gantt Chart illustrated the work plan in detail by showing the weeks on the vertical side and the phases or tasks of the project on the horizontal axis. The blue bars illustrated the length of each task that was to be carried out.

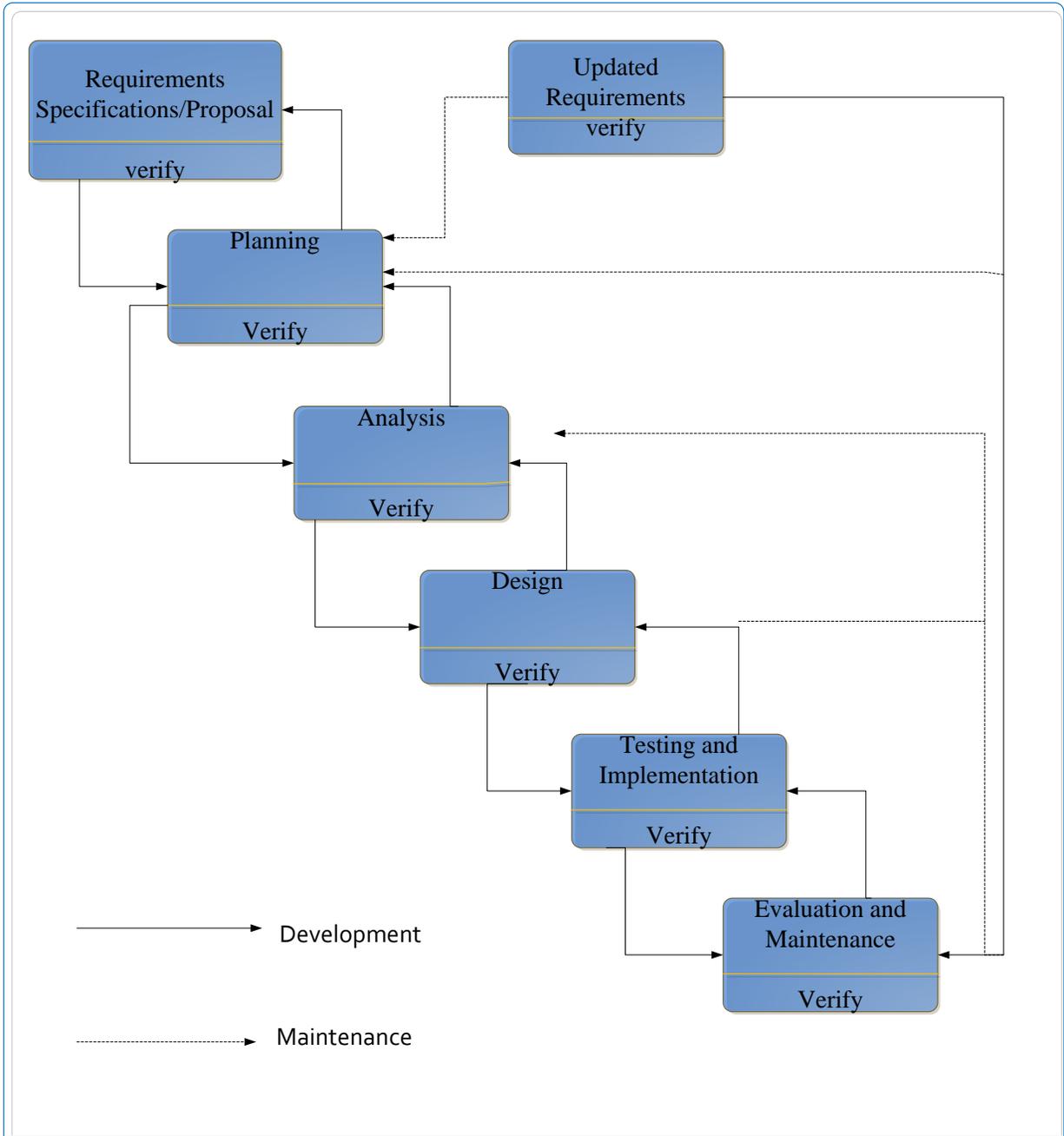
**Gantt Chart of the system**

WEEK/PHASE	1	2	3	4	5	6	7	8	9	10	11	12
Project Proposal	█											
Planning phase		█	█									
Analysis phase				█	█							
Design phase						█	█	█	█			
Implementation										█	█	
Maintenance												█
Documentation	█	█	█	█	█	█	█	█	█	█	█	█

*Fig 2.1 Gantt Chart*

**The waterfall model**

The waterfall model was then used to explain the stages that were to be followed during the implementation of the system that is it just helped in modelling the development of plan. It explained the stages involved in the documentation of the project that is form the planning phase up to the maintenance phase. It can be represented as follows:



**Fig 2:2 Waterfall Model**

The waterfall model has been recommended as the best model because it results in well-illustrated documentation. It clearly explains the stages of the system being developed such that it will be easy for one to understand the procedures that takes place during the development of the new system.

## **2.7 Conclusion**

Considering all the activities, planning and approvals that were carried out to check whether it was viable to continue with the project, the developer was now able to carry on with the project.

The following points explain why the system was to be carried out:

- Delta management and the users of the system (that is the sales clerks) agreed to the development of the new system.
- There were some risks methods and procedures that were designed to deal with risks (that is if they occur).
- After carrying out the capital investment appraisal analysis, it was proved that the project was feasible on all aspects.
- There was a successful scheduling and establishment of all the tasks.

Hence, after all the planning was done the analyst was able to carry on with the analysis of the current system and all other activities involved in the current system.

## CHAPTER 3: ANALYSIS PHASE

### 3.1 Introduction

According to Broady J.E and Hartley R.J (2003), a process of inspecting, altering, transforming, modeling and examining data with the aim of emphasizing valuable, appropriate and relevant information is known as system analysis. In systems development life cycle (SDLC) model, system analysis is one of the most relevant and important phase. This stage involved a thorough investigation with detailed information of the current system that was being used at Delta Beverages Customer Collection Depot which included the flow of information, control of the current system, methods of work and all the procedures undertaken. System analysis phase wholly examined all the information (that includes input and output) and all the activities and processes of the current system. Furthermore, different gathering methodologies were used that clearly stated the users of the current system, how the data was being managed, where it was being handled and what kind of data was being used in the current system. It also considered how the current processes were modelled (process modelling) in the current system.

### 3.2 Information gathering methodologies

Different kinds of methods have been used to examine and discover more required information about the current system that is being used at Delta Beverages Customer Collection Depot. The research methods below have been used by the researcher:

- a) **Interviews** – a method of obtaining information by asking questions from different individuals on the issue that is being investigated upon.
- b) **Questionnaires** – questions that are written down with different choice of answers that reveal the investigated matter.
- c) **Observations** – visual or optical study of an activity without asking any questions to gain information about what is happening.
- d) **Discussion groups** – a group of different individuals positioned together to discuss a certain issue or matter at hand.

### 3.2.1 Interviews

Presto (2001) cited that “an interview is a technique of finding detailed information by a way of asking face-to-face questions with the user of the system.” In this case the sales clerks, the management at Delta Beverages CCD as well as the clients of the organization were orally and face-to-face asked some questions by the analyst (that will be shown in Appendix B). The following steps were used by the analysts in conducting the interviews:

- **Selecting (choosing) the interviewees** – the individuals who were to going to participate in the interviews by answering the questions asked.
- **Designing and scheming the interview questions** – preparation of the interview questions that were going to be asked to different individuals who were going to use the system.
- **Conducting and steering the interview** – going ahead with the interview process.

The following strategies were used during the process of interviews:

- **Interviews for the clients** - Different clients were asked some questions by the analysts on what thy desired to see in the new system and they gave suggestions on what they always wished to see from the existing system.
- **Private interviews-** different stakeholders (sales clerks, management and a few clients) of Delta Beverages were asked questions on a one-on-one basis.
- **Group interviews-** a certain group of employees and Delta management were asked some questions. These interviews were carried out within the department of sales and distribution.

The interview took place at Delta Beverages Customer Collection Depot, Graniteside and it took only about three hours, from half past ten (in the morning) to around one o'clock after midday. The organization's boardroom was used by the management, the sales clerks were interviewed in their offices, others in the canteen, and some of the clients were interviewed within the company's premises and some outside the company's premises. The selected interviewees were asked some information about the current system and some of them were willing and able to answer the asked questions as well as providing the correct information that was required. However, some were not willing to provide the information required because they felt that they

might be trapped in some instances. Open-ended questions were used because the interviewer was aiming at getting as much relevant information as possible from different stakeholders.

Most of the group interviews took place in the organization's boardroom and group interviews for the clients were carried out outside the company's premises. Employees' group interviews were not that realistic because some employees were not free enough to offer and say out their views because they did not want to act as if they were betraying the organization by saying out the problems they really faced with current system and also they did not feel comfortable to say out their real views in the presence of the management.

The interviews were a success to some extent and they contributed much to the improvements of the current system. Though the process of undertaking interviews was not that easy to prepare and practice since many individuals were not that open enough to say out all their views in front of other work colleagues, the analyst managed to prepare the interview questions in such a way that would not leave the organization at a greater disadvantage and perceived as a failing business organization. Also the interview questions were prepared in such a way that would not end up offending other individuals who were going to participate in these interviews. The analyst also managed to create a conducive environment for the interviewees such that they will be able to answer all the questions freely without any hindering factor.

**The following are the advantages of the interviews that were carried out:**

- Direct, original and immediate information was attained because the individuals affected by the current system and who were going to use the new system were the ones that were saying out their views on their own.
- The private interviews provided better answers because they were private, personal and confidential thus resulted in better results achieved.
- There was honesty and no misinterpretations since the researcher did all her best to create a strong rapport with the interviewees before instigating the vital facts from the interviewees.
- There was a room of asking other further question following up to a response that was given unlike it was in questioners.

- Honest and realistic answers were obtained through the interviews because of a favourable atmosphere that was created through entertaining the interviewees.

**Nevertheless, the interviews resulted in the following weaknesses:**

- It was really costly to undertake the interviews since meeting with management required some scheduling at the same time breakfast and lunch needed to be provided.
- They consumed more time than the anticipated time because there were some misinterpretations during the course of the interviews and some explaining that needed to be done.
- Some responses were not realistic because they were afraid of the outcome after they said all their views and also some employees were not open enough to say their views in front of the management.

### **3.2.2 Questionnaires**

According to Stuhlman. J and Daniel D (2006), a questionnaire is a written or printed form with different questions some with choice of answers and some free questions that require free answers designed for surveying a certain issue. On the other hand, they defined a questionnaire as an instrument with different questions that a researcher uses to gather certain information. In this research study a questionnaire was used (it is going to be shown in Appendix C). Delta's different stakeholders (that includes the clients, the management and employees) were given those questionnaires and the researcher tried by all means to explain to the stakeholders that the information will be private and confidential.

**The following strategies were used in the process of questionnaires:**

- a) **Questionnaire for Delta management** – these questionnaires were meant for the management of Delta Beverages, that is they were supposed to explain their expectations from the new system and from the sales clerks in terms of submitting their sales reports.
- b) **Employee questionnaire** - This was meant for the sales clerk at most since they were going to use the system on a day-to-day basis. They were to explain what they want the system to offer especially in terms of producing sales reports.

- c) **Client questionnaire** - It was meant for the clients of Delta Beverages to stress out their expectations from the new system that will make the acquisition process much easier.

**The following are the merits derived from the use of questionnaires:**

- Realistic, honest and accurate responses were obtained since there was an issue of anonymity, privacy and confidentiality.
- Many people were involved in this process of questionnaires because emails were used also as a part of the questionnaires, thus saving time.
- Unlike interviews, questionnaires were cheaper.
- Since the respondents were given time to answer their questions without being rushed they were able to provide correct answers.

**Despite the advantages of the questionnaire, they were also some drawbacks derived:**

- The questionnaires did not have the truthfulness and integrity in them because of vague questions.
- There was no personal communication or one-on-one basic means of communication: hence some questionnaires were not taken seriously.
- Some questions were not answered correctly because they were misinterpreted by the respondent.

### **3.2.3 Discussion groups**

Stuhlman. J and Daniel D (2006) cited that discussion groups involves people meeting together to discuss and review certain issues regarding their organization and reach at a certain decision. The researcher held some discussions with the management and the sales clerks at the organization's premises (that is in the boardroom). Discussions groups were undertaken by the management and the sales clerks to reveal and evaluate the new system and discuss what they expected to see as well as adding some of their suggestions they expected to see in the existing system.

Although the process of undertaking decision groups was not that easy to prepare and practice since many individuals were not that open enough to say out all their views in front of other work colleagues, the analyst managed to prepare the decision group questions in such a way that did not leave the organization at a greater disadvantage and perceived as a failing business

organization. Also the decision groups' questions were prepared in such a way that would not end up offending other individuals who were going to participate in them. The analyst also managed to create a conducive environment for the groups participating such that they were able to answer all the questions freely without any hindering factor.

**Advantages obtained through the use of discussion groups include:**

- a) Better and constructive ideas were introduced through the management and sale clerks' contributions.
- b) There was direct and instant information acquired.
- c) Discussion groups gave room for asking further questions as a way of explaining further an answer that was given.

**Disadvantages from discussion groups:**

- More time was consumed in discussion groups because of different opinions that were raised by the members present.
- Discussion groups were very expensive to undertake because the members who attended the discussion were supposed to be provided with breakfast and lunch just like the interviews.

**3.2.4 Observations**

According to Nielsen (2005), observation is referred to as the process of monitoring a certain activity closely that is being carried out. In other words a visual study of a certain individual in order to acquire some information or study about nature, behavior as well as the activities done by a certain group of people at a defined place. The observer was able to observe how the sales clerks performed their duties. The results obtained from the observation will be revealed in Appendix D. Furthermore, the observer was able to observe all the stages the client takes to procure Delta products, how the sales clerks serve their clients and also how the management deals with the daily sales reports and how they are produced. Observation technique was relevant because it was meant for testing the strength of the questionnaires and interviews done.

**The following are the advantages for observation:**

- There were no costs incurred since there was no breakfast or lunch to be provided, unlike the interviews and the discussion groups.
- There was no interruption of work to the employees since it was just observing.
- This technique helped the observer to discover some appropriate information on her own without anyone's help.

**Though there were benefits derived from this technique, however there were some setbacks drawn:**

- Some of the activities were not observable.
- Some personnel changed their actual and normal way of working because they knew that someone was observing their activities, thus there was a danger of getting unrealistic information.

Of all the research methods that were used, the researcher discovered that the questionnaires were very much effective since there was the case of anonymity as well as private and confidential details provided. Therefore the aim of the study was to find out the real and exact problem of the current system and how much it is affecting the stakeholders of the company. Henceforth, the questionnaires showed more realistic views of different individuals compared to other research methods.

### **3.3 Analysis of the Current System**

The current system at Delta Beverages Customer Collection Depot is manual meaning that for a client to be able to procure Delta products he or she has to physically attend to the company's premises. Delta Beverages has got many clients such that most of the time there will be long queues. Some clients come from different parts of the country just to purchase their products and thus many inconveniences are caused. A client is supposed to register first with the organization for him or her to have access to the organization's products. There are some clients who do not wish to register with the organization, but however they have limited benefits compared to registered clients. There are some cases when a client wishes to order for the products that will be purchased at a later date, accordingly in that case the client is supposed to physically attend to

the organization's premises and get an approved letter from the Sales and Distribution Manager who is based at another branch (Sparkling Beverages). After the form has been approved the customer will be given some days to give the Sales and Distribution Manager some time to verify and confirm the request. After the request has been approved the client will then be able to order for his or her desired products.

The clients wait in a queue for them to pay up for the products they would have purchased. Then after making the payment they wait for another queue to collect their products. Most of Delta clients are supermarkets, different companies as well as different individuals. Thus, the current system at the moment is not able to reflect the assigned trucks to their defined destinations and as for individual clients they are not able to order for a delivery truck.

Every day the sales clerks are supposed manually produce a report concerning the proceeds or sales of the day. They are supposed to give this report to the management and all the information will be reflected in these reports including the queries of the clients.

### **3.4 Process Analysis**

When the course of modelling, reviewing, inspecting and examining the processes or activities being carried out with the aim of highlighting relevant and useful information is done it is referred to process analysis, Pretso (2002). Hence, in this case process analysis was practiced by a way of reviewing and also assessing the function of the existing system. The assessment revealed the inputs that were involved, the processes as well as the outputs that were produced by the current system.

#### **Inputs of the current system**

- The client details reflected in the organization's database.
- Booking details
- Payment details

### **Process of the current system**

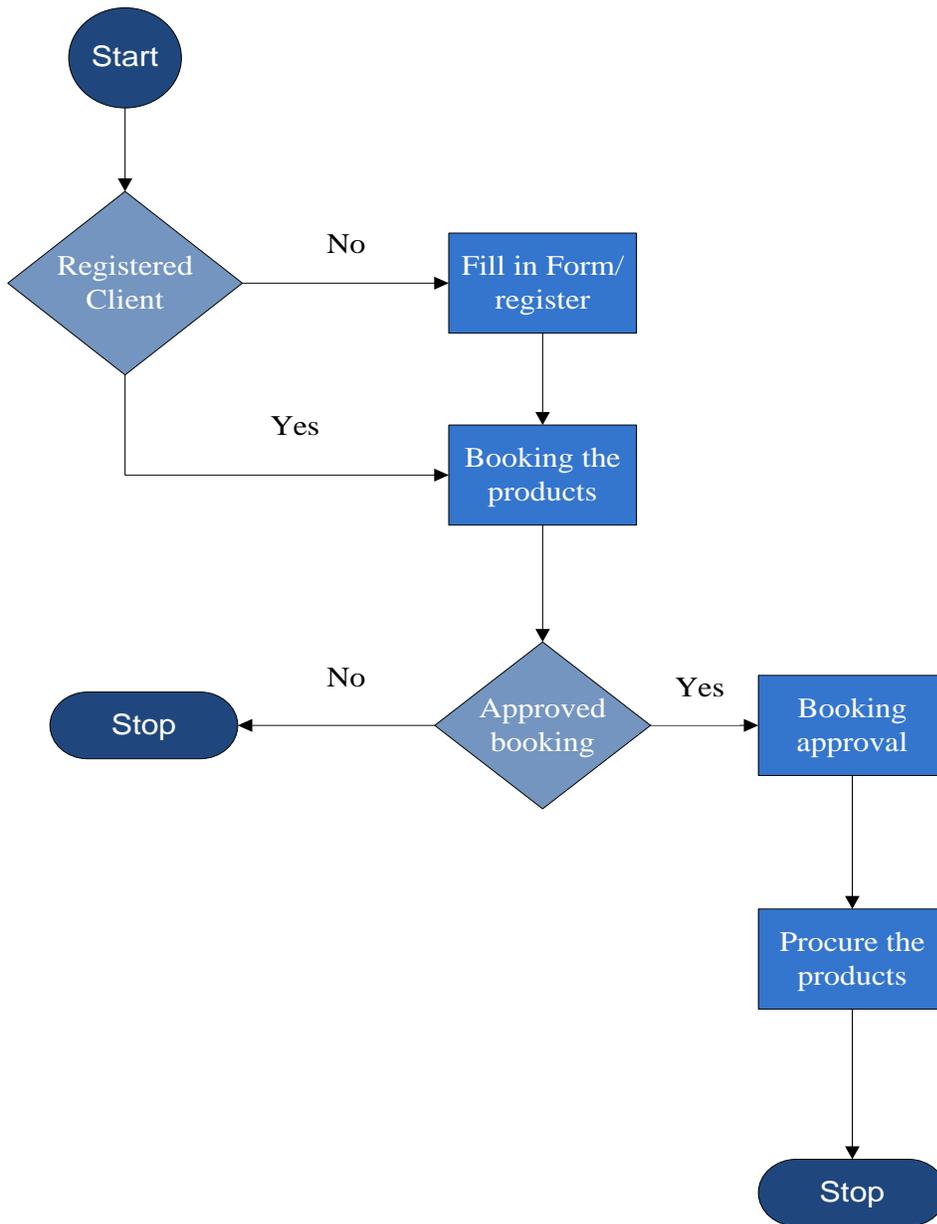
- Registration of the client- includes capturing and storing of the client's information or details into the organization's database.
- Confirming the client's booking.

### **Output**

- Receipts of the purchased product.
- Reports of the sales

The activity diagram will illustrate the activities that will be done by the current system during the acquisition of the products by the user (that is to explain in detail process analysis)

**Activity Diagram of the current system**

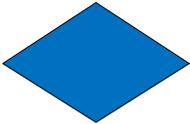


*Fig 3.1: Activity diagram of the current system*

### Key



Initial state of an activity



Decision



Process i.e. action state of an activity



Control flow of data



Final State

### 3.5 Data Analysis

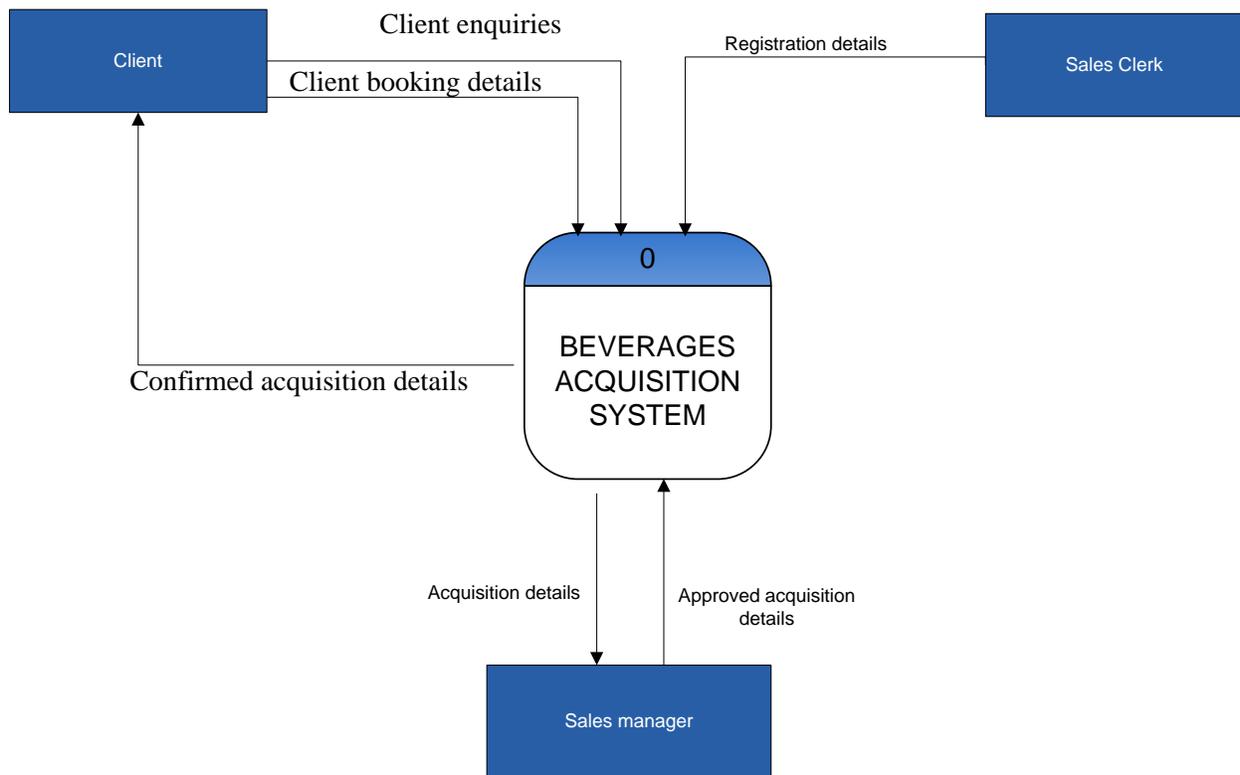
According to Presto (2002), data analysis is the process of modelling, reviewing, inspecting and examining data being carried out with the aim of highlighting relevant and useful information. In this phase Data Flow Diagrams (DFD) and Context diagrams were used to show the flow of data in the current system.

This section is going to illustrate the flow of data in the current system, the activities involved and stages in the processes that are done by the current system. There is going to be an overview of how the organization uses its current system. The following are the diagrams involved to illustrate the flow of data and the activities involved in the current system.

### 3.5.1 Context diagram

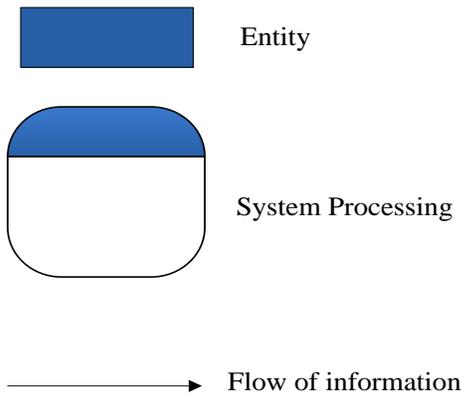
Swanson (2000) stated that a context diagram is a simple diagram that demonstrate and represent the flow of data through modelling the processes involved and also through a certain information system. The context diagram of the current system illustrates and shows the boundaries of the system in use. The following diagram is the context diagram of the current system:

#### Context Diagram



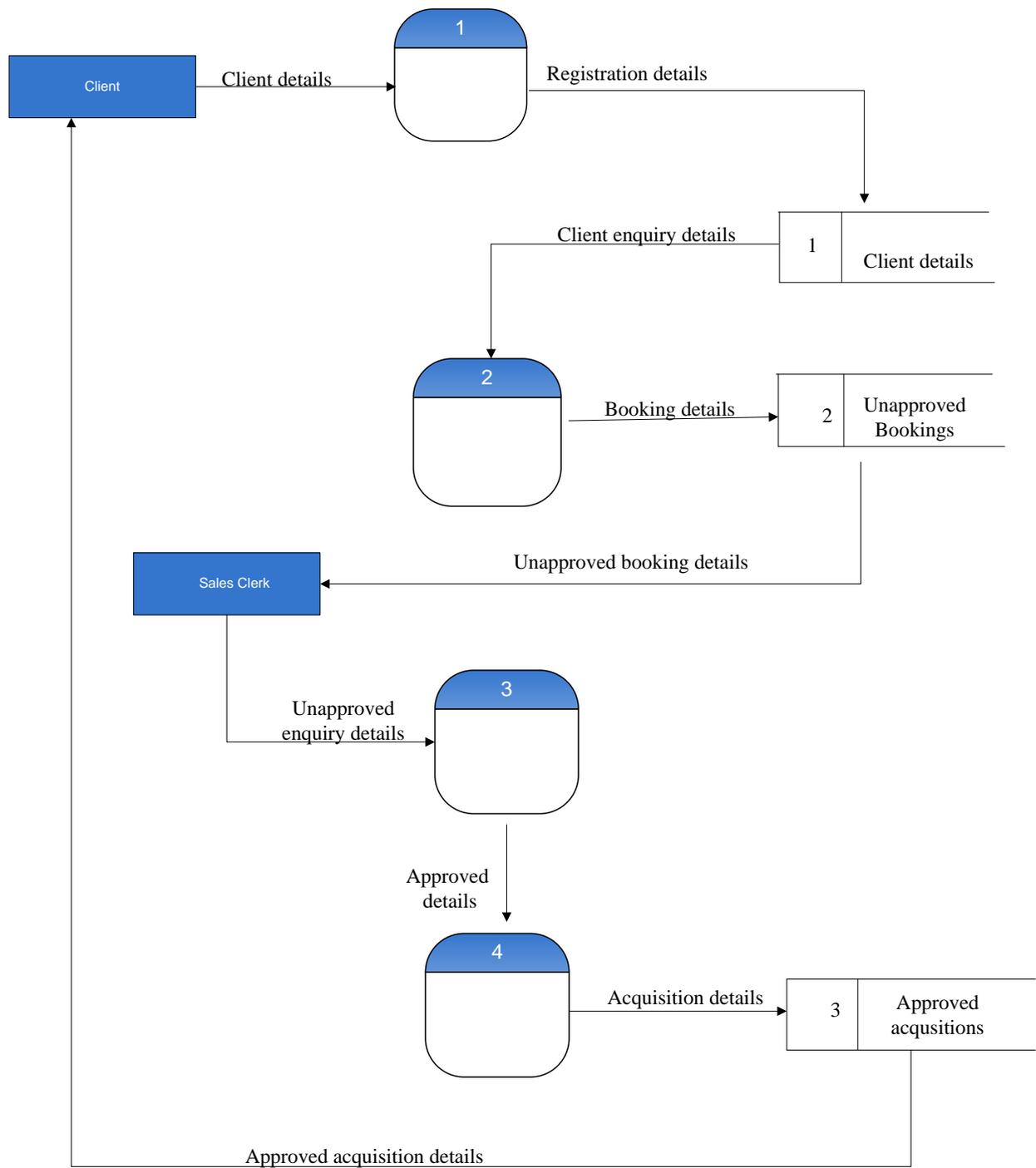
*Fig 3.2 Context Diagram*

### Context diagram key



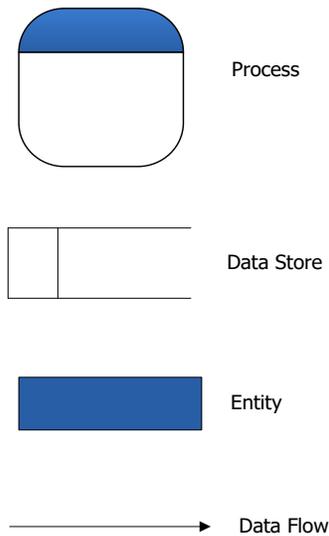
### 3.5.2 Data Flow Diagram

Swanson (2002) quoted that a Data Flow Diagram is a graphic-like representation of the organization's system components that is processes, the flow of data, the entities as well as showing how the data is presented. It is one of a useful method or technique that is used by the system analyst to reflect how the data flows in the system. It shows the data that is coming into the system, the processes that are to be done as well as the output destination of the processed information. The DFD of the current system is shown as follows:



**Fig 3.3 Data Flow Diagram**

### Key (Data Flow Diagram)



### 3.6 Weaknesses of the current system

There are some weaknesses that have been derived from the current system. Below are the weaknesses of the current system:

- The system is not fast to attend to the client' queries which is why there are long queues.
- The booking system for the products by the clients is manual and also it takes time for one's request to be approved.
- It takes time to produce the reports that are needed by the management after every daily sales.
- The system does not reflect the available trucks and those that are on route.
- This current system does not allow the clients to view their previous transactions they made with organization.
- The security of the client's cash is not that effective since one has to walk around with his or her money before the purchase.

### 3.7 Evaluation of system development alternatives

In order to work on the problems stated above for the current system, the alternatives below were suggested to help in finding out an effective solution to those problems:

- **Improvement of the Current system-** this process can only be achieved by analysing the problems with the current system and try to alter them as a way of improving the current behaviour.
- **Outsourcing (Off The Shelf Package)** - this is when an organization purchases an already made software package from a system's developer who will offer the certain instructions for use of the software.
- **Developing an In-house software package**– this a process by which the organization decides to develop its own system to use that will satisfy their defined needs as an organization.

#### 3.7.1 Improvement of the current system

Presto (2001) stated that improvement of the current system involves the process of finding the weakness of the system in use and try to develop and improve its functionality. This means that it is a matter of making adjustments and altering the current system without applying any changes to it.

##### **Advantages of improvement of the current system**

- This process is not expensive because there will be no additional costs to be incurred.
- It does not consume much time since the issue will be just altering some problems and not developing a new thing out of nothing

##### **Drawbacks of improving the current system**

- Some problems are too complex to resolve such that during the process of solving them some other different problems might emerge.
- Improving the system might result in some problems sneaking into the system unnoticed, thus causing more problems in future.

**Therefore, the evaluation given was that:**

To improve the system was not advisable since the problems might arise again in the future. Henceforth, because of this reason the problem might end up costing more than what it is at this present moment.

**3.7.2 Outsourcing (Off-The-Shelf Package)**

Swanson (2002) stated that outsourcing is a process of purchasing an already made software package that has been developed by a system's developer or any other vendor. This kind of application is designed in such a way that the organization does not specify their specifications or requirements on the system.

**Advantages of outsourcing**

- This process is cheap as the cost charged will cover all the operational costs incurred in producing that software.
- Outsourcing does not consume much time and it is always available whenever it is needed.
- The software is standard since it will be used also by other companies so it will be easy to help each other if there is a need.

**Drawbacks**

- This process does not involve the user specifications and thus there is no security of the organization's data since the developer of the system might be attracted to the organization's information.
- There are added costs that are likely to be incurred in future, that is maintenance and installation costs.
- Being dependant on the external source is not advisable for a big organization like Delta Beverages and it might not disclose the real user needs.
- The license fees might become more and more expensive in the future thus more added costs.

The idea of outsourcing does not lead the organization into gaining competitive advantage against the competitors or rivals.

## **Evaluation of outsourcing**

The drawbacks of outsourcing exceeds the benefits that can be realized when an organization uses outsourcing. This process leads to more costs incurred and might lead to the organization's privacy being known by other external individuals. Furthermore, it does not give the organization a competitive advantage.

### **3.7.3 Development of a new system:**

Tannebaum (2004) cited that developing a new system development of a new system encompasses of the system's analyst collecting the required information of the users of the system to be developed, then he analyses, designs and also develop the new system according to the users' requirements. Therefore, in this case the users specify all their desired function as well as non-functional requirements. Every part and stage of the system being developed will be documented and relevant reports will be delivered to the management and direct users of the system.

The following are the benefits derived for the process of developing a new system:

#### **Advantages of developing a new system:**

- There is a higher extent of user satisfaction since the user will be able to specify his or her desired needs.
- The procedures, policies as well as license fees result in minimal charges that are not even costly to the organization in the future.
- It is cheap in future because the cost of installation, development and also maintenance is within the reach of organization.
- There will be an added advantage against the organization's competitors since the organization will be developing its unique system different from that of the competitors.
- Elimination of the problem of the current system since there is going to be the development of a new system.
- The existence of the project documentation will make it easier in terms of system support such that other personnel will be able to maintain and support the new system.

- It increases the morale of the employees and also increases their capability of knowing more things.

#### **The drawbacks of developing a new system:**

- More time is consumed in documenting and developing the system hence it might affect the daily business activities.
- There are additional costs to be incurred since there is need for new hardware and software.
- There is need for the user training and this might result in more time consumed and costly to the organization.

#### **Evaluation of developing a new system**

The benefits that have been derived from developing a new system outweighed the demerits, thus it will be advisable to carry on with the development of the new system. The problems that are being experienced currently at Delta Beverages Customer Collection Depot would be solved completely by developing a new system. User requirements are going to be specified such that what the user needs is going to be developed and also this results in a unique system being developed different from the competitors' system (competitive advantage). Moreover, there will be an increase in employees' moral since they will be involved in the development and maintenance of the system; hence resulting in an improvement in their work experience.

#### **3.8 Requirements Analysis**

Tannebaum (2004), cited that requirement analysis is a review, assessment and evaluation of what is expected from the system that is being used and its expected properties. The users' functional and non-functional requirements are the main focus of this section and it also includes the competencies and capabilities of the new system. It will also look at how data is going to be stored and captured by the proposed system. The system analyst is going to develop the Requirement Specifications Document that will reflect and show all the requirements of the system.

### **3.8.1 The Functional requirements**

Functional requirement is a term that describes and explains the functions, tasks and competencies that a system must perform successfully without any complications or errors, Presto (2001). Furthermore, functional requirements is also known as the inputs, processes (or behavior) and outputs of the system. Also it presents calculations, data manipulation, processing and technical details that explains more on what the system is expected to accomplish. Integrated Online Acquisition System is going to involve:

Configuration to the client server - that enables and facilitates faster and quicker response to all the cliental queries.

Booking logging - this will support the client to log on to the system in order to order for the desired products.

Authentication – the proposed system is going to authenticate using an unknown (private) key that is the user who is going to provide the credentials given to him or her.

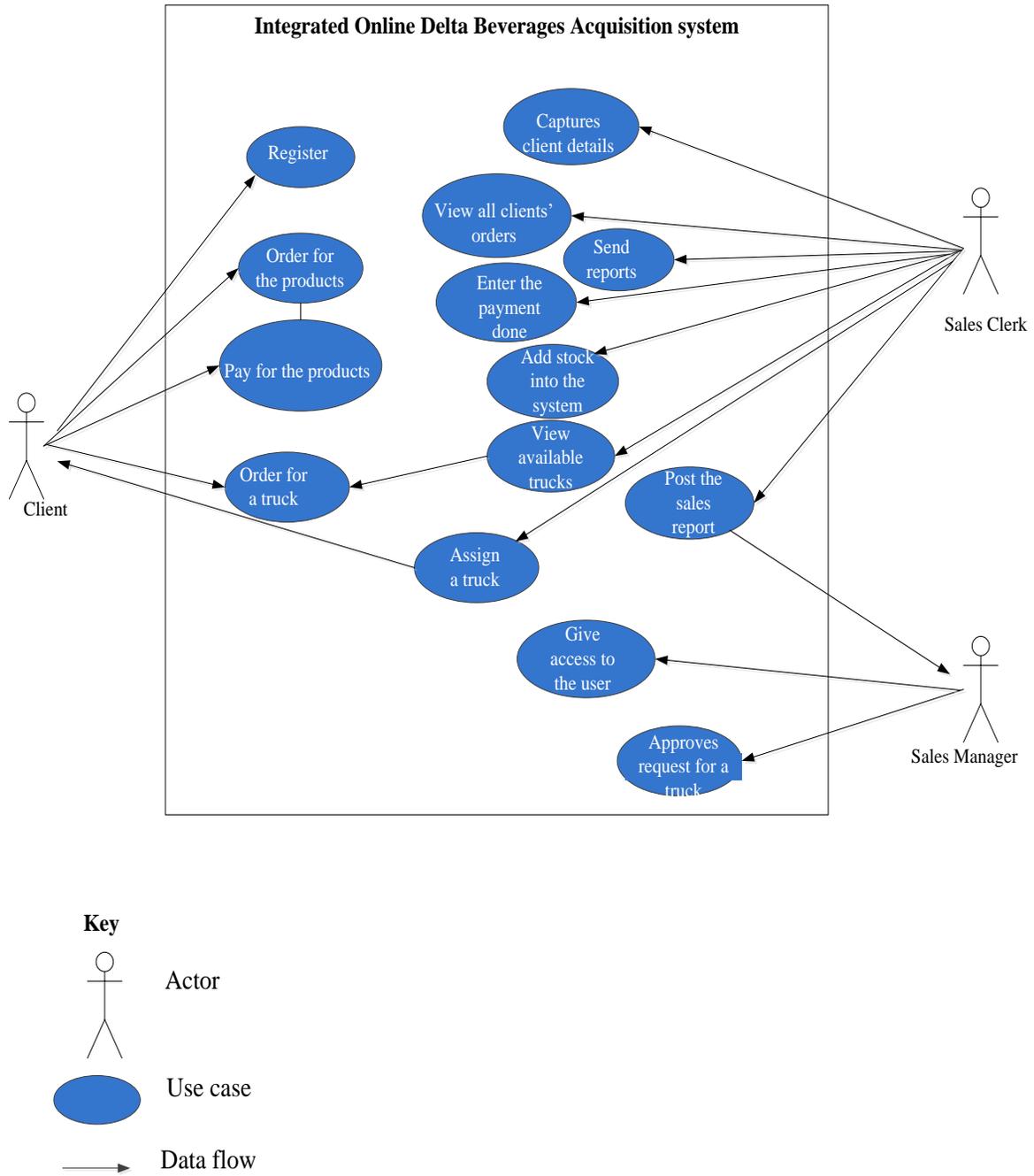
Privacy of data – passwords are going to be used and they will be encrypted. Data privacy in this case includes decryption, encryption, signing and verification of certain information.

To use a central database – the central database will be used to permit real time updates, capturing of data so as manipulation of data to enable access and permission to the resolution provided to the queries raised. MySQL database will be used in case of software and hardware failure.

Backup – there is going to be periodic back-ups for all cliental information.

#### **Use case diagram**

According to Tannebaum (2004), a use case diagram is a representation of how the users of the system interact with system. It can also show the different types of users who use the system and the different ways they interacts with the system. Use case diagram of the new system is shows the processes and actors of the system. The following is the use case diagram of the new system



**Fig 3.4 : Use case diagram of the proposed system**

### 3.8.2 Non-functional requirements

According to Swanson (2002), non-functional requirements are restrictions on the functional services that will be offered by the system. It clearly defines what the system should do or what it is supposed to do. Furthermore, non-functional requirements can also be defined as requirements that specify the standards and criteria that can be used to make a judgment on the system's operation. There are two different categories that are involved in non-functional requirements that include:

**Execution qualities** – the actions can be recognized at run time for example issue of security.

**Evolution qualities** – these include the maintenance, the testing, the scaling and the extensibility which will be exemplified in the fixed structure of the software system. Those requirements include:

- The system must have a logging password that will not be easy to trace or guess (security).
- This new system must be easy to interact with and must not be too complicated to understand.
- The information that is needed by the user should be available each time the user request for it (integrity) and also the system must be efficient such that data will not be repeated again and again.
- The system is supposed to be usable and also accept all the correct information sent to it.
- Furthermore, the system should be able to stop further execution and must be able to handle any errors as soon as the error occurs.

### 3.9 Conclusion

This system analysis phase has given a clear picture of how the current system really works and also has shown most of the weaknesses with the current system. Thus, this section has really proved the need of a new system and what the new system is supposed to provide to meet the needs of the users.

## **CHAPTER 4: DESIGN PHASE**

### **4.1 Introduction**

Design phase explains more in detail the functions and the work of the proposed system, Mingers (2002). Actually, the main concern of this project was to introduce and implement an integrated acquisition system that allows the clients of Delta Beverages to be able to order in advance and procure their products online without any difficulties. Various forms and reports (that is the screen shots) of the project are also going to be reflected in this chapter. Different designs are going to be explained in detail in this chapter and some of these designs include; architectural design, physical design, database design system design as well as interface design.

### **4.2 System design**

According to Fowler (2003), systems design defines the components, interfaces, data as well as the architecture that fulfils the desired requirements and needs of a system. In other words system design explains how the system is going to operate with the inputs, processes as well as outputs and also reflect how the entities relate to each other. System design is going to state all the stages that are involved in Integrated Online Delta Beverages Acquisition System.

Integrated Online Delta Beverages Acquisition System should allow the user (client) to browse through the internet to the organization's website and register with Delta in a bid to create an online account. Throughout the registration process, the client is supposed clarify all the personal details like name, national ID number, phone number and address. In that same registration process the client will choose his or her username and password and also show his or her bank statement that will guide the sales clerk in assigning the credit limit.

The client will be either activated or deactivated by the sales clerks for some reasons. In the case that a client has been activated, the client will have to enter his or her login credentials (that is password and username) that he or she will be using whenever he or she wants to procure Delta products (thus , maintaining the privacy and confidentiality of the client's information). Thus, he or she will now have access to order all the Delta products that will be available. There will be a

list of various products that are in stock and the client will have to select among the given products. The client will have to add different products to his or her cart and then finalize it. The amount of products added to the cart will also depend with the credit limit the client has been given.

Subsequently, after the client has finalized his or her cart, it will reflect under sales to the sale clerk's side. The sales clerk will now assign a truck to the client and track the truck until up until it delivers the products. It will be shown on the client side that the batch has been delivered and has reached its destination. If the client has made some payments to his or her bank account, the bank reconciliation will be sent and the sales clerk will enter the certain payment made by the client for the products procured.

On the sales clerk's side he or she logs on into the system under the admin section and after logging on the first screen he will be able to view all the bookings that have been logged. The sales clerk will be able to view all the registration details made by the client such that he or she will be supposed to either "activate" or "deactivate" the client. The sales clerk after viewing those bookings he or she will be supposed to respond to them by assigning a truck to deliver the clients products.

If the client wants to view his or her transactions made so far with organization, the system will cater for that section where the client views all the transactions he or she would have made. Also the system provides a section for the client to log any query and the sales clerk will be able to respond to those queries made by the client.

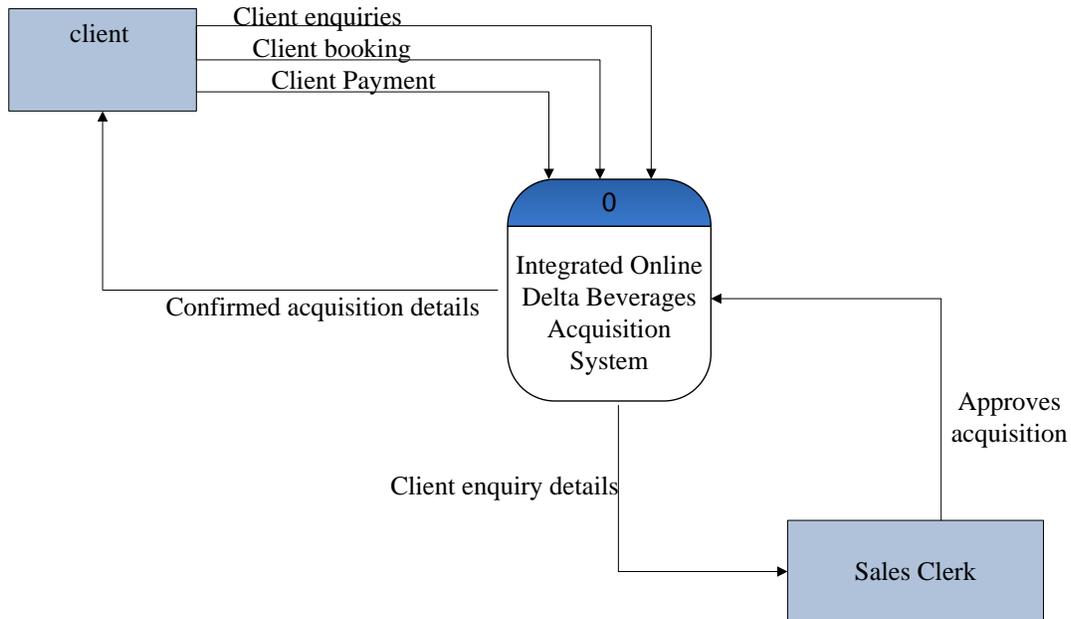
Therefore, just to summarize the system:

- Allows the new client to register.
- Captures all the client's inquiry details.
- Reveals all the trucks available for delivery.
- Allows the client to order for the desired products.
- Allows the client to log queries and the sales clerk to respond to those queries.
- Shows all the transactions made.
- Allow the client to have a credit limit to purchase the products.

#### **4.2.1 Context diagram of the proposed system**

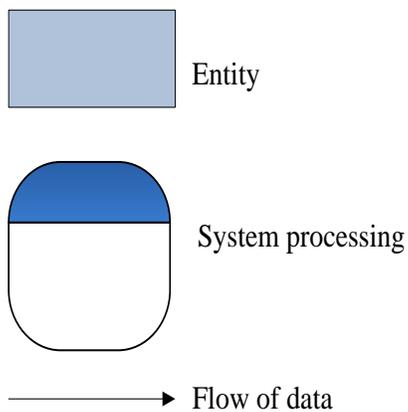
Fairbanks. G. (2010) cited that a context diagram is an element of a functional modelling tool that expresses the periphery of the system and how it will interact and relate with other elements that surrounds its environment (that is both internal and external). It is also a level 0 figure that reflects the boundary level of the system by emphasizing on its sources (that is where the information is coming from) and destinations (that is where it is going). The context diagram helps the system analyst, the user as well the management in charge and control of the system to visualize the highest level of logical system designs. In this case, the system is viewed as a solitary process that receives or accepts information as it is and then delivers it to the external entities or individuals. The data will be provided to both the clients and the sales clerks. Therefore, the context diagram of the proposed system is going to reflect an overview of how the system and the users of this system are going to interact and interface within the system and which information will be distributed.

### Context diagram (proposed system)



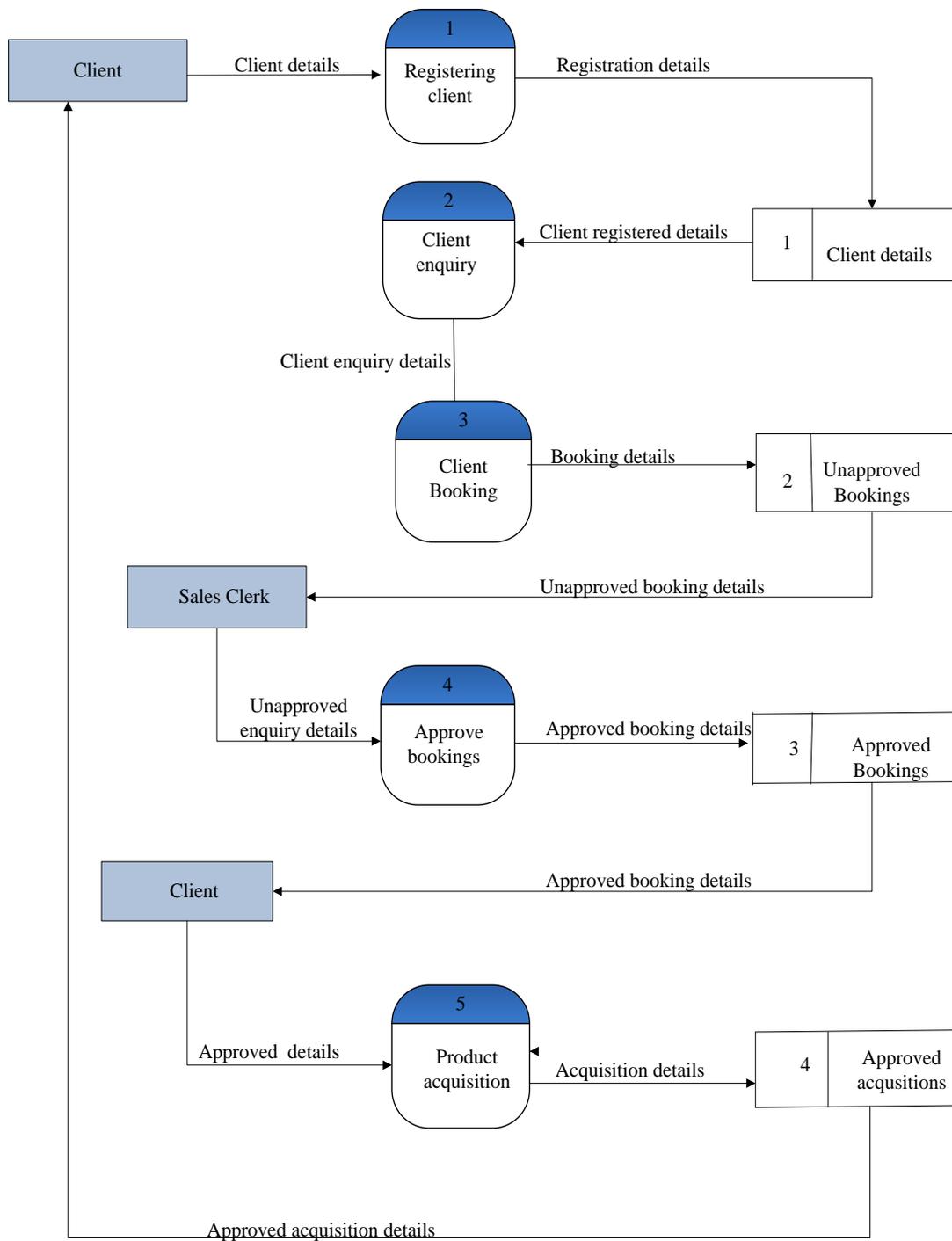
*Fig 4.1 Context diagram of the proposed system*

### Context diagram key



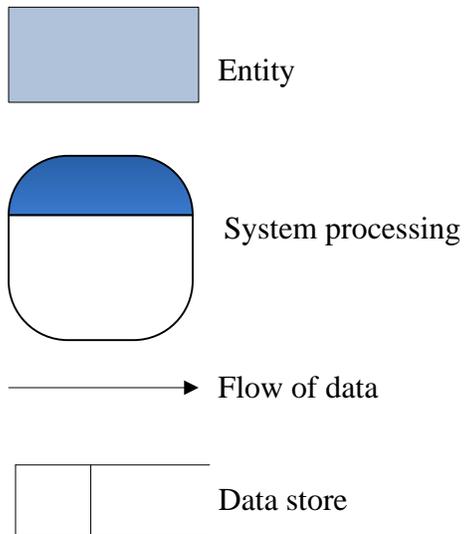
#### **4.2.2 Data Flow Diagram (proposed system)**

The representation that shows and reveals the flow of data in an information system at the same time modelling its development aspects is referred to as the Data Flow Diagram, Fowler, M (2003). Fowler, M. (2003) continued to clarify a Data Flow Diagram as a figure that illustrates how the data flows and move. A detailed data flow diagram shows the entities that are involved in the system, the processes involves, the links that connect to different activities in the diagram as well as showing where the data is stored (data store). The system's processes are not dependent on each other. Fowler, M (2003) cited that the main reason for using these data flow diagrams is that they enable and also simplify the communication between the system analyst and the users of the system in order for them to understand the system since most of them are not technical. The following is the data flow diagram of the proposed system:



**Fig 4.2 Proposed Data flow diagram**

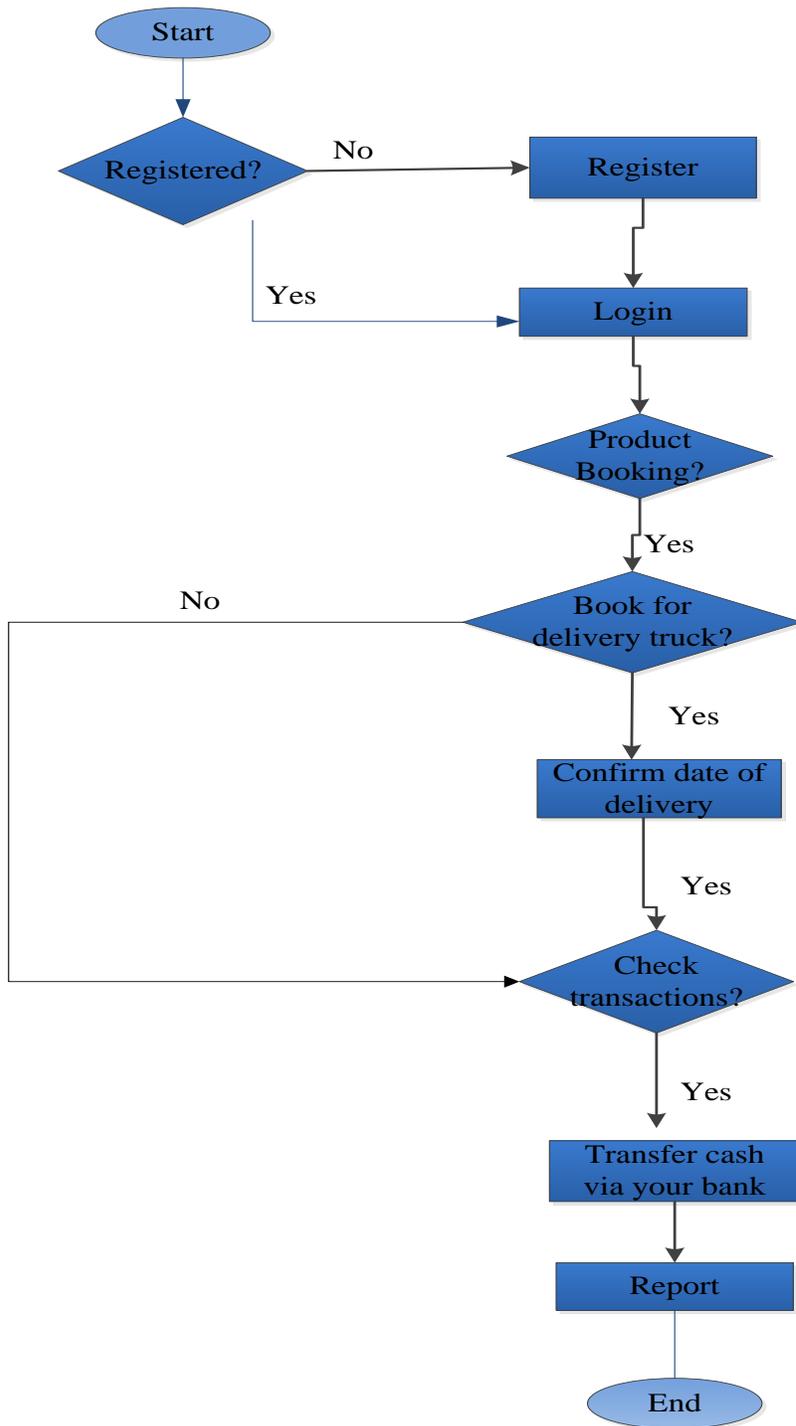
### *Proposed DFD's key*



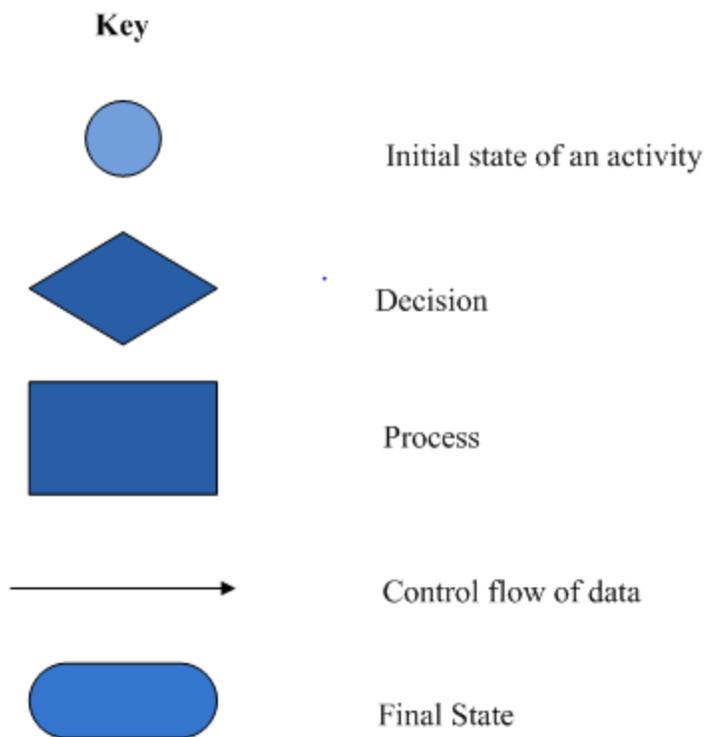
#### **4.2.3 Logic Flow Chart: Proposed system**

According to Fowler, M. (2003), a logic flow chart diagram is a diagram used to analyze, document, and manage the system's processes, its defined steps as well as their connection order. The main reason for the use of logic flow chart is that it offers the manuals for all the procedures to be undertaken in the system's development, and also it gives an illustrative picture of the sequential actions that will be done in the system and thus will be easy to grasp.

The following is the logic flow chart diagram of the new system "Integrated Online Delta Beverages Acquisition" system.

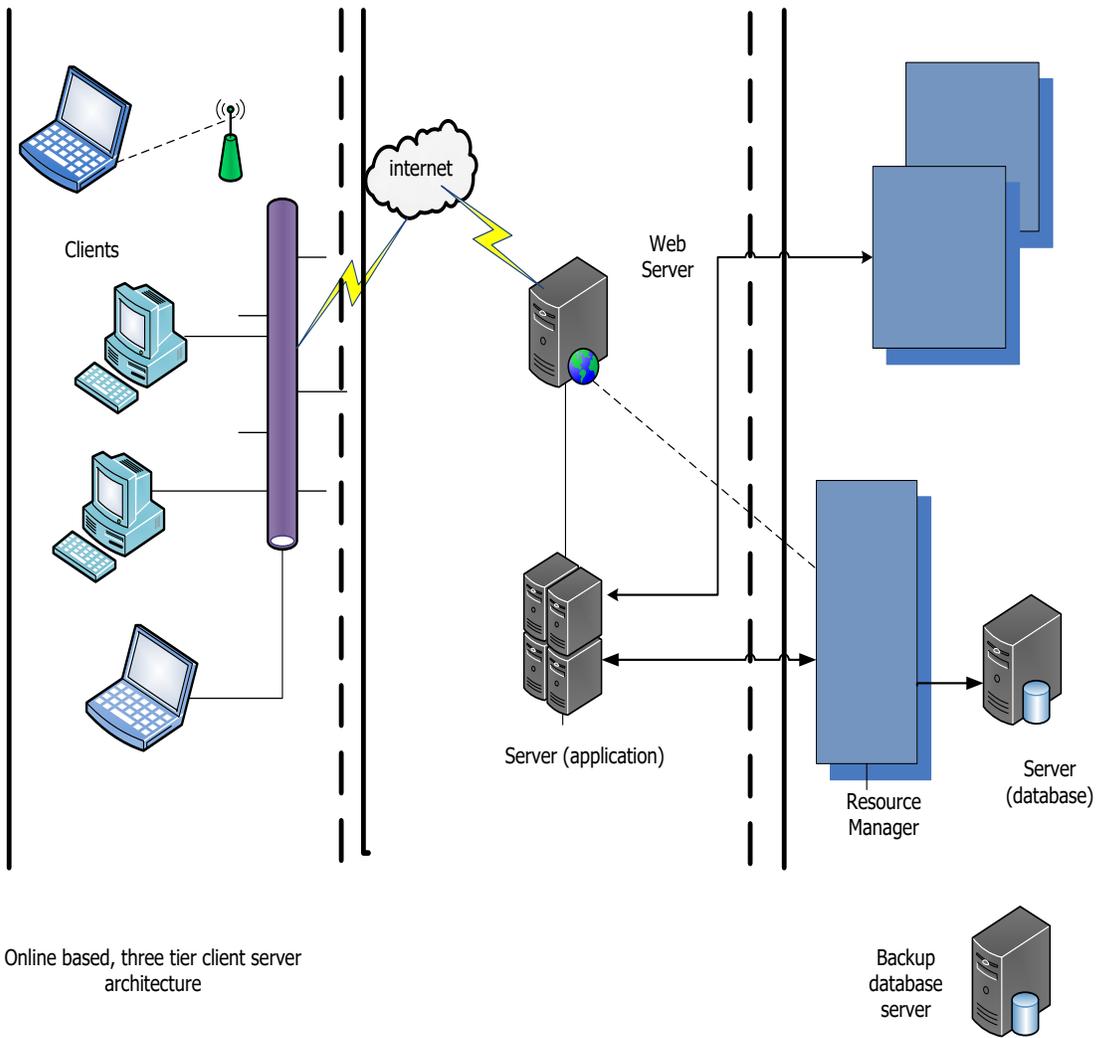


**Fig 4.3 Logic flow chart of the proposed system**



### 4.3 Architectural design

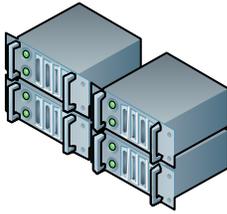
Architectural design is the structure, symbol as well as the metaphor of the system's software with the documentation of the structure being explained, Fowler, M (2003). A three tier client to server architecture was used also the presentation on the side of the client computer, the web application server as well as the management of data on the database server was developed for Integrated Online Delta Beverages Acquisition system. The architectural design of the system is shown as follows:



Online based, three tier client server architecture

*Figure 4.4: Online based and three-tier client server architecture*

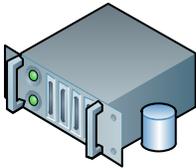
## Key



Application servers



Webservers



Database servers



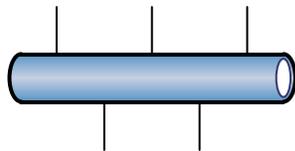
Client workstations



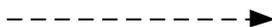
Wireless access point



Common link



Ethernet (local Area Network)



Information flow

First-tier module works with the user interface and is responsible for presenting the system, Jansen, A (2005). The user interface of the system Integrated Online Delta Beverages Acquisition System allows the users to interact and interrelate with the system. This is a modest text oriented

user interface. The client modules allow the user to interrelate with the second tier procedures in a protected, secure and intuitive routine. There is no direct access by the client to the third tier services.

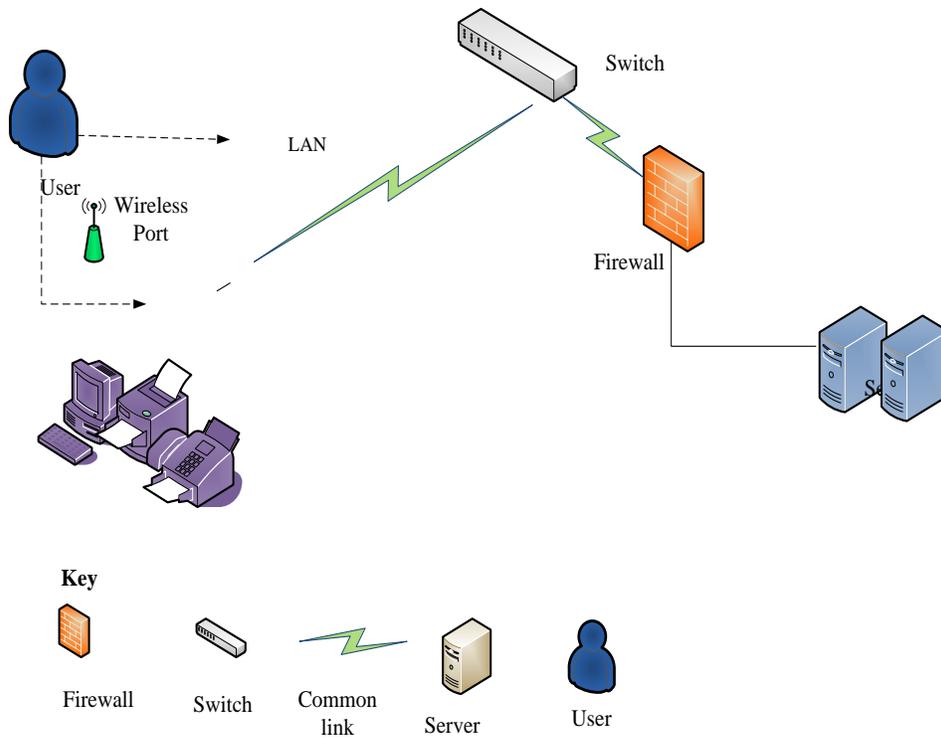
Jansen, A (2005) cited that the second tier process (application layer) manages the application of the of the business logic and unlike the first tier it is allowed to access the third tier directly. The Web Sphere Application server delivers the application logic layer in three tier architecture, thus permitting the components of the client to coordinate with the resources of the data and application legacy. The application logic layer involves the processing of all work schedules. The second tier processes can be accessed by numerous client modules simultaneously thus it has to manage its own transactions. Therefore the apache-friend-server is handled in this system.

The DB server also known as the third tier manages the persistency of some defined information or data and executes the transaction services in the database, that is according to Jansen ,A (2005). The transaction services are secured from (direct)uninterrupted access brought about by the client components. The interaction takes place in the second tier.

#### **4.4 Physical Design**

According to Fowler, M (2003) physical design is the formation of the database using the SQL statements. This phase explains how the physical components (that is hardware and software) of the proposed system will be set up and how these components interact. The Wide Area Network will be connected to the database to allow ease of access by the organization's clients who are located form different locations around the country

The following diagram explains the set up as well as the physical components of the proposed system. One computer will work represent the application server whereby the workstations of the users will be interacting with this server using the organization's LAN.



**Fig 4.5 Proposed Physical design diagram**

### Software requirements

The following are the software requirements that are going to be used by of the proposed system:

- Wamp Server manager
- Microsoft Windows server 2008, windows 7 and Windows 8
- Web Browser (Internet explorer, Google Chrome and Mozilla firefox).
- Macromedia Dreamweaver 8.0.

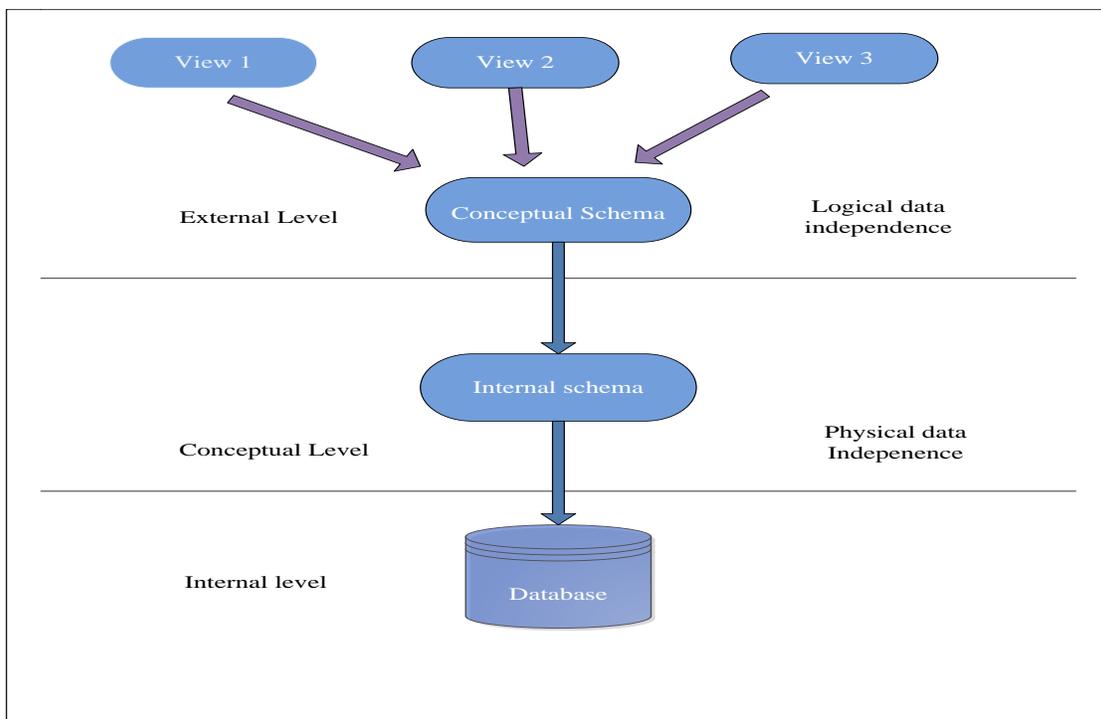
### Hardware requirements

The hardware requirements of the proposed system are as follows:

- Client computers – HP Pro 3400 Series MT
- Patch panel (16 Port)
- Database server - Dell PowerEdge R610.

## 4.5 Database design

Fowler. M. (2003) cited that a database design is a method of creating and designing the detailed database's model. It contains all the physical and logical design choices that are required to generate a language (data definition language) that is used to create the database. A database is a central source that contains all the data and information in the organization that can be accessed, shared and used by different users. The diagram that follows shows the architectural view of the database design that shows the levels and involved in the database.



**Fig 4.6 : Architectural view of the database design**

### External Level

Jansen. A. (2005) stated that the external level is the level that is used by the users that is what the users see on the database. It is the level that is used to connect and link with the users. There will be different views from the users and this will distinguish how the database is created. This is where the logical data independence takes place also.

## **Conceptual Level**

According to Fowler. M. (2003), conceptual level explains the what type of data that is kept in the database how that that same data relate to each other. This level is used by the DA (Database Administrator). It reflects and shows the DA the kind of data stored and it will be the duty of the DA to maintain that level.

## **Internal Level**

Fowler. M. (2003), explained the internal level as the physical depiction and representation of the database that involves and include the schema that explains and shows the mechanism of how data is kept in the database.

## **View level**

This is the level that is used by the users and the level which they manipulate also they are able to view, Jansen.A (2005). It simplifies the interaction of the users with the database system and it shows a simplified interface. Structured Query Language is used to manipulate the database.

## **Entity Relationship Diagrams**

According to Krutchen. P. (2008), Entity Relationship diagram is a diagram that explains the relationship between the entities, their attributes as well as the relations among the tables in the database. Entity Relationship diagram is also clarified as a graphical presentation that shows and presents the connections between entities in a specified system. These presentations aid in focusing on the functions of the database as it relates and interacts with all the entities and flow of data.

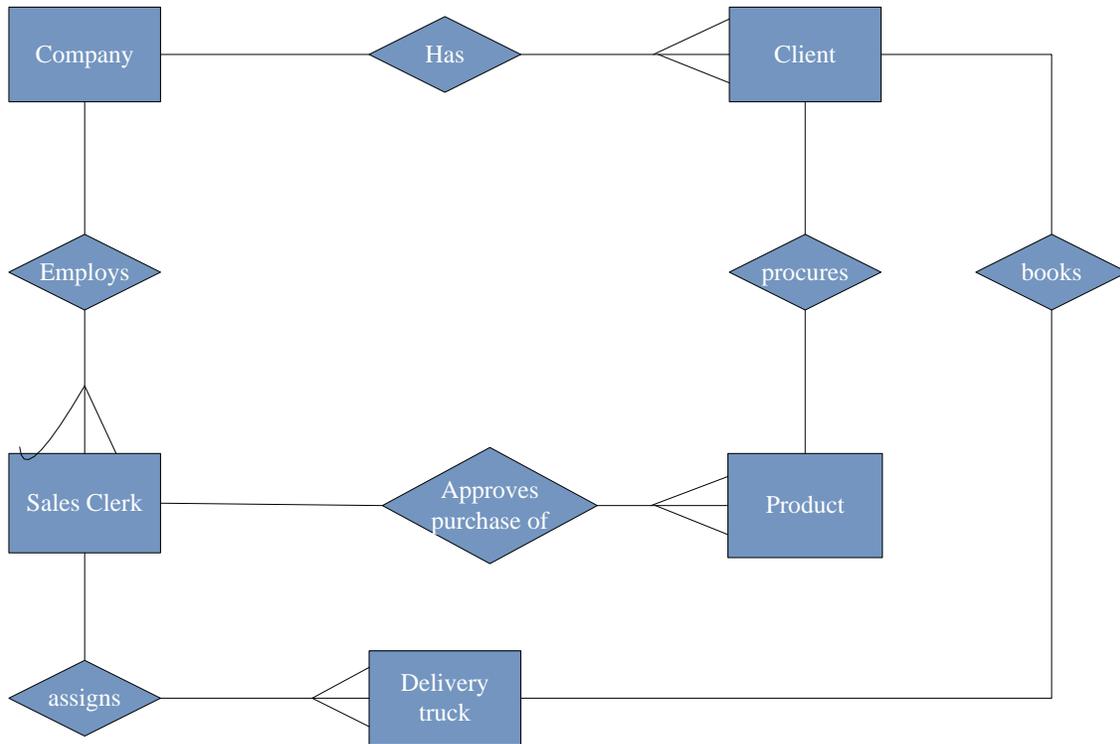
### **Components of an Entity Relationship diagram:**

**Entity** - is defined as an object that is unique in its nature and that has an independent presence and existence, Mingers (2002). Thus, in this project the entity presented are the clients and the sales clerks.

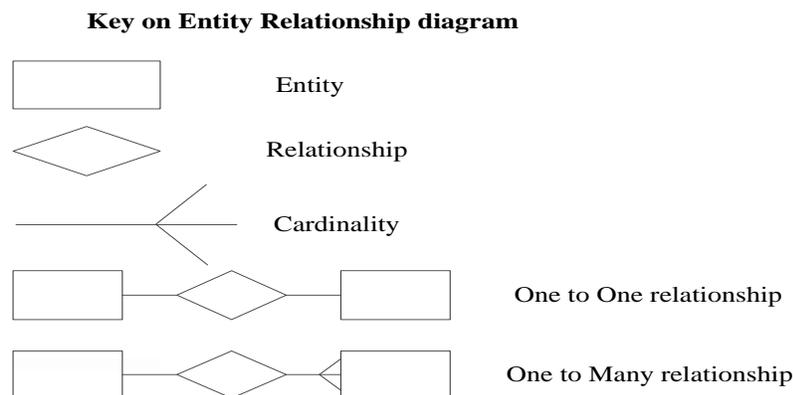
**Attributes** – these are the features of the entity that gives a better description of the entity, Fowler. M. (2003). In this system, one of the clients’ attributes is the username.

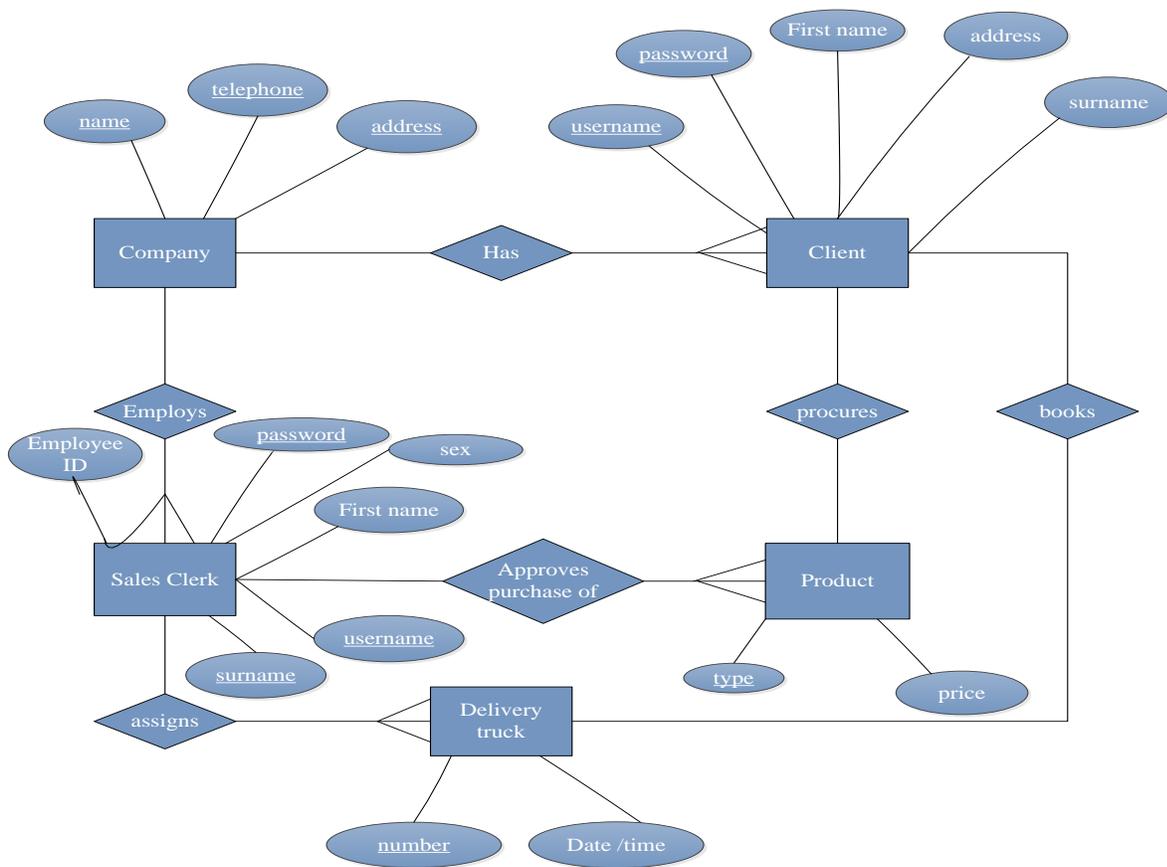
**Relationship** – this is what connects and links two different entities together and show how they relate to each other, Fowler.M. (2003).

The entity diagram of Integrated Online Delta Beverages Acquisition system is as follows:

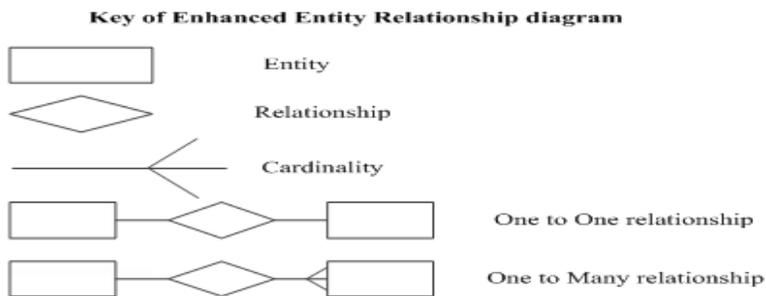


**Fig 4.7: Entity relationship diagram of the proposed system**





**Fig 4.8: Enhanced entity relationship diagram of the proposed system**



### 4.5.3 Database tables

According to Krutchen. P. (2008), a database table (also referred to as a relation) is a group or collection of structured data that is related in some way. In other words a table refers to a set of values and data presented in columns and rows. The following is the database table of the new system:

#### The table with the clients' details

Name of Field	Data Type	Size
Username	Varchar	(20)
Password	Varchar	(15)
First Name	Varchar	(20)
Surname	Varchar	(30)
National_id	Varchar	(15)
Acc_number	Number	(12)
Town	Char	(20)
Country	Char	(15)
Address	Varchar	(25)
Suburb	Varchar	(25)
Cell number	Integer	(15)

*Table 4.1: Clients' table*

### Table for the Sales clerks

Name of the Field	Data Type	Size
FirstName	Varchar	(25)
Surname	Varchar	(20)
Nationalid	Varchar	(15)
Username	Varchar	(15)
Password	Varchar	(15)
Cell number	Integer	(12)

*Table 4.2: Sales Clerks table*

### Sales Management table

Name of the Field	Data Type	Size
FirstName	Varchar	(25)
Surname	Varchar	(20)
Nationalid	Varchar	(15)
Username	Varchar	(15)
Password	Varchar	(15)
Cell number	Integer	(12)

*Table 4.3: Sales Management table*

### Delivery truck details

Field	Type	Size
Regno	Varchar	(30)
Type	Char	(30)
Value	Number	(30)
Accnumber	Number	(12)

*Table 4.4: Delivery truck*

### Booking table

Field	Type	Size
FirstName	Varchar	(25)
Surname	Varchar	(25)
Nationalid	Varchar	(25)
Accnumber	Integer	(12)
Booking details	Varchar	(20)
Delivery details	Varchar	(10)
Address	Varchar	(25)
City	Char	(10)
Town	Char	(10)
Country	Char	(10)
Cel Number	Integer	(15)
Date	Varchar	(15)

*Table 4.5 Booking details*

## 4.6 Program design

According to Krutchen. P. (2008), program design is the process of designing, implementing and executing software of a system. It includes the development of the system by means of designing functions, classes as well as the modules of the proposed system. In this case the class diagram is going to be used as it will explain in detail how the behaviours and states of the proposed will interact and function together.

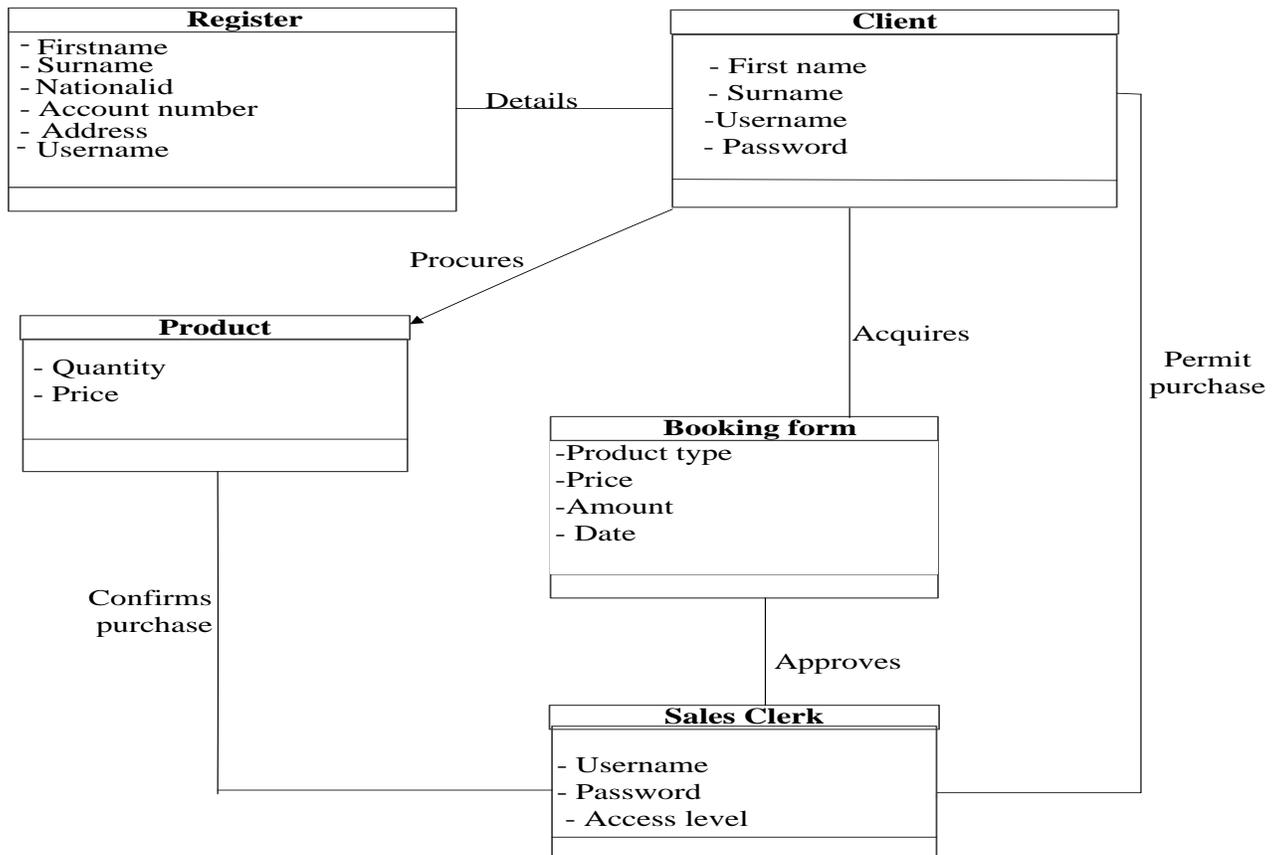
A class diagram has the following components:

**Class name** - that refers to the entities like people, places and other events involved in the system.

**Operation** – the activities a class is going to perform.

**Attributes** – the description of the class name in the system.

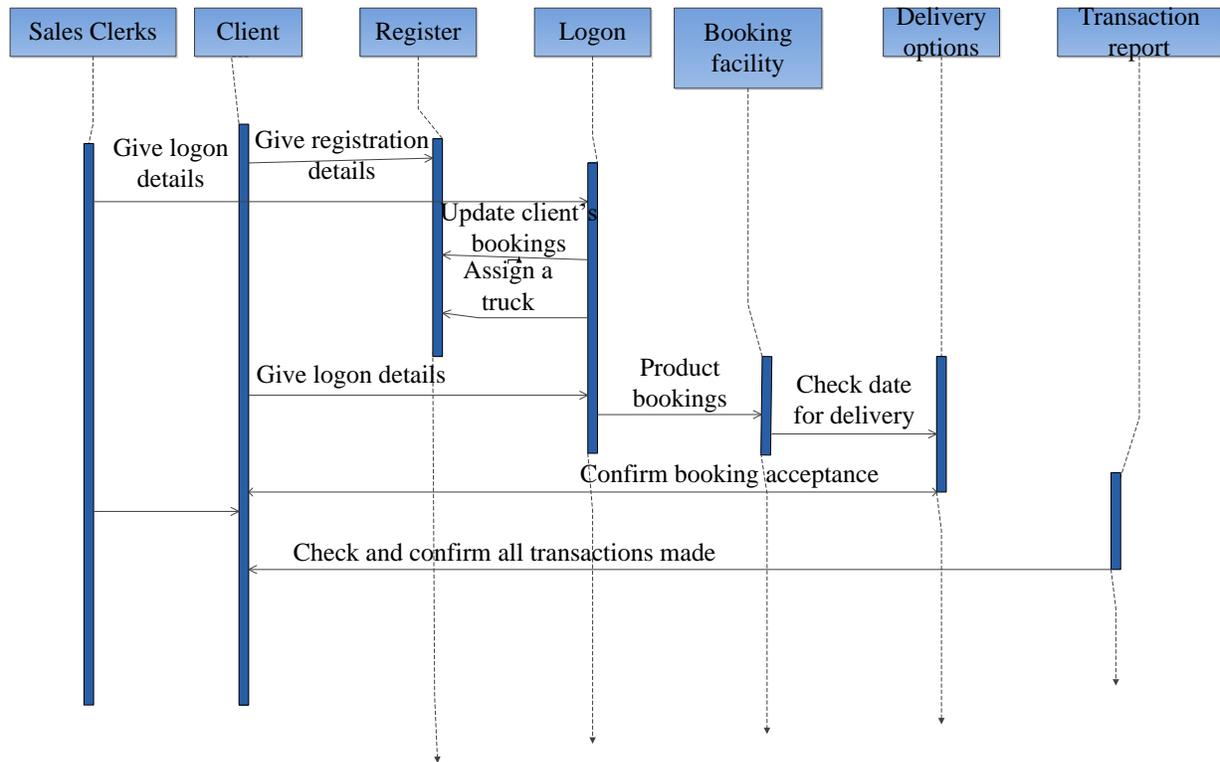
The class diagram for the proposed system (Integrated Online Delta Beverages Acquisition System) is as follows:



*Fig 4.9: Class diagram*

#### 4.6.2 Sequence diagram

Krutchen. P. (2008) defined sequence diagram as a pictorial diagram that illustrates how the objects in the system interact together. This diagram involves the objects of the system as well as the messages communicated and passing between these objects. All the activities, processes and interactions will be captured within a single set-up.



**Fig 4.10: Sequence diagram of the proposed system**

## 4.7 Interface design

According to Krutchén. P. (2008), interface design is explained as the design that shows the forms, menus, websites, computers as well as the software processes and applications that will be focusing on the users' interaction and experience. The input and output structures are also shown on the interface design. The interface also to a greater extent determines the attitude of the users towards the system since it is the most important thing they test to check if their needs and requirements towards the system are met.

### 4.7.1 Input design

Krutchén. P. (2008) explained that the input design concentrates much on regulating the input that is required, monitoring errors that might occur, being conscious of any delay that might occur as well as simplifying all the processes. The following points are considered in input design:

- The type and kind of data that will be provided as input
- The arrangement of data and the way the way it is coded.
- What type of discourse (dialog) is there to monitor the functioning of personnel in providing the input into the system.
- Approaches that can be used to prepare input validations and what to do in case if an error occurs.

### Client Registration form

Firstname	<input type="text"/>
Surname	<input type="text"/>
National ID	<input type="text"/>
Sex	<input type="text"/>
Address	<input type="text"/>
Phonenumber	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
Confirm password	<input type="text"/>
National ID/Police Clearance	<input type="text" value="Browse"/>
<input type="submit" value="submit"/>	

*Fig 4.11 Client registration form*

## Administration and Client login form

### Login Form

The login form has two different login forms that is one for the client and the other for the administrator. Therefore the client who has registered with the organization is the one who is able to log in.

The diagram illustrates two login forms within a single container. The top form is titled "Administrator login" and features a "Username" label followed by a light blue rectangular input field, a "Password" label followed by another light blue rectangular input field, and a blue rounded rectangular "submit" button below them. The bottom form is titled "Client login" and features a "Username" label followed by a light blue rectangular input field, a "Pasword" label followed by another light blue rectangular input field, and a blue rounded rectangular "submit" button below them.

*Fig 4.12 Login form*

## Ordering Delta products

This form shows the details that the client input when he or she books for the products he or she wants to procure.

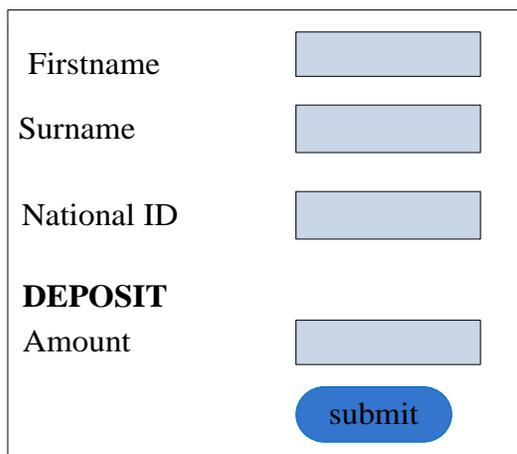


A form for ordering Delta products. It features a label 'Category' on the left. To its right is a dropdown menu with 'Coca-cola' selected and a downward arrow icon. Below these elements is a blue rounded rectangular button labeled 'submit'.

*Fig 4.13 Booking form*

## Logging of the user's payment

When a user has transferred his or her payments to the bank account, the sales clerk has to enter the payments made into the system.



A form for logging a user's payment. It contains four input fields: 'Firstname', 'Surname', 'National ID', and 'Amount'. The 'Amount' field is preceded by the label 'DEPOSIT'. Below the input fields is a blue rounded rectangular button labeled 'submit'.

*Fig 4.14 Payment form*

## 4.6.2 Output design

The output design is the presentation of what has been entered into the system meaning the displaying of all the entered information, Mingers (2002). This design defines how the information that is already in the system is going to be displayed as output. This is what the user really wants to view and to use. This displayed information or the output that the user views improve the interaction between the user and the system in the sense of making any decisions.

The output design of the system should consider the following:

- Identification of the required and specified output.
- Generating the reports and the relevant documents that encompass all the detailed information formed by the system.
- Showing and reflecting the accurateness of the output produced.
- Display an exciting user-friendly output.

### **Report on all the bookings made.**

This output displays all the sales orders that have been made by the clients whether paid or not yet paid for.

Batch No	First name	Surname	National ID	Phone No	Sex	Address	Sales date	Total
5	Blessed	Blanket	12-12222-A-12	077772222	Male	320 Crowhill	3 September	\$700
6	Jones	Tina	13-13333-B-13	0777333777	Female	656 Greendale	4 september	\$800

**Fig 4.15 Reports on orders made**

**Generated reports after the acquisition and delivery**

The following are the responses that finalize the acquisition of Delta Beverages' products including the delivery status.

Batch No	First name	Surname	National ID	Phone No	Delivery status	Address	Sales date	Total
5	Blessed	Blanket	12-12222-A-12	077772222	Delivered	320 Crowhill	3 September	\$700
6	Jones	Tina	13-13333-B-13	0777333777	Deliver pending	656 Greendale	4 september	\$800

*Fig 4.17 Final results of acquisition and delivery*

The following form is the transaction form which shows all the transactions that has been made by the client to the organization.

Batch No	First name	Surname	National ID	Phone No	Sex	Address	Sales date	Total
5	Blessed	Blanket	12-12222-A-12	077772222	Female	320 Crowhill	3 September	\$700
6	Blessed	Blanket	12-12222-A-12	077772222	Female	320 Crowhill	4 september	\$800
9	Blessed	Blanket	12-12222-A-12	077772222	Female	320 Crowhill	8 September	\$1500
<b>Total sales</b>								<b>\$3000</b>

*Fig 4.18 Transaction form*

## 4.8 Conclusion

Therefore this phase of designing the system has explained in detail the existence of the proposed system. The necessary and relevant details were explained and carried out in this phase and thus it has shed more light about the system and will therefore help in the implementation and coding of the system.

## CHAPTER FIVE: IMPLEMENTATION PHASE

### 5.1 Introduction

Fowler. M. (2003) defined implementation phase as the stage and section at which the systems analyst and designer delivers the ultimate finished system to the end user. In other words this stage articulates the implementation and application that has been proposed in the previous sections that meets the objectives of the proposed system (that is Integrated Online Delta Beverages Acquisition System). The proposed system is going to be tested and verified before it is delivered to the users for final use. This will help in checking and confirming if the users' needs as well as their requirements are met before the system is used and introduced to the organization. If the testing of the system is positive and successful it will then be formally launched for use in the organization.

### 5.2 Coding (Pseudo code)

Garlan. M and Shaw. A (1994) cited that pseudo code is a sketch of the systems' program. It can be presented in a form that is straightforward and easy to convert into simple, real and understandable programming statements. In this project, the programming language used was PHP and for the database it was MySQL database. Relevant tables as well as the attributes have been placed in their respective areas (fields). The software system was constructed in different modules that were later combined together thus forming a single functioning system. Data manipulations as well data retrieval operations were done in the MySQL database.

#### 5.2.1 Pseudo code

##### To register a client

Confirm the connections to the MySQL database.

*// Is it connected?*

If connected

Let the client enter all relevant and necessary details

Confirm the necessary details

If accurate then

Confirm the existence of the record

If record exist

Leave the update

Else\_

Save the original record

### **Sales Clerk (Administrator) login**

Confirm the connections to the MySQL database

*// Is it connected or linked?*

If linked {

Type in login details (username and password)

If accurate then\_

Show the home page of the administrator

Else\_

Login failed!! Enter the correct credentials again

End if }

### **Login of the client**

Confirm the MySQL database connections

*// If connections are positive:*

```
{  
    Login using the Username and Password (login etails)  
  
    If correct_  
        Show the cliental homepage  
  
    Else  
        Login failed!! Enter again the correct username and password  
  
End if  
}
```

### **Booking of the desired product**

```
Log into the system  
  
    Select the desired product  
  
If cart is finalized  
  
    Submit the booking made  
  
Else  
  
    Cart cannot be finalized because of negative balance  
  
// Logout of the system  
  
End if
```

### **Response to the cliental booking**

```
Log as the system administrator (Sales clerk)  
  
Choose the batch number of the booking made  
  
    If unattended bookings are available
```

Click for more information

Select and response to the option of response to the booking

Submit

Else

No unattended booking inquiry available

End If

Logout

### **Review the sales clerk response**

Client login to the system

Choose the response to the booking made

Click on the booking number

Then, the response will be displayed

Logout

### **Report on all the transactions made by client (sales clerk's side)**

Login to the system with the correct credentials

Go on home page, select **Transactions**

Click on the name of the client

Review all the client's transactions

Logout

### **Report on all the transactions made by client (client's side)**

Login to the system using the correct credentials

Go on client's home page

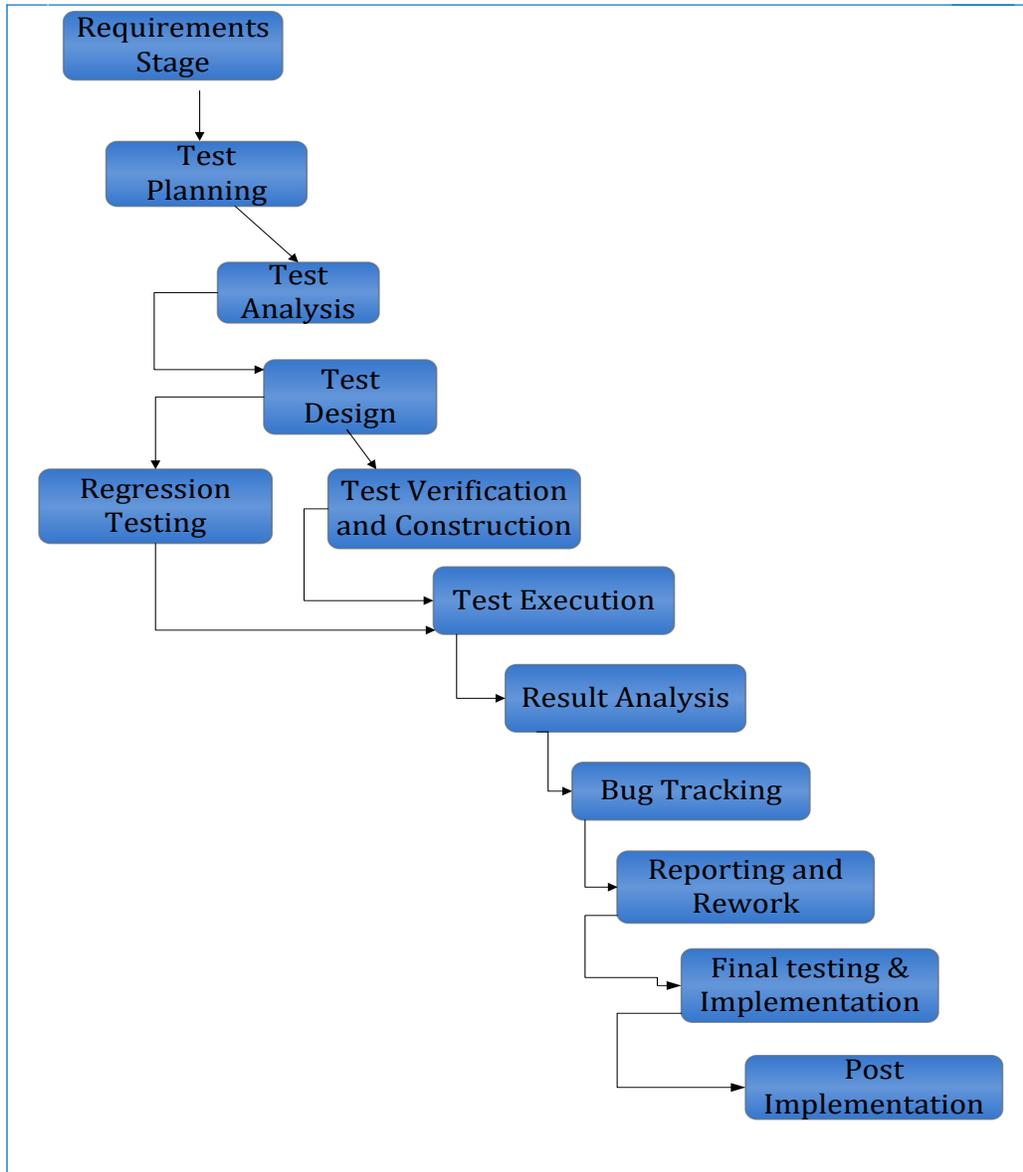
Click on **Transactions** tab

Select the option- These are the transactions made by client

### **5.3 Testing**

According to Jansen. A (2005) software testing is the practice of implementing an application or program with the aim and goal of finding out some bugs or errors. In other words it is a way of examining, studying and also investigating the proposed software to identify and detect any problems and differences between the existing and the proposed system software. If the end user's specific requirements are met and satisfied, that is when the system software will be considered as successful. It will be incomplete and imperfect if the Testing phase is not included in any software development. This phase aids to improve software quality and security to benefit the client.

The following is the diagram of software testing that occurs in every stage of System Development Life Cycle (SDLC) that was used in IODBA system.



**Fig 5.1 Software testing life cycle**

The following are the stages of software testing system explained in detail:

**Requirements stage**

Krutchen. P (et al) (2004) defined the requirements stage as the early stage of the software testing system whereby the systems analyst and developers evaluate and analyze the main requirements for the development of the system. In this case the testers are also involved since

they will be able to test the system using the views of the users. The documentation of the requirements analyzed is also of much greater use in this stage and it will assist in specifying the critical requirements needed by the users, developers and testers of the system.

### **Test Planning**

According to Kaner. C (2003), deciding an effective plan in advance before the occurrence of a risk is called test planning. He went on further to state that a good and effective plan results in better and improved management of the software development and thus lowers the obstacles that leads to software failure. Therefore, the test plan is documented after the confirmation of the project's requirements.

### **Test Analysis**

The documentation of the test plan will then result in the analysis of the software testing types being done at SDLC's stages.

### **Test Design**

Black. R (2003) cited that test design determines if automated or manual testing is going to be carried out and it centers on the stated requirements of the proposed project as documented. Hence, in this case script writing can be done and diverse testing paths are recognized.

### **Test Verification and Construction**

There is a completion of automated and programmed scripts, performance testing plans, test plans as well as the design tests. Bug reporting as well as the integration testing is carried out in this phase. After the development of the system's code the system testers will have to intervene in this case to check for any errors on the code.

### **Test Execution**

This phase is whereby all execution and planning of numerous tests are carried out. This is also when the working and functionality of the unit code is tested. Hence, the tests reports are supposed to be documented appropriately at the same time the top or upper level testing should be completed in order for the developers to attend to any higher level of code failures.

## **Result Analysis**

This analysis comes soon after bug fixing, the effective test case execution and the team testing the system will start to compare now if the anticipated values tally with the actual values, and they will be in better position to check if it is a pass or a failure.

## **Bug Tracking**

The bug tracking stage involves the use of the DPD (Defect Profile Document) that is supposed to be efficient and updated such that it will be of great help to the developers of the system to know more of the defect.

## **Reporting and Rework**

Fowler. M (2003) has regarded testing as a continuing process that needs to be done over and over again (iterative). Hence, in this case the errors or bugs found will have to be fixed and it goes under testing again to confirm that the error or bug has been resolved and fixed. The moment the Quality analyst confirms the readiness of the software, that is when the system software has to go live, but before it is released it has to undergo another upper level test again. Thus, reflecting that testing is a continuous process that needs to be carried out almost every time.

## **Final Testing and Implementation**

Diverse matrices as well as environments for testing are accomplished in this final testing stage. The remaining levels like load, acceptance, recovery testing as well as stress testing are achieved at this stage. Web system will also have to be proved and verified before it is put in use under the stated conditions provided in the SRS.

## **Post Implementation**

This phase involves the improvement of planning concerning the testing procedures undertaken in the previous stages for future and upcoming applications. Thus all the all errors that transpired are recorded for future references.

### 5.3.1 Testing methods

White box testing and black box testing are some of the software testing techniques that are used in almost every phase of the software testing life cycle. Below is the detailed explanation of these testing methods:

#### **Black Box Testing**

According to Krutchen. P (2006), black box testing is the software testing technique that is not concerned with the internal functioning of the system that is being tested, meaning that the system tester is aware of how the system works but does not scrutinize the inner structures. In this case the structure of the code is of no use to the tester, thus the term *black box*. Therefore, the main aim of using this technique is to select the suitable information and data for the functionality and comparing it with the practical conditions and stipulations of the system with the goal of checking for the unusual performance of the system. Beta-testing, user-acceptance testing as well as alpha-testing (these are the types of Black box technique) were carried out throughout the development of the system

- ***Alpha Testing***

All the actions that were performed by the users of the new system (sales clerks) during the development of the system were being observed and any unusual behavior that occurred was identified and corrected immediately.

- ***Beta Testing***

Beta release was carried out such that the new system was distributed to the experimental sales clerks' team to test using their organizational client computers if there were no errors. Thus, any errors that occurred were noted and corrected.

- ***User Acceptance Testing***

The system software was given to the respected users of the software to check whether all their expectations from the new system were met and if it really functions well and correctly. Hence, the users wrote some cases to confirm the functioning of the new system on their computers in their working and organizational atmosphere.

## **White Box Testing**

Krutchen. P (2008) white box testing is a technique that considers the inner structure of the software system in contrast to its functionality (hence opposite of black box testing). White box testing can also be referred to as transparent box testing and also structural testing among other names meaning that there is actual viewing of the system's code, the inner workings of the system as well as the logic involved. The following are the different types of white box testing used:

- ***Unit testing***

Unit testing involved the checking of a single form if it was coded appropriately and that it does not have any errors on it before it is aggregated as a system. In this case after the coding of the booking form it was tested to check if does not have any complications on it that needs any attention before it was linked with the complete code. This made it easier to deal with any errors before they could be identified in a completed code set-up.

- ***Integration testing***

This is when the hardware and software components are both joined to check if they interact together properly without any complications. Thus, it involved combining the booking forms, registration forms, the client computers as well the whole code of the system to check if they were functioning properly.

- ***Regression testing***

Regression testing results in the retesting of the software system to prove and confirm that all the alterations made did not cause any negative effects on the system as well as meeting the users' requirements and specifications.

### **5.3.2 Strategies for testing**

The testing strategies are used for confirming the functionality and working of all the programs that are involved in the system. Errors were identified during the testing process and hence there was need for validation and verification of the system's program.

## **Verification**

According to Boehm, B.W. (1999), validation is a process of inspecting whether the proposed system meets the specified requirements of the system and accomplishes what it is supposed to

do exactly. Verification is being sure of whether we are building and implementing the system the right way and is it meeting all the user's needs as specified. The most important question raised was whether the system was built the right way and was it able to specify the need of the organization. System reviews were done to mend some errors and some complications that were raised since some objectives were not clearly met and satisfied.

### **Validation**

The process of proving and checking that the correct data and information is being entered into the system is referred to as validation, Boehm, B.W. (1999). It is considering that the system has been fed with the right information and it has to deny access in case of wrong data being entered.

Some of the checks that are so important to confirm on validation are:

- The login details or client's credentials that is the username and the password. The system must prove whenever there might be a wrong password or username entered.
- The client must not exceed the credit limit assigned to him or her. This means that when the client exceeds the credit limit he or she must be denied the right to finalize the cart.

### **Objective Evaluation and System Performance**

One of the techniques of proving whether the system has been successful is to confirm whether the objectives stated initially were met in the system. Therefore this stage is going to illustrate how these objectives were met in the system by showing the screen shot that illustrate each objective.

The system should give allowance to those customers who want to order for the drinks and it must respond to the inquiries of the customers as soon as the inquiries are received.



*Fig 5.1: Ordering of the products*

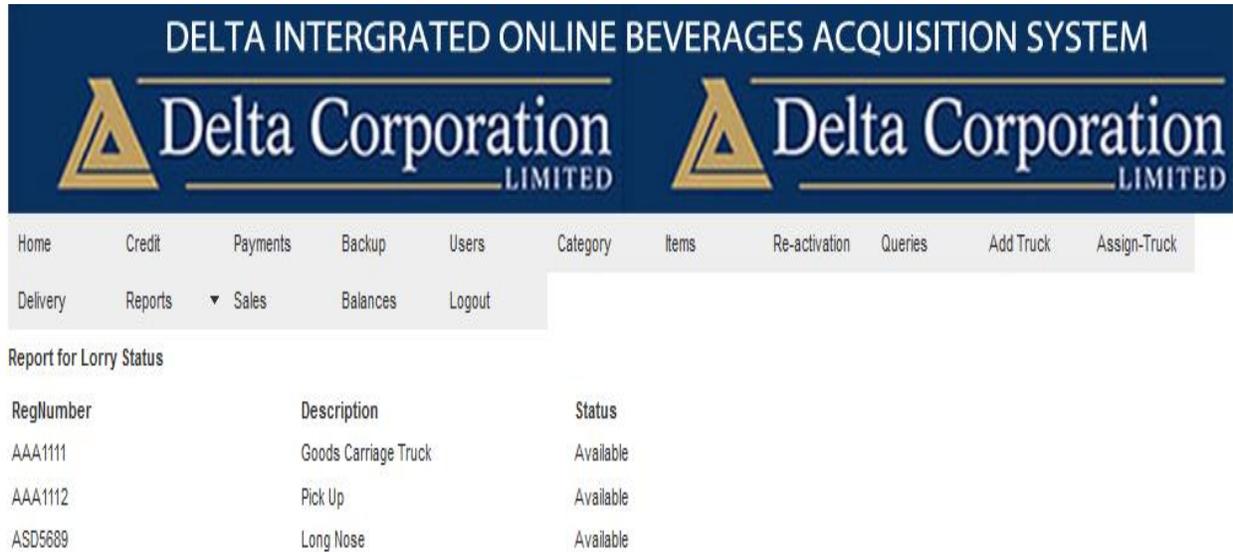
The system should be able to identify all the stock that is available in the system and also show the stock's prices.

The screenshot displays the 'DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM' interface. At the top, there is a navigation menu with options: Queries, Home, Profile, Balance, Order, Logout, and Track. Below the navigation is a 'SHOPPING CART FOR DELTA' section. On the left, there is a table with columns for Name, Quantity, and Price, and a 'Total Price' field showing '\$'. A 'Finalise Cart' button is present. On the right, there is a 'Category' dropdown set to 'Mineral Water' and a 'Submit' button. Two products are listed:

Good Description	Price	Status
Beer	\$3	Available
Castle lager	\$1	Available

Fig 5.2 Showing status of the products

To show all trucks that are available for delivering clients' products whenever there is need for delivery.



The screenshot displays the Delta Corporation Limited online system interface. At the top, a dark blue banner contains the text "DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM" and two instances of the Delta Corporation Limited logo. Below the banner is a navigation menu with items: Home, Credit, Payments, Backup, Users, Category, Items, Re-activation, Queries, Add Truck, Assign-Truck, Delivery, Reports, Sales, Balances, and Logout. The "Sales" menu item is expanded, showing a "Report for Lorry Status". Below this, a table lists three trucks with their registration numbers, descriptions, and statuses.

RegNumber	Description	Status
AAA1111	Goods Carriage Truck	Available
AAA1112	Pick Up	Available
ASD5689	Long Nose	Available

*Fig 5.3 Trucks available for delivery*

To display and track batch sales made by the client in procuring the products from order to delivery.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM

Home   Profile   Balance   Order   Track   Query   Reply   Logout

<p><b>SHOPPING CART FOR DELTA</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Name</th> <th style="text-align: left;">Quantity</th> <th style="text-align: left;">Price</th> </tr> </thead> <tbody> <tr> <td colspan="2">Total Price</td> <td style="text-align: right;">\$</td> </tr> </tbody> </table> <p style="text-align: center;"> <input type="button" value="Finalise Cart"/> <span style="margin-left: 100px;">Empty_Cart</span> </p>	Name	Quantity	Price	Total Price		\$	<p><b>Details of buyer:</b></p> <p>             Firstname      blessed              Surname        blessed              National ID    11-1111111-A-11              Sex              Female              Address        111 Westgate              Phone Number  7771111111         </p> <p><b>Batch Status</b></p> <p>Batch Delivered</p> <p><b>Detailed Transaction</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Good Category</th> <th style="text-align: left;">Good Description</th> <th style="text-align: right;">Price</th> <th style="text-align: right;">Quantity</th> <th style="text-align: right;">Total</th> </tr> </thead> <tbody> <tr> <td>Schweppes</td> <td>Schweppes</td> <td style="text-align: right;">\$3</td> <td style="text-align: right;">150</td> <td style="text-align: right;">\$450</td> </tr> <tr> <td>Mineral Water</td> <td>Pure Water</td> <td style="text-align: right;">\$1</td> <td style="text-align: right;">50</td> <td style="text-align: right;">\$50</td> </tr> <tr> <td colspan="4"><b>Total Sales</b></td> <td style="text-align: right;"><b>\$500</b></td> </tr> </tbody> </table>	Good Category	Good Description	Price	Quantity	Total	Schweppes	Schweppes	\$3	150	\$450	Mineral Water	Pure Water	\$1	50	\$50	<b>Total Sales</b>				<b>\$500</b>
Name	Quantity	Price																									
Total Price		\$																									
Good Category	Good Description	Price	Quantity	Total																							
Schweppes	Schweppes	\$3	150	\$450																							
Mineral Water	Pure Water	\$1	50	\$50																							
<b>Total Sales</b>				<b>\$500</b>																							

*Fig 5.4 Sales date being reflected*

To allow the clients to trace (track) all the transactions made in procuring the products.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM

Delta Corporation LIMITED

Delta Corporation LIMITED

Queries Home Profile Balance Order Logout **Track**

SHOPPING CART FOR DELTA

Name	Quantity	Price
Total Price \$		

Finalise Cart

Empty\_Cart

Track Sales Online

BatchNo	Firstname	Surname	Nationalid	Sex	Address	Phone	Sale_Date	Total
1	Blessed	Gumbeze	12-345678-A-12	Female	Malborough Harare	774896589	22-09-2014	\$170
2	Blessed	Gumbeze	12-345678-A-12	Female	Malborough Harare	774896589	26-09-2014	\$23
3	Blessed	Gumbeze	12-345678-A-12	Female	Malborough Harare	774896589	26-09-2014	\$6
4	Blessed	Gumbeze	12-345678-A-12	Female	Malborough Harare	774896589	29-09-2014	\$300
Total Sales								\$729

*Fig 5.5 Transactions made by the client*

## **5.4 Installation**

Installation refers to an act of making the software system ready for implementation and execution, that is according to Shawn.M (1996). This installation was carried out within Delta Beverages making use of the organization's network.

The following are the steps that were carried out during the installation of IODBA software system:

- The disc containing the software is installed in the computer.
- Mount the software system on the appropriate program file folder.
- Confirm that all the system's folders are properly mounted on the computer.
- Then add the data source of the system software (that is "IODBA" system)
- Now connect the system software's data source with the main server system hosting the database.
- That marks the end of the installation process of the new systems software.

## **User training**

This is the teaching given to the users of the system basing on the operation and functioning of the new system that is to be developed and used in the organization, Babar.M.A (2009). Each user will be trained in line with how he or she is going to use the system.

- Sales Clerks – the sales clerks will be trained on how to add the payment made the client to the system, attend to all cliental requests, to log into the new system, assign a vehicle to a client, check available stock and to retrieve the reports that will be produced after the daily sales.
- IT Specialists – they will be trained on troubleshooting the errors and problems that might occur and also to produce a backup of all the system's activities performed by the sales clerks.
- Sales Management - they will be trained on how to check all the transactions made by the clients, give access to clients who want to order for the products and also to download reports on daily sales.

Training plan will involve all the users of the system that is the IT specialists, the sales clerks as well as the sales management crew. The IT specialists will be involved in all the training sessions because they will be assisting the users in any challenges they are going to face and thus they need a clear overview of the whole processes and activities that are performed in the system.

**First Session:**

<b>Training Venue</b>	Delta Beverages SBs Training room 1, Graniteside
<b>Team being trained</b>	IT Specialists , Sales Clerks
<b>Areas to be trained</b>	How to retrieve daily reports of sales, attending to cliental booking requests, how to check the available stock and how to assign a delivery vehicle to a certain client.
<b>Hardware specifications</b>	Projector and Eight Computers
<b>System Trainer</b>	Tambirai. B. Chimbwanda (System developer)

*Table 5.1: Sales Clerks training*

**Second session:**

<b>Training Venue</b>	Delta Beverages SBs Training room 2, Graniteside
<b>Team to be trained</b>	IT Specialists, Sales Management
<b>Areas to be trained</b>	The functionality of IODBA system, how to retrieve daily sales reports, give credit access to the client and check available trucks for delivery.
<b>Hardware Specifications</b>	Projector, two laptops, two computers
<b>System Trainer</b>	Tambirai . B Chimbwanda (Systems Developer)

*Table 5.2: Sales Management training*

**Third session:**

<b>Training Venue</b>	IT office Delta Beverages SBs, Graniteside
<b>Team to be trained</b>	IT Specialists
<b>Areas to be trained</b>	Troubleshooting the System, how to handle errors, how to install the new system on users computers, updating the daily sales into the system and how to produce the transaction report.
<b>Hardware specifications</b>	Projector, three computers.
<b>System Trainer</b>	Tambirai. B. Chimbwanda (Systems Developer)

*Table 5.3: IT Specialists training*

**5.3.2 System Changeover and File conversion**

Conversion is a method of shifting from the old system and all its operations to a new developed system, Christine.H. (et al) (2007). Thus, whenever a new system is to be introduced, an organization will have to decide on the method they would want to use in system changeover. There are different methods that can be used and an organization can choose the method they consider as the best.

**Pilot conversion**

According to Broady, J.E (et al) (1994), pilot conversion is the rolling-out or shifting of the new system and all the relevant hardware and software to a certain selected cluster or part of users for them to test and evaluate how the system is performing. Thus, pilot conversion was performed in the Purchasing and Delivery office and each office had one sales clerk who used the system. The group was able to test the system's functionality and its effectiveness.

The advantage of using direct conversion is that there are reasonable costs incurred since the selected department will be operating using two systems consecutively. However, there are practical risks of failure because if the new system fails the department will have to continue with the old system, hence no loss of data.

### **Direct conversion**

Broady, J.E (et al) (1994) cited that direct conversion is a strategy that involves the wiping off of the old system and the beginning of operation of the new system, meaning that the old system will no longer be used entirely. All the departments in the organization will have to freeze the use of the old system and start to use the new system

The advantage of using this strategy is that the costs incurred are lower since only one system will be in use. But however, there is no room of backing up all the information used in the old system and there is a danger of losing more important information and disturbance of business daily activities if the new system fails to meet all the user requirements.

### **Phased conversion**

Laudon. K.C (1994) stated that phased conversion is when then new system is being gradually introduced in the organization and also in phases letting the users of the system grasp the operation of the new system slowly, getting used to it without facing any challenges, thus wiping-off the old system slowly.

This strategy is less expensive since the operation of the new system is done in phases and the risks only lies on the phase implemented. Also it allows the users to grasp the use of the new system at a lower speed.

### **Parallel conversion**

Parallel conversion is a strategy that involves the operation of both the old and the new system together for a certain period until a prearranged time when the old system will have to be withdrawn and there will be fulltime use of the new system, Laudon. K. C (1994). This means that the old system is not wiped off immediately when the new system has been developed. Therefore, some of the sales clerks used the manual way of capturing data and producing reports, whilst at the same time some other sales clerks used the automated way of attending the inquiry booking details of the clients. Any errors discovered were attended to such that there was no need of freezing the daily daily business operations because the old system was being used whilst the error was being attended to. By so doing it gave the users of the system the platform to

make final conclusions on whether to use the new system and also see clearly if it met their desired needs.

The advantage is that:

- There is safe shifting and movement of all the information from the old system to the new system
- There are lower levels of risks since back up options will be available

However:

- It is too expensive to operate using two different systems at the same time.

### **Conclusion made in relation to system conversion**

Parallel conversion strategy was recommended by Delta management because it was considered as the most perfect strategy compared to other conversion strategies since:

- It was proved that there will be room for back-up because the old system was also in use.
- There is room for comparing the operations of both the new and the old system thus easy to make conclusions.
- The users will be able to grasp the operations of the new system at a favourable speed since there will be a gradual change for the old system to a new system.

## **5.5 Maintenance**

Grubb et al (2003) defined software maintenance as the alteration, modification and improvement of new developed software after it has been delivered with the aim of improving its functionality, upgrading it as well as correcting some faults. This phase will explain the major categories of software maintenance that is adaptive maintenance, corrective maintenance and perfective maintenance.

### **Corrective maintenance**

According to April.A and Abran. A (2008), corrective maintenance is the responsive and sensitivity of the new developed software after it has been delivered to the site to correct any

problems discovered during its use. The errors would have occurred usually from wrong installation and application to an extent of performing incompletely. Thus, after the identification of the error, there will be need of some investigations to be carried out to check out the main causes of that error. It will be best to work on the solution of getting rid of that error and all its effects. When all has been done it will be advisable to correct all the effects discovered and there is need of some reviews to check whether the error has truly been dealt with completely, that during the corrections no new errors arose and also that it no longer causes any problems to the system. It will be wise also for that error to be noted down in case for future reference.

### **Adaptive maintenance**

According to Armstrong (2003), adaptive maintenance is the system software modification that is carried out after the software has been delivered to the respective organization to manage it in a dynamic (changed) environment. Therefore, the system was changed to meet the requirements of the users who were going to use it. Where there was a different platform of operating system and hardware being used, the software system was then changed to suit the new platform because of new advances in technology emerging.

### **Perfective maintenance**

Armstrong (2003) stated that perfective maintenance is when there is modification of the software system by improving its maintainability, functionality as well as the performance after it has been delivered to its respective site. The functional as well as the non-functional software system requirements that were created by the organization's users as the organization changes were also taken into account in this category. Hence, perfective maintenance resulted in meeting the stated objectives as well as testing the functionality of the system.

### **Preventive maintenance**

The is the maintenance that detects and corrects the likely errors affecting the system software in advance before they cause more effective damage, April.A and Abran. A (2008). Therefore, in order for the organization to lower total costs incurred there was a need for pre-release maintenance.

Therefore, just because of limited funds the adaptive and corrective maintenance were used, however there were some promises of reserving funds in future to cater for all the maintenance methods since they are all important to the well-being of the software.

### 5.5.1 Disaster recovery

Disaster discovery plan is a term used to describe a process of taking measures as well as procedures that are meant to protect all the organization’s IT infrastructure in the case of a disaster, Thomas M. (1996). The disaster discovery plan is very relevant and important for IODBA system since it will result in recovery and prevention of loss of data in an event where there might be hardware or software failure. Weekly back-up of data will have to be done in external drives and on the terminal servers.

The following is a back-up plan that needs to be maintained properly as it is essential to the organization.

<b>What activity</b>	<b>Appropriate time for the activity</b>	<b>Where it will be stored.</b>
Back-up of the software system (Application) Setup Files.	Every quarter of the year	IT Back-up or Storage room, Delta Beverages SB’s IT room.
Back-up Plan for the database.	7:30a.m Daily	Delta Beverages SB’s IT room.

**Table 5.4: Backup plan**

### 5.5.2 Recommendations

IODBA system has been considered a successful project, hence there are some essential and very important recommendations that need to be followed and clarified:

- It is important to comply, observe and also maintain the security measures that have been stated to safeguard private and confidential data.
- There should be a plan that will cater for all the maintenance methods, the back-up plan should be done as specified and also maintenance should be taken seriously because it

contributes more to the failure of hardware and software ,thus results in more costs to be incurred.

- It would be very wise if the users of the system will be trained effectively to minimise errors and promoting effective day to day running of the business thus resulting in an increase in the organization's sales.

## **5.6 Conclusion**

This section has clarified more on the developed software and has revealed more ideas on how to maintain the software which has been discussed under the maintenance phase. Also more testing has been done to prove the working and functionality of the system, which has been explained more in system testing. Therefore, all the information has been discussed to ensure the up-keeping of the new system.

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# APPENDICES

## Appendix A: User Manuals

The first thing that a client does when he or she logs into the system is to register with the organization.

**Client registration form-** the following screen shot shows how the client registers with the organization the first time he or she logs onto the system.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM

Delta Corporation LIMITED

Delta Corporation LIMITED

Home

NB: Attach your National ID / Police Clearance in order to have your account activated

Firstname

Surname

National ID  -  - A

Sex

Address

Phonenumber

Username

Password

Confirm Password

National ID/Police Clearance  No file selected.

## Login form

The login form shows how the administrators of the system and the client logs onto the system (thus one has to choose where appropriate). Only registered individuals with valid credentials are able to login.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM



Home Register

**Brands**

**Drinks**

- .....Coca Cola
- .....Fanta
- .....Cream Soda
- .....Sprite
- .....Pine Nut
- .....Cherry Plum

**Mineral Water**

- .....Natural
- .....Chibuku

..Register Online  
..Acquire Credit Limit  
..Buy Online  
..Track Delivery

**ADMIN LOGIN**

Username

Password

**CUSTOMER LOGIN**

Username

Password

Overview



Delta Corporation is a broad-based company with interests in beverages (manufacturing and distribution) and the Agro Industrial sectors. It is listed on the Zimbabwe Stock Exchange and is one of the top quoted companies in terms of market capitalisation.

Its beverage business manufactures and distributes Lager beer, Traditional Sorghum beer and Sparkling Soft Drinks.

## Client's main menu

After the client has successfully logon to the system, the following form appears that is the client's main menu.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM

 **Delta Corporation**  
LIMITED

 **Delta Corporation**  
LIMITED

Queries   Home   Profile   Balance   Order   Logout   Track

---

SHOPPING CART FOR DELTA

Name	Quantity	Price
Total Price		\$

  [Empty\\_Cart](#)

## Client's booking form

This form is the booking form whereby the client orders for his or her desired products.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM

 **Delta Corporation**  
LIMITED

 **Delta Corporation**  
LIMITED

Queries   Home   Profile   Balance   Order   Logout   Track

---

SHOPPING CART FOR DELTA

Name	Quantity	Price	
Pure Water	3	1	Delete
Total Price		\$3	

  [Empty\\_Cart](#)

Category: Mineral Water



Good Description: Pure Water  
Price: \$1  
Status: Available

## Add truck to the system

This form shows the procedure that the sales clerk undergoes in adding a new truck into the system.

The screenshot shows the 'ADD TRUCK DETAILS' form within the Delta Corporation system. The header includes the system name 'DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM' and the company logo 'Delta Corporation LIMITED'. A navigation menu contains links for Home, Credit, Payments, Backup, Users, Category, Items, Queries, Add Truck, Reports, Sales, Balances, and Logout. The form fields are: 'Reg Number' (a text input field), 'Truck Description' (a large text area), and a 'Submit' button.

## Payment form

This form shows how the administrator enters the payment made by the client into the system.

The screenshot shows the 'PERSONAL DETAILS' form within the Delta Corporation system. The header and navigation menu are identical to the previous form. The form fields are: 'Firstname' (Blessed), 'Surname' (Gumbeze), 'NationalID' (12-345678-A-12), 'DEPOSIT Amount' (a text input field), and a 'Submit' button.

## Balance form

This form shows all the balances that a client has and also shows the credit limit of the client.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM

Delta CorporationLIMITEDDelta CorporationLIMITED

[Home](#)   [Credit](#)   [Payments](#)   [Backup](#)   [Users](#)   [Category](#)   [Items](#)   [Queries](#)   [Add Truck](#)   [Reports](#)   [Sales](#)

[Balances](#)   [Logout](#)

**Report Balance**

Nationalid:

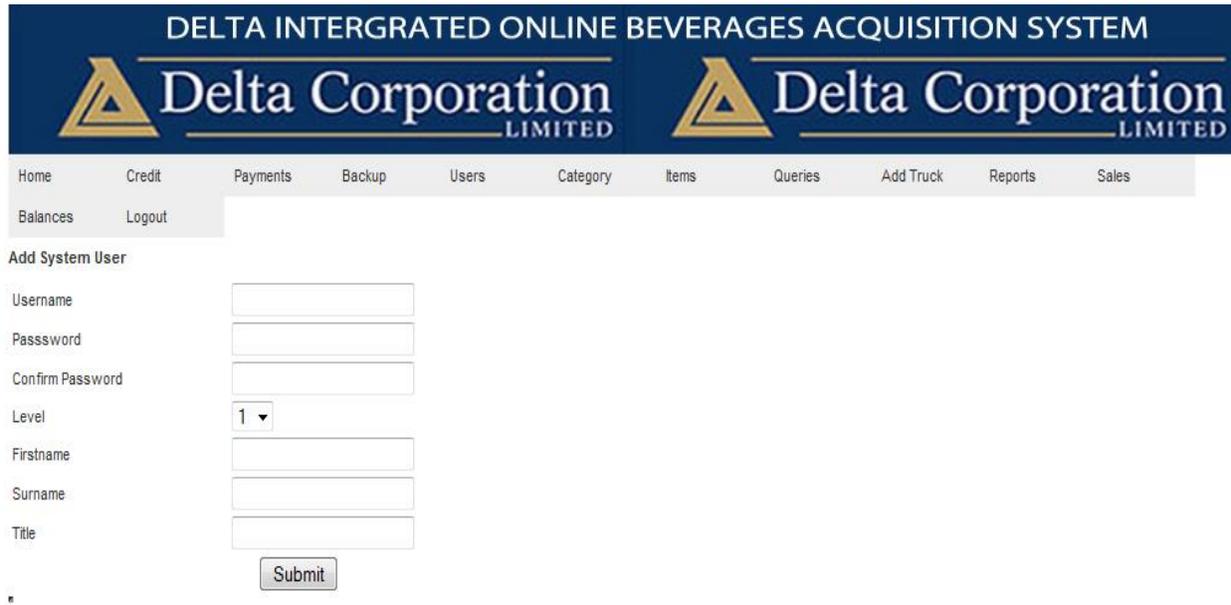
Firstname	Diago
Surname	Coaster
National ID	12-1234567-A-12
Sex	Male
Address	123 MSU
Phonenumber	777222444
Payslip	<a href="#">Download Payslip</a>
Account Created	29-09-2014
Status	Account Activated

Balance:

Total Deposit	\$
Total Transactions	\$
Balance	\$0
Credit Limit	\$1000
You can buy for:	\$1000

## Adding a new user into the system (administrator's side)

This form shows how a new administrator is added into the system and it also reflects the kind of level that the administrator is supposed to have that depends with the access rights he or she is going to have in the system.



The screenshot displays the 'DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM' interface. At the top, there is a dark blue header with the Delta Corporation logo and name. Below the header is a navigation menu with the following items: Home, Credit, Payments, Backup, Users, Category, Items, Queries, Add Truck, Reports, Sales, Balances, and Logout. The 'Users' menu item is highlighted. The main content area is titled 'Add System User' and contains the following form fields:

- Username:
- Password:
- Confirm Password:
- Level:  (dropdown menu)
- Firstname:
- Surname:
- Title:

A 'Submit' button is located at the bottom of the form.

## Tracking the transactions made

This form shows all the transactions that the client has performed. The client will be able to view all the transactions made.

DELTA INTERGRATED ONLINE BEVERAGES ACQUISITION SYSTEM


Delta Corporation  
LIMITED

Delta Corporation  
LIMITED

[Queries](#) | [Home](#) | [Profile](#) | [Balance](#) | [Order](#) | [Logout](#) | [Track](#)

SHOPPING CART FOR DELTA				Track Sales Online									
<b>Name</b>	<b>Quantity</b>	<b>Price</b>			<b>BatchNo</b>	<b>Firstname</b>	<b>Surname</b>	<b>Nationalid</b>	<b>Sex</b>	<b>Address</b>	<b>Phone</b>	<b>Sale_Date</b>	<b>Total</b>
Pure Water	3	1	<a href="#">Delete</a>	1	Blessed	Gumbeze	12-345678-A-12	Female	23	Malborough Harare	774896589	22-09-2014	\$170
Total Price		\$3		2	Blessed	Gumbeze	12-345678-A-12	Female	23	Malborough Harare	774896589	26-09-2014	\$23
<input type="button" value="Finalise Cart"/>			<a href="#">Empty_Cart</a>	3	Blessed	Gumbeze	12-345678-A-12	Female	23	Malborough Harare	774896589	26-09-2014	\$6
				4	Blessed	Gumbeze	12-345678-A-12	Female	23	Malborough Harare	774896589	29-09-2014	\$300
<b>Total Sales</b>												<b>\$729</b>	

**Appendix B: Interview questions**

**A GUIDE FOR THE INTERVIEWS FOR INTEGRATED ONLINE DELTA BEVERAGES ACQUISITION SYSTEM**

**Section A:**

- 1. Interviewer's name.....
- 2. Name of the organization .....
- 3. Interviewee's position & department.....

**Section B**

**Management and Employees**

1) As an organization how do you serve the clients when they want to procure their products?

.....  
.....  
.....

2) What are your views about the responds you get from the clients after they procure their products?

.....  
.....  
.....

3) Describe the problems and difficulties you are facing with the present manual system when you serve your clients?

.....

.....  
4) Does the current system allow clients to book for their products and delivery trucks? (If No explain why it does not allow to do so)

.....  
.....

5) Do you face any problems in producing sales reports and stock details with the current reports?

.....  
.....

6) Is the internet connection of your company reliable? (Comment on the reliability of the connections.)

.....  
.....  
.....  
.....

7) At the present moment what are your comments concerning the technology you are using? (That is if you are using any technology).

.....  
.....  
.....

8) What are your expectations from the proposed system (Integrated Online Delta Beverages Online Acquisition system)?

.....  
.....  
.....  
.....

**Clients**

1) What are your views about the current system at Delta Beverages CCD when you are procuring your products?

.....  
.....

2) How long do you wait before you are attended to and how does the waiting period affect you?

.....  
.....

3) Do you face any inconveniences whilst you are procuring your products with the current system?

.....  
.....

4) Does the current system allow you to book for any desired products and assign delivery trucks?

.....  
.....  
.....

5) Do you wish for any changes with the current system?(give your reasons)

.....  
.....

## Appendix C: Questionnaires

### QUESTIONNAIRE FOR INTEGRATED ONLINE DELTA BEVERAGES ACQUISITION SYSTEM.

I am Tambirai B. Chimbwanda a student at the Midlands State University in Zimbabwe currently undertaking Information Systems Honours Degree. In order for me to fulfill all the requirements of this degree I have to provide a functioning, working as well as running software system. Hence, this questionnaire is meant to discover and find evaluate the requirements of the proposed system (that is Integrated Online Delta Beverages Acquisition System).

Therefore, may you kindly please assist me with the information that is required by this questionnaire. I also promise to safeguard all the information that you are going to provide meaning that all the information will be considered private and confidential. Your cooperation is highly appreciated. Thank you.

( PUT A TICK WHERE RELEVANT )

#### Management and employees

- 1) As the users of the current system, what can you say about the functionality and performance when you are attending your clients during their acquisition process?

EXCELLENT       GOOD       FAIR       POOR

- 2) Is the current system always reliable when you serve your clients?

AGREE       STRONGLY AGREE       DISAGREE

Give reasons for your answer if you disagree

.....  
.....

3) Is the current system efficient when the clients wants to book for their products?

EXCELLENT                       GOOD                       POOR

4) Do you often experience busy stressful days because of client's physical attention to your premises?

OFTEN                       VERY OFTEN                       LESS OFTEN

5) Comment on the current system's technology?

.....  
.....

6) What can you say about the new system (Integrated Online Delta Beverages Acquisition System )?

.....  
.....

7) Comment on how cliental data and information, sales information and also stock details is secured in the current system?

.....  
.....  
.....

**Thank you very much for your co-operation. Good day!!**

**Clients**

6) What are your views about the current system at Delta Beverages CCD ?

EXCELLENT       BETTER       GOOD       POOR

7) How long do you wait before you are attended to?

*Approximately:*

5-10 mins       10-15 mins       20-30 mins       30 or more mins

8) Do you face any inconveniences whilst you are procuring your products?

MOST OF THE TIMES       VERY OFTEN       NOT AT ALL

9) What kinds of problems do you face with the current system when you want to procure your products?

.....  
.....  
.....

10) Does the current system allow you to book for any desired products and assign delivery trucks?

.....  
.....

11) Do you wish for any changes with the current system?(give your reasons)

.....  
.....

**Thank you very much for your co-operation. Good day!!**





## Appendix E: Snippet of code Connection to the database

```
<?php  
  
mysql_connect("localhost","root","");  
  
mysql_select_db("abc");  
  
?>
```

## Client registration

```
<body>  
  
<p><strong>NB: Attach your National ID / Bank Statement in order to have your account  
activated</strong></p>  
  
<form action="" method="post" enctype="multipart/form-data" name="form1"  
target="laststage" id="form1"  
onsubmit="MM_validateForm('firstname','R','surname','R','id1','RisNum','id2','RisNum','id  
4','RisNum','phonenumner','RisNum','username','R','password','R','password1','R','address'  
,','R');return document.MM_returnValue">  
  
<table width="643" border="0">  
  
<tr>  
  
<td>Firstname</td>  
  
<td><input type="text" name="firstname" id="firstname" /></td>  
  
</tr>  
  
<td>Surname</td>  
  
<td><input type="text" name="surname" id="surname" /></td>  
  
</tr>
```

<tr>

<td>National ID</td>

<td colspan="3"><input name="id1" type="text" id="id1" size="2" maxlength="2" />

-

<input name="id2" type="text" id="id2" size="7" maxlength="7" />

-

<select name="id3" id="id3">

<option value="A">A</option>

<option value="B">B</option>

<option value="C">C</option>

<option value="D">D</option>

<option value="E">E</option>

<option value="F">F</option>

<option value="G">G</option>

<option value="H">H</option>

<option value="I">I</option>

<option value="J">J</option>

<option value="K">K</option>

<option value="L">L</option>

<option value="M">M</option>

<option value="N">N</option>

```
<option value="O">O</option>
<option value="P">P</option>
<option value="Q">Q</option>
<option value="R">R</option>
<option value="S">S</option>
<option value="T">T</option>
<option value="U">U</option>
<option value="V">V</option>
<option value="W">W</option>
<option value="X">X</option>
<option value="Y">Y</option>
<option value="Z">Z</option>
</select>
<td><select name="sex" id="sex">
<option value="Female">Female</option>
<option value="Male">Male</option>
</select></td>
</tr>
<tr>
<td>Address</td>
<td><textarea name="address" id="address" cols="45" rows="5"></textarea></td>
```

```
</tr>
```

```
<tr>
```

```
<td>Phonenumber</td>
```

```
<td><input type="text" name="phonenumber" id="phonenumber" /></td>
```

```
</tr>
```

```
<tr>
```

```
<td>Username</td>
```

```
<td><label>
```

```
<input type="text" name="username" id="username" />
```

```
</label></td>
```

```
</tr>
```

```
<tr>
```

```
<td>Passsword</td>
```

```
<td><label>
```

```
<input type="password" name="password" id="password" />
```

```
</label></td>
```

```
</tr> <tr>
```

```
<td>Confirm Password</td>
```

```
<td><label>
```

```
<input type="password" name="password1" id="password1" />
```

```
</label></td>
```

```

</tr>

<tr>

<td>National ID/ Police Clearance</td>

<td><input type="file" name="picture" id="picture" /></td>

</tr>

<tr>

<td colspan="2" align="center"><input type="submit" name="submit" id="submit"
value="Submit" /></td>

</tr>

</table>

</form>

<?php
if(isset($_POST['button']))
{
    if(is_numeric($_POST['firstname']))
    {
        ?>

<script language="javascript">

    alert("Enter Characters on firstname");

</script>

<?php

```

```
        exit();
    }

    if(is_numeric($_POST['surname']))
    {
        ?>

<script language="javascript">
    alert("Enter Characters on surname");
</script>

<?php
    exit();
}

/* if(is_numeric($_POST['nationality']))
{
    ?>

    <!--

    <script language="javascript">
    alert("Enter Characters on nationality");
</script>

    <?php
    exitit();

    } */
```

```
if(($_POST['password'])<>($_POST['password1']))  
  
{  
  
?>
```

```
<script language="javascript">  
  
alert("Password Mismatch");  
  
</script>
```

```
<?php  
  
exit();  
  
}
```

```
if( strlen($_POST["id1"]) < 2)  
  
{  
  
?>
```

```
<script language="javascript">  
  
alert("Invalid input on 1st National ID input");  
  
</script>
```

```
<?php  
  
exit();  
  
}
```

```
if( strlen($_POST["id2"]) < 6)
```

```
    {
        ?>
<script language="javascript">
    alert("Invalid input on 2nd National ID input");
</script>
<?php
    exit();
}
if( strlen($_POST["id4"]) < 2)
{
    ?>
<script language="javascript">
    alert("Invalid input on 3rd National ID input");
</script>
<?php
    exit();
}
    if( strlen($_POST["phonenummer"]) < 10)
    {
        ?>
<script language="javascript">
```

```
alert("Invalid Phonenumber");

</script>

<?php
exit();

    }

    if( strlen($_POST["onenumber"]) > 15)

    {

        ?>
```

```
<script language="javascript">
```

```
alert("Invalid Phonenumber");
```

```
</script>
```

```
<?php
```

```
exit();
```

```
}
```

```
if( strlen($_POST["password"]) < 6)
```

```
{
```

```
?>
```

```
<script language="javascript">
```

```
alert("Password should be more than 6 characters");
```

```
</script>
```

```
?>
```

```
alert("Member account already exist");
```

```
</script>
```

```
alert("Username Exist");
```

```
}
```

```
<?php
```

```
}
```

```
?>
```

### **Login to the system**

```
<?php
```

```
include "includes/opendb.php";
```

```
?>
```

```
<h2>ADMIN LOGIN</h2>
```

```
<form id="form1" method="post" action="adminlogindetails.php">
```

```
<td>Username</td>
```

```
<td><label>
```

```
<input name="username" type="text" id="username" size="15" />
```

```
</label></td>
```

```
</tr>
```

```
<td>Password</td>
```

```
<td><label>
```

```
<input name="password" type="password" id="password" size="15" maxlength="20" />
```

```
<input type="submit" name="Submit" value="Submit" />
```

```
<h2>CUSTOMER LOGIN</h2>
```

```
<p><form id="form2" method="post" action="indexdetails.php">
```

```
<tr>
```

```
<td>Username</td>
```

```
<td><label>
```

```
<input name="username" type="text" id="username" size="15" maxlength="20" />
```

```
</label></td>
```

```
</tr>
```

```
<tr>
```

```
<td>Password</td>
```

```
<td><label>
```

```
<input name="password" type="password" id="password" size="15" maxlength="20" />
```

```
</label></td>
```

```
</tr>
```

```
<tr>
```

```
<input type="submit" name="Submit2" value="Submit" />
```

```
<?php
```

```
}  
  
}  
  
?>
```

## Ordering of products

```
<?php  
  
$rs3=mysql_query("select * from category") or die(mysql_error());  
  
while($row3=mysql_fetch_array($rs3))  
  
    { ?>  
  
        <option value="<?php echo $row3["id"]; ?>"><?php echo $row3["good_category"];  
?></option>  
  
<?php  
  
}  
  
?>  
  
    </select></td>  
  
</tr>  
  
<tr>  
  
    <td colspan="2" align="center"><input type="submit" name="button" id="button"  
value="Submit"></td>  
  
</tr>  
  
</table>  
  
</form>
```

```

<?php
if(isset($_POST['button']))
{
    $rs=mysql_query("select goods.*,category.good_category from goods,category where
category.id=goods.categoryid and category.id='".$_POST[category]'"") or die(mysql_error());

    ?>

<?php
    while($row=mysql_fetch_array($rs))
    {
        ?><a href="userhome.php?link=shopping_cartquantity.php&productid=<?php echo
$row["id"]?>">
<tr>
<td><strong>Good Description</strong></td>
<td><?php echo $row["good_description"]; ?></td>
</tr>
<td><strong>Price:</strong></td>
<td><?php echo "$".$row["price"]; ?></td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td>
<?php

```

```

if($row["status"]==1)

{

echo "Available";

}else

{

echo "Not Available";

}

?>

<?php

    }

?>

```

### **Report on sales**

```

<?php

if(isset($_POST['button']))

{

$date1=strtotime("$_POST[startdate]");

$date2=strtotime("$_POST[enddate]");

$rs=mysql_query("select
                    batch.id
                    as
batchid,batch.customerid,batch.total,batch.bdate,customer.*
from batch,customer
where
bdate>='$date1' and bdate<='$date2' and customer.id=batch.customerid") or die(mysql_error());

$rs1=mysql_query("select sum(total) as totalsales
from batch
where bdate>='$date1' and
bdate<='$date2'") or die(mysql_error());

```

```
$row1=mysql_fetch_array($rs1);

$totalsales=$row1["totalsales"];

if($date1 > $date2)

{

?>

<script language="javascript">

alert("Invalid Date Range");

</script>

<?php

exit();

}

?>

</p>

<p>&nbsp;</p><table width="86%" border="0">

<tr>

<td><strong>BatchNo</strong></td>

<td><strong>Firstname</strong></td>

<td><strong>Surname</strong></td>

<td><strong>Nationalid</strong></td>

<td><strong>Sex</strong></td>

<td><strong>Address</strong></td>
```

```

<td><strong>Phone</strong></td>

<td><strong>Sale_Date</strong></td>

<td><strong>Total</strong></td>

</tr>

<?php
while($row=mysql_fetch_array($rs))
{
//$date=date("d-m-Y",$row["dob"]);
$date1=date("d-m-Y",$row["bdate"]);
?>

<tr>

<td><a href="adminhome.php?link=reports/report_detailedsale.php & batchid=<?php echo
$row["batchid"]; ?>"><?php echo $row["batchid"]; ?></a></td>

<td><?php echo $row["firstname"]; ?></td>

<td><?php echo $row["surname"]; ?></td>

<td><?php echo $row["nationalid"]; ?></td>

<td><?php echo $row["sex"]; ?></td>

<td><?php echo $row["address"]; ?></td>

<td><?php echo $row["phonenummer"]; ?></td>

<td><?php echo $date1; ?></td>

<td><?php echo $row["total"]; ?></td>

```

</tr>

<?php

}

?>

<tr>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

</tr>

<tr>

<td colspan="3"><strong>Total Sales</strong></td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

<td>&nbsp;</td>

```
<td><?php echo "$".@$totalsales; ?></td>

</tr>

</table>

<?php
}
?>
```

### **Logout code**

```
<?php

session_start();

unset($_SESSION['id']);

unset($_SESSION['username']);

unset($_SESSION['logged']);

unset($_SESSION['nationalid']);

unset($_SESSION['firstname']);

unset($_SESSION['surname']);

unset($_SESSION['level']);

?>

<script language="javascript">

alert("Logout Success");

window.location="index.php";

</script>
```