Click to Buy: Building a Smart Scalable Multi-Vendor E-Commerce Solution

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Submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
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APPROVAL

The thesis/project titled "**Click to Buy: Building a Smart Scalable Multi-Vendor E-Commerce Solution**" submitted by **M S Ripon Mia** (CSE2103024157), **Md Abu Naim** (CSE2103024158), **Sathu Chandra Ajoy** (CSE2103024159), **Sourav Rahman** (CSE1902017025) and Tamanna Jannat (CSE1603009016) to the Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents.

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DECLARATION

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Md. Shamim Hossain,** Lecturer**,** Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this thesis or project has been or is being submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The Project entitled “Click to Buy” is a web-based application. The main aim of “Multi-Vendor E-Commerce Website: Click to Buy” is to improve the services of Customers and vendors. It maintains the details of customer payments, product receipts, the addition of new customers, products, and also updating, and deletion for the same. It also stores the details of invoices generated by customers and payments made by them with all Payment details like a credit card. The main features of the project “Click to buy” are high accuracy, design flexibility, and easy availability and also it uses database tables Representing entities and relationships between entities. It is a form of electronic commerce where the buyer is directly online to the seller’s computer usually via the internet. The primary goal of e-commerce is to reach the maximum number of customers at the right time to increase sales and profitability of the business. Functional e-commerce like shopping bazar includes features like buying and selling goods online. Online shopping makes use of digital technology for managing the flow of information, products, and payment between consumers, site owners, and suppliers. Online shopping can be either B2B (business to business) of B2C (business to consumer) “Click to Buy” is one of the important facilities provided in online shopping, this lets customers browse different goods and services, and once they select an item to purchase they can place the item in the shopping cart, and continue browsing till the final selection.

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Finally, our deepest gratitude and love to my parents for their support, encouragement, and endless love.

LIST OF ABBREVIATION

HTTP	Hyper Text Transfer Protocol
JS	JavaScript
PHP	Hypertext Preprocessor
SQL	Structured query language
UI	User Interface
XAMMP	Cross-Platform (X), Apache (A), MariaDB (M), PHP (P), and Perl (P)

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Chapter 1
INTRODUCTION

1.1 Overview

The digital age, where convenience and accessibility define success, e-commerce platforms have revolutionized the way we shop, sell, and interact with products and services. This project focuses on the development of a fully functional e-commerce website that serves as a bridge between buyers and sellers through an interactive and user-friendly online interface. The platform is designed to offer a seamless shopping experience by integrating essential features such as product listings, user authentication, shopping cart functionality, order processing, and payment simulation.

The core idea behind this project is to create a scalable and dynamic web application that mimics the real-world process of online shopping. It allows users to register and log in securely, browse through categories of products, view detailed product descriptions, add items to their cart, and proceed to checkout. Admin users have separate access to manage product inventory, monitor orders, and handle user interactions. The system has been designed to ensure usability, security, and performance, keeping in mind both the end-users and administrators.

Technically, the project has been built using front-end technologies such as HTML, CSS, and JavaScript to create a responsive and engaging user interface. The backend is powered by technologies like PHP (or Node.js / Python depending on implementation) and MySQL for database management. The interaction between the front-end and back-end layers has been developed following best practices in web development to ensure data integrity and smooth operations.

This e-commerce website project is not just a demonstration of technical skills but also an implementation of real-world business logic. It simulates practical e-commerce functionalities including product filtering, search capabilities, cart management, order history, and basic payment gateway simulation (non-transactional for academic purposes). Proper validation and form-handling mechanisms are integrated to improve the user experience and data accuracy.

E-commerce has evolved significantly over the past decade. Studies by highlight the importance of user-centric design and the role of personalization in driving customer satisfaction and loyalty in online shopping platforms. The rise of AI-driven recommendations, chatbots, and voice-assisted shopping interfaces is becoming more prominent. Additionally, studies also emphasize the significance of mobile optimization and secure payment systems, especially in developing markets. These insights have informed various design choices in this project, ensuring that the website aligns with modern consumer expectations and industry standards [1].

Through this project, the aim is to understand the structure of modern e-commerce platforms and apply theoretical knowledge into a practical system that solves a real problem. It reflects the intersection of software engineering, database design, and user experience. It also opens the door for future enhancements such as mobile responsiveness, real-time order tracking, and integration of real payment APIs.

In conclusion, this e-commerce website project stands as a comprehensive demonstration of the development process of a modern web-based application, highlighting the full life cycle from planning and design to implementation and testing. It provides a robust foundation for further development and scaling into a fully operational commercial application in the future.

1.2 Problem definition

In today's fast-paced world, traditional shopping methods often fall short of meeting the evolving needs of modern consumers. Visiting physical stores requires time, effort, and availability of local resources, which can be a significant inconvenience, especially for individuals with tight schedules or limited access to products. The need for an efficient, accessible, and secure platform for purchasing goods has become more apparent with the advancement of internet technologies.

Despite the growth of e-commerce globally, many small-scale businesses or localized users still lack access to dedicated digital platforms to buy and sell products effectively. Customers often struggle with poor user experiences, limited product availability, and lack of product information on existing platforms. Moreover, for students and developers, there is a growing need to understand the core structure and operation of an e-commerce system from a development perspective.

This project aims to address the following key problems:

1. Lack of accessibility and convenience in traditional shopping.
2. Absences of a centralized platform for product display and management for small businesses.
3. Limited technical understanding of how e-commerce systems function in real-time.
4. Inadequate integration of secure login, order management, and product browsing in simple educational prototypes.

By developing a user-friendly, secure, and functional e-commerce website, this project seeks to bridge the gap between theoretical knowledge and real-world application. It aims to simulate a real online shopping experience while solving the aforementioned issues in a streamlined and efficient manner.

1.3 Motivation

The growing importance of multi-vendor e-commerce websites in today's digital economy presents a rich opportunity for research and innovation. These platforms, which host products from various sellers in one unified marketplace, have reshaped how businesses operate and how consumers shop online. Websites like Amazon, eBay, and Etsy have become household names, demonstrating the vast potential of multi-vendor platforms to offer customers an extensive variety of products while empowering small businesses and individual vendors. A thesis on this subject is motivated by the increasing demand for efficient, scalable, and user-friendly multi-vendor systems, as well as the technical, operational, and business challenges that come with managing such platforms. Understanding these dynamics is key to improving platform design, user experience, and vendor management, all of which contribute to the success of multi-vendor e-commerce models.

Furthermore, examining multi-vendor e-commerce websites provides valuable insights into the future of online commerce. As competition intensifies and technology evolves, there is a pressing need to optimize these platforms for better security, performance, and customer engagement. This thesis aims to address these challenges, offering solutions that can benefit both vendors and consumers. By focusing on aspects such as platform scalability, payment gateways, inventory management, and user interface design, this research seeks to contribute to the development of more efficient, sustainable, and competitive e-commerce ecosystems [2].

1.4 Objective

The primary objective of this project is to design and develop a responsive, secure, and efficient e-commerce website that replicates the core functionalities of modern online retail platforms. In an increasingly digital world, where consumers prefer convenience and instant access, this project aims to create a user-centric solution that bridges the gap between traditional shopping and online commerce. By simulating the real-world online shopping experience, this project serves both educational and practical purposes.

The key objectives of the project are outlined as follows:

1. **Develop an Intuitive User Interface:** Create a clean, responsive, and easy-to-navigate interface that enhances user experience across devices, ensuring accessibility and usability.

2. **Implement Secure User Authentication:** Establish role-based user authentication with secure login systems and session control to protect user data and maintain system integrity.

3. **Build a Dynamic Product Management System:** Enable administrators to efficiently manage products, including adding, updating, and deleting product details through a centralized dashboard with real-time stock visibility.

4. **Design a Functional Shopping Cart and Checkout System:** Create a seamless shopping experience that allows users to select products, view pricing, and proceed through a realistic checkout process.

5. **Integrate a Backend Database for Efficient Data Management:** Use a relational database (e.g., MySQL) to manage user information, products, and order history efficiently and accurately.

6. **Ensure Scalable and Maintainable Architecture:** Follow modular development practices that allow for future feature enhancements, including payment gateway integration and customer feedback systems.

The primary objective of this project is to build a simple, user-friendly, and functional e-commerce website that demonstrates the real-world flow of online shopping. It aims to enhance technical skills in web development, apply academic knowledge in a practical context, and deliver a system that can be used for educational, business, or personal purposes. This project also lays the groundwork for future expansion with more advanced features and better scalability.

Chapter 2
LITERATURE REVIEW

The literature review explores various studies and existing systems related to the development and evolution of e-commerce platforms. It highlights the rapid growth of online shopping, the role of web technologies in enabling seamless user experiences, and the importance of features such as product filtering, secure payment gateways, and responsive design. Several research papers and case studies have shown that user trust, system performance, and ease of navigation are critical success factors in e-commerce. Existing platforms like Amazon and Shopify set industry standards, while many open-source solutions serve as learning references for developers. However, most of these systems are either highly complex or commercially focused, leaving room for simpler, educationally-driven projects. This review serves as a foundation to understand the current trends, identify gaps, and justify the implementation of a lightweight, functional e-commerce system suitable for academic and practical use. Chaffey [3]. Also discusses the operational aspects of these platforms, focusing on inventory management, payment systems, and customer service. He stresses the need for scalable and efficient back-end infrastructure to manage multiple vendors. Overall, literature suggests that while multi-vendor platforms offer significant opportunities, managing them effectively requires addressing both technical and business challenges.

2.1 Background

In recent years, e-commerce has significantly transformed the way businesses operate and how customers interact with products and services. With the proliferation of internet access, smartphones, and digital payment systems, online shopping has become a convenient alternative to traditional retail. Major platforms like Amazon, Alibaba, and Flipkart have set benchmarks in the industry by offering a seamless user experience, fast delivery, and a wide range of products. However, while these commercial giants dominate the market, there is still a growing interest in developing small-scale, customizable e-commerce platforms for specific needs, particularly in academic and startup contexts.

E-commerce systems are complex and involve multiple components, including product listings, shopping carts, payment gateways, order management, and user authentication. Over the past decade, several researchers and developers have worked on simplifying these components to make e-commerce platforms more accessible and educational. Open-source platforms like WooCommerce and Magento offer modular systems, but they often require advanced configuration skills and may not be suitable for beginners or students. As a result, many academic projects and technical workshops aim to build simplified models of e-commerce websites to provide learners with hands-on experience in full-stack web development.

Several studies and papers have analyzed the key success factors of e-commerce systems. According to research, user trust, ease of navigation, responsive design, and secure transactions

are some of the most important aspects that influence customer satisfaction. From a developer's perspective, creating a system that balances simplicity and functionality is crucial. This includes designing user-friendly interfaces, structuring efficient backend databases, and implementing basic security measures. These lessons from existing literature help set the direction for educational projects that aim to replicate real-world e-commerce behavior on a smaller scale.

This project draws inspiration from these prior works and attempts to bridge the gap between theoretical knowledge and practical implementation. It is aimed at developing a basic e-commerce website that demonstrates the essential features of online retail systems, including product management, user login, shopping cart functionality, and order handling. The goal is not only to replicate known patterns but also to understand the underlying logic that powers such systems. By studying existing e-commerce architectures and their limitations, this project identifies opportunities to build a lean, functional, and expandable web-based solution.

In summary, the background of this project is rooted in the global rise of digital commerce and the need for simplified learning models that reflect industry standards. It builds upon existing research, case studies, and web development practices to provide an academic platform that is both practical and scalable. This foundational understanding serves as the basis for the system analysis, design, and implementation phases that follow.

2.2 Executive System Comparison

The continuous evolution of digital commerce has resulted in the development of numerous e-commerce platforms, each with its own set of features, architecture, and target audience. To better understand the landscape and position this academic project within it, a comparative analysis of popular e-commerce systems is essential. This comparison not only highlights the strengths and weaknesses of existing solutions but also justifies the need for a simplified, educationally focused platform like the one proposed in this project.

Comparison Criteria

The systems are compared based on key factors that define the quality and usability of an e-commerce platform:

1. Ease of Use
2. Customization Flexibility
3. Technical Complexity
4. Cost
5. Scalability
6. Educational Value

2.3 Analysis of Existing Systems

1. **Amazon**
   Amazon is a global leader in e-commerce with a vast product range and advanced systems, including AI-powered recommendations and one-click purchasing. However, its backend is highly complex and not accessible to developers for customization or learning purposes. It is a commercial platform, not intended for educational adaptation.

2. **Shopify**
   Shopify is ideal for small to medium businesses due to its user-friendly interface and drag-and-drop customization. However, it is a paid service and hides most backend logic from users, making it less suitable for technical learning or modification beyond the surface level.

3. **Woo Commerce**
   Woo Commerce is an open-source plugin for WordPress, offering flexibility and a decent level of customization. It is popular among developers but requires a solid understanding of WordPress and PHP, which may overwhelm beginners or those wanting a simple architecture.

4. **Daraz**
   Daraz is widely used in South Asia and focuses on regional commerce with high functionality. However, like Amazon, it is a closed-source platform with little educational value for students or developers who want to learn internal processes.

5. **Proposed E-Commerce System**

   This project aims to provide a minimalist yet functional e-commerce platform that captures the essence of online shopping—from product browsing and cart management to order placement and admin control. Unlike commercial platforms, it offers complete visibility and control over the codebase, making it a perfect learning model. It is free, fully customizable, and tailored for academic use, allowing students to understand and build each component from scratch.

6. **Software & Hardware Requirements for Running Software (User)**

Hardware	**Software**	**Network**
Computer, Mobile, Tab etc. with minimum requirements	OS: Platform Independent Browsers: Chrome, Firefox	Must have high speed internet connection.

Table 2.1: Software & Hardware Requirements for Running Software (User)

7. Software & Hardware Configuration for Running Software

Configuration	PC-1(Ripon)	PC-2(Naim)
Processor	Intel Core i7, 2.4 GHz	Intel Core i5, 2.20 GHz
RAM	16GB	4GB
Storage	SSD-120 HDD-1TB	SSD-120 HDD-1TB
OS	Windows 10, 64Bits	Windows 10, 64Bits

Table 2.2: Software & Hardware Configuration

8. Software & Hardware user for Development

A. Vital Components

Database: E-Commerce website

Domain and Hosting: Security System

Payment gateway: SSLCOMMERZ

B. Software Tools:

Local Server XAMPP

Database Server MySQL

IDE NetBeans, Notepad++

9. Resource Table

Programming languages	PHP
Web frameworks	CodeIgniter
JavaScript graphics	Chart.js
JavaScript Library	jQuary
Databases	MySQL
Database Managers	PHP Myadmin

Table 2.3: Resource Table

10. For Design Diagram:

Gantt Chart	www.app.smartsheet.com
Modeling	www.draw.io

2.4 Conclusion

While commercial platforms dominate the market with features optimized for business growth, they are rarely suited for educational experimentation. This proposed system fills that gap by delivering a lean, accessible, and insightful model for understanding how real-world e-commerce systems function. It combines the essential features of a modern e-commerce site with the transparency and flexibility that learning environments demand. As a result, this system stands not in competition with the giants but as a foundation for future developers to build, explore, and innovate.

SL/NO	Features	Daraz.com.bd	Alibaba.com	Evally.com.bd	Holesalebd.com
01	Vendor Registration Option.	✓	✓	✗	✓
02	Product Listing.	✓	✓	✓	✓
03	Product Image zoom In and zoom Out.	✓	✓	✓	✓
04	Product Rating.	✓	✓	✓	✓
05	Several payment gateway.	✓	✓	✓	✓
06	Multiple currencies support.	✗	✓	✗	✓
07	Multilevel user system.	✗	✗	✗	✓
08	Dynamic shipping method choose.	✗	✗	✗	✓
09	Product feedback, Ratings and reviews.	✓	✓	✓	✓
10	Discount coupon System.	✓	✓	✓	✓
11	Live chat option.	✓	✓	✓	✓
12	Multiple cash drawer.	✗	✓	✗	✓
13	Bundle pack Discount offer.	✓	✓	✓	✓
14	Multiple Bank account manage.	✗	✓	✗	✓
15	Multiple Brunch Handle.	✗	✓	✗	✓

Table 2.4: System Comparison Feature table

Chapter 3

SYSTEM MODEL

A System Model in multi-vendor e-commerce platforms defines the overall architecture, ensuring that multiple vendors can operate simultaneously while maintaining system efficiency, security, and scalability, thereby supporting the growth of online marketplaces [4]. In an e-commerce website development project, the system model plays a crucial role. It essentially provides a framework through which the different components of the system and their interactions are explained. A well-designed system model ensures that the e-commerce website functions effectively, offering a user-friendly, efficient, and secure experience. The system model indicates how various elements of the system will communicate and collaborate to achieve the website's objectives.

3.1 Types of System Models

1. **Data Flow Diagram (DFD):**
   A Data Flow Diagram visualizes how data flows within the system. It is used to analyze the system's various processes, data storage, and input/output relationships. DFD provides a simple and effective way to understand how the system operates.

2. **Integrated Design:**
   This model integrates all the components of the system and visualizes their relationships. It helps in understanding how the various parts of the website, such as the user interface, database, payment gateway, and shopping cart, will work together. This can also be referred to as the system design model.

3. **E-commerce System Architecture:**
   E-commerce system architecture involves the connection between the website's server, database, client-side components, and other services such as payment gateways and email servers. This model illustrates how the system components communicate with each other.

4. **Functional Modeling:**
   Functional modeling is used to identify and illustrate the relationships between various functions in the e-commerce system, such as product display, payment processing, and order tracking.

5. **Modular Design:**
   The system model can be divided into smaller modules, each performing specific functions. This modular approach simplifies the analysis and management of the system. Each module interacts with others but works independently.

3.2 Components of the E-commerce System Model

1. **User Interface (UI):**
   The UI handles interactions between the user and the website. Through the UI, users can browse products, place orders, and make payments. The system model explains how the UI works and its relationship with the back-end systems.

2. **Database Modeling:**
   The e-commerce website stores information such as products, users, orders, and invoices in a database. The system model includes the structure of the database and its interaction with other components of the website.

3. **Payment Gateway:**
   The payment gateway is a third-party service that processes users' payments securely. The system model explains how the payment gateway integrates into the e-commerce system and ensures security during the transaction process.

3.3 Objectives of the System Model

1. To create a cohesive relationship between the system's functionality and processes.
2. To make the development, maintenance, and updates of the system more manageable.
3. To ensure a smooth and reliable experience for the end-user.
4. To facilitate efficient communication and collaboration between various components.
5. This structure can serve as the foundation for the system model chapter in your project. You can expand on each topic, providing more specific details related to your project.

3.4 Registration Process of Stores and Customer

1. Select Registration from the main login screen.
2. Now enter a valid Name, email address, Phone number and password & conform password.
3. If all are valid then you get an OTP by SMS.
4. Select Terms & Conditions
5. Finally submit for registration

3.5 Registration Process

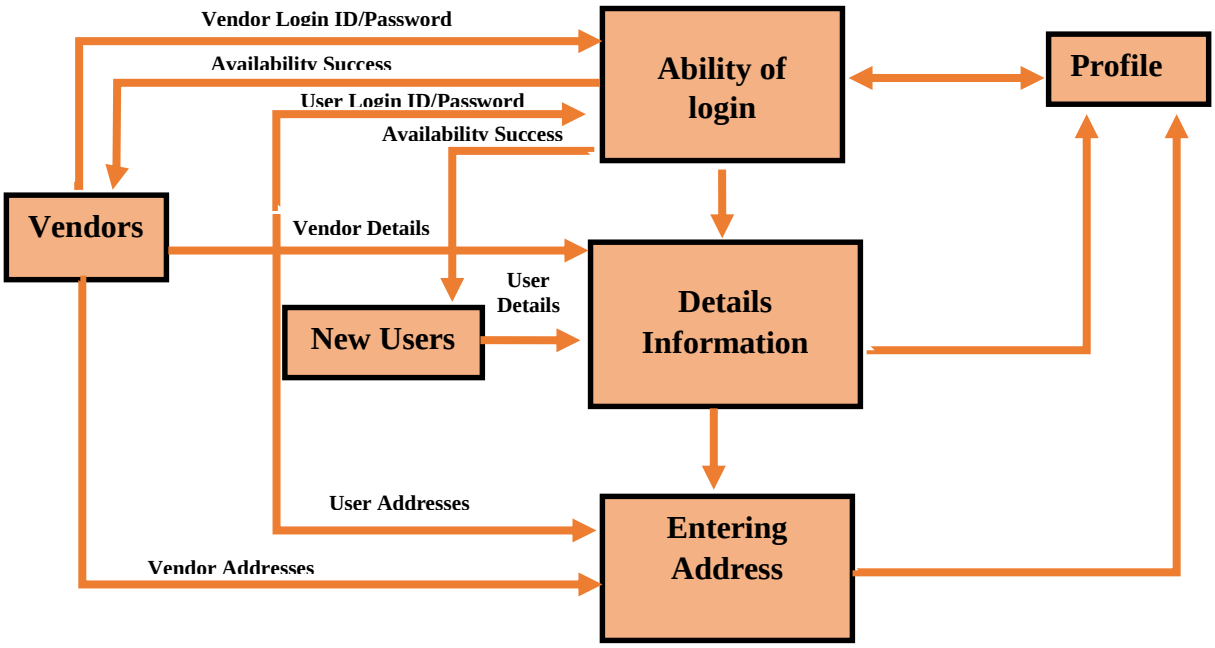


Fig 3.1: Registration Process

3.6 Login Process of Stores and Customer

1. Enter your register email id & password.
2. Then Click on Login Button.

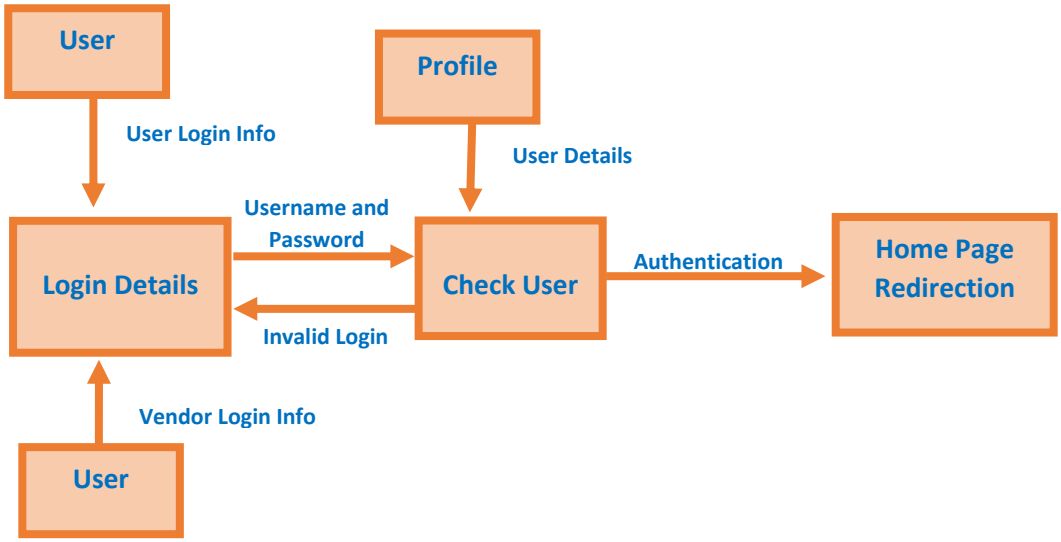


Fig 3.2: User Login Process

3.7 Project Development Workflow

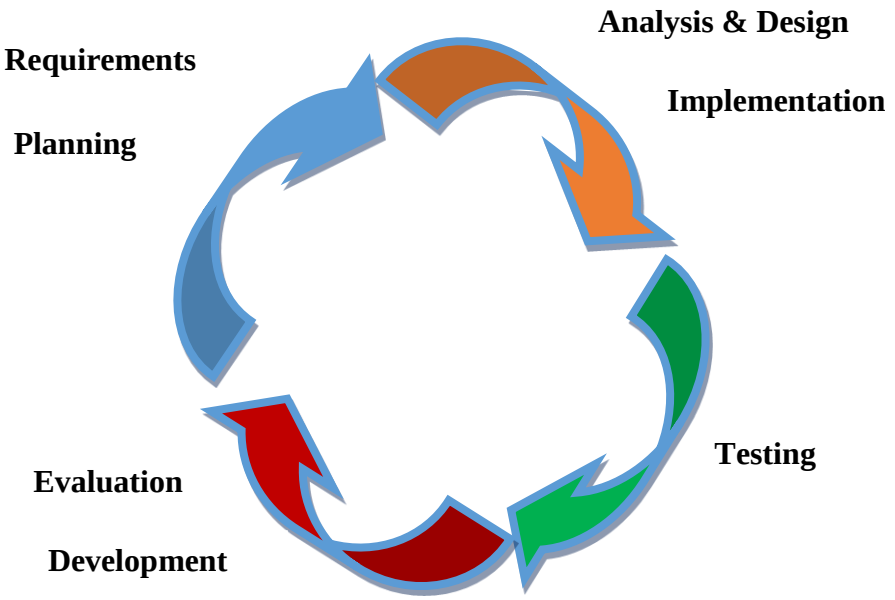


Fig 3.3: Project Development Workflow

3.8 Requirements

1. **Product Catalog Management:** The E-commerce platform should provide a way for the administrator to manage the products in the catalog. This includes adding, deleting, and updating products as well as organizing them into categories and subcategories.

2. **Shopping Card Functionality:** The platform should provide users with the ability to add products to a shopping card and review the contents of their card before checkout.

3. **Payment Gateway Integration:** The platform should integrate with one or more payment gateways to allow customers to make secure online payments using credit/debit cards, PayPal, or other payment methods.
4. **Order Management:** The platform should provide the administrator with the ability to manage orders, including tracking shipments, updating order status, and generating invoices.

5. **User Management:** The platform should allow users to register, login, and manage their profile information, this includes maintaining their order history, tracking shipments, and managing their billing and shipping addresses.

6. **Search Functionality:** The platform should provide users with the ability to search for products by keywords, category, or other relevant filters.

7. **Responsive Design:** The platform should be designed to work on a range of devices, including desktops, tablets, and mobile phones.

8. **Security:** The platform should be secure, using SSL encryption and other security measures to protect customer's information and prevent unauthorized access.

9. **Marketing and Promotions:** The platform should provide tools for creating and managing promotions, discounts, and other marketing campaign to drive sales and customer loyalty.

10. **System Specification:** After the feasibility study, the next phase involves creating the system specification document, which outlines both functional and non-functional requirements.
    - Functional Requirements: These describe the specific features the system must support, such as product search functionality, customer account management, and payment processing.

    - Non-Functional Requirements: These refer to aspects like performance (website speed), scalability (ability to handle increased traffic), and security (SSL encryption, secure payment gateways).

These are just a few of the common requirements for an E-commerce project. The specific requirements will depend on the needs of the business and the target market.

3.9 Planning

Planning for the quality assurance requirements and identification of the risks associated with the project is done in the planning stage. The outcome of the technical feasibility study is to define the various technical approaches that can followed to implement the project successfully with minimum risks. In our planning phase, we have designed gnat chart and work plan. By doing this we have clear concept how we work to complete this project within time frame.

Working Strategy:

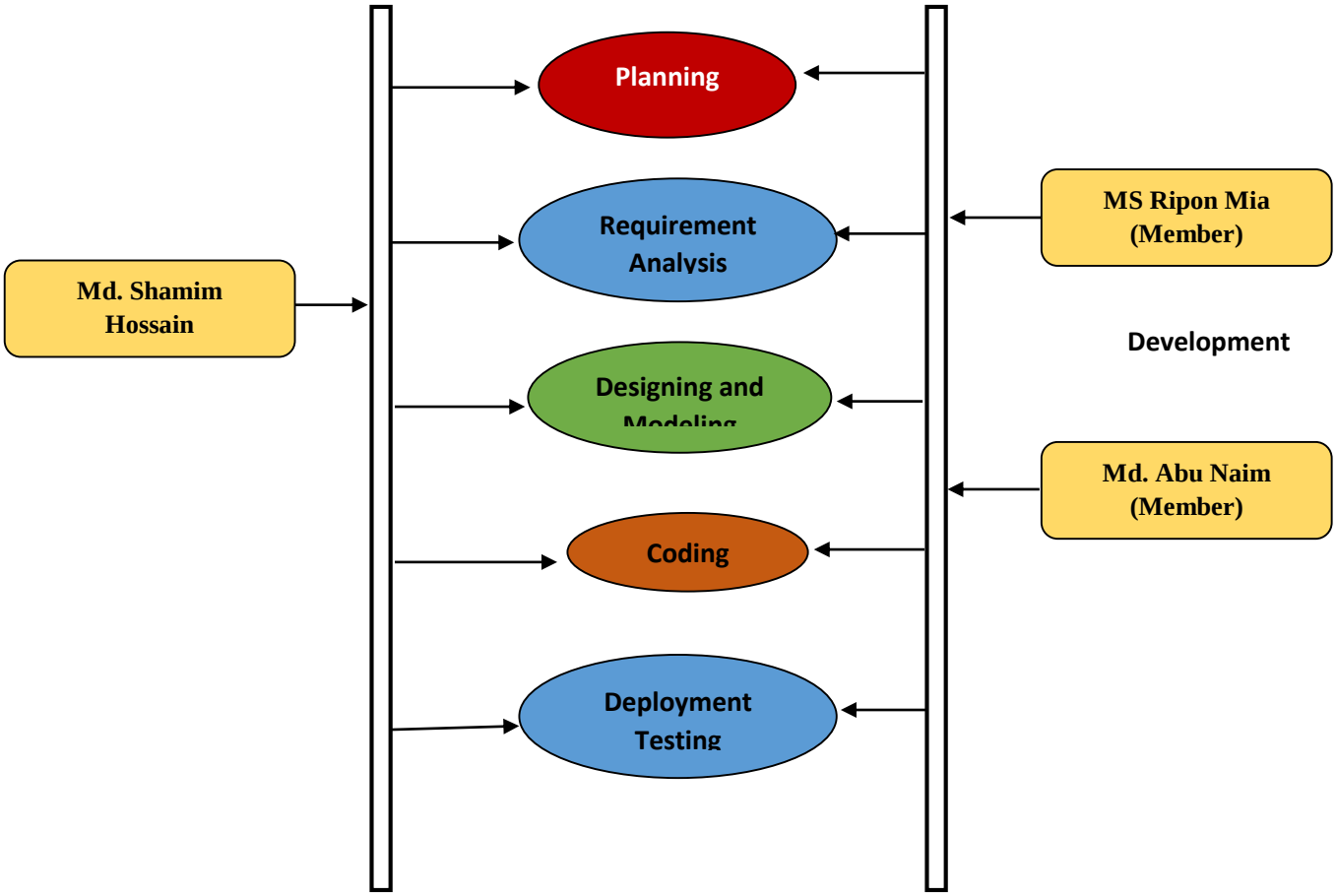


Fig 3.4: Working Strategy

Gantt chart:

A Gantt chart is a type of bar chart that illustrates a project schedule, named after its inventor. Modern Gantt charts also show the dependency relationships between activities and current schedule status.

					Q4			Q1			Q2	
SL No	Task Name	Start	Finish	Duration	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1													
2	MULTI-VENDOR E-COMMERCE WEB SITE.	11/4/2023	5/4/2024	130d									
3	SECTION 1: PLANNING	11/3/2023	12/3/2024	23d									
4	SECTION 2: REQUIREMENT ANALYSIS.	12/3/2023	1/6/2024	25d									
5	SECTION 3: DESIGN AND MODELLING.	1/6/2023	2/16/2024	30d									
6	SECTION 4: CODING	2/16/2023	4/12/2024	40d									
7	SECTION 5: DEPLOYMENT	4/12/2023	5/4/2024	17d									

Fig 3.5: Gantt Chart for Multi-Store E-Commerce Website

Team Works Breakdown Chart:

Team Works Breakdown Chart								
Duration (Count as Month)								
SL No	Task Name	Team Member Name	1	2	3	4	5	6
	Member Name							
1	Analysis Phase	MS Ripon & Md Abu Naim						
2	Planning Phase	Sathu Chandra & Saurov						
2.1	Pre-Planning	Sathu Chandra & Saurov						
2.2	Planning	Sathu Chandra & Saurov						
2.3	Post-Planning	Sathu Chandra & Saurov						
3	Design Phase	MS Ripon & Md Abu Naim						
3.1	Design The Software	MS Ripon & Md Abu Naim						
3.2	Tasking Review from Supervisor	MS Ripon & Md Abu Naim						
4	Coding Phase	MS Ripon & Md Abu Naim						
4.1	Module Develop	Sathu Chandra & Saurov						
4.2	Integrate Module	MS Ripon & Md Abu Naim						
4.3	Review the System	MS Ripon & Md Abu Naim						
5	Testing	Sathu Chandra & Saurov						
6	Deployment Phase	MS Ripon & Md Abu Naim						
6.1	Documentation Prepare	MS Ripon & Md Abu Naim						
6.2	Final Submission	MS Ripon & Md Abu Naim						

Table 3.1: Team Works Breakdown Chart

3.10 Analysis & Design

Requirement analysis is the most important and fundamental stage in SDLC. This information used to plan the basic project approach and to conduct product feasibility study in the economical, operational and technical areas.

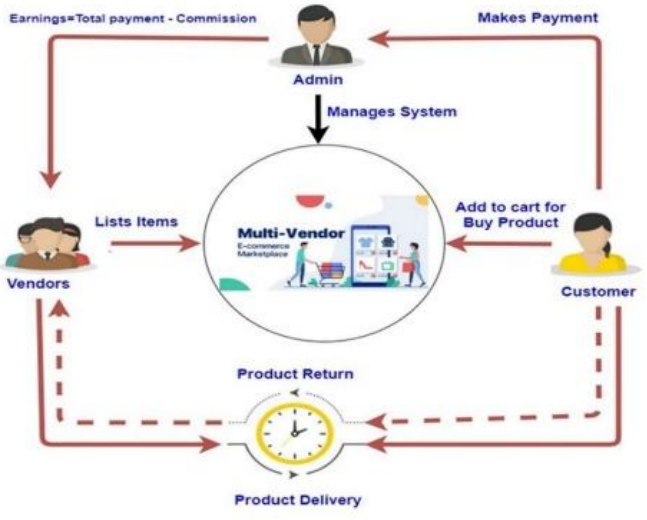


Fig 3.6: Concept Mapping for Multi-Vendor E-Commerce Website

3.10.1 Entity Relationship Diagram

An entity-relationship diagram (ERD) is a graphical representation of an information system that shows the relationship between people, objects, places, concepts or events within that system. An ERD is a data modeling technique that can help define business processes and can be use as the foundation for a relational database. While useful for organizing data that can be represent by a relational structure, an entity relationship diagram cannot sufficiently represent semi-structured or unstructured data, and an ERD is unlikely to be helpful on its own in integrating data into a preexisting information system.

Entity Relationship Diagram of Multi-Vendor E-Commerce Website:

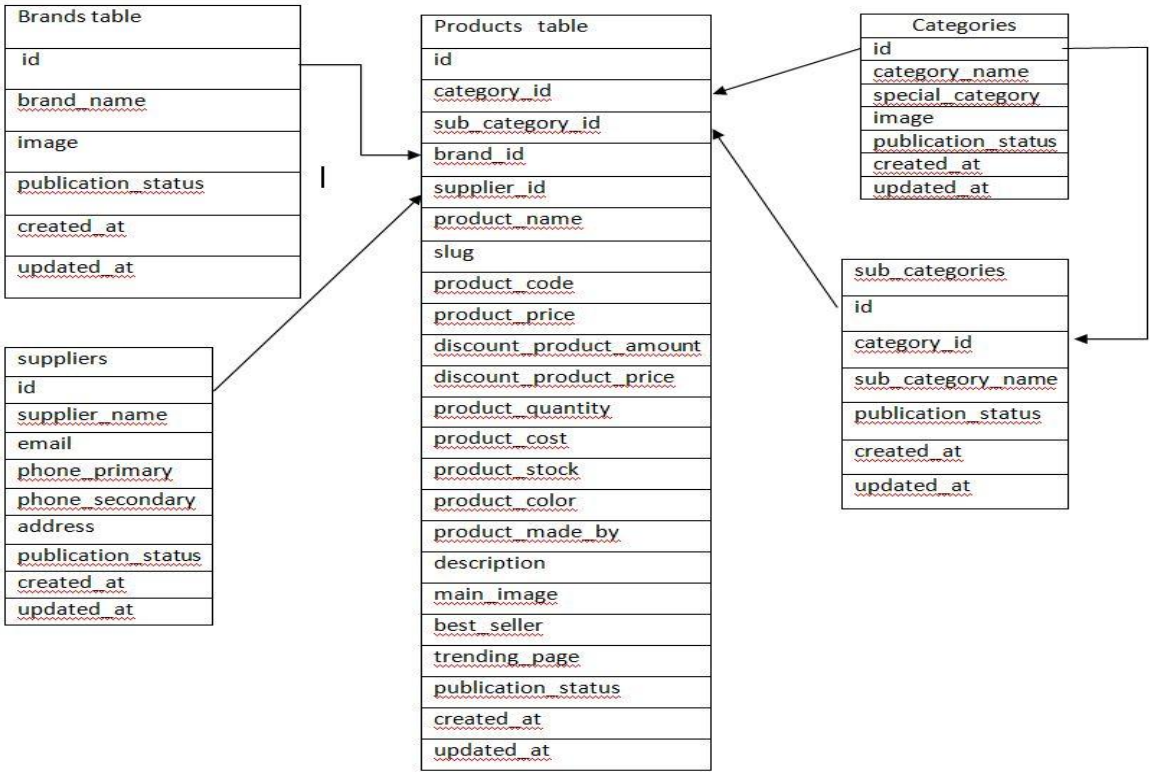


Fig: Entity Relationship Diagram of Multi-Vendor E-Commerce Website

3.11 Implementation

1. **Planning and Analysis:** The first step is to gather requirements, define the scope of the project, and develop a detailed project plan. This includes identifying the target market, defining the product catalog, and determining the payment and shipping methods. The development team also needs to select the e-commerce platform and any third-party tools or services needed to build the project.

2. **Design and Development:** Once the planning and analysis phase is complete, the development team can begin the design and development phase. This includes designing the user interface, implementing the product catalog, shopping card functionality, and payment gateway integration. During this phase, the team will use programming languages such as HTML, CSS, JavaScript, database management tools such as SQL to build the project.

3. **Testing and Quality Assurance:** After the development phase is complete, the team will conduct extensive testing and quality assurance to ensure that the platform is stable, secure and meets all the requirements. This includes unit testing, integration testing and user acceptance testing. The team will also conduct load testing to ensure that the platform can handle heavy traffic and transactions.

4. **Deployment:** Once the testing phase is complete, the team can deploy the e-commerce platform. This involves setting up the server, configuring the database and installing the platform. The team will also configure the payment gateway and other third-party services as needed.

5. **Maintenance and Support:** After the platform is deployed, the development team will provide ongoing maintenance and support. This includes monitoring the system for errors, updating the software as needed and providing technical support to users.

6. **Marketing and Promotion:** Once the e-commerce platform is live, the business will need to implement a marketing and promotion strategy to attract customers and drive sales. This may include search engine optimization, social marketing and other tactics.

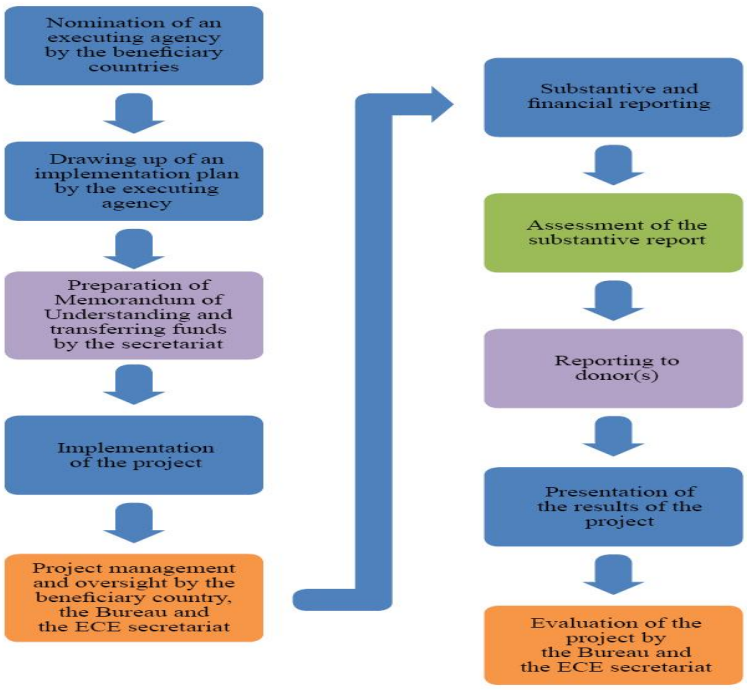


Fig 3.7: Marketing and Promotion of Multi-Vendor E-Commerce Website

Those are the general steps involved in implementing an E-Commerce project. The specific process will vary depending on the size and complexity of the project.

3.12 Testing

1. **Unit Testing:** The first step in testing an e-commerce project is to conduct unit testing. This involves testing each component of the platform, such as the product catalog, shopping cart, and payment gateway, to ensure that it functions correctly.

2. **Integration Testing:** Once the individual components have been tested, the next step is to conduct integration testing. This involves testing the interactions between the different components to ensure that they work together correctly.

3. **User Acceptance Testing:** After the platform has been tested internally, the next step is to conduct user acceptance testing. This involves testing the platform with a group of users who are representative of the target audience. The goal of user acceptance testing is to ensure that the platform meets the needs of the users and is easy to use.

4. **Security Testing:** Security testing is an essential part of testing an e-commerce project. This involves testing the platform for vulnerabilities, such as SQL injection and cross-site scripting, to ensure that customer data is secure.

5. **Performance Testing:** Performance testing is used to ensure that the platform can handle heavy traffic and transactions. This involves testing the platform under different loads to ensure that it responds quickly and does not crash.
6. **Regression Testing:** Regression testing is conducted after changes have been made to the platform to ensure that existing functionality has not been affected. This involves testing the entire platform, including any changes that have been made, to ensure that it still functions correctly.

7. **User Experience Testing:** User experience testing involves testing the platform to ensure that it provides a positive user experience. This includes testing the design, navigation, and usability of the platform.

8. **Accessibility Testing:** Accessibility testing is conducted to ensure that the platform can be used by people with disabilities. This includes testing the platform for compliance with accessibility guidelines, such as the Web Content Accessibility Guidelines (WCAG).

These are the general types of testing involved in an e-commerce project. The specific testing process will depend on the size and complexity of the project

3.13 Deployment

In this stage of SDLC, the actual development starts and the product is built. The programming code is generated as per DDS during this stage. If the design is performed in a detailed and organized manner, code generation can be accomplished without much hassle.

Developers must follow the coding guidelines defined by their organization and programming tools like compilers, interpreters, debuggers, etc. are used to generate the code. **Laravel** are used for coding. The programming language is chosen with respect to the type of software being developed. This stage is usually a subset of all the stages as in the modern SDLC models, the testing activities are mostly involved in all the stages of SDLC.

3.14 Evaluation

Evaluating a multi-store e-commerce website requires considering various factors that contribute to its overall performance and success. Here are some key areas to assess:

1. **User Experience:** The website's user interface and navigation should be intuitive and easy to use, with clear product categorization, search functionality, and filtering options. The checkout process should also be streamlined, with minimal steps required to complete a purchase.

2. **Product Selection:** The website should offer a wide range of products across various categories to cater to diverse customer needs. Additionally, the product information should be detailed and accurate, with high-quality images and videos to help customers make informed purchasing decisions.

3. **Pricing and Discounts:** The website should offer competitive pricing and regular discounts to incentivize customers to make purchases. Additionally, shipping and handling fees should be transparent and reasonable.

4. **Customer Service:** The website should offer prompt and responsive customer service through multiple channels, such as live chat, email, and phone. This can include pre-sales queries, after-sales support, and return and refunds.

5. **Payment Option:** The website should offer a variety of payment option, including credit/debit cards, digital wallets, and net banking, to different customer preferences.

By evaluating these factors, you can gain a comprehensive understanding of a multi-store e-commerce website's strengths and weaknesses, and make an informed decision about whether to use it for your online shopping needs.

Chapter 4
SYSTEM ANALYSIS

System Analysis is a critical process in designing multi-vendor e-commerce platforms, focusing on understanding system requirements, identifying user needs, and defining the flow of data and operations to ensure the platform functions effectively and efficiently [5]. System analysis is a critical phase in the development of an e-commerce website. It involves systematically examining the needs of the business, the users, and the technology to design a functional and efficient system. This phase helps in gathering requirements, analyzing business processes, and ensuring that the proposed system can meet all the functional and non-functional needs of the organization.

4.1 Phases of System Analysis

1. **Requirement Gathering:** Requirement gathering is the first step in the system analysis phase. During this phase, the project team collects detailed information from various stakeholders, including business owners, potential users, and IT personnel.

2. **Interviews and Surveys:** Conducting interviews with stakeholders to understand their expectations, needs, and pain points.

3. **Document Review:** Analyzing existing systems or documentation to identify areas for improvement.

4. **Use Case Scenarios:** Developing use case scenarios that describe how users will interact with the e-commerce system. The primary objective is to understand the business goals and user requirements. For an e-commerce system, these could include product listings, user registration, payment processing, inventory management, etc.

5. **Feasibility Study:** Once the requirements are gathered, it's important to assess the feasibility of building the system. This involves evaluating:

6. **Technical Feasibility:** Whether the required technology and resources are available to build the system.

7. **Operational Feasibility:** Whether the system will integrate well with existing business operations and processes.

8. **Economic Feasibility**: Whether the project's budget aligns with the expected benefits. It's essential to determine whether the benefits of the system will justify the investment.

This document serves as a blueprint for the development team and provides a detailed outline of how the system should behave and what it must deliver.

4.2 Importance of System Analysis in E-commerce Website Development

1. **Ensures Alignment with Business Goals:** System analysis ensures that the e-commerce website aligns with the business objectives. By understanding what the business aims to achieve (e.g., increasing sales, improving user experience, expanding market reach), the system can be designed to meet those goals.

2. **Identifies Potential Issues Early:** By thoroughly analyzing the system and its requirements, potential issues such as technical limitations, integration challenges, or user experience problems can be identified early on. This allows for adjustments before development begins, saving time and costs in the long run.

3. **Improves Communication Among Stakeholders:** System analysis facilitates clear communication between stakeholders, including business owners, developers, designers, and end-users. The documentation produced during this phase ensures that everyone is on the same page regarding the system's features, functionality, and design.

4. **Optimizes Resource Allocation:** The insights gained from system analysis help in identifying the resources required for the project. This includes the technology stack, server infrastructure, security measures, and human resources needed for development and maintenance.

5. **Enhances User Experience:** System analysis takes into account the needs and preferences of end-users, ensuring that the website is user-friendly, easy to navigate, and provides a positive shopping experience. Understanding user behavior and expectations is critical for building a successful e-commerce platform.

6. **Risk Mitigation:** By assessing the feasibility and identifying potential problems in the early stages, system analysis helps in mitigating risks associated with the project. This includes technical risks, financial risks, and operational risks.

4.3 Experiment

The experiment section focuses on the practical implementation and testing of the developed e-commerce website. It includes the setup of the environment, testing procedures, and evaluation of various system functionalities. The purpose of this experiment is to ensure that the website performs as expected under real-world conditions and meets the objectives defined during the system analysis and design phases.

4.3.1 Experimental Setup

- **Development Tools:**
  - Frontend: HTML, CSS, JavaScript, React (or any framework used)
  - Backend: PHP / Node.js / Python (based on your tech stack)
  - Database: MySQL / MongoDB
  - Hosting: Localhost (XAMPP/WAMP) or live server (if deployed)

4.3.2 Test Environment:

The system was tested on multiple devices including desktops, laptops, and smartphones to check for responsiveness and usability.

4.3.3 Features Tested

1. The following key features of the e-commerce system were tested.
2. FeatureTest Objective Expected Result Outcome.
3. User Registration/Login Ensure users can sign up and log in securely successful registration and login with validation Passed.
4. Product Browsing Test how users can search and view products Product display correctly and load quickly passed.
5. Add to Cart Test functionality of cart operations Products are added/removed correctly passed.
6. Checkout System Verify order placement and total calculation Orders placed and totals calculated correctly passed.
7. Payment Gateway (dummy or live) Ensure transaction system functions Payment is processed or simulated correctly passed.
8. Admin Dashboard Manage products and orders Admin can add/update/delete products Passed.
9. Responsive Design Test site on various screen sizes Proper layout and usability on all devices passed.

4.3.4 Testing Techniques Used

1. **Black Box Testing:** Focused on user interface and checking if all inputs produce the correct outputs.
2. **Unit Testing:** Individual components like login form, shopping cart, and product details page were tested separately.

3. **Integration Testing:** Ensured that modules such as cart and payment gateway worked together smoothly.
4. **User Testing:** A group of users were asked to use the site and provide feedback on usability, performance, and design.

4.4 Conclusion of the Experiment

The experimental phase verified that the e-commerce website meets the expected functional and design requirements. All major features performed correctly during the testing phase. The website is ready for deployment and can be further enhanced with real-time analytics, product recommendations, and third-party integrations.

Chapter 5

RESULT AND DISCUSSION

This chapter presents the results obtained after the implementation and testing of the e-commerce website. It also provides a critical discussion on the findings, challenges encountered, and how the outcomes align with the initial project goals.

5.1 System Performance

The system performed well under light to moderate traffic during testing. It was able to process user actions like browsing products, adding to cart, and checking out without any lag or failure. However, stress testing was limited due to the lack of advanced hosting resources.

5.2 Usability and User Experience

User interface testing showed that users had a positive experience. Navigation was intuitive, and the color scheme, fonts, and layout were well received. Minor suggestions such as the addition of a wish list feature were noted for future improvements.

5.3 Challenges Faced

1. **Limited Testing Environment:** Testing was done in a controlled environment (local host), not on a live server.
2. **Payment Integration:** A real-time payment gateway (like Stripe or SSLCommerz) was not integrated due to budget and time limitations.
3. **Product Database:** Only dummy data was used for products and orders, not connected to any real inventory system.

5.4 Achievement vs. Objective

Objective	Achieved	Remarks
User Account Management	Yes	Fully functional
Product Management	Yes	Admin panel works correctly
Order and Checkout System	Yes	Simulated and validated
Secure Login System	Yes	Passwords encrypted
Mobile Responsiveness	Yes	Tested on various screen sizes
Live Payment Integration	Partially	Simulated, not live gateway

5.5 User Registration System

In this section user registered to the system. During registration, system will have sent an OTP into registered mobile for verification.

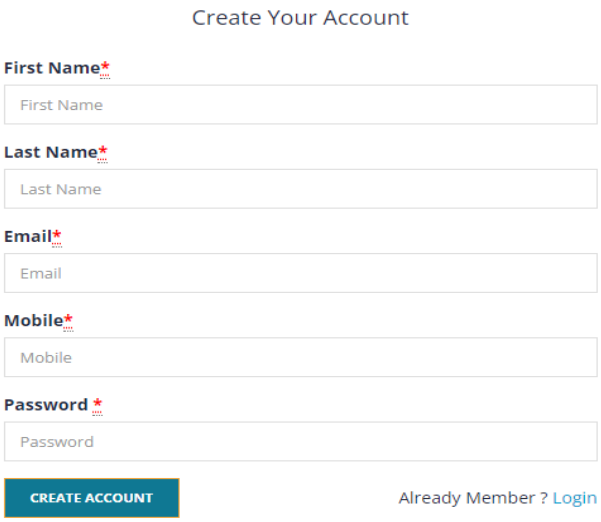


Fig 5.1: User Registration System

5.6 User login system

Different user will get different UI as example if user is admin than he/she will get different Dashboard. User get User interface and Store get store interface.

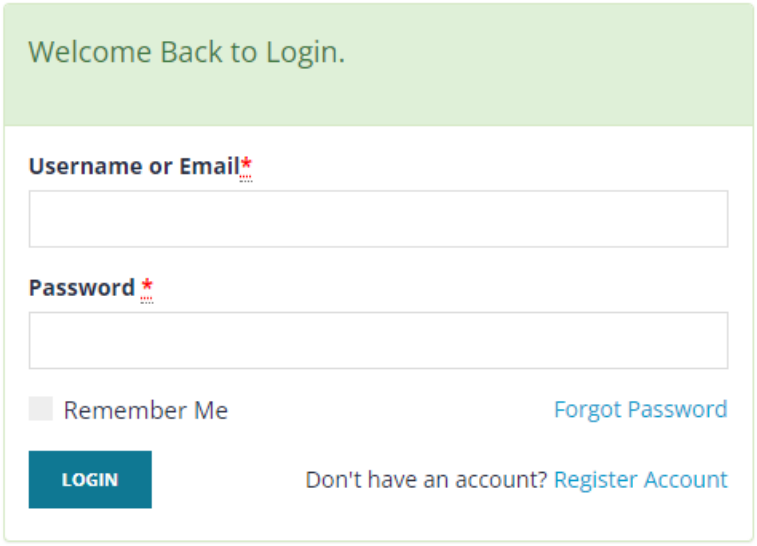


Fig 5.2: User Login System

5.7 Home Page

This is the preview at home page of our project. Here you get Login option and showing all products with category and you can start shopping from here.

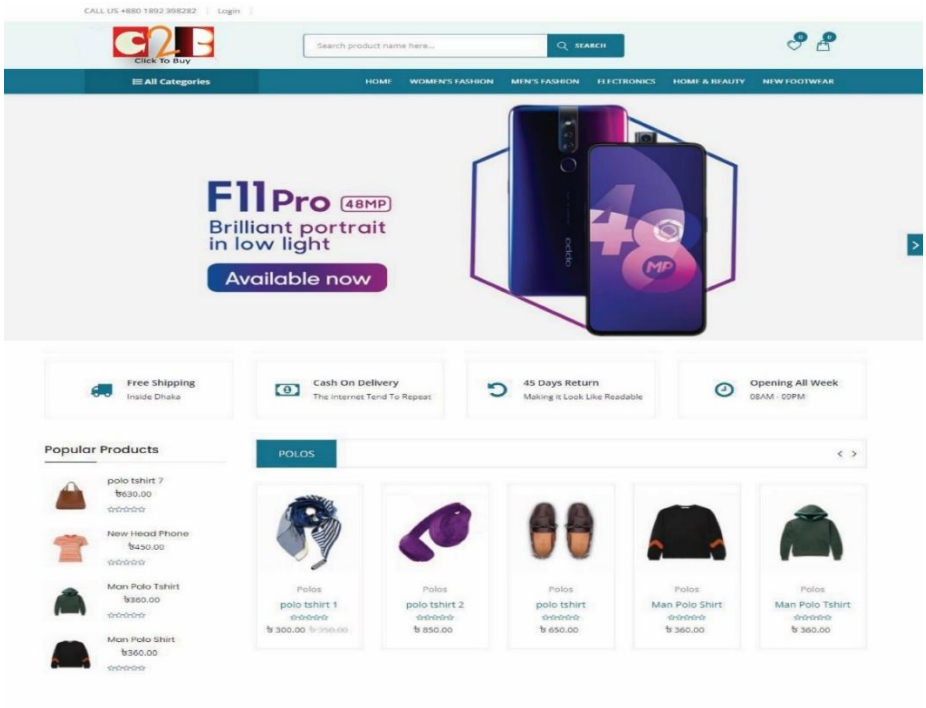


Fig 5.3: Home Page

5.8 Admin Dashboard

After login Admin, can able to view his/her dashboard. In this dashboard user can see his/her all information at a glance. Citizen dashboard page shown in figure 5.4. After login Admin can view his/her profile, can add product, update his/her profile information.

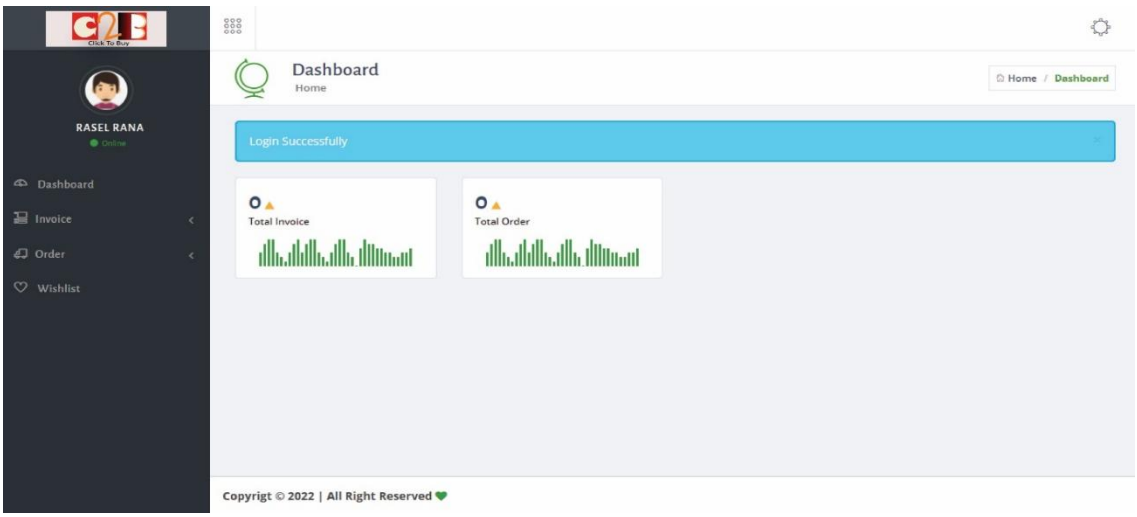


Fig 5.4: Admin Dashboard

5.9 User Profile

5.9.1 Admin Can Manage User

After login User, can able to view his/her dashboard. In this dashboard user can see his/her all information at a glance. User dashboard page shown:

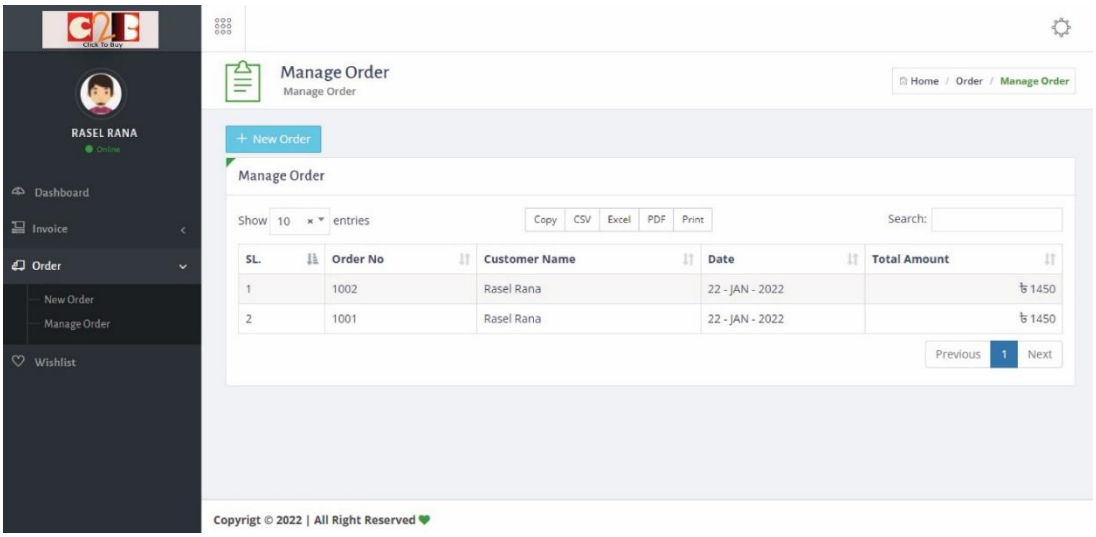


Fig 5.5: User Profile

5.9.2 This section admin can manage any user .Admin can remove user fake account.

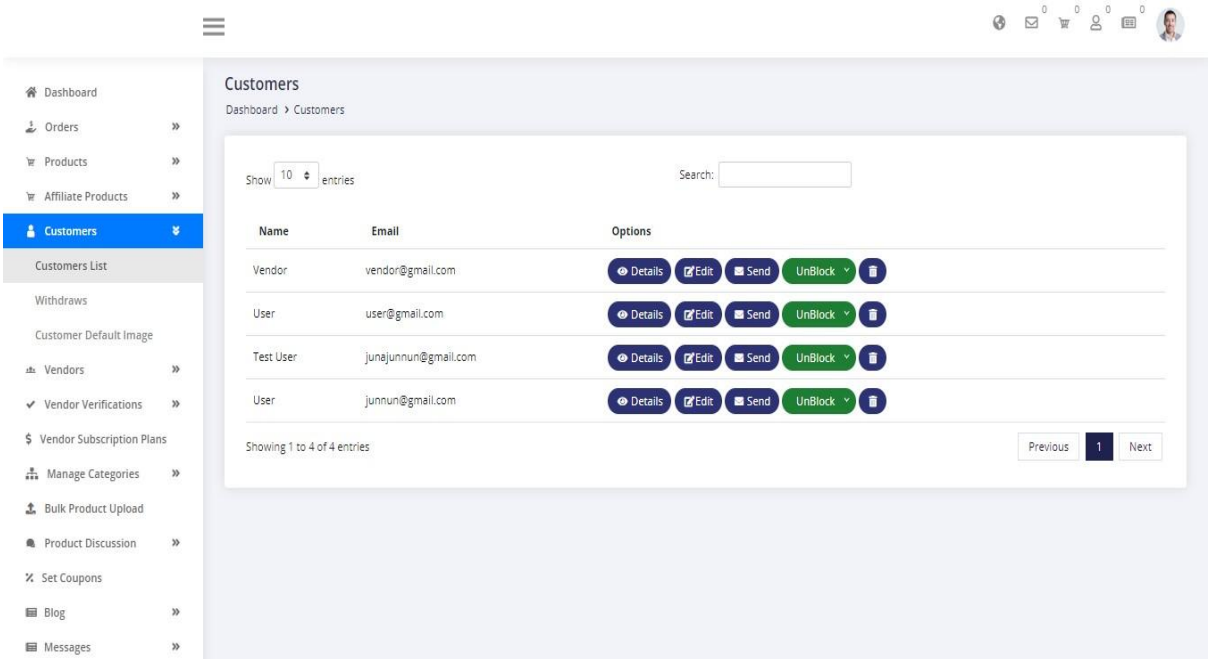


Fig 5.6: User Management Profile

5.9.3 Admin Can Manage User Product List

This section admin can manage user all products.

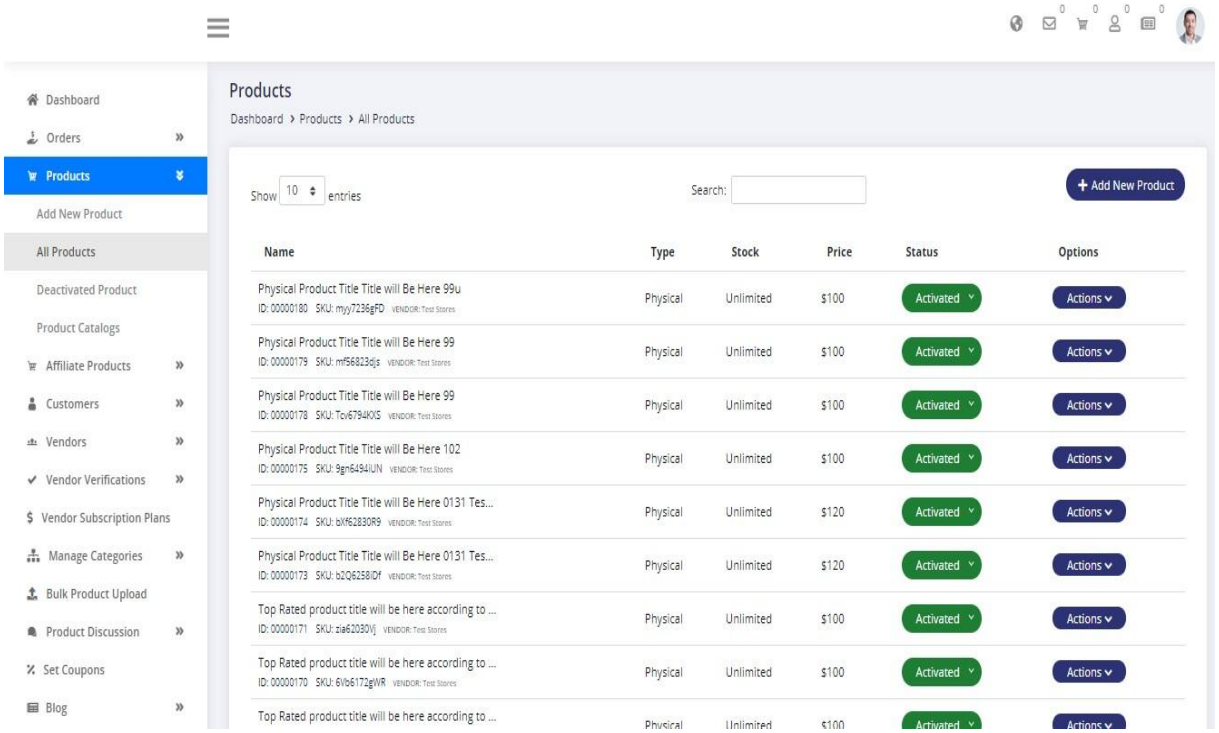


Fig 5.7: Product List Management Profile

5.9.4 User Product Categories

This section admin can manage all the product categories. Admin can create new categories and can remove categories.

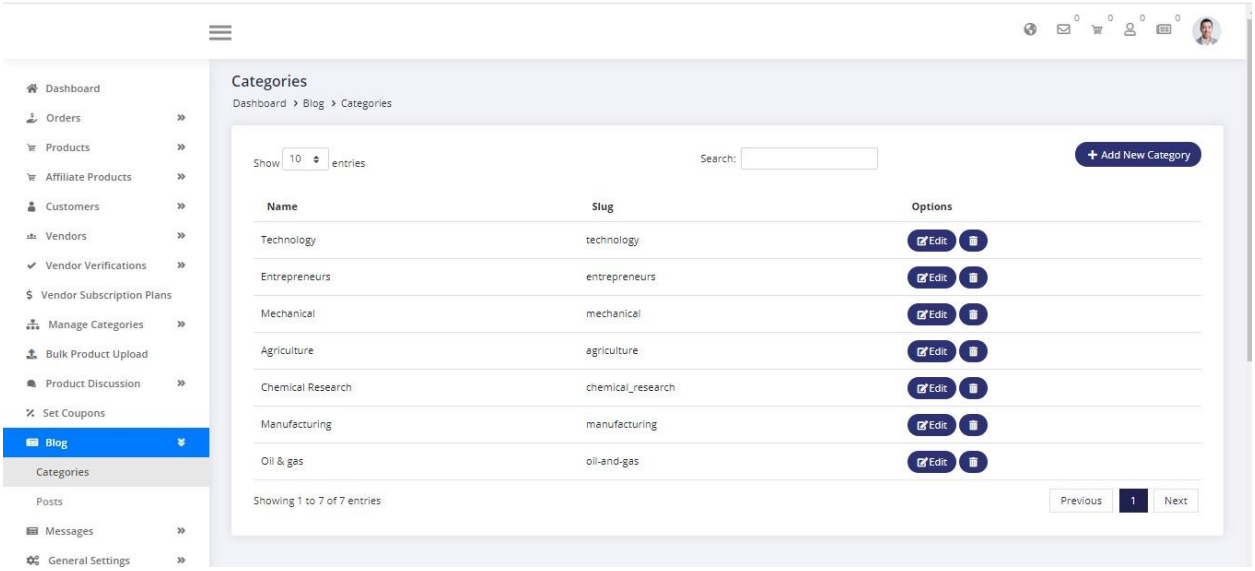


Fig 5.8: Product Categories Page

5.9.5 User Product Main Category

This section admin can manage the product main Category.

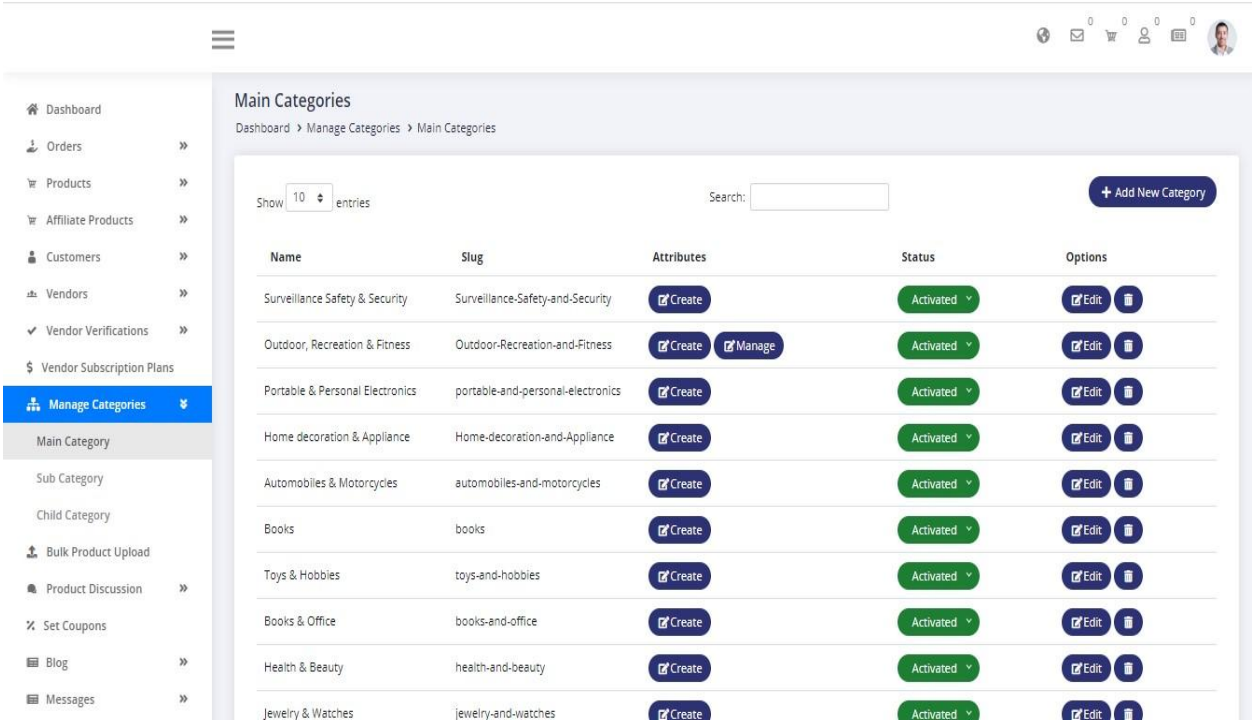


Fig 5.9: Product Main Category

5.9.6 User Product Sub Category

This section admin can manage the product sub Category.

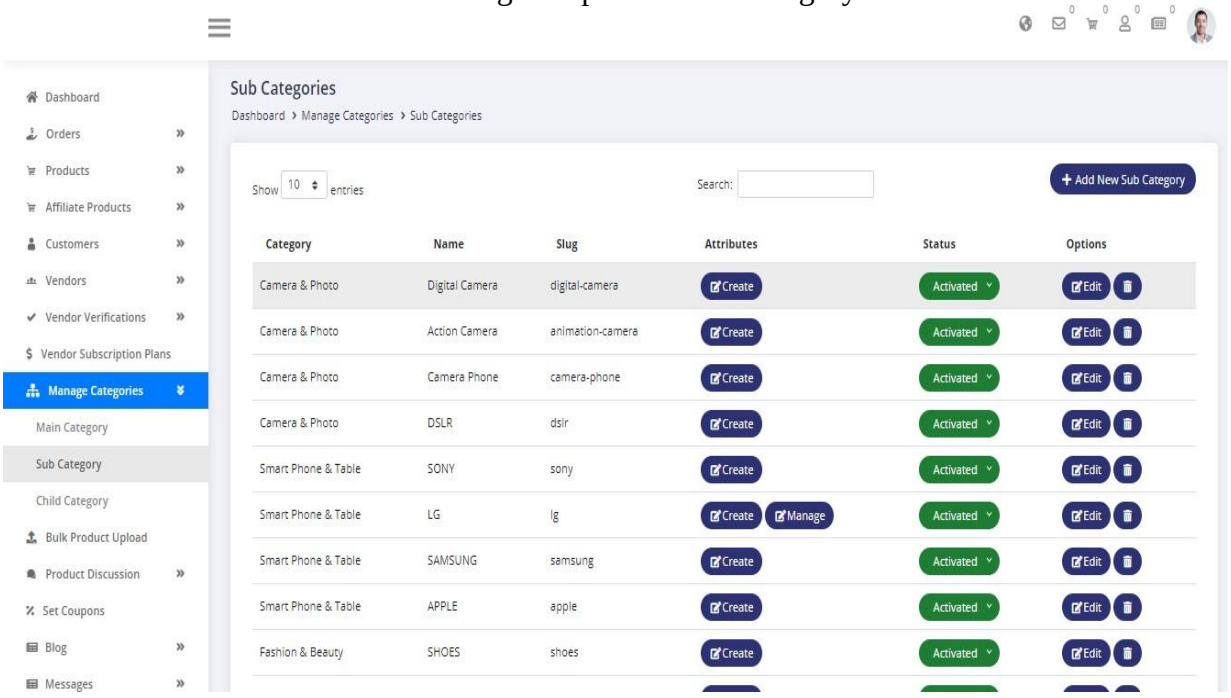


Fig 5.10: Product Sub Category Page

5.9.7 User Product Child Category

This section admin can manage the product Child Category

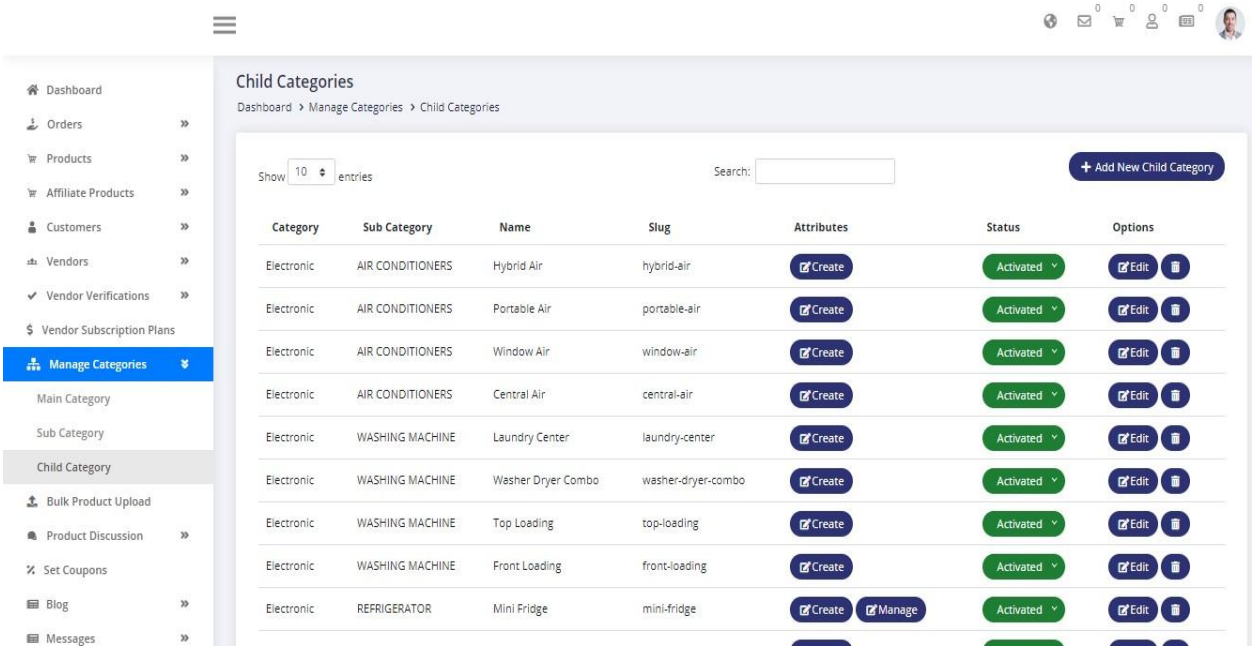


Fig 5.11: Product Main Category

5.9.8 Add Affiliate Product

This section admin can manage all Order.

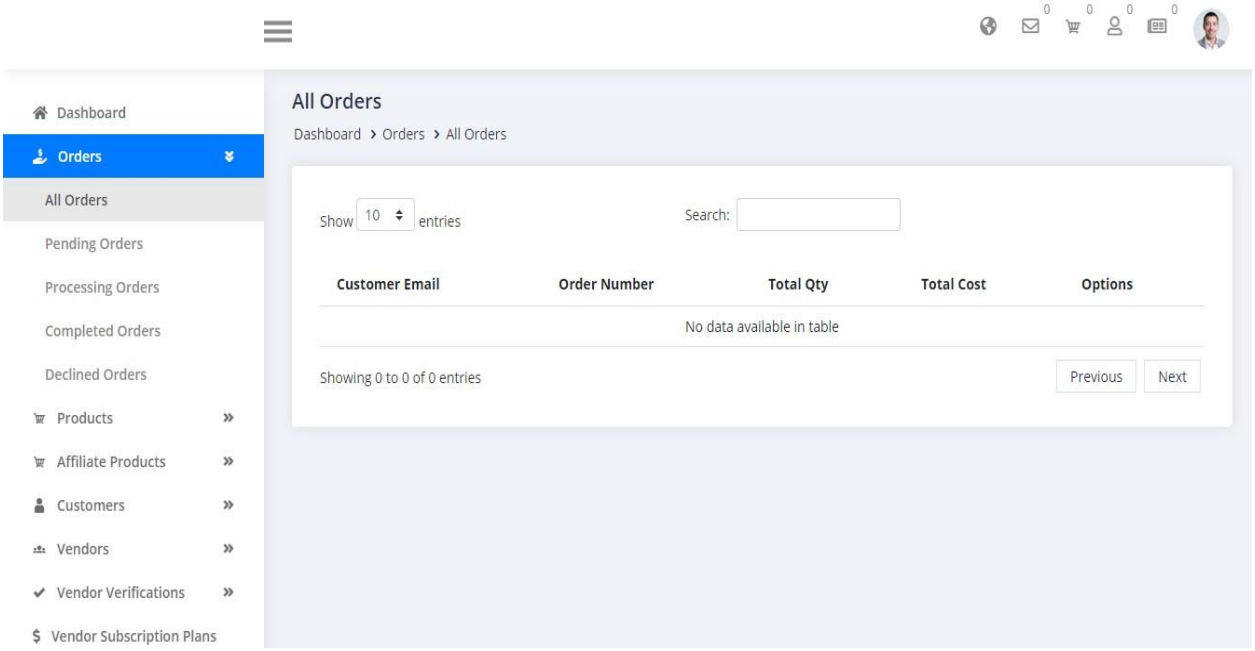


Fig 5.12: Affiliate Product Page

5.9.9 Admin Can Manage Withdraw

This section admin can manage withdraw.

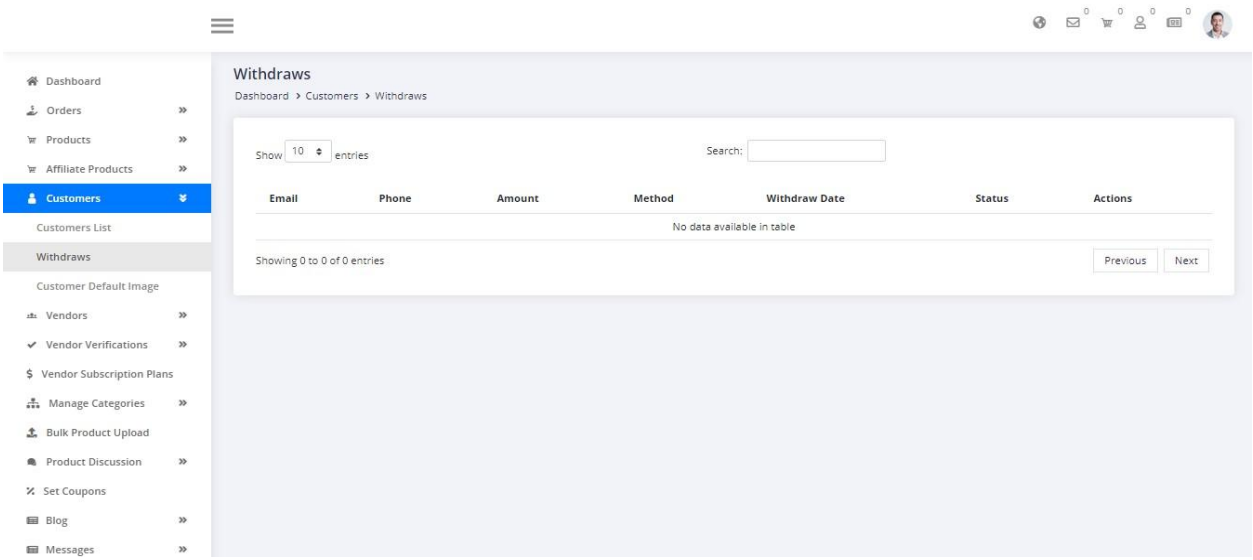


Fig 5.13: Admin Withdraw Management Page

5.9.10 Admin Can Manage All Order

This section admin can manage all Order.

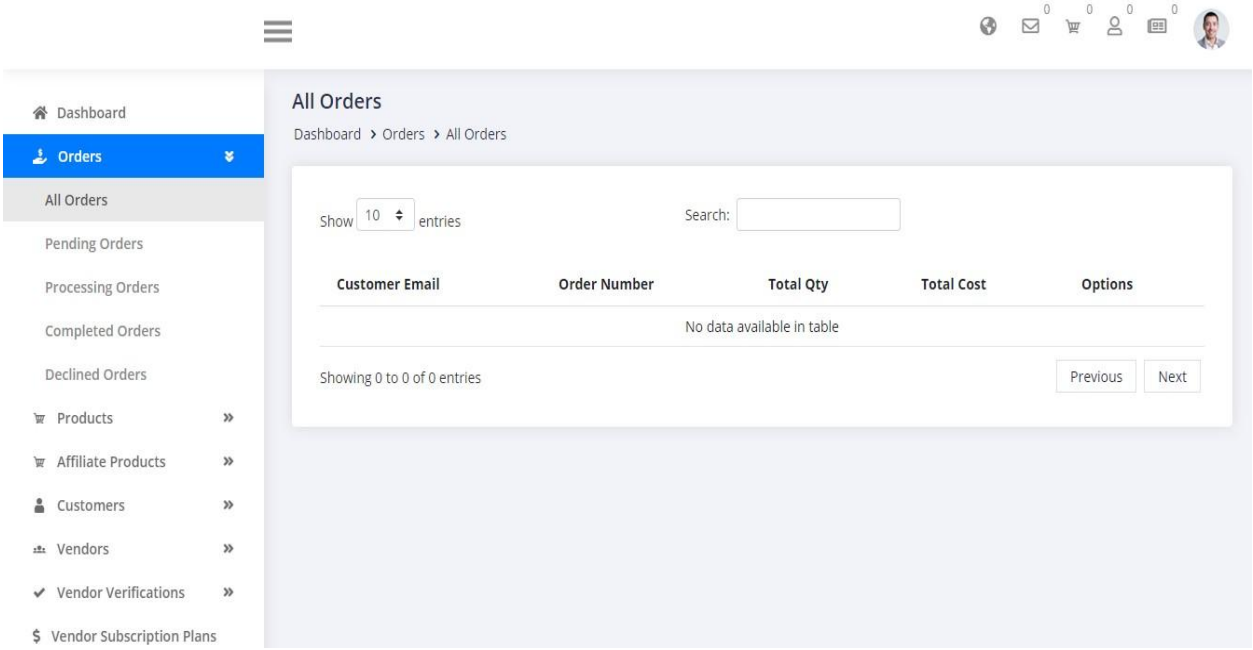


Fig 5.14: All Order Page

5.9.11 Admin Can Manage Store Subscriptions

This section admin can manage store subscriptions.

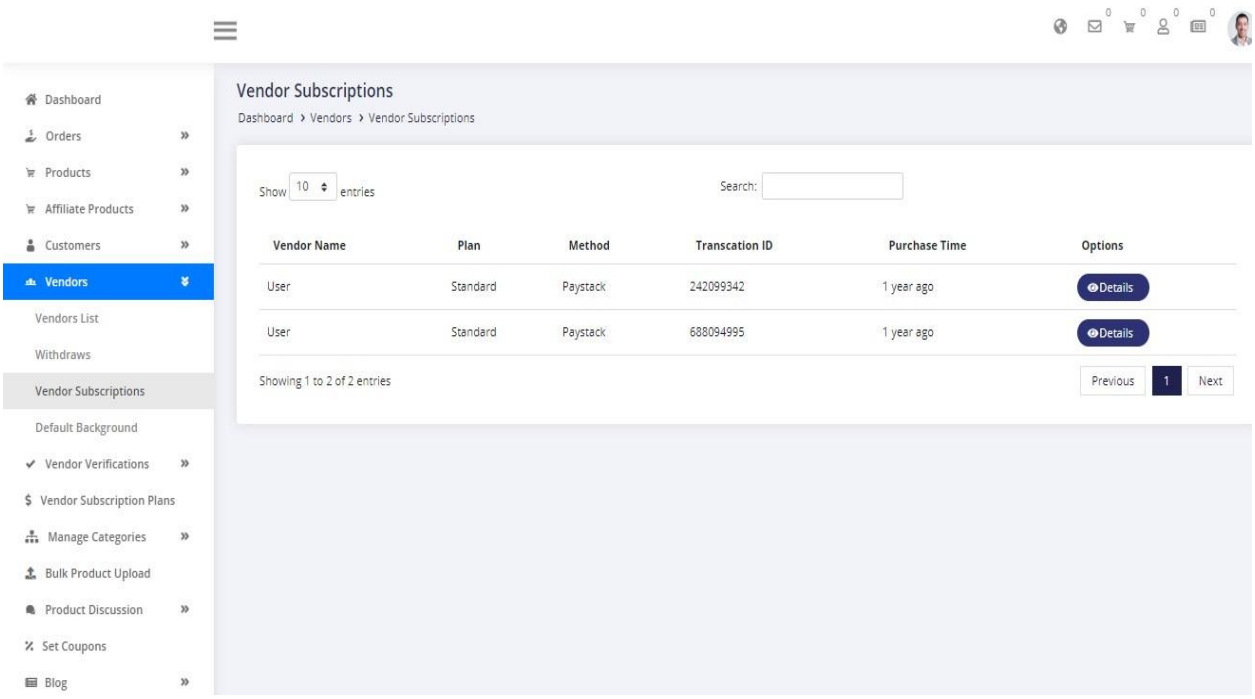


Fig 5.15: Store Subscription Page

5.9.12 Admin Can Manage Store List

This section admin can manage Store list.

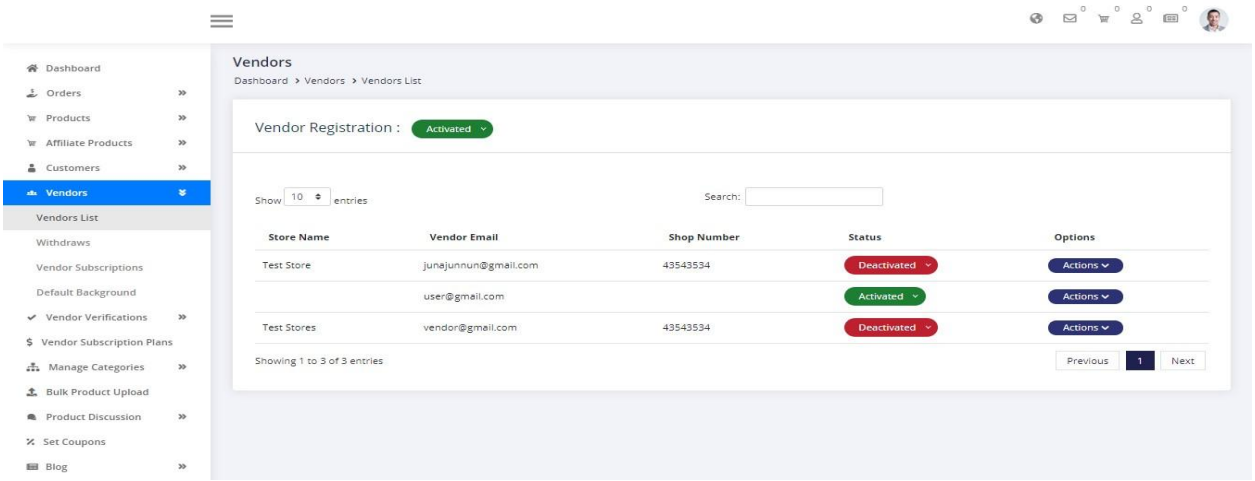


Fig 5.16: Store Page

5.9.13 Admin Can Product Bulk Upload

This section admin can manage product bulk upload.

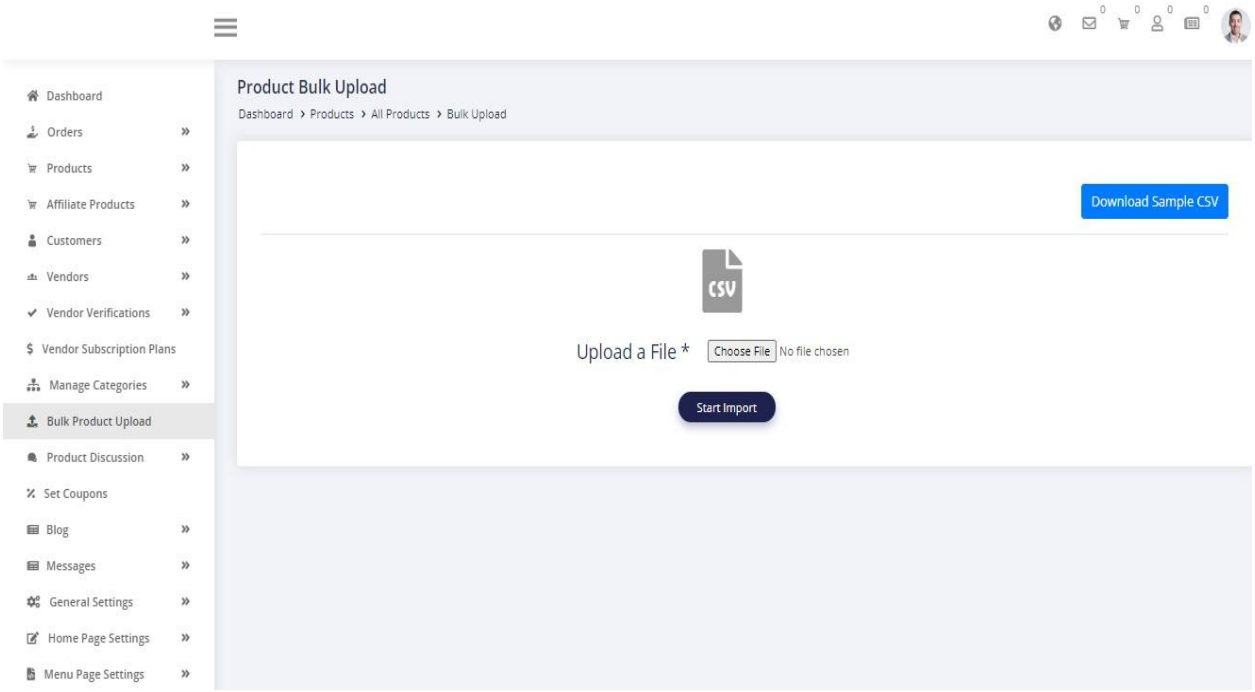


Fig 5.17: Product Bulk Upload Page

5.9.14 Admin Can Manage User Product Reviews

This section admin can manage user product reviews.

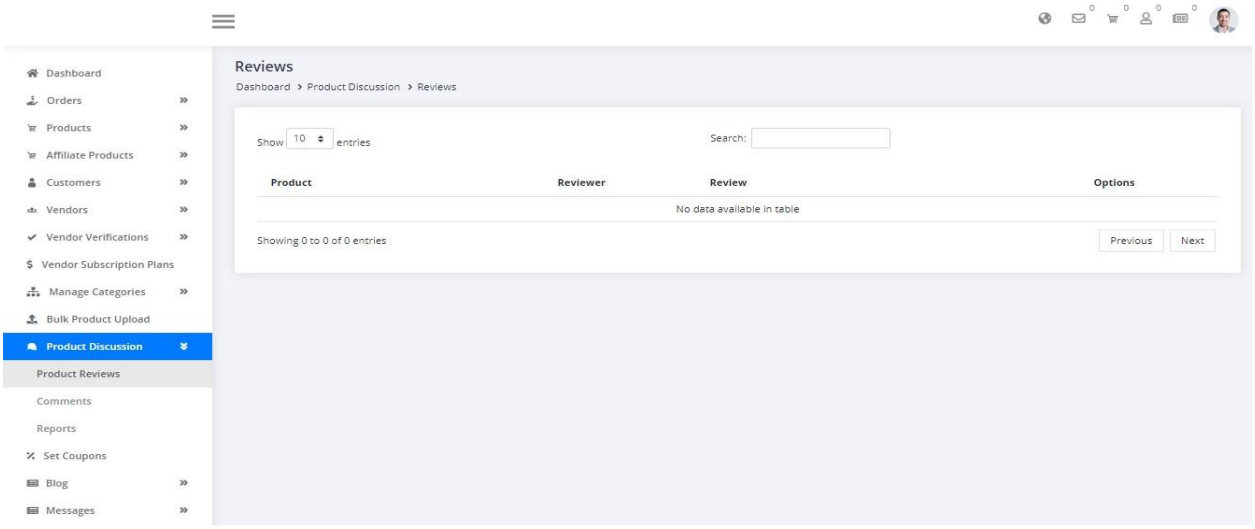


Fig 5.18: Product Review Page

5.9.15 Admin Can Manage User Comments

This section admin can manage user all the comments.

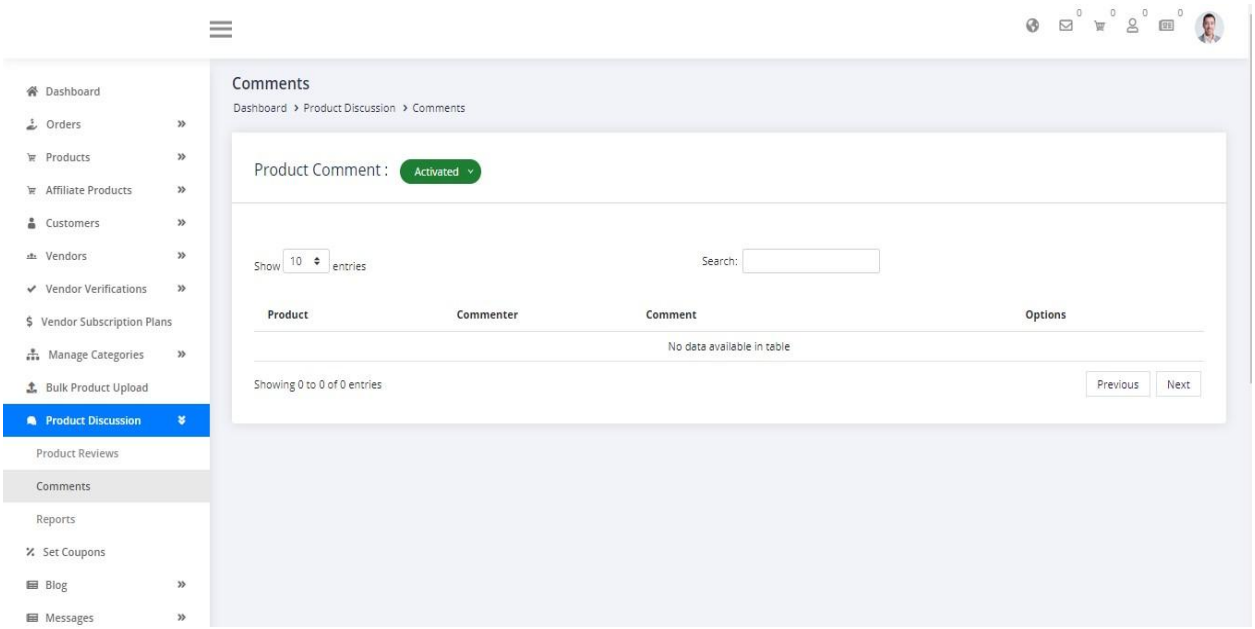


Fig 5.19: User Comment Page

5.9.16 Admin can manage product Report

This section admin can manage product Report.

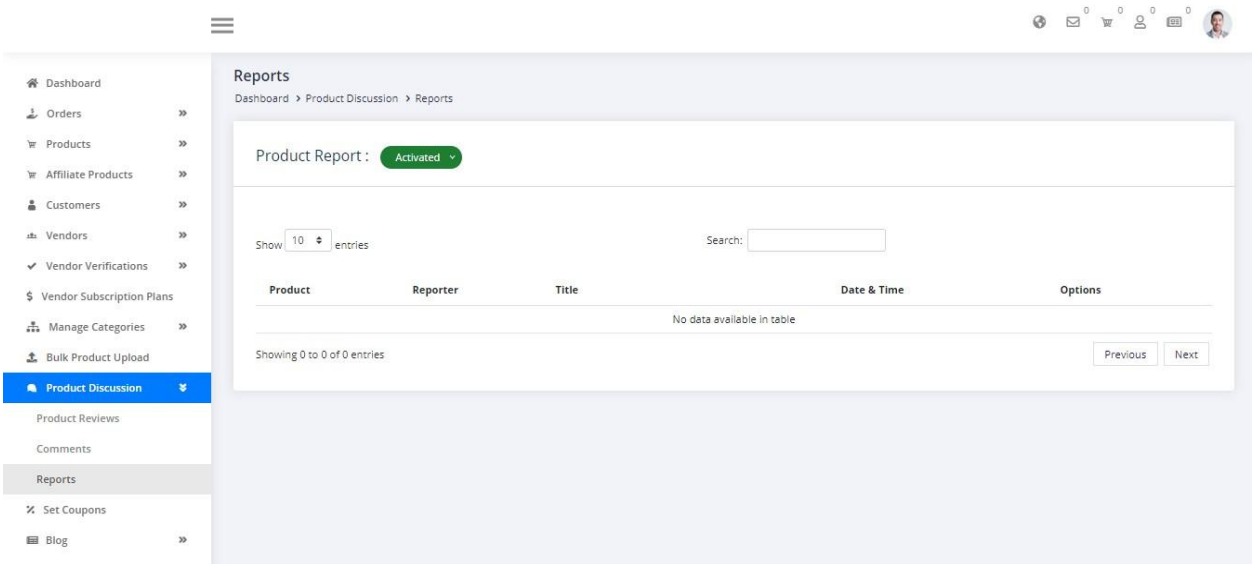


Fig 5.20: Product Report Page

5.9.17 Admin Can Manage Coupon System

This section admin can manage coupon system.

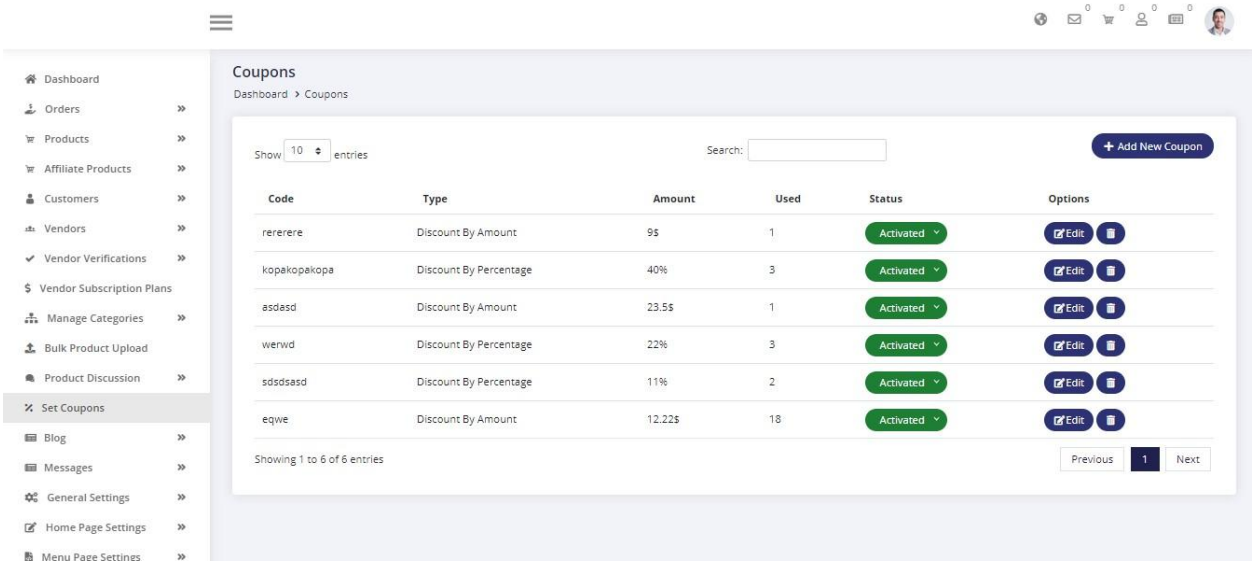


Fig 5.21: Coupon System Page

5.9.18 Admin Can Manage Blog Post

This section admin can manage all the Blog post.

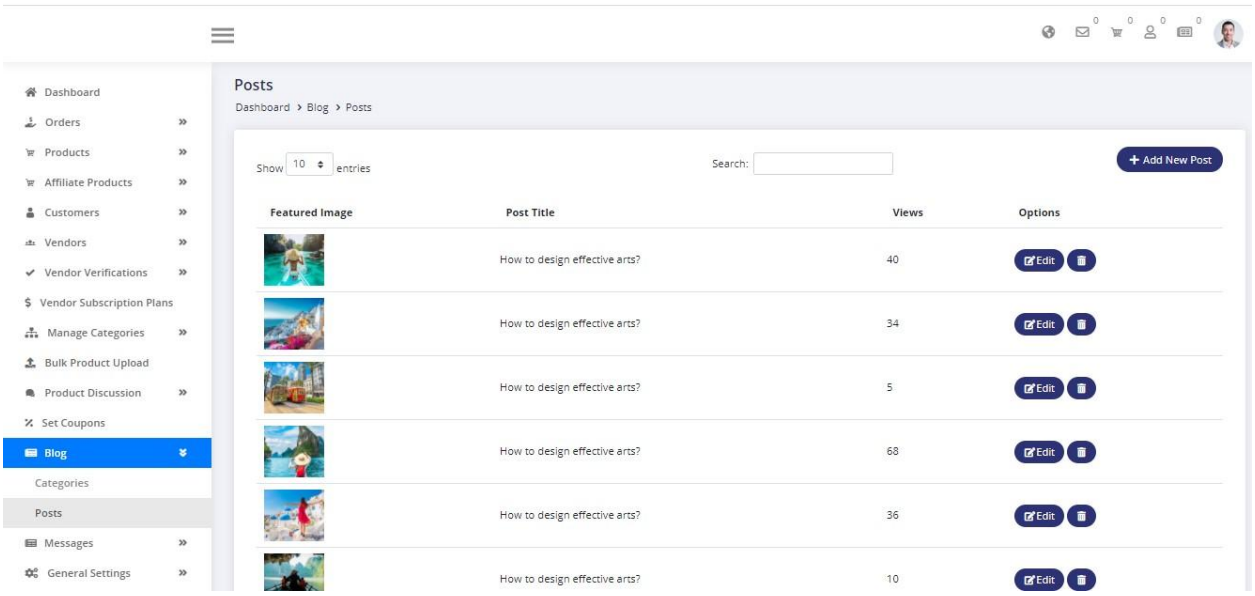


Fig 5.22: Blog Post Page

5.9.19 Admin Can Manage Message System

This section admin can manage user message and can solve the customer problems.

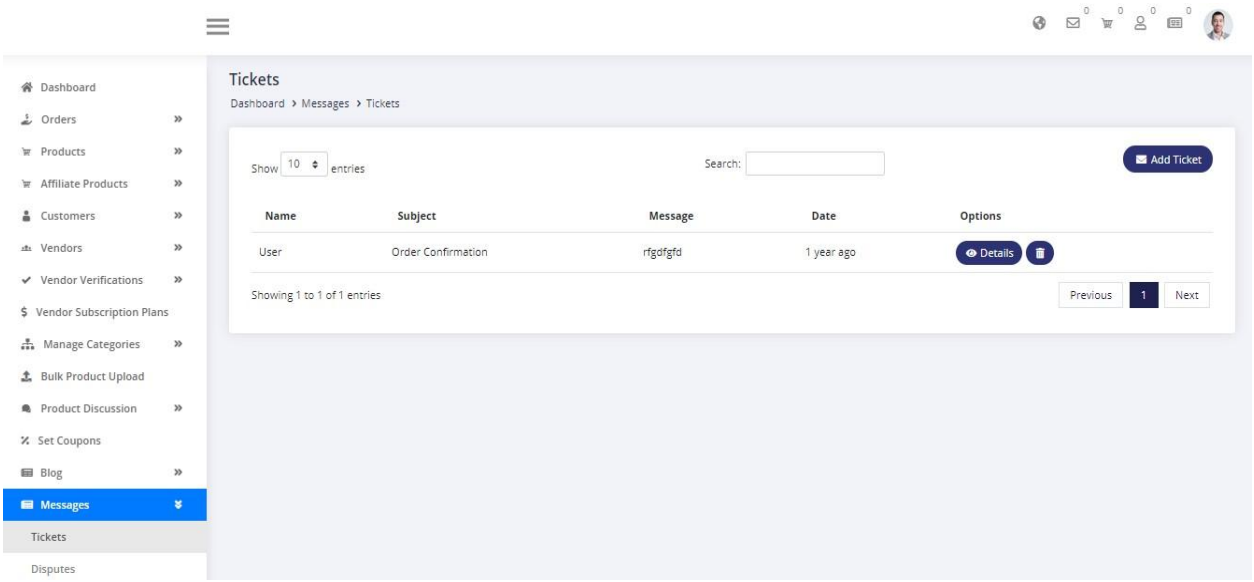


Fig 5.23: Message System Page

5.9.20 Dispute Message System

This section admin can manage customer product dispute problem solve.

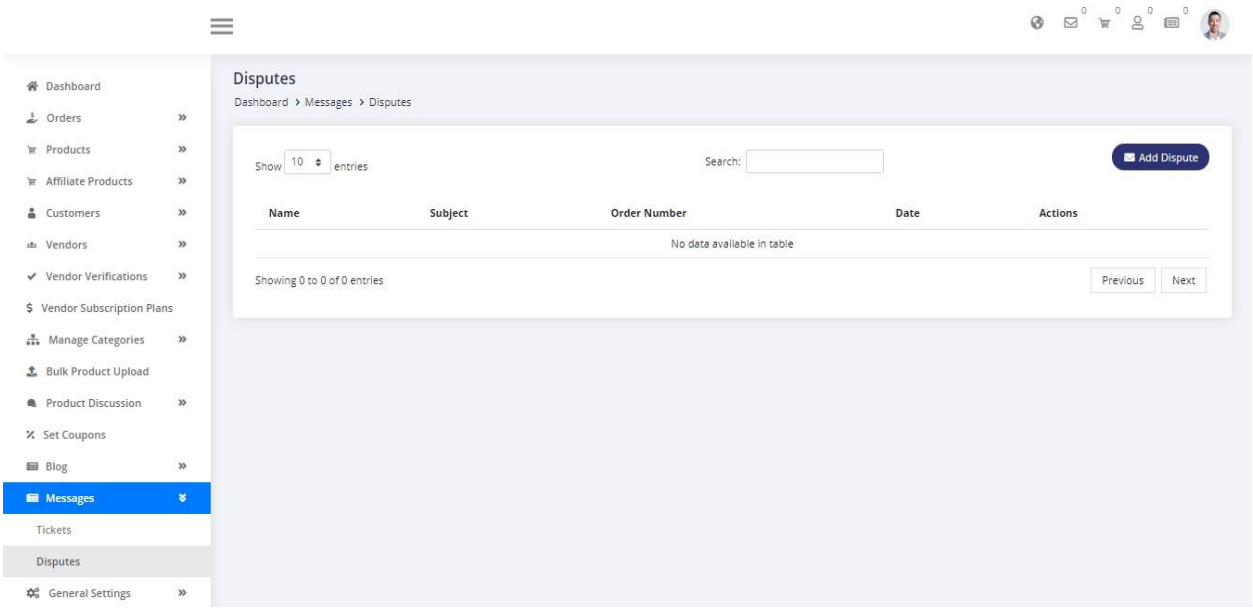


Fig 5.24: Dispute Message System Page

5.9.21 Admin can Manage Website Logo

This section admin can manage web site logo. Normally admin can choose the logo and upload it manually.

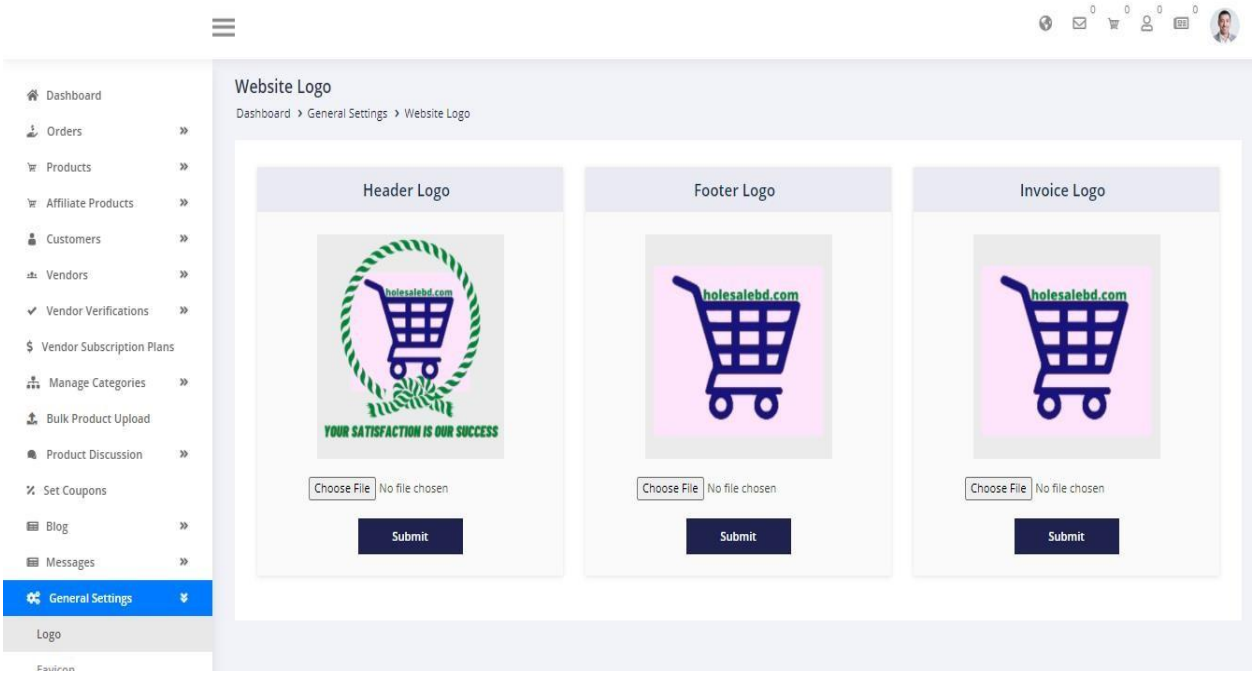


Fig 5.25: Logo Management Page

5.9.22 Admin Can Manage Website Favicon

This section admin can manage web site Favicon. Normally admin can choose the Favicon and upload it manually.

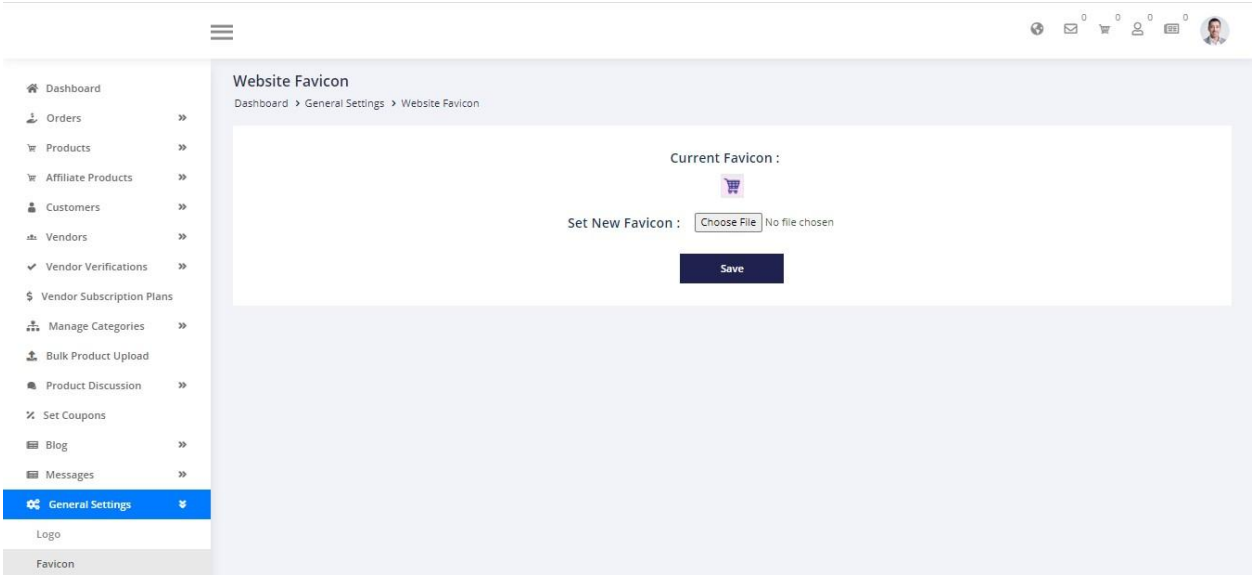


Fig 5.26: Website Favicon Page

5.9.23 Admin Can Manage Website Loader

This section admin can manage web site loader.

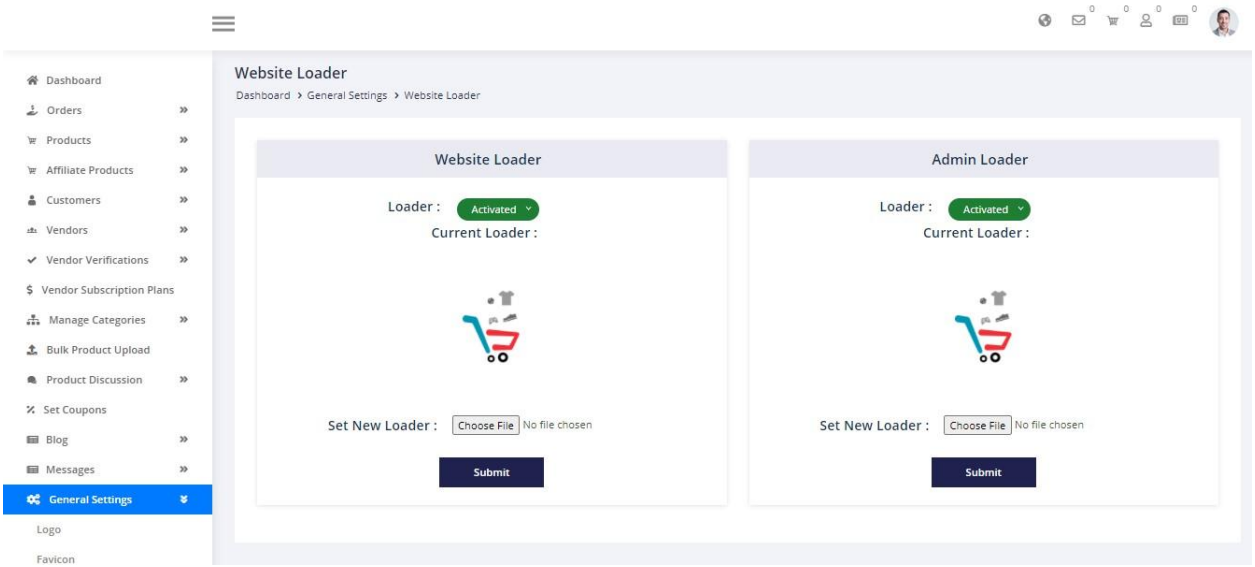


Fig 5.27: Website Loader Page

5.9.24 Admin Can Manage Shipping Methods

This section admin can manage product shipping methods.

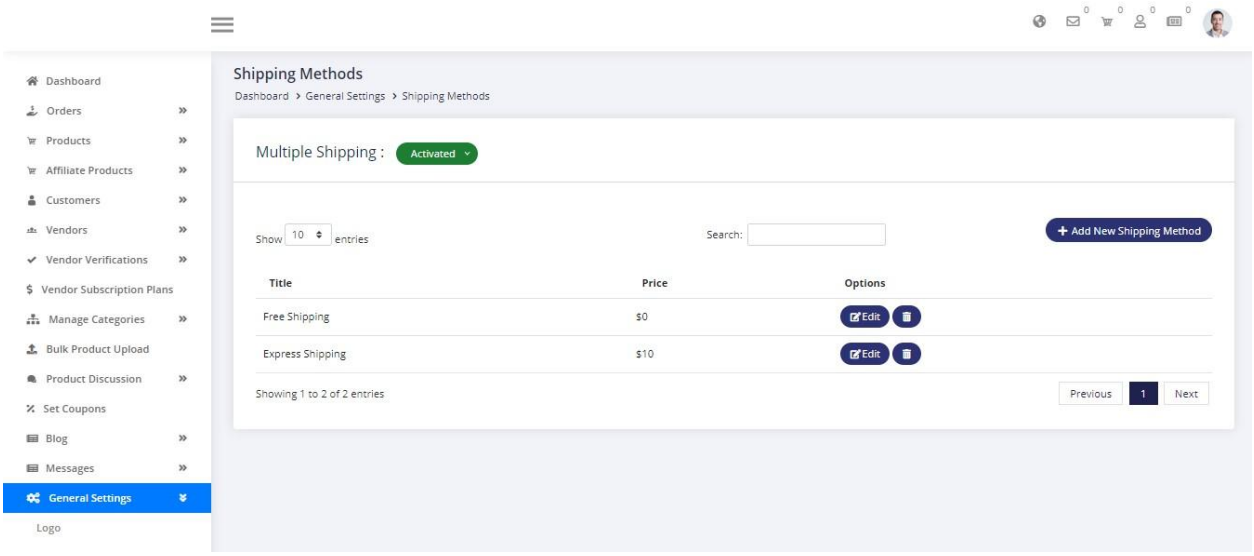


Fig 5.28: Shipping Management Page

5.9.25 Admin can Manage Pickup Locations

This section admin can manage product pickup locations.

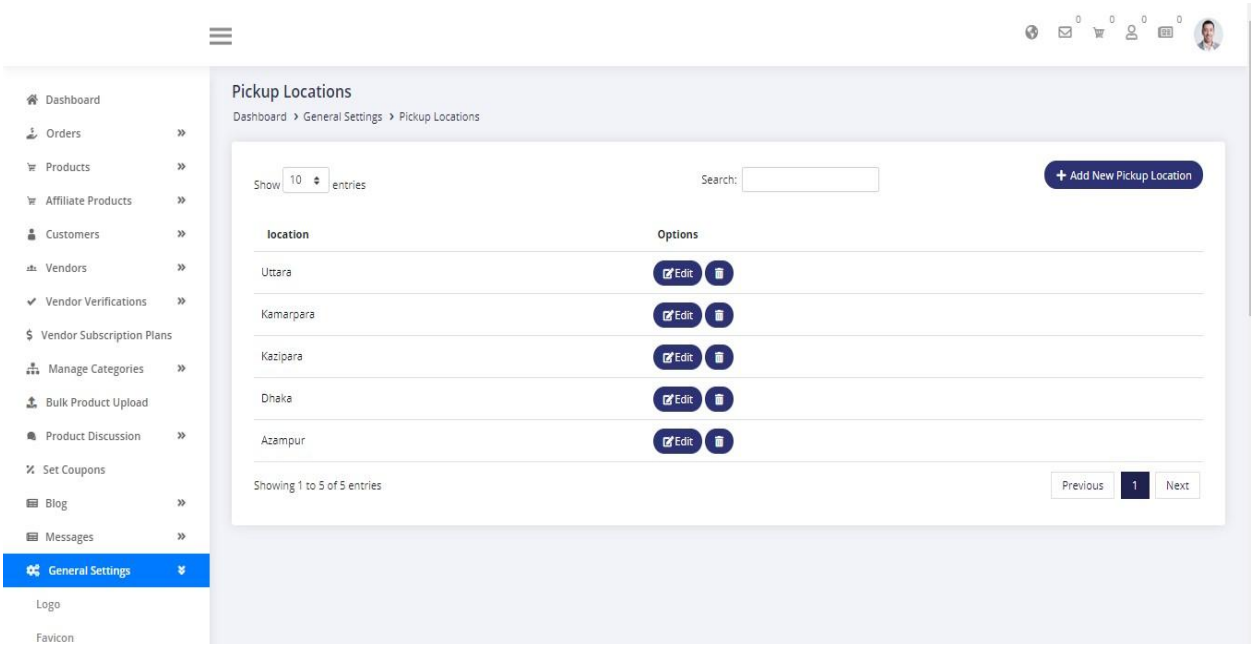


Fig 5.29: Pick-Up Location Management Page

5.9.26 Admin Can Manage Website Content

This section admin can manage web site content.

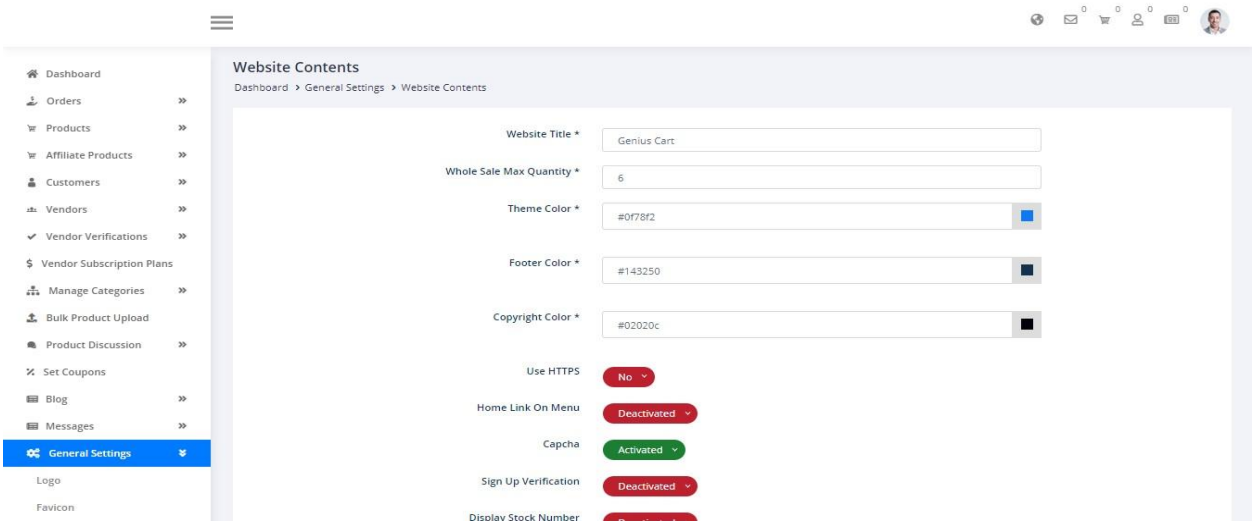


Fig 5.30: Website Content Management Page

5.9.27 Admin Can Manage Email Configurations

This section admin can manage web site Email configurations.

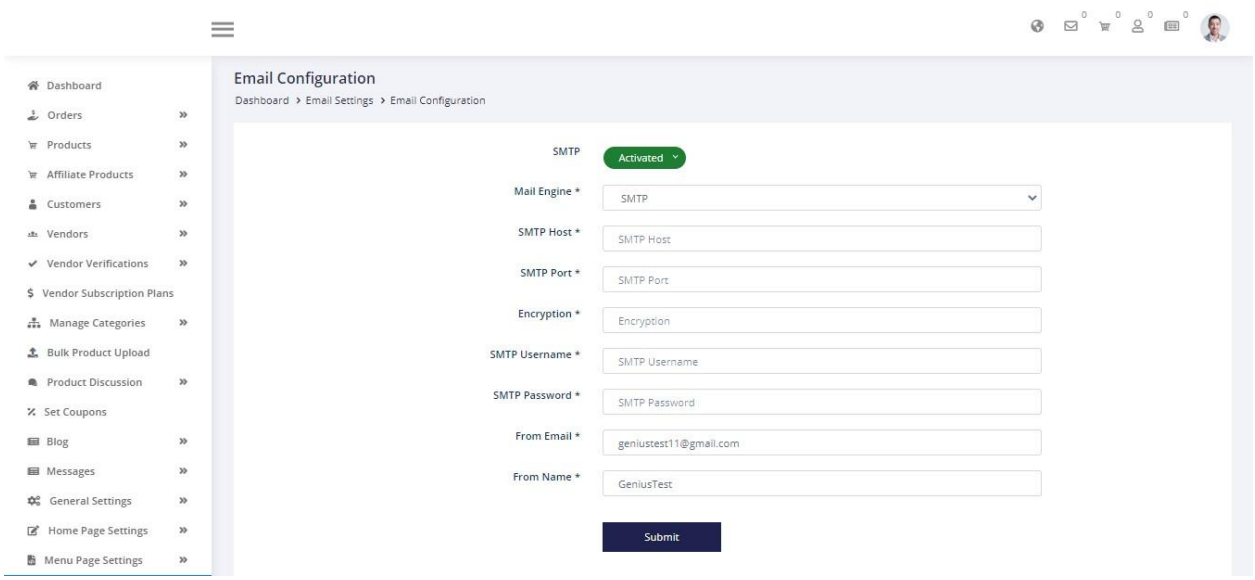


Fig 5.31: E-mail Configuration Management Page

5.9.28 Admin Can Manage Group of Email

This section admin can manage web site group of email. Admin can send many emails into many customer within a time. It helps to send any update and any offer to the customer.

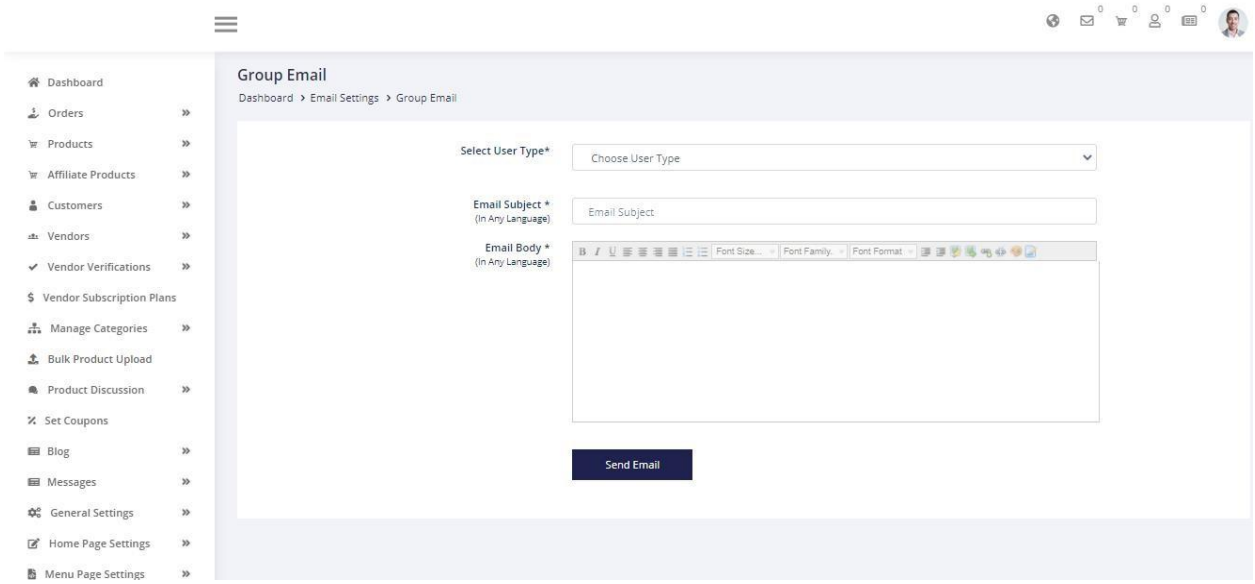


Fig 5.32: Group E-mail Management Page

5.9.29 Admin Can Manage Payment Information

This section admin can manage payment information.

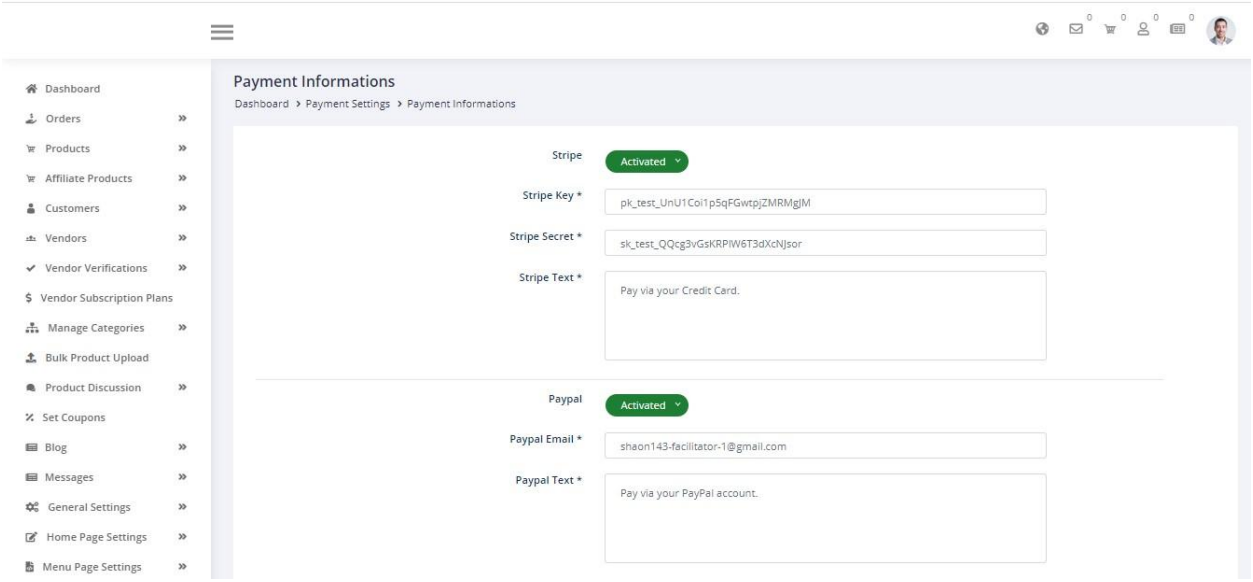


Fig 5.33: Payment Information Management Page

5.9.30 Admin Can Manage Payment Gateway

This section admin can manage Payment Gateway.

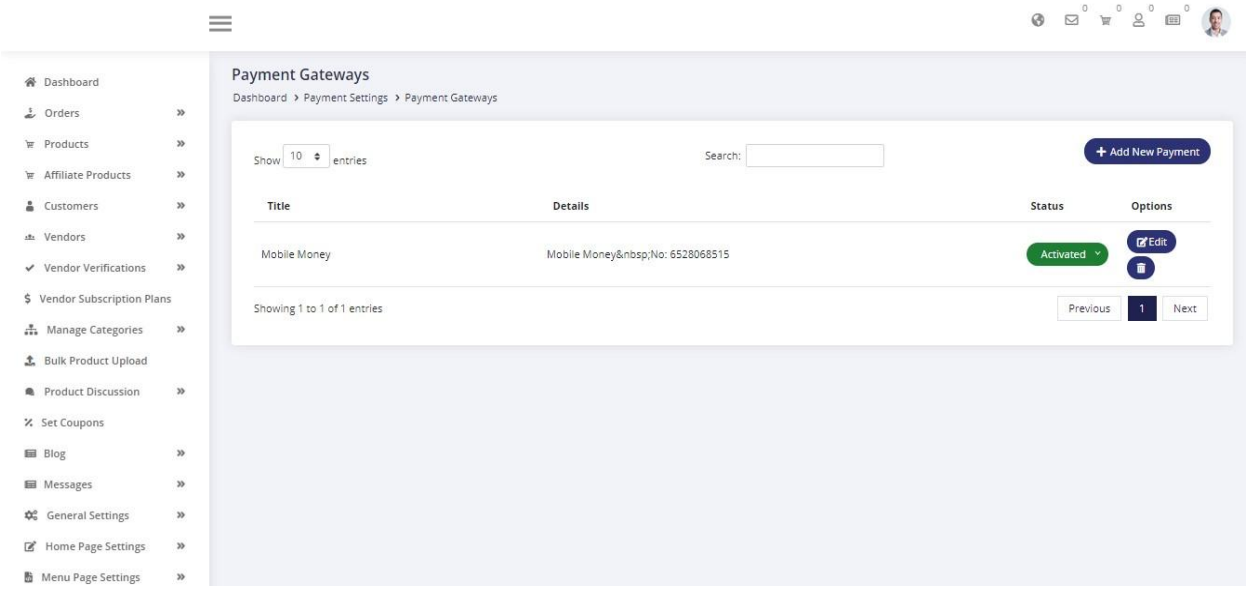


Fig 5.34: Payment Gateway Management Page

5.9.31 Admin Can Manage Multi Currency System

This section admin can manage Multi currency. Foreign customer can buy the product using foreign currency.

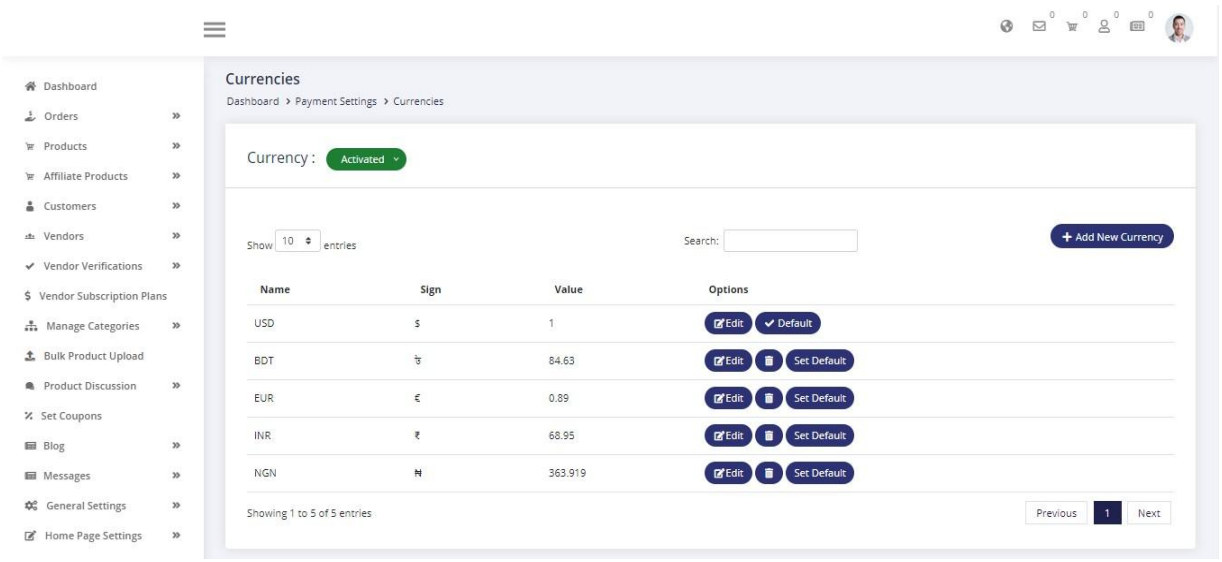


Fig 5.35: Multi-Currency System Management Page

5.9.32 Admin can manage Multi Language System

This section admin can manage multi-language. Admin can change language and update it as per requirement.

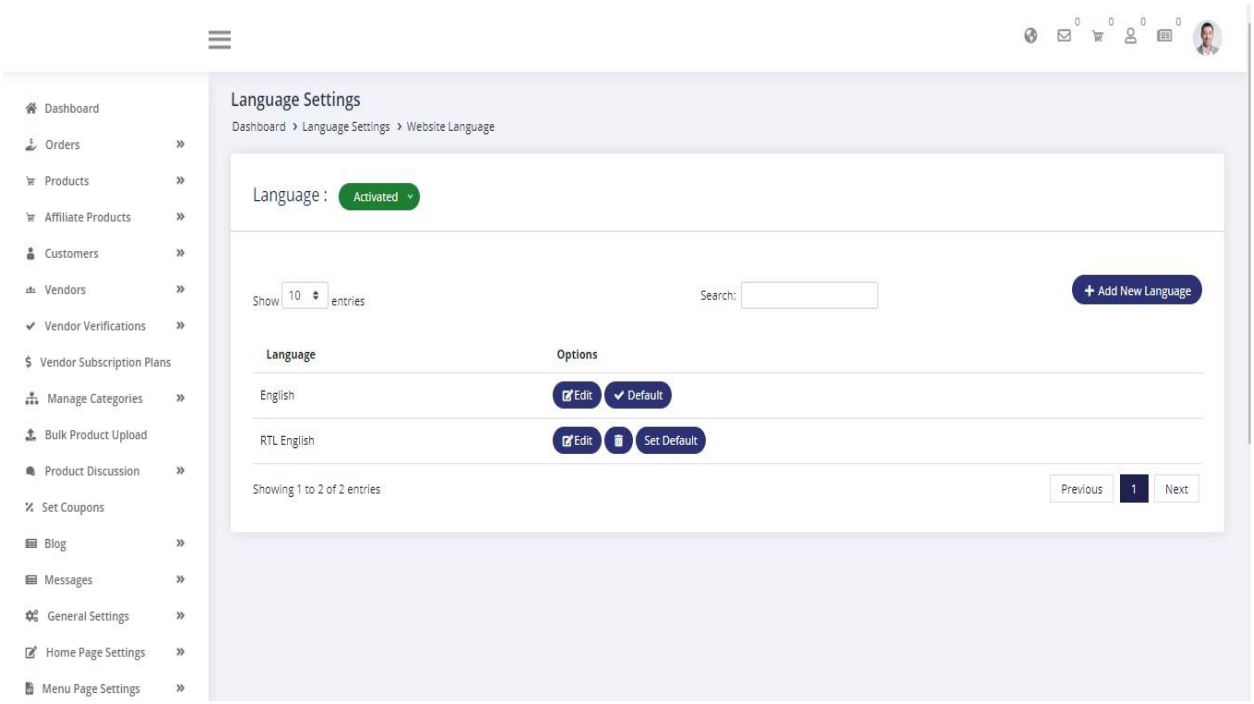


Fig 5.36: Multi-Language System Management Page

5.9.33 Admin Can Manage Admin Panel Language System

This section admin can change admin panel language system as per requirements.

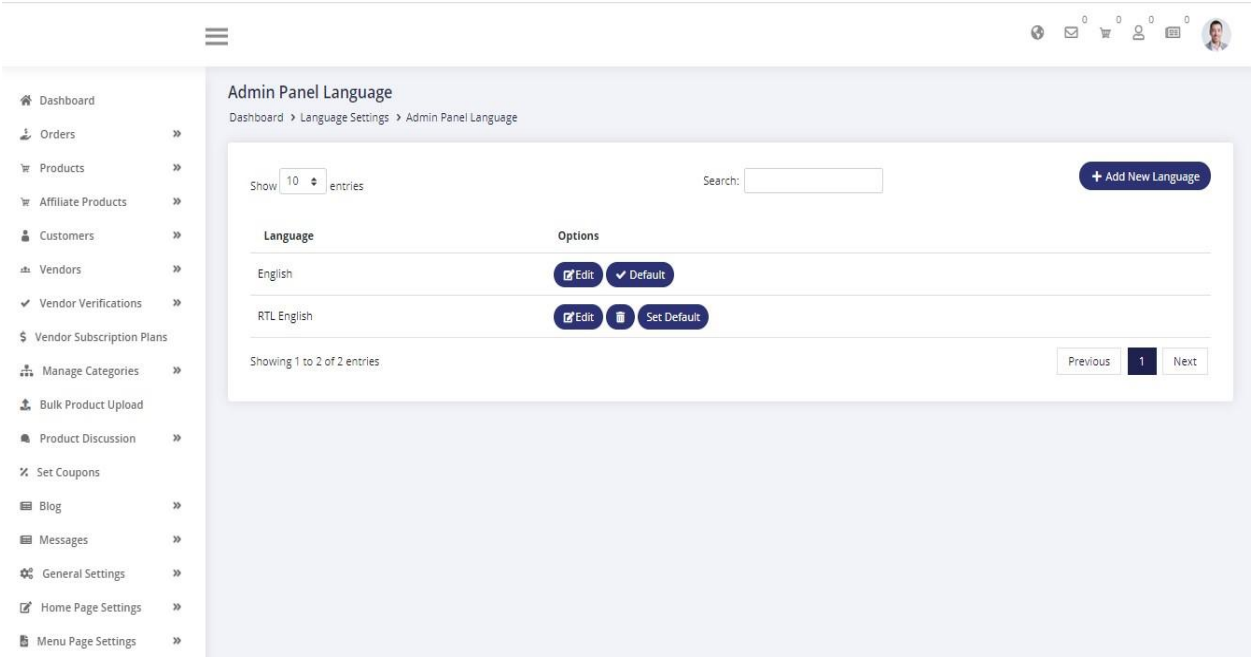


Fig 5.37: Admin Panel Language Management Page

Chapter 6
CONCLUSION

In conclusion, multi-vendor e-commerce platforms have revolutionized the way businesses operate by offering a unified marketplace where multiple vendors can sell their products. These platforms offer numerous benefits, such as wider product variety, reduced barriers for small businesses, and the ability to reach a larger audience. However, managing these systems comes with challenges such as ensuring system scalability, handling complex database management, and maintaining security across different vendors [6]. The integration of new technologies like AI, real-time payment systems, and customer feedback mechanisms will enhance the functionality and competitiveness of these platforms. As e-commerce continues to grow, future research should focus on improving platform security, enhancing user interfaces, and integrating emerging trends to create more efficient and sustainable multi-vendor ecosystems. [7]

6.1 Limitations

1. **Technical Complexity**: Building and maintaining a scalable platform requires advanced technical expertise, especially in integrating third-party services like payment gateways, inventory systems, and shipping providers.
2. **Security Risks**: Protecting sensitive customer data and preventing cyber-attacks becomes more complex with the involvement of multiple vendors, each potentially introducing security vulnerabilities.
3. **High Costs**: Developing, maintaining, and continuously upgrading the platform can be resource-intensive, making it costly, particularly for smaller businesses or startups.

6.2 Future Scope

Advanced Security Features: Implementation of industry-standard security protocols such as HTTPS/SSL, two-factor authentication, data encryption, and regular security audits to ensure user data protection.

AI-Based Recommendation System: Integrating artificial intelligence to provide personalized product recommendations based on user behavior, preferences, and purchase history.

Comprehensive Admin Panel: A fully-featured admin dashboard could be added for better management of users, products, orders, and analytics, making the system more scalable and easier to maintain.

Mobile Application Development: Creating dedicated mobile apps for Android and iOS platforms to provide a smoother and more accessible shopping experience for users on the go.

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