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Repositioning the Logistic Industry for Effective Service Delivery in Nigeria: A Case Study

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Abstract

The logistic sector remains one silent but vital component of the transportation sector in Nigeria. In developed countries of the world, the use of information and communication technology has brought tremendous transformation to different workplaces including the logistic industry in terms of speed, convenience, efficiency and wealth creation. Unfortunately, processes in the courier services in Nigeria are still being largely managed manually with its attendant security challenges, waste of time, storage etc. Through a system development life cycle methodology, this work developed a computerized courier mail tracking and management system with enhanced features using PHP and MySQL database. It was hosted on a WampServer and successfully implemented for Suvex Delivery Services Limited (SDSL).The platform does not only guarantee that processes in the logistics section are more secured and better organized for tracking and retrieval of relevant information, it ensures that effectiveness and efficiency remain the watch word in the logistics industry.

Keywords: Logistic industry; survex delivery services; courier mail tracking system; system development life cycle etc.

1. Introduction

The advent of the internet has brought remarkable changes to the logistic Industries. The courier tracking and management system is a great effort that attempt to show how the internet has proved its significance. It has helped in integrating shared information within the courier management system and also between the customers and the courier company. A website can prove as the best interface between the user and the company. This interface would serve as a platform for customers to request the status of their parcel and get instant responses regarding the present location of the parcels and how much more time it will take to reach its destination [3].

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Courier Mail Tracking and Management system would have two levels of users: the administrators and the customers. While the administrators manages the information about the parcel, register new customer, check parcel status, generate report and allow customers check the status of their package; the customers checks the status of parcels and view general delivery information

There are a number of identifiable challenges associated with manual operations in the logistic industry. These challenges range from poor database management system, security, storage to tracking system etc. In the manual system, the data preparation and entry operations are dependent mainly on people. As labour costs are high, the cost of preparing and entering the data is also high. The challenge of going through the massive number of records manually involves lots of time and patience. Computer can do a search job instantaneously with no wastage of time. Calculations by computer systems are much faster and error free than humans. More so, the medium of storage for manual maintenance is paper which is not a permanent and reliable medium, since it is easily susceptible to damage due to fire, insects, cyclones etc. It even involves security concerns. However, storage medium in computerized system is magnetic disk, which is a permanent storage device.

In case of manual maintenance, introducing changes such as changes in address or name fields may not be reflected correctly across many ledgers using them. The inconsistent data allows the errors to creep in and integrity of the data is lost. However, in computerized system a central database is maintained such that any changes made in any field is reflected uniformly in any module using them.

Tracking technologies in logistics networks are either non-existent or are implemented fairly little in the global technology industry. There is even no available tracking system between invoice and transportation. Customers get their ordered goods through calling or e-mailing the vendors and there do not exist real-time tracking and tracing technologies. This lack affects the network and relationship structures between courier companies and customers.

The aim of this work is to develop a computerized courier mail tracking and management system which will be used to manage the services offered by Suvex Delivery Services Limited (a courier organization) in an effective and efficient manner. The specific objectives include:

a. To develop a web based tracking application
b. To create a database for effective storage of information, easy access, retrieval and reporting
c. Creation of data security at different levels

This system would assist staff of Suvex Delivery Services Limited to generate annual report about parcel delivery, view the status of parcel, update parcel status, make data backup in a short time. This system hopes to include some advanced like which will bring about enhancements in data entry, better authentication processes and improved user friendliness.

The study was basically focused on addressing specific operational tasks such as packet tracking, pickup

request, rate calculation and posting comments through mail tracking. In the course of testing the application, issues related to poor level of computer appreciation, willingness of users to adopt the system as well as financial implications emanating from purchase of new systems to drive the technology were addressed through frequent interaction with different categories of staff, training and retraining.

1.1 Related Literature on Courier Services

Courier services are usually fast in delivery than any alternative method of transporting documents and many services in the modern world. Based on a widely used description, a typical parcel carrier transports shipments that are sufficiently small to be handled by one person without aid, which are often larger than a normal letter. The most commonly known parcel carriers in Europe include DHL Express, UPS, TNT Express and FedEx [5].

According to [5], the global parcel business generates revenues of approximately $180 billion per year; they have advanced greatly in developed countries with the use of information and communication product and services. In their research, the industry consists of companies that provide express delivery and pick-up services for documents and parcels in domestic and international areas. A typical express shipment is defined as being small enough to be handled by a single person without usage of any special equipment. Delivery is most commonly same-day, next-day or one-to-three-days due to the time-sensitive nature and content of the shipments, such as biological substances, spare parts or medical supplies.

As companies and consumers increasingly purchase goods online, the demand for express delivery services grows [5]. Furthermore, the growth of online retail sales has influenced the logistics industry for the past ten years and the trend is expected to continue at least on a similar level during the next few years. Traditionally, it was the consumers themselves, who performed the last mile logistics. In an e-commerce context, the set-up is completely different as consumers purchase goods online and the order fulfilment is being handled by the e-commerce provider [4].

Tracking has the ability to increase the productivity of administrative processes. It can help in initiating paperless systems, and can therefore enhance information accuracy and help minimize waste. The leading companies plan and evaluate their marketing strategy to survive and keep up with the rapid transformations in dynamic and competitive environment. Along with the globalization and the development of technologies, more and more companies have realized how complex the competitive situation is today. In order to make customer feel comfortable and safe, DHL has implemented DHL Interactive to give possibility to customers to track the shipping process [6].

Service delivery has a deliberate obligatory decision by the elected or appointed officials to serve or deliver goods and services to the recipients. Service delivery framework is a set of principles, standards, policies and constraints used to guide the design, development, deployment, operation and retirement of

services delivered by a service provider with a view to offering a consistent service experience to a specific user community in a specific business context. Service delivery framework is the context in which a service provider's capabilities are arranged into services [7].

According to [8], tracking technologies in logistics networks are implemented fairly little in the global technology industry. There is even no available tracking system between invoice and transportation. Customers got their ordered goods through calling or e-mailing the vendors and there do not exist real-time tracking and tracing technologies. This lack affects the network and relationship structures between manufacturers and potential customers. Thus industries need a concept, methods, tools and competencies to systematically develop their real-time tracking technologies for logistics network. Moving hundreds of thousands of shipments each day requires certain procedures in order to facilitate reasonable costs. The services provided by courier companies share some characteristics which differentiate them from other traditional forms of delivery services. The door to door services includes seamless transfer across multiple nodes of transport. The 'integrated' aspect of the service offered frees the customer from the need to make complex transportation arrangements for pickup and deliveries. The close custodial control uses sophisticated information systems that enhance security. Track and trace technology shippers and consignees may track the precise movement and location of their shipments and confirm delivery with the use of sophisticated track and trace technology that a courier service provides. Therefore, these small parcels need to be combined into larger units based on the routing and final destination. This procedure basically defines how parcel carriers operate.

This is a necessity, as the accessibility of delivery status at any time and the immediate notification of delays or other delivery problems are regarded as basic information needs in the logistics chain [11].

From the research findings of [8], analysis of external and internal factors show that the competitive advantages of DHL are related to customer satisfaction, hi-tech transportation service and sustainable program. The long-term relationship with customer brings win-win situation to both parties, which means DHL makes customer feel safe and happy. Hi-tech service seems to attract more and more potential customers. Besides, if DHL can learn something complementary from other companies, or improve teamwork spirits, it must have another important competitive advantage.

While stressing the need for wide research into the adoption of ICT applications into the logistic industry, [2] posited that many contributions are taking the "public transportation" perspective, that only few has focused on the viewpoint of the private companies offering logistics and transportation services. In a similar dimension, [3] developed a website in India that contains information about user function such as booking the couriers and services, loading the collection of lots in the selected consignments in container as well as administrator function such as office registration, creating user, viewing suggestions and complaints of user, adding new cities and states, view the status of consignment etc.

1.2 The Proposed System

After a detailed study of the existing system, it is evident that is does not fulfil the objective of the organization, hence, it is necessary to design and develop a new system. The proposed system is being designed in such a way that many users can have a view with the system simultaneously. It makes effective and perfect utilization of man power and resources. The salient features of courier tracking and management system are as follows:

The provision of online courier service, multiple user access login, packet tracking facility, access to pickup schedule, effective communication with admin etc. The proposed system is developed using the waterfall software development life cycle. The waterfall software development life cycle consists of following phase:

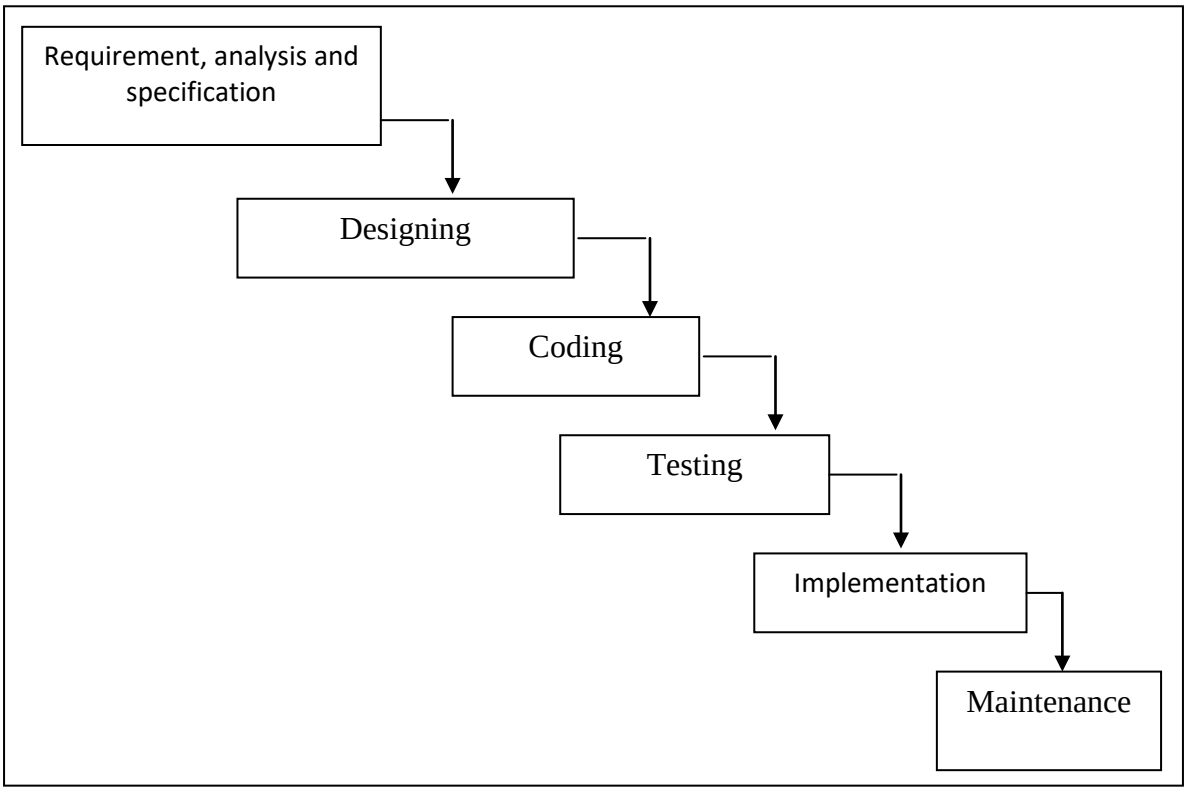

Figure 1: The waterfall software development cycle (Royce, 1970)

1.3.1 system analysis

To begin with solving the problem, firstly fact finding is done. For this purpose the researcher visited staffs and customers of Suvex Delivery Services Limited. From where the need of developing a portal which could provide the users with facility of performing different activities such as packet tracking , pickup request , rate calculation and posting comments through mail tracking.

Target users included: Administrators and customers. While administrators of SDSL request for valid user name and password for authentication, customers can query the database from the front end application to check the status of their parcel. Existing customers must insert a user name and password

to view history, parcel status and update information while a new customer can either signup or access the system directly without keying in login credentials.

The software will consist of the following input: a. Administrative information, Packet information, Branch information, Rate calculation, Network information.

The software will also consist of the following functions: (a) Update information related pickup request (b) Submit new record (c) Packet Delivery record (d) Employee Information (e) Collects the valuable Feedback. Outputs of software will include: (a) Report Generation (b) Branch Location (c) Packet Tracking.

1.3.2 system specification

The work is designed to support online courier management. The home page will provide all the above mentioned options. Also a search field will be provided to search services and helps to the category. Users can send their requests. Admin login option will be provided separately. Home page will describe the details regarding the courier service, and gives the consignment guidelines.

1.3.2.1 system modules

These modules with their sub modules are describe below: (a) User Module:

In this module, users can use various services by online. These services help the user to do their work effectively and efficiently. The services are following: (a) Pickup Request (b) Destination Locator (c) Consignment Guidelines (d) Expected date of delivery (e) Regional Services

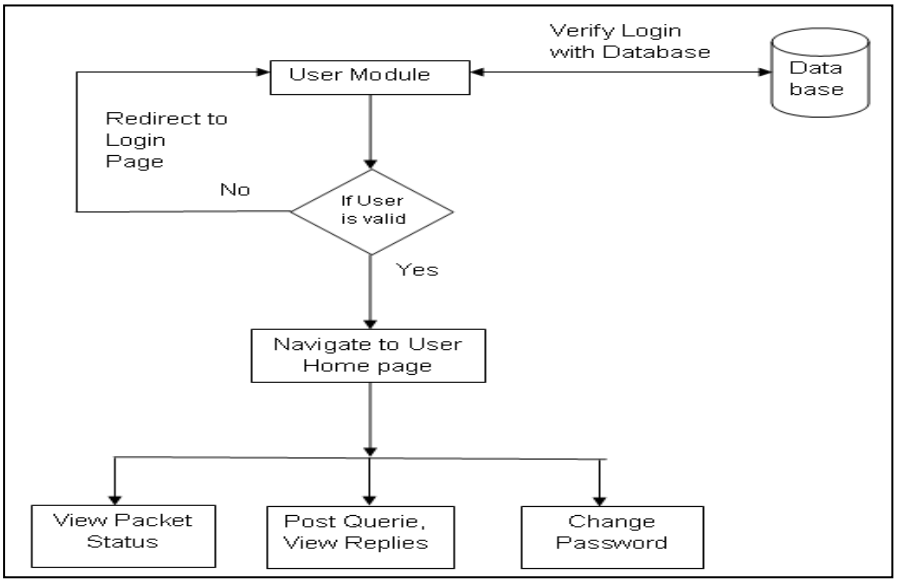

Figure 2: Flow chart of user module

(b) Branch Module: This module helps the branch admin to use various services after they logged on the courier tracking and management system. These services include: (a) New Record (b) Packet Dispatched (c) Employee Record (d) Message (e) Request.

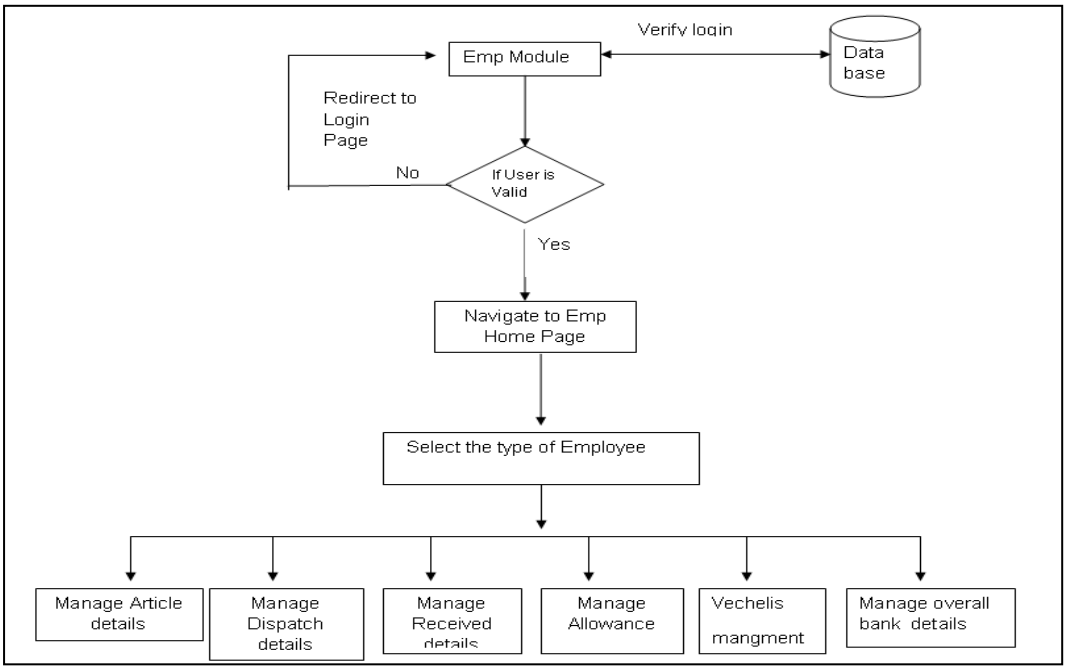

Figure 3: Flow chart of Branch employee module

(c) Admin Module : The Admin module helps the admin to do work with the different facility that helps to solve the problem of manual work and contact can be easily maintain with all (national) branches.

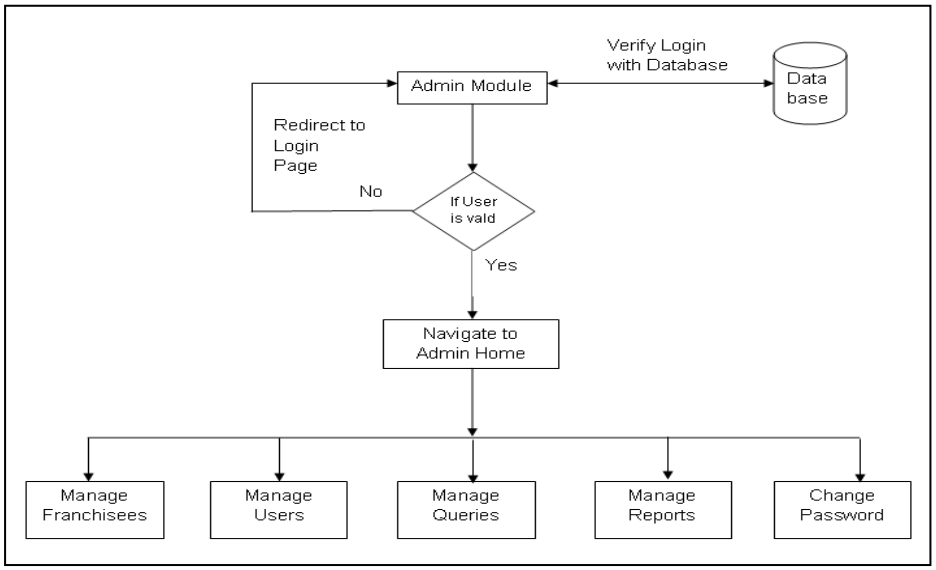

Figure 4: Flow chart of Admin Module

It includes the following sub modules: (a) Branch Creation, (b) Branch Termination, (c) Send Message,

(d) User request, (e) Request, (f) Update Branch, (g) Update Branch Services

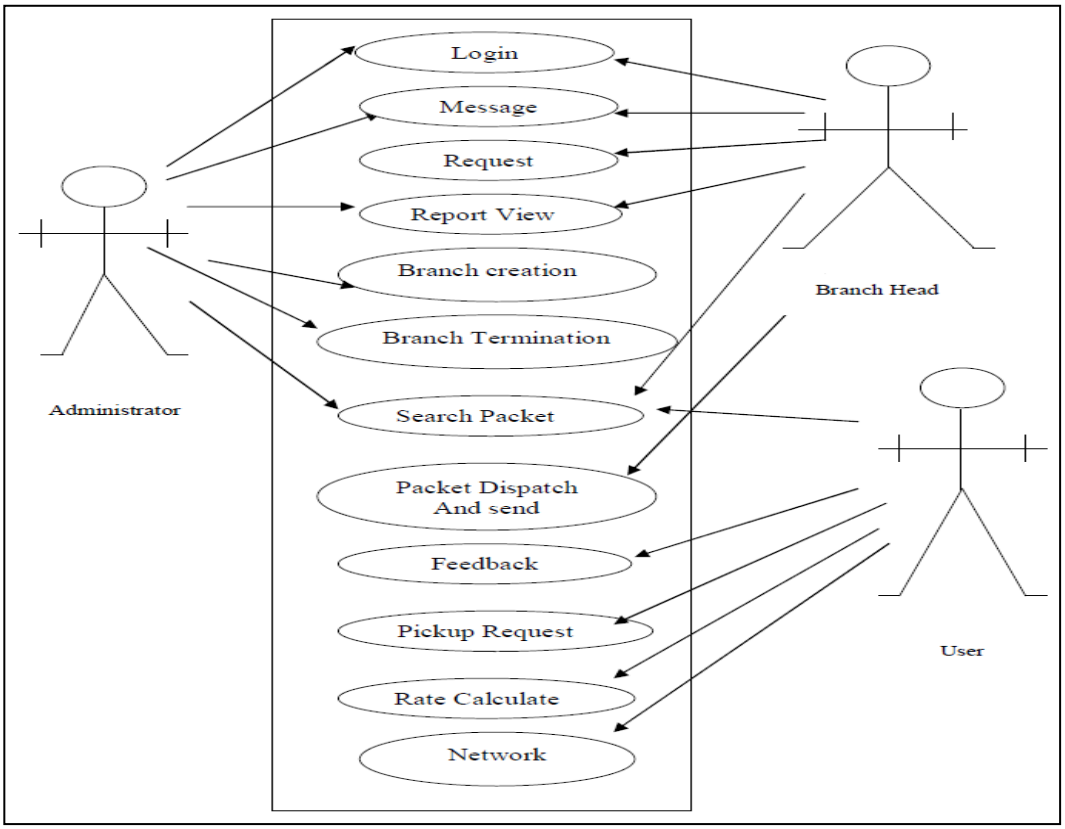

Figure 5: Flow chart of Admin Query Module

1.3.2.2 Database design

See figure 6.

1.3.3 Client / server environment

1.3.3.1 Hypertext markup language (html)

The Hypertext Markup Language (HTML) is a simple markup language used to create hypertext documents that are platform independent. HTML documents are SGML documents with generic semantics that are appropriate for representing information from a wide range of domains. HTML markup can represent hypertext news, mail, documentation, and hypermedia; menus of options; database query results; simple structured documents with in-lined graphics; and hypertext views of existing bodies of information.

1.3.3.2 Wamp server

WAMP is a windows based web development environment. It installs and configure PHP scripting

Language, MySQL database server, Apache web server and phpMyAdmin (to manage MySQL databases). WAMP is designed to offer an easy way to use PHP, MySQL and Apache all within one server.

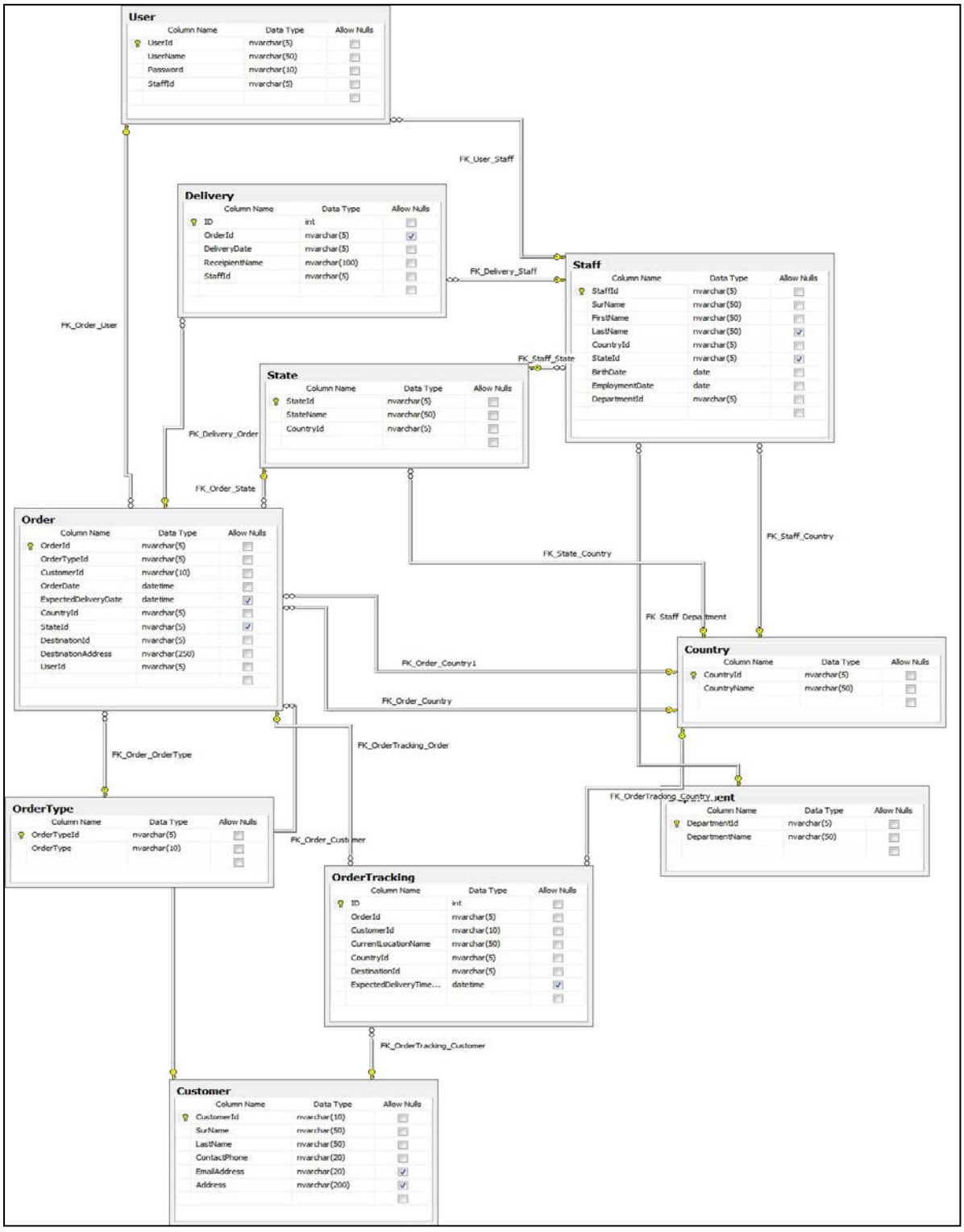

Figure 6: Database design for proposed model

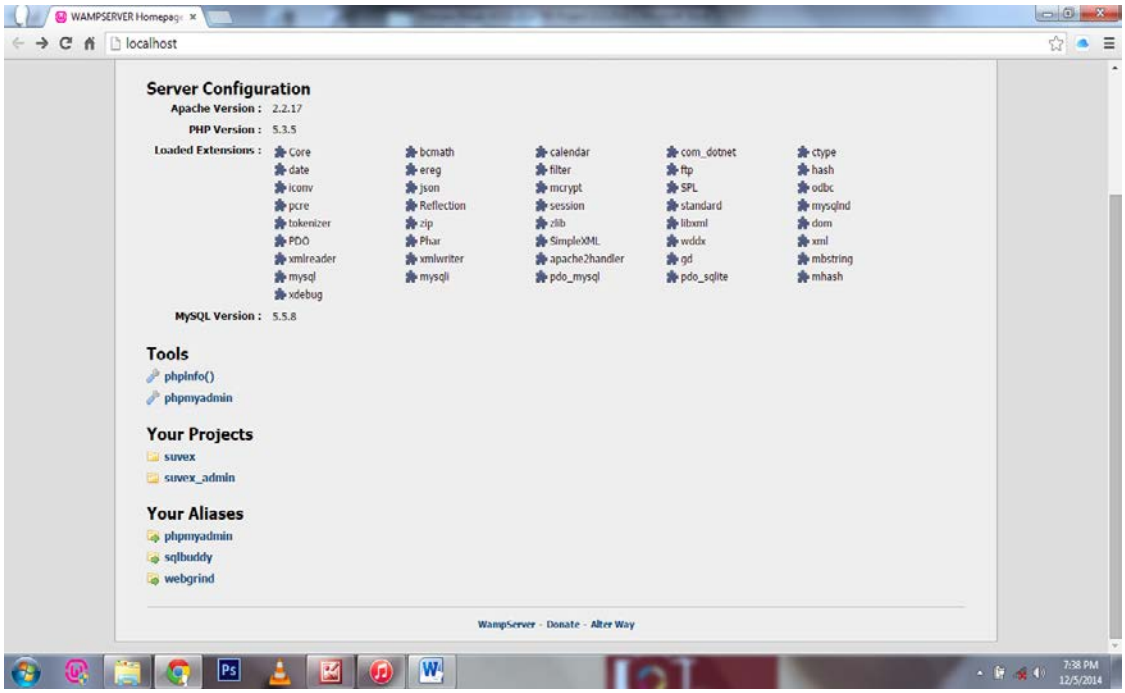

Figure 7: A Wampserver

1.3.3.3 Components of wamp server

1.3.3.3.1 PHP: PHP is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML. Although PHP's development is focused on server-side scripting, you can do much more with it. Basically, PHP allows a static webpage to become dynamic. "PHP" is an acronym that stands for "PHP: Hypertext Pre-processor". The word "Preprocessor" means that PHP makes changes before the HTML page is created. This enables developers to create powerful applications which can publish a blog, remotely control hardware, or run a powerful website such as Wikipedia or Wikibooks. Of course, to accomplish something such as this, you need a database application such as MySQL.

1.3.3.3.2 MYSQL

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation. It is fast, reliable, scalable and works in a client/server environment.

1.3.3.3.3 Phpmyadmin

It handles the administration of MySQL and the World Wide Web. phpMyAdmin supports a wide range of operations with MySQL. The most frequently used operations are supported by the user interface

1.3.4 System design

This Major Objective of this work is to design and implement a courier mail tracking system. The system has been designed in four different steps which comprise of: (a) Input Design (b) Form Design (c) Code Design (d) Database Design (e) Output Design.

1.3.4.1 Input design

Input design is a process of connecting the user originated inputs into the computer system. The goal of the input design is to allow data entry. Error in the input database is controlled here in the input design.

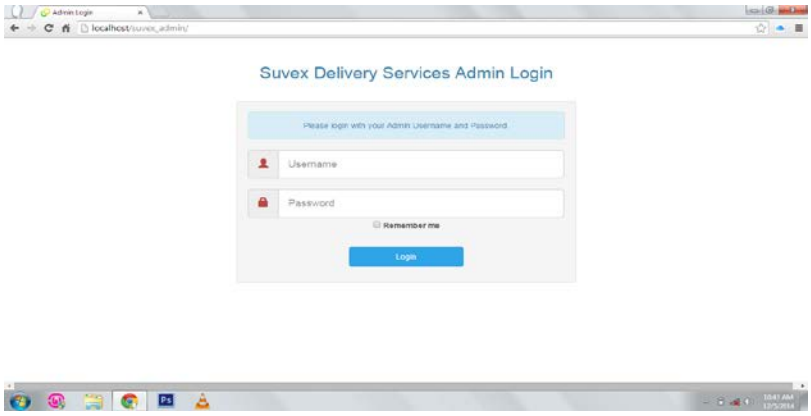

Figure 8: Input design to Login into the admin side

1.3.4.2 Form design

Once the Input details are identified, the next step is to feed them with the right kind of data values. The forms are being designed in two inter-phases: The administrator side and the client side.

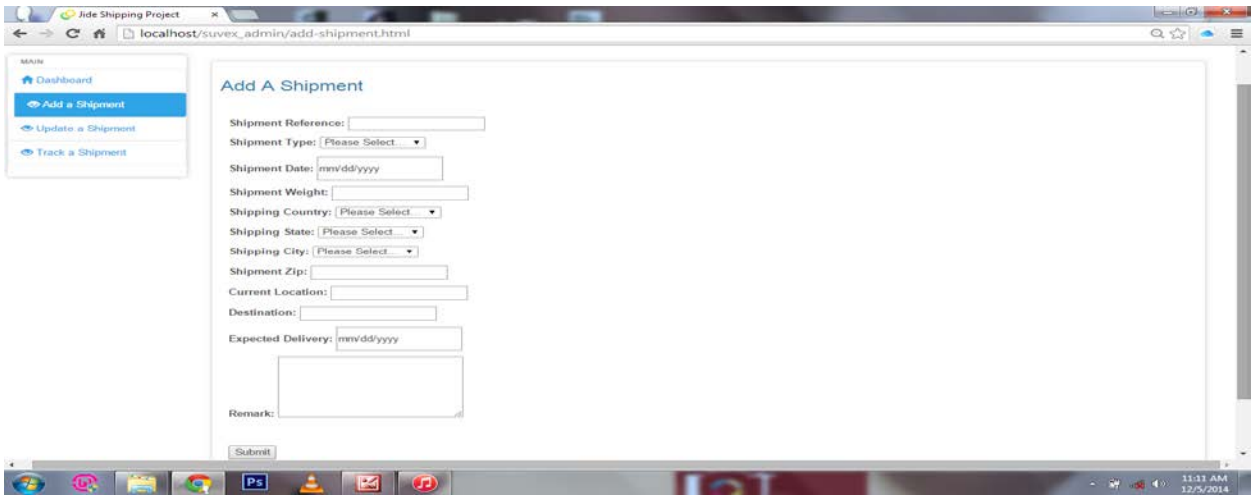

Figure 9: Input design form to add customers to the Company's Database

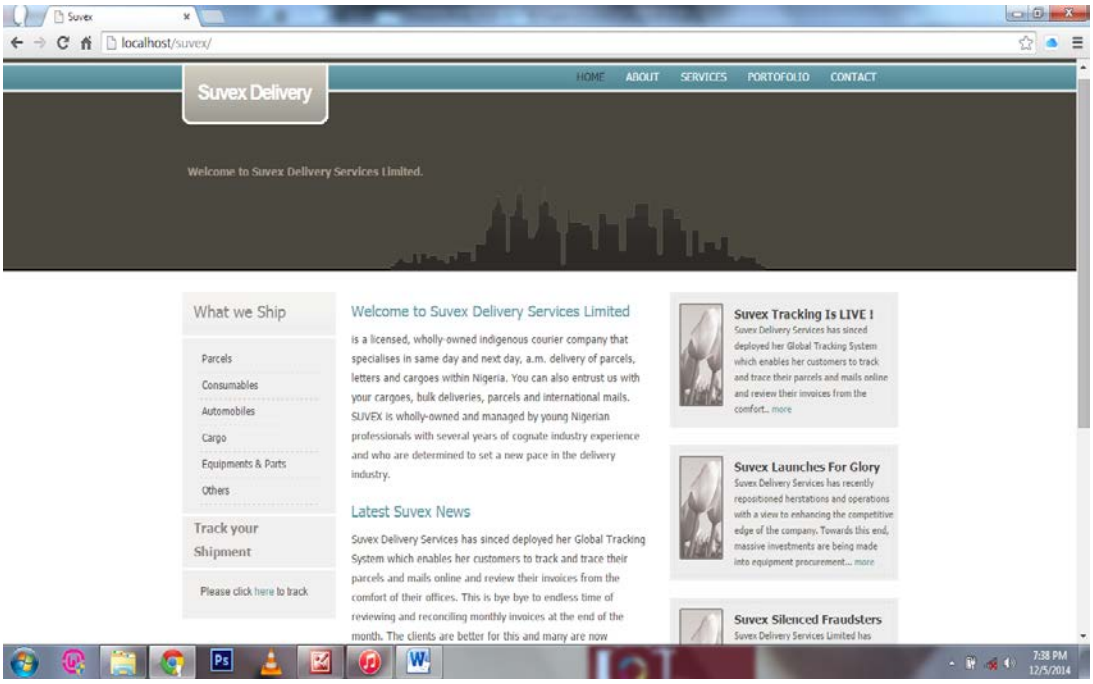

Figure 10: Suvex Delivery Services website

1.3.4.3 Database design

The database design involves creation of tables. Tables are represented in physical database as stored files. A table consists of rows and columns. Each column corresponds to a piece of information called field. A set of fields constitutes a record. The record contains all the information, specific to a particular item.

Table 1: Mail Tracking Details

FIELD NAME	DATA TYPE	SIZE	DESCRIPTION
SHIP_REF	INTEGER	12	SHIPMENT REFERENCE
SHIP_TYPE	VARCHAR	20	SHIPMENT TYPE
SHIP_DATE	DATE		SHIPMENT DATE
SHIP_WEIGHT	VARCHAR	20	SHIPMENT WEIGHT
SHIP_COUNTRY	VARCHAR	20	SHIPMENT COUNTRY
SHIP_STATE	VARCHAR	20	SHIPMENT STATE
SHIP_CITY	VARCHAR	10	SHIPMENT CITY
SHIP_ZIP	INTEGER	25	SHIPMENT COUNTRY ZIP CODE
CURRENT_LOCATION	VARCHAR	20	MAIL PRESENT LOCATION
DESTINATION	VARCHAR	20	DESTINATION
EXPECTED_DELIVERY	DATE		EXPECTED DELIVERY DATE
REMARK	MEDIUMTEXT		REMARKS

FIELD NAME	DATA TYPE	SIZE	DESCRIPTION
USERID	VARCHAR	5	USER ID
USERNAME	VARCHAR	50	NAME
PASSWORD	VARCHAR	10	PASSWORD
STAFFROLE	VARCHAR	30	STAFF ROLE

1.3.4.4 Output design

The output design of the system is to be displayed on the screen. Output could also be printed out as a paper, serving as a hard copy. Output design aims at communicating the result of the location of the couriered mail.

1.3.5 Implementation

Implementation is the stage in the work where the theoretical design is transformed into a working system. This is the most crucial stage in achieving a successful new system and giving the users confidence that the system will work efficiently and effectively. This stage involves careful planning, investigation of the current system & its constraints on implementation and lastly how the change is to be implemented. Apart from these, the two major task of preparing for implementation are Education and training of users on the new system.

The system administrators of Suvex Delivery services limited are responsible for updating the courier mail location as it approaches its destination. An “update a shipment” tab was added to the system. This is to enable other administrators know the present location of a particular mail/parcel, and also give customers the privilege to know the present location of their parcel when they visit suvex delivery services limited website. For example, to change the location of a parcel with reference number “1234567890” from its present location of “Opebi” to ’Newyork”, Enter the reference number and specify its current location.

1.4 Summary, Conclusion and Recommendations

1.4.1 Summary

Courier Mail Tracking and management system is a way of improving the logistics industry, making logistics fast and efficient. Customers have had cause to worry about the way their parcel would safely get to its destination. Some normally have the thought of not certain about the safety of their package or delay in delivery. This system would help monitor and assure customers of the safety of their mail/parcel. All the customers need to do is visit any of *SDSL* outlets to send their mail and be issued a

reference number. This work was developed using PHP and MySQL database. It was hosted on a WampServer and was successfully implemented for Suvex Delivery Services Limited (*SDSL)*. The system is very interactive and user friendly. It has all the command control that would allow administrators of *SDSL* successfully register customers and automatically generate a reference number; using the simplest graphic styles. This system aims to provide customers with real time details of their mail and also provide the company a better and effective way of transporting mails.

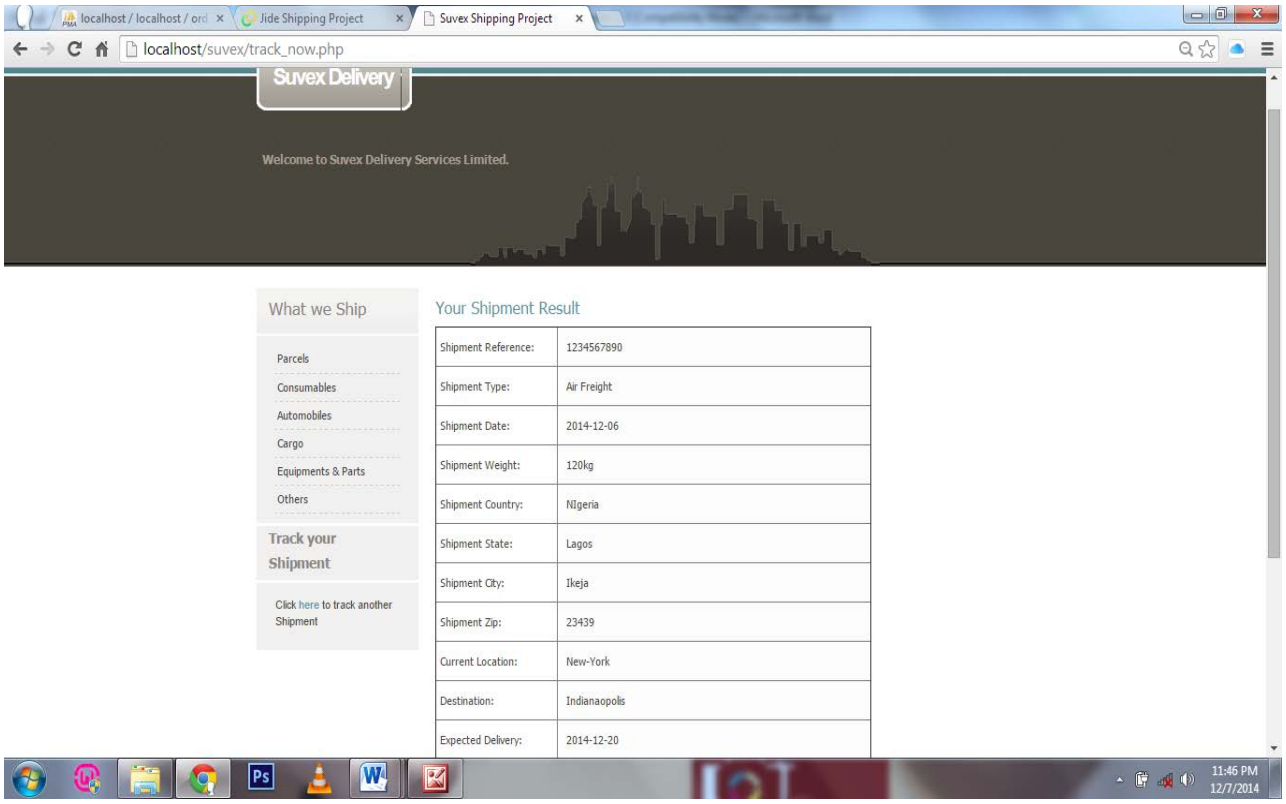

Figure 11: Updated record displayed on Suvex when clients request for their parcel details

1.4.2 Conclusion

Having developed the courier mail tracking and management system, though it is subjected to modification of features as time goes on. This system through its interactive interface can minimize the logistic workload of the logistics sector, saves cost in regards to reducing paper usage and purchase, saves human labour and time, and maintains data consistency and integrity. This is a very creative information technology system that stores customers' mail details and can be referenced simultaneously by administrators of *SDSL*. As a result of the ability of the system, the customers can also at the confinement of their homes query their couriered details directly on the company database.

Courier mail tracking and management system appears as a ready solution to this problem of real time update of customer detail that has been posed over the years. Thought the system was designed based on a stand-alone or single user programming. Courier mail tracking and management system can still be

designed to make use of multi-access facilities to the database. Perhaps the use of network will ensure effective use of the program.

The development of the system involves the system administrators, staffs of *SDSL* and the secondary users of the system (Customers), it is important to identify the system requirements by properly collecting the right details about the customers' parcel to be couriered. Proper design built upon this foundation would form a blue print which is implemented into developing the system. On realizing the importance of systematic documentation all the processes are implemented using a software engineering approach. Working in a live environment enables one to appreciate the intricacies involved in the System Development Life Cycle (SDLC). I have gained a lot of practical knowledge from this work, which we think, shall make us stand in a good state in the future. This system would be the solution to the logistics activities that has posed as a problem over the years.

1.4.3 Recommendations

Courier mail tracking and management system was designed and implemented for Suvex Delivery Services Limited, but considering its benefit to Logistics Company, it would be recommended for:

Upcoming logistics companies: New logistics companies can benefit from this system by having a more structured development system while starting up as a logistics company. It would help them incur customers by building an efficient system to help reduce labour workload, save time and minimize cost. Present Logistics Company can also adopt this system to improve their services.

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