ASHESI UNIVERSITY

BUILDING AN E-COMMERCE WEBSITE FOR A TRADITIONAL RETAIL

FOOTWEAR SHOP (ES-STORE)

APPLIED PROJECT

B. Sc. Management Information System

Sandra Osei Mintah

2019

ASHESI UNIVERSITY

BUILDING AN E-COMMERCE WEBSITE FOR A TRADITIONAL RETAIL

FOOTWARE SHOP (ES-STORE)

APPLIED PROJECT

Applied Project submitted to the Department of Computer Science and Information

Systems, Ashesi University in partial fulfillment of the requirements for the award

of Bachelor of Science degree in Management Information Systems.

Sandra Osei Mintah

April 2019

DECLARATION

I hereby declare that this Applied Project is the result of my original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:

……………………………………………………………………………………….

Candidate's Name:

………………………………………………………………………………………

Date: …………………………………………………………………………………………

I hereby declare that the preparation and presentation of this Applied Project were supervised in accordance with the guidelines on supervision of Applied Project laid down by Ashesi University College.

Supervisor's Signature:

……………………………………………………………………………………….

Supervisor's Name:

……………………………………………………………………………………….

Date: …………………………………………………………………………………………

Acknowledgment

I have taken credit for this project. However, it would have been impossible without the assistance and the kind support of many individuals. I would like to thank the Sovereign Lord for seeing me through all the difficulties of this project. My next appreciation is to my supervisor, Mr. Stephan Nwolley Jnr. for his support, guidance, and advice throughout this project. I would also like to express my sincere gratitude to Mr. Joseph Mensah and Mr. Eric Ocran for being my motivation and inspiration when the journey got tougher.

For such success, I cannot forget the golden inspiration behind this project, my daddy, Mr. Emmanuel Osei, a special gratitude to him. A very big thank you to my mummy Mrs. Janet Obenewaah and my younger sister, Constance Obenewaah for their generous support. I also thank Elvis Oko Asirifi for his support through out this project, and my friend, Atarebono Amwelmoo.

This project would not be a success without the knowledge I have acquired from all the lecturers throughout my four years at Ashesi University. I hereby express my sincere appreciation to all lecturers in the Computer Science and Information Systems Department, all my colleges and friends who have supported me in all manner of ways.

I finally want to say a big thank you to everyone who supported me one way or the other throughout this project; I am very grateful.

Abstract

The evolution of technology has impacted the world significantly; in government, industries, and sports. Business activities such as buying and selling have equally received their share of the technology boom. Despite the utility of technology in modern times, many traditional businesses have failed to incorporate technology in their daily activities. Es-Store is no exception. In the typical routine of Es-Store, people travel from the outskirt of Accra towards the central part to transact business with Es-Store. The uncertainties associated with the availability of the specific type of brands of footwear is a concern to potential customers, and often, customers are disappointed after traveling long distances without getting their desired footwear.

Mr. Emmanuel Osei, the shop owner of Es-Store, spends huge part of their business capitals on stocking his shops with products customers sometimes do not need, leading to a slow market. Mr. Osei makes significant losses when the products in their heavily stocked shop begin to wear out.

The benefits of online platforms in transacting businesses cannot be overemphasized considering the challenges above. People can obtain product information, availability, prices, and access delivery options. On the other hand, business owners can build a database of past and future customer details, preferences and trends in sales and shift supplies to respond to the shift in customer demands.

In this project, I develop a web-based platform for Es-Store using technology tools such as HTML (Hypertext Markup Language), PHP (Hypertext Preprocessor), Javascript, Ajax, CSS (Cascading Style Sheet), and MySQL (Structured Query Language).

I hope that Es-store and all other traditional retail shops will leverage this platform to enhance their operations and increase their profit margins.

Table of Contents

Chapter 3**: Architecture And Design**

Chapter 4**: Implementation And Testing**

Table of Features

Table of Tables

Chapter 1: Introduction

1.1 Introduction

Es-Store is a retail shop located at Rawlings Park, Accra in the Greater Accra Region. It has been in operations for 15 years. Es-Store provides footwears for people within all age ranges.

Nonetheless, most of its significant group of customers are tertiary students, businessmen, and women who have busy schedules and do not have enough time at their disposal to visit the shop for footwear frequently. These busy people sometimes send relatives to Es-Store to buy footwears on their behalf, but they mostly return without the products because they sometimes do not get what they want or do not have enough money to purchase due to lack of price knowledge on products.

Es-Store operates like every regular traditional store. When people get into the shop, they walk around the shelves and search for what they want. Customers' access to information is prolonged with the traditional footwear retailing shop. They check the prices of the products, categories, brands and other information that are peculiar to their purchasing decision.

Es-Store faces challenges such as customers not getting what they came into the shop to buy and have to return empty-handed. Customer also spends so much time in the shop searching for what they need. The rate of shoplifting in the shop currently is also very high according to Mr. Osei, the owner of Es-Store. Customers join very long queues to get their products to the counter to check out, making the place crowded all times. Due to time constraints, most customers do not visit the shop as they did initially due to the modern-style of shopping introduced by technology, known as e-commerce. Since Es-Store does not have a proper way of storing feedback from

customers for service improvement, some customers feel that their feedback is not considered and worked on.

Es-Store Online is an online web application that allows the customers of Es-Store to buy products from their favorite old shop without traveling to the place. Es-Store Online is to help Mr. Osei communicate and interact with his customers more quickly in a technological way. Es-Store Online allows customers to find quick answers to specific questions within the shortest time, creating a better and stronger public image. Es-Store Online is to provide a convenience reach for customers, enhancing smooth transaction and breaching distance barriers. Customers can have significant information to make rational decisions when choosing to buy products on the website.

1.2   Background – Businesses and E-commerce Technology

The evolution of the world through technology has changed the way so many things are done affecting how businesses operate today [1]. The invention of the new technology, e-commerce, have had a drastic change in business models. "E-commerce is the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between organizations and individuals" [2]. The increase in population and globalization has significantly increased the demand for products and services. This shift in the market has attracted suppliers to invest in businesses that provide the needs of people. This has led to the building of many shops all around the world. There are many shops in Ghana that provides people with all kinds of goods and services. Overs the years, customers have travelled to places they are convinced they will get their products from to satisfy their needs.

However, e-commerce has improved the way businesses are conducted today especially on sales revenue. Figures on sales are increasing substantially [3] with this technology. Studies [4] have shown that online retailers made profits of $104 billion reflecting an increase in sales revenue by 39% more in 2003 than in 2002. With the continuous efforts in e-commerce, sales increased from $172 billion in 2005, and it was expected to grow to $329 billion in 2012 [5]. The gradual increase in the number of internet users is proportionally improving the skills of online shoppers [6]. Consumers who like to browse on the internet in search of product information constitute about 52% of online consumers and 24% of them search online for products before making any purchase decision [7].

As a result, firms have invested heavily in this technology when they found the platform very lucrative. One of the leading computer networking equipment company, Cisco use e-commerce in its business operations. Thus, most of its products are sold online [8]. In 1998, when selling online became operational, 72% of Cisco's sales were traced from transactions on the web [8]. Cisco involved in traditional retail selling meant spending about $500 million on 500,000 calls every month for a year [8]. With e-commerce, the company avoided those costs, thereby improving its profitability. Due of this technological innovation, 99% of Cisco's sales and purchase transactions are conducted online [8]. Once every month, about 69% of the United States (US) households that have access to internet shop online with 78% of US adults buying products through the web with e-commerce [9].

In 2012, US retailers generated $231 billion with e-commerce. A research conducted by Forrester [10], forecasted that sales would increase by 13% to $262 billion for US retailers in 2013. It is estimated that sales will rise to about $370 billion in 2017 outpacing the sales growth of traditional retail shops considering that the growth of e-commerce contributes 8% to the total sales

for US retailers [10]. Online selling is estimated to grow from £112 billion to £191 billion between 2012 and 2017 contributing about 11% to the compound annual growth rate in the United Kingdom and 9% in the United States [10]. Moreover, it is deduced that western Europe is expected to grow at a faster rate than the United States. Online retailing contributes 13% to the total economy of the United Kingdom, and it is predicted to increase to about 15% in 2017 [10].

Doing business online is very quick as compared to the traditional way of transacting businesses. E-commerce enhances rapid communication by impacting on delivery time, which makes the whole transaction process very economical. Electronic business transactions reduce cost beyond what is needed to provide the goods and services for sale. As a result, when businesses use the web-based approach, extra costs that arise as a result of marketing, postage, price printing, marketing personnel, distribution, and others are reduced. E-commerce eliminates all boundaries since the internet does not understand governmental restrictions, making it very easy to do business everywhere in the global village due to the web that connects the world via the internet.

With e-commerce, producers get the opportunity to attract new customers and can sell to these people even in other geographical locations unlike physical stores [11], which allows only people within that geographic scope have access to product or services. Notwithstanding, companies that operate online have a more significant advantage of providing more information about their products or services, compared to traditional retailing. Online shops get the opportunity to give full detail of what products or services they are offering to customers, how their products work, and obtain user reviews as well. This presents a more efficient and effective way of sharing the word about products than explaining details of products or services to customers that visit the shop repeatedly.

1.3   Problem Description

Taking a proper glance at Es-Store paints a picture of the activity of selling and buying of goods and services in the world before technology. Es-Store is a retail shop that has been in operations for 15 years and it is based at Rawlings Park, Ghana. It was built to provide customers with footwears of all categories and brands. Since its establishment, Es-Store has been providing footwears to all groups of people, from toddlers to adults. Due to the long existence of Es-Store and the customer relationships it has built in the past, people love to visit the shop frequently for footwears as a need of life.

Customers did not see the problem of travelling to Es-Store to buy footwears until online shopping was introduced, of which they found to be more convenient. The convenience presented by technology made people find many flaws in their visit to Es-Store for footwears. Customers felt that they waste so much time looking for products of specific brands in the shop. They also go through tedious process in finding the products they really love to buy anytime they visited the shop. Customers of Es-Store became more concerned with joining long queues to get products to the counter for checkouts. Due to the increase in the prices of goods and services in Ghana, customers sometimes return from the shop with no or less products due to lack of updated on prices of products. Customers also found it very stressful in finding all the vital information about a product when they visited the shop, especially when they need to inquire more from sales persons who are also attending to other customers in the shop. Customers are not able to buy products on certain days and times because Es-Store has specific days for which the shop is opened and the times it is closed.

Managing inventory in the shop is a difficulty that Es-Store encounters. Records of the quantity, types and categories of footwears sold frequently or less are not easily known, unless it is done manually by the shop keepers. The store does not have a database that help keep records of customer feedback, which are very important to improving customer services and building relationships. All these problems are leading to customer turnovers, and sales are decreasing gradually as a result.

Therefore, there is a need for Es-Store to have a web-presence to retain its customers, as well as to provide a modern and a better shopping experience for them.

1.4 Motivation

Globalization is one of the motivations for this project, such that it helps brings together the economies of different nations into a shared world market as a result of trade. E-commerce helps increase flexibility in locating activities and products across the world. This enables producers or traders to reach large groups of people over the globe. International trade increases due to internet technology [13].

E-commerce allows online consumers to writer reviews voluntarily about products and their experience on the web platform, which serve as a way of spreading the news about products [14]. When customers and visitors search and browse online on e-commerce sites, they share insights on their experiences and expectations on the site, and what their views are on products. E-commerce marketers, through this information, analyze, learn and draw insights from these interactions. Insights gathered from reviews can be used to improve marketing effectiveness and conversion rates. Customer intelligence helps e-commerce markets with making decisions such as how to engage customers, place brand pricing, create site contents, develop new products, design campaigns and execution, and with brand strategy [15].

53% of companies that appear to be enjoying great success in their businesses are those who leverage customer insights in marketing activities such as trade and sales [15]. Nonetheless, 57% of successful companies who are performing well in operating activities rather than marketing or sales operations deploy customer insights relative to manufacturing and supply chain [15]. Customer insights help improve business activities.

Another motivation for this project is the easy access to the market that e-commerce provides. The style of shopping today has created a problem where people do not mostly go to traditional retail shops to gets products for themselves. With e-commerce, people who may be far from traditional retail shops can access stores remotely in the comfort of their homes [16]. E-commerce shops have no specific opening and close times; they can be accessed 24 hours every day, making it very convenient for people to get products anytime they wish [16].

1.5   Related Works and Existing Solutions

Amazon operates in 13 countries, and it is one of the largest online shopping platforms in the world [17]. It sold books on its initial market operation, but it currently expanded its product portfolio to electronic devices, consumer goods and digital media [17]. Amazon allows customers to buy products online, going through specifically required processes such as signing in, logging in, adding to cart and others.

Jumia is an e-commerce platform that allows potential buyers to access online products and markets at their convenience. It sells clothing, shoes, and accessories or dressing products for women, men, kids, and other products such as beauty and perfume products [18]. Jumia operates in countries; like Kenya, Egypt, Morocco, South Africa, Ivory Coast, Nigeria, and Ghana.

Kikuu is an online market that is committed to serving the needs of its customers in Africa directly and with confidence. It is the first online shop in Africa that upgraded from just ordering products online to delivering products to customers [19]. It works in Senegal, Cote d'Ivoire, Ghana, Nigeria, Uganda, Congo, and other countries.

Tonaton is one of the online marketplaces in Ghana. This company deals with the buying and selling of used technologies such as computers, cars, mobile phones, home appliances and others [20]. It also offers cheaper rates for properties such as plots, apartments, land, commercial and residential properties. Tonaton also gives a platform for people or organization to post and apply job opportunities available in Ghana [20].

OLX is an online shop that was established in 2006, working intensively in about 45 countries in the world [12]. OLX offers its customers with goods and services including household goods, electronics, furniture, cars, bikes, fashion items and others [21].

1.6 Aims and Objectives

The purpose of this project is to create a web-based application for Es-Store, a footwear shop located at Rawlings Park that still uses the traditional retail shopping system. The application is to serve as a platform that allows the vendor to communicate and transact business with customers who may not want to use the website. Es-Store Online will help connect products to potential customers who may not have enough to go to the shop to get their footwears. This application, in effect, will connect all potential customers across the world to help maximize profit for Es-Store. With Es-Store Online, customers can view and order for whatever products that are available on the online platform. This project is designed with functionalities that allow customers to read and write reviews of any products purchased before from the site. It will also enable

customers to rate their experience with the website. This system will also let customers pay for products online through mobile money.

In summary, the objective of this project is;

- Connect Es-Store to existing and potential customers online

- Find a broader market for Es-Store with its web presence

- Allow customers to buy products online without visiting the traditional or local shop

- Allow customers to pay for products online

1.7   Overview Description of Project Report

This section of the paper gives a chronological structure of the entire project to help end-users understand every aspect and requirements of this project. This is a brief description of the chapters:

Chapter 1 gives an introduction of how Es-Store, an existing traditional retail shop, suffers a backlash from online shops as many customers tend to buy product through a more convenient way. An aspect also explains how technology has emerged and transformed the world of business. It also states how e-commerce has improved the world of business in terms of revenues and customer expansion. The problems encountered by Es-Store are addressed in this chapter as well as the motivation behind building a web presence for it. Related works and existing solutions of this project like Es-Store Online are explained in this chapter as well as the aims and objectives of the project.

Chapter 2 explains the requirements of the entire project. It discusses the results obtained from interviews, an overview of the system, the web application, and features of the system. Essential parts of the system that makes it function well, such as the functional, non-functional and product requirements are also discussed in this chapter. This facet of this dissertation also studies the organizational needs of the system, considering conditions on operations, ethics, and product regulatory.

Chapter 3 describes the architecture and design of Es-Store website application. It elucidates the interface, data and database design of the system. It also details out the system models and activity diagrams that would be involved in the functioning of Es-Store system.

Chapter 4 spells out how the system works; thus, the system description. The feature of the system, the implementation support, which includes tools and libraries used in building and designing Es-Store Online are explained in this chapter. Functional requirement testing, and results are analyzed here.

Chapter 5 gives a summary of the entire project, the limitations encountered during the plans and recommendations for future works.

Chapter 2: Requirements

The requirement is one significant aspect of software development. It involves a compilation of details and specifications collected from users by software developers. In order to understand what users, want from an online shopping platform, there was a need to gather requirements.

2.1   Requirement design overview

2.2   Interview

The primary stakeholders for this project are the customers and the shop owner of Es-Store. Interviews were conducted to inquire from customers and potential customer of Es-Store using open-ended questions.

Twenty people from Ashesi University were interviewed on their interactions with some e-commerce shopping platforms. Interviewees were asked how often they purchased products online and which online platform they mostly used in buying products. Other questions that interviewers were asked were what informs their decision when purchasing things online, challenges they face in buying from online and what they require from e-commerce platforms.

Analysis from the interview results indicated that most people loved to buy things online because it is very convenient taking into consideration their busy schedules. Most interviewees were also concerned about the convenience of buying with their credit cards and mobile money accounts. Information security, thus protecting their payment mode or credit card details were of very much concern during the interview. Online shoppers want to receive consistent notifications of new products available in the shop. Issues such as difficulty in refunding money for products that were

not delivered, not being able to see and track orders, difficulty in navigating through the system were captured during the interview.

Customers explained that the presentation and appearance of e-commerce websites application are not good enough, and that did not motivate them to visit e-commerce sites often. Customers also complained that most of the products they received from delivery persons were not precisely what they ordered for because most of the products were of bad qualities. Customers realized that products that were deleted from their carts during their purchasing procedures; products that were not added to their wish lists were not permanently removed. Customers also loved to write and read reviews of products from existing customers as well as recommendations for products on the websites. Most buyers also found it difficult to retrieve items from sites and so need specific keywords to help search and find products online easily.

2.3   Overview of the Application

Es-Store web application is an online platform that allows customers to order their footwears at their convenience and get them delivered to them. This application has a few related pages that work together to provide users with significant experience in their interaction with it. There is the home, category, products, about, contact, cart, login and sign up pages. All these pages are consistently arranged on the navigation bar at the top of each page.

The **home page** is the default page of the Es-Store Online website, and it is the first page potential customers, and visitors see anytime they go to the site.

The **category page** displays a list of product categories available on the online shop. And it is to allow easy retrieval of products on the website.

The **products page** contains products available on the Es-Store website. This page shows product images, names, and prices.

The **about page** gives the purpose of the Es-Store website, its mission, and vision. It has a video that shows the kinds of products available in Es-Store Online shop.

The **contact page** is a page on the Es-Store website that allows potential and existing customers to contact people who maintain the system and the owner of the site. The contact us page has a form that users can enter with specific information to be sent to the administrator of the system for any purpose.

The **cart** serves as a grocery store shopping basket that stores all products selected by customers for final purchase. The cart page presents all products in the cart of a user in a tabular form together with the individual corresponding images, names, prices, and quantity and the total cost of the items in the cart.

The **login page** is a page that allows users to enter identifier information into the system to allow access to the Es-Store Online. The user can only use the login page if they have already signed up and are known as an existing user from the information in the database of Es-Store Online.

The **signup** page provides a registration form that users must fill out with the specifically required information to make them eligible to access certain information on the website.

Footer is the bottom section of the webpage, and it is located on every page that is related to the website. It contains information about Es-Store Online, quick links that lead users to pages on the site, contact information and other information such as privacy policy, support, order tracking and delivery information.

2.4   Features of the Application

For identification, Es-Store Online allows users and administrators to register on the system and access respective details anytime they want based on their user privileges. Es-Store Online permit users to view, search, add products to cart, delete products added to cart and place orders for selected products when they create accounts. Existing customers can write reviews on products on the system.

Similarly, authenticated administrators can add and delete products, update product brands, categories, and colors. They can accept customer orders and send them emails when their orders are being processed. Administrators can see customers reviews and reply to their consent on the Es-Store Online system.

2.5   Operating Environment

Es-Store Online would work on the web application. HTML (Hypertext Markup Language), CSS (Cascading Style Sheet), JavaScript, PHP (Hypertext Preprocessor), Ajax (Asynchronous JavaScript and XML) and MySQL (Structured Query Language) are the programming languages that are used in developing the web application.

2.6   Functional Requirements

These are requirements that are directly related to the functionality of Es-Store Online, thus, what the system is supposed to do.

2.6.1   First-User Type: Buyer

Any user who signs onto Es-Store Online as a customer can perform the following operations; Customers can

- Login in successfully on the site

- View products on the site

- Search for products

- Add products to their cart

- Delete selected products from their cart

- Purchase products in their cart

- Write reviews on products and make recommendations to other customers

- Receive messages from administrators on the site

- Contact an administrator by sending emails

2.6.2 Second-User Type: Administrator

Administrators on Es-Store can perform the following activities on the system; Administrators can

- Add products to existing ones on the site

- Delete products from the product page

- Update product information

- Update product brand, colors, categories, sizes

- Accepts customer orders

- See and read customer reviews

- Send and reply to customer emails

2.7 Non-Functional Requirements

2.7.1 Product Requirements

Security**:** Es-Store Online system is designed such that customers payment gateway information is made secured from any breach [22]. Customer information collected for identification and verification is stored securely from unauthorized access. All passwords are encrypted and cannot be read, and only necessary customer data will be stored. Existing customers undergo an authentication process before allowing access to any vital information on the site. Customers cannot access administrative pages. Es-Store Online will implement a web application firewall to affect security.

Dependability**:** Es-Store Online customers will smoothly be logged in provided they enter the correct credentials. Customers will be sent notifications when they make orders. The system will be available for use at any time since customers love to shop any time of the day, unlike the traditional retail shops that have closing and opening times and days. No one component failure on the website would affect other components.

Performance is one of the features that users look out for in every system application. Users tend to use systems that have high-performance rates than ones that have just amazing aesthetics. Therefore, all the various features of the system will be tested to detect all errors for corrections to enhance practical usability.

2.7.2   Organizational Requirements

2.7.2.1 Operational Requirements

The users will be able to access Es-Store Online on the web when connected to the internet. Customers are not restricted from accessing any part of the system that is necessary for smooth transactions on the system.

2.7.2.2   Ethical Requirements

Data is one of the most sensitive and powerful tools in the world today. Data breaches deprive people of their privacy and power. Therefore, Es-Store Online will secure customer data and its systems from all kinds of vulnerabilities and threats. Customer data will not be disclosed to unauthorized users [23]. Es-Store Online will ensure that products that are made available on the websites are products that indeed exist. No fake products will be sold to customers. All products will be listed completely, accurately and with honesty.

2.7.2.3   Product Regulatory Requirements

Es-Store Online authenticates authorized users, the administrators of the system before they are allowed access to customer details and other vital information. Thus, there is a login page that ensures that administrators enter their correct credentials before working on any aspect of the system. Other employees will review all products that will be uploaded on the Es-Store Online system before published.

This system allows multiple users to have access to it. Es-Store Online will maintain the system when a need arises.
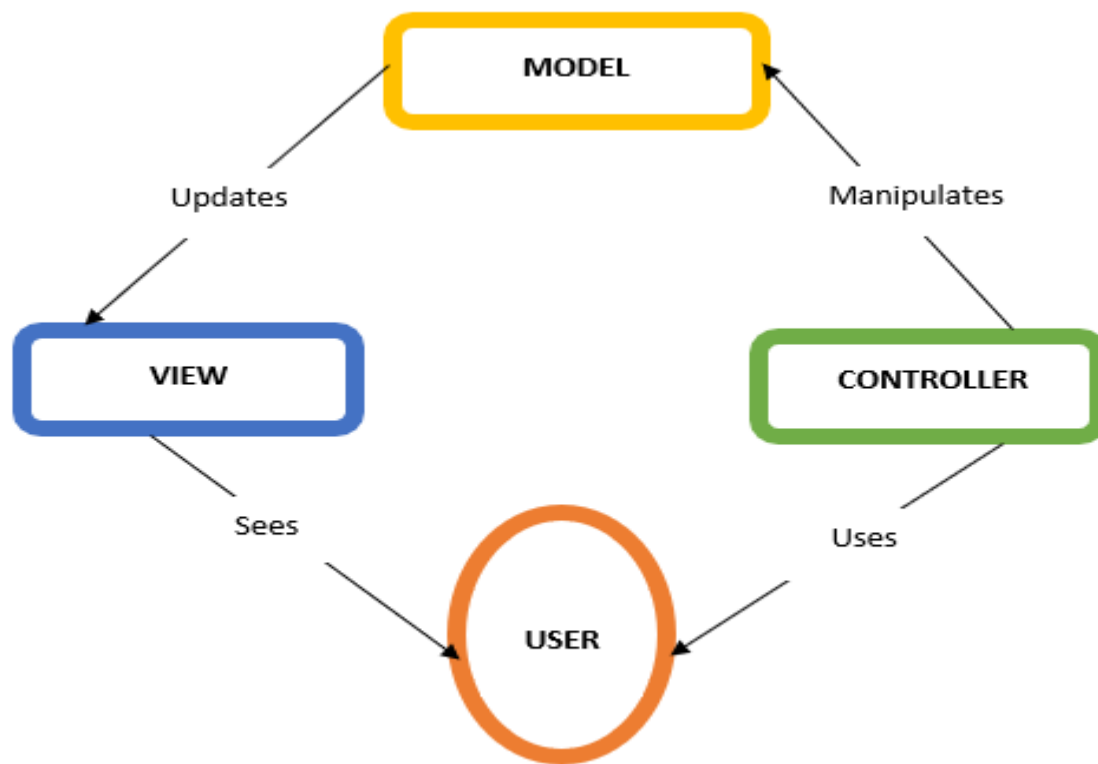
Chapter 3: Architecture And Design

3.1 Architecture Outline

The two architectures that were used in building Es-Store Online are;

3.1.1 Model-View-Controller (MVC) Pattern

The **Model-View-Controller (MVC)** Pattern is a design model that allows the developer to reuse the object code. MVC is very significant in developing applications that involve user interfaces because it takes shorter times as compared to other models [24]. The MVC has three main components;

Figure 1: Model View Controller diagram

Model: This component is very significant to the development because it represents user data; thus, the logical structure of data in the software application development process [24]. The model defines where the data objects of the software application are stored. It is independent of the view and the controller.

View: This layer is concerned with the visual representation of the elements that constituents the user interface of the application [24]. It gives a pictorial output of what users will see on the screen of the software application. These elements include display boxes, buttons, date fields, modal information, search field, toggles, icons, sliders, and others. However, the View component is not responsible for controlling what it displays but accepts instructions from the model and controller to show anything to users. Another importance of the view is that it sends quick messages to the model before it makes updates to it.

Controller: This layer acts as the brain of the MVC architecture and functions as an intermediary between users and the system [24]. With the controller, all outputs of users are converted into appropriate messages and passed on to the views [24].

The reason for choosing the MVC architecture is because of the separation of concerns, such that the model, view, and control are independent of each other. Its independence allows many developers to work on the system at the same time and enhances easy maintenance of the application.
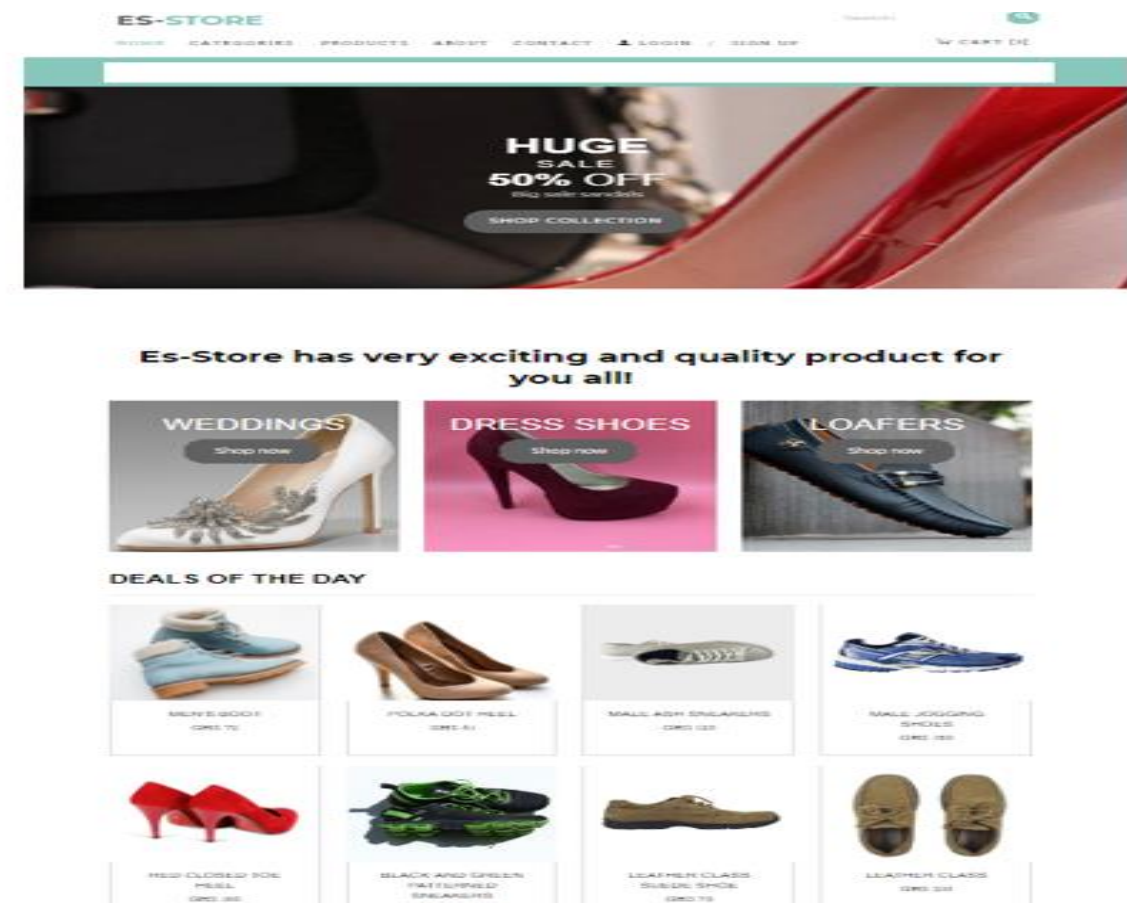
3.1.2 Client – server Pattern

This pattern is mostly used for web systems. The web system, which acts as a server accepts and responds to all requests made by clients using different clients such as browsers [25]. The system uses a standard protocol for this functionality. All responses processed by the web system

are personalized towards a request from a client. There are no interferences from other clients' requests [25]. The client-server pattern allows clients to access information directly from the server due to the shared database. It supports the integration of services, scalability and easy to maintain.
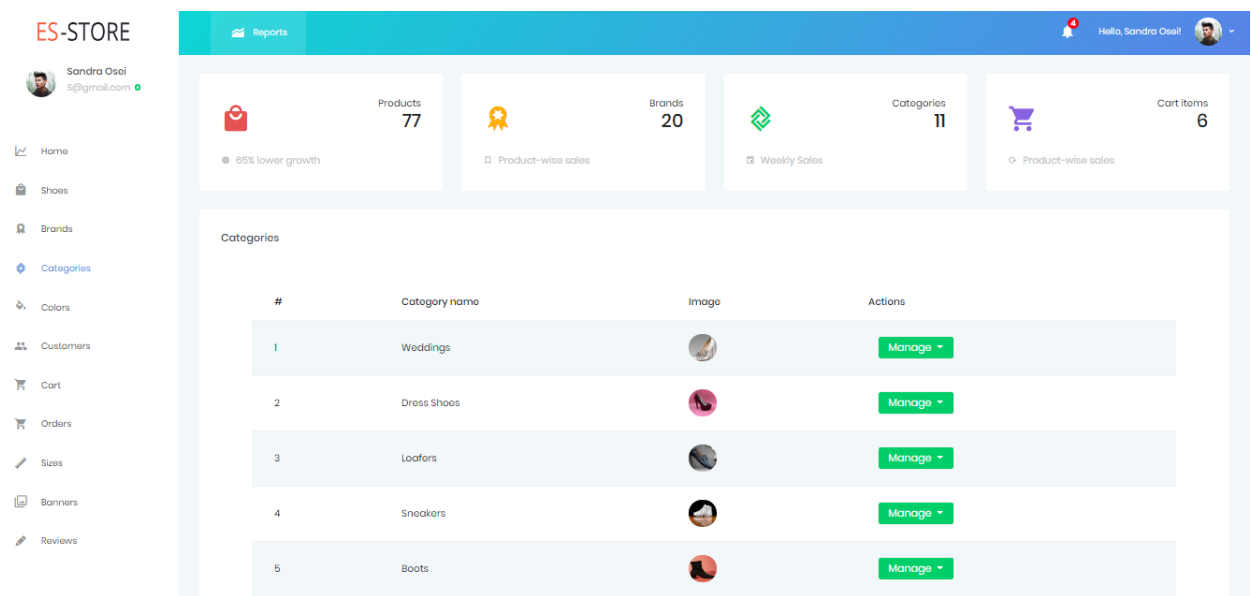
3.2   Interface Design

Es-Store Online has two user interfaces; the customer interface and the administration interface.

Figure 2: The customer interface of the Es-Store website

This is the home page of Es-Store Online, where customers can view products images, names, and prices. This page has a top navigation bar that links all the pages on the system together and enables

users to access precise details based on the menu quickly. The search bar also allows users to retrieve information about a product easily by using specific keywords.

Figure 3: Administrators interface on the Es-Store Website

Another user interface on Es-Store Online is the administration page. This page is only available to users who have the privilege to make changes on this page. Es-Store Online administrators need to log in on this page to be able to access and update information on this website. The side menu has links to the different pages that together make-up the site. Right below the horizontal bar are sections that display the number of items in products, brands, categories, and cart items tables. The category page as shown in the page below presents information on a data table. The actions section on the data table pages has a dropdown menu that allows administrators to edit or delete rows on the table.

Figure 4: Insert product form page for the administrator

The administration page has a form that will enable authorized administrators to add new products to the existing ones by filling out the fields in the form. All the other data tables that the administrator can alter such as the color, category, brand, sizes, and banners have forms that allow the updating.

3.3 Database Design

The Es-Store Online database has tables that stores all data provided by customers on the site including all information that makes up the website. These tables are banner, brand, cart, category, color, consent, customer, orders, payment, reviews, shoe, shoe size, and users. The banners table stores all the images that are used as banners on the pages of the websites. Brand table stores the brand names of the products displayed on the site. Cart table stores the user's information that is vital to purchasing and delivering processes. The category table contains

information about the different categories of products available on the website. Color table holds the colors of products. All information that is sent by users in the form of email is stored in the consent table. The customer table houses customer personal information details. Information about customer orders including products, quantity, date, invoice number, and order status is stored in the orders table. Payment details are kept in the payment table. Reviews table holds customer reviews made about specific products on the website. Shoe table stores all information about the products displayed for sale on the site. The shoe size table contains the sizes of products as the user table stores the information user.

All these tables have attributes and primary keys that give their unique identifications. The database can be updated and altered anytime when necessary by authorized users.

3.4   Data Design

Use Case Diagram

Figure 5: Use case diagram of the users of the website; customer and administrator

This diagram shows what users of Es-Store Online can do on the web application. Each user has limited use of features of the system such that, customers cannot update products on the website. Similarly, an administrator cannot add products to cart unless he registers as a customer.
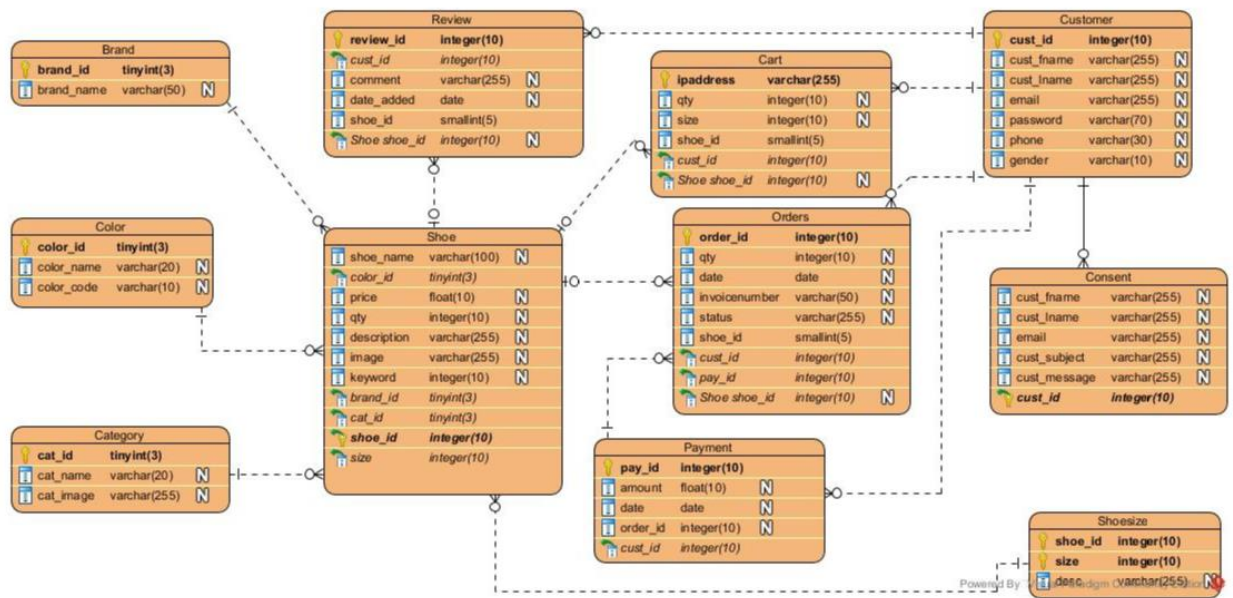
3.5   Entity Relationship Diagram

Figure 6: Entity relationship diagram showing the relations between the tables in the database.

The activity diagram shows the relationships that exist between the various entity sets in the database of Es-Store Online. The entities have attributes that describe the properties in the tables as known in the database.

Chapter 4: Implementation And Testing

4.1   System Description

Es-Store Online supports many processes that efficiently and successfully enhance the practical completion of the entire procedure. Users can go through the pages on the website for relevant information about products. However, no transactions can be made when users have not signed up. An actual purchasing on Es-Store Online starts when a user signs up on the website by entering specific necessary credentials about themselves. Upon completion, customers need to login to access other pages for a smooth transaction. Es-Store Online displays products categories by shoe types to enhance the easy retrieval of products on the site. It also provides information such as product names, prices, images and other details such as shoe sizes, keywords related to footwear and a button that allows users to increase or decrease the quantity of a kind of product. All selected items are saved in the cart with corresponding prices and quantity. Users total transaction costs, made up of the actual and delivery charges, are displayed in a section below the cart items. There is a button that allows customers to proceed to check out the products in their cart.

On the other hand, administrators have a login page that allows them to enter correct credentials to authenticate them before having access to information in the database. In the dashboard, administrators can add different colors, sizes, categories, brands, banners, and shoes. Administrators can see products ordered by customers and process their orders.

4.2   System Features

The features that will make Es-Store Online work efficiently are described below:

- ❖ **User signup and log in**: This is one of the essential functions that need to be present in every electronic commerce web application. Without these features, the user's identity cannot be tracked to cater for their orders.

- ❖ **Shopping Cart**: This serves as a traditional basket, where all products selected by customers with their corresponding prices and quantities are stored before they can proceed to payment through a secure checkout process. This functionality allows customers to add products to their basket virtually, update product quantity in their cart, and delete products from the cart.

- ❖ **Order management**: This feature makes it easy for merchants to obtain detail information about transaction cancellations, order verifications, order status, and others. It helps merchants handle customer orders completely.

- ❖ **Communications**: This system has a feature that sends customers constant reminders on their orders by sending notifications. This is to inform customers of their order statuses.

- ❖ **Content Management System**: Es-Store Online has contents such as banners, logo, footer links, products and policies [26]. Each of these features gives the website aesthetics looks and makes it easy for customers to access quick links.

4.3   Implementation Support

4.3.1   Tools and Libraries

Websites and applications cannot be designed without the use of specific tools and libraries. The following tools and libraries are considered in developing the website and the application:

HTML stands for Hypertext Markup Language. It is the standard markup language for buildings web applications and webpages. It has elements that enable the creation of HTML pages. HTML

is used as a foundation for the building of a website. It is straightforward to use because it supports the incorporation of other languages.

CSS (Cascading Style Sheet) is a styling language that enhances the presentation of HTML documents. It gives HTML beautiful looks with the use of elements such as colors, layouts, fonts, and others. CSS makes the front ends of web pages have an attractive and well-structured presentation.

PHP (Hypertext Preprocessor) is a server scripting language used for web application development. It plays an active role in designing interactive and dynamic web pages that communicate with databases. It can be embedded into HTML documents.

JAVASCRIPT is a programming language that helps in web application development by controlling the behavior of HTML and CSS. It can be used for validation on web pages. It also provides a dynamic and responsive user experience.

AJAX (Asynchronous JavaScript and XML) provides responsive and live interactions for users through the communication between a web server and a browser (client) to obtained searched keywords or data from a database. Ajax [27] works in collaboration with JavaScript to provide amazing website interaction. The search bar for Es-Store Online uses Ajax to provide live search experience for users.

MYSQL (Structured Query Language) is a backend and a standard language that helps to store, retrieve and manipulate data in the databases. It operates as a server and allows several users to create and manage a large number of databases. MySQL uses delete, update and insert in its execution.

Apache Server (XAMPP) is a localhost that displays the layout and the updates made on Es-Store Online.

4.4   Functional Requirement Testing and Results

This section of this paper shows the functional features on the website.

4.4.1   Sign up Feature

Figure 7: Signup interface for customers Interface

Potential customers and visitors can navigate through the site to find out about whatever information they may need to inform their decision on buying any product from the site. However,

transactions on Es-Store Online cannot be recorded and taken track of without any new customer signing up on this page. The sign-up page demands that visitors enter specific vital information about themselves for unique identification.

Test Result

When a user signed up on the website, he was redirected to the login page.

4.4.2   Login Feature

Figure 8: Login interface on the customer interface

The login page allows existing customers to enter their credentials before carrying out any transaction. The login page demands fewer user information than the sign-up page. This is because any time a user signs up on their first visit on the page, their data is stored in a database for future usage. The login page gives a functionality named **forgot password** which allows existing customers to reset their password if it is forgotten. It also has a **sign-up** button that directs the user to the sign-up page for details entry if they are visiting the site for the first time.

Test Result

Figure 9: Notification displayed for wrong credentials

When a user logs in with the wrong email address or password, it gives a notification; "**Wrong email address and password combination**" as shown below the login button above.

However, when a user logs in with the correct email address and password, it directs the user to the home page.

4.4.3   Add Product Feature

This feature is in the administrator's interface design. The administrator is the only one who can add products on the website. He has the privilege to add colors, prices, categories and other vital information that may not be currently on the website. He is also responsible for all updates on the site.

Figure 10: Insert brand name form on the administrator page

The figure above shows the administrators brand page, where all product brands are displayed in a table. The table shows that there are 20 brands in all.

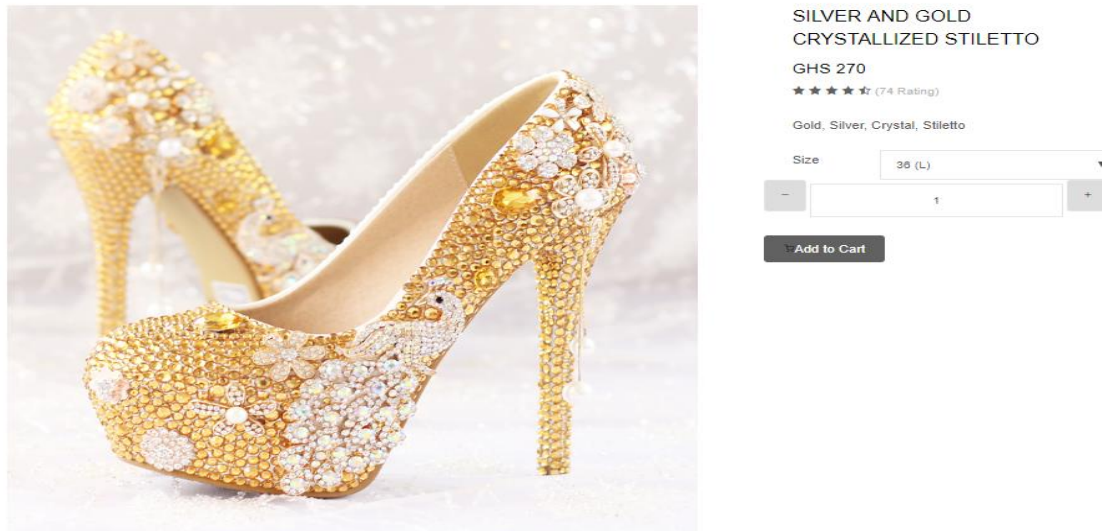**Test Result**

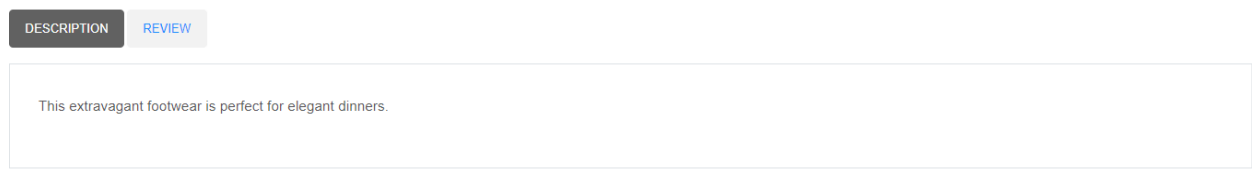*Figure 11: Brand name Display on Administrator Interface*

Gucci was added as a new brand to the brand table, and the entire available brand has updated to 21, showing that the **added** feature works.

4.4.4 Display Product Feature

Figure 12: Single product display on the customer interface

The display product feature gives the necessary information that customers may need to make any purchase from the website. This feature shows the names, prices, ratings and some keywords that can be used to access the product. It also has a drop-down button that displays a list of sizes for customers to choose from any time they want to buy a product. Next is another button that allows users to specify the quantity of the same product they would want to buy by a continuous clicking on the plus (+) sign to increase the quantity and the minus (-) sign to decrease quantity. The **Add To Cart** button, when clicked on, adds the particular product to the basket, as known traditionally, or the cart of the customer.

DESCRIPTION   REVIEW

This extravagant footwear is perfect for elegant dinners.

Figure 13: Product description section

The single product page also has a description and a review section. The description section displays short but detailed information about the selected product to give customers an overview of the product.

DESCRIPTION   REVIEW

0 REVIEWS   GIVE A REVIEW

no reviews available
                                           ★ ★ ★ ★ ★   0 Reviews

                                           ★ ★ ★ ★ ☆   0 Reviews

                                           ★ ★ ★ ☆ ☆   0 Reviews

                                           ★ ★ ☆ ☆ ☆   0 Reviews

                                           ★ ☆ ☆ ☆ ☆   0 Reviews

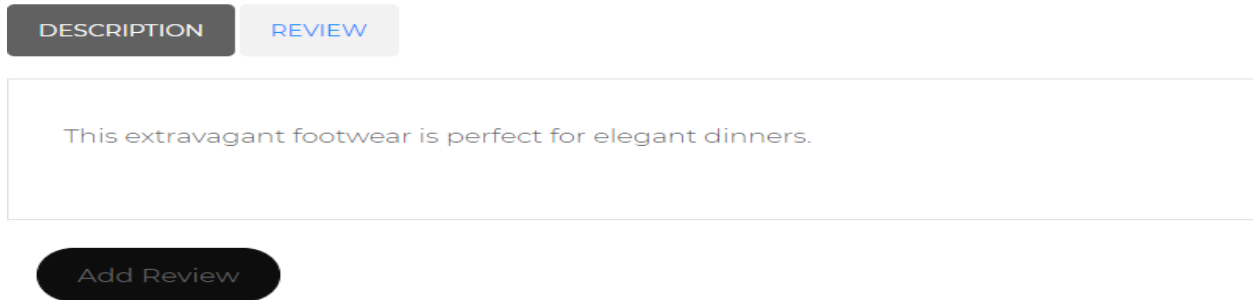Please log in to add a review about this product

Figure 14: Give a review section

The review section allows customers to write and publish their experience with the products by writing and using stars.

Test Result

The customer can see products displayed on a page with all information about the products when a product is clicked on from the product page showing that the single product page works.

A customer can write a review on a product when logged in. This figure is displayed, given a button to add a review.

Figure 15: Add review button

Figure 16: Add review pop-up box

A customer can add a review by typing in the space provided and choosing corresponding stars as well.

Figure 17: Review added

When the **OK** button is clicked on, a notification pops up, confirming that the review has been added.

4.4.5 Search Product Feature

This feature allows customers to find products easily on the webpage by using specific keywords. The search feature is designed to enhance users experience as they interact with the page. It gives a live search experience by displaying products with keywords that form a part of the product name.

Figure 18: Search Feature

Products that have that specific keyword in their naming are displayed when typed in the search engine. This shows that the search product feature works.

Payment Page

When customers proceed to checkout on the cart page, they are given directions on how to pay for their purchases using mobile money on all networks. On paying via Mobile Money, customers have to enter certain details for successful payment. The diagram below shows a notification giving a customer directions on how to pay via mobile money.

Figure 19: Mobile Money Payment

All Mobile Money payments are stored on the dashboard of Nponto Technology, a software company that manages all mobile money transactions on Es-Store Online.

Below is an Nponto Pay Dashboard showing all the various mobile networks used in Ghana and the number of trasactions that have been made to each of them.

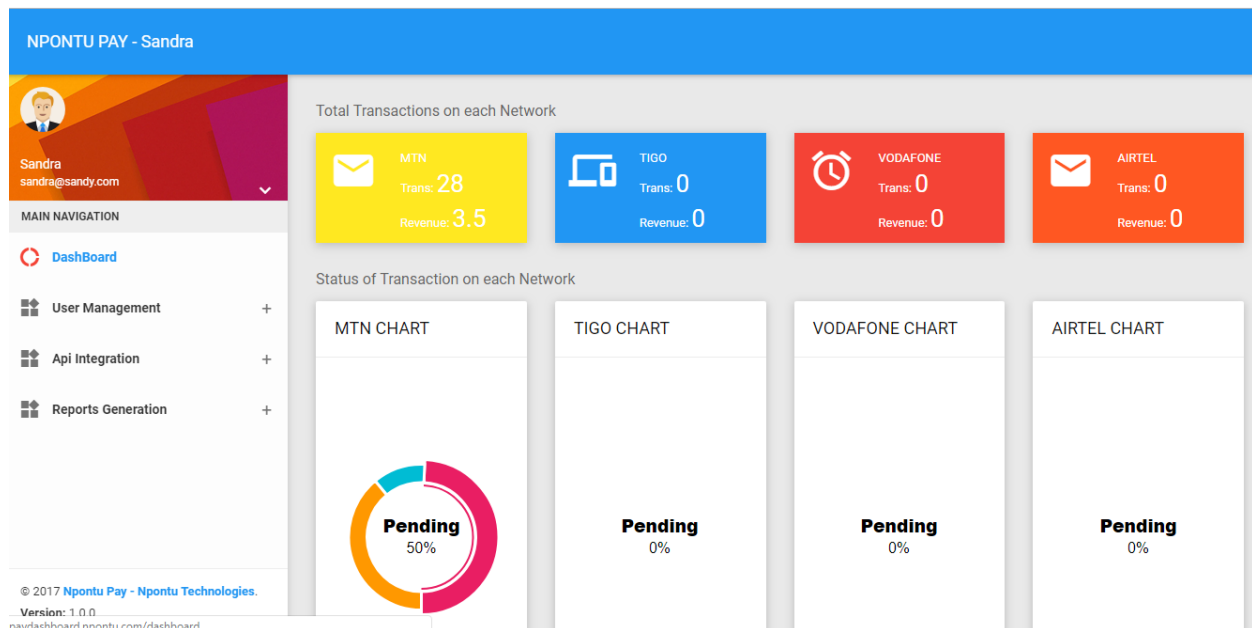

Figure 20: Npontu Pay Dashboard

In the diagram above, MTN is the most dominant network that has most transactions done. It is because the testing was done using the MTN Network.

4.5   System Testing

Testing the system confirms its purpose, the reason for which it was build. Assumptions cannot be used as a prove of correction system functioning. Therefore, after the system was completely built, 10 students perceived as potential users of the system, were called randomly to test the system. These students were made to enter specific information such as first name, last name, password, username, phone number, as new customers to make some purchase on the website. When the users clicked the submit button and logged in, they were redirected to the home page to continue with their purchase process. Users were able to go through the process to checkout, where they used Mobile Money for payments.

Chapter 5: Conclusion And Recommendation

5.1 Future Works

In the future, I would want to develop a mobile application that allows the customers of Es-Store Online to orders for footwares by just downloading an the application on the phones without using the website anytime they want to purchase products.

Also, I would implement a functionality that allow customers to upload images of products they want to buy on the platform but are not available on the page. With this, administrators of Es-Store Online would benefit from this by gaining knowledge on new fashion trends in the world.

Machine learning would also be implemented on the application for product suggestions as well as using a chatbot to respond to user queries.

5.2 Limitations

Es-Store Online is available to customers who have smartphones, computers, and internet access. Customers who may not know how to use smartphones or laptops to browse on the internet cannot make any purchase transactions on Es-Store Online. Places with poor internet connections cannot access Es-Store Online. Also users with less idea on how to use Mobile Mobile cannot successfully complete a purchase on the website.

 There is a limited payment option on the website. Customers who are not using any form of mobile network that allows for payment cannot complete a transaction.

5.3 Recommendation

Es-Store Online has been built based on most requirement gathered from the requirement specification. However, some functionalities can be added to the system to make better user experience. Updating the features of what has been done on Es-Store Online so far can make it easy to use and enhance effective interaction. Due to the changing style of shopping today, this system could be designed to be accessed with or without the internet for every individual's usage.

5.4 Conclusion

The purpose of Es-Store Online is to enable Es-Store to move its tradition footwear retail shop to an online e-commerce platform for effective interaction with customers and easy buying process. Es-Store Online allows customers to access all information that is vital to making purchase decisions and enable them to order for products from the online shop. Customers can buy all the products they need from Es-Store Online. Customers can add products to their cart, delete products from the cart and proceed to check out if they want to make purchases.

The website administrator, through a process of authentication and authorization, can be allowed to add and update information on the websites. Administrators can manage all customer orders, receive and reply to all customers emails.

References

[1] Laudon Kenneth and Traver Carol. 2014. E-commerce: business, technology, society. Retrieved January 10, 2019, from https://sabraz.files.wordpress.com/2017/05/e-commerce-laudon.pdf

[2] Panigrahi Dr Ashok and Joshi Vijay. 2016. *Application of E-Commerce in Indian Textile Industry*. Retrieved from https://papers.ssrn.com/abstract=2800477

[3] Ha Sung, Bae Soon, and Son Lee. 2015. *Impact of Online Consumer Reviews on Product Sales: Quantitative Analysis of the Source Effect*. 15.

[4] Johnson Carrie. 2004. Getting multichannel retailing right: How to create and implement a multichannel strategy, http://www.forrester.com/rb/Research/getting multichannel retailing right/q/id/35560/t/2. [2]

[5] Johnson Carrie. .2005. US e-commerce: 2005 to 2010, http://www.forrester.com/rb/Research/us ecommerce 2005 to 2010/q/id/37626/t/2. [3]

[6] Zhou Lina, Dai Liwei, and Zhang Dongsong. 2007. Online shopping acceptance model-a critical survey of consumer factors in online shopping, Electronic Commerce Research. 8, 41-62.

[7] Ahuja Manju, Gupta Babita, and Raman Pushkala. 2003. An empirical investigation of online consumer purchasing behavior, Communications of ACM. 46, 145-151.

[8] Schneider Gary P. 2011. *Electronic commerce*. Boston, MA: Course Technology Cengage Learning.

[9] Loo Warren., Kirubakaran Mahendran, Chin Ong, and Joshi Jignyasu. 2016. *Evolution of E-Commerce: Amazon case study*. Retrieved from https://www.academia.edu/30175817/Evolution_of_E-Commerce_Amazon_case_study

[10] Indvik Lauren. 2013. Forrester: U.S. Online Retail Sales to Hit $370 Billion by 2017. Retrieved March 30, 2019, from Mashable website: https://mashable.com/2013/03/12/forrester-u-s-ecommerce-forecast-2017/

[11] Khurana Ajeet. 2019. Why E-commerce Is Taking the Retail World by Storm. Retrieved January 12, 2019, from https://www.thebalancesmb.com/advantages-of-ecommerce-1141610

[12] Chaffey Dave. 2017. The reasons why consumers shop online instead of in stores. Retrieved January 12, 2019, from https://www.smartinsights.com/ecommerce/ecommerce-strategy/the-reasons-why-consumers-shop-online-instead-of-in-stores/

[13] Porter Michael. 1986. Competition in global industries (Research colloquium (Harvard University. Graduate School of Business Administration)). Boston, Mass.: Harvard Business School Press.

[14] Brown Johnson Jacqueline and Reingen Peter. 1987. Social ties and word-ofmouth referral behavior, Journal of Consumer Research. 14, 350-362.

[15] Jacobs Kees, Morgan Jules, Buvat Jerome, Khadikar Amol, and Bisht Ashish. 2017. *Consumer Insights: Finding and Guarding the Treasure Trove*. 30.

[16] Khurana Ajeet. 2018. Advantages and Disadvantages of Ecommerce. Retrieved March 31, 2019, from The Balance Small Business website: https://www.thebalancesmb.com/ecommerce-pros-and-cons-1141609

[17] Hall Mark. 2018. Amazon.com | History & Facts. Retrieved March 31, 2019, from Encyclopedia Britannica website: https://www.britannica.com/topic/Amazoncom

[18] Jumia Ghana. [n.d.]. Jumia Ghana | Buy Electronics, Phones, Fashion & more. Retrieved March 31, 2019, from Jumia Ghana website: https://www.jumia.com.gh/

[19] Kikuu.com. [n.d.]. Kikuu Online Shopping. Retrieved March 14, 2019, from

https://kikuu.com.gh/document/about-us.html

[20] Tonaton.com. [n.d.]. Tonaton.com - Electronics, Cars, Property and Jobs in Ghana. Retrieved

March 14, 2019, from https://tonaton.com/

[21] OLX. n.d. Company OLX | Cleverism.com. Retrieved March 31, 2019, from Cleverism website:

https://www.cleverism.com/company/olx/

[22] Inderjit Singh. 2017. E-commerce and its effect on nowadays production. *International Journal

of Multidisciplinary Research and Development*, *4*(4), 283–286.

[23] Lunka Ryan. 2019. Ethical Issues in eCommerce: Are you violating any of them? Retrieved

March 15, 2019, from https://www.nchannel.com/blog/ethical-issues-in-ecommerce/

[24] Rouse Margaret. 2011. What is model-view-controller (MVC)? - Definition from WhatIs.com.

Retrieved March 23, 2019, from https://whatis.techtarget.com/definition/model-view-controller-

MVC

[25] Cheung Tyrone. 2014. Client-Server Model and MVC Design Pattern. Retrieved March 24,

2019, from http://webcoursify.github.io/content/1-DjangoBasic/1-ClientServer.html

[26] Bhalla Puneet. 2018. Top 10 [Must Have] Features of an E-commerce Website. Retrieved March

14, 2019, from https://www.kartrocket.com/blog/top-10-ecommerce-website-features/

[27] Martsoukos George. 2016. An Introduction to AJAX for Front-End Designers. Retrieved March

10, 2019, from https://webdesign.tutsplus.com/tutorials/an-introduction-to-ajax-for-front-end-

designers--cms-25099

Appendices

Table 1: Brand Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description
brandid	Tinyint	Primary key	No	Uniquely identifies a product brand
brandname	Varchar	Field Length: 50	No	Specifies brand name

Table 2: Category Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description
catid	Tinyint	Primary key	No	Uniquely identifies a product category
catname	Varchar	Field Length: 50	No	Specifies category name

Table 3: Color Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description

colorid	Tinyint	Primary key	No	Uniquely identifies a product color
colorname	Varchar	Field Length: 50	No	Specifies color name

Table 4: Shoe Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description
shoe_id	Smallint	Primary key	No	Uniquely identifies a product
shoename	Varchar	Field Length: 50	No	Specifies product name
brandid	Tinyint	Foreign key	No	Uniquely identifies a product brand
catid	Tinyint	Foreign key	No	Uniquely identifies product category

colorid	Tinyint	Foreign key	No	Uniquely identifies a product color
price	Float	Field Length: 50	No	Specifies the price of a product
qty	Mediumint	Field Length: 100	No	Specifies quantity of a product
description	Text	Field Length: 255	No	Describes a product
image	Varchar	Field Length: 255	No	Shows the image of a product
keywords	Text	Field Length: 255	No	Specifies products keywords

Table 5: Customer Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description

cust_id	Int	Primary key	No	Uniquely identifies a customer
custname	Varchar	Field Length: 255	No	Specifies customer name
email	Varchar	Field Length: 255	No	Specifies customer email address
password	Varchar	Field Length: 70	No	Store customer password
phone	Varchar	Field Length: 30	No	Tells the customers' telephone number
gender	Enum	"Male", "Female"	No	Specifies gender of a customer

Table 6: Order Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description

order_id	Int	Primary key	No	Uniquely identifies a specify order
shoe_id	Smallint	Foreign key	No	Uniquely identifies a product
cust_id	Int	Foreign key	No	Uniquely identifies a customer
qty	Mediumint	"Male", "Female"	No	Quantity of products
date	Date	Null	No	Specifies date of order
invoicenumber	Varchar	Field Length: 50	No	Order invoice number
status	Enum	Null	No	Tells the status of a product after order

Table 7: Payment Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description

payid	Int	Primary key	No	Uniquely identifies a payment transaction
cust_id	Int	Foreign key	No	Uniquely identifies a customer
amount	Float	Field Length: 100	No	Amount customers need to pay
date	Date		No	Date payment was made
orderid	Int	Field Length: 20	No	Uniquely identifies an order

Table 8: Cart Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description
ipaddress	Varchar	Primary key	No	Uniquely identifies an IP address

Field Name	Data Type	Other Information	Allow Null	Description
shoe_id	Smallint	Primary key	No	Uniquely identifies a product
qty	mediumint	Field Length: 20	No	Specifies quantity purchased by customer

Table 9: Review Table and Attributes

Field Name	Data Type	Other Information	Allow Null	Description
reviewid	Tinyint	Primary key	No	Uniquely identifies a customer review
cust_id	Int	Foreign key	No	Uniquely identifies a customer
shoe_id	Smallint	Foreign key	No	Uniquely identifies a product
comment	Text	Field length: 255	No	Complaints made by customer

date_added	Date	Null	No	Date a review was added