

**DESIGN AND IMPLEMENTATION OF A MARKETPLACE  
PLATFORM**

**BY**

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**FEBRUARY 2025**

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**A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF COMPUTER  
SCIENCE, FACULTY OF PHYSICAL SCIENCES, UNIVERSITY OF BENIN, BENIN  
CITY**

**IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A  
BACHELOR OF SCIENCE (B.Sc.) DEGREE IN COMPUTER SCIENCE**

**FEBRUARY 2025**

## **CERTIFICATION**

This is to certify that this project work was carried out by **MPUKUTA ROSSIE KINTUNA** with Matriculation Number **PSC2008172** under my supervision. It is adequate and satisfactory, both in scope and content, for the award of Bachelor of Science (B.sc) Degree in Computer Science of the University of Benin.

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**PROF. (MRS.) V.I. OSUBOR**

Project Supervisor

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**DATE**

## **APPROVAL**

This project work is hereby approved in partial fulfilment of the requirements for the award of Bachelor of Science (B.Sc.) Degree in Computer Science from the University of Benin.

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**Prof. G.O. Ekuobase**

Head of Department

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**DATE**

## **DEDICATION**

This project is dedicated to God Almighty for giving me the strength and wisdom to see it through to completion, and even throughout my stay in the University of Benin (UNIBEN). It is also dedicated to my mother; Mrs Angellique Mpukuta and my sister Kintuna Blessing and also my brother Kintuna Emmanuel; for their constant love, support and guidance throughout my academic journey. It is also dedicated to the DAFI Programme (German Albert Einstein scholarship); for their support throughout my years in the university.

## **ACKNOWLEDGEMENT**

My utmost acknowledgement goes to God Almighty for giving me the strength, wisdom and direction throughout my academic journey. I would like to express my gratitude to my project supervisor who is also the Head of the Department of Computer Science, Prof. G.O. Ekuobase for his consistent guidance towards ensuring the successful completion of this project.

I would also like to specially thank my project coordinator, Prof. (Mrs.) V.I. Osubor and other lecturers in the Department of Computer Science who I have been opportune to cross paths with, and have impacted me immensely these past few years, Dr. F.O. Oliha, Prof. (Mrs.) A.O. Egwali, Prof. K.C. Ukaoha, Prof. A.A. Imiavan, Prof. (Mrs.) F. Egbokhare, Prof. (Mrs.) V.V.N. Akwukwuma, Prof. F.I. Amadin, Prof. (Mrs.) S. Konyeha, Dr. (Mrs.) Aziken, Dr. F.O. Chete, Dr. (Mrs) R.O. Osaseri, Dr. J.C. Obi, Mr. P. E.B. Imiefoh, Dr. (Mrs.) A.R. Usiobaifo, Mr. I.E. Obasohan, Mr. S.O.P. Oliomogbe, Mr. K.O. Otokiti, Mr. I.E. obayagbonna, Mrs. R.I. Izevbizua, Mr. E.C. Igodan, Miss L.O.Usiosefe, Mr J. Okhuoya, Prof. F.A.U. Imouokhome, Mrs. J.I. Adun, Dr. E. Nweli and Mr. D.N. Idehen.

Finally, I also want to appreciate those who contributed to the success of this project: Osemene Azubuike Smart, Anuligo Chiamaka Francisca, Redemption Charles Idehen, Otakpolor Rejoice Favor, Felix Promise Ebuh, Ifechukwu Chiemelu Bright and Oriekemen Wisdom. I would also like to thank my family and friends for their support, words of encouragement, and consistent guidance throughout this project.

# CHAPTER ONE

## INTRODUCTION

### 1.0 Background Study

A marketplace is an organized venue, either physical or virtual, where buyers and sellers convene to exchange goods or services (Patrik and Asaf, 2022). The core purpose of these platforms is to connect individuals or businesses who wish to sell products or services with those who wish to buy them. Big companies like Amazon, which was started in 1994, and eBay, which began in 1995, were the first to create this idea and changed the way people shop worldwide.

Amazon began as a small online bookstore but grew fast and is now one of the biggest online shopping sites in the world. eBay, on the other hand, allowed individuals to list products for sale, creating an auction-style marketplace. These platforms revolutionized the retail industry, offering consumers easy access to products from all around the world, while businesses were able to reach larger audiences than ever before (Gilton et.al, 2023).

The success of Amazon and eBay didn't just change how people shop, it also helped online shopping grow around the world. Now, online shopping makes up a big part of total retail sales. More people are shopping online than ever before, and the ease and speed of buying things online have become normal. These companies helped create a new way of shopping where physical stores aren't the only choice, and online platforms are now a key part of shopping.

Historically, people bought and sold goods in open markets like town squares and bazaars, which were also places for social interaction. Over time, these markets became more organized, leading to the creation of shopping malls and supermarkets, making shopping easier. Recently, digital platforms, e-commerce, and online marketplaces have reshaped how people buy and sell goods. Businesses now rely on technology to connect with customers in new ways, changing how shopping works (Dastenov, 2023).

In the context of the University of Benin (UNIBEN), small businesses are an essential part of the campus community. They provide a wide range of services, such as laundry, food, clothing, and printing services, to meet the daily needs of students, staff, and faculty. However, many of these businesses still rely on traditional advertising methods, such as word-of-mouth and flyers, which are increasingly ineffective in the digital age. While these methods may work within small,

localized communities, they limit the growth potential of businesses and make it difficult for customers to find information about the services available to them. Moreover, the lack of an organized platform makes it harder for businesses to stand out, as there is no central place where students and staff can easily access the services offered by these businesses.

Given the challenges that small businesses at UNIBEN face, this project proposes the creation of an online marketplace tailored specifically to the university community. By building an online platform, small businesses can enhance their visibility and attract more customers. This platform will serve as a one-stop shop where students, staff, and faculty can find a variety of services offered by local businesses. It will make it easier for customers to discover businesses, browse their offerings, and make informed decisions based on reviews and ratings. Additionally, the platform will allow business owners to better manage their services, communicate with customers, and track performance through built-in analytics tools.

## **1.1 Motivation**

Small businesses are important to both the local economy and university life, offering services like data, laundry, and catering. However, these businesses often have trouble reaching their customers because they don't have many ways to advertise. Some existing platforms like Sulekha and StudySoup try to help by connecting service providers with customers, but they don't fully meet the needs of university communities. For example, they don't offer student discounts, special deals, or features that make it easier for businesses to manage orders and payments. This project aims to solve these problems by creating a platform specifically for the university community, where small businesses can easily promote their services, handle transactions, and connect with students and staff. The goal is to make it easier for businesses to grow and reach their customers.

## **1.2 Problem Definition**

Small businesses at universities like UNIBEN face many challenges that make it difficult for them to grow and succeed. Many of these businesses still rely on traditional advertising methods, such as word-of-mouth and paper flyers. While word-of-mouth can build trust, it is slow and limited in reach (Aladejebi and Taiwo, 2023). Flyers, on the other hand, are easy to produce and can target specific locations, but they are often ignored and cannot be updated in real time. Other traditional methods like posters, banners, and newspaper ads focus on physical visibility but can be costly and less effective in today's digital world, where customers expect information to be accessible online (Mohammed and Adamu, 2021).

Students and staff also struggle to find on-campus businesses that offer the products and services they need. Without a central platform for businesses to showcase their offerings, customers often prefer off-campus options for convenience. This reduces the visibility and income of campus businesses, making it harder for them to grow (Aladejebi and Taiwo, 2023).

Moreover, small businesses often lack proper tools to manage their operations effectively. They may struggle to track inventory, understand customer preferences, or improve their services. This makes it harder for them to adapt to changing customer needs and the competitive market (Mohammed and Adamu, 2021).

Online platforms provide a single space where businesses can advertise their products and services, making it easier to connect with customers. Without such a platform, small businesses will continue to struggle, missing opportunities for growth and failing to engage with the larger university community (Aladejebi and Taiwo, 2023). This project aims to solve these issues by introducing a digital marketplace that supports small businesses and improves the shopping experience for everyone at UNIBEN.

## **1.3 Goal and Objectives**

The goal of this project is to create a working marketplace platform to help small businesses at UNIBEN be more visible. The objectives include:

- Designing and implementing an easy-to-use platform for businesses to show their products and services.

- Allowing customers to find businesses by category and location.
- Helping businesses manage their activities with digital tools.
- Improving interaction between businesses and customers.
- Supporting small business growth by expanding their reach.

#### **1.4 Scope of Research**

This study focuses on building a marketplace for the UNIBEN community to help small businesses become more visible. It will offer tools to improve customer interaction and manage services. The development will use ideas from other markets to make sure the platform works well and can grow as needed.

#### **1.5 Research Methodology**

The project will use a mix of qualitative and quantitative methods:

- **Literature Review:** Study the effectiveness of existing marketplace platforms and their impact on small businesses. This will involve analyzing existing research and reports on online marketplaces, focusing on their success, limitations, and specific benefits to small businesses and target audiences, particularly in the context of university settings.
- **Surveys and Interviews:** Gather specific needs and preferences from students and small business owners at UNIBEN. Surveys will collect quantitative data regarding user preferences, while interviews will allow for more in-depth qualitative insights into the user experience and specific challenges faced by small businesses in the local market.
- **Development Tools:** Use React for the front end and Node.js with MongoDB for the backend, ensuring a responsive and scalable design. React will be used to create an interactive and dynamic user interface, while Node.js will power the server-side logic and MongoDB will handle data storage, offering scalability and flexibility for the platform's growth.

- **Testing and Feedback:** Conduct iterative testing phases to gather feedback from users and business owners to refine functionalities. Testing will include usability, performance, and functional assessments, with continuous feedback from the user base to guide refinements and improvements.

## 1.6 Research Significance

This research will help small businesses in university settings go digital. Key benefits include:

- **Better Visibility:** Gives small businesses a platform to increase their presence in the UNIBEN community.
- **Improved Access:** Provides students and staff an easy way to find and interact with local businesses.
- **Economic Growth:** Supports small business expansion, strengthening the university economy.
- **Digital Innovation:** Finally, this research promotes the use of digital innovation among small businesses in the university. Many small businesses lack the expertise or resources to fully take advantage of the benefits offered by digital tools and platforms.

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## **CHAPTER TWO**

### **LITERATURE REVIEW**

This chapter provides an overview of marketplace platforms from a global perspective, with a primary focus on Nigeria and the University of Benin as a case study. It examines traditional methods of running marketplaces, highlighting their challenges, and compares them to modern digital platforms. The discussion also highlights the benefits of these digital platforms, showcasing their efficiency and ease of use.

#### **2.1 Marketplace: An Overview**

Marketplaces have played a key role in trade for centuries, serving as places where people buy and sell goods and services (Li *et.al*, 2016). However, in the late 20th century, the internet changed how marketplaces function by shifting them from physical locations to digital platforms. The introduction of e-commerce websites such as Amazon and eBay in 1995 marked the beginning of this transformation (Brynjolfsson *et.al*, 2019; Einav *et.al*, 2016). These platforms removed the need for in-person interactions, making it possible for buyers and sellers from different parts of the world to do business easily.

This shift made transactions faster, more convenient, and more accessible. Sellers could now reach a much larger audience beyond their local markets, while buyers had access to a wider variety of products and services (Pappas *et.al*, 2016). Additionally, online marketplaces have helped reduce costs and improve efficiency in trade by making it easier to compare prices, process payments, and deliver goods (Kumar *et.al*, 2018).

Over time, online marketplaces have expanded beyond just selling physical products. Many industries, including ride-sharing, food delivery, and freelance work, have adopted the marketplace model (Einav *et.al*, 2016). Platforms such as Uber, Airbnb, and Fiverr have successfully built businesses that connect service providers with customers, further demonstrating the flexibility and effectiveness of digital marketplaces (Pappas *et.al*, 2016).

Today, online marketplaces continue to evolve, adapting to changing consumer needs and technological advancements. They not only make transactions easier but also provide opportunities

for businesses to grow and reach new markets. While traditional marketplaces still exist, digital marketplaces have become an essential part of modern commerce, making buying and selling more efficient than ever before (Kumar *et.al*, 2018).

Universities function as unique ecosystems where students, faculty and staff interact regularly. A university-focused marketplace can provide a specialized digital space, tailored to the needs of this community. Unlike large-scale e-commerce platforms like Amazon, a campus-specific marketplace could address the following:

- **Improve access** to goods and services for students and staff.
- **Reducing the time and effort** required for students and staff to access goods.
- **Providing a platform for local businesses** within the campus to connect with potential customers.
- **Building a stronger sense of community** by encouraging interactions between buyers and sellers within the university.

### **2.1.1 Traditional Marketplace**

A traditional marketplace is a physical, geographically defined area where goods and services are exchanged between buyers and sellers. This can be a market, a street vendor stall, or a shopping mall. In these places, buyers and sellers meet face-to-face to make transactions (Bromley and Mackie, 2015).

In these marketplaces, transactions occur in real-time—buyers approach sellers, inspect goods, negotiate prices, and exchange money directly. Despite the rise of online platforms, traditional markets continue to thrive in many parts of the world due to their cultural, social, and economic relevance (Reynolds *et.al*, 2020).

### 2.1.2 Characteristics of a Traditional Marketplace

Traditional marketplaces have the following characteristics:

- **Physical location:** Traditional marketplaces are usually fixed in one place. People would need to travel from one place to another to buy or sell items (Mukhia *et.al*, 2019). Unlike online platforms, they are not accessible from anywhere at any time (Reynolds *et.al*, 2020).
- **Face-to-Face Interaction:** In traditional markets, buyers and sellers engage in direct face-to-face interactions, allowing customers to inspect goods, ask questions, and negotiate prices. This personal engagement fosters trust and facilitates immediate feedback during transactions (Sari and D.F.,2019).
- **Cash payment:** Traditional markets predominantly operate on cash transactions. This reliance on cash is due to various factors including the informal nature of these markets and limited access to digital payments systems. A study on traditional markets in Ibadan, Nigeria, highlights that despite the emergence of modern retail outlets, cash remains the primary medium of exchange in these settings (Adeyemi, 2019).
- **Variety of products:** Traditional markets often provide customers with a wide variety of products. These can include clothing, food, shoes, electronics, and handmade items (Bromley and Mackie, 2015; Mukhia *et.al*, 2019).
- **Limited hours:** Unlike online marketplaces that operate 24/7, traditional markets have specific operating hours. For instance, some markets in Nigeria function during particular times of the day or on designated days of the week, reflecting cultural practices and logistical considerations (Okonkwo and Yusuf, 2020).
- **Community feeling:** Beyond commerce, traditional markets foster social interactions and community cohesion. They serve as venues for socialization, cultural exchange and the strengthening of social ties.

### 2.1.3 Types of Traditional Marketplaces

The various types of traditional marketplaces include the following:

- **Street Markets**

These are informal and most times, they are often set up in spaces such as streets, sidewalks, or public squares. They are typically not governed by strict rules and regulations and sellers may set up their stalls temporarily.

Street markets are known for offering a wide variety of goods at affordable prices, including fresh produce, clothing, and household items. They often operate daily or on designated days, depending on the location. A notable example is the Balogun Market in Lagos, Nigeria, which is famous for its diversity of products and bustling environment.

- **Bazaars**

Bazaars are traditional markets usually found in regions like the Middle East, Asia, and North Africa. They are typically large and well-organized, with different sections dedicated to specific types of goods, such as spices, textiles, jewelry, or carpets.

Bazaars are often covered or semi-enclosed, offering shoppers a unique cultural experience. A prime example is the Grand Bazaar in Istanbul, Turkey, which features thousands of shops and a rich history. These marketplaces often serve as tourist attractions due to their cultural significance and vibrant atmosphere.

- **Farmers' Markets**

Farmers' markets, as the name implies are venues where farmers come to sell their agricultural produce directly to their customers. In these markets, you can find fresh, seasonal, and even locally grown products like vegetables, fruits, and dairy.

Farmers' markets are popular in urban areas, where they provide an opportunity for people to purchase organic or farm-fresh goods. They are often held on a weekly basis and these markets increase the support for local agriculture while ensuring product freshness.

- **Craft Markets**

These markets are usually dedicated to handmade goods. They showcase products like pottery, jewelry, traditional art, and other handcrafted items. Craft markets are often tied to cultural events, festivals, or tourist destinations.

An example of a craft market might be one in a tourist-heavy area where local artisans sell unique, culturally significant goods. These markets not only promote creativity but also preserve cultural heritage by providing a platform for artisans to display their skills.

- **Central Markets**

Central markets are large, permanent markets housed in purpose-built structures. They are central hubs for trade in urban areas and offer a wide range of goods, from fresh produce to clothing and electronics.

An example is the Wuse Market in Abuja, Nigeria, which is a go-to destination for diverse shopping needs. Central markets often play a vital role in a city's economy by bringing together buyers and sellers from various regions.

- **Specialized Markets**

Specialized markets focus on a specific category of products or services. Examples include fish markets, flower markets, and technology markets. These marketplaces are tailored to meet the needs of specific customer groups.

For instance, the Computer Village in Lagos, Nigeria, is renowned for its wide range of electronics and tech accessories. Specialized markets are efficient for customers looking for expertise and variety in a particular product line.

- **Periodic Markets**

Periodic markets are temporary markets that operate on specific days or seasons. They are common in rural areas, where buyers and sellers gather during market days to trade goods. These markets provide a platform for people to access goods that may not be available in their local communities regularly.

Periodic markets are often social events as well, allowing people to connect and exchange not just goods but also news and ideas.

- **Flea Markets**

These are informal markets that specialize in the sale of second-hand goods, vintage items, and antiques. Flea markets are often held in open spaces or large halls and are known to sell a variety of items, ranging from old furniture to rare books and handcrafted goods. They are especially popular in Western countries and are growing in other regions.

### **2.1.4 Advantages of Traditional Marketplace**

Traditional marketplaces offer a unique set of benefits that have kept them relevant and important. They not only serve as centers for trade but also play a critical role in fostering social connections, supporting local economies, and preserving cultural heritage. Here are some of the key advantages of traditional marketplaces:

- **Affordability and Accessibility**

Traditional markets are usually strategically located, often at the heart of towns or neighborhoods, which makes them easily accessible to a wide audience. It doesn't matter if you're in a rural area or a bustling city, these markets cater to the immediate needs of the community. Prices in traditional markets are usually competitive. Additionally, buyers can take advantage of discounts and negotiate prices directly with sellers, ensuring affordability for everyone.

- **Social Engagement and Community Building**

Traditional markets are not only places to buy products but also hubs for social activities where people can gather to socialize or exchange information. These markets are usually lively and interactive spaces. Shoppers often build long-standing relationships with vendors, creating trust and loyalty. The market atmosphere allows for casual conversations, cultural exchanges, and a sense of belonging, which strengthens the social fabric of the community (Jae-Jang and Sun-Choung, 2020).

- **Wide Variety of Goods**

Traditional marketplaces have an extensive range of products available. Ranging from fresh fruits and vegetables to handcrafted jewelry and traditional textiles, these markets offer different items, which are usually dependent on taste and preference. This variety ensures that customers can find unique and high-quality products that might not be available in conventional stores.

- **Flexible Pricing and Negotiation**

Traditional markets thrive on bargaining. Customers can negotiate prices, making goods more affordable, while sellers adjust their rates based on the individual customer. This flexible pricing system creates a personalized shopping experience, promoting mutual respect and understanding (Chin and Lau, 2016).

- **Preservation of Culture and Tradition**

Traditional markets are living representations of a community's heritage. They showcase local craftsmanship, culinary practices, and traditional attire, which help preserve cultural identity. Visitors can experience the unique flavors and artistry of a region, promoting cultural pride and continuity. For instance, markets selling handmade goods offer buyers authentic, one-of-a-kind items that celebrate local traditions (Li and Li, 2019).

- **Tourist Attraction Sites**

Recently, traditional markets have become tourist attractions. They offer tourists a special cultural experience where they can encounter the unique atmosphere and goods of a country. These markets provide cultural experiences while also being places for social and commercial exchange (Jae-Jang and Sun-Choung, 2020).

- **Employment Generation**

Traditional markets are vital for job creation, especially in developing economies. They provide employment opportunities for a wide range of people, including farmers, artisans, transporters, and market vendors. Small businesses, in particular, benefit greatly from traditional markets, which offer an affordable way to start and sustain a business. This

employment ecosystem helps reduce poverty and empowers individuals to contribute to the local economy (Ghosh and Roy, 2017).

- **Simple Transactions**

Cash remains the primary mode of payment in traditional markets, making transactions straightforward and accessible to everyone, including those without access to banking services or digital payment systems. This simplicity ensures that even individuals in remote or underserved areas can participate in economic activities without barriers.

### **2.1.5 Disadvantages of Traditional Marketplace**

While traditional marketplaces offer several benefits, they are not without their challenges. These limitations can hinder their efficiency, accessibility, and ability to adapt to modern consumer demands. Here are some disadvantages of traditional marketplaces:

- **Limited Reach and Accessibility**

Traditional marketplaces are known to cater to local communities, which decreases their reach. This limitation makes it difficult for vendors to expand their customer base and prevents buyers from accessing unique goods available in other regions. Additionally, markets in rural or remote areas may be inaccessible to some consumers due to inadequate transportation infrastructure.

- **Lack of Efficiency**

Transactions in traditional markets are often time-consuming. Buyers may need to visit several vendors to find specific items, compare prices, or negotiate deals. This inefficiency can lead to delays and frustration for customers, especially when compared to the convenience of modern retail stores or online shopping platforms.

- **Vulnerability to External Factors**

It is well known that merchants in the traditional market are exposed to poor working conditions, such as long working hours, musculoskeletal stress, lack of physical activity,

irregular meal times, and nutritional imbalances (Chae and Ha, 2021). These marketplaces are heavily influenced by external conditions such as weather, public holidays, or economic fluctuations. For instance, outdoor markets may face disruptions during heavy rains or extreme heat, reducing foot traffic and impacting sales. Economic instability can also affect both vendors and customers, leading to reduced purchasing power and lower profits.

- **Overcrowding and Poor Hygiene**

Many traditional marketplaces suffer from overcrowding, especially during peak hours or festive seasons. This can create a chaotic shopping experience, making it difficult for customers to browse or negotiate effectively. Additionally, poor hygiene standards in some markets, particularly in areas selling perishable goods like meat and fish, can pose health risks to consumers.

- **Security Concerns**

Traditional markets are prone to security issues such as theft, pickpocketing, or even fraud. The lack of formal monitoring or surveillance systems makes it difficult to ensure the safety of both vendors and buyers. Furthermore, cash transactions can make vendors vulnerable to loss or theft.

- **Competition**

In highly competitive markets, vendors may engage in aggressive price wars to attract customers. While this may benefit buyers in the short term, it can lead to unsustainable practices for sellers, reducing their profits and jeopardizing their long-term viability.

- **Inconsistent Opening Hours**

Traditional marketplaces may not operate on fixed schedules, with some vendors opening late or closing early depending on personal circumstances. This inconsistency can inconvenience buyers who rely on the market for daily necessities, leading to reduced customer satisfaction.

- **Environmental Concerns**

Despite their localized nature, traditional markets can contribute to environmental degradation if not managed properly. Poor waste disposal practices, such as littering and dumping unsold goods, can lead to pollution and sanitation issues. Additionally, reliance on non-recyclable materials like plastic bags further exacerbates environmental concerns.

### **2.2.1 The Emergence of Online Marketplace**

An online marketplace can be defined as the application of information technology in traditional marketing activities (Akhmadi and Pratolo, 2021). The emergence of online marketplaces played a big role in how buying and selling happened, this was due to technological advancement and the invention of the internet. This evolution transformed traditional e-commerce, enabling buyers and sellers to connect in ways that were previously unimaginable. Below is a detailed exploration of the transition, key milestones, and the internet's role in redefining commerce.

### **2.2.2 Transition from Physical to Digital Platforms**

The transition from physical to digital platforms marked a major change in global commerce. Traditional marketplaces were centered around physical locations where buyers and sellers interacted face-to-face to exchange goods and services. These marketplaces had several limitations, such as geographical boundaries, fixed hours of operation, and logistical challenges (Binns *et.al*, 2021).

The introduction of digital platforms eliminated these barriers. The internet provided a virtual space where commerce could happen without the need for physical presence (Laundon and Traver, 2021). Online marketplaces grew rapidly over the past decade, creating new markets where none existed before, reducing transaction costs, and allowing small sellers to enter the market more easily (Luca, 2016). Early digital platforms began with simple features like classified ads, where sellers listed items for sale, and buyers contacted them via phone or email. Over time, these platforms evolved into complete online marketplaces with features such as integrated payment systems, real-time inventory tracking, and customer support (Choudary, 2015).

### 2.2.3 Key Milestones in Online Marketplace History

- **Amazon (1994):**

Amazon was founded by **Jeff Bezos** as an online bookstore, making it easier for people to buy books they couldn't find in local stores. Over time, it grew into a massive online store selling everything from electronics to groceries. Amazon introduced new features like recommending products based on what you like, offering Prime memberships for faster delivery, and improving its shipping system. These innovations changed the way people shop online (Kantor and Streitfeld, 2015).

- **eBay (1995):**

eBay was founded by **Pierre Omidyar** in 1995, initially called "AuctionWeb". In 1995, Pierre Omidyar started the consumer auction website that became eBay. An often-cited story is that he recognized its potential when he put a broken laser pointer up for sale, and sold it for \$14.83 to a buyer who turned out to be a collector of broken laser pointers. It was created as an online auction site where people could sell items to each other (Einav *et.al*, 2016). Omidyar's goal was to build a platform that allowed individuals to trade goods directly. eBay made online auctions popular, encouraging reusing items and making it a leader in sustainable online shopping. The addition of user reviews helped buyers and sellers trust each other, creating a community feel on the site (Zhao and Lu, 2015).

- **Etsy (2005):**

Etsy was founded in 2005 by **Robert Kalin, Chris Maguire, and Haim Schoppik**. It is an online marketplace that focuses on handmade, vintage, and unique goods, catering to sellers and buyers interested in personalized and creative items. Etsy was designed to help small businesses, artists, and crafters reach a global audience. It has become a popular platform for independent creators to sell their products, ranging from handmade jewelry to custom home décor (Villarroel *et.al*, 2015).

- **Alibaba (1999):**

Alibaba was founded by Jack Ma in 1999 as a B2B (business-to-business) e-commerce platform. Its goal was to connect small businesses in China to global buyers, allowing them to easily trade goods on an international scale. Since its launch, Alibaba expanded its services to B2C (business-to-consumer) and C2C (consumer-to-consumer) models. Alibaba has grown to become one of the largest e-commerce companies in the world, offering everything from cloud computing to entertainment. Its reach has transformed global trade, particularly in Asia, and it continues to lead in areas like digital payments and online retailing (Chen and Sun, 2016).

#### **2.2.4 Advantages of Online Marketplace**

Online marketplaces have become integral to modern commerce, and their advantages go far beyond just convenience. They've transformed how businesses reach customers and how shoppers make purchases. Here are some of their advantages:

- **Global Reach and Access**

Unlike traditional markets that are restricted to local or regional customers, online marketplaces break down geographic barriers. Businesses can sell their products to anyone around the world. For example, a small business in Nigeria can reach customers in the United States, Europe, or Asia, expanding their market reach exponentially. This global accessibility not only increases a business's potential for sales but also allows consumers to find products that might not be available locally, creating a more diverse shopping experience

- **Convenience and 24/7 Availability**

Online marketplaces allow customers to shop whenever they want, whether it's late at night, on weekends, or during holidays. This level of convenience far surpasses the limitations of traditional stores, which are bound by operating hours. Shoppers no longer need to rush to stores during limited hours, making online shopping a preferred choice for those with busy schedules. Additionally, online shopping eliminates the need for physical travel, saving time and money on transportation.

- **More Product Choices**

With no space restrictions like physical stores, online marketplaces can offer an endless variety of products. Customers can find unique items, specialty goods, or products from international brands that may not be available in local stores. Whether it's handmade crafts from independent artisans or the latest tech gadgets from major global companies, online marketplaces offer a vast range of options. This diverse selection provides customers with more choices, increasing the likelihood that they will find exactly what they're looking for.

- **Lower Costs**

Operating an online marketplace generally incurs fewer costs than running a physical store. Sellers save on expenses like rent, utilities, and staffing, which are essential for physical businesses. This cost-saving allows businesses to offer products at more competitive prices, benefiting consumers with lower prices or better quality products for the same amount. In addition, the competition online keeps prices reasonable, as consumers can easily compare prices across multiple sellers.

- **Easier for New Sellers**

Online marketplaces lower the barriers to entry for new businesses. Setting up an online store can be done quickly and without the significant initial investment required for a physical store. Sellers don't need to invest in infrastructure like store fronts or warehouses. They can simply sign up for an existing platform like Etsy, Amazon, or eBay and begin reaching customers immediately. This accessibility encourages entrepreneurship, as people can start businesses from the comfort of their homes.

- **Customer Reviews and Feedback**

Customer reviews are a critical element of online marketplaces. Buyers can easily check the experiences of previous customers before making a purchase, which adds a layer of trust to the process. For sellers, positive reviews serve as a form of social proof, demonstrating their reliability and product quality. For buyers, these reviews make them feel more confident in their purchase decisions, knowing they're choosing products that others have already tested and liked.

- **Variety of Payment Methods**

Online marketplaces provide multiple payment options, catering to different customer preferences. Buyers can choose from credit cards, digital wallets (like PayPal or Apple Pay), or even bank transfers, making transactions easier and more secure. These platforms often have built-in fraud protection, ensuring that both buyers and sellers are protected during the transaction process. The availability of these payment methods helps remove barriers for customers who may prefer certain ways of paying.

- **Better Customer Service**

Many online marketplaces offer robust customer service features that help resolve issues quickly. This can include live chat, dedicated customer support hotlines, and easy return or refund policies. The ability to resolve problems without having to visit a store in person makes the shopping experience smoother and less stressful for customers. Additionally, sellers can use these platforms to provide quick responses to customer inquiries, ensuring a positive experience that can lead to repeat business.

- **Lower Operational Costs for Sellers**

Online platforms allow sellers to operate with lower overhead costs. They don't have to spend money on store rents or utilities. Many marketplaces even offer services such as warehousing, packaging, and shipping. This reduces the complexity of running a business, allowing sellers to focus on improving their products or services. The ability to reduce operational costs makes it easier for small businesses to compete with larger companies without needing extensive capital investment.

- **Effective Marketing Tools**

Online marketplaces provide a range of marketing tools that help sellers boost visibility. Sellers can use paid advertising within the platform, participate in promotional events, or feature their products on the homepage to attract more customers. These tools give smaller businesses the ability to advertise without requiring large budgets, leveling the playing field with larger corporations. Additionally, marketplaces may provide sellers with

analytical data about their sales performance, helping them tailor their marketing efforts more effectively.

### **2.2.5 Disadvantages of Online Marketplace**

It is a known fact that online marketplaces revolutionized how buyers and sellers interact, but as much as it is efficient, it is not left without some disadvantages. Here are some of the disadvantages of online marketplaces:

- **Security Threats**

One of the biggest issues with online marketplaces is the risk of fraud and cyberattacks. Since transactions happen over the internet, there's always a chance that personal or financial information could be compromised. Fake sellers and products can also undermine the trust between buyers and sellers.

- **No Physical Inspection**

When shopping online, customers can't touch or examine the product in person. This increases the risk of disappointment when items don't match expectations or images, especially when it comes to quality or size.

- **Delivery Issues**

Although online marketplaces offer convenience, shipping can sometimes cause problems. Late deliveries, lost or damaged goods, and high shipping costs can all negatively affect the buyer's experience.

- **Intense Competition**

Many online platforms have a vast number of sellers, creating fierce competition. Small businesses or individual sellers can struggle to stand out, leading to challenges in pricing, gaining customer loyalty, and reaching the target audience.

- **Difficult Return and Refund Procedures**

Returning items or getting refunds can be more complicated in online marketplaces than in physical stores. Buyers may face unclear return policies, expensive return shipping fees, and delays in processing refunds.

- **Dependence on Technology**

Online marketplaces rely heavily on the internet and digital platforms. Any technical glitches, website crashes, or downtime can disrupt transactions, causing inconvenience for both buyers and sellers. Moreover, people without access to technology or the internet may face difficulties.

- **Privacy Concerns**

Online marketplaces often gather a lot of personal information, such as shopping habits and payment details. This raises concerns about how that data is stored and protected, especially with the increasing risk of privacy breaches and unauthorized use of consumer information.

- **Impersonal Interaction**

Unlike physical stores where shoppers interact with salespeople, online marketplaces lack personal interaction. This impersonal experience can lead to a less engaging shopping journey, where customers miss out on personalized recommendations or the ability to ask direct questions.

- **Language and Cultural Barriers**

Shopping across global online marketplaces can create confusion due to language differences or varying cultural norms. This can make it difficult for buyers to fully understand product descriptions or terms, potentially leading to misunderstandings.

- **Hidden Fees and Charges**

Online platforms may have additional fees that buyers aren't immediately aware of, such as transaction fees, service charges, or hidden delivery costs. These extra expenses can make online shopping more expensive than expected, affecting customer satisfaction.

### **2.3.1 Online Marketplace in Nigerian Universities**

Online marketplaces have the ability to change how commerce is conducted within academic institutions. These platforms allow students, staff, and local businesses to connect in ways that weren't possible in traditional marketplaces. As the internet becomes a bigger part of everyday life, Nigerian universities can take advantage of this trend to improve access to goods and services, encourage entrepreneurship, and stimulate economic growth on campuses. This section delves into

the role of these platforms, the current state of e-commerce in Nigerian universities, and the challenges involved in adopting them.

### **2.3.2 The Role of Marketplaces in Academic Institutions**

Online marketplaces in universities are crucial for connecting students, staff, and local businesses. Traditionally, students might have to leave campus to buy items, which wastes time and increases transportation costs. By creating an online marketplace, universities can bring local businesses to the digital forefront, offering products and services that students and staff need right on campus. This can include textbooks, school supplies, food delivery services, fashion, electronics, and more.

For example, a student looking for a particular textbook no longer has to visit multiple bookstores or rely on word of mouth to find it. Instead, they can simply go online and search through a local marketplace where sellers, including other students, offer these resources. Furthermore, this also creates a market for small local businesses to thrive by providing them with access to a captive audience on campus.

By providing a platform where students can interact with local businesses, universities not only make shopping more convenient for their members but also help local businesses by giving them direct access to a wider customer base. This also supports the campus economy, helping it grow in a more sustainable and localized manner.

### **2.3.3 Current State of E-Commerce in Nigerian Universities**

While still in the early stages, Nigerian universities have begun adopting e-commerce solutions to facilitate trade on campus. These e-commerce platforms generally start as smaller, student-led initiatives, but some have grown to include participation from local businesses and even university departments. For instance, student unions may set up online spaces where students can buy and sell used textbooks, stationery, or other academic materials.

At some universities, student-led businesses use social media platforms such as Facebook and Instagram, alongside messaging apps like WhatsApp, to conduct sales. These online spaces make it easier for students to list items for sale and communicate directly with potential buyers. Despite not being formalized as full-fledged online marketplaces, these initiatives are a step in the right direction, showing that students and staff are eager to take part in e-commerce.

On a larger scale, some universities have started to integrate more structured online platforms. These can range from creating a basic website to hosting an actual marketplace that mimics popular e-commerce platforms like Jumia or Konga. These platforms usually focus on selling textbooks, electronics, food, and other essential items. However, many of these platforms are still in their infancy and may not yet have the sophistication or features of well-established e-commerce websites.

Some universities in Nigeria have created their own marketplace platforms to serve their communities. For example:

- **Uniben Market** at the University of Benin is an online platform created by students where they can sell and buy various items, ranging from textbooks to electronics.
- **UI Marketplace** at the University of Ibadan is another example of an online platform where students and staff can trade books, gadgets, and services.

Other informal examples include students using social media platforms like Facebook, Instagram, and Twitter to promote their products or services. Platforms like Jumia and Konga also play an indirect role in Nigerian universities by offering a way for students to purchase products online, though these are not university-specific platforms.

However, many of these e-commerce practices and platforms are still informal and fragmented, lacking the full-fledged infrastructure that could enable them to operate at a larger scale. Despite this, the growing trend suggests that there is potential for the development of more robust and fully integrated online marketplaces on university campuses.

## **2.4 Categories of Marketplaces**

Marketplaces are classified based on how buyers and sellers interact. With the rise of digital platforms, different models have emerged to meet various needs. Some marketplaces focus on

businesses selling to other businesses, while others cater directly to consumers or facilitate transactions between individuals. Each type plays a key role in shaping the way people buy and sell goods or services. Below are the categories of marketplaces:

### **2.4.1 Peer-to-Peer (P2P) Marketplaces**

A Peer-to-Peer (P2P) Marketplace is an online platform where people can buy, sell, or trade goods and services directly with each other, without the need for a middleman. This means that users can communicate with one another, set prices, and make deals by themselves. In P2P marketplaces, it is important to protect both buyers and sellers from possible fraud. This is because there are uncertainties, vagueness, and potential confusion when unknown people interact with each other for business (Sundararajan, 2016). Popular examples of P2P marketplaces include OLX and Facebook Marketplace, where individuals can list products or services, browse available items, and negotiate deals directly with others.

#### **Benefits of P2P Marketplaces**

P2P platforms offer many benefits, especially for students who need affordable ways to buy or sell things. These platforms make it easier for students to trade directly with each other. Here's how they can help:

- **Affordable and Convenient**

Local businesses on campus can offer items such as textbooks, electronics, clothing, or services like tutoring and freelance work through P2P platforms at more affordable rates than traditional stores.

- **Trust Among Students**

P2P platforms in universities help build trust since they are often used by people from the same school. Users can leave feedback or reviews after transactions, so future buyers and sellers can trust that they're dealing with someone reliable.

- **Flexible Prices and Negotiation**

P2P marketplaces allow students to negotiate prices with each other, unlike big e-commerce sites where prices are fixed. This helps students get the best deal, especially when they have limited money to spend.

- **Supporting Sustainability**

Using P2P platforms helps students buy second-hand goods, which reduces waste and promotes a more sustainable lifestyle. Students can find items like furniture or study materials that they only need for a short time, without having to buy brand new things.

## **2.4.2 Business-to-Business (B2B) Marketplaces**

Business to Business (B2B) model marketplace, is an e-commerce model where the main actors are corporate entities and other companies. It can be explained in simple terms as a business process where a company sells goods or services to other companies (Heri Akhmadi *et.al*, 2021). On a university campus, B2B marketplaces can serve as a hub where local businesses, suppliers, can interact, trade, and collaborate. These platforms provide a space where businesses, whether large or small, can connect with each other to meet their needs, such as sourcing products, services, or supplies necessary for their operations.

### **Benefits of B2B Marketplaces**

- **Cost savings**

B2B platforms often allow businesses to buy in bulk, which reduces costs. Larger suppliers offer wholesale prices, helping businesses save money compared to purchasing at retail prices.

- **Access to a Wide Range of Products and Services**

B2B platforms provide access to a variety of products, services, and suppliers that businesses may not easily find elsewhere. This helps companies source high-quality resources like equipment, software, and office supplies.

- **Streamlined Procurement Process**

B2B marketplaces centralize suppliers and products, making it easier for businesses to compare prices, check availability, and place orders quickly, without lengthy negotiations or complex searches.

## **2.4.3 Business-to-Customer (B2C) Marketplaces**

Business to consumer (B2C) model marketplace, is an e-commerce model where the main actors are a company and a direct consumer. It is a traditional marketplace model where companies sell their products directly to consumers using an e-commerce platform (Heri Akhmadi *et.al*, 2021). These platforms streamline the buying and selling process by allowing businesses to showcase their offerings online, making it easier for customers to browse, compare, and purchase products. Examples include university-specific online stores, mobile apps, or platforms like Jumia or Konga tailored for campus use.

Common campus-based businesses, such as bookstores, cafeterias, printing shops, and local vendors, can benefit from B2C platforms by increasing their visibility and improving access to their products and services.

### **Benefits of B2C Marketplaces**

- **Wider Audience Reach**

Online platforms enable campus businesses to connect with more people, including students, staff, and visitors, without relying solely on walk-ins. This digital presence ensures their products or services are accessible to a broader audience.

- **Round-the-Clock Accessibility**

Unlike physical stores with fixed operating hours, B2C marketplaces are available 24/7, allowing customers to place orders or browse products at any time. This can lead to increased sales opportunities, even after business hours.

- **Efficient Transactions**

B2C platforms simplify the entire purchasing process. Customers can explore options, select items, and complete payments digitally. This reduces the need for manual processes like cash handling and in-person price negotiations.

- **Lower Operational Costs**

By selling through online platforms, campus businesses can minimize expenses associated with maintaining large physical spaces. This is particularly useful for smaller businesses that may lack the resources for full-scale brick-and-mortar operations.

## 2.4.4 Hybrid Marketplaces

Hybrid marketplaces are platforms that combine the features of different marketplace models, such as Peer-to-Peer (P2P), Business-to-Business (B2B), and Business-to-Consumer (B2C), into one unified system. These platforms serve a wide range of user groups by enabling individuals, businesses, and organizations to interact and transact seamlessly. For example, global platforms like Amazon and Alibaba demonstrate the efficiency of hybrid systems by supporting various types of transactions on a single platform (Liang *et.al*, 2020).

### Benefits of Hybrid Marketplaces

- **Versatility in Transactions**

Hybrid marketplaces combine the features of Peer-to-Peer (P2P), Business-to-Business (B2B), and Business-to-Consumer (B2C) platforms, making them versatile. They allow users to buy, sell, trade, or collaborate seamlessly, catering to the diverse needs of individuals, businesses, and organizations.

- **Convenience and Efficiency**

By integrating multiple marketplace models into a single platform, hybrid marketplaces eliminate the need for users to switch between different services. Everything from personal item exchanges to business collaborations can be done in one place, saving time and effort.

- **Broader User Appeal**

Since hybrid marketplaces serve a wide range of users—individuals, small businesses, larger organizations, and even suppliers—they attract a broader audience. This increases engagement and fosters a more vibrant ecosystem.

- **Increased Revenue Opportunities**

Local businesses and vendors benefit from hybrid marketplaces by accessing a larger, more diverse customer base. Universities can also generate revenue through advertising or partnerships on the platform.

## 2.5 Advantages of Marketplaces in University Communities

Marketplaces hold a vital place in university environments, driving accessibility, economic growth, and collaboration. Their value can be outlined across several areas:

- **Improving Accessibility**

Marketplaces act as a bridge between buyers and sellers within the campus, offering a centralized space for seamless transactions. This eliminates the stress of searching for specific products or services and reduces reliance on external vendors. Instead, users have access to a platform that is tailored to meet the unique needs of the campus.

The convenience of having campus-focused goods and services available online cannot be overstated. Essentials such as books, electronics, and food items can be easily browsed and ordered at any time, which is especially helpful for campuses in remote areas. By removing the limitations of physical stores, these platforms make life easier for both students and staff.

- **Boosting Campus-Based Small Businesses**

Marketplaces serve as a launch pad for small businesses run by individuals within the university, including students and staff. They offer a platform to showcase products and services to a broader audience without the need for significant marketing budgets or physical locations.

These platforms provide local businesses with visibility and a direct connection to their target customers, facilitating growth in sales. Whether it's handmade crafts, food delivery, or other services, campus entrepreneurs gain the exposure and financial backing they need to thrive. Additionally, it gives them valuable hands-on experience in managing businesses while balancing other responsibilities.

- **Encouraging Local Economic Development**

Marketplaces contribute significantly to strengthening the university's micro-economy. By supporting local trade and services, they help retain money within the campus, benefiting everyone involved. Local businesses gain steady income, and buyers enjoy affordable and quality options.

Furthermore, these platforms inspire entrepreneurial initiatives by creating an environment where new ideas and ventures are nurtured. For example, students are more likely to start small-scale businesses when they have a reliable platform to promote their work. This not only benefits the individuals involved but also encourages a culture of innovation and financial independence within the campus.

- **Building Stronger Campus Collaboration**

Marketplaces unify various stakeholders within the university—students, staff, and local businesses—by creating a shared space for interaction. This fosters collaboration and strengthens community bonds.

For instance, a student needing a particular service, such as event planning or tutoring, can easily connect with someone offering that skill through the platform. Similarly, businesses and academic departments can partner for mutual benefit, such as sourcing bulk supplies or organizing events.

## **2.6 Disadvantages of Traditional Marketplaces for Universities**

- **Limited Reach**

Traditional marketplaces are restricted by their physical locations, which limits the interaction between buyers and sellers. In university settings, this can make it difficult for students and staff to access certain products or services that are not readily available on or near campus. This physical constraint often reduces the diversity of goods and services.

- **Inefficiency**

Processes in traditional marketplaces tend to take longer, as buyers and sellers must invest time in traveling, negotiating, or searching for specific items. For busy university students and staff, this can lead to wasted time that could be spent on other activities. Additionally, the lack of streamlined systems for tracking transactions can create accountability issues and make record-keeping more complicated.

- **Lack of Data and Insights**

Traditional setups lack tools for gathering and analyzing data, making it difficult to understand what buyers want or how sellers can improve their offerings. Without access to consumer behavior insights or performance metrics, traditional marketplaces miss opportunities for informed decision-making and growth.

- **Challenges in Scaling**

Expanding operations in a traditional marketplace often requires significant investment in physical resources, which may be impractical for small businesses, including those run by students. Furthermore, the limited customer base in such marketplaces can restrict sellers' ability to offer a wider variety of products or services, stifling growth.

## **2.7 Related Works**

This section presents an overview of existing research on marketplace platforms within university and community contexts. The aim is to review case studies from similar environments, identify key features contributing to successful platforms, and highlight existing gaps in solutions.

### **2.7.1 Existing Platforms in Similar Environments**

Numerous universities and small communities have created online marketplace platforms tailored to meet the specific needs of their users. These platforms generally aim to provide a secure and user-friendly space where students, faculty, and staff can engage in buying and selling activities.

#### **Case Studies of Other Universities Using Marketplace Platforms**

- **University of California, Berkeley**

The University of California, Berkeley, introduced the "Cal Marketplace," designed to allow students to buy and sell textbooks, furniture, electronics, and other items crucial for student life. This platform serves as an internal solution, minimizing the need for external e-commerce sites.

- **University of Edinburgh**

Likewise, the University of Edinburgh developed "Edinburgh Exchange," where students can sell textbooks, used electronics, and second-hand clothing. This platform encourages

sustainability by promoting the reuse of items and integrates payment and communication features to facilitate seamless transactions.

### **Lessons Learned and Best Practices from These Implementations**

- **Ease of Use and Intuitive Design:** A recurring theme across successful university platforms is user-friendliness. A simple and intuitive design is essential, particularly for students who may not be technologically proficient.
- **Secure Payment Integration:** In the early stages, payment security was a common concern. To combat this, universities integrated trusted payment systems, such as PayPal or Stripe, ensuring a secure and fraud-free environment.
- **Community Trust and Reputation Systems:** Effective platforms included rating and review systems, fostering trust within the community. For example, "Cal Marketplace" allows users to leave feedback, helping others to gauge the reliability of sellers and buyers.

### **2.7.2 Comparative Analysis of Online Marketplaces**

To better understand the critical features of successful marketplace platforms, it's helpful to examine broader e-commerce platforms like Jumia and Konga.

#### **Key Features of Successful Marketplace Platforms**

- **Diverse Product Categories:** Platforms like Jumia and Konga offer a broad range of products, appealing to a diverse user base. A similar approach can be applied to university marketplaces by including textbooks, electronics, and furniture.
- **User-Friendly Interfaces:** Platforms like Amazon and Jumia emphasize easy navigation, and this is critical for university marketplaces as students need to quickly search for products, make purchases, and communicate with others.
- **Secure Payment Methods:** Secure transaction systems, such as Konga's "Konga Pay," help maintain a safe environment for financial exchanges and are crucial in university settings.

- **Mobile Accessibility:** Given the widespread use of smartphones, successful platforms like Jumia ensure mobile-friendly access. For university marketplaces, mobile compatibility is essential as students often conduct transactions via their phones.

### 2.7.3 Gaps Identified in Related Works

Despite the success of existing marketplace platforms, certain issues remain, especially regarding platforms designed for specific communities like universities.

#### Challenges Not Addressed by Existing Marketplace Solutions

- **Limited Localized Options:** While platforms like Jumia and Konga serve large-scale markets, they are not tailored for smaller, community-based needs. University students may struggle to find items or services specific to their academic environment on these platforms.
- **Lack of Personalized Services:** General platforms often overlook university-specific needs such as textbook exchanges, room rentals, or other academic services. University-focused platforms could fill this gap by offering tailored services for students, faculty, and staff.
- **Inefficient User Experience:** Many existing platforms suffer from cluttered interfaces and complicated registration processes. This can discourage user engagement. A user-centered approach is necessary to promote active participation from students.

#### Opportunities for Improvement in University-Specific Platforms

- **Better Integration of Campus-Specific Features:** University marketplaces could incorporate features like event listings, campus service directories, or peer-to-peer tutoring services, making the platform more relevant and engaging for students and staff.

- **Stronger Security Measures:** Unlike generalized platforms, university marketplaces could integrate campus IDs and student portals to provide secure and verified transactions, enhancing trust and safety.
- **Sustainability and Reuse:** Many students seek affordable products and services. By focusing on sustainability, such as encouraging the purchase of second-hand goods, university marketplaces could reduce campus waste while offering practical services to students.

## 2.8 Summary

In conclusion, existing marketplace platforms, such as Jumia and Konga, demonstrate valuable features, yet they still fall short in areas such as localization, personalization, and security. University-specific marketplaces present a promising opportunity to address these shortcomings by creating platforms tailored to the unique needs of academic communities. Drawing from lessons learned from other platforms, the proposed university marketplace can overcome challenges related to user experience, payment security, and relevant product offerings.

## 2.9 Table of Related Work

Author(s)	Year	Objective	Methodology	Findings
Xiaohui Li, Qiang Li	2016	To examine the transformation of marketplaces from physical to digital platforms	Literature review and case study analysis	Found that digital marketplaces reduce transaction costs and improve market efficiency

Erik Brynjolfsson, Huaxia Rui, Michael D. Smith	2019	To analyze the impact of Amazon's emergence on global e-commerce	Empirical research and market trend analysis	Concluded that Amazon's model reshaped consumer behavior and business logistics
Liran Einav, Chiara Farronato, Jonathan D. Levin, Neel Sundaresan	2016	To study the role of online marketplaces in economic growth	Data analysis of eBay transactions	Identified that online marketplaces facilitate cross-border trade and broaden market access
Yingying Cao, Qiang Li	2015	To evaluate user experience in digital marketplaces	Usability testing and consumer feedback surveys	Found that trust mechanisms such as reviews and ratings improve consumer confidence in digital purchases
Efraim Turban, David King, Jae Kyu Lee, Ting-Peng Liang, Deborah C. Turban	2018	To explore the benefits of online marketplaces for businesses	Systematic review and comparative analysis	Found that online marketplaces offer scalability and flexibility compared to traditional retail models
Anuj Jain, Sandeep Kumar, Subhash Bhattacharya	2021	To examine the impact of digital marketing on consumer behavior in online marketplaces	Case study on digital marketing strategies	Found that social media integration and personalized advertising increase sales conversion rates

Vikas Kumar, Yogesh K. Dwivedi, Michael D. Williams, Pushpa Rani	2018	To assess the effectiveness of peer-to-peer (P2P) marketplaces	Survey and data analytics	Found that user trust and secure payment systems are key factors in P2P marketplace success
Suyun Turgunpulatovich	2021	To explore digital tools for small business management in online marketplaces	Analysis of digital platforms used by small businesses	Concluded that integrated analytics and customer interaction tools help businesses grow in digital marketplaces

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## **CHAPTER THREE**

### **SYSTEM DESIGN AND ANALYSIS**

This chapter provides a model of the development process while offering an overview of the system design and system analysis.

#### **3.1 System Analysis**

System analysis is the process of studying user needs, identifying existing challenges, and defining system requirements to create an efficient marketplace platform. For this project, system analysis focuses on designing a scalable, secure, and user-friendly online marketplace where buyers and sellers can interact directly through WhatsApp messaging, without integrated payments.

##### **3.1.1 Objectives of System Analysis**

The main objectives of this analysis include:

- **Understanding User Needs:** Identifying how buyers and sellers interact in a marketplace and the challenges they face.
- **Evaluating Existing Platforms:** Analyzing platforms like Jiji, OLX, and Facebook Marketplace to determine their strengths and limitations.
- **Enhancing Security & Trust:** Designing fraud prevention strategies since transactions occur outside the platform.
- **Optimizing Performance & Scalability:** Ensuring the system can handle a growing number of users, product listings, and inquiries.
- **Integrating a Seamless Communication System:** Implementing WhatsApp messaging as the primary means for buyers and sellers to interact.

### 3.1.2 System Analysis Approach

There are two main methods for system analysis and design:

**Object-Oriented Analysis and Design (OOAD)** – Breaks down the system into objects like users, products, and messages, allowing for scalability and code reusability.

**Structured System Analysis and Design (SSAD)** – Uses a process-driven approach with Data Flow Diagrams (DFDs) to define how data moves through the system.

For this project, the OOAD method is used because:

- It simplifies real-world interactions (e.g., buyers, sellers, and product listings are treated as distinct objects).
- It supports scalability as the marketplace grows.
- It allows easy updates to system components without affecting the entire platform.

## 3.2 Analysis of Existing Marketplaces

As discussed in Chapter 2, the current marketplace systems, such as platforms like Amazon and eBay, serve as key examples of online marketplaces. These platforms rely on a variety of features, including product listings, user reviews, and integrated payment systems, to facilitate transactions between buyers and sellers. While these systems have been successful in meeting the basic needs of users, they also come with several limitations that impact the overall user experience.

For instance, the existing platforms use complex user interfaces and navigation, which can be overwhelming, especially for new users. Despite their wide range of features, many of these platforms have a high transaction fee, which affects the profitability of sellers. Additionally, security concerns, such as data breaches and fraudulent transactions, remain a significant challenge in the e-commerce space. Customer support on some of these platforms is slow, leading to dissatisfaction among users who may encounter issues during transactions.

The existing systems also often lack customization options for sellers. Sellers have limited control over the design and features of their store, making it difficult for them to differentiate their offerings. These limitations highlight the need for a more intuitive, secure, and flexible marketplace platform.

With these challenges in mind, it is clear that a more modern approach to online marketplaces is necessary. The proposed marketplace platform will address these issues by offering a streamlined user experience, lower transaction costs for sellers, enhanced security features, and better customer support, all while providing sellers with more customization options to help them stand out.

### **3.3 Problem of Existing Systems**

As outlined in Chapter Two, current marketplace platforms face several significant challenges:

- **Complicated Navigation and Interface:** Many platforms have intricate designs that make it difficult for users, especially new ones, to easily find their way and complete transactions.

- **High Seller Fees:** Sellers are often required to pay substantial charges, such as listing fees, sales commissions, and payment processing costs, which reduce their profits and deter smaller businesses.
- **Security Issues:** Platforms are often vulnerable to problems like data leaks, fraudulent activities, and account breaches, which compromise the safety of buyers and sellers.
- **Limited Customization for Sellers:** Most platforms provide little flexibility for sellers to personalize their storefronts, making it harder for them to create a distinct brand or tailored customer experiences.
- **Slow Customer Support:** Users often experience delays in resolving disputes or addressing technical issues, leading to dissatisfaction with the platform.
- **Scalability Limitations:** As platforms grow in users and transactions, they may struggle with slower performance, including longer loading times and delayed search results, which can negatively impact user satisfaction.

### 3.4 Overview of Proposed System

The proposed system is an online marketplace designed to connect buyers and sellers within the university community. Unlike traditional e-commerce platforms, this marketplace will not process payments directly. Instead, it will facilitate buyer-seller interactions through WhatsApp messaging, allowing users to negotiate and finalize transactions externally.

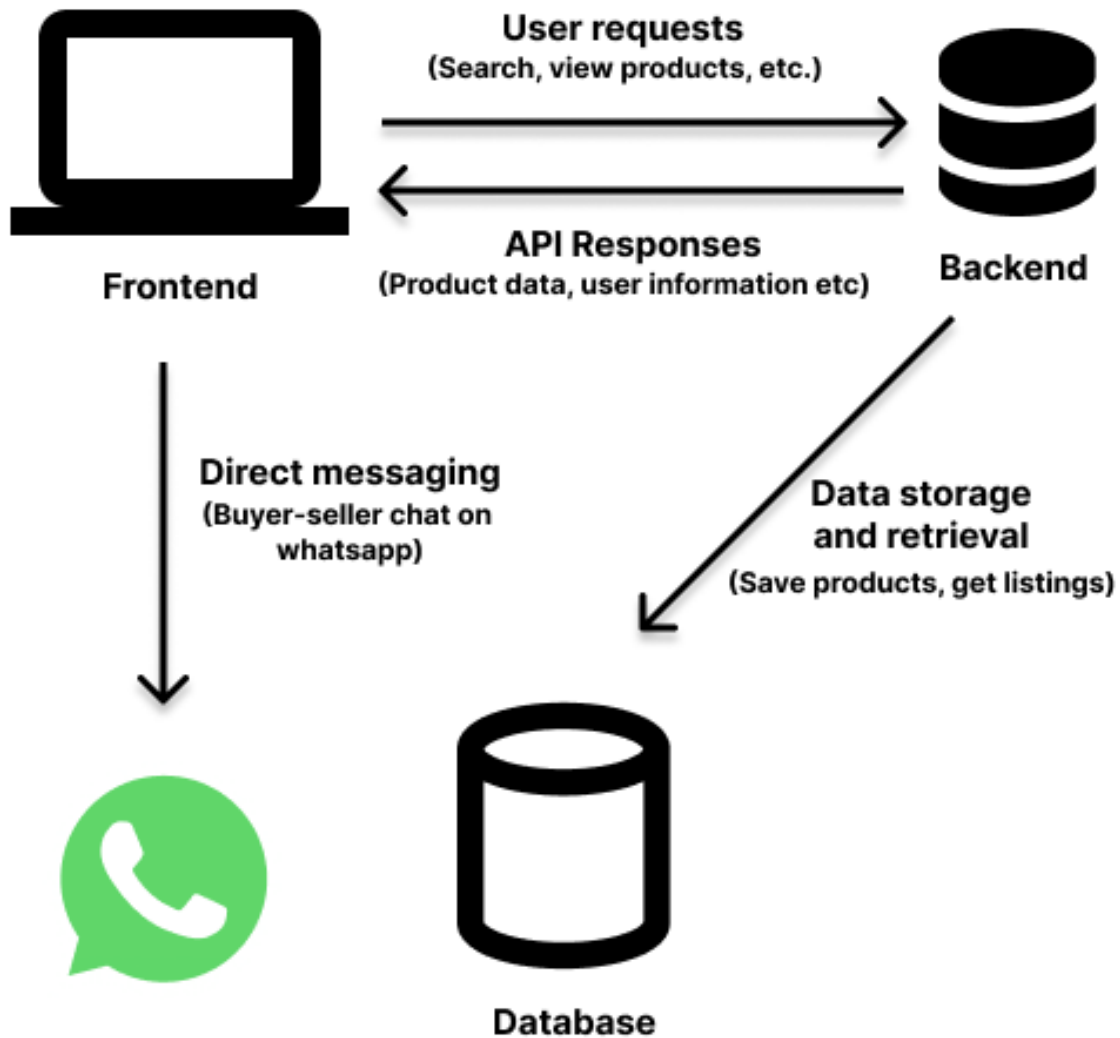
The key features of the system include:

- **User-Friendly Interface:** A clean, intuitive design that makes it easy for buyers to browse listings and for sellers to manage their storefronts.
- **Product Listings and Search:** Sellers can upload product images, descriptions, and contact details, while buyers can search and filter listings by category.
- **Direct Communication via WhatsApp:** Each product listing will include a WhatsApp contact button, enabling buyers to chat directly with sellers for negotiations and payments.
- **User Authentication & Verification:** New users must register and verify their accounts to minimize fraudulent activities.

- **Seller Storefronts:** Registered sellers will have personalized profiles where they can manage listings and view customer inquiries.
- **Fraud Prevention & Reporting System:** Buyers can report suspicious listings or users, helping to maintain a trustworthy marketplace.
- **Scalability & Performance Optimization:** The system will be designed to handle a growing number of users and product listings efficiently.

### **3.5 Proposed System Architecture and Interface**

The marketplace website consists of interconnected components that facilitate buyer-seller interactions, as shown in Figure 3.1. The frontend lets users view products and chat with sellers on WhatsApp. The backend handles user accounts, stores products, and manages reports. Sellers add product details, which are saved in the database and shown when needed. When a buyer selects a product, they are sent to WhatsApp to talk directly with the seller. Important data, like user profiles and product listings, is safely stored for smooth website operation.



**Figure 3.1 Marketplace System Architecture**

The diagram depicts a three-tier marketplace architecture where buyers and sellers connect via WhatsApp instead of built-in payments. The frontend (React.js) allows users to browse and contact sellers, while the backend (Node.js & Express.js) processes requests and fetches data from the database (MongoDB), which stores user and product details. Buyers initiate chats through WhatsApp for direct communication.

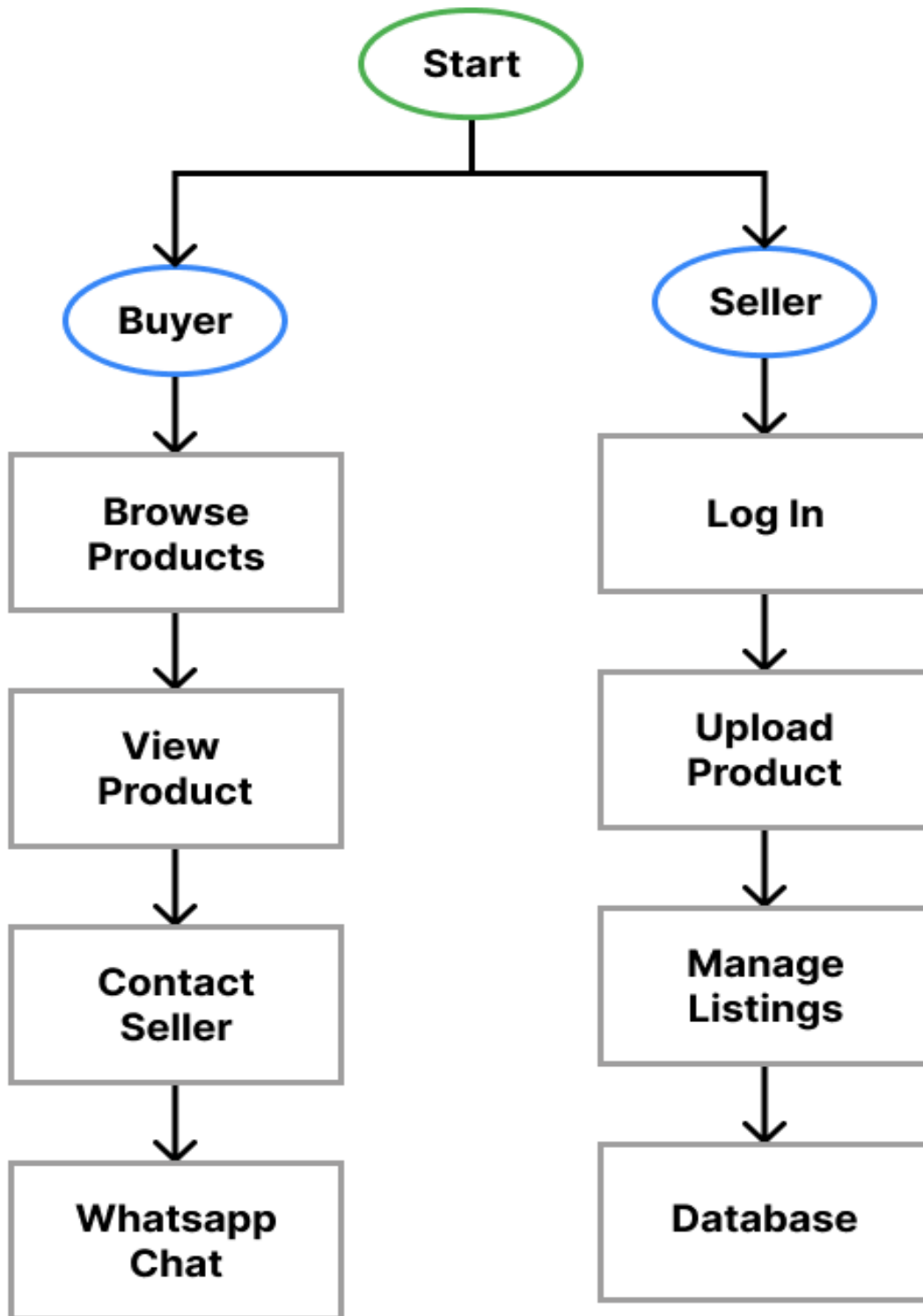


Figure 3.2 Marketplace System Interface

### 3.6 System Design

System design involves planning how the different parts of a system will work together to meet specific requirements. For this marketplace platform, the goal of system design is to create a structure that ensures smooth operation, user-friendliness, and the ability to handle multiple users effectively. It includes organizing the user interface, database, and backend processes so buyers, sellers, and admins can use the platform seamlessly.

### 3.7 System Design Tools

System design tools help in visually explaining how the system is organized and how its parts connect. These tools simplify the process of planning and building the system. The tools relevant to this marketplace platform include:

- **Unified Modelling Language (UML):**

This is a visual tool that helps represent the system's functionality by using diagrams such as use case diagrams to show interactions between users and the platform, class diagrams to outline the structure of data like users, products, and orders, and sequence diagrams to map out the steps involved in processes like placing orders and completing payments.

- **Data Flow Diagram (DFD):**

DFDs are used to show how information moves within the system. For instance, they can depict how a user adds a product to their cart, places an order, and how the order data is stored and processed.

- **Entity-Relationship Diagram (ERD):**

ERDs focus on database design, showing how different pieces of information (e.g., users, products, and orders) are related. For example, one customer may place multiple orders, and each order may include multiple products. This helps organize and structure the database for efficiency.

- **Wireframes and Prototypes**

Wireframes are simple layouts that display how pages like product listings, the shopping cart, and user profiles will look. Tools like Figma or Sketch can help create these designs. Prototypes provide an interactive version of the wireframes to allow early feedback and testing.

- **API Design Tools**

Since the marketplace will likely integrate with external services (e.g., payment gateways or delivery systems), tools like Postman or Swagger are useful. These tools help design and test how the platform communicates with these services, ensuring smooth data transfer.

- **Database Design Tools**

Database design tools are essential for structuring and visualizing the database. These tools make it easier to organize data, such as user details, product information, and order records, ensuring the platform runs efficiently and reliably.

### **3.8 System Design Tool: UML**

Unified Modeling Language (UML) is a tool used to plan and design software systems. It helps developers understand, organize, and explain how a system should work before building it. For this marketplace platform, UML diagrams will show how users (customers, business owners, and admins) interact with the system and how different parts of the system work together.

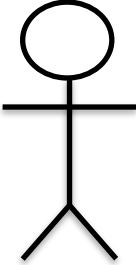

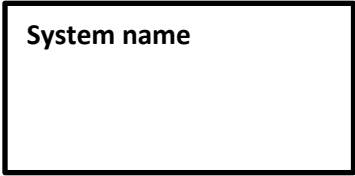
The key UML diagrams used are:

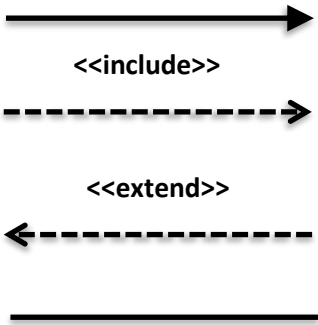
- Use Case Diagram – Shows what users can do on the platform.
- State Machine Diagram – Shows how the system moves from one stage to another.
- Class Diagram – Shows the relationship between users, businesses, and transactions.

### 3.9 UML – Use Case Diagram

A Use Case Diagram is a graphical representation that shows how different users (actors) interact with a system. It defines the system's functions from a user's perspective and helps in understanding the system's requirements before development. In the marketplace platform, the Use Case Diagram will show how customers, business owners, and admins interact with the platform, such as searching for businesses, placing orders, managing listings, and verifying users.

**Table 3.1 Use Case Notations and Descriptions**

Objects	Symbols	Descriptions
Actors		These are the people or external systems interacting with the system. Examples include customers, business owners, and admins. They initiate actions within the system but do not belong to it.
Use Case		A use case represents a function or process within the system. It describes a specific task that users can perform, such as "Login," "Search for Products," or "Manage Listings."
System		This represents the entire software application being developed. It defines the system's boundary, showing

		what is included in the system and how different actors interact with it.
Relationship	 <p>The diagram illustrates four types of UML relationships:</p> <ul style="list-style-type: none"><li>A solid line with an arrow pointing right, labeled <code>&lt;&lt;include&gt;&gt;</code>.</li><li>A dashed line with an arrow pointing right, labeled <code>&lt;&lt;extend&gt;&gt;</code>.</li><li>A dashed line with an arrow pointing left.</li><li>A solid line with an arrow pointing right.</li></ul>	<p>These show how different elements in the diagram are connected. Relationships include:</p> <ol style="list-style-type: none"><li>1. <b>Association</b> – Links actors to use cases (e.g., a customer places an order).</li><li>2. <b>Include</b> – Shows that a use case uses another (e.g., "Checkout" includes "Payment Processing").</li><li>3. <b>Extend</b> – Represents optional or conditional functionality (e.g., "Apply Discount" extends "Make Payment" if a coupon is used).</li></ol>

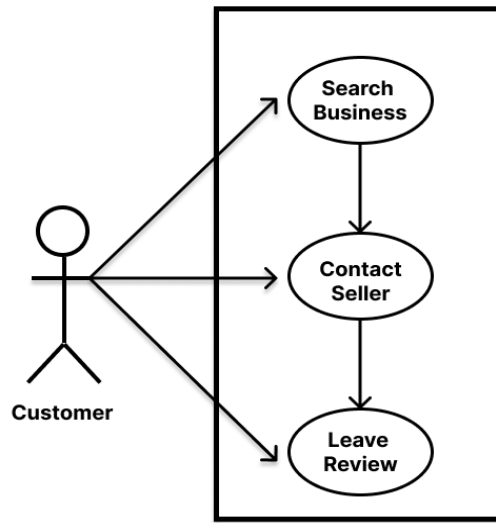


Figure 3.2 Use case Diagram for Customers

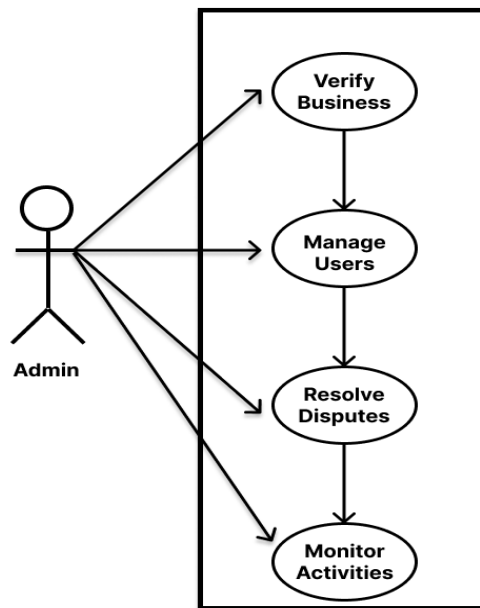


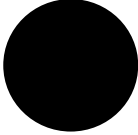
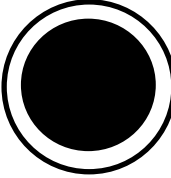
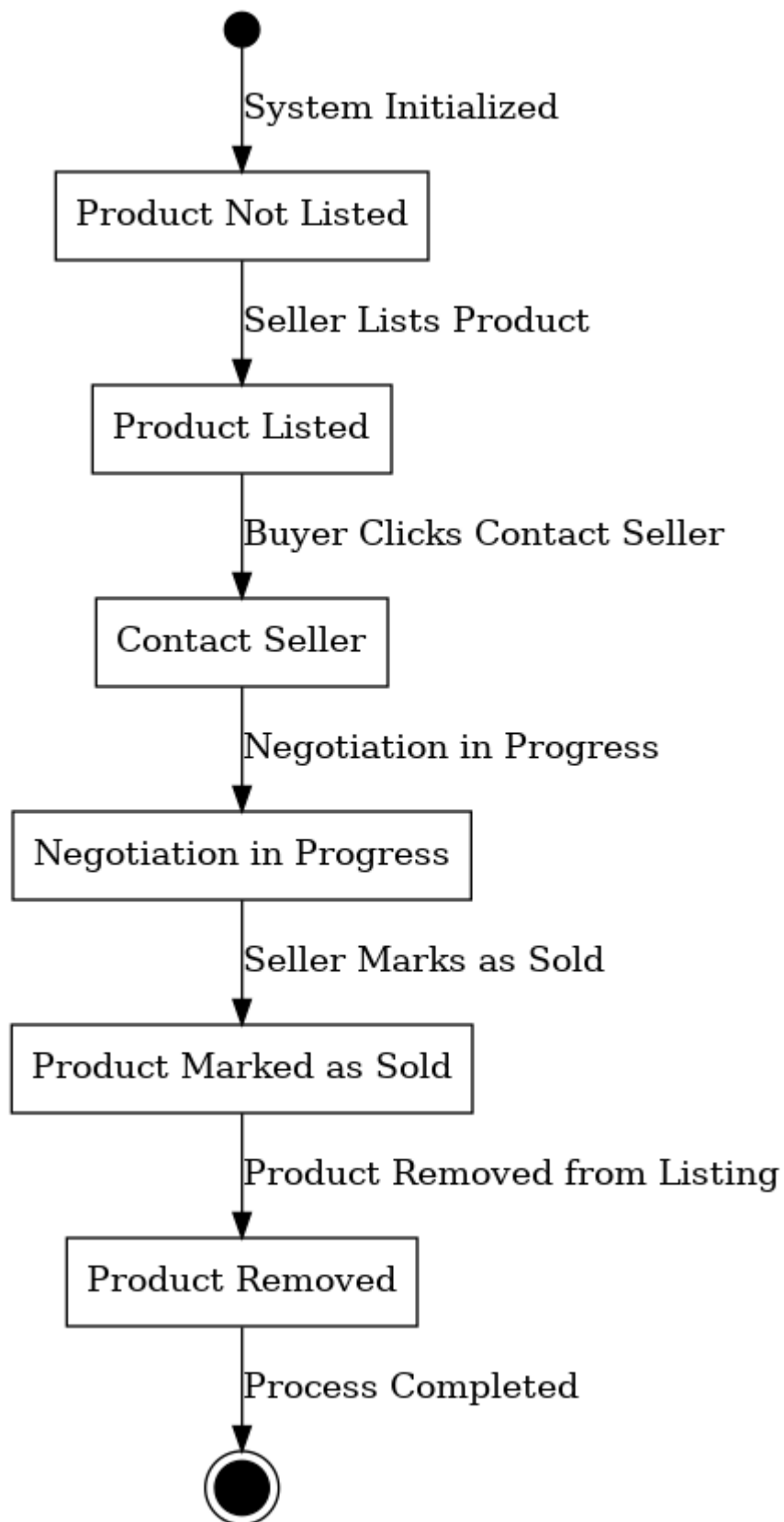


Figure 3.3 Use case Diagram for Admin

### 3.10 UML – State Machine Diagram

A state machine for the e-commerce marketplace platform is a conceptual model that outlines the different states that an object (such as a product or a user) can transition through during its lifecycle in the system. In the context of this marketplace, the state machine describes the flow of actions and events that can occur as products are listed, purchased, and delivered, and as users (buyers and sellers) interact with the platform. The system keeps track of each state and manages transitions based on specific actions taken by the users or the platform itself. This ensures a seamless user experience and provides transparency for both buyers and sellers.


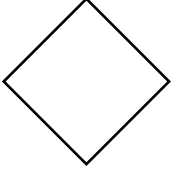
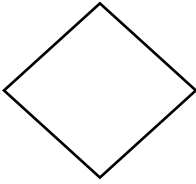


Objects	Symbols	Descriptions
State		This represents a specific condition of the product in the system. Example states: Product Not Listed, Product Listed, Contact Seller, Product Marked as Sold.
Transition		Indicates movement between states based on an event. Example: A transition from "Product Listed" to "Contact Seller" occurs when a buyer clicks on a product.
Initial State		The starting point of the system before any action occurs. Example: "Product Not Listed" when no item is added by the seller.
Final State		This represents the end of the process. Example: "Product Removed" when an item is sold or deleted.



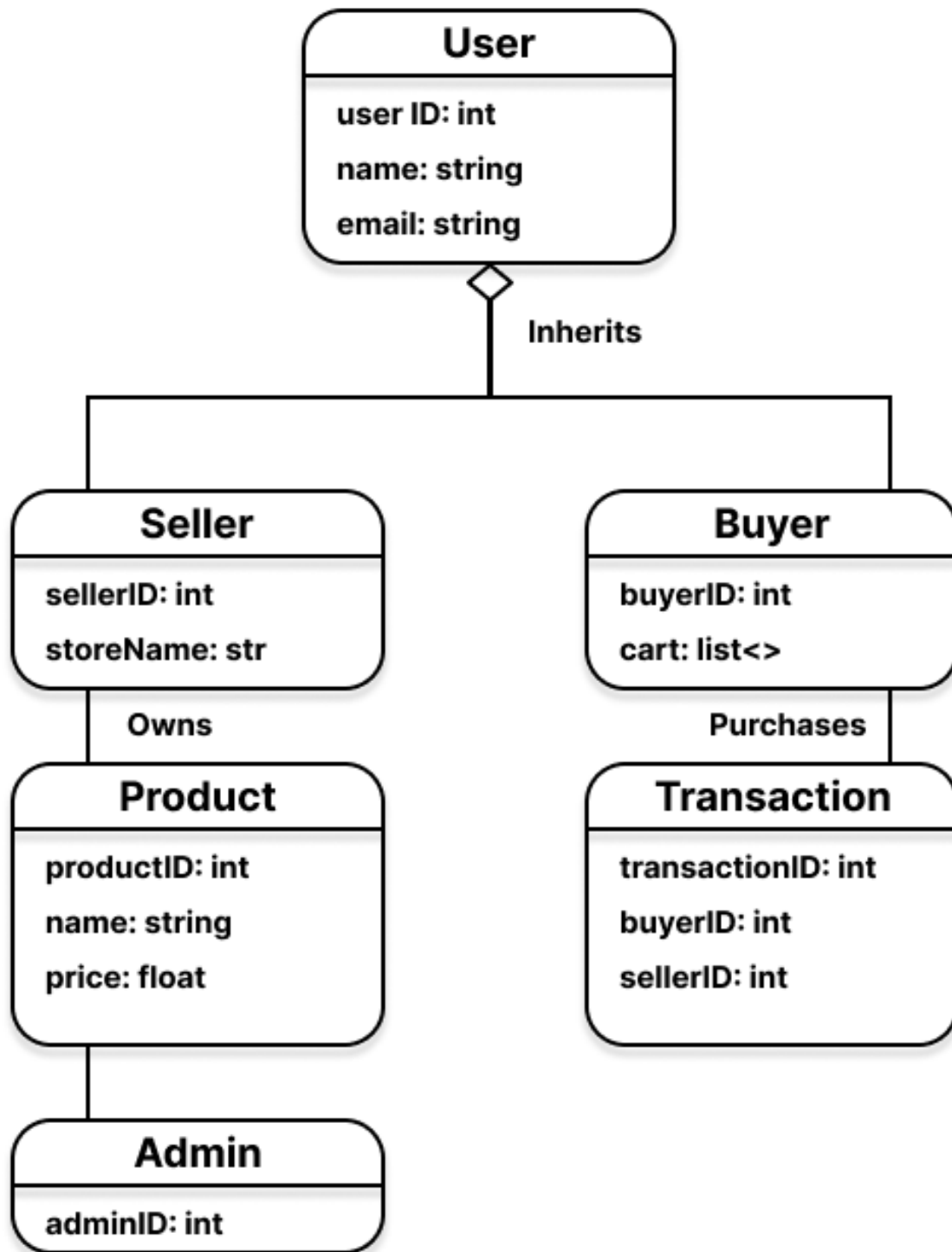
### 3.11 UML – Class Diagram

A Class Diagram represents the structure of the marketplace platform, showing how different entities such as users, products, transactions, and communication interact within the system. It defines the key classes, their attributes, methods, and relationships, helping to model the platform's functionality and data flow.

**Table 3.3 Class Diagram Notations and Descriptions**

<b>Objects</b>	<b>Symbols</b>	<b>Descriptions</b>
Class		This represents an entity in the system with attributes and methods. Examples: User, Product, Order, Message.
Attributes		This defines the properties of a class. Example: Product (name, price, description, category).
Methods		This represents the actions a class can perform. Example: User (register(), login()).
Association		This shows a relationship between two classes. Example: A Seller owns multiple Products.
Generalization		This represents inheritance between a parent and child class. Example: Customer and Seller inherit from User.





## CHAPTER FOUR

### SYSTEM IMPLEMENTATION

#### 4.1 Software Implementation Tools

This project focuses on both the front-end and backend implementation of an Online Marketplace for Small Businesses at UNIBEN. The following software tools were used:

##### 1. Implementation Languages

The following programming languages were used for the project's implementation:

- **TypeScript:** This is a superset of JavaScript that adds static typing to enhance code reliability, maintainability, and scalability. It was used in both the frontend and backend of the application to improve development efficiency.
- **Hyper Text Markup Language (HTML):** HTML was used to structure the web pages of the application. It defines the content and layout of the marketplace platform, enabling proper rendering of text, images, and interactive elements.
- **Cascading Style Sheets (CSS) with Tailwind CSS:** CSS was used to style the HTML elements of the web pages. Tailwind CSS, a utility-first framework, was integrated to simplify styling, ensuring responsive and aesthetically appealing designs.
- **JavaScript (Node.js):** JavaScript was used in the backend through Node.js to handle server-side logic, data processing, and API management. It enables event-driven, non-blocking operations that enhance the performance of the application.

##### 2. Implementation Frameworks

Frameworks provide pre-built structures that enhance software development. The frameworks used in this project include:

- **React.js:** A JavaScript front-end library that was used for building the interactive user interface of the application. React's component-based architecture allowed for reusable UI elements, making the system more modular and maintainable.

- **Express.js:** A lightweight backend framework for Node.js that was used to manage API requests, user authentication, and server operations. It played a crucial role in handling data exchange between the client-side and MongoDB.
- **Tailwind CSS:** This CSS framework was used to streamline the styling process. It provided utility classes that helped in designing a consistent and responsive user interface without writing extensive custom CSS.

### 3. Implementation Platforms

- **Visual Studio Code (VS Code):** VS Code was used as the primary code editor for writing, debugging, and managing the project's codebase. It provided essential tools like IntelliSense, extensions, and Git integration to improve productivity.
- **Postman:** Postman was used to test and debug the backend APIs, ensuring efficient communication between the frontend and backend components.
- **MongoDB Atlas:** This cloud-based database service was used to manage and store application data efficiently.
- **Git and GitHub:** Version control was managed using Git, with GitHub serving as the remote repository for collaboration, tracking changes, and deploying the project.

### 4. Deployment Platforms

To make the web application accessible, the following deployment tools were used:

- **Vercel:** Vercel was used to deploy the frontend of the application. It provided a seamless and scalable hosting solution, enabling continuous integration and automatic updates upon pushing changes to the GitHub repository.
- **Render:** The backend server and database were deployed using Render, ensuring high availability and efficient performance of the API services.

### 5. Operating System

The project was developed using the Windows operating system, which provided a developer-friendly environment with support for essential tools such as VS Code, Node.js, and Git.

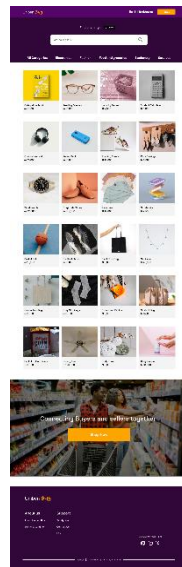
## 4.2 User Documentation – System Testing

System testing is a crucial phase in the software development life cycle that ensures the proper functioning of all system components and verifies that the application meets its requirements. This phase involves testing both functional and non-functional aspects of the Online Marketplace for Small Businesses at UNIBEN to ensure a seamless user experience.

The following features were tested:

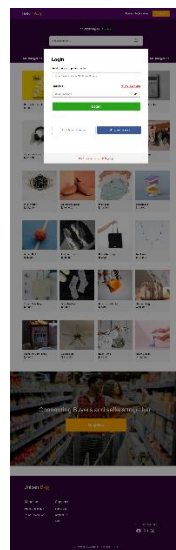
- Is user authentication working properly? Can users successfully register, log in, and log out?
- Can business owners add, edit, and delete their business listings? Is the listing information displayed correctly?
- Is the search and filtering system working as expected? Can users search for businesses by category, name, or location?
- Can users successfully contact business owners? Is the messaging system (or WhatsApp integration) functioning correctly for inquiries?
- Does the review and rating system work properly? Can users leave ratings and reviews for businesses? Are reviews displayed correctly?
- Does the admin dashboard function correctly? Can super admins add or remove other admins? Can admins approve or reject business registrations?
- Is user data secure and properly handled? Are passwords securely stored, and is authentication properly implemented? Are unauthorized users restricted from accessing admin functionalities?
- Is the system mobile-friendly and responsive? Does the website display properly on different devices (desktop, tablet, mobile)?
- Are API calls and database operations working correctly? Is data being fetched, stored, and updated properly? Are API responses correct when tested with Postman?
- Does the system perform well under load? Can multiple users search for businesses and interact with listings simultaneously without performance issues?

### 4.3 Screenshots of the Running System



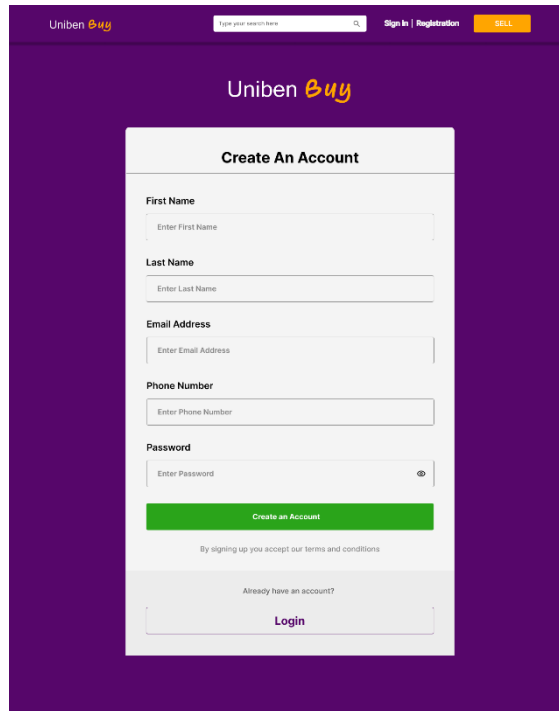
**Figure 4.4 Landing Page of the Marketplace Platform**

Figure 4.1 shows the landing page of the online marketplace. This is the first screen users see when they visit the platform. It provides a brief introduction to the marketplace, highlighting its purpose and key features. The landing page includes a **Call-to-action (CTA) button** for users to **Sign up** or **Sign in**, as well as **navigation links** to explore available products and services. The design is clean and user-friendly, ensuring a smooth onboarding experience for both buyers and sellers.



## Figure 4.2: User Sign In Page

Figure 4.2 displays the **Sign In Page**, which allows **registered users** to access their accounts. Users log in using their **email address** and **password**. The page includes a **“Forgot Password?”** link to help users recover their accounts.



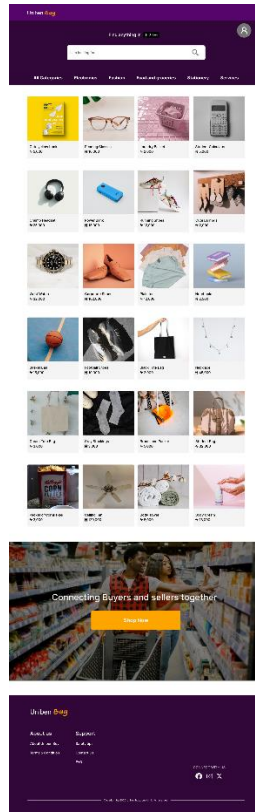
The screenshot shows the 'Create An Account' page on the Uniben Buy website. The page has a purple background. At the top, there is a navigation bar with the Uniben Buy logo, a search bar, and links for 'Sign In | Registration' and 'SELL'. The main content area is a white form with the following fields:

- First Name**: Enter First Name
- Last Name**: Enter Last Name
- Email Address**: Enter Email Address
- Phone Number**: Enter Phone Number
- Password**: Enter Password (with a toggle for visibility)

Below the form is a green button labeled 'Create an Account'. Underneath the button, there is a small text: 'By signing up you accept our terms and conditions'. At the bottom of the form, there is a link: 'Already have an account? Login'.

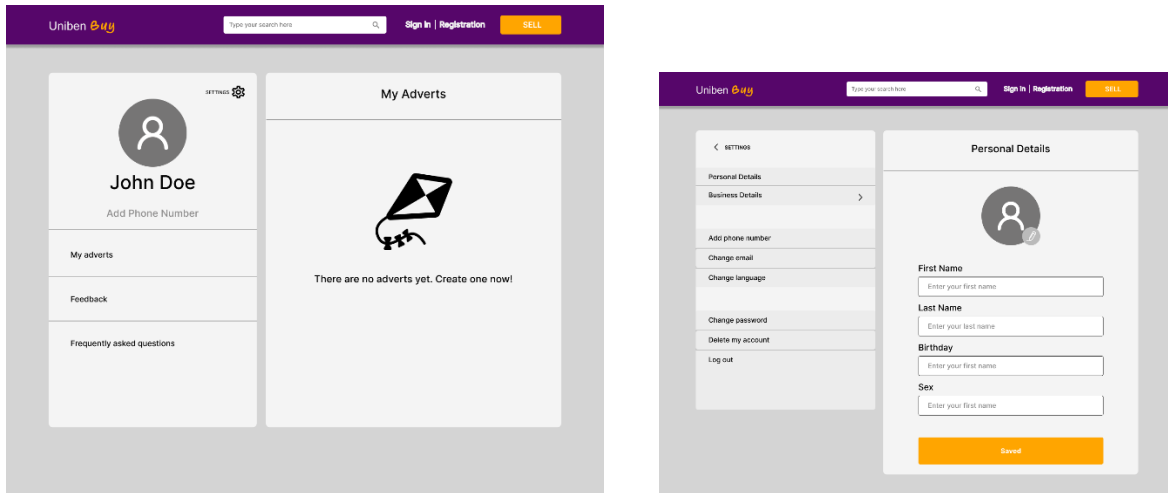
## Figure 4.3: User Sign Up Page

Figure 4.3 presents the **Sign Up Page**, where new users can create an account. The registration process requires users to enter their first name, last name, email address, phone number, and password.



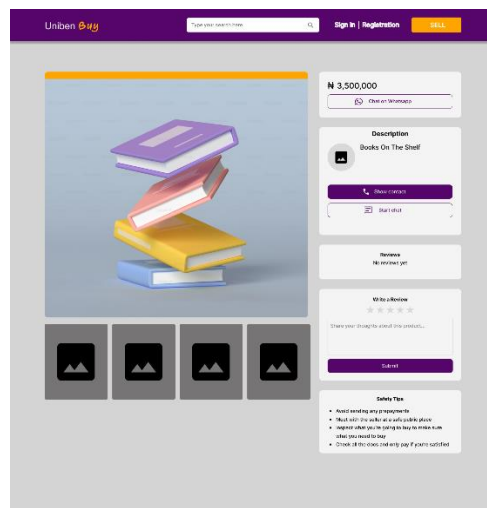
**Figure 4.4: Homepage of the Online Marketplace**

Figure 4.4 presents the Home Page of the marketplace platform. The Home Page serves as the main dashboard where users can browse products and categories. The page features a search bar, filter options, featured products, and a recent listings section. The user-friendly layout ensures buyers can easily navigate and find products or services of interest.



**Figure 4.5: Vendor Dashboard**

Figure 4.5 displays the Vendor Dashboard, where sellers can efficiently manage their stores. Vendors can add, edit, and delete product listings, track customer inquiries, and monitor their sales performance. The dashboard provides real-time updates, ensuring vendors stay informed about their store’s activity. The intuitive interface enhances the overall store management experience.



**Figure 4.6: Product Detail Page**

Figure 4.6 illustrates the Product Detail Page, which provides in-depth information about a selected product. This includes a detailed description, pricing, seller information, and an image gallery. A WhatsApp chat button is integrated, allowing buyers to contact the vendor directly for negotiations or inquiries. This feature ensures seamless communication between buyers and sellers.

#### **4.4 System Usability Evaluation**

The System Usability Scale (SUS) is a widely recognized tool used to evaluate the usability and user experience of digital systems, including websites and online platforms. Developed by John Brooke in the 1980s, the SUS provides a standardized method for measuring a system's ease of use, efficiency, and overall user satisfaction. The SUS consists of a 10-statement questionnaire, where participants rate their experience using a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree."

The SUS is particularly valuable in assessing how well the Online Marketplace for Small Businesses at UNIBEN meets user needs and expectations. By analyzing feedback from actual users, the system's strengths and weaknesses can be identified, leading to improvements that enhance usability and overall functionality.

SUS Score	Grade	Adjective Rating
> 80.3	A	Excellent
68 – 80.3	B	Good
68	C	Okay
51 – 68	D	Poor
< 51	F	Awful

Source: <https://uiuxtrend.com/measuring-system-usability-scale-sus/>

### System Usability Scale (SUS) Questionnaire

The usability test was conducted using the SUS questionnaire with ten users. Each participant provided feedback based on the following questions:

- I found the system easy to use.
- I needed to learn many things before I could effectively use the system.
- The various features in the system are well integrated.
- I believe most people would learn to use this system quickly.
- I found the system intuitive and user-friendly.
- I needed technical support to use the system effectively.
- The system contains inconsistencies that affected my experience

- I felt confident using the system.
- I needed to learn a lot before I could accomplish tasks within the system.
- Overall, I am satisfied with the usability of the system.

**Table 4.1 User Usability Scores Table**

<b>User</b>	<b>Sus Score</b>
User 1	60.0
User 2	85.0
User 3	78.5
User 4	55.0
User 5	70.0
User 6	90.0
User 7	88.5
User 8	75.0
User 9	62.5
User 10	80.0
<b>Total</b>	<b>744.5</b>

### **Evaluation of the SUS Score**

The total SUS score obtained is 744.5. According to the SUS Grade and Rating Scale, a score between 68 and 80.3 classifies the system as "Good" in terms of usability. This means that the Online Marketplace for Small Businesses at UNIBEN is generally user-friendly and effective, though minor enhancements can further improve its accessibility and efficiency.

## **CHAPTER FIVE**

### **SUMMARY AND CONCLUSION**

#### **5.1 Summary**

Many small businesses in the University of Benin struggle to reach customers because they rely on old-fashioned advertising methods. This project introduced an Online Marketplace for Small Businesses at UNIBEN to help business owners promote their services and make it easier for students and staff to find what they need.

The system was built using React.js, TypeScript, Node.js, and MongoDB to create a simple and user-friendly experience. Business owners can sign up, add their services, and manage their listings, while students and staff can search, filter, and contact businesses directly. The platform also includes secure login, business ratings and reviews, an admin panel, and a chat system to improve communication.

The project was tested to make sure everything worked well, including logging in, searching for businesses, sending messages, and reviewing services. It was then deployed on Vercel (Frontend) and Render (Backend) to make it accessible online.

This project successfully solved the problem of limited business visibility by creating a centralized online platform that helps businesses grow and makes it easier for customers to find services.

#### **5.2 Conclusion**

This project aimed to connect small businesses with students and staff at the University of Benin by creating an online marketplace. It replaced traditional advertising with a modern, digital solution that makes business discovery simple and fast.

By using secure login, search features, messaging, and customer reviews, the system helps businesses and customers interact more easily. The project showed that technology can improve business connections and create better opportunities for local businesses.

In conclusion, this project provides an easy-to-use online marketplace that benefits both business owners and customers. In the future, adding more features like a mobile app and better marketing tools could make it even more useful for the UNIBEN community.