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RESEARCH ARTICLE

AN ECOMMERCE SYSTEM FOR FEDERAL COLLEGE OF FORESTRY CONSULTANCY UNIT, JOS.

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Abstract

This project work was carried out on the design and implementation of an e-commerce website, a case study of Federal College of Forestry Consultancy Unit (FEDCOF). The project work is aimed at providing a virtual market system that will automate the manual system of buying and selling of FEDCOF products within the state. The current processes in FEDCOF are carried out manually thus causing delays and cancellation of orders as FEDCOF could either retrieve the customer and/or order information. SSDM (Structured System Analysis and Design Methodology) is the methodology used in the analysis and design stages of the system development. The project was implemented using Dreamweaver CS6 (HTML, CSS, Jquery, and Javascript) as its front end and MySQL as the back end and a careful analysis of the existing system was carried out in order to identify and correct the problems of the existing system. The deployment and usage of this new system will help in the reduction of poor record keeping of daily transactions and provide a 24/7 online virtual market. Its success and efficiency depends largely on the availability of internet enabled devices to the end users.

Introduction:-

E-commerce is a part of e- business and is simply the buying and selling goods and services over the Internet while, E-business is a structure that includes not only those transactions that center on buying and selling goods and services to generate revenue, but also those transactions that support revenue generation. These activities include generating demand for goods and services, offering sales support and customer service, or facilitating communications between business partners. E-commerce is fast gaining ground as an accepted and used business paradigm in Nigeria with business houses such konga, Jumia implementing web sites providing functionality for performing commercial transactions over the web.

Over the past decade, there has been an extreme jump in internet sales globally. Online shopping presents a more convenient method of shopping with the lines and crowds; however, buying online takes away stress. An online store is a virtual store on the Internet where customers can browse the catalog and select products of interest. The selected items may be collected in a shopping cart. At checkout time, the items in the shopping cart will be presented as an order. At that time, more information will be needed to complete the transaction. Usually, the customer will be asked to fill or select a billing address, a shipping address, a shipping option, and payment information. An e-mail notification is sent to the customer as soon as the order is placed.

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During the system investigation, we discovered that Federal College of Forestry (FEDCOF), consultancy unit is still using the traditional commerce which has so many challenges. The following are the problems discovered.

- Poor arrangement of items.
- Time wastage in searching for desired items.
- Time wastage in attending to customers.
- Inadequate record keeping of daily transactions.

The proposed system will help the college community regulate the cash carried around hence promoting a cashless society and also Provides a 24/7 online virtual market.

E-Commerce can be defined as the integration of communications, data management, and security capabilities that allows organizations to exchange information on sale of goods and services. It can also be defined as an act of conducting transaction via electronic medium. Such electronic media can be TV, Fax, or the internet.(Adeyeye,2008) With the unraveling evolution of GSM in Nigeria, e-commerce brings another untapped method of commerce via mobile devices called m-commerce. E-Commerce requires authentication, non-repudiation, confidentiality, and trust to mention a few (S.G.E. Garrett and P.J. Skevington,1999).

Therefore, a framework is needed to structure the complex system of effects of these different factors, and develop an in-depth understanding of consumers' attitudes toward Internet shopping and their intentions to shop online.

Yaser(2013) stated that Electronic commerce framework is comprised of three levels that this framework is needed to for successful electronic commerce.

Infrastructure:-
The first part of the framework for electronic commerce is including hardware, software, databases and communications. It is used in term of World Wide Web on the Internet or other message switching methods on the Internet or other telecommunication networks.

Services:-
The second part of the framework include a wide range of services that provide the ability to find and present of information and are including the search for trading partners, negotiation and agreements

Products and Structures:-
This section of the electronic commerce frameworks consist forecasts and direct provision of goods, services and trade-related information to customers and business partners, cooperation and sharing of information within and outside the organization and organizing of environment of electronic marketplace and chain of supply and support.

There are many various classifies of electronic commerce and many different methods to characterize these clusters. Academics determined a number of frameworks for classifying electronic commerce but each one want to illustrate it form a unique perspective. The main different classifies of electronic commerce are Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Consumer (C2C), Consumer-to-business (C2B) and Mobile Commerce (M-Commerce) (Yaser,2013).

B2B
Business-to-Business is a type of commerce transaction that exists between businesses or a transaction that occurs between a company and other company to transfer of services and products. A possible explanation for this might be that Business-to-Business includes online wholesaling in which businesses sell materials, products and services to other businesses on the websites.

B2C
Business-to-Consumer refers to transactions between a business and its end consumer and so it create electronic storefronts that offer information, goods, and services between business and consumers in a retailing transaction or it is an Internet and electronic commerce model that indicates a financial transaction or online sale between a business and consumer.

C2B
Consumer-to-Business is the transfer of services, goods or information from persons to business or it is a business model where end users create products and services that are used by business and institutions.

C2C
Consumer-to-Consumer is an electronic Internet facilitated medium, which involves transactions among users and it is a business model which two consumers deal business with each other directly.

M-Commerce:-
The term of Mobile Commerce was invented in 1997 to aim "the buying and selling of products, information and services" via wireless handheld devices such as cellular phones, laptops and personal digital assistants. These wireless devices interact with computer networks that have the ability to conduct online merchandise purchases. Mobile commerce allows to users access to Internet and shopping in it without needing to find a place to plug in. Mobile Commerce transactions continue to improve and the phrase includes the purchase and sale of a wide range of products and services, online banking, bill payment, information delivery and so on.

Materials and Methods:-

SSADM (Structured Systems Analysis and Design Methodology) is the methodology used in the analysis and design stages of systems development. During the cause of this research, observation and interview methods were employed and it was discovered that the traditional commerce method is used in the consultancy unit.
The system modules are as follows:

1. **Order Module:** E-Commerce has made purchasing easier by a very large margin. When it comes to online ordering, customers are always looking for the preeminent online ordering websites and the most competitive prices. A major function of this system is that, it gives the customers of FEDCOF the ability to order products online.
2. **Customer records module** This system will consist of a Database Management System (DBMS) to store product information, order details, customer details and a front end client website to enable users access the products held and place orders. Customers are very skeptical (doubtful) about sharing their personal details with any company, so the system must be trustworthy. The system will offer secure connections to enable encryption and decryption of sensitive information (e.g. customer passwords) using Secure Sockets Layer (SSL).The system will be built on mySQL and PHP programming languages to carry out automatic functions like invoicing, searching, encryption and decryption etc.
3. **Product Catalog Module:** this system will provide around-the-clock availability of products and services to customers; it will be very effective as there will be no busy phone lines and a broader audience can be targeted online.
4. **Advert Module:** the proposed system will be able to advertise the college product on the website. This will lead to sharp increase in sales as the internet orders is generally higher than that of the existing system as the advertise all products in their various unit, telephone calls/message and the use of other commercial advert such as radio stations.

The tools used for this application are listed below:
Front End: For the development of the application front end, below are the tools used:

- HTML(hypertext markup language)
- CSS (cascading style sheet)
- J QUERY
- JAVA SCRIPT
- CorelDraw is used for graphic design.
- Adobe Dreamweaver is used as the Integrated Development Environment (IDE) because of its robustness.

Backend: Microsoft Structured Query Language (MySQL) is used as the database application as the back end and also the Wamp Server was used as the testing server.

System Design:-
The FEDCOF system design defines the architecture, components/subsystems, modules, interface and data required of the system to satisfy specified requirements. In the system design the following tools and techniques were used;

1. Architectural design
2. Process modeling
3. Data modeling
4. Database design

Architectural Design:-

Architectural design is concerned with understanding how a system should be organized and designing the overall structure of that system. FEDCOF is a web-based application to be hosted on a web server that communicates to a database server. The user on a web interface makes a web request which is received by the web server. The web server processes the request and interacts with the database server using SQL embedded in PHP Scripts. The response is a web page data sent on the web interface for the user.

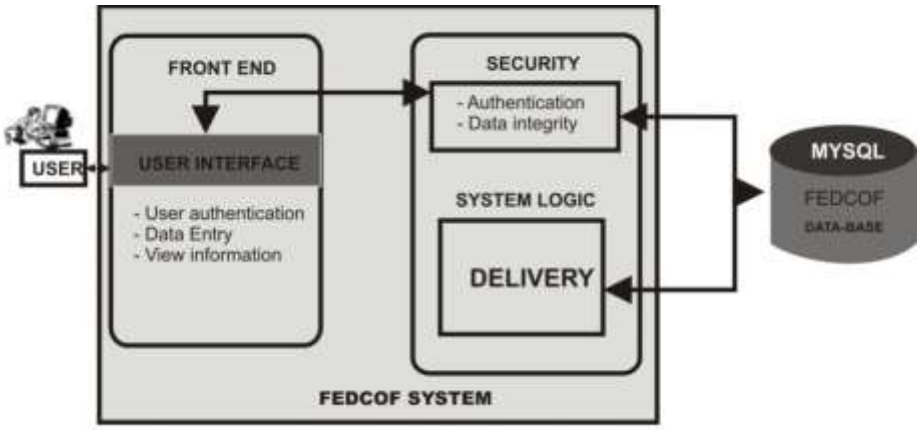


Fig 1:- Architectural Design for FEDCOF

Process Modeling:-

A context diagram and a data flow diagram are used to illustrate the various activities performed and how data moves in FEDCOF. The diagram below are the Data Flow Diagrams for the proposed system. The Context Level DFD provides a conceptual view of the process and its surrounding input, output and data stores.

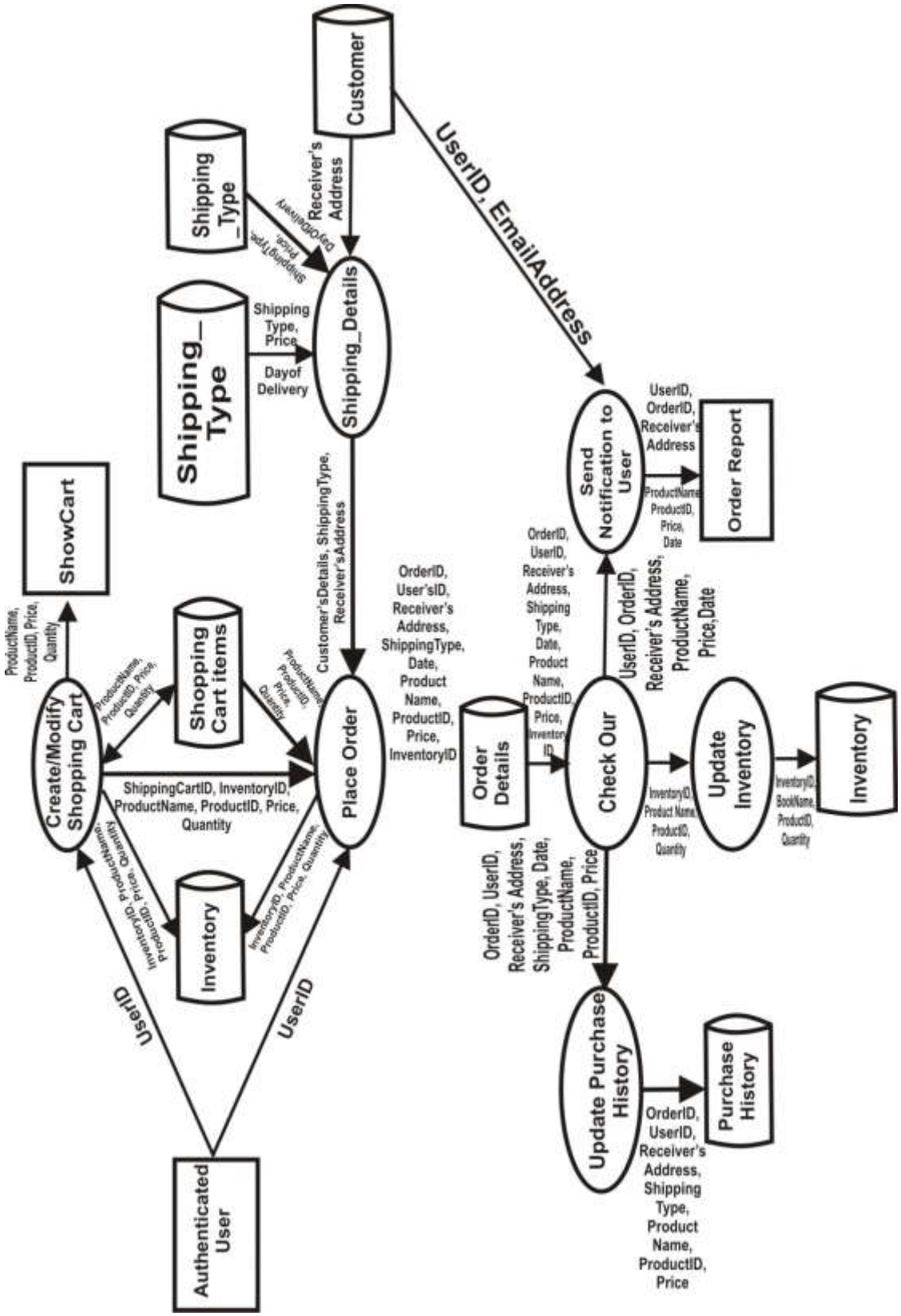


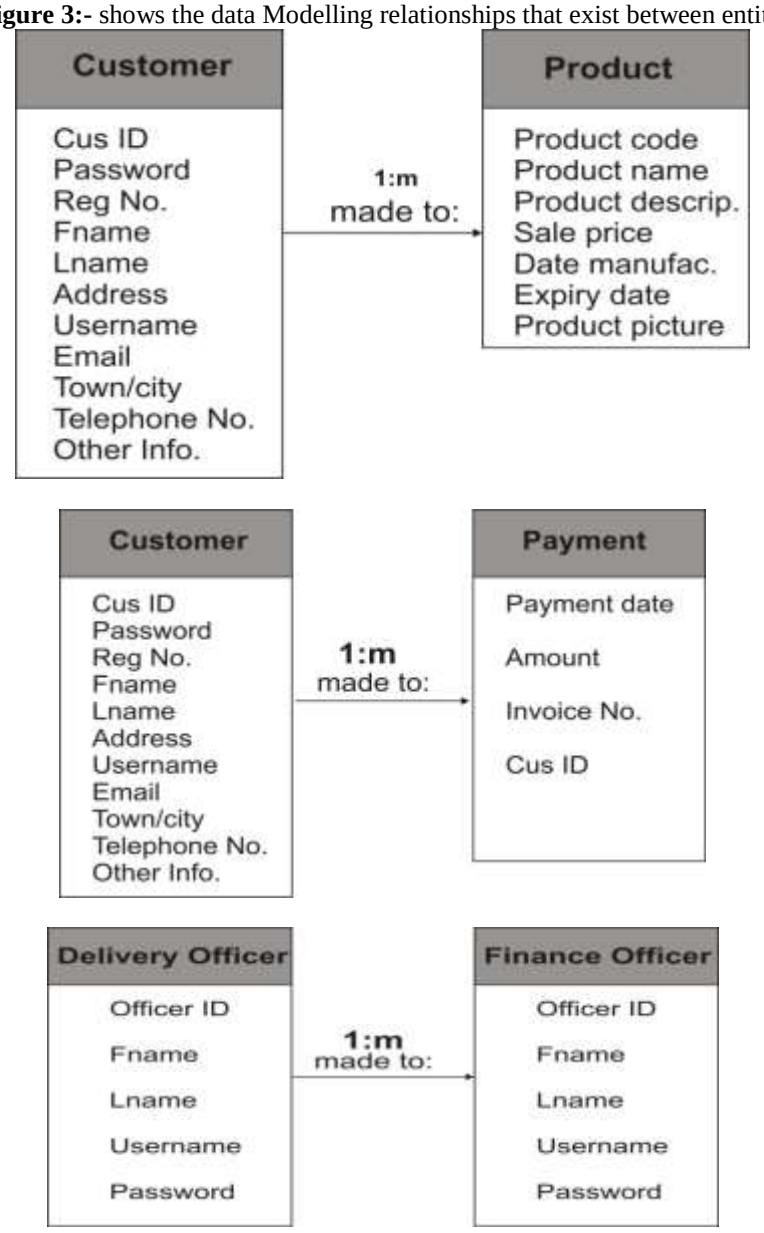
Fig 2:- Fedcof Dfd

Data Modeling:-

The table 1 below shows the various entities and their associated attributes.

Entity	Attributes	Description
Customer	Customer ID	Customer number, unique customer identification number
	Password	Customer login password
	RegNo.	Customer registration number
	Fname	Customer first name
	Lname	Customer last name
	Address	Address where product will be delivered
	Username	Desired user name of the customer
	E-mail	Customer mail address
	Town/city	Customer residential area
	Telephone No	Customer telephone number
	Otherinfo	Customer other information
Delivery	Tracking No	Product track number
	Date shipped	Date a product is been shipped
	Ex-delivery-date	Expiring date for delivery
	Delivery details	Customer delivery detail
	Customer ID	Customer identification number
Delivery item	Order item ID	Ordered item identification number
	Order date	Date of placed order
	Productcode	Code of product
	Order details	Details of order made
	Productquantity	Number of item/product
	Unit saleprice	Unit sale price
	Subtotal	Subtotal price
	Grandtotal	Summary of all totals
	Other details	Other details of placed product
Payment	Paymentdate	Date payment is been made by the delivery man
	Amount	Amount of payment made
	Invoice No	Receipt number issued to customer email
	Customer ID	Customer identification number
Product	Product code	Product code
	Product name	Name of the product
	Product description	Brief description of product
	Sale price	Price to be sold
	Datemanufactured	Manufactured date of product
	Expirydate	Expiry date of product
	Product picture	Pictorial view of product

Figure 3:- shows the data Modelling relationships that exist between entities



Database Design:-

Logical database design:-

The following are the derived relations from the proposed system database design:
CUSTOMER(UserID, Password, FirstName, Lastname, Address, City, EmailAddress, MobileNumber)
PK: UserID

PRODUCT(InventoryID, ProductName, Price)
PK: InventoryID

SHOP CART ITEM(ShoppingCartID, InventoryID, Price, Date, UserID, Quantity)
PK:ShoppingCartID

ORDER DETAILS(OrderID, UserID, Address, City, TypeOfShipping, DateOfPurchase)
PK:OrderID

FK: UserID

ShippingType(TypeOfShipping, Price, ApproximatelyDaysOfDelivery)
PK:TypeOfShipping

ProductReview(InventoryID, Review, Date, Username)
PK:InventoryID

ProductHistory(UserID, InventoryID, DateOfPurchase, OrderID, Quantity, Price)
PK:UserID
FK:OrderID

Physical database design:-
Table 6:- Database schema for FEDCOF

Entity	Field	Type	Key	Description
Customer	UserID	Varchar	PRI	Primary key for customer identification
	Password	Varchar		Security for customer
	First_Name	Varchar		Customer first name
	Last_Name	Varchar		Customer last name
	Address	Varchar		Customer address
	City	Varchar		Customer Town
	Email_Address	Varchar		Customer email address
	Mobile_Number	Varchar		Customer Mobile Number
Product	Inventory_ID	Varchar	PRI	Record specification
	Product_Name	Varchar		Name of the product
	Price	Double		Price of the product
Shop_cart_item	Shopping_CartID	Integer	PRI	Primary key for shopping cart identification
	InventoryID	Varchar		Foreign key customer
	Price	Double		Price of the items in the cart
	Date	Date		Date an item is added to the cart
	UserID	Varchar		Foreign key to customer
	Quantity	Integer		Quantity of items added to the cart
Order Details	OrderID	Integer	PRI	Primary key for order identification
	UserID	Char		Foreign key to customer
	Address	Char		
	City	Char		
	Type of shipping	Char		Foreign key to shipping type
	Date of purchase	Date		Date of purchase
Shipping Type	Type of shipping	Varchar	PRI	Primary key to define type of shipping
	Price	Double		
	Approximately days for delivery	Integer		
Product review	InventoryID	Varchar	PRI	Primary key to describe the product review
	Reviews	Varchar		Review on product
	Review_Date	Date		Date a product is reviewed
	Username	Varchar		Name of the user providing the review
Product History	UserID	Varchar	PRI	Primary key for customer identification
	InventoryID	Varchar		Product purchase by the user
	Date of purchase	Date		Date of purchase
	OrderID	Integer		Foreign key to order details
	Quantity	Integer		Quantity
	Price	Double		Amount a product is sold

Results and Discussion:-

The implementation of the system was successfully achieved by the development of FEDCOF ECOM System which intends to replace the traditional commerce system in the consultancy unit. Several errors were encountered during the implementation phase and it was later fixed for proper functionality of the proposed system (FEDCOF ECOM). Details of the system is as shown below:

Figure 4:- FEDCOF ecommerce web preview of home screen

This section of the webpage displays the home page of FEDCOF ECOM where different units can be viewed.

Figure 5:- Web browser preview of Product page

This section of page displays the order page for Old Layer.

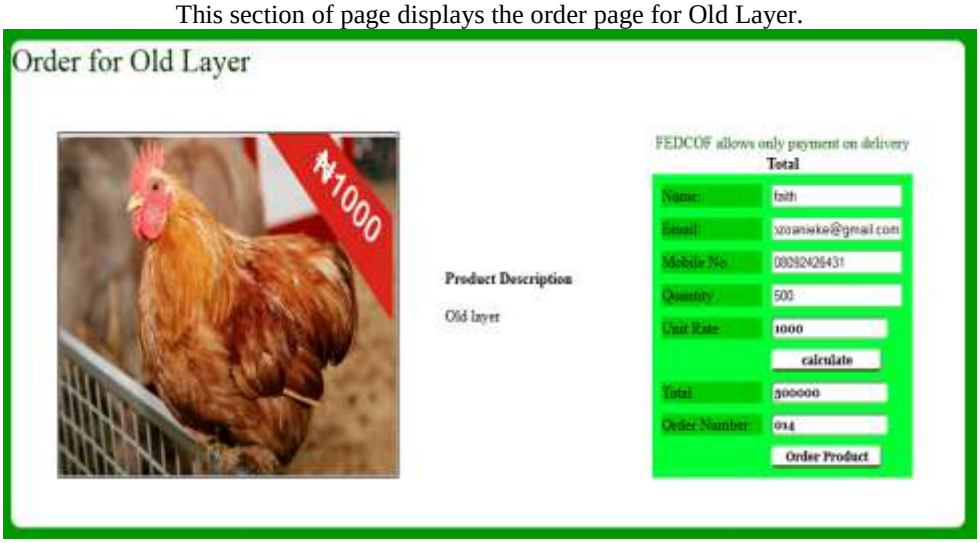


Figure 6:- Web browser preview of Product page
This section displays the order page for Roytonia Ragia (Royal Palm).

Figure 7:- Web preview of egg from the shop category
This section displays the order page for egg from the shop category which then takes a customer to the order page for egg.

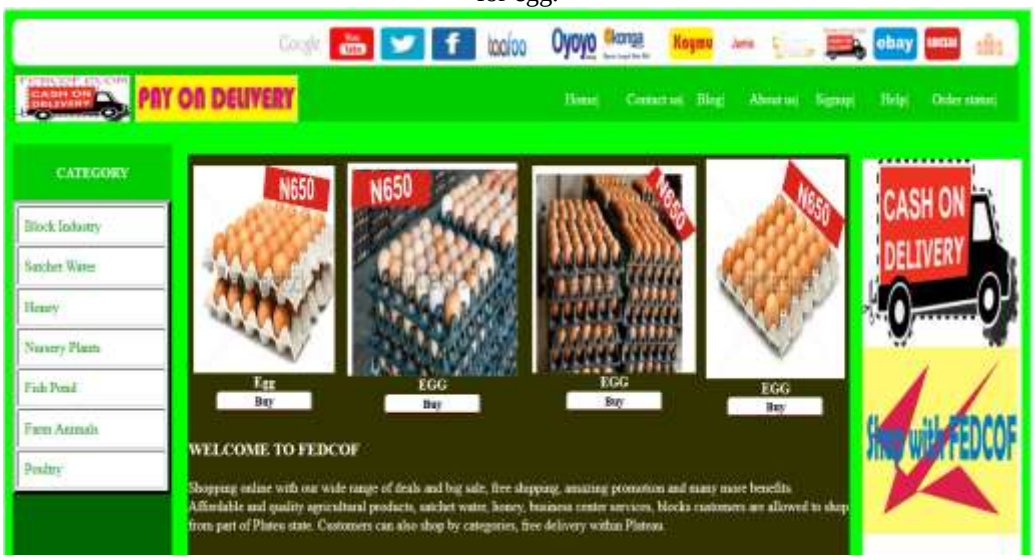


Figure 8:- Web preview of Registration Page

This page displays the customer registration form which is then saved to the database.

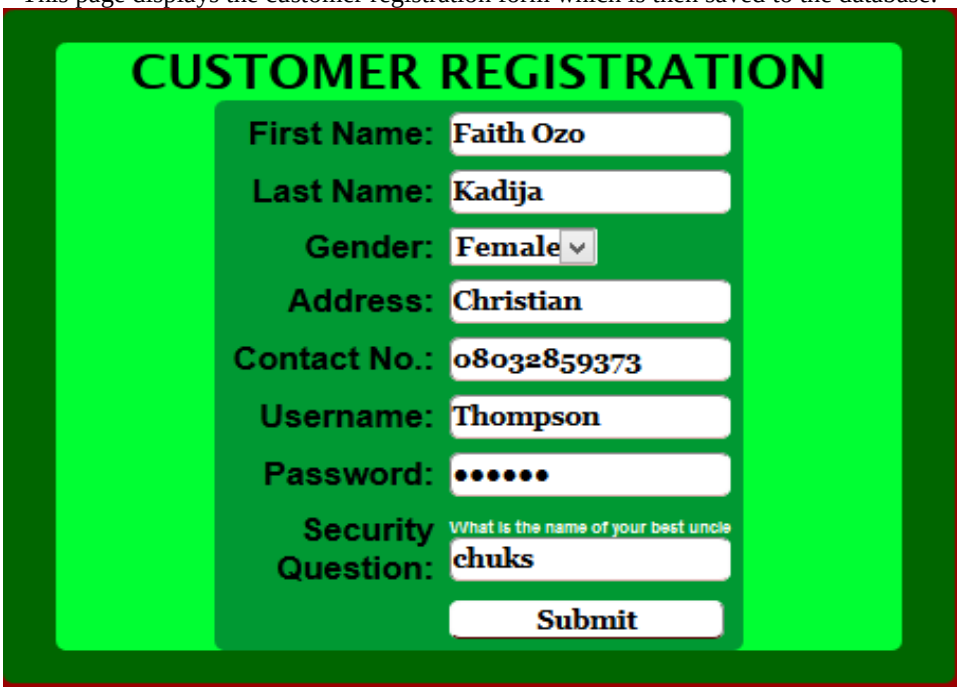


Figure 9:- Web preview of Block Page

This page displays the web preview of block from the shop category which then takes the customer to the order page for block.

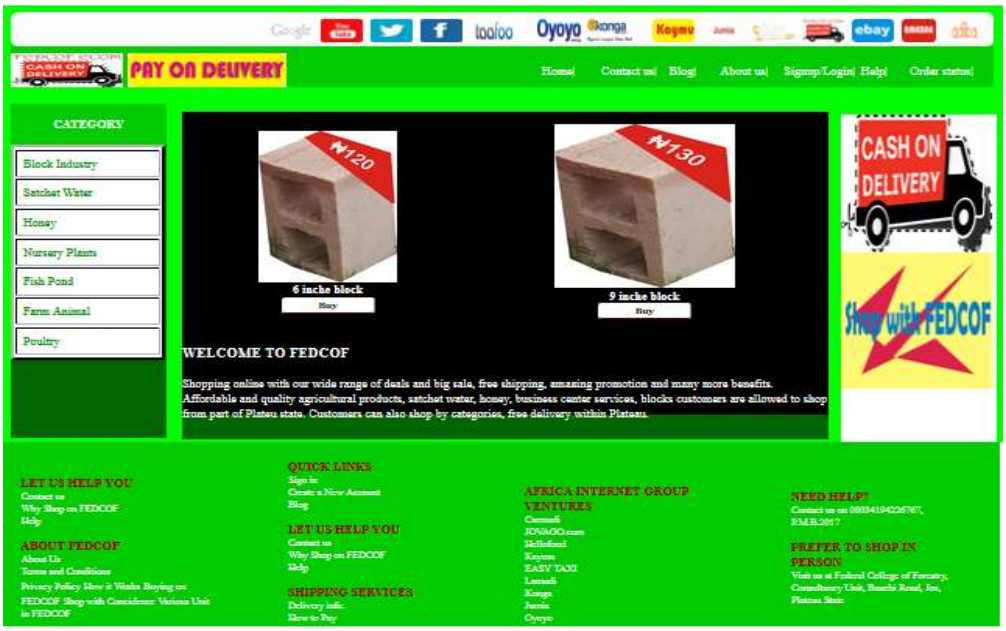


Figure 10:- Web preview of Admin Login Page
This page displays the admin login page.

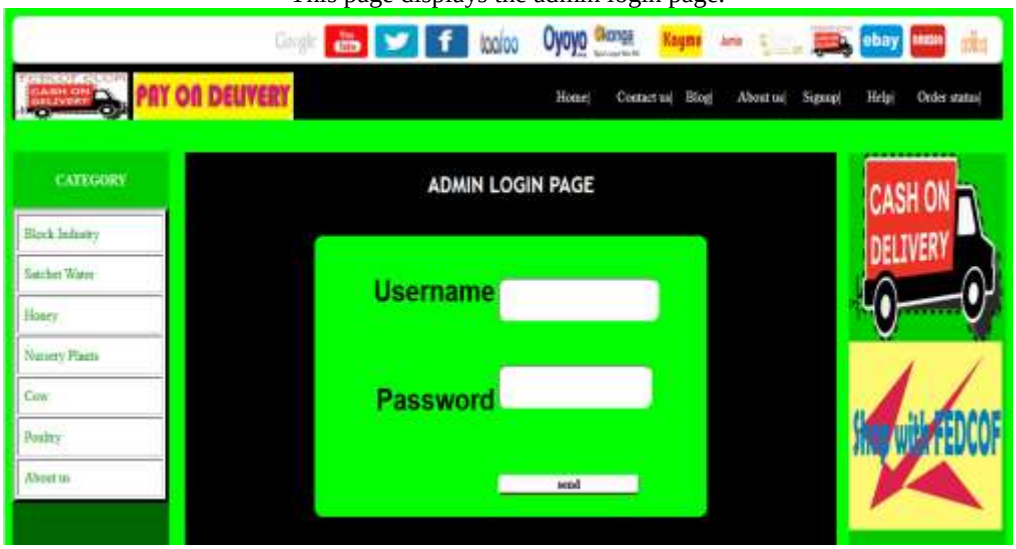


Figure 11:- Web preview of Admin Browse Page
This page displays a page where the admin can browse, edit, add and view the customer delivery and product.

Figure 12:- Web preview of Customer Receipt
This page displays the customer receipt.

Figure 13:- Web preview Admin Update Delivery Page
This page displays a page where the admin can update customer delivery.

Figure 14:- Web preview Admin View Order Page
This page displays a page where the admin can view customer's order.

Figure 15:- Web preview Admin Upload Product Page
This page displays a page where the admin can add product.

Conclusion:-

As business activities increasingly adopt information technology into their operations, it has become important for the consultancy unit to move their operations and services to a new paradigm by wholly embracing the use of electronic commerce (e-commerce) for handling and processing their transactions. The benefit of such move is substantial and significant in terms of convenience, transaction speed, effectiveness, flexibility, reliability, cost reduction and security among a host of others. Also, since virtual world operations where e-commerce falls are in a continuum, it provides unlimited opportunity for business interaction and helps create instant response by satisfying the unlimited demand of customers for information and services. The deployment of e-commerce solutions to business organizations makes the services offered by staff very effective and enables customers obtain information in conducive atmosphere without hustle and bustle.

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