ReviveMarket (Online Second-hand Store)

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In partial fulfillment of requirement for the degree
Bachelor of Science (Computer Science)

Department Computer Science
Faculty of Computing and Engineering Sciences
SZABIST University
Islamabad, Pakistan

Fall 2024

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By

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A PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE)

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Fall 2024

DECLARATION

We, the candidates of Bachelor of Science (Computer Science) at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology, Islamabad do hereby certify that this report titled **ReviveMarket (Online Second-hand Store)**, submitted as partial fulfillment of Bachelor of Science (Computer Science) degree requirements, is our original work and we are its sole author. All the employed materials, references to the literature and the work of others have been referred to and duly cited. This report has not been presented for examination anywhere else.

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Project Overview

The innovative platform is designed for buying, selling, and donating second-hand items, specifically addressing the challenges faced by traditional marketplaces. The initiative enhances user experience and accessibility by providing a streamlined, user-friendly environment for individuals seeking affordable and sustainable options. By incorporating gamification elements, donation and charity functionalities, advanced search tools, and real-time communication options, the platform enhances user engagement and promotes community involvement, ensuring a comprehensive and enjoyable experience for all users. The significance of the endeavor lies in its potential to promote sustainable consumption while fostering community engagement among users. Ultimately, the solution aims to revolutionize the pre-owned goods marketplace, benefiting eco-conscious consumers and charitable organizations by creating a supportive ecosystem.

The proposed solution will transform the second-hand goods marketplace by introducing a user-friendly platform that will address existing challenges. The system will categorize products and will allow users to search easily through advanced filtering options. Secure access will enable users to list items or make purchases through secure payment transactions. Key features will include a robust user authentication system, gamification elements that will reward engagement, and an efficient order management process for tracking purchases. Users will also have the option to donate items to charity and will explore rental opportunities. With real-time communication tools and local meetup coordination, the platform will aim to foster community interaction and create a sustainable ecosystem for pre-owned goods.

The scope of the proposed system will encompass a comprehensive online platform for buying, selling, and donating second-hand goods. Key features will include user authentication for secure access, advanced search and filtering options for easy navigation, and an intuitive product management system for listing and editing items. Real-time communication tools will facilitate interactions between users, while a dedicated admin dashboard will ensure effective oversight and management. The integration of gamification elements will engage users through rewards and challenges. Additionally, secure payment processing will enhance transaction safety, and the donation module will promote charitable giving. Ultimately the system will aim to create a supportive and sustainable marketplace for users.

The innovative platform will deliver significant outcomes, including improved user experiences, enhanced accessibility to affordable second-hand goods, and increased community engagement through donation initiatives. Users will benefit from efficient transactions, secure payment options, and streamlined inventory management. Plans will include integrating artificial intelligence to facilitate personalized user interactions, predict market trends, and automate buyer-seller matching. Additionally, efforts will aim to broaden international outreach and optimize mobile accessibility. Such enhancements will cultivate a sustainable consumption model, ensuring that the platform remains relevant and effective in fulfilling user needs.

Dedication

Firstly, our proposed system is dedicated to Allah Almighty, the Creator of the universe, and to our beloved Prophet Muhammad (Peace Be Upon Him), who guides humanity with wisdom and compassion. Their profound teachings inspire us to strive for excellence, uphold justice, and serve our communities, ultimately motivating us to make a lasting positive impact in the world. We express our gratitude for their guidance."

It is also dedicated to our esteemed teachers and mentors, the supportive management, whose unwavering support and guidance have shaped our journey, and to our families for their encouragement and sacrifices, as well as our friends for their companionship and motivation; their collective belief in us has been instrumental in overcoming challenges, achieving our goals, and inspiring us to reach greater heights.

We extend our deepest gratitude to the IT department for their exceptional support and for providing us with the necessary documentation software. The invaluable tool greatly simplified the process of organizing, editing, and compiling our proposed system, allowing us to work more efficiently. Their continuous assistance and technical expertise were pivotal in helping us deliver a high-quality, well-organized final product.

Acknowledgment

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Chapter 1

Introduction

The system aims to transform the second-hand goods marketplace by addressing ineffi-
ciencies in traditional platforms. It provides a user-centric solution for buying, selling,
donating, and renting pre-owned items. With advanced search filters, users can easily
navigate through product categories, ensuring convenience and efficiency. Secure payment
methods, real-time communication, and local meetup coordination ensure that transac-
tions are safe, transparent, and efficient. A unique feature is the integration of donation
options, enabling users to give goods to charitable organizations, which promotes sus-
tainable consumption and fosters a sense of community. By offering eco-friendly and
affordable options, the system responds to the increasing demand for sustainability in
the e-commerce industry. The platform aligns with environmental trends, reducing waste
and encouraging the reuse of products, which contributes to a circular economy. The plat-
form introduces elements such as awarding users badges for responsible behavior, which
enhances user engagement and loyalty. The approach positions the system as a leading
solution in the competitive second-hand goods market, benefiting consumers, charita-
ble organizations, and the environment. Its importance in e-commerce, with a focus on
sustainability and user interaction, ensures a significant impact on both the market and
society.

1.1   Product Purpose

The proposed system core functionality is designed to create a user-friendly environ-
ment for buying, selling, renting, and donating second-hand items, ensuring efficiency
and engagement for all users. Secure user authentication is achieved through a com-
prehensive registration and login system, allowing individuals to access their accounts
safely. Users can create and manage product listings across various categories, utilizing
advanced search filters to connect with potential buyers or donors. The admin dashboard
plays a crucial role by providing tools for user management, performance analytics, and
product oversight, ensuring effective platform operation. The order management system
enhances user satisfaction by offering features like order tracking, returns, and updates
on order history. For rental transactions, the platform includes a dedicated rental list-
ing management feature, which facilitates booking calendars and tenant communication
tools. Additionally, the local meetup coordination tools foster community connections,
while the inventory management system ensures accurate tracking of stock levels with
automated alerts for replenishment. The donation module streamlines charitable con-
tributions, while secure payment integration offers multi-currency support and detailed
transaction histories. By encompassing these diverse functionalities, the proposed system
promotes sustainable consumption and responsible giving.

The establishment of a second-hand store addresses the growing demand for sus-
tainable shopping options in an era where consumers are increasingly conscious of their
environmental impact. Many users seek affordable alternatives to new products, yet ex-
isting marketplaces often lack user-friendly interfaces, effective search functionalities, and

secure payment options, leading to frustration among buyers and sellers. Additionally, these platforms frequently do not adequately support the community aspect of buying and selling, resulting in missed opportunities for local connections and charitable contributions. By integrating features like user authentication, product list management, and local meetup coordination, the proposed system enhances user engagement and trust. It provides a streamlined, efficient, and responsible platform for users to find affordable second-hand items, buy, sell, and donate pre-owned goods. Recognizing that the second-hand marketplace is among the fastest-growing industries, the platform also introduces a rental service, allowing users to rent items for specific events, such as expensive brand clothing or formal wear for weddings. The incorporation of gamification elements further motivates users to participate actively, fostering a sense of community and shared responsibility in promoting sustainable consumption.

The proposed system aligns seamlessly with the broader goal of promoting sustainable consumption while addressing key challenges within the second-hand marketplace. By offering a user-friendly interface and integrating features like product list management, secure payments, and local meetup coordination, it enables consumers to access affordable second-hand items more efficiently. The approach not only meets the growing demand for cost-effective products but also encourages responsible behavior in buying, selling, and donating pre-owned goods. The introduction of a rental service further contributes to sustainability, allowing users to rent items like high-end clothing or formal wear for special events, reducing the need for new purchases and lowering waste. By connecting users with local resources and charitable organizations, the platform fosters community engagement, encouraging users to give back to their communities and support social causes. The comprehensive system facilitates economic accessibility by making goods affordable while advancing the movement toward environmental sustainability. With its focus on affordability, community involvement, and environmental responsibility, the proposed system provides a key solution to the challenges of sustainable living, serving as an essential tool for addressing issues of resource management and waste reduction.

1.2 Product Scope

The scope of the initiative is to create an online marketplace that facilitates the buying, selling, renting, and donating of second-hand goods, addressing the growing demand for sustainable consumer practices. The platform aims to establish a user-friendly environment that promotes engagement in the circular economy, reducing waste and enhancing resource efficiency. It is essential to implement a solution that allows users to connect easily while emphasizing eco-friendly behaviors that extend product lifecycles. Key features include user authentication, product management, order tracking, local meetup coordination, and product promotion, ensuring a seamless experience for individuals and businesses alike. As a consumers increasingly seek sustainable alternatives due to environmental concerns and cost considerations, the initiative aligns with the trend of conscious purchasing decisions. Additionally, the functionalities like donation facilitation and charity partnerships highlight social responsibility, resonating with market preferences for businesses that contribute positively to their communities. By addressing these requirements, the initiative creates a robust solution that not only meets consumer needs but also encourages the sustainable practices, fostering a responsible approach to consumption and enhancing the well-being of the community. [1].

The module provides a concise and comprehensive overview of the core features, including user authentication, product management, order tracking, payment integration, and donation facilitation, ensuring seamless platform functionality.

Module: User Authentication

- User Registration
- Login Functionality
- Logout Functionality
- Password Recovery

Module: Product List Management

- List Creation and Editing
- Category Selection
- Search and Filter Options
- Listing Status Management

Module: Admin Dashboard

- User Management
- Performance Analytics
- Product Oversight
- Notifications and Alert

Module: Product Promotion

- Featured Listing
- Discount and Coupon Management
- Limited-Time Offers
- Social Media Sharing

Module: Order Management

- Order Tracking
- Returns and Refunds
- Status Updates
- Order History

Module: Local Meetup Coordination

- Event Planning Tools
- Location-Based Suggestions
- MeetLink Online

- User Messaging feature

Module: Business data and Reports

- User behavior Insights
- Sales Analytics
- Market Trend Reports
- Custom Reporting Tools

Module: SmartRentor

- Rental Listing Management
- Booking Calendar
- Tenant Communication Tools
- Rental Agreement Templates

Module: Gamification

- User Reward System
- Challenges and Badges
- Leaderboards
- Engagement Matrics

Module: Inventory Management

- Stock Level Tracking
- Automated Restock Alerts
- Product Categorization
- Supplier Management

Module: Donation and Charity

- Item Donation Facilitation
- Charity Partnerships
- Donation Tracking
- Community Impact Reporting

Module: Payment Integration

- Secure Payment Processing
- Multi-Currency Support
- Transaction History
- Payment Gateway Management

1.3 Objectives

The primary objective of the initiative is to establish an accessible online marketplace for second-hand goods in Pakistan, addressing the pressing need for affordable products while promoting sustainable consumer practices. The platform aims to bridge the existing gap in the market by enabling users to easily discover quality items at lower prices, which is particularly crucial in a developing economy where financial constraints often limit access to essential goods. These objectives are essential for facilitating seamless transactions, promoting eco-friendly behaviors, and encouraging the recycling and reusing of products, contributing to waste reduction and resource conservation. Furthermore, the initiative emphasizes community building by incorporating features such as local meetup coordination and donation facilitation, allowing users to engage positively with their neighborhoods. Such elements not only enhance user interaction but also underscore social responsibility, enabling participants to contribute actively to their communities. Ultimately, these objectives serve as a roadmap to ensure the platform effectively meets user needs and supports sustainable practices, fostering a responsible approach to consumption that benefits individuals and the broader society. The proposed system positions the marketplace as vital for regional economic and social development [2].

The Proposed system serves as an innovative online platform designed to address the need for affordable second-hand goods in Pakistan. It features a User Authentication that provides secure user registration, login, password recovery, and logout functionality, fostering user trust. The Product List Management enables users to create and edit listings with options for category selection, search, filter, and management of listing status, enhancing the product discovery experience. The Admin Dashboard facilitates user management, performance analytics, product oversight, and notifications. In terms of marketing, the Product Promotion includes features such as discounted listings, coupon management, and social media sharing to increase product visibility. Order processing is simplified through the Order Management , which supports tracking, returns, and refunds, while the Local Meetup Coordination offers event planning tools and location-based suggestions for safe transactions. The Business Data and Reports provides insights into user behavior, sales analytics, and market trends. The Gamification module enhances user engagement with reward systems and leaderboards, while the Inventory Management focuses on stock tracking and supplier management. The Donation and Charity encourages social responsibility, and the Payment Integration ensures secure payment processing

The objectives of the proposed system will be meticulously crafted to align with its broader vision of creating a sustainable and accessible marketplace for second-hand goods. The strategic alignment will ensure that the platform effectively addresses the needs of users while contributing to a significant shift toward sustainable consumption practices. By prioritizing user authentication, product list management, and an efficient order management system, the proposed system will be committed to providing a secure and seamless experience for both buyers and sellers. It will Focusing on security will be essential for building trust within the marketplace, which will be crucial for its success. Moreover, the features such as local meetup coordination and donation facilitation will highlight the dedication to community engagement and social responsibility, fostering user interaction and promoting a culture of sharing and recycling. These objectives will resonate deeply with the increasing consumer demand for sustainability in purchasing

the good choices. Ultimately, the goals will serve to bridge the gap between the desires of the intended market and the overarching mission of transforming the perception and practice of second-hand shopping.

1.4   Intended Market of Product

The intended market for the proposed second-hand marketplace focuses primarily on environmentally conscious consumers, budget-conscious individuals, and trend-savvy millennials and Gen Z. The demographic typically includes young adults aged 18 to 35, who actively seek affordable yet fashionable alternatives to new products. They often prioritize sustainability and are inclined to support platforms that promote recycling and reduce waste. Additionally, the marketplace targets individuals within urban areas, where access to both second-hand goods and digital technology is prevalent. The industry context for the platform lies within the rapidly growing e-commerce sector, particularly within the second-hand and thrift market. The sector has witnessed significant growth, driven by increasing consumer awareness of environmental issues and a shift towards circular economies. Furthermore, the rise of social media and mobile applications has contributed to the popularity of online reselling platforms. As a result, the proposed marketplace aligns with industry trends, catering to a community that values sustainability, affordability, and accessibility in their purchasing decisions. The alignment with demographic and industry trends ensures that the product is positioned effectively to meet the needs and preferences of its intended market .

Sustainability Focus: The core mission of promoting sustainable consumption practices will emerge as a cornerstone of the platform and will align seamlessly with the values and concerns of the target demographic. As awareness of environmental issues will continue to rise, especially among younger generations, there will be a marked increase in the inclination toward sustainable living. The platform will highlight the environmental benefits of second-hand shopping—such as waste reduction and lower carbon footprints—and will engage users who will be passionate about eco-friendly initiatives. Research will indicate that millennials and Gen Z consumers will increasingly prioritize brands that demonstrate social responsibility and a commitment to sustainability. By emphasizing sustainability, the platform will position itself as a socially responsible choice in the marketplace and will encourage users to take pride in their purchasing decisions. They will feel confident knowing that their choices will contribute to a circular economy that will focus on reusing and recycling. Features such as a "sustainability score" for products will provide clear indicators of environmental impact and will enhance user loyalty. Ultimately, this focus will cultivate a community of eco-conscious consumers .

Donation and Charity: The proposed system will integrate a dedicated donation and charity feature, allowing users to contribute a portion of their purchases to selected charitable organizations or initiatives. This will create a transparent system where users will choose causes they wish to support. This aspect will resonate with socially conscious consumers who will be eager to make a positive impact through their shopping habits, particularly millennials and Gen Z, who will increasingly favor brands committed to social responsibility (Cone Communications, 2017). By showcasing the collective impact of user contributions through features like "donation milestones" or "charity highlights," the platform will foster a sense of accomplishment and community among its users. In the future, additional organizations will be included to broaden donation options. This

integration will position the platform as more than just a marketplace for second-hand goods; it will serve as a vehicle for positive change, reinforcing the notion that every purchase will contribute to a greater good. This alignment with the market's growing preference for ethical consumption will enhance the platform's reputation and attractiveness, encouraging user loyalty and engagement.

Renting facilities: The proposed system will incorporate a rental feature that will allow users to rent various items, including clothing, accessories, and electronics, rather than purchasing them outright. This innovative approach will meet the growing consumer demand for sustainable and cost-effective alternatives within the sharing economy. By offering rentals, the platform will not only appeal to budget-conscious individuals but will also promote a circular economy by encouraging the reuse of items, ultimately reducing waste and minimizing the environmental impact associated with production. Research will indicate that the rental market is poised for significant growth, particularly among younger generations who will increasingly seek sustainable consumption options. This feature will also attract users who will look to experience premium or high-quality products without the commitment of full ownership, thus broadening the platform's user base. The implementation of a user-friendly interface for rental transactions, coupled with clear item care guidelines and return policies, will ensure a seamless experience for both renters and lenders. Highlighting success stories and user testimonials will further engage the community, enhancing the platform's sustainability focus while addressing specific consumers.

Fostering Small Business Growth: The proposed system will actively promote individual businesses by providing a dedicated space for local entrepreneurs to showcase their products and services. This feature will empower small businesses and artisans, enabling them to reach a broader audience while fostering a sense of community within the marketplace. By prioritizing local sellers, the platform will cater to consumers' increasing preference for supporting small businesses, as research will show that shoppers are more inclined to purchase from brands that align with their values and contribute to their local economies. Additionally, the platform will offer promotional tools and resources, such as marketing support, featured listings, and user reviews, to help individual businesses thrive in a competitive landscape. Users will have access to exclusive deals and promotions from these businesses, creating a mutually beneficial relationship that enhances customer loyalty and satisfaction. By integrating educational resources and workshops for entrepreneurs, the platform will not only help individuals grow their businesses but will also foster innovation and collaboration among users. This initiative will further solidify the platform's commitment to community development and economic sustainability.

1.5   Intended Users of the Product

The product is designed for a varied audience, mainly focusing on younger demographics, which includes both adults and seniors. These users demonstrate a strong dedication to sustainability, eco-friendly habits, and social accountability. They typically live in urban or suburban settings, where they easily access technology and opportunities for purchasing second-hand items. Their preferences emphasize convenience and efficiency, seeking a user-friendly online platform that allows for smooth browsing, buying, and selling of pre-owned goods. Moreover, these users possess a high degree of technological

aptitude, favoring interfaces that are intuitive and equipped with features such as real-time notifications and social sharing options. Social interaction is vital for them, as they are attracted to platforms that foster community initiatives and facilitate connections among individuals with similar values. By thoroughly understanding these traits and requirements, the platform customizes its features and marketing strategies to improve user satisfaction and cultivate a strong community. The strategy not only enhances brand loyalty but also empowers users to make positive contributions to their environment through sustainable shopping choices. Ultimately, the product meets the needs and ambitions of its target audience.

Seller: Users will play a vital role in the platform's success, acting as the primary source of second-hand goods and driving the overall marketplace experience. Sellers will include individuals decluttering their homes, small businesses, and entrepreneurs aiming to reach a broader audience. By listing their items on the platform, they will contribute to a sustainable ecosystem that promotes recycling, reusing products, and reducing waste, aligning with the platform's mission of sustainability. Sellers will also have the option to donate unsold items to charity, enhancing their positive impact on the community and reinforcing the platform's eco-friendly goals.Empowered by an intuitive interface, sellers will find it easy to list products using guided tutorials and user-friendly templates. They will set their own prices, manage inventory, and engage directly with potential buyers through a secure messaging system. Additionally, analytics tools will offer insights into sales performance, allowing sellers to refine their strategies over time. Gamification will further boost seller engagement, offering points and badges for completed tasks and friendly competition through leaderboards. Ultimately, sellers will be pivotal in driving the platform's growth and promoting sustainable living and social responsibility.

Buyers: Users will play a crucial role in the proposed system, serving as the primary audience for second-hand goods while also benefiting from the option to rent items. Buyers will seek unique, quality products at affordable prices and will have the opportunity to rent various goods, from clothing to electronics, allowing them to access items they may not need to purchase outright. This flexibility will cater to users looking for short-term solutions or those interested in trying products before committing to a purchase. The proposed system will feature an intuitive interface that simplifies browsing and renting, complete with the advanced search filters, personalized recommendations, and user reviews. Buyers will have the ability to interact with sellers through a secure messaging system, facilitating inquiries about rental terms and product specifics. Additionally, the proposed system will encourage responsible consumption by allowing buyers to donate items to charity, reinforcing their commitment to sustainability. Gamification strategies will be implemented to motivate buyers further, rewarding them for rentals, purchases, and referrals with points and badges. This approach will enhance user engagement and encourage repeat business.

Chapter 2

Background and Literature Review

Based on the idea of the study, the literature review guides the exploration of the second-hand market domain, illuminating past consumer behaviors and market dynamics. The retrospective analysis proves crucial for charting the course of the research, shaping its direction, and ensuring that the proposed online platform, the Proposed System, is both innovative and informed by the most recent developments in the field. By surveying past studies on consumer preferences and sustainability in second-hand shopping, the research team builds upon existing knowledge, identifies shortcomings, and contributes to the advancement of sustainable consumption practices [3].

The forthcoming sections will detail the existing second-hand marketplace systems, analyze usage trends, explore the problem statement and limitations, present the proposed solution, and overview the selected software process model. The comprehensive roadmap will aim to provide insights into current technology, its strengths and weaknesses, and the methodologies that the study will employ to address these challenges, ultimately enhancing user experiences and promoting sustainable practices in the second-hand goods market.

2.1 Existing System Description

Analyzing existing systems is crucial for the product, providing a foundation for research and innovation. By examining current market technologies, insights into their strengths, weaknesses, and usage trends are gained. The understanding helps identify areas needing improvement and guides the direction of the proposed solution. Building on past achievements and leveraging prior research contributes meaningfully to enhancing user experiences, ensuring that the work is informed and capable of effectively addressing current limitations [4].

The review examines ten leading second-hand marketplace systems, emphasizing their architecture, features, and performance. It provides a structured framework and comparison table to underscore each system's key attributes, strengths, and weaknesses. Through a systematic assessment, the review identifies trends, best practices, and potential improvement areas within the technology for second-hand marketplaces, offering insights into existing solutions and setting the stage for advancements in user experience and community engagement.

PakWheels: It is Pakistan's premier online automotive marketplace, revolutionizing the buying and selling of vehicles across the country. With its intuitive platform, users can effortlessly list cars, motorcycles, and other vehicles, or browse an extensive collection of new and used options. The site features a variety of tools, including car valuation services and filters, making it easy to find the perfect vehicle. It fosters local transactions, helping users connect with potential buyers or sellers, and offers additional services like vehicle inspection reports for transparency. With an active automotive community, detailed

reviews, and expert opinions, it provides a trusted space for both enthusiasts and casual buyers. The platform also promotes convenience with tools like car financing, insurance options, and a seamless mobile app experience. By focusing on reliability, transparency, and convenience, it remains a top choice for anyone looking to buy or sell vehicles in Pakistan [5].

The main features of the Application are listed below:

- Extensive Vehicle Listings : The application offers a wide range of vehicles, from cars and bikes to trucks and vans. Users can filter searches by price, make, model, year, and location, making it easier to find suitable options.
- User Reviews and Ratings: The application allows users to leave reviews and ratings for vehicles, providing insights into the quality and performance of specific models. This feature enhances transparency and helps potential buyers make informed decisions
- Community Engagement: The system also includes forums and community features where users can discuss automotive topics, seek advice, and share experiences with fellow enthusiasts.
- Local Transactions: Emphasizing local buying and selling, platform allows users to connect with potential buyers or sellers nearby. This promotes convenience for users who prefer to inspect vehicles in person, facilitating smoother transactions.
- Mobile Accessibility: It has a fully functional mobile app, allowing users to browse listings, post ads, and manage their accounts from anywhere. The app ensures that users stay connected to the marketplace on the go.

The limitations of the application are listed below:

- Verification and Trust Issues: Despite efforts to create a trustworthy marketplace, users often express concerns about the verification process of sellers. There have been reports of fraudulent listings and scams, leading to distrust among potential buyers.
- Limited Categories: While Platform excels in automotive listings, it lacks comprehensive options for other types of second-hand goods. This narrow focus means that users looking for broader second-hand products may need to seek alternative platforms .
- User Experience: Some users report that the website's interface can be cluttered, making navigation challenging. This can deter users who prefer a more streamlined and intuitive browsing experience.
- Transaction Risks: The absence of a secure payment system can expose users to risks during transactions. Buyers and sellers often have to rely on direct communication and payment methods, increasing the likelihood of scams or disputes .
- Limited Seller Support: Sellers may find that the support provided by system is insufficient for resolving issues related to listings or disputes. The platform does not offer extensive resources for sellers to optimize their listings or handle customer inquiries effectively .

Mega Thrift store: It is an innovative online platform in Pakistan that focuses on selling second-hand clothing and accessories, emphasizing eco-friendly and sustainable shopping practices. The store offers a diverse selection of pre-loved items, including fashion for men, women, and children, catering to various style preferences. By encouraging the purchase of second-hand goods, the platform helps reduce textile waste, supporting conscious consumerism. The website is user-friendly, featuring simple navigation, secure payment options, and detailed product descriptions, enhancing the shopping experience. Although it allows users to buy items, it seems lacks the option for individual sellers to list their products, limiting its marketplace potential. Nonetheless, the system remains a valuable resource for budget-conscious shoppers seeking affordable, stylish, and environmentally responsible alternatives [6].

The main features of the Application are listed below:

- Wide Range of Products: Mega Thrift Store offers an extensive variety of second-hand clothing and accessories for men, women, and children, catering to a broad spectrum of fashion tastes and preferences. Shoppers can find trendy and timeless pieces that suit different styles.
- Sustainability Focus: By promoting the purchase of pre-loved items, the application supports eco-conscious consumerism, significantly contributing to the reduction of textile waste and encouraging environmentally sustainable shopping practice.
- User-Friendly Experience: Designed with a clean and intuitive layout, the website enables users to browse product categories effortlessly, find items quickly, and enjoy a seamless shopping experience.
- Affordable Pricing: The store offers budget-friendly prices, allowing shoppers to find fashionable, high-quality alternatives without stretching their finances. It appeals to those seeking style on a budget.
- Secure Payment Options: Customers benefit from secure payment processing, which ensures that their personal and financial information is protected, giving them confidence and peace of mind during transactions.

The limitations of the application are listed below:

- No Selling Option for Users: Unlike other second-hand marketplaces, Mega Thrift Store does not provide an option for users to sell their own items. This limits its functionality as a fully user-driven marketplace, restricting it to a buyer-only platform.
- No Return Policy: The store might enforce a strict or non-existent return policy, which could pose challenges for customers who receive items that do not meet their expectations or have undisclosed flaws. This increases the importance of thorough inspection before purchase.
- Geographical Limitations: Mega Thrift Store's services are limited to certain regions in Pakistan, restricting access for customers in remote areas. Shipping may take longer or incur higher costs for those outside major cities.
- Limited Product Categories: The Mega Thrift Store offers a restricted range of product categories, primarily focusing on clothing and accessories. This limitation

may deter customers looking for a more diverse selection, such as home goods or electronics.

- Lack of Reviews and Ratings : The Mega Thrift Store website lacks a section for user reviews and ratings, which can limit potential buyers' ability to assess product quality and customer satisfaction. Without feedback from previous customers, shoppers may find it challenging to make informed purchasing decisions.

Pink Closet: It is a pioneering online thrift store in Pakistan, focusing to promote sustainable fashion through an extensive range of second-hand clothing, accessories, and distinctive vintage pieces. The application redefines fashion consumption by inspiring customers to embrace pre-owned items, effectively reducing textile waste and lowering environmental impact. With a thoughtfully curated collection of high-quality, gently pre-owned apparel for men and women, Pink Closet meets diverse style preferences while promoting affordability. The store underscores the importance of conscious consumerism, aims to build a supportive community that values sustainability and ethical fashion choices. By providing a smooth and enjoyable shopping experience, Pink Closet reinforces its commitment to environmental responsibility, advocates for an eco-conscious lifestyle, and makes sustainable fashion accessible to a wide audience [7].

The main features of the Application are listed below:

- Wide Range of Categories: The site offers a wide variety of clothing categories, including summer and winter clothing, footwear, and bags. Within these categories, users can find specific items such as dresses, tops, jackets, and more.
- Regular Stock Updates: PinkCloset consistently refreshes its inventory with new stock added weekly. This practice encourages customers to revisit the site regularly to discover unique finds and seasonal trends, ensuring they don't miss out on stylish options.
- Promotional Offers: The system frequently showcases attractive deals on various items, enabling shoppers to discover stylish, gently pre-owned clothing at budget-friendly prices. These promotions enhance the accessibility of sustainable fashion, motivating eco-conscious choices and assisting customers in finding unique pieces that suit their individual styles.
- User-Friendly Navigation: The website is designed for easy browsing, with a structured layout that allows users to navigate through various categories effortlessly. Sorting options based on popularity, ratings, and price help customers find exactly what they are looking for quickly.
- Supportive Content: The site includes helpful sections such as FAQs and a blog. These resources offer valuable information and updates, assisting customers in making informed purchasing decisions while fostering a sense of community around sustainable fashion.

The limitations of the application are listed below:

- User Reviews and Ratings Absence: The lack of a user review or rating system can hinder the shopping experience. Without feedback from previous customers, new

buyers may struggle to gauge the quality and suitability of products before making a purchase.

- Geographical Restrictions: Depending on the location, shipping options may be limited. This can impact delivery times and availability for customers living in remote areas or regions where service is not well-established.

- No Support for Seller-Buyer Communication: If there are queries regarding product details or sizing, users cannot directly communicate with sellers. This lack of interaction can hinder the buying process, especially in a thrift store context where conditions of items can vary significantly.

- No Chat System Between Buyer and Seller: PinkCloset.pk lacks a chat feature for direct communication between buyers and sellers. This limits users from discussing product details or negotiating prices, which can be crucial when dealing with second-hand items.

- Limited Return Policy: The store may have a strict or unclear return policy. This limitation can make it challenging for customers to return items that do not meet their expectations or are unsuitable after purchase.

Paklap.pk: It is a leading online retailer in Pakistan specializes in a vast array of electronics, particularly laptops, tablets, and accessories. The platform is dedicated to providing customers with high-quality products at competitive prices, catering to both tech enthusiasts and everyday users. With an extensive selection of brands and models, shoppers can easily find the right device to meet their specific needs. The website features user-friendly navigation, detailed product descriptions, and customer reviews to facilitate informed purchasing decisions. Additionally, it prioritizes customer satisfaction by offering after-sales support and assistance, ensuring that users feel confident in their purchases. The commitment to quality and service sets the retailer apart in the competitive online marketplace, making it a preferred choice for those seeking reliable technology solutions in Pakistan [8].

The main features of the Application are listed below:

- User-Friendly Navigation: The website features an intuitive design that simplifies browsing, allowing customers to effortlessly find products through well-organized categories, advanced search filters, and easy-to-navigate menu.

- Detailed Product Descriptions: Each product listing includes comprehensive specifications, unique features, high-resolution images, and comparison tools, empowering customers to make informed purchasing decisions based on their specific requirements.

- After-Sales Support: The system offers robust after-sales services, including dedicated technical support, warranty assistance, and hassle-free return policies, ensuring that customer satisfaction remains a top priority throughout the entire purchasing experience.

- Wishlist Feature: The system includes a convenient wishlist feature, enabling users to save their favorite products for future reference, making it easier to track desired items and plan purchases at their convenience.

- Wide Range of Products: The system showcases a diverse selection of electronics, including high-performance laptops, cutting-edge tablets, and various accessories

from reputable and trusted brands, catering to different user preferences and needs.

The limitations of the application are listed below:

- Shipping Restrictions: Depending on the customer's location, shipping options may be limited, which can affect delivery times and increase shipping costs for certain regions.
- Quality Variation: The condition of used laptops can vary significantly, and while listings provide details, customers may still encounter discrepancies between expectations and actual product quality.
- Limited Promotion for Individual Sellers: The application primarily focuses on promoting inventory from its own stock rather than individual businesses or sellers, which may reduce visibility for smaller vendors aiming to reach a broader audience.
- No Live Chat Support: The absence of a live chat feature may limit immediate customer support, leaving users to rely on email or phone communication for assistance.
- Return Policy Restrictions: The return policy for used items may be strict or unclear, making it difficult for customers to return products that do not meet their needs or expectations.

SoUnique.pk: It is an innovative online marketplace in Pakistan dedicated to the buying and selling of both new and used furniture. The platform aims to provide a seamless shopping experience for individuals looking to furnish their homes with distinctive pieces at competitive prices. Offering a diverse range of furniture categories, including living room, bedroom, and office furnishings, SoUnique.pk caters to various tastes and preferences, ensuring there's something for everyone. The website places a strong emphasis on user engagement by allowing sellers to list their items, facilitating direct transactions between buyers and sellers. With its user-friendly navigation, comprehensive product descriptions, and unwavering commitment to quality, SoUnique.pk strives to create a vibrant community for furniture enthusiasts who value sustainability and stylish home décor options [9].

The main features of the Application are listed below:

- Diverse Furniture Categories: The system offers an extensive selection of furniture, including options for living rooms, bedrooms, and offices, catering to different tastes and styles.
- User-Friendly Interface: Designed with ease of use in mind, the website offers a clean and organized layout that allows users to effortlessly navigate through various categories and quickly locate desired products.
- User Engagement: SoUnique.pk empowers sellers by providing an intuitive interface for listing their furniture items. This feature promotes direct transactions between buyers and sellers, fostering a sense of community and encouraging interaction among users.

- Community Building: By fostering a sense of community among furniture enthusiasts, SoUnique.pk encourages sustainable practices through the promotion of preowned items. This commitment to sustainability not only benefits the environment but also supports ethical consumption.
- Search and Filter Options: The application includes robust search functionalities and filter options, allowing users to search for specific items or narrow down results based on categories, price ranges, and geographical location.

The limitations of the application are listed below:

- Limited Inventory: As a marketplace primarily for second-hand items, the inventory may fluctuate significantly, resulting in inconsistent availability of specific furniture pieces. This variability can sometimes leave customers unable to find exactly what they are looking for.
- Quality Variation: The condition of used furniture can differ widely from one listing to another, necessitating that buyers carefully evaluate the quality of items before making a purchase. This aspect may require additional effort and diligence from customers.
- No Integrated Communication System: The absence of a built-in chat feature for direct communication between buyers and sellers may limit effective negotiations and inquiries about specific items. This gap can lead to misunderstandings or missed opportunities for both parties.
- Lack of Review and Rating System: SoUnique.pk currently lacks a review and rating system for its products. This absence restricts buyers from accessing valuable feedback regarding the quality and reliability of items sold on the platform.
- No Return Policy: The application may enforce a strict no-return policy, which can pose challenges for customers who find that an item does not meet their expectations or needs upon arrival. This limitation can deter potential buyers who value flexible return options.

YMBP: It is an innovative online fashion marketplace that specializes in offering trendy and affordable second-hand clothing and accessories for fashion enthusiasts. The application focuses on sustainable fashion by providing a curated selection of pre-loved items, allowing customers to shop stylishly while promoting eco-friendly practices. With a diverse range of outfits that cater to various tastes and preferences, shoppers can easily find unique pieces that suit their personal style. YMBP features a user-friendly interface, making it effortless to browse through different categories, including casual wear, formal attire, and seasonal collections. Regular updates to the inventory ensure customers can discover new arrivals frequently. Committed to quality and affordability, YMBP is the perfect destination for budget-conscious shoppers looking for fashionable options without compromising on style or sustainability [10].

The main features of the Application are listed below:

- Affordable Fashion: One of YMBP's key selling points is its emphasis on affordable clothing. The system enables customers to stay on trend without exceeding their budgets, offering a wide range of prices across various categories.

- Diverse Selection: YMBP offers a wide range of clothing styles, including casual wear, formal attire, and accessories that cater to various demographics and fashion preferences. This variety enables shoppers to mix and match outfits that reflect their individual tastes.
- User-Friendly Interface: The website is designed for ease of use, with straightforward navigation that allows users to filter products by category, size, or color. This makes the shopping experience smooth and enjoyable, especially for new users.
- Quality Assurance: YMBP is committed to providing quality products at competitive prices. The platform features items that not only look good but are also made to last, addressing common customer concerns about fast fashion.
- Responsive Customer Support: YMBP prioritizes customer satisfaction and offers reliable customer support. Whether it's assistance with orders, inquiries about products, or handling returns, the platform ensures that shoppers receive the help they need.

The limitations of the application are listed below:

- Stock Availability: Due to the popularity of certain items, popular styles or sizes can quickly sell out. This may lead to frustration for customers who are keen on purchasing specific pieces.
- Size Variability: Variations in sizing among different brands can lead to confusion. Customers may find that items do not fit as expected, which can be a drawback of shopping online without the ability to try on clothes beforehand.
- Shipping Times: Depending on the customer's location, shipping times can vary significantly. While many orders are processed quickly, delays can occur, which may be disappointing for customers expecting timely deliveries.
- Return Policy Restrictions: YMBP's return policy may have specific limitations that could complicate the return or exchange process. Understanding these policies is crucial for a smooth experience when needing to return items.
- Limited Brand Selection: While YMBP offers a variety of styles, it may not feature some popular or high-end brands. Customers looking for specific labels may need to explore other platforms for those options.

Bonpaper: It is a leading online bookstore in Pakistan, offering a vast selection of new and used books, stationery, and educational supplies for readers of all ages. The website features a user-friendly interface, allowing customers to easily browse through different categories, including fiction, non-fiction, academic textbooks, and children's books. The system focuses on providing a seamless shopping experience with secure payment options and fast delivery services. Additionally, the store regularly offers discounts and promotions, making it an attractive option for students, book lovers, and professionals looking for affordable yet high-quality products. Whether customers are searching for rare out-of-print titles or the latest bestsellers, the system focuses on a diverse collection of new and used books to cater to various reading preference [11].

The main features of the Application are listed below:

- Intuitive User Interface: The system boasts a sleek and user-friendly design that allows shoppers to navigate seamlessly through various categories, enhancing the overall shopping experience.
- Extensive Product Selection: The application provides a diverse range of products across multiple categories, catering to a wide audience and ensuring that customers can find everything they need in one place.
- Secure Payment Options: With multiple secure payment methods available, including credit cards and other online payment systems, Bonpaper prioritizes customer security and convenience during transactions.
- Accessible Customer Support: The website features a dedicated customer service section, offering support for inquiries and issues, which contributes to a positive shopping experience.
- Attractive Promotions and Discounts: Regular sales and promotional offers make Bonpaper an appealing choice for bargain hunters, allowing users to enjoy significant savings on their purchases.

The limitations of the application are listed below:

- Absence of Customer Reviews: The lack of customer reviews on product pages can create uncertainty for potential buyers, as they have no way to gauge the quality or reliability of items.
- Limited Product Descriptions: Some listings may not provide comprehensive product descriptions, which can make it difficult for customers to find the detail of the books and make well-informed decisions.
- Insufficient Shipping Information: The website provides minimal details regarding shipping options and costs, which may lead to confusion and inconvenience for customers trying to understand delivery timelines.
- Unclear Returns and Exchange Policy: The system seems return and exchange policies are not prominently featured, potentially causing apprehension for customers regarding post-purchase support.
- Geographical Limitations: The system may face geographical limitations in its shipping and delivery services. Customers in remote or rural areas might experience delayed shipping times or even be unable to receive certain products due to logistical challenges.

PakistanCarDealers: It is an online platform that serves as a comprehensive marketplace for buying and selling vehicles in Pakistan. The website connects potential buyers with a variety of car dealers and individual sellers, offering an extensive selection of new and used cars. It features detailed listings that include essential information such as vehicle specifications, prices, and images, facilitating informed purchasing decisions for users. The application also aims to enhance the car-buying experience by providing easy navigation and search options, allowing customers to filter results based on their preferences. With a focus on transparency and convenience, Pakistan Car Dealers strives to simplify the vehicle trading process in the country, catering to diverse customer needs. It represents a valuable resource for anyone looking to buy or sell a vehicle [12].

The main features of the Application are listed below:

- Extensive Vehicle Listings: The marketplace offers a wide range of new and used vehicles from various dealers and individual sellers, allowing buyers to browse through multiple car options.
- Detailed Information: Each car listing includes comprehensive details such as make, model, price, mileage, and high-quality images, enabling users to make informed purchasing decisions.
- Advanced Search Filters: Buyers can refine their search using filters like vehicle type, model year, location, and price range, making it easier to find cars that suit their needs.
- Dealer and Individual Sellers: The application connects customers to both car dealers and individual sellers, expanding the choices for potential buyers and sellers .
- User-Friendly Interface: The website is well designed with easy navigation, making it simple for users to browse through categories, view listings, and contact sellers.

The limitations of the application are listed below:

- Limited User Authentication Options: The system lacks advanced user authentication features such as social media logins or two-factor authentication, which could enhance security for both buyers and sellers.
- Absence of Seller Ratings and Reviews: There is no system for users to rate or review sellers, which could improve transparency and trustworthiness in transactions.
- Limited Geographic Reach: The website primarily focuses on major cities, leaving users in smaller towns or remote areas with fewer vehicle options and limited access to local dealers.
- No Instant Chat Support: The absence of a live chat feature limits direct communication between buyers and sellers, potentially slowing down the negotiation process.
- Inadequate Support System: The customer support system is limited to phone calls and email, with no provision for live chat or 24/7 support. This can result in delayed responses to customer queries, particularly outside of business hours (9 AM to 9 PM).

GoCheapShop: It is a dynamic classified ads platform in Pakistan, catering to a wide array of categories for buying, selling, and advertising products and services. Users can list items such as vehicles, real estate, electronics, clothing, and more. Additionally, the platform allows posting of job ads, offering services, and even promoting events or classes, making it a versatile space for both personal and business needs. The application facilitates convenient browsing, enabling users to compare prices, explore various deals, and make informed purchases. For sellers, it offers free classified ad postings, which helps them reach a broader audience, while also featuring premium listing options for greater visibility. The website emphasizes user-friendliness, with an easy registration process for creating accounts and posting ads efficiently [13].

The main features of the Application are listed below:

- Wide Variety of Categories: The platform offers a diverse selection of categories, including vehicles, electronics, real estate, clothing, jobs, and services, catering to various buyer and seller needs.
- Free Ad Posting: Users can post classified ads for free, making it accessible for individuals and small businesses to reach potential customers without incurring costs.
- User-Friendly Interface: The website is well designed for easy navigation, allowing users to search for listings quickly and efficiently, enhancing the overall user experience.
- Community Engagement: It is a foster community-driven approach, encouraging users to interact, share feedback, and report any fraudulent activities and promoting a safer marketplace.
- Local Focus: The platform emphasizes local buying and selling, allowing users to connect with others in their area, which facilitates in-person transactions and supports the local economy.

The limitations of the application are listed below:

- Limited Verification of Listings: There is minimal oversight on the verification of ads, which can lead to fraudulent listings or scams, making it essential for users to exercise caution when making purchases.
- Lack of Reviews and Ratings: The platform does not provide a built-in system for users to leave reviews or ratings for sellers or buyers, which can hinder trust and transparency in transactions.
- Basic Search Functionality: While the site offers browsing options, the search functionality may not be as advanced as that of competitors, potentially making it harder for users to find specific items quickly.
- Geographical Limitations: Although the platform targets a Pakistani audience, users may find limited availability of certain categories or items depending on their location, impacting the variety of options.
- Limited Customer Support: The platform may not offer comprehensive customer support, which can be a drawback for users needing assistance with transactions or resolving issues related to listings.

Preloved Treasures: It is an online marketplace specializing in pre-owned t-shirts and shoes, catering to fashion enthusiasts seeking affordable and unique clothing options. The platform is designed to provide a seamless shopping experience, allowing users to browse a curated selection of casual apparel. With a user-friendly interface, customers can easily navigate through listings, view detailed product descriptions, and filter items based on size, type, and price range. Emphasizing quality and sustainability, Preloved Treasures promotes the reuse of clothing, making it a go-to destination for eco-conscious consumers. Secure payment options ensure safe transactions, while responsive customer support is available to address inquiries. By offering a focused inventory of stylish second-hand pieces, Preloved Treasures helps shoppers find distinctive fashion items while contributing to a more sustainable wardrobe [14].

The main features of the Application are listed below:

- Specialized Inventory: The platform focuses exclusively on pre-owned t-shirts and shoes, offering a thoughtfully curated selection that caters to fashion enthusiasts seeking unique casual apparel at affordable prices.
- User-Friendly Interface: The website features a clean and intuitive design, making it easy for users to navigate through various categories and effortlessly browse or search for their desired items.
- Clear Product Listings: Each of the listing provides comprehensive descriptions, including specific sizes, conditions, and competitive prices, empowering buyers to make well-informed purchasing decisions.
- Advanced Search Functionality: The site offers efficient search options, allowing users to filter products based on size, type, condition, and price range, enhancing the shopping experience.
- Mobile-Responsive Design: The website is optimized for mobile devices, it enabling users to seamlessly access listings and make purchases from anywhere, at any time.

The limitations of the application are listed below:

- Limited Product Range: The platform specializes exclusively in t-shirts and shoes, which may not cater to the diverse clothing needs of all consumers. Shoppers seeking a wider variety of apparel may find their options limited, potentially driving them to explore other marketplaces.
- Potential for Quality Variation: As a marketplace for pre-owned items, the quality and condition of products can vary significantly from one listing to another. This variability can create uncertainty for buyers, who may be concerned about receiving items that do not meet their expectations.
- Limited Buyer-Seller Interaction: The platform may impose restrictions on direct communication between buyers and sellers, which can limit opportunities for negotiation and discussion about product specifics. This lack of interaction may lead to buyer hesitancy or dissatisfaction.
- Dependence on Listings: The effectiveness of the site relies heavily on users consistently listing new products. If inventory does not refresh regularly with new items, it may result in stagnant listings, reducing overall consumer interest and engagement on the platform.
- Lack of Promotion for Individual Sellers: The platform does not actively promote individual sellers' businesses, limiting their ability to stand out or build a distinct brand presence. This may reduce visibility for sellers who are looking to expand their business through personalized branding and marketing efforts.

Table 2.1 1 gives a comparison of the applications reviewed. Although there are many applications available, but the idea behind the proposed solution is to combine the features form different applications into one so that the user can have all facilities without going for multiple applications

Table 2.1: Applications Comparison

Features	Applications										
	PakWheels [5]	Mega Thrift store [6]	Pink Closet [7]	Paklap.pk [8]	SoUnique.pk [9]	YMBP [10]	Bonpaper [11]	PakistanCarDealers [12]	GoCheapShop [13]	Preloved Treasures [14]	Proposed System
user Authentication	✓	✓	✗	✓	✓	✓	✓	✓	✓	✗	✓
Admin dashbord	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gamification	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Order Management	✗	✓	✗	✓	✓	✓	✓	✗	✗	✓	✓
Donation and Charity	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Smart Rentor	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
local Meetup	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Business Data and Reports	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓
Product Promotion	✗	✓	✓	✗	✗	✓	✓	✗	✗	✓	✓
Payment integration	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓

2.2 Future System Usage Analysis

Envisioning the future of the platform will anticipate a transformative change in how second-hand goods will be bought, sold, and donated. It will seamlessly integrate into users' daily lives through smartphones and web applications, harnessing advanced technologies such as AI and machine learning to provide predictive analytics that will forecast market trends, user preferences, and product demand, enabling personalized recommendations that will enhance the shopping experience. As the platform evolves, it will foster a vibrant community where users will share experiences, provide feedback, and engage in local meetups, enhancing loyalty and supporting sustainable consumption. Features like gamification will motivate users to engage actively, promoting responsible purchasing habits and encouraging donations to charity. Seamless communication between buyers and sellers will enhance trust through detailed product descriptions, user reviews, and real-time messaging. Long-term, the platform will adapt to emerging technologies such as blockchain for secure transactions and IoT for efficient inventory management, ensuring relevance and effectiveness. The extensive benefits of utilizing the platform will include fostering a circular economy, promoting sustainability, enhancing community engagement, and contributing to environmental preservation. By streamlining the buying and selling processes, users will save time and resources while being empowered to make conscious choices that will positively impact their communities and the planet.

2.3 Problem Statement / Limitations

The increasing focus on sustainable consumption has created a pressing need for effective platforms that facilitate the buying and selling of second-hand goods. Unfortunately, many existing platforms face challenges that undermine user experience, including a lack of trust between buyers and sellers, difficulties in locating quality products, and

overwhelming competition that complicates the purchasing process. Users frequently encounter obstacles while navigating these platforms due to unclear product listings, inadequate communication tools, and a deficiency in community engagement features. These issues can lead to frustration, preventing users from making informed purchasing decisions and diminishing their sense of belonging within the marketplace. Consequently, there is an urgent demand for a more user-centric solution that addresses these shortcomings and fosters a more engaging and trustworthy environment for second-hand transactions.

The platform is subject to several limitations that may hinder its functionality and user satisfaction. First, the narrow focus on specific product categories may not accommodate the diverse needs of consumers seeking various second-hand items. Additionally, the nature of pre-owned goods often results in significant variability in product quality, creating uncertainty for potential buyers. The absence of a physical location can deter users who prefer inspecting items before making a purchase. Furthermore, limited interaction between buyers and sellers restricts negotiation opportunities, affecting price flexibility. The platform's reliance on user-generated listings may lead to stagnant inventory if engagement wanes, impacting the variety of available products. Insufficient promotional efforts may hinder individual seller business growth and limit community engagement, impeding the platform's development.

2.4 Proposed Solution

To address limitations faced by the online second-hand store, a comprehensive solution implements features to enhance user experience, encourage sustainable practices, and foster community engagement. User registration, login, and password recovery processes streamline security and usability. Expanded product listing capabilities enable users to create, edit, and categorize listings with ease, while advanced search and filtering improve product discoverability. To support responsible consumption and charitable giving, a donation feature allows users to donate items to partnered charities directly through the platform, strengthening community ties and supporting those in need. Additionally, a rental option introduces users to renting items, promoting a sharing economy and sustainable resource use.A robust admin oversight system ensures user management and product quality, creating a secure environment for transactions. Promotional features, such as discounts and social media sharing, allow individual sellers to highlight listings, enhancing visibility and audience reach. Simplified order tracking and returns increase buyer confidence, while support for local meetups enables buyers and sellers to coordinate safely, building trust through face-to-face interactions. Community engagement is encouraged with gamification elements that reward responsible purchasing behaviors and active participation. Secure transactions and multi-currency support create a seamless buying experience. Collectively, these functionalities address existing limitations while fostering a vibrant community dedicated to sustainable consumption and social responsibility

2.5 Software Process Model

A software process model is vital for developing the online second-hand store platform, providing a structured framework from initial concept to deployment. The model ensures a systematic development process, adhering to industry best practices, which is crucial for achieving high quality and reliability. By facilitating clear communication, setting

realistic timelines, and enabling effective risk management, the process model enhances functionality and performance, ensuring the platform meets the needs of buyers and sellers while promoting sustainable consumption practices [15].

The agile software development model is ideal for the online second-hand store platform due to its adaptability and focus on collaboration. Frequent iterations and quick feedback loops allow the team to rapidly respond to user requirements, ensuring a continually refined, user-centered experience that meets evolving expectations.

2.5.1 Introduction

In developing the second-hand marketplace platform, the Agile software development model has been selected due to its inherent flexibility and capacity to adapt to evolving user needs and market dynamics. Agile's iterative approach facilitates continuous improvement, allowing the development team to incorporate feedback rapidly and make adjustments to key features such as user authentication, product listing management, local meetup coordination, and donation facilitation. The adaptability is crucial for a platform focused on real-time user engagement and satisfaction. Moreover, Agile promotes strong collaboration and communication between the development team and stakeholders, ensuring that the platform remains user-centered and aligned with market trends. The emphasis on delivering functional increments allows for features like gamification, inventory management, and rental systems to be implemented swiftly, enhancing user experience while promoting sustainable consumption practices. Additionally, Agile's focus on customer feedback ensures that the platform not only meets functional requirements but also exceeds user expectations, fostering a vibrant community of users committed to sustainable practices. The Agile model ensures that the platform can evolve dynamically, supporting the goals of efficiency, sustainability, and user engagement in the second-hand marketplace environment [16].

Figure 2.1 The agile model vividly illustrates the software development processes by showcasing iterative phases that span from planning to deployment. It emphasizes key principles such as adaptability, stakeholder collaboration, and a commitment to continuous improvement throughout each phase of the process.
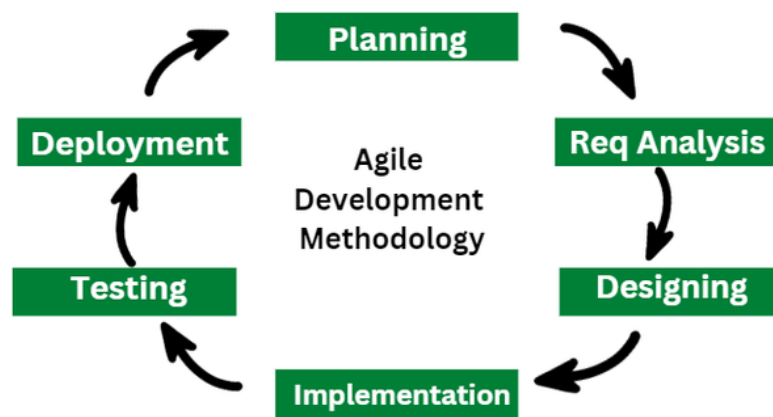

Figure 2.1: Agile Model [16]

2.5.2 Justification

The decision to implement the Agile software development process model for the application will stem from its adaptability and alignment with the initiative's specific requirements and goals. Agile iterative nature will foster regular cycles of development, testing, and user feedback, ensuring the application remains responsive to emerging challenges and evolving user needs. The flexibility will be essential in the dynamic field of emergency response, where real-time adjustments will often be necessary. By adopting Agile, the team will create an environment of continuous adaptation and optimization, enabling them to pivot and refine processes as required. Additionally, Agile will emphasize collaboration and a strong user focus, which will facilitate effective communication among team members and stakeholders. The methodology will ensure the solution not only meets but exceeds user expectations. Through Agile iterative cycles, continuous interaction with users will be prioritized, producing a highly adaptive and responsive emergency response framework. The proactive approach will position the initiative for long-term success, delivering a solution that evolves alongside the shifting demands of emergency scenarios. Choosing the Agile model will be a strategic decision aimed at addressing future needs and ensuring the initiative's effectiveness in handling the evolving challenges of emergency response.

2.5.3 Steps

In the development process for the platform, the chosen model is the Agile model. It fosters iterative development, ensuring responsiveness to user needs. Collaboration and continuous improvement drive the journey towards an innovative online marketplace. The details are given below.

Sprint 1 (User Authentication): The team will focus on implementing the user authentication module, which will encompass user registration, secure login and logout functionality, and password recovery features. This initial phase will aim to establish robust access control mechanisms to ensure secure user authentication from the outset. The team will develop a comprehensive registration process, facilitate smooth login/logout operations, and create effective password recovery options. Feedback from stakeholders regarding user experience and security will inform adjustments to enhance the authentication module's performance and usability.

Sprint 2 (Product List Management): The team will implement the product list management module, focusing on features such as list creation and editing, category selection, search and filter options, and listing status management. This phase will streamline how users create and manage product listings, ensuring a user-friendly experience. Additionally, the team will prioritize performance optimization to handle large volumes of data efficiently. Continuous feedback from stakeholders will guide necessary adjustments, ensuring that the module effectively meets user needs and enhances overall usability.

Sprint 3 (Admin Dashboard): The team will focus on developing the admin dashboard module, which includes user management, performance analytics, product oversight, and notifications and alerts. This phase will empower administrators to efficiently manage user accounts, monitor system performance, and oversee product listings. The implementation of robust analytics tools will provide insights into user behavior and

product performance, facilitating data-driven decision-making. Additionally, the notifications and alerts feature will ensure that administrators stay informed about critical updates and potential issues in real time. Feedback from stakeholders will play a crucial role in refining the dashboard's functionality and enhancing the overall administrative experience.

Sprint 4 (Product Promotion): The team will focus on implementing the product promotion module, which encompasses featured listings, discount and coupon management, limited-time offers, and social media sharing. This phase will enhance the visibility of select products, allowing sellers to promote their listings effectively. The introduction of discount and coupon management features will incentivize purchases and boost sales. Additionally, limited-time offers will create urgency, encouraging users to take action quickly. Integration with social media platforms will facilitate broader outreach and engagement, allowing sellers to share promotions with their networks. Continuous feedback from stakeholders will ensure that the promotional strategies align with user preferences and business goals.

Sprint 5 (Order Management): The team will implement the order management module, focusing on order tracking, returns and refunds, status updates, and order history management. This phase will enhance user experience by providing real-time order tracking and simplifying returns and refunds for a seamless process. Users will receive timely status updates to monitor their orders, while efficient order history management will allow easy access to past purchases. Continuous feedback from stakeholders will ensure the module will meet user expectations, promoting transparency and satisfaction in the order management experience.

Sprint 6 (Local Meetup Coordination): The team will develop the local meetup coordination module, focusing on event planning tools, location-based suggestions, the MeetLink online feature, and user messaging functionalities. This phase will aim to facilitate seamless event organization and enhance user interactions. Users will benefit from tools that will streamline event planning and will receive tailored location suggestions for their meetups. The MeetLink feature will provide a dedicated platform for online interactions, while the messaging function will foster communication among users, ensuring a collaborative and engaging experience for organizing local meetups.

Sprint 7 (Business Data and Reports): The team will implement the business data and reports module, focusing on user behavior insights, sales analytics, market trend reports, and custom reporting tools. This phase will aim to enhance data-driven decision-making by providing valuable insights into user interactions and sales performance. The module will generate comprehensive reports that will help identify market trends and customer preferences. Additionally, custom reporting tools will allow stakeholders to create tailored reports, ensuring that the analytics provided will align with their specific needs and objectives for effective business strategies.

Sprint 8 (SmartRentor): The team will focus on implementing the SmartRentor module, which will include rental listing management, a booking calendar, tenant communication tools, and rental agreement templates. This phase will aim to streamline the rental process by providing landlords and tenants with efficient tools for managing listings and bookings. The booking calendar will facilitate scheduling and availability tracking, while tenant communication tools will enhance interaction between landlords and ten-

ants. Additionally, customizable rental agreement templates will simplify documentation, ensuring compliance and clarity in rental transactions.

Sprint 9 (Gamification): The team will develop the Gamification module, focusing on the implementation of a user reward system, challenges and badges, leaderboards, and engagement metrics. This phase will aim to enhance user engagement and motivation by providing interactive features that will reward participation and achievements. The user reward system will incentivize actions within the platform, while challenges and badges will encourage users to complete tasks and interact with the community. Leaderboards will foster a sense of competition, and engagement metrics will track user activity and satisfaction, informing future enhancements.

Sprint 10 (Inventory Management): The team will implement the inventory management module, focusing on stock level tracking, automated restock alerts, product categorization, and supplier management. This phase will aim to enhance inventory oversight by providing real-time visibility into stock levels and automating notifications for low inventory. The module will enable efficient categorization of products to streamline management processes and enhance user experience. Additionally, supplier management features will facilitate effective communication and collaboration with suppliers, ensuring timely restocking and optimal inventory levels to meet user demand.

Sprint 11 (Donation and Charity): The team will focus on the Donation and Charity module, which will encompass item donation facilitation, charity partnerships, donation tracking, and community impact reporting. This phase will aim to streamline the process of donating items, making it easier for users to contribute to charitable causes. Establishing partnerships with local charities will enhance the platform's outreach and impact. Donation tracking features will provide users with transparency regarding their contributions, while community impact reporting will highlight the positive effects of donations, fostering a sense of community and engagement among users.

Sprint 12 (Payment Integration): In this sprint, the team will focus on integrating a secure and reliable payment system to streamline the transaction process. Key features will include multi-currency support, enabling users to make payments in their preferred currency, and secure payment gateways to protect user information. The sprint will also cover the setup of various payment methods, such as credit/debit cards, bank transfers, and e-wallets, to provide flexibility and accessibility for all users.

Chapter 3

Software Requirements Specification

A Software Requirements Specification (SRS) is a critical document that outlines the functionality of the proposed system, an online marketplace for second-hand goods. The document ensures clear communication between stakeholders and the development team, guiding the design, testing, and implementation phases. The SRS helps prevent misunderstandings and scope creep, aligning development with the platform's objectives. It serves as a contractual agreement, aiding in product planning, cost estimation, and ensuring the final product meets user expectations. For an online marketplace, the SRS is essential for achieving success and reliability [17].

The SRS for the proposed system covers functional requirements, detailing real-world operations, and non-functional requirements, focusing on performance, security, and usability. It also specifies system constraints and dependencies, offering a clear view of the platform's scope and limitations. These sections provide essential insights into the requirements critical to the system's successful development.

3.1 Introduction

In the proposed system, the SRS document will be crucial in guiding all phases of development and ensuring alignment with platform objectives. It will help maintain consistency, estimate resources, prevent scope creep, and ensure that the product delivers an efficient and reliable platform for users to buy, sell, rent, or donate items.

3.1.1 Document Scope

The SRS for the proposed system covers all functional and non-functional requirements of the online marketplace, specifying how it operates to facilitate transactions and interactions among users. It excludes technical implementation details and code-level specifications, as well as external components not core to the platform.

3.1.2 Audience

The SRS document for the Product serves multiple audiences. The development team clarifies requirements, while stakeholders use it as a contractual reference. The quality assurance team bases test cases on it, product managers leverage it for planning, and end-users understand the platform's capabilities for effective engagement in sustainable buying and selling.

- **Development Team:** They will gain a clear understanding of the product requirements and scope, which will facilitate streamlined development. This clarity will enable effective collaboration and support the efficient implementation of features, ultimately resulting in a user-friendly platform tailored for eco-conscious consumers.
- **Project Stakeholders:** The SRS will act as a contractual reference to ensure that the delivered system will align with stakeholders' expectations. This alignment will

foster transparency and accountability, allowing stakeholders to monitor project progress and validate that outcomes will meet their objectives.

- **Quality Assurance Team:** The quality assurance team will use the SRS to craft test cases and validate the system's functionality. This approach will ensure reliability and foster user confidence in the product, ultimately enhancing overall user satisfaction.
- **Project Managers:** The SRS will assist project managers in resource allocation, planning, and progress monitoring. This guidance will support the effective functioning of the product, aligning development efforts with desired outcomes and facilitating on-time delivery that meets project objectives.
- **End Users:** The SRS will help end users understand the system's capabilities and functionalities, promoting efficient use. This clarity will minimize unnecessary actions, enabling eco-conscious consumers to effectively engage in buying, selling, renting, and donating second-hand goods through the platform.

3.2   Functional Requirements

In the Product, Functional Requirements (FR) are essential for guiding the software's development by detailing specific functions the system must possess. Acting as a contractual agreement between stakeholders and the development team, these requirements help prevent misunderstandings and scope creep. They guide product planning, design, and testing activities, ensuring that the system aligns with specified criteria. Ultimately, FR ensures that the platform delivers expected functionalities, effectively meeting the needs of eco-conscious consumers and facilitating efficient transactions in the second-hand marketplace [18].

Table 3.1 provides a detailed list of essential Functional Requirements (FR). Precision and comprehensiveness in outlining these requirements are crucial for the successful implementation and adoption of the software by stakeholders.

Table 3.1: Functional Requirements

Requirement ID	Description
FR1	Users can register, log in, and log out.
FR2	Users can create, edit, and delete product listings.
FR3	Users can search and filter products by categories.
FR4	Users can communicate in real time with buyers/sellers.
FR5	Users can manage user profiles and preferences.
FR6	Users can facilitate secure payment transactions.
FR7	Users can donate items and track donation history.
FR8	Users can generate reports on sales and user activity.
FR9	Users can track stock levels for products.
FR10	Users can track the status of their orders.

3.3   Non-Functional Requirements

In the product , Non-Functional Requirements (NFR) are essential for determining the quality and user experience. These requirements encompass performance, security,

reliability, and usability, which are crucial for the platform's success. NFRs ensure that the system not only delivers its intended functionalities but also adheres to high standards of responsiveness, data security, and user-friendliness. They significantly influence the final product, impacting how users engage with the platform and rely on it for sustainable buying, selling, and donating practice [19].

In the following sub-sections of NFR, key quality attributes and constraints essential for the product are explored. These include system performance, security measures, reliability criteria, and usability standards. Such NFRs ensure the platform meets and exceeds user expectations while maintaining high-quality standards and user experience.

3.3.1 Software Quality Attributes

Software Quality Attributes are crucial characteristics that define the quality and performance of a software system. Key attributes must be considered to ensure the success of the product , including performance efficiency, security, reliability, and usability, all of which significantly impact user satisfaction and engagement.

- **Performance:** The system must be highly responsive for rapid alert processing and real-time communication among responders.
- **Security:** Data must be encrypted to protect sensitive information and maintain the system's integrity from unauthorized access.
- **Reliability:** The system should operate without failures, especially during critical emergencies, ensuring consistent performance and trust.
- **Usability:** An intuitive user interface enables emergency responders to navigate and use the system effectively and efficiently.
- **Scalability:** The system must accommodate increased usage and data volume as the user base expands over time.
- **Maintainability:** The platform should allow for quick updates and fixes without disrupting service, ensuring continued functionality.
- **Availability:** The system must be accessible 24/7 to support emergency responders at any time during urgent situations.

3.3.2 Performance Requirements

The performance requirements for the product are designed to meet the dynamic needs of users engaging in buying, selling, donating, and renting second-hand goods. The system must be highly responsive, facilitating quick loading times and seamless navigation for users. It should handle a significant number of concurrent users and manage product listings without performance degradation. Scalability is crucial to ensure consistent response times during peak usage periods .Additionally, the platform must guarantee 24/7 availability, minimizing downtime and disruptions since users may access the site at any time. These performance expectations ensure effective support for eco-conscious consumers and promote a positive experience in their sustainable shopping practices.

3.3.3 Safety Requirements

Safety is paramount in Product, which includes stringent requirements to protect users and promote responsible transactions. The platform features secure user authentication and data encryption to safeguard personal information and ensure transaction integrity. Additionally, it incorporates measures to prevent fraudulent activities, such as robust user verification processes and real-time monitoring. These protocols enhance the system's reliability and trustworthiness, fostering a secure and safe environment for buying, selling, donating, and renting second-hand goods.

3.3.4 Other Non-Functional Requirements

The Product software must meet several critical requirements for effectiveness and usability. It should be compatible with various devices and platforms, facilitating access for a diverse user base. Integration with other e-commerce systems and payment gateways is essential for seamless transactions. Accessibility is paramount, ensuring usability by individuals with disabilities. The platform must manage data retention and comply with privacy regulations while allowing for easy retrieval of historical transactions. Additionally, comprehensive auditing and logging mechanisms should be included for tracking activities and ensuring accountability. These requirements ensure that the product is a comprehensive, reliable tool for sustainable second-hand commerce.

3.4 Requirements Gathering Techniques Used

Requirements gathering techniques are fundamental in software development, ensuring alignment with stakeholders' needs. For product these methods are crucial for understanding the diverse needs of users, including buyers and sellers of second-hand goods. Systematic techniques such as interviews, surveys, and observations are employed to collect and prioritize requirements. These techniques serve as the foundation for the software's design and development, facilitating a comprehensive understanding of user needs and expectations. By utilizing these techniques, product aims to create a solution that addresses the dynamic and varied requirements of its users, ultimately enhancing the platform's effectiveness and usability in promoting sustainable consumption [20].

The development of the proposed app involved two key requirements gathering techniques. Each technique was discussed in the subsequent sections, which provided insight into the specific methodologies employed during the app's development. These techniques had been carefully chosen to ensure a comprehensive and accurate of user needs and system requirements, ultimately enhanced the app's effectiveness and user satisfaction.

3.4.1 Brainstorming

Brainstorming involves generating innovative ideas and solutions to software challenges by gathering a group of individuals who freely contribute thoughts and suggestions without judgment. The process begins with defining the problem, encouraging participants to produce numerous ideas, regardless of their practicality. After generating a list, the group evaluates and discusses these ideas to identify the most promising concepts and formulate an implementation plan. The technique is essential in software engineering, promoting innovative solutions, identifying potential risks early, fostering

collaboration among team members, and encouraging creative problem-solving [21].

A series of brainstorming sessions were conducted to leverage the collective creativity and expertise of the team and key stakeholders. These sessions addressed specific system facets, aiming to generate innovative ideas, identify challenges, and align the final software product with product objectives. Each session included distinct participants, such as developers, designers, testers, and end-users, enabling comprehensive exploration of ideas that shape the software's features, user experience, quality, and performance.

User-Centric Enhancement Session: This session aimed to improved the user interface and overall experience of product. Participants included UI designers, UX researchers, and representatives from the target user base. Discussions focused on streamlining the user journey, enhanced accessibility, and increased user satisfaction. Outcomes included proposals for a more intuitive navigation structure, simplified product listing processes, and features for effective user communication and feedback.

Quality and Performance Enhancement Session: Centered on ensuring the software's robustness, security, and performance, this session involved quality assurance experts, software testers, and system administrators. Participants identified strategies to enhance data security, implement rigorous testing protocols, and optimize the application's performance. Recommendations included developing thorough testing methodologies, utilizing encryption for secure transactions, and strategies to ensure system reliability during peak usage.

Feature Enrichment Session: This session focused on expanding the functionalities of product. Developers, product managers, and key stakeholders brainstormed potential enhancements and additional features for the final platform. Discussions led to ideas such as improved search and filtering options, integration of advanced payment gateways, and tools for promoting community engagement through user-generated content and reviews.

3.4.2   Requirements Workshop

Requirements Workshop is a structured, interactive method used to define and refine software requirements. The approach is key to ensuring that stakeholders' needs are accurately captured and incorporated into the software's design and functionality. Through collaborative sessions, cross-functional teams—including developers, product managers, and key stakeholders—come together to discuss, prioritize, and document each requirement for the Product. These workshops promote open communication, align expectations, and establish a shared understanding of the software's scope and objectives. [23].

The Requirements Workshop for Product brought together a diverse team of software developers, eco-conscious advocates, product managers, and stakeholders—totaling around 12 participants. Each individual contributed unique expertise, offering perspectives that ranged from technical functionality to user experience and market needs. The varied backgrounds helped ensure a well-rounded view of requirements, addressing every critical facet of the Product. The workshop followed an organized process, beginning with a clear overview of the platform's sustainability goals and consumer-oriented objectives.

The Requirements Workshop focused on capturing essential requirements related to features, usability, and scalability. Participants, including developers, eco-conscious ad-

vocates, and product managers, discussed features such as real-time messaging, secure payment gateways, and intuitive navigation to enhance browsing. The sessions covered user-friendly interface design, system performance, and scalability to support a growing community of eco-conscious users. Open idea-sharing fostered a sense of ownership, enabled early identification of potential challenges, and encouraged collaborative problem-solving.

3.5 Time Frame

Requirements Gathering Techniques are crucial for successful software development. These methodologies involve collecting and understanding stakeholders' needs, ensuring the software fulfills its intended purpose. By establishing a foundation for design and development, these techniques facilitate effective communication between stakeholders and development teams. Their systematic application helps accurately identify and prioritize features, leading to a product that meets user requirements and aligns with stakeholders' expectations, ultimately delivering value to end-users. Thus, these techniques are essential for successful software execution [22].

Table 3.2 provides the schedule for the proposed app with 9 key iterations each focusing on specific functionalities. Ensuring efficient coordination and completion of each phase within the designated time frame.

Table 3.2: Time Frame

Phase	Duration
Sprint 1: User Authentication	20 days
Sprint 2: Product List Management	20 days
Sprint 3: Admin Dashboard	20 days
Sprint 4: Product Promotion	20 days
Sprint 5: Order Management	20 days
Sprint 6: Local Meetup Coordination	20 days
Sprint 7: Business data and Reports	20 days
Sprint 8: SmartRentor	20 days
Sprint 9: Gamification	20 days
Sprint 10: Inventory Management	20 days
Sprint 11: Donation and Charity	20 days
Sprint 12: Payment Integration	20 days

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