University of Eldoret

flame of knowledge and innovation

BICYCLE E-COMMERCE WEBSITE

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A PROJECT SUBMITTED TO THE DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE IN PARTIAL FULFILLMENT OF THE AWARD FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE) OF UNIVERSITY OF ELDORET.

Declaration

We hereby declare that the work presented in this project report titled Bicycle Ecommerce Website is entirely our own work, except where explicitly stated otherwise. All sources used have been properly acknowledged and referenced. No part of this project has been submitted for any other qualification at any institution.

The candidate has developed this project under my supervision as the university supervisor

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Dedication

We dedicate this project to Our supervisors. Their unwavering support, encouragement, and inspiration have been instrumental throughout this journey. This project is a testament to their belief in our abilities and their constant encouragement to strive for excellence. Thank you for being our guiding light and for always believing in us.

Acknowledgements

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Furthermore, we would like to acknowledge the support our friends who have been a constant source of encouragement and motivation. Their unwavering belief in us has fueled our determination to succeed.

Lastly, we are thankful to the University of Eldoret for providing us with the necessary resources and facilities to undertake this project.

<u>Abstract</u>

As more people use the internet, online shopping is becoming popular. In Kenya, bikes are a common way to get around, usually bought from shops. This study looks at what makes people want to buy bikes online in Kenya. It compares how important different factors are to Kenyan shoppers. The findings can help bike businesses in Kenya make online shopping better for customers.

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF FIGURES

CHAPTER ONE

INTRODUCTION AND BACKGROUND STUDY

With the rise of online shopping, more people are turning to the internet to buy everything from clothes to groceries. However, the bicycle industry has been slower to adapt to this trend. Many people still prefer to visit physical stores to buy bikes, where they can see and test ride the bicycles before making a purchase.

While physical stores offer the advantage of hands-on experience, they also come with limitations. Customers often need to travel long distances to find the right bike shop, which can be inconvenient. Additionally, store hours may not always align with customers' schedules, making it difficult for them to visit during open hours.

Recognizing these challenges, there's a growing need to bring the convenience of online shopping to the world of bicycles. By creating an e-commerce platform for bike sales, we aim to bridge the gap between traditional retail and online convenience. This shift not only caters to the preferences of modern consumers but also opens up new opportunities for bike manufacturers and sellers to reach a broader audience.

Moving bike sales online presents numerous opportunities for both customers and businesses. For customers, it means the ability to browse and purchase bikes from the comfort of their homes, without the constraints of physical distance or operating hours. They can also access a wider selection of products and compare prices more easily.

For businesses, transitioning to online sales means tapping into a larger market and reducing overhead costs associated with maintaining physical storefronts. It also allows for more efficient inventory management and targeted marketing strategies to reach specific customer segments.

With this project, we envision creating a user-friendly platform that replicates the experience of shopping at a physical bike store, but in a virtual environment. Customers will have access to detailed product descriptions, high-resolution images, and even to help them make informed purchasing decisions. Through innovative

features and responsive customer support, we aim to redefine the bike buying experience and set a new standard for online retail in the bicycle industry.

1.2. Motivation

We know that buying a bike can be hard work. You might have to visit many stores, trying out different bikes, and it can take a lot of time. We thought about how we could make this easier for people.

We love bikes, and we've been through the struggle of finding the right one. We thought, wouldn't it be great if there was an easier way to find and buy bikes? That's why we got motivated to create this online bike store.

We want to help people who love bikes as much as we do. By making it easier to buy bikes online, we hope to save people time and effort. Plus, we want to make sure they get the right bike for them without all the hassle.

We've heard from many people who say they'd love to buy bikes online if it was easier. So, we decided to do something about it. We want to make sure that buying bikes online is as simple and enjoyable as possible for everyone.

We believe that by creating this online bike store, we can make a positive difference in people's lives. Whether it's helping someone find their dream bike or saving them a trip to the store, we want to make bike shopping a breeze for everyone.

Our motivation comes from our love of bikes and our desire to make bike shopping easier for everyone. By creating this online bike store, we hope to make a positive impact on the biking community and help people find their perfect ride with ease.

1.3. Problem Statement

Selling bikes physically is tough because the customer reach is limited. The customers have to travel to the sellers place in order to view, inspect and test bikes. They have to go to different stores, which takes a lot of time and effort. It's hard to find the right bike, and sometimes the stores don't have what customers want. For sellers, finding buyers and managing sales records can be a challenge. This makes buying and selling bikes a difficulty for everyone involved.

1.4. Objectives of the Study

i. To Define Project Scope: we clearly outline the goals of the bicycle ecommerce website project, including the timeline, budget and desired features.

ii. To Prepare the Development Environment: Set up development environments, including web servers, relational databases such as mySQL, and version control systems like Git. Install necessary development tools, frameworks, and libraries.

iii. To Design and Develop User Interfaces: Design intuitive user interfaces for browsing bicycles, product pages and completing transactions.

iv. To Integrate Backend Functionality: Implement backend functionality for processing orders and updating records in the database

v. To Integrate Payment Gateways: integrate online transactions platforms like Google Pay which can facilitate user payments.

vi. To Test and Deploy the Website: conduct thorough testing to ensure functionality and performance.

1.5. Justification

Our project aims to simplify the process of buying and selling bikes online, driven by the understanding that the current experience can be challenging for both buyers and sellers. We recognize the convenience of online shopping for customers but acknowledge the difficulties they face in finding the right bike and accessing comprehensive information. Similarly, sellers encounter obstacles in reaching potential buyers and managing their sales effectively. By creating a user-friendly platform that addresses these issues, we strive to enhance the overall experience of buying and selling bikes online, making it easier and more enjoyable for everyone involved.

1.6. Scope and Limitations

Our project focuses on developing an online platform for buying and selling bikes, with features tailored to meet the needs of both customers and sellers. We aim to provide a comprehensive solution that includes easy browsing and purchasing options for customers, as well as efficient listing and management tools for sellers. However, it's important to acknowledge certain limitations. Our initial efforts will concentrate on establishing a presence within a specific market region, with potential expansion in the future. Additionally, while we strive to offer a seamless user experience, we may encounter challenges such as technical limitations and resource constraints during the development process. Furthermore, our ability to ensure the accuracy and reliability of product information and delivery services may be influenced by external factors beyond our control, such as supplier availability and shipping regulations. Despite these limitations, we remain committed to delivering a valuable and user-friendly online platform for bike enthusiasts.

CHAPTER TWO

LITERATURE REVIEW

Electronic commerce (e-commerce) refers to companies and individuals that buy and sell goods and services over the internet. E-commerce operates in different types of market segments and can be conducted over computers, tablets, smartphones, and other smart devices (ANDREW, 2024).

As noted above, e-commerce is the process of buying and selling tangible products and services online. It involves more than one party along with the exchange of data or currency to process a transaction. It is part of the greater industry that is known as electronic business (e-business), which involves all of the processes required to run a company online.

E-commerce has helped businesses (especially those with a narrow reach like small) gain access to and establish a wider market presence by providing cheaper and more efficient distribution channels for their products or services. Target supplemented presence with an online store that allows customers to purchase everything from clothes and coffeemakers to toothpaste and action figures right from their homes.

Providing goods and services isn't as easy as it may seem. It requires a lot of research about the products and services you wish to sell, the market, audience, competition, as well as expected business costs.

E-commerce has experienced rapid growth since its humble beginnings with e-commerce sales projected to grow to 599.2 billion USD by 2024. The COVID-19 outbreak saw e-commerce sales spike 25% in March 2020 alone. The power of e-commerce should not be underestimated as it continues to pervade everyday life and present significant opportunities for small, medium, and large businesses and online investors (Smale, 2020).

A major advantage of eCommerce is the potential to reach thousands of new customers daily. Traditional brick and mortar businesses are limited to the customer base that lives and works in the vicinity of the store, or those that pass through while

traveling. However, if you start an online retail presence, you'll never again be limited by geography. Essentially, if you can promote your shop online and people are interested in your products, anyone in the world could be your customer, provided you are willing to ship to them. (lightspeed, 2021)

The ability to have customers complete orders 24 hours a day is invaluable. A potential customer can roll over in bed at 4 AM, think of something they want to buy, search for it on your site and make the purchase instantly. And you, the small business owner, don't have to pay for the resources to physically keep a store open 24 hours a day.

On the supply side, eCommerce stores can remain open without paying staff to run the registers and manage the store. On the demand side, shoppers don't have to pay travel costs in order to make a purchase.

A winter storm might stop a person from making the drive to a mall, or paying a visit to your local business, but it won't limit a visit to an online store, reinforcing the effects of cost and convenience on the popularity of eCommerce in the modern era.

Setting up an online business is significantly cheaper and easier than opening a physical store. Brick-and-mortar businesses face several upfront costs, including renting and stocking a retail space, purchasing sales equipment, and potentially hiring employees. Setting up an ecommerce website requires a smaller initial investment. Potential business expenses include buying a domain name, paying web hosting fees, and purchasing services from an ecommerce solutions platform. (staff, 2023)

The global bicycle industry has experienced significant growth over the past decade, with the market size reaching USD 47.51 billion in 2020 and projected to reach USD 75.6 billion by 2027, representing a compound annual growth rate (CAGR) of 6.1% during the forecast period (Grand View Research, 2021). This growth is fueled by various factors, including increasing urbanization, rising health and fitness consciousness among consumers, and growing environmental concerns. Notably, North America and Europe are key markets for bicycles, with a strong demand for electric bicycles (e-bikes) driving market expansion (Statista, 2021). The Asia-Pacific

region, particularly China and Japan, dominates the global bicycle market due to high production and consumption levels (Research and Markets, 2020).

Several notable trends are shaping the bicycle industry's trajectory. E-bikes, in particular, have witnessed significant growth globally, driven by advancements in battery technology, increasing consumer preference for eco-friendly transportation options, and government initiatives promoting electric mobility (Fortune Business Insights, 2020). Additionally, there's a growing trend towards using bicycles for urban commuting and last-mile connectivity, as cities worldwide seek sustainable mobility solutions to alleviate traffic congestion and reduce environmental pollution (European Cyclists' Federation, 2020). Furthermore, the COVID-19 pandemic has accelerated the shift towards online retailing in the bicycle industry, with e-commerce platforms offering convenience and safety amid lockdowns and social distancing measures (Retail Dive, 2020).

Consumer behavior within the bicycle industry reflects evolving preferences and priorities. Increasing environmental awareness has prompted consumers to choose bicycles as a sustainable mode of transportation, contributing to the market's growth momentum (Mintel, 2020). Moreover, there's a growing emphasis on health and fitness, with consumers integrating cycling into their lifestyle as a means to stay active and improve well-being. This trend has fueled demand for premium bicycles and accessories catering to health-conscious individuals (Bicycle Retailer, 2021). Additionally, consumers are increasingly seeking customization and personalization options when purchasing bicycles, reflecting a desire for unique products and tailored experiences (Forbes, 2019).

An analysis of various e-commerce platforms used for selling bicycles online reveals a diverse landscape of options catering to the specific needs and preferences of bicycle retailers. Shopify, WooCommerce, and Magento are among the leading platforms utilized by businesses in the bicycle industry to establish and manage their online presence.

Shopify is a popular choice for its user-friendly interface, scalability, and extensive range of features tailored for e-commerce. It offers customizable templates, robust

inventory management tools, and seamless integration with third-party applications, making it suitable for both small startups and large enterprises in the bicycle sector (Hussain et al., 2019). Moreover, Shopify's dedicated support and comprehensive documentation enable bicycle retailers to efficiently set up and operate their online stores, minimizing technical barriers and maximizing sales potential.

WooCommerce, an open-source e-commerce plugin for WordPress, provides flexibility and customization options favored by bicycle businesses seeking a tailored online solution. With WooCommerce, retailers have full control over their store's design, functionality, and content, allowing for seamless integration with existing WordPress websites and plugins (Al-Azmi et al., 2018). Additionally, WooCommerce offers various extensions and add-ons to enhance the shopping experience, such as advanced product customization tools and integrated payment gateways, catering to the diverse needs of bicycle consumers.

Magento, known for its robust features and scalability, is a preferred choice for bicycle retailers requiring advanced customization and enterprise-level capabilities. As an open-source platform, Magento offers extensive customization options, allowing businesses to create unique and feature-rich online stores tailored to their specific requirements (Ivanchenko et al., 2020). Furthermore, Magento's robust architecture and support for large product catalogs make it suitable for bicycle retailers with complex inventory management needs, including multiple product variants, configurations, and pricing options.

The role of technology in enhancing the online bicycle shopping experience is crucial for improving customer engagement, satisfaction, and ultimately, conversion rates. Several technologies contribute significantly to this enhancement.

Augmented Reality (AR) and Virtual Reality (VR) enable customers to virtually try out bicycles and accessories before making a purchase, providing a more immersive and engaging shopping experience. For example, customers can visualize how different bicycle models would look in their surroundings or customize features like colors and accessories in real-time. This technology reduces uncertainty and increases confidence in purchasing decisions (Barton, Shen, & Love, 2019).

Advanced product customization tools empower customers to personalize their bicycles according to their preferences. These tools allow users to select from a range of options such as frame size, color, components, and accessories. Research indicates that offering customization options can significantly enhance customer satisfaction and loyalty (Pine & Gilmore, 1998).

AI-powered algorithms analyze customer data to offer personalized product recommendations and promotions. By understanding individual preferences and browsing behavior, retailers can provide tailored suggestions, improving the relevance and effectiveness of marketing efforts (Li, Shang, & Zhang, 2020). AI can also optimize pricing strategies and inventory management, ensuring timely availability of popular bicycle models (Verhoef, Kannan, & Inman, 2015).

Mobile apps and responsive website design are essential for providing a seamless shopping experience across devices. Mobile apps offer features like push notifications and mobile payments, enhancing engagement and convenience for on-the-go shoppers (Deng, Tandon, Rong, & Li, 2020). Responsive design ensures that the website adapts to different screen sizes and resolutions, providing a consistent user experience.

Chatbots and virtual assistants provide instant support and assistance to customers throughout their shopping journey. These AI-powered tools can answer product-related questions, provide sizing recommendations, and assist with order tracking and returns. By automating routine tasks, chatbots improve efficiency and enhance customer service (Wang, Yu, & Wei, 2019).

User Experience (UX) and Interface Design play pivotal roles in shaping the success of online bicycle retail platforms by ensuring seamless navigation, intuitive interaction, and engaging visual presentation. A well-designed UX/UI enhances customer satisfaction and fosters trust, ultimately leading to increased conversion rates and customer retention. Research indicates that an intuitive and user-friendly interface significantly influences users' perception of a website's credibility and

usability, thus impacting their willingness to engage and make purchases (Möller & Sitzmann, 2017). Elements such as clear product categorization, easy-to-use search functionality, and visually appealing product displays contribute to a positive user experience. Moreover, incorporating responsive design principles to optimize the platform's performance across various devices and screen sizes is crucial for accommodating the preferences of diverse users (Suresh & Shinde, 2021). Additionally, conducting usability testing and gathering user feedback are essential strategies for iteratively improving the platform's UX/UI design to meet evolving customer needs and preferences (Hassenzahl et al., 2013). By prioritizing UX/UI design, online bicycle retailers can create compelling and user-centric digital experiences that drive engagement, loyalty, and ultimately, business success.

Several online bicycle retailers have successfully implemented UX/UI design strategies to enhance customer satisfaction and drive business growth. Here are two case studies showcasing notable examples.

Canyon Bicycles, a German-based manufacturer and retailer of high-performance bicycles, is renowned for its exceptional online shopping experience. The company's website features a sleek and intuitive interface that prioritizes simplicity and ease of navigation. Canyon utilizes high-quality product imagery, detailed specifications, and user-generated reviews to provide customers with comprehensive information about each bicycle model. The website's responsive design ensures a seamless experience across desktop, tablet, and mobile devices, catering to customers' preferences for shopping on-the-go. Furthermore, Canyon offers innovative customization options, allowing customers to tailor their bicycles to their exact specifications, from frame size to component selection. By focusing on user-centric design principles and leveraging cutting-edge technologies, Canyon Bicycles has earned a reputation for delivering outstanding UX/UI in the online bicycle retail industry.

Veloretti, a Dutch bicycle brand specializing in stylish urban bicycles, has differentiated itself in the competitive online bicycle market through its emphasis on minimalist design and personalized shopping experiences. Veloretti's website features clean and visually appealing layouts, with clear product categorization and

intuitive navigation menus. The company places a strong emphasis on storytelling, using engaging content and lifestyle imagery to evoke emotions and inspire customers. Veloretti offers a unique "Build Your Bike" tool, enabling customers to customize their bicycles with various color options and accessories in real-time. This interactive feature not only enhances user engagement but also empowers customers to create bicycles that reflect their individual style and preferences. Additionally, Veloretti prioritizes customer service and support, offering responsive live chat assistance and hassle-free returns, further enhancing the overall shopping experience. Through its commitment to user-centric design and personalized service, Veloretti has successfully established itself as a leading player in the online urban bicycle market.

Bicycle e-commerce introduces several distinctive logistics challenges that retailers must navigate to ensure efficient operations and customer satisfaction throughout the purchasing process. Firstly, the logistics of product delivery are paramount, as bicycles are not only bulky but also require specialized packaging to prevent damage during transit. Moreover, the size and weight of bicycles pose constraints for shipping carriers, necessitating strategic partnerships with reliable freight services to minimize shipping costs and delivery times (Jones & Bonsall, 2016). Secondly, the assembly of bicycles upon delivery presents additional logistical hurdles, as customers may require clear and detailed instructions to properly set up their bicycles. Retailers may opt to provide optional assembly services or partner with local bike shops to offer professional assembly assistance, balancing convenience with cost-effective solutions (Reinartz & Wiegand, 2015). Lastly, managing returns and exchanges in bicycle e-commerce can be complex and costly, given the intricacies involved in inspecting and restocking assembled bicycles. Retailers must establish clear return policies and streamline the return process, leveraging technologies such as return shipping labels and local pickup services to minimize inconvenience for customers (Fernie & Sparks, 2014). By addressing these logistics challenges effectively, bicycle e-commerce retailers can optimize their operations and provide a seamless shopping experience for customers, ultimately fostering loyalty and driving business growth.

Leading online bicycle retailers have embraced innovative supply chain solutions to streamline operations, enhance efficiency, and deliver exceptional service to customers. One such solution is the implementation of advanced inventory management systems that utilize real-time data analytics to optimize inventory levels and ensure timely availability of products (Fleischmann et al., 2014). By leveraging predictive analytics and demand forecasting algorithms, retailers can anticipate customer demand trends and adjust inventory accordingly, minimizing stockouts and overstock situations. Additionally, many online bicycle retailers have adopted a dropshipping model, where products are shipped directly from manufacturers or distributors to customers, eliminating the need for holding inventory and reducing storage costs (Chopra & Meindl, 2019). This approach not only improves inventory turnover rates but also enables retailers to offer a wider selection of products without increasing warehouse space. Furthermore, leading online bicycle retailers have invested in automated fulfillment technologies, such as robotic picking systems and conveyor belt systems, to streamline order processing and reduce order fulfillment times (Raman, 2017). By automating repetitive tasks and optimizing warehouse layouts, retailers can minimize labor costs and improve order accuracy, thereby enhancing the overall customer experience. Overall, by adopting these innovative supply chain solutions, leading online bicycle retailers are able to meet customer expectations for fast and reliable service while maintaining competitive advantage in the dynamic e-commerce landscape.

The evaluation of sustainability practices in the supply chain of bicycle e-commerce reveals a growing emphasis on environmental responsibility and social impact among retailers. One key aspect of sustainability in the bicycle industry is the promotion of eco-friendly transportation alternatives, aligning with the industry's commitment to reducing carbon emissions and promoting healthier lifestyles (Fishman, 2016). Many bicycle e-commerce retailers prioritize the use of sustainable materials and manufacturing processes in their product offerings, such as utilizing recycled materials for bicycle frames and components and implementing energy-efficient

production methods (Cleary & Johnson, 2016). Additionally, leading retailers have implemented initiatives to minimize waste and promote recycling throughout the product lifecycle, from packaging materials to end-of-life bicycle disposal (Reckwitz & Wolling, 2017). Furthermore, some retailers have adopted sustainable transportation practices in their supply chain operations, such as optimizing delivery routes and utilizing electric vehicles for last-mile delivery, to reduce the carbon footprint associated with product distribution (Leboullenger et al., 2018). By prioritizing sustainability practices in their supply chain operations, bicycle e-commerce retailers not only contribute to environmental conservation but also enhance brand reputation and customer loyalty among environmentally-conscious consumers.

Responsive customer service plays a critical role in online retailing, serving as a cornerstone for building trust, fostering loyalty, and ensuring customer satisfaction. In the digital realm, where face-to-face interactions are limited, prompt and attentive customer service becomes essential for addressing inquiries, resolving issues, and providing personalized assistance to shoppers. Research indicates that responsive customer service significantly influences customers' perceptions of a brand's reliability and credibility, ultimately impacting their purchasing decisions and likelihood of repeat business (Wang et al., 2019). Moreover, in the highly competitive landscape of e-commerce, where consumers have myriad options at their fingertips, delivering exceptional customer service can serve as a key differentiator for retailers seeking to stand out from the crowd (Reinartz & Wiegand, 2015). By offering responsive customer service channels such as live chat support, email assistance, and social media engagement, online retailers can demonstrate their commitment to customer care and create positive experiences that drive customer loyalty and advocacy (Floh & Treiblmaier, 2006). Furthermore, responsive customer service not only resolves immediate issues but also provides valuable feedback and insights that retailers can leverage to improve their products, services, and overall customer experience (Gounaris et al., 2010). In summary, responsive customer service is

paramount in online retailing, serving as a vital component of customer relationship management and contributing to long-term business success.

A review of studies on customer satisfaction and loyalty in the context of bicycle e-commerce reveals several key findings and insights. Research in this area indicates that customer satisfaction plays a crucial role in driving loyalty and repeat purchase behavior among online bicycle shoppers (Kim & Park, 2019). Factors such as product quality, delivery speed, and customer service responsiveness significantly impact customers' overall satisfaction levels and likelihood of recommending the retailer to others (Jones & Bonsall, 2016). Moreover, studies suggest that providing personalized shopping experiences, such as offering customization options and tailored product recommendations, can enhance customer satisfaction and strengthen brand loyalty in the competitive bicycle e-commerce market (Lee & Lee, 2018). Additionally, customer engagement with the online platform, including browsing behavior, interaction with product reviews, and social media engagement, has been identified as a predictor of satisfaction and loyalty, highlighting the importance of fostering meaningful connections with customers throughout their shopping journey (Tutuncu, 2020). Overall, understanding the drivers of customer satisfaction and loyalty in bicycle e-commerce is essential for retailers to design effective marketing strategies, optimize the online shopping experience, and cultivate long-term relationships with their customer base.

Security and privacy concerns are paramount in the context of bicycle e-commerce, as online transactions involve the exchange of sensitive personal and financial information between customers and retailers. One of the primary concerns is the risk of data breaches and cyberattacks, which can result in the unauthorized access, theft, or misuse of customer data (Kshetri, 2017). Moreover, the proliferation of mobile shopping apps and online payment platforms introduces additional vulnerabilities, such as malware and phishing scams targeting unsuspecting users (Xu et al., 2018). Customers are increasingly concerned about the privacy of their personal information,

including their browsing history, purchase behavior, and location data, as retailers collect and analyze this data to personalize marketing efforts and improve customer experiences (Chen et al., 2017). Furthermore, the implementation of stringent security measures, such as encryption protocols, secure payment gateways, and multi-factor authentication, is essential to safeguard customer data and prevent unauthorized access (Mell, 2011). By addressing security and privacy concerns effectively, bicycle e-commerce retailers can build trust and confidence among their customer base, thereby fostering long-term relationships and driving business growth.

Bicycle e-commerce websites implement a range of security measures to protect customer data and transactions from potential cyber threats. One of the fundamental security measures is the use of Secure Sockets Layer (SSL) encryption, which encrypts data transmitted between the customer's browser and the website's server, ensuring that sensitive information such as credit card details and personal information cannot be intercepted by malicious actors (Kshetri, 2017). Additionally, reputable bicycle e-commerce websites employ secure payment gateways, such as PayPal or Stripe, which handle payment processing securely, reducing the risk of payment fraud and unauthorized access to financial information (Xu et al., 2018). Moreover, many e-commerce platforms implement multi-factor authentication (MFA) systems to verify the identity of users during login or transaction processes, adding an extra layer of security beyond traditional password protection (Mell, 2011). Furthermore, regular security audits and vulnerability assessments are conducted to identify and address potential weaknesses in the website's infrastructure and codebase, minimizing the risk of data breaches and cyberattacks (Chen et al., 2017). By implementing these security measures comprehensively, bicycle e-commerce websites can instill confidence in customers and demonstrate their commitment to protecting sensitive information and ensuring secure transactions.

Privacy concerns related to online tracking, data sharing, and targeted advertising have become increasingly prevalent in the digital landscape, raising important ethical and regulatory considerations. Online tracking refers to the collection of user data,

including browsing history, search queries, and location information, often without the explicit consent or knowledge of users (Mayer & Mitchell, 2012). This practice enables companies to create detailed profiles of individuals' online behavior, which can then be shared with third parties for targeted advertising purposes (Turow et al., 2015). However, the widespread use of online tracking has raised concerns about user privacy and data security, as sensitive information may be collected and exploited without adequate safeguards in place (Acquisti et al., 2015). Moreover, the practice of data sharing between companies further exacerbates privacy risks, as user data may be passed on to multiple parties without transparency or accountability (Hannak et al., 2013).

Targeted advertising, enabled by the extensive collection and analysis of user data, allows advertisers to deliver personalized ads based on individuals' interests, demographics, and browsing behavior (Goldfarb & Tucker, 2011). While targeted advertising can enhance the relevance and effectiveness of marketing campaigns, it also raises concerns about privacy intrusion and the manipulation of consumer preferences (Turow et al., 2015). Users may feel uncomfortable with the level of surveillance inherent in targeted advertising and the potential for their personal information to be exploited for commercial gain without their explicit consent (Hoofnagle et al., 2014). Furthermore, the lack of transparency and control over the collection and use of their data undermines users' trust in online platforms and diminishes their willingness to engage with targeted advertising (Zimmeck et al., 2016).

In response to these privacy concerns, regulatory frameworks such as the General Data Protection Regulation (GDPR) in Europe and the California Consumer Privacy Act (CCPA) in the United States have been introduced to protect individuals' privacy rights and impose restrictions on data collection, sharing, and use (European Union, 2016; California Legislative Information, 2018). These regulations require companies to obtain explicit consent from users before collecting their personal data, provide clear information about data practices and purposes, and offer users control over their data through opt-out mechanisms and data access requests (Hannak et al., 2013).

However, the effectiveness of regulatory measures in addressing privacy concerns related to online tracking, data sharing, and targeted advertising remains subject to ongoing debate, highlighting the complex and evolving nature of privacy challenges in the digital age.

Emerging trends in bicycle e-commerce encompass a variety of factors reshaping the industry landscape. Notably, the proliferation of electric bicycles (e-bikes) has become a prominent trend, reflecting a growing interest in sustainable and efficient transportation alternatives (Fleischmann et al., 2014). E-bikes combine the benefits of traditional cycling with electric propulsion, appealing to a broader audience including commuters and recreational riders. As battery technology advances and prices become more affordable, the popularity of e-bikes continues to soar, prompting bicycle e-commerce retailers to expand their product offerings to cater to this evolving market segment. Additionally, subscription models have emerged as a novel approach in bicycle e-commerce, offering customers flexible access to bikes and related services through recurring payment plans (Girod & Freire, 2017). These subscription-based platforms often include features such as bike rentals, maintenance services, and exclusive perks, providing convenience and flexibility to consumers while promoting sustainability through bike sharing initiatives. By embracing these emerging trends, bicycle e-commerce retailers can stay ahead of the curve, meet evolving consumer demands, and drive growth in the dynamic e-commerce landscape.

CHAPTER THREE

METHODOLOGY

3.1 Waterfall Model

The Waterfall model is a linear sequential approach to software development, where each phase must be completed before moving on to the next. This methodology is well-suited for projects with well-defined requirements and stable environments.

3.1.1 Requirements Analysis

Objective:

- Gather requirements from stakeholders, including the features, functionalities, and constraints of the bicycle ecommerce website.

- Document the requirements in detail, ensuring clarity and completeness.

Steps:

1. **Stakeholder Engagement:** We identified key stakeholders for our project, focusing on current campus students in the vicinity of the University of Eldoret. By engaging with these stakeholders, we aimed to gain insights into their experiences with purchasing bicycles and understand their expectations for an improved ecommerce platform.

2. **Requirements Gathering:** Through interviews, we delved into the personal experiences of campus students regarding their bicycle purchasing journeys. We sought to uncover the challenges they faced, their preferences, and suggestions for enhancements to the ecommerce platform.

3. **Requirements Documentation:** Following the stakeholder engagement and requirements gathering phases, we meticulously documented the gathered insights and expectations. The requirements documentation encompasses a detailed breakdown of desired features, functionalities, and constraints for the bicycle ecommerce platform. Each requirement is thoroughly described, with clear specifications, acceptance criteria, and any relevant visual aids such as diagrams or mockups to ensure clarity and understanding. This

comprehensive documentation serveds as a roadmap for the development team, guiding the implementation process and ensuring alignment with stakeholder needs and project objectives.

3.1.2. System Design

Client-Server Architecture

In this architecture, the client(browser) sends the requests to the server, and the server processes the request if a request is valid then it responds with the requested data to the client. The client hosts the user interface(UI) while the server hosts the business logic and database.
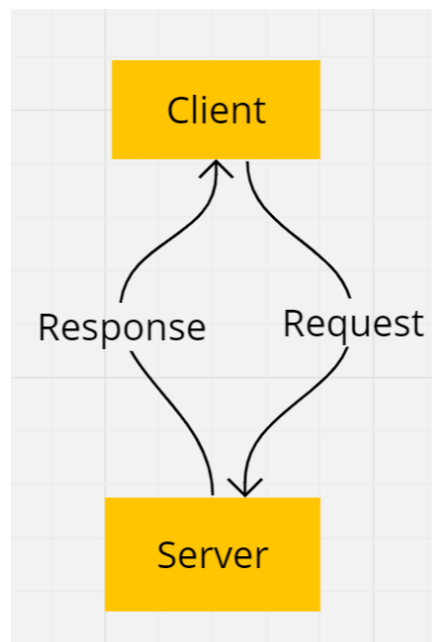
Figure 1 Client-Server Architecture

Database schema

In order to support the backend functionality of the bicycle ecommerce website, we will design a comprehensive database schema. The database schema will serve as the foundation for storing and managing various data entities, including product information, user data, orders, and transactions.
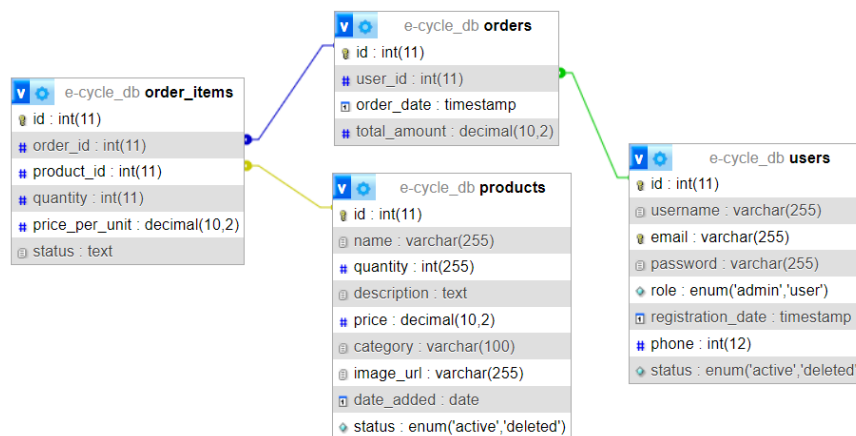

Figure 2 Database schema

The database schema will include the following entities:

1. **Products -** This entity will store information about the bicycles available for sale on the website, including attributes such as bike name, description, price, available quantity, category and inventory status (either active or deleted).

2. **Users:** This entity will contain details about registered users of the website, including customer profiles, login credentials, shipping addresses, and order history.

3. **Orders:** This entity will capture information about individual orders placed by customers, including order ID, user ID, order date, total amount.

4. **Order Items:** This entity will represent the individual items included in each order, including the product ID, quantity, and price per item.

The database schema will be implemented using a relational database management system (RDBMS), such as MySQL

User Authentication

- **User Model:** Stores user information, such as User ID (autogenerated), username, password, email address, phone number

- **Signup:** Allow users to register with a username, email, password and potentially other relevant details. Validate username uniqueness (ensure no duplicate usernames exist).

- **Login:** Verify user credentials (username and password) upon login attempts

- **Session Management:** Maintain user sessions upon successful login (e.g., using session tokens or cookies). Authenticate subsequent requests by verifying these tokens/cookies.

Inventory Management

- **Product Model:** Create a data structure to store product information, such as product ID, name, price, description, quantity, and associated images (URLs).

- **Stock Updates:** Track product availability in real-time using an inventory database. Deduct stock quantities from the database whenever an order is placed for a particular product. Reflect stock updates across the platform (user interface and search results).

Order Processing

1. **Order Placement:** Process orders initiated by users, including: Validating product availability in the cart against current stock levels. Calculating the total order amount based on product prices and quantities. Provide options for users to enter payment information securely (integrate with payment gateways).

2. **Order Fulfillment:** Upon successful payment, create a new order record in the database with a status of "pending" awaiting the admin to approve the order. The order -record should include details like user ID, product details (ID, quantity, price), total order amount, and timestamps. Reduce the corresponding product stock levels in the inventory database.

3. **Order Tracking:** Allow users to track the status of their orders (processing, completed). Provide functionalities for order history retrieval based on user ID.

Additional Considerations

- **Scalability:** Design the backend to handle increasing numbers of users, products, and orders efficiently. Consider technologies like cloud databases and message queues.

- **Security:** Implement robust security measures to protect user data (e.g., encrypted storage of passwords) and prevent unauthorized access to the system. Regularly update software dependencies to address vulnerabilities.

- **Error Handling:** Implement proper error handling mechanisms to gracefully handle unexpected situations (e.g., out-of-stock scenarios, payment failures) and provide informative messages to the user.

- **Logging and Auditing:** Maintain order history even when items are deleted from the database and system events for auditing purposes and troubleshooting.
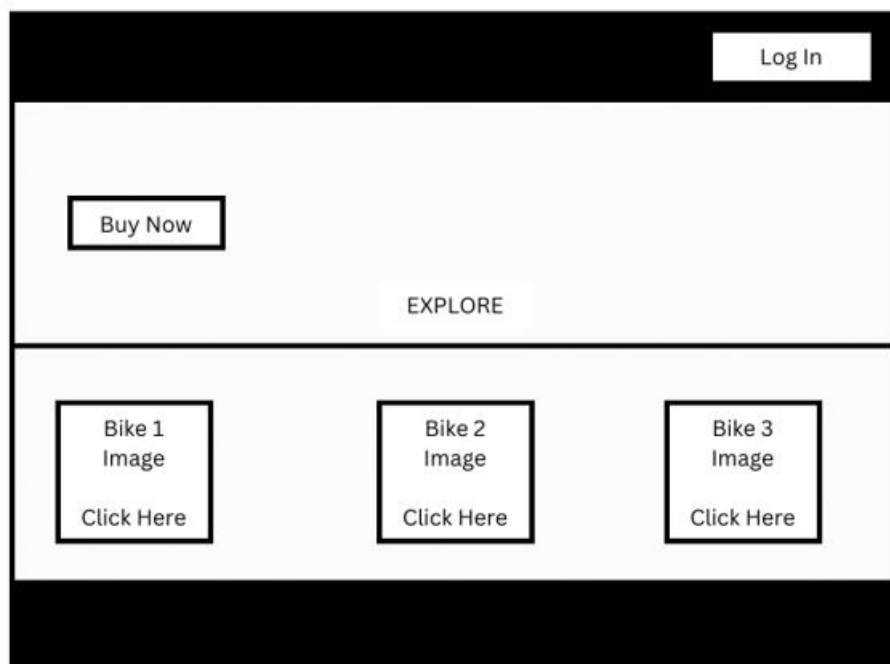
3.1.2.1 User Interfaces

Landing Page

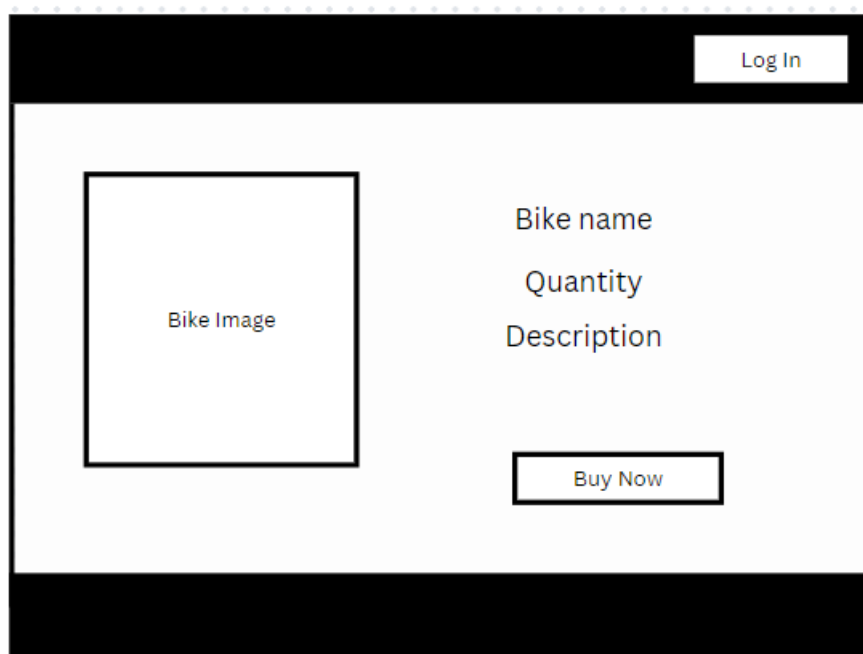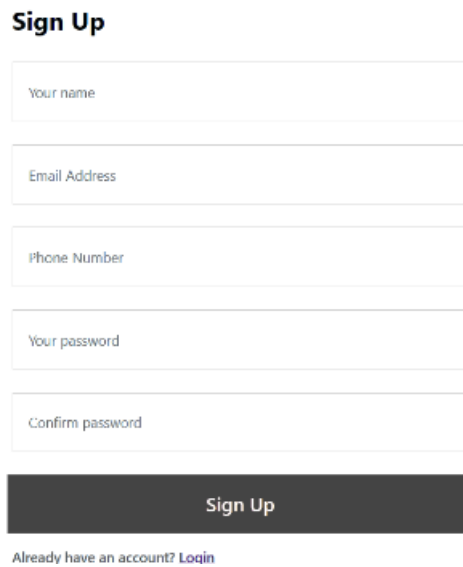

Figure 3 Landing Page

Product Details Page

Figure 4 Product Details Page

User Sign-Up Page
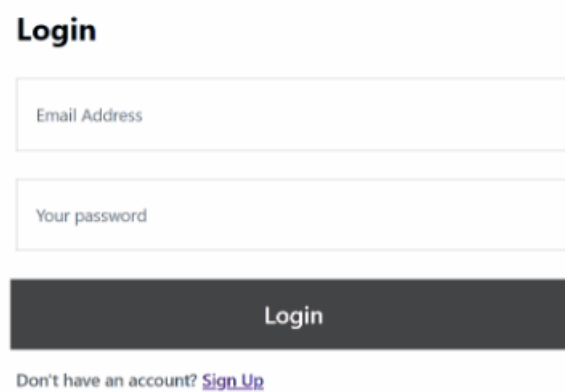
Figure 5 User Sign-Up Page

User-Login Page

Figure 6 User Login Page

User Profile Page

Figure 7 User Profile Page

Admin Page

Figure 8 Admin Page

After implementing the initial design for the bicycle ecommerce website, we organized a stakeholder meeting where representatives from different departments provided feedback on the user interface, functionality, and overall user experience. We collected their suggestions and concerns regarding the website's navigation, product presentation, checkout process, and payment options.

Following the stakeholder meeting, we conducted usability testing sessions with a group of target users selected from our customer base. During these sessions, participants were asked to perform specific tasks on the website while providing feedback on their experience. We observed their interactions with the website, noted any issues they encountered, and gathered insights into their preferences and expectations.

Based on the feedback received from both stakeholders and usability testing sessions, we identified areas for improvement and refinement in the website design. These insights were used to make necessary adjustments to the user interface, streamline navigation pathways, optimize the checkout process, and enhance the overall user experience.
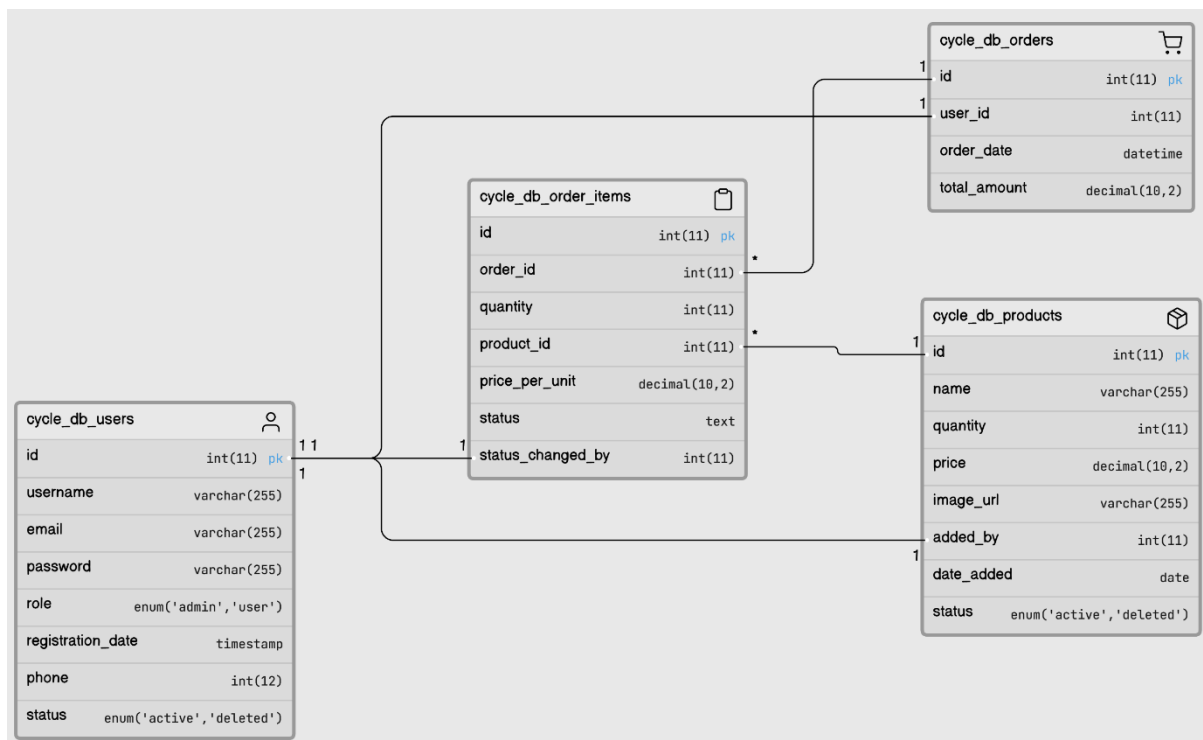
3.1.2.2 Entity – Relationship Diagram

Figure 9 Entity - Relationship Diagram
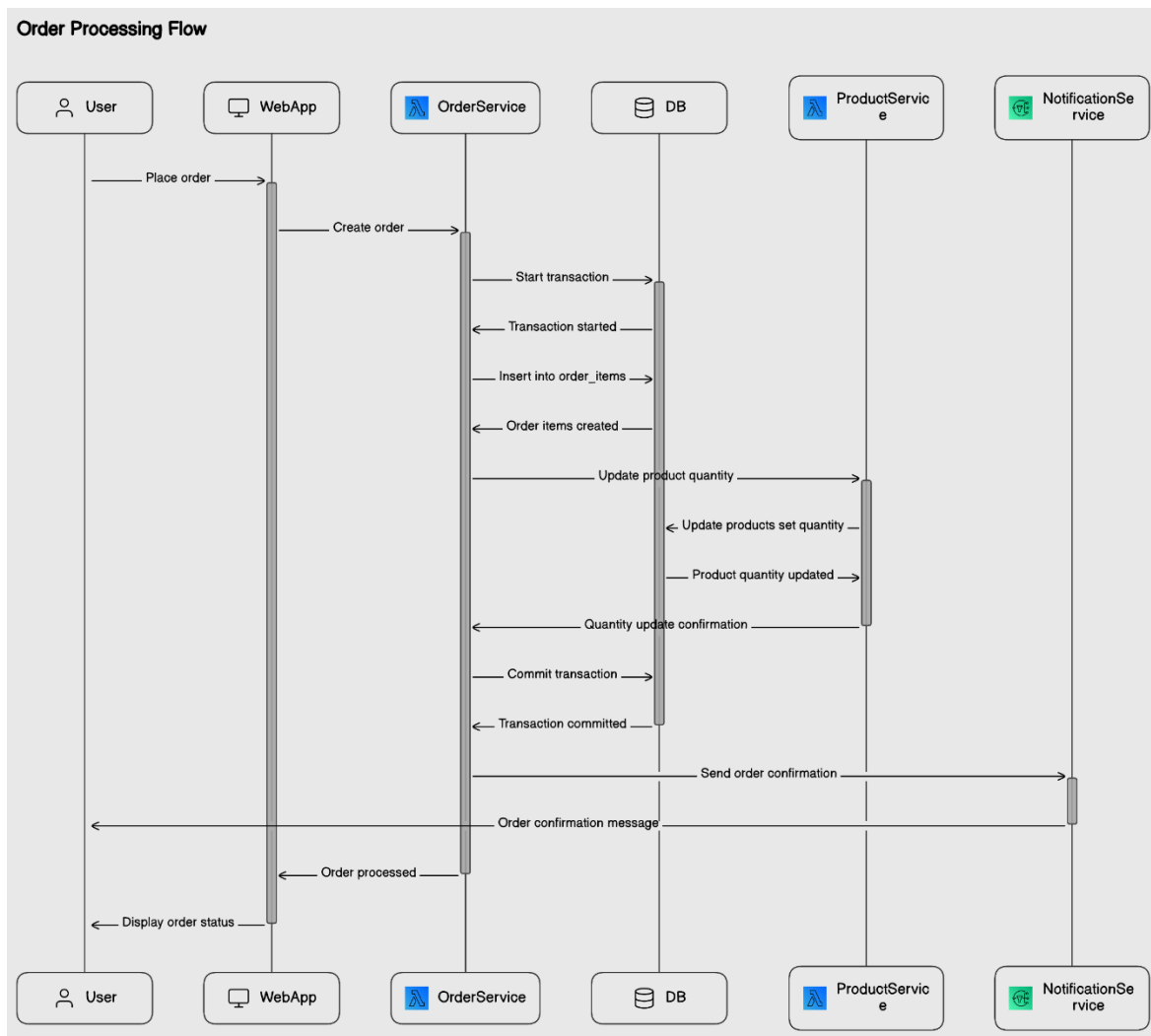
3.1.2.3 Sequence Diagram

Figure 10 Sequence Diagram
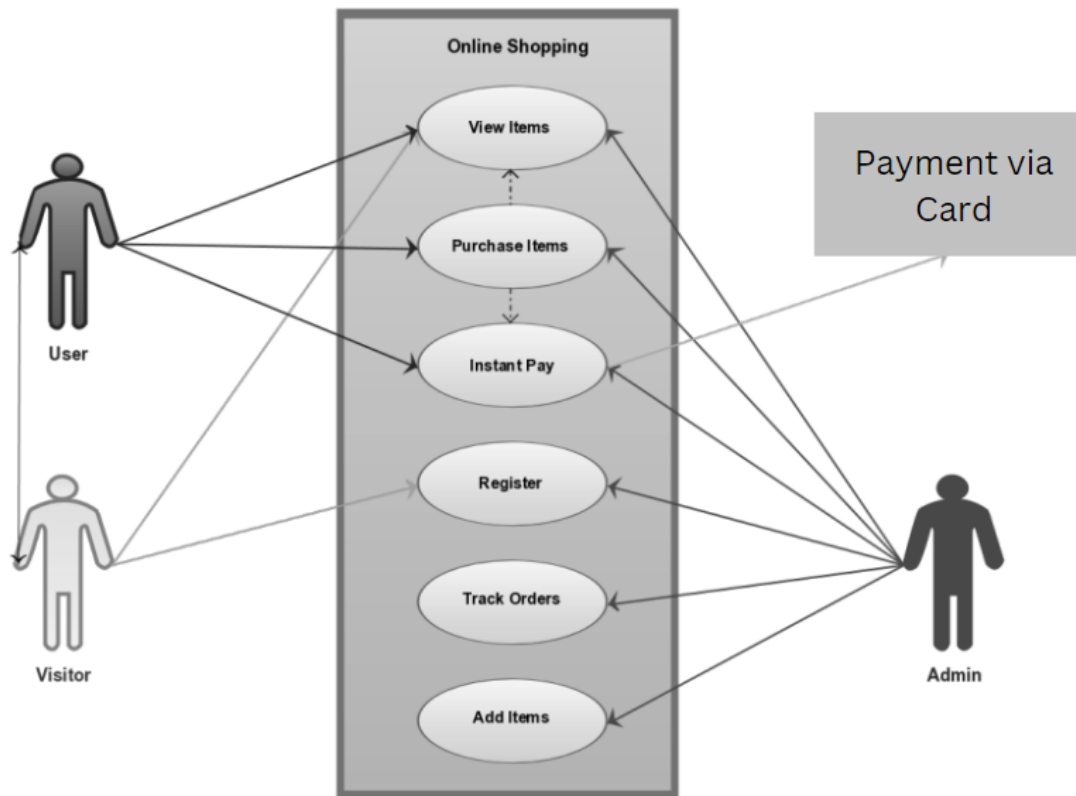
3.1.2.4 Use Case Diagram

Figure 11 Use case diagram

3.1.3 Implementation

With the design well illustrated and user feedback incorporated, the implementation phase proceeded as follows:

1. **Frontend Development**: Using the detailed design specifications, frontend development commenced with the creation of **HTML/CSS** templates. These templates reflected the visual elements and layout outlined in the design, ensuring consistency across all pages. This guarantee optimal viewing experiences on various devices.

2. **Client-Side Scripting**: JavaScript was employed for client-side scripting to enhance interactivity and user engagement. This included implementing dynamic content loading, form validation, and animations as per the design requirements. We employed a JavaScript front-end library, React.js.

3. **Backend Development**: Backend development focused on building the server-side logic to handle user requests and process data. Using a suitable server-side language Node.js to create APIs to interact with the frontend and facilitate communication with the database.

4. **Database Integration**: The database, configured based on the schema design, was integrated into the backend system. Using SQL queries, data gets stored, retrieved, and manipulated as required by the application. The database ensures seamless management of user information, product details, orders, and other relevant data.

5. **Payment Gateway Integration**: Payment gateway services were integrated to enable secure online transactions. This involved setting up APIs provided by payment service providers for example Google Pay, and implementing encryption protocols such as HTTPS to safeguard sensitive user information during payment processing.

3.1.4 Testing

1. **Unit Testing**: Each component of the application, both frontend and backend, underwent unit testing to ensure individual functionalities work as intended. Testing frameworks such as Jest were employed.

2. **Integration Testing**: Integration testing verifies the interaction between different modules of the application, ensuring seamless communication and data flow between frontend, backend, and database components.

3. **Regression Testing**: After implementing changes based on user feedback, regression testing was performed to ensure that existing functionalities remain intact and unaffected by the updates.

4. **Performance Testing**: The application's performance was evaluated under various conditions, including different levels of user traffic and data loads. Performance testing tools measure response times, server performance, and scalability to identify and address any performance bottlenecks.

3.1.5 Deployment:

Once all testing phases for the bicycle ecommerce website were completed and the website was ready for release, the deployment phase began:

1. **Deployment Planning**: Developed a deployment plan outlining the steps and timelines for moving the website from the testing environment to production servers. This plan included considerations for server configurations, domain registration, and SSL certificate installation.

2. **Server Setup**: Configured production servers with the necessary software and settings to support the website. This included installing web servers (e.g., Apache), database servers (e.g., MySQL), and any other required dependencies.

3. **Database Migration**: We migrated the database from the testing environment to the production servers. We also verified that all data was transferred accurately and that database connections were configured correctly in the website's backend code.

4. **Testing in Production**: Conducted final testing in the production environment to ensure that the website functioned correctly and performs well under real-world conditions. We tested all website features, including browsing products, placing orders, and making payments.

5. **Monitoring and Backup Setup**: We implemented monitoring tools to track website performance, server health, and security threats. Set up regular backups of website data and configurations to mitigate the risk of data loss in case of unexpected events.

3.1.6 Maintenance and Support:

After the bicycle ecommerce website was successfully setup, ongoing maintenance and support are essential to ensure its smooth operation and continued success:

1. **Issue Resolution**: Provide prompt support to address any issues or bugs reported by users. Implement fixes and patches as needed to maintain website functionality and performance.

2. **Updates and Enhancements**: Regularly review user feedback and analytics data to identify areas for improvement. Implement updates and enhancements to enhance user experience, add new features, or address changing business requirements.

3. **Security Updates**: Stay vigilant against security threats by applying security updates and patches to the website, server software, and third-party dependencies. Regularly scan for vulnerabilities and implement security best practices to protect user data and maintain trust.

4. **Performance Optimization**: Continuously monitor website performance and identify opportunities for optimization. This may include optimizing code, improving server configurations, and implementing caching mechanisms to reduce load times and improve user experience.

5. **Scalability Planning**: Plan for future scalability by monitoring website traffic trends and anticipating growth. Implement scalability measures such as load balancing, caching, and scaling server resources as needed to accommodate increasing demand.

6. **User Training and Documentation**: Provide training and documentation to website administrators and staff members to ensure they can effectively manage and operate the website. This includes instructions for content updates, order processing, and website administration tasks.

3.2 Build and Fix

This methodology aims to provide the flexibility required for quick adaptation to evolving requirements while ensuring a structured framework for development and quality assurance.
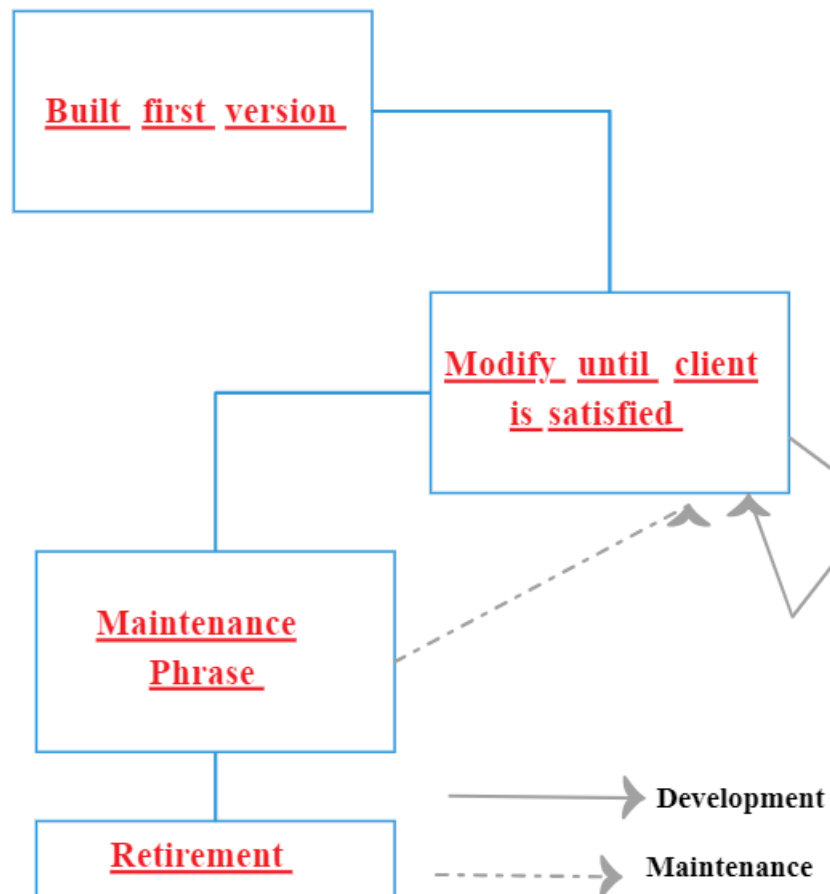

Figure 12 Build and Fix

3.2.1. Iterative Development:

The development process is organized into iterative cycles, allowing for the incremental delivery of features and functionalities.
Each iteration focused on addressing specific user stories and requirements, with regular feedback sessions driving subsequent iterations.

3.2.2. Agile Principles:

Agile principles, including collaboration, flexibility, and responsiveness to change, were integrated into the development process.

Cross-functional teams collaborated closely with stakeholders to prioritize tasks and made informed decisions throughout the project lifecycle.

3.2.3. Minimalistic Documentation:

While documentation is essential for ensuring knowledge transfer and maintaining consistency, emphasis is placed on lean documentation practices.

Documentation was kept concise and targeted, focusing on essential aspects such as system architecture, key design decisions, and user stories.

3.2.4. Continuous Feedback Loop:

A feedback-driven development approach was adopted, with stakeholders actively involved in providing feedback on prototypes, mockups, and early releases.

Feedback was then collected through various channels, including user interviews, usability testing, and stakeholder meetings, to inform iterative improvements.

3.2.5. Rapid Prototyping:

Rapid prototyping techniques are utilized to quickly validate design concepts and gather user feedback.

Low-fidelity prototypes are iteratively refined based on user input, enabling early identification of usability issues and design flaws.

3.2.6. Lightweight Testing and Bug Fixing:

Testing was integrated throughout the development process, with a focus on identifying critical bugs and usability issues early on.

Automated testing tools are leveraged to streamline the testing process and facilitate continuous integration and deployment.

3.2.7. Regular Review and Retrospective:

Regular review meetings are conducted to evaluate project progress, identify bottlenecks, and adjust priorities as needed.

Retrospective sessions are held at the end of each iteration to reflect on lessons learned, celebrate successes, and identify areas for improvement.

3.2.8. Balancing Speed and Quality:

While speed is important for meeting project deadlines and delivering value to stakeholders, quality remains a top priority.

Trade-offs between speed and quality are carefully evaluated, with a focus on delivering a robust and user-friendly e-commerce platform.

3.2.9. Transition to Structured Approach:

In summary, the methodology employed in the development of the e-commerce platform for bike selling combines the flexibility of agile practices with the structured framework of traditional development methodologies. By prioritizing iterative development, continuous feedback, and a focus on quality, the project aims to deliver a responsive and user-centric solution that meets the evolving needs of stakeholders.

CHAPTER FOUR

PROJECT MANAGEMENT

4.1 Project scope

In our bicycle e-commerce website project, the primary objective is to create a user-friendly online platform where customers can easily browse, and purchase bicycles. This platform will serve as a one-stop-shop for all bicycle enthusiasts, providing them with a wide range of options to choose from.

Objective: Develop an online platform for selling bicycles and related accessories to customers worldwide.

Scope:

- Design and develop a user-friendly website with intuitive navigation and a visually appealing interface.

- Implement essential features such as product listings, product management and secure checkout.

- Integrate payment gateways for seamless transactions

- Ensure compatibility with multiple devices (Desktop / Laptops) and browsers to maximize accessibility for users.

Success Criteria:

- Maintain website uptime of 99.9% to minimize disruptions in service.

4.2. Project Stakeholders and Communication Channels:
Stakeholders:

Development Team: Includes web developers, designers, and testers responsible for building and testing the website.

Customers: End-users of the website who provide valuable feedback on usability and functionality.

Communication Channels:

Resource Allocation:

a) Team Members:

In a group of 4, we divided ourselves, each member to do a specific role

- Web Developers (2): Responsible for frontend and backend development, ensuring functionality and performance.

- UI/UX Designer (1): Designs user interfaces and layouts to enhance the website's visual appeal and usability.

- Quality Assurance Tester (1): Conducts thorough testing to identify and rectify any bugs or issues before launch.

b) Budget

Category	Item	Cost
Development Costs	Payment Gateway Integration	KES 4,000
Testing Costs	Testing Tools and Software Licenses	KES 1,500
Hardware Costs	Two Laptops	KES 86,000
Internet Costs	Internet Subscription Fees	KES 13,000
Total Budget		**KES 154,000**

Table 1 Budget Costs

c) Technology Infrastructure:

- Development Tools: Subscriptions to web development platforms, design software, and testing tools.

- Payment Gateways: Integration with trusted payment processors to facilitate secure online transactions.

4.3. Project Planning

4.3.1 Project Plan

Phase	Task	Milestone	Timeline
Requirements Gathering	GatherIng requirements from stakeholders	Completion of requirements gathering	**Week 1-2**
Design	Creation wireframes and mock-ups	Completion of frontend design	**Week 3-4**
Development	Implemented frontend development	Completion of frontend development	**Week 5-6**
Development	Implemented backend development	Completion of backend development	**Week 7-8**
Testing	Conducted usability testing	Completion of usability testing	**Week 9-10**
Deployment	Website built ready for production	Completion of deployment	**Week 11-12**
Maintenance and Support	Provide ongoing maintenance and support for the website	Ongoing process post-deployment	**Continuous**

Table 2 Project Plan

4.3.2 Project Dependencies

In developing a bicycle ecommerce website, it's crucial to define project dependencies and critical paths to ensure a smooth and timely delivery of the final product. Let's outline these aspects for our project:

1. **Identify the sequence of tasks:**

- Task 1: Requirements gathering

- Task 2: Designing the user interface

- Task 3: Frontend development

- Task 4: Backend development

- Task 5: Database integration

- Task 6: Payment gateway integration

- Task 7: Testing

- Task 8: Deployment

- Task 9: Maintenance

2. **Determine task dependencies:**

- Task 2 depends on Task 1 (Design cannot start without understanding requirements).

- Task 3 depends on Task 2 (Frontend development relies on finalized designs).

- Task 4 depends on Task 3 (Backend development requires completed frontend).

- Task 5 depends on Task 4 (Database integration relies on backend functionality).

- Task 6 depends on Task 5 (Payment gateway integration requires a functional database).

- Task 7 depends on Task 6 (Testing can only start after integration tasks are complete).

- Task 8 depends on Task 7 (Deployment follows successful testing).

- Task 9 can start parallelly with Task 8 (Maintenance begins post-deployment).

3. **Identify critical paths:**

- The critical path for our bicycle ecommerce website project is Tasks 1-9.

- Any delay in completing these tasks will directly impact the project's overall timeline.

- By understanding this critical path, we prioritized resources and efforts to ensure these tasks are completed efficiently and on time.

4.4. Implementing Agile Methodology

1. **Utilizing Project Management Tools:** To effectively track tasks, assign responsibilities, and monitor progress, project management tools such as Jira, Trello, or Asana were employed. These platforms provided a centralized location for organizing tasks, setting deadlines, and visualizing project workflows. Team members could easily update task statuses, collaborate on assignments, and track overall progress in real-time.

2. **Maintaining Clear Communication Channels:** Clear and transparent communication channels were crucial to ensure that team members remained aware of their responsibilities and deadlines. Regular communication via platforms like Slack, Microsoft Teams, or email facilitated information sharing, clarification of tasks, and resolution of any issues or concerns. Additionally, periodic check-ins and team meetings allowed for open discussions and alignment on project goals and objectives.

3. **Regular Review of Project Metrics and KPIs:** Project metrics and key performance indicators (KPIs) were regularly reviewed to evaluate progress and identify areas for improvement. Metrics such as task completion rates, sprint velocity, and burn-down charts provided insights into project health and performance. By analyzing

these metrics, the project team could proactively address any bottlenecks, adjust timelines, or reallocate resources as needed to ensure project success.

4. **Conducting Regular Project Status Meetings:** Regular project status meetings were held to facilitate discussions on progress, address issues, and make necessary adjustments to the project plan. These meetings provided an opportunity for team members to share updates, discuss challenges, and collaborate on solutions. By maintaining open communication and regularly reviewing project status, the team could identify potential risks early and take proactive measures to mitigate them.

4.5. Task Tracking and Progress Monitoring:

1. **Breaking down project requirements**:

   Project requirements were broken down into smaller tasks to facilitate easier management. For instance, instead of addressing "frontend development" as a single task, it was divided into smaller tasks such as "designing homepage layout" and "implementing product listing page."

2. **Conducting regular sprint planning meetings**:

   Regular sprint planning meetings were conducted at the beginning of each sprint, which typically lasted 2-4 weeks. During these meetings, prioritized user stories from the product backlog were reviewed to determine which ones would be addressed in the upcoming sprint. Tasks were then assigned to team members based on their skills and availability to ensure a balanced workload across the team.

3. **Holding daily stand-up meetings**:

   Daily stand-up meetings were held by the project team each day during the sprint. These short meetings, often referred to as daily scrums, served to provide updates on progress. Team members shared what they had accomplished since the last meeting, outlined their plans for the next tasks, and discussed any obstacles or blockers they had encountered. These meetings played a crucial role in keeping everyone aligned, identifying potential issues early on, and fostering collaboration among team members.

4.6. Quality Assurance and Testing

1. **Developing a Comprehensive Testing Strategy:** A comprehensive testing strategy was developed to ensure the quality and reliability of the bicycle ecommerce website. This strategy encompassed various types of testing, including functional testing, usability testing, performance testing, and security testing. Test cases were meticulously designed to cover all aspects of the website's functionality and features.

2. **Implementing Automated Testing Tools and Frameworks:** Automated testing tools and frameworks were implemented to streamline the testing process and identify bugs and issues early in the development cycle. Tools such as Selenium for automated browser testing and JUnit for unit testing were leveraged to automate repetitive test scenarios and accelerate the testing process. This approach helped improve testing efficiency and reduce manual effort.

3. **Conducting Thorough Testing Across Different Devices and Browsers:** Thorough testing was conducted across a wide range of devices, browsers, and user scenarios to verify functionality, usability, and performance. Compatibility testing ensured that the website rendered correctly and functioned optimally on various devices, screen sizes, and operating systems. Cross-browser testing was performed to validate consistent behaviour across popular web browsers such as Chrome, Firefox, Safari, and Edge.

4. **Involving Stakeholders and End-Users in User Acceptance Testing (UAT):** Stakeholders and end-users were actively involved in user acceptance testing (UAT) to gather feedback and validate that the website met their requirements and expectations. UAT sessions were organized to allow stakeholders and real end-users to interact with the website, perform common tasks, and provide feedback on usability, design, and functionality. Their input was invaluable in identifying any remaining issues or areas for improvement before the website's launch.

4.6. Change Management:

1. **Establishing a Formal Change Management Process**: A formal change management process was established to handle scope changes, requirements updates, and other project modifications effectively. This process defined the steps and procedures for requesting, evaluating, approving, and implementing changes to the project.

2. **Documenting Change Requests**: Change requests were documented thoroughly to capture the details of proposed modifications, including the rationale behind the change, the anticipated benefits, and any potential risks or impacts on the project. Each change request was assigned a unique identifier for tracking purposes and logged in the change management system.

3. **Assessing Impact on Project Scope, Schedule, and Budget:** Upon receiving a change request, the project team conducted a thorough assessment to evaluate its impact on project scope, schedule, and budget. This assessment considered factors such as resource requirements, timeline adjustments, and cost implications to determine the feasibility and consequences of implementing the change.

4. **Obtaining Approval from Project Stakeholders:** Change requests were presented to project stakeholders for review and approval before implementation. Stakeholders were provided with relevant information and analysis to help them make informed decisions about whether to approve, reject, or defer the proposed changes. Approval from stakeholders was obtained through formal sign-off procedures to ensure accountability and alignment with project goals.

5. **Communicating Updates to the Project Team and Relevant Stakeholders:** Once a change request was approved, updates were communicated promptly to the project team and relevant stakeholders. This included informing team members about any adjustments to project scope, schedule, or budget, as well as providing clarity on their roles and responsibilities in implementing the approved changes. Effective communication helped maintain transparency and alignment throughout the change management process.

CHAPTER FIVE

DISCUSSION

Firstly, we started by gathering requirements from potential users and stakeholders. We conducted surveys and interviews to understand their needs and preferences. Based on this feedback, we developed a plan for the platform's design and functionality.

Next, we moved on to the implementation phase. We used agile methodologies to manage the development process efficiently. This involved breaking down the project into smaller tasks and prioritizing them based on user feedback and business objectives. We then developed the platform iteratively, regularly delivering updates to incorporate new features and improvements.

For the implementation overview, we focused on creating a user-friendly interface that makes it easy for buyers and sellers to navigate the platform. We ensured that the platform provides clear information about products and supports secure transactions. Additionally, we implemented features such as personalized recommendations and responsive customer support to enhance the user experience.

As for the sample code, below is a simplified example of how we implemented SQL query to select all orders along with user details:

app.get('/orders', (req, res) => {

  // Execute SQL query to select all orders along with user details

connection.query('SELECT orders.id AS order_id, orders.user_id, users.username, users.email, order_items.product_id, order_items.quantity, order_items.price_per_unit, order_items.status, orders.order_date, products.name FROM orders JOIN order_items ON orders.id = order_items.order_id JOIN products ON order_items.product_id = products.id JOIN users ON orders.user_id = users.id', (err, results) => {

```javascript
    if (err) {

        console.error('Error fetching orders:', err.stack);

        res.status(500).json({ error: 'Internal server error' });

        return;

    }


    // If no orders found

    if (results.length === 0) {

        res.status(404).json({ error: 'No orders found' });

        return;

    }


    // Orders found, send back the order data

    res.status(200).json(results);

  });

});
```

```
app.get('/orders', (req, res) => {
    // Execute SQL query to select all orders along with user details
    connection.query('SELECT orders.id AS order_id, orders.user_id, users.username,
        if (err) {
            console.error('Error fetching orders:', err.stack);
            res.status(500).json({ error: 'Internal server error' });
            return;
        }

        // If no orders found
        if (results.length === 0) {
            res.status(404).json({ error: 'No orders found' });
            return;
        }

        // Orders found, send back the order data
        res.status(200).json(results);
    });
});
```

Figure 13 Sample Code

in addition to the implementation, we also developed screen displays to showcase the platform's features, such as product listings, search functionality, and checkout process. These displays were designed to be visually appealing and easy to use, ensuring a positive user experience.

For gathering data, we implemented functionality to gather and organize information related to user interactions, product listings, and transactions. This involved creating databases to store user profiles, product details, and transaction history. By effectively organizing and managing this data, we were able to provide personalized recommendations, track user behaviour, and generate insights to improve the platform's performance.

In terms of outcomes, our implementation efforts resulted in a functional and user-friendly online bike buying and selling platform. Users can easily browse through product listings, view detailed product information, and make secure transactions. The platform also offers personalized recommendations based on user preferences and browsing history, enhancing the overall shopping experience.

Furthermore, our implementation approach allowed for scalability and flexibility, enabling us to adapt to changing user needs and market trends. We incorporated feedback from users and stakeholders throughout the development process, iteratively improving the platform based on their input.

Overall, our implementation efforts culminated in the successful creation of an online bike retail platform that prioritizes user experience, convenience, and trust. By focusing on user feedback, implementing key features, and leveraging data-driven insights, we have created a platform that meets the needs of both buyers and sellers in the online bike retail market.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

In conclusion, our project successfully developed an online bike buying and selling platform that prioritizes user experience, convenience, and trust. Through careful planning, implementation, and iteration, we created a user-friendly interface that enables seamless transactions and personalized recommendations. By incorporating user feedback and leveraging data-driven insights, we have ensured that the platform meets the needs of both buyers and sellers in the online bike retail market.

Looking ahead, we recommend continuing to gather user feedback and monitor platform performance to identify areas for improvement. This could involve implementing additional features based on user requests, refining existing functionalities to enhance usability, and exploring opportunities for expanding the platform's reach and impact. Additionally, ongoing maintenance and updates will be necessary to ensure the platform remains secure, reliable, and up-to-date with evolving technology and user expectations.

Overall, our project has laid a strong foundation for further development and innovation in the online bike retail space. By continuing to prioritize user-centric design and responsiveness to user needs, we can further enhance the platform's effectiveness and cement its position as a valuable resource for both buyers and sellers in the online bike market.

In wrapping up our project, we've successfully created an online bike marketplace that's easy to use and helpful for both buyers and sellers. We've listened to feedback, made improvements, and built a platform that people can trust.

Moving forward, we suggest keeping an eye on how people use the platform and what they want. This means asking for feedback regularly and making changes based on what we learn. We might also think about adding new features or making things even easier to use.

Lastly, we need to keep the platform running smoothly. This means fixing any problems quickly and keeping everything up-to-date. By doing these things, we can make sure our platform stays helpful and keeps people coming back.

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Appendix A: Survey Questions

How often do you purchase bikes online?

What factors influence your decision to buy a bike online?

What features do you look for in an online bike marketplace?

How important is user experience when browsing for bikes online?

What improvements would you like to see in existing online bike marketplaces?