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Development of a Web-Based Selling System Utilizing the RajaOngkir API at Toko Hijab ByAlya to Enhance Online Transaction Performance

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Abstract

Toko Hijab By Alya, located in Kudus, is a newly established hijab retail store that faces challenges in reaching potential customers who do not use mobile-based e-commerce applications. To address this issue, a web-based selling system has been developed, integrated with the RajaOngkir API. This system allows customers to conveniently purchase hijab products online without the need to install additional applications, while simultaneously providing real-time and accurate shipping cost estimations. The integration of the RajaOngkir API enables the calculation of shipping fees from various courier services, enhancing transparency and improving customer satisfaction regarding delivery charges. The web-based platform not only simplifies the shopping experience but also provides clear and accessible delivery information, enabling the store to expand its market reach and increase online transaction volume. The implementation of this system is expected to significantly improve online sales performance and provide customers with a seamless shopping experience.

Introduction

The rapid growth of online transactions in the fashion industry has led to the increasing need for digital systems that are both efficient and responsive in managing sales and logistics. In today's business landscape, having an e-commerce website has become a fundamental requirement for companies aiming to grow and reach wider markets. E-commerce offers various advantages in supporting business expansion, particularly in terms of enhancing accessibility and reducing operational costs (Nurusyifa et al., 2023; Al Tamer, 2021; Kedah, 2023). Electronic commerce (E-commerce) is a transactional trade activity conducted via the internet. E-commerce is a type of website specifically designed to offer and sell one or more products or services online (Maulana et al., 2024; Jain et al., 2021; Dai et al., 2022).

The adoption and integration of emerging technologies in e-commerce platforms have revolutionized the retail sector (Ntumba et al., 2023; Ivanov, 2023; Mohdhar & Shaalan, 2021). This transformation has facilitated greater market access, particularly for small retailers, who can now reach national and international markets with significantly lower capital investment by utilizing digital platforms (Thind et al., 2024; Chen et al., 2021; Mandviwalla & Flanagan, 2021; Li et al., 2023). The widespread use of mobile applications through services like the Play Store and App Store has played a pivotal role in this trend, enabling users to engage in online shopping directly from their smartphones. However, despite the prevalence of such applications, a large portion of potential customers are reluctant to use or install additional apps for shopping purposes (Bruwer et al., 2022; Pantano et al., 2022; Maseeh et al., 2023).

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Several factors may influence this reluctance, including limited storage capacity on mobile devices, user fatigue from managing multiple apps, concerns over data privacy, or unfamiliarity with mobile-based e-commerce platforms (Blayone, 2017). Providing alternative methods of accessing e-commerce services, especially ones that do not rely on mobile applications, can serve as a strategic approach to improving customer outreach and transaction rates (Varshney & Vetter, 2002; Gordini & Veglio, 2017).

Toko Hijab By Alya, a growing hijab retail store based in Kudus, Central Java, faces similar challenges. While the business has demonstrated promising growth since its inception, it struggles to reach and serve customers who are unwilling to install dedicated e-commerce applications. Many potential buyers are discouraged by the need to download and configure a new app merely to make a single purchase, which ultimately narrows the market reach and limits the potential increase in online transactions (Au & Kauffman, 2008).

To address this challenge, this study proposes the development of a web-based selling system that eliminates reliance on mobile applications. Furthermore, the system is integrated with the RajaOngkir API, which offers real-time shipping rate information from various courier services in Indonesia. RajaOngkir is a service provider that offers information about courier services and shipping costs, specifically for calculating shipping fees (Putra & IArwani, 2024; Normaliza et al., 2024). This integration allows customers to receive accurate and transparent shipping cost estimates during checkout, reducing uncertainty and increasing trust in the online purchasing process.

The proposed system not only aims to streamline online transactions but also serves as a strategic innovation for Toko Hijab By Alya to remain competitive in the digital economy. By implementing a web-based solution, the store can broaden its customer base, improve customer satisfaction, and ultimately increase the volume of online sales. This study will detail the system's design, development process, and evaluation of its effectiveness in addressing the aforementioned challenges.

Methods

The research method employed for the development of the web-based selling system for Toko Hijab By Alya follows the Waterfall Model, a structured and sequential approach that is well-suited for projects where requirements are clearly defined from the outset. The Waterfall Model is a Software Development Life Cycle (SDLC) approach that follows a series of stages including requirements analysis, design, implementation, testing, deployment and maintenance in a sequential order (Herawati et al., 2021).

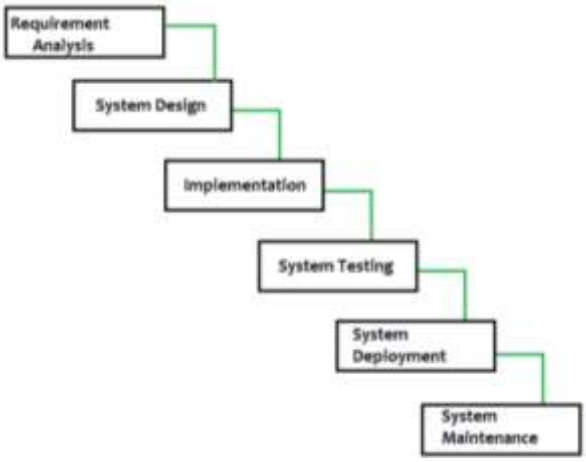

Figure 1. Waterfall Model

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Requirement Analysis

The initial phase a comprehensive analysis of both software and hardware system requirements is carried out to ensure the system meets operational and functional needs. During this phase, the design and planning of the software solution take place. The development team outlines the software's structure, including designing algorithms, defining the software architecture, and creating logical diagrams. Data structures are also determined at this stage. The primary focus is on the design of the software, ensuring that it is aligned with the project's functional requirements and objectives (Rahayu et al., 2024).

Implementation

The implementation stage involves writing the program code to develop the interface designs and functionality of the web library, based on the previously created designs (Akbar & Fauzi, 2023). This is where the core functionality of the web-based selling system is developed. The system is integrated with the RajaOngkir API to fetch real-time shipping rates during the checkout process. This phase also includes setting up a secure payment gateway to ensure safe and smooth transactions for customers.

Testing

After the system has been developed, After the implementation phase is completed, the system must undergo testing to ensure that all features operate correctly and that the system is free from errors (Wijaya & Lomban, 2022). This is a crucial step to identify any bugs or issues in the system. Various types of testing are performed: 1) Unit Testing: Individual components of the system are tested to ensure that each part functions correctly; 2) Integration Testing: The interaction between the system and external APIs, like RajaOngkir, is tested to ensure accurate data exchange.

Deployment

Once the system has passed all testing phases and is verified to meet the requirements, it is deployed. The deployment process is the phase where the software is made available to users, representing the final step in the software development cycle (Priyanto et al., 2023). The web-based system is made available to customers through a web browser, eliminating the need for any mobile application downloads.

Maintenance

The maintenance phase involves making changes to the software after deployment to fix errors, improve performance, and enhance quality (Aroral, 2023). It also includes adapting the software to its environment, meeting new user needs, and increasing reliability. After deployment, the system enters the maintenance phase. The maintenance stage typically involves backing up the system code and addressing issues such as malware, viruses, or other threats that could disrupt the system's operation. This maintenance is performed regularly once the system is in use.

By following the Waterfall methodology, each project phase is carefully planned and carried out sequentially, ensuring that the final product aligns with business objectives and offers an optimal user experience. This organized approach helps reduce risks and guarantees clear deliverables at each stage.

Results and Discussion

This section outlines the outcomes of the development process for the web-based selling system for Toko Hijab By Alya, a growing hijab retail store in Kudus, Central Java. In this section, we will also discuss the results derived from the design and testing phases and present

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a deeper exploration of the flowchart, sequence diagram, and activity diagram used to model the system's functionality and workflow.

Flowchart

A flowchart was developed to offer a simplified and clear visualization of the core processes within the system, particularly the steps that a user would follow when engaging with the online store. A system flowchart represents a sequence of processes within a system, showing the tools used for input, output, and the types of media involved in data storage during processing (Zalukhu et al., 2023).

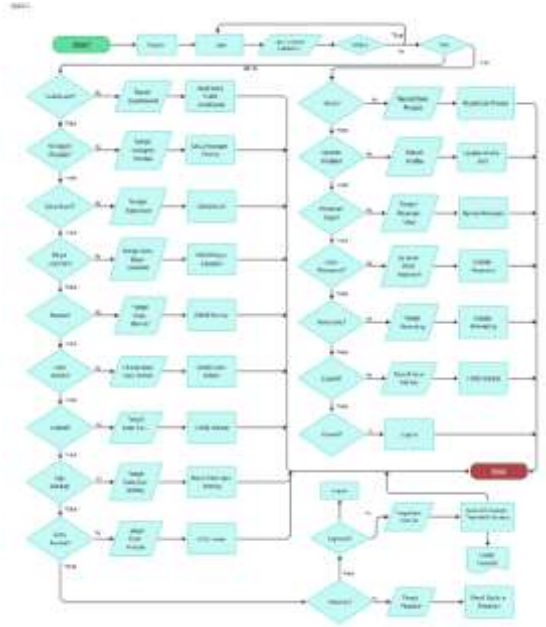

Figure 2. Flowchart

The flowchart designed for the Toko Hijab By Alya web-based selling system captures the key steps users follow when interacting with the platform. It is divided into two distinct paths: one for the admin and another for the user. Each type of user interacts with features tailored to their specific roles and aligned with the overall system objectives.

User Registration and Login: User registration and login represent the initial stages for both administrators and general users. During registration, new users are required to create an account by providing essential personal information. Following successful authentication, users are granted access to the system’s features, which are tailored according to their respective roles as administrators or general users.

Administrator Features: Involve a range of actions accessible through the administrator dashboard after a successful login. The dashboard presents an overview of recent transactions, user activities, and key business metrics. Administrators are responsible for managing product categories, including adding, editing, and deleting categories. *User Features*: User features are designed to support the management of the shopping experience. The homepage displays product listings that can be filtered by category and searched by keywords, allowing users to easily find desired items.

Activity diagram

An Activity Diagram is a representation of the flow of activities within the system, illustrating the sequence and relationship of processes that occur during system operation. The activity diagram offers a detailed visual representation of the system’s workflow, illustrating the

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sequence of actions performed by both administrators and users. It illustrates the step-by-step processes involved in managing the system, from user interactions to administrative tasks.

Administrator: These tasks include managing system settings, overseeing product categories, handling orders, managing users, and reviewing business reports. The administrator has control over various platform aspects, ensuring smooth operations and effective management of the e-commerce site. Each action helps the administrator maintain an organized and responsive online store.

Login, the administrator login allows authorized personnel to access the system's backend. After entering valid credentials, the system verifies the administrator's identity and redirects them to the dashboard.

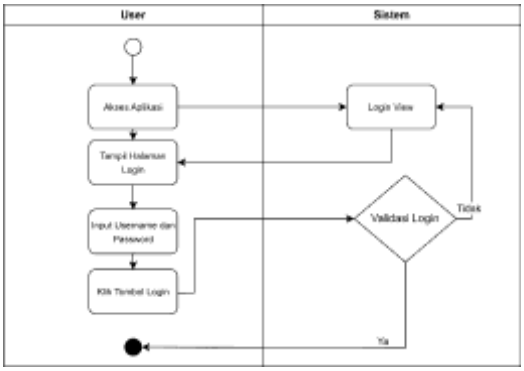

Figure 3. Administrator Login Activity Diagram

Dashboard, can access the centralized dashboard, which provides a comprehensive overview of store performance.

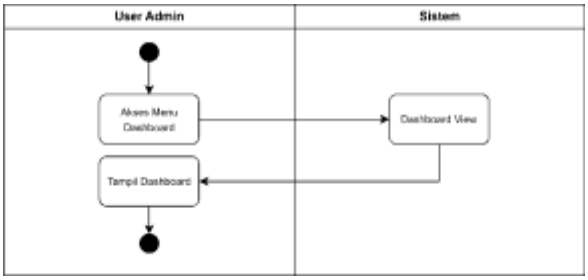

Figure 4. Administrator Dashboard Activity Diagram

Product categories management, the administrator manages product categories, including adding, editing, or removing categories as required.

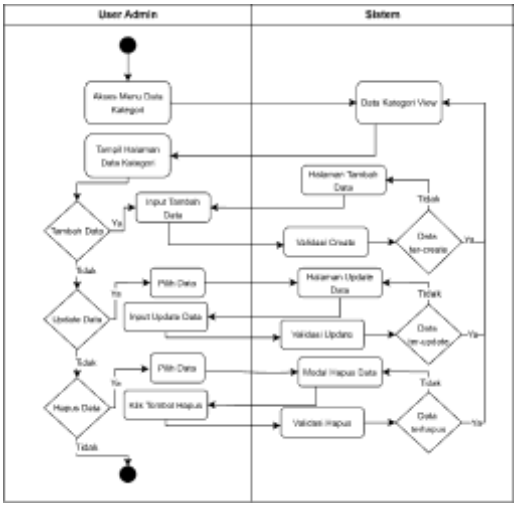

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Figure 5. Product Categories Management Activity Diagram

Courier Data, manages courier services by adding or updating available shipping options. This guarantees customers have access to reliable, efficient, and cost-effective delivery services.

Figure 6. Courier Data Activity Diagram

Service fees, the administrator is tasked with setting and updating service fees related to product shipments and other services.

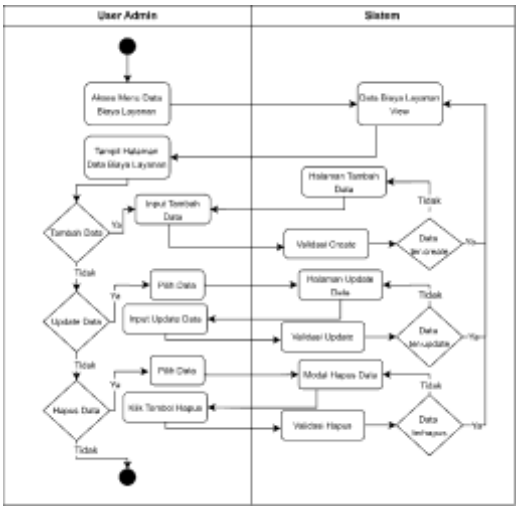

Figure 7. Service Fees Activity Diagram

Banner management, this functionality allows the business to effectively highlight important promotions, enhancing customer engagement.

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Figure 8. Banner Management Activity Diagram

Admin User, the administrator oversees the management of user accounts and permissions, including adding, updating, or removing administrator accounts.

Figure 9. Admin User Activity Diagram

App settings, the administrator can modify specific application settings to adjust the functionality and configuration of the system.

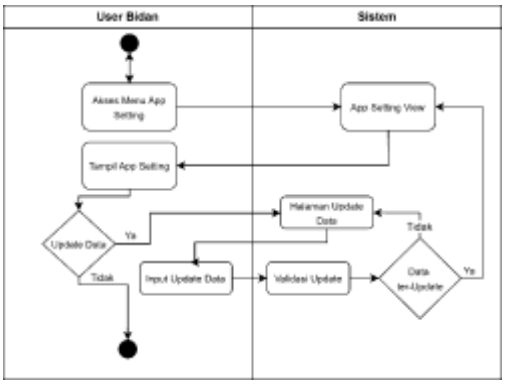

Figure 10. App Settings Activity Diagram

Orders, the administrator oversees customer orders from start to finish, tracking order statuses from processing to delivery. This task ensures timely order fulfillment and addresses any issues that may arise during the process.

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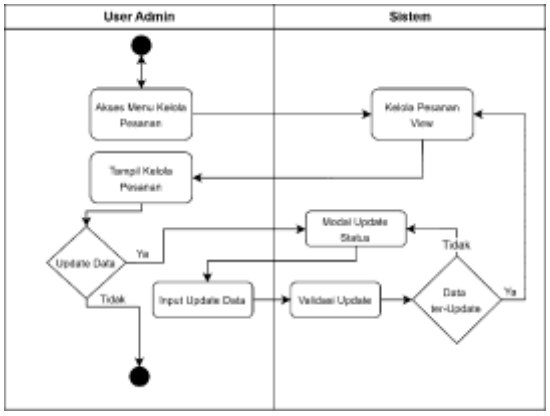

Figure 11. Orders Activity Diagram

Product Data, the administrator is responsible for managing the product catalog. This includes adding new products, editing existing product details, or removing discontinued items, ensuring that the store's product offerings are current and relevant.

Figure 12. Product Data Activity Diagram

Reports, the administrator has access to detailed business reports, including those related to sales, customer behavior, and other key metrics.

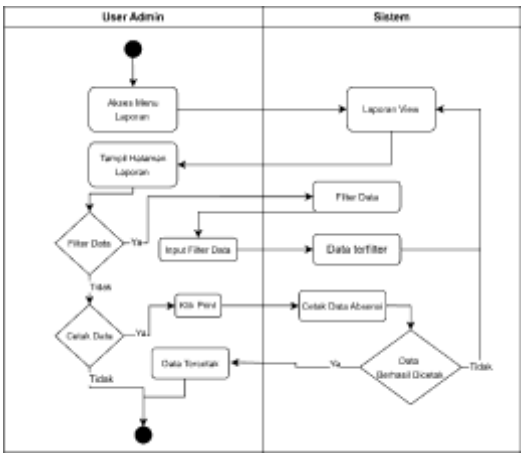

Figure 13. Reports Activity Diagram

Logout, the administrator logout function ensures that once administrative tasks are completed, the administrator can securely exit the system.

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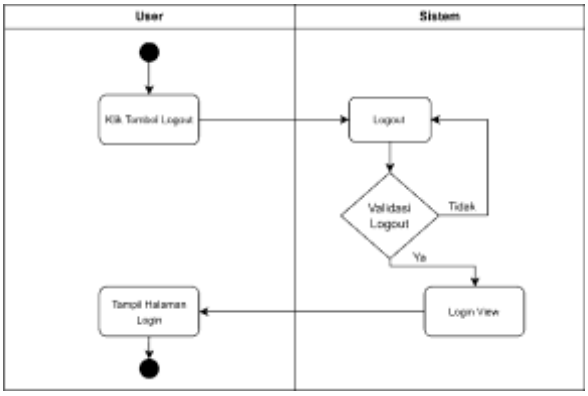

Figure 14. Administrator Logout Activity Diagram

User: The activity diagram for users outlines the main processes involved in interacting with the system from a customer's perspective. It begins with the login or registration process and proceeds to various actions related to product browsing, order handling, and personal account management. The following are key activities that users can perform within the system to ensure a smooth and personalized shopping experience.

User registration, new users can register for an account, providing necessary personal information such as name, email, and password to gain access to system features.

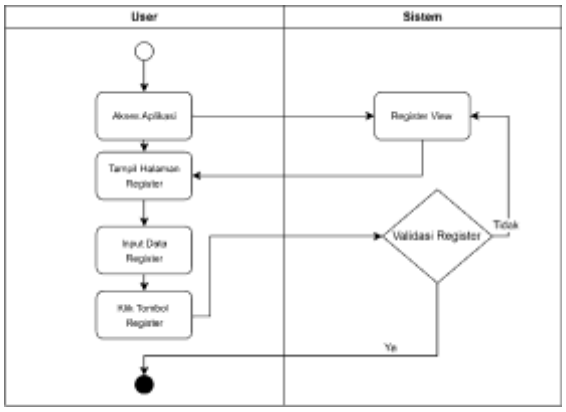

Figure 15. Registration Activity Diagram

Orders, the user can view their order history, track the status of ongoing orders, and monitor their delivery progress, ensuring they stay informed about their purchases.

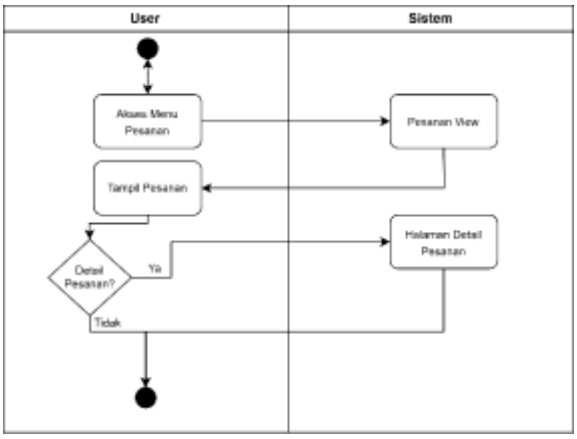

Figure 16. Orders Management Activity Diagram

Sequence diagram

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A sequence diagram is utilized to assist in understanding the requirements of a new system, documenting processes, and visualizing technical scenarios during system runtime, enabling users to comprehend and anticipate how the system will behave (Ramdany et al., 2024). The sequence diagram for the user represents a straightforward process starting with registration, followed by login and interaction with the product features (Aditya et al., 2021).

Administrator: The administrator's sequence diagram represents key system interactions after successful login. These include tasks such as managing settings, overseeing product and category data, processing orders, handling users, and generating reports.

Login, the administrator submits credentials for authentication. Upon success, access to administrative functionalities is granted. Successful login grants access to system management functionalities.

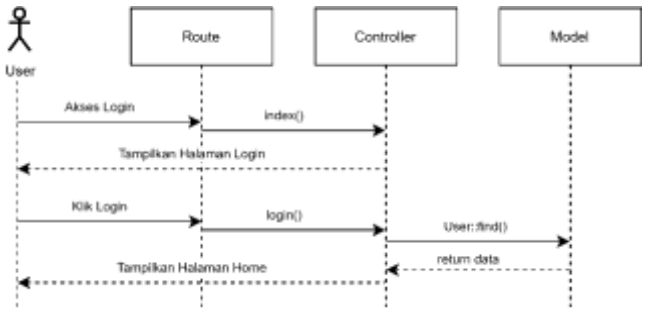

Figure 17. Administrator Login Sequence Diagram

Dashboard, displays real-time business data such as sales and user activity, between the admin and the system when accessing the dashboard feature.

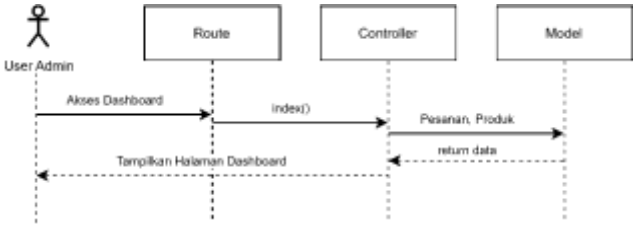

Figure 18. Administratror Dashboard Sequence Diagram

Products, administrators can add, update, or remove products. These actions are reflected in the product database.

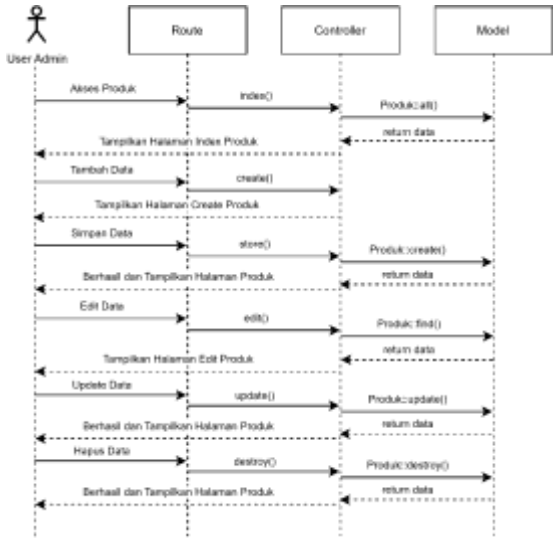

Figure 19. Products Sequence Diagram

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Categories, categories are organized by creating, modifying, or deleting entries to maintain a structured product catalog and improve customer navigation.

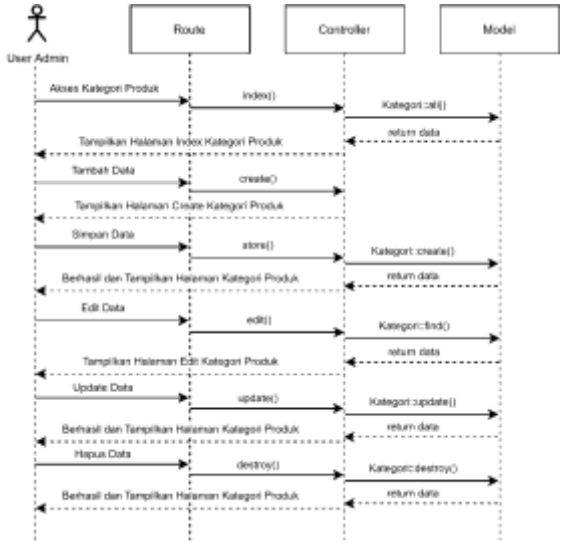

Figure 20. Categories Sequence Diagram

Banners, admin configures delivery addresses, supporting accurate and efficient logistics.Banner assets and settings are stored and displayed as configured.

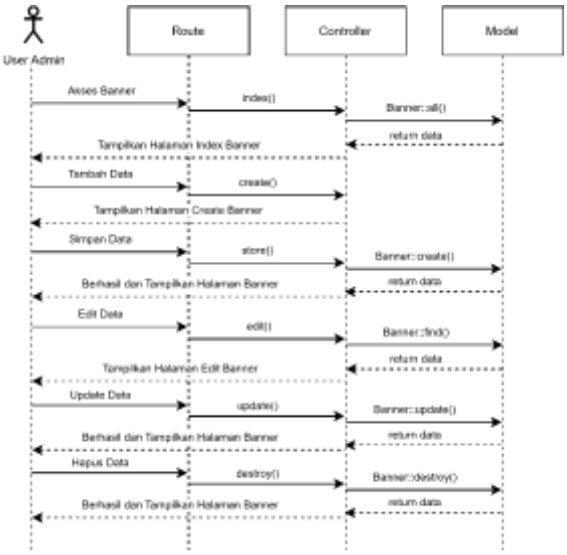

Figure 21. Banners Sequence Diagram

Addresses, involves configuring, adding, or updating delivery locations to ensure accuracy and reliability in the order fulfillment process.

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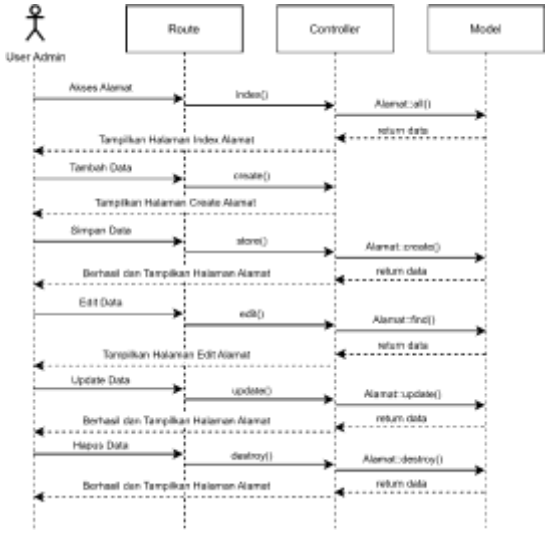

Figure 22. Addresses Sequence Diagram

Courier, updates available courier options to ensure reliable and current delivery services. The goal is to ensure that all delivery options are kept up-to-date and reflect available logistics providers.

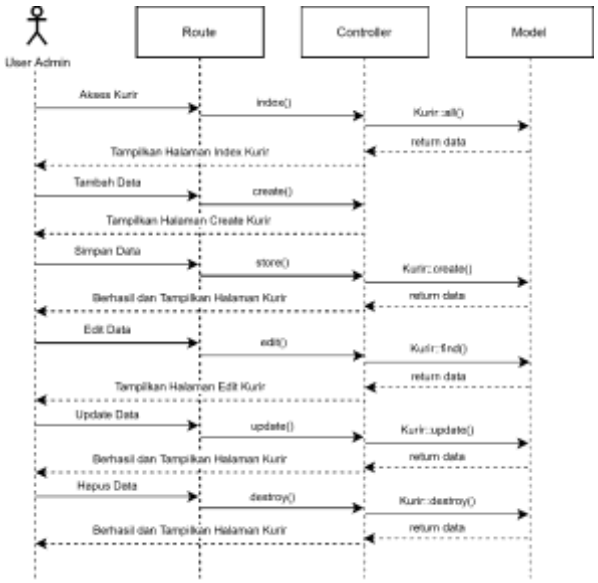

Figure 23. Courier Sequence Diagram

Service Fees, adjustments service fee structures are modified to align with operational costs and competitive pricing strategies.

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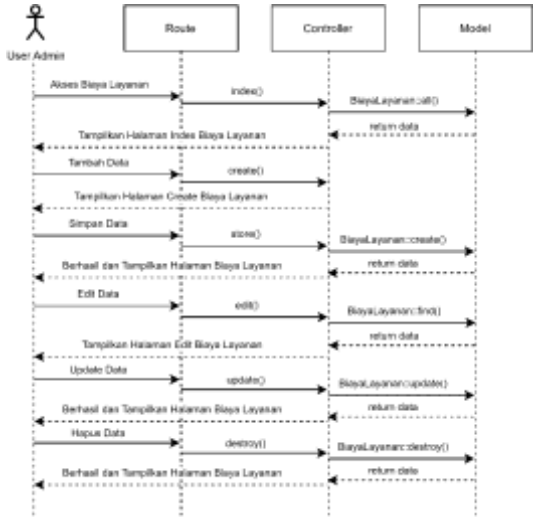

Figure 24. Service Fees Sequence Diagram

Orders, order data is monitored and updated throughout the fulfillment process. Order status tracking ensures transparency and timely delivery for customer satisfaction.

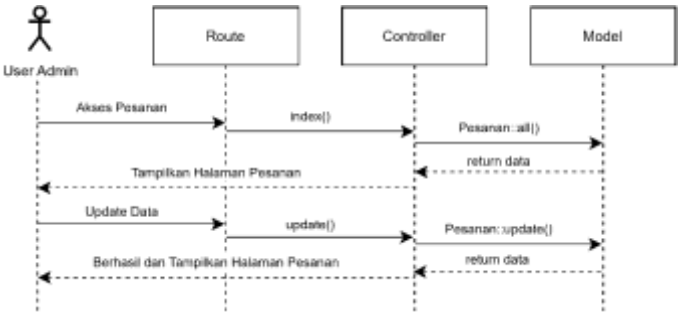

Figure 25. Orders Sequence Diagram

Admin Users, admin manages roles and permissions by adding, editing, or removing other admin accounts.

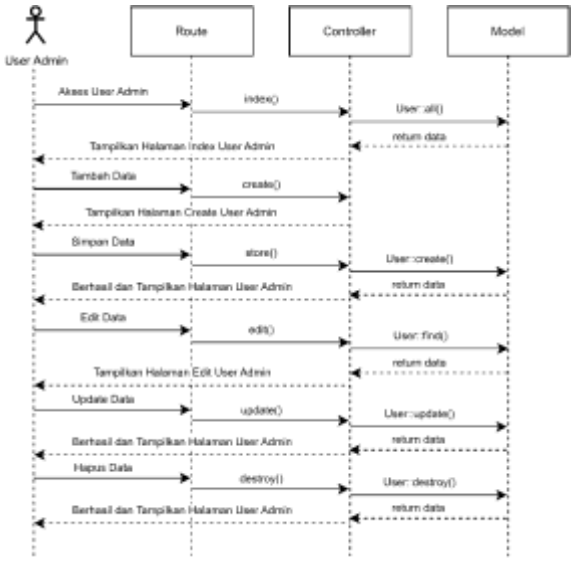

Figure 26. Admin Users Sequence Diagram

App Settings, system behavior and interface preferences are configured through the settings panel to align with business requirements and user experience standards.

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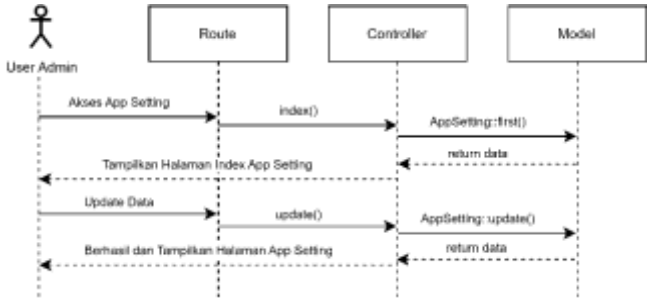

Figure 27. App Settings Sequence Diagram

Reports, business performance is evaluated through generated reports containing key analytics such as sales trends and user activity. These insights support data-driven decisions.

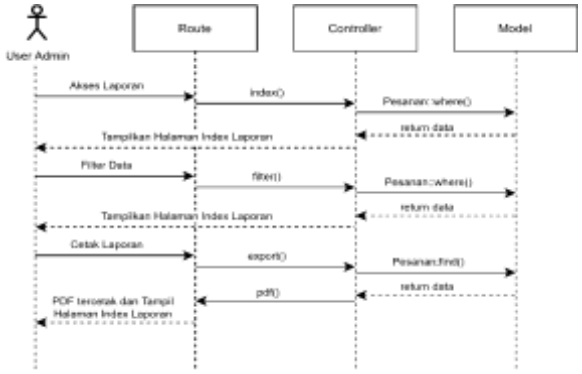

Figure 28. Reports Sequence Diagram

Logout, the session is securely terminated by logging out. This action ensures session integrity and protects administrative data from unauthorized access.

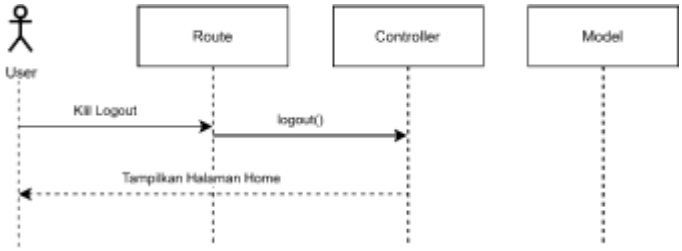

Figure 29. Administratror Logout Sequence Diagram

Users: The following sequence diagram descriptions illustrate the core interactions between the user and the system within the platform. Each activity outlines how the system responds to user actions, ensuring a seamless experience from account registration to order completion.

Register, account creation is initiated by submitting required personal data. The system validates and stores this information to grant access to user-specific services.

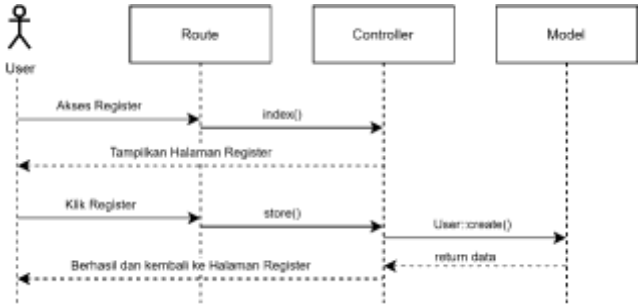

Figure 30. User Register Sequence Diagram

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Orders, order histories and real-time delivery updates are accessible. Progress tracking enhances transparency and user confidence in the fulfillment process.

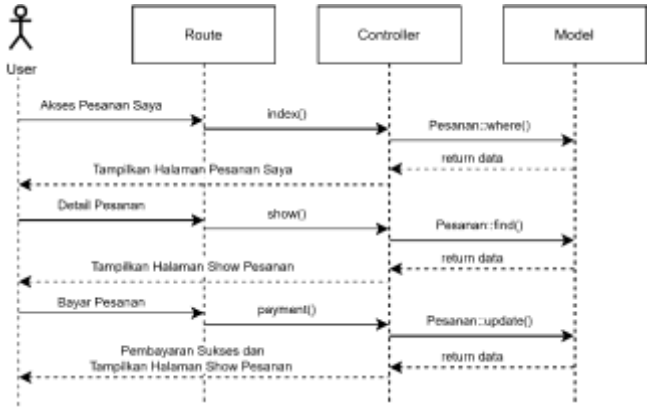

Figure 31. Orders Sequence Diagram

System interface display

This section presents the results of the system implementation through its user interface. The developed system supports two types of users: Administrator and User, each with different functionalities and access rights. The following are the main interface displays for each user type.

Administrator Interface: Provides access to advanced system functionalities, including user account management, product catalog management, transaction monitoring, and system settings.

Login

The login page enables authentication process ensures the security and privacy of the system, restricting access to authorized personnel only.

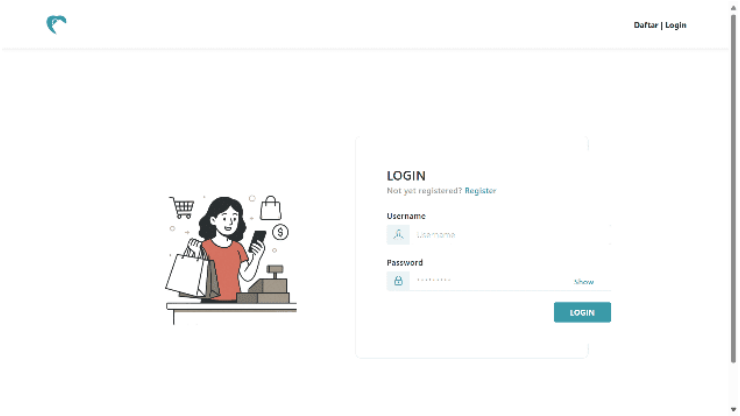

Figure 32. Admininstrator Login Page

Dashboard

It displays essential metrics, including the total number of products, product categories, and available courier services, providing administrators with a clear understanding of the platform's inventory and logistics infrastructure.

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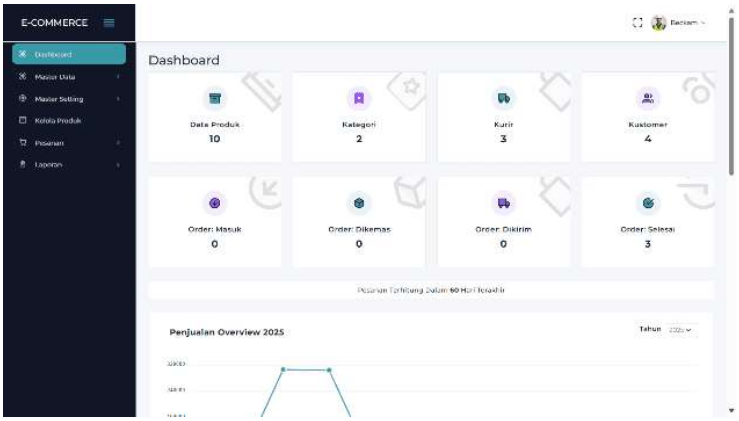

Figure 33. Admininstrator Dashboard

Product Categories

The Product Categories section provides administrators with the tools to manage the various product categories within the platform. Each category is represented by an icon, a category name, and a unique slug that facilitates easier identification and URL generation for the category.

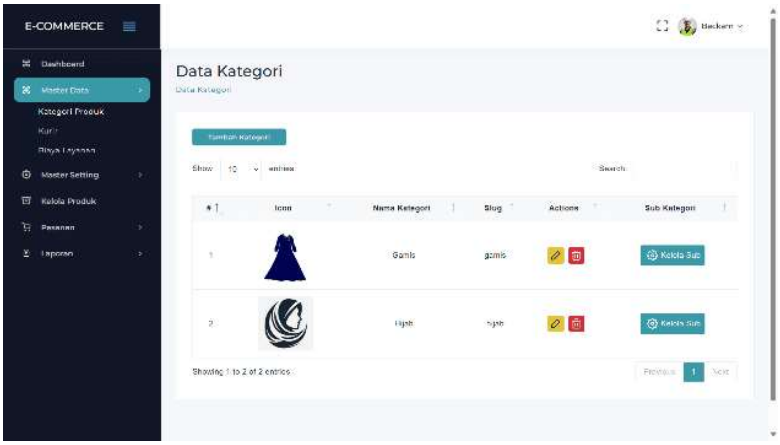

Figure 34. Product Categories Page

Courier

Administrators can also update the status of each courier service, marking them as active or inactive, depending on whether the service is currently available for use by customers.

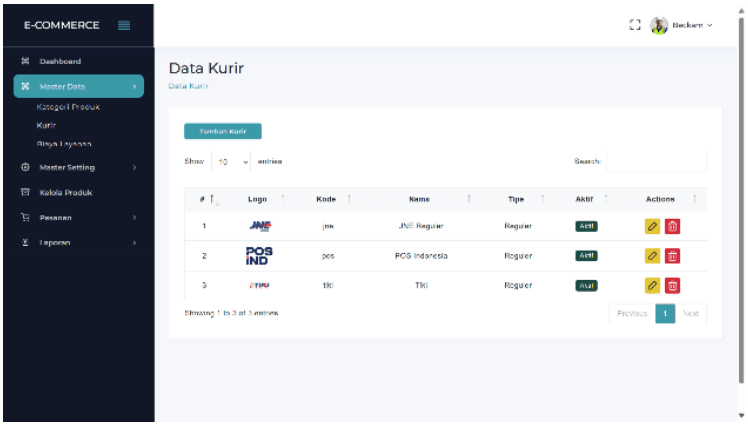

Figure 35. Courier Data Page

Service Fees

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The Service Fees section provides administrators with the ability to manage and configure the costs associated with various services on the platform.

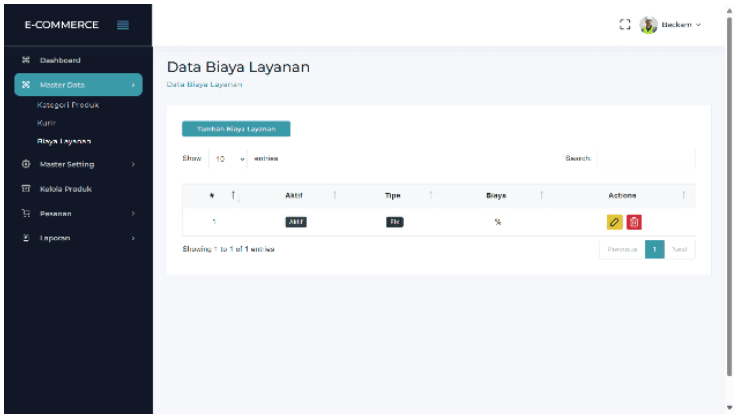

Figure 36. Service Fees Page

Banner

The Banner includes an image, typically used to promote products, events, or special offers, and is positioned prominently on the homepage for maximum visibility.

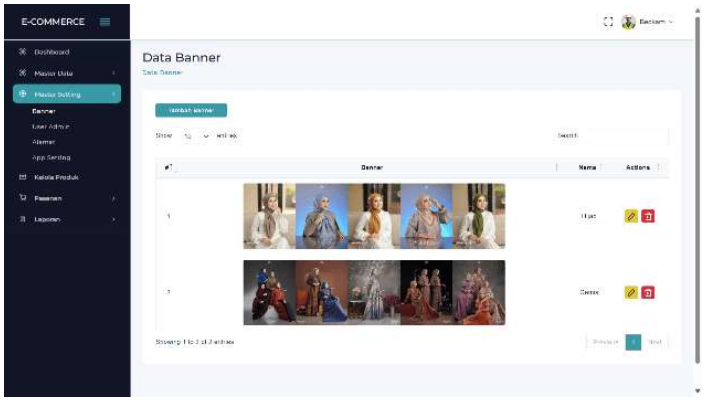

Figure 37. Banner Data Page

Admin User

The administrator can input essential information for the new user, including a profile photo, username, full name, email address, phone number, gender, and date of birth.

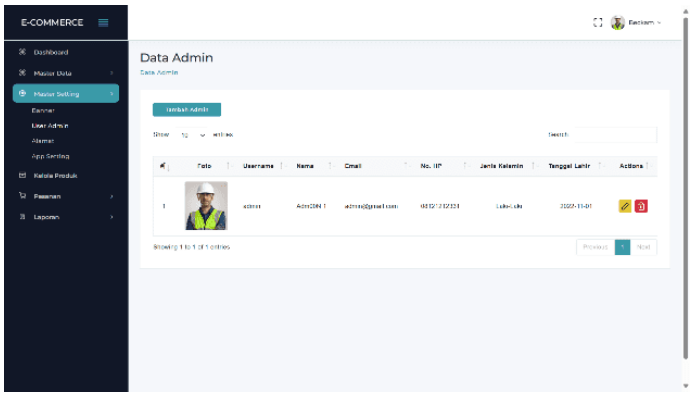

Figure 38. Admin User Management Page

App Setting

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The app settings section includes the system's logo, name, description, and the author's name. These settings provide important information about the platform, such as its branding and purpose.

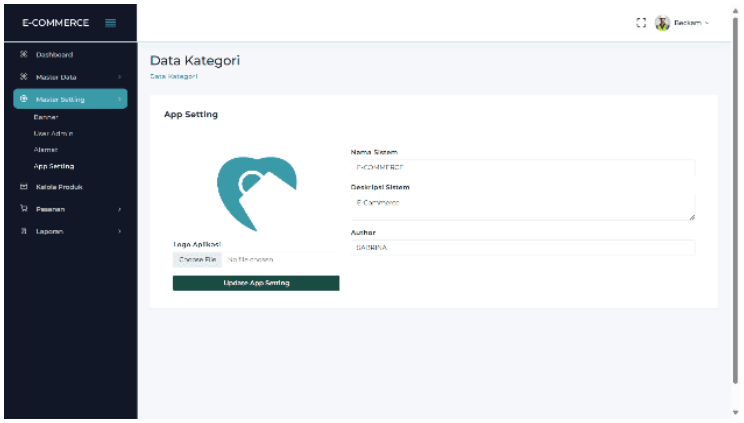

Figure 39. App Setting Page

Product Data

The product data section allows for the management of product details within the system. The product status is also displayed, indicating whether the item is available or out of stock.

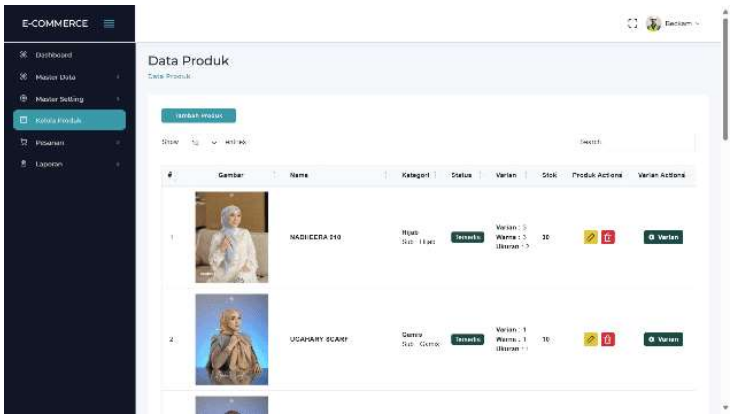

Figure 40. Product Data Page

Orders

The Order Data section contains comprehensive information regarding customer orders placed on the platform. This section plays a critical role in managing the lifecycle of each order, providing administrators with the necessary tools to monitor, update, and track orders at every stage.

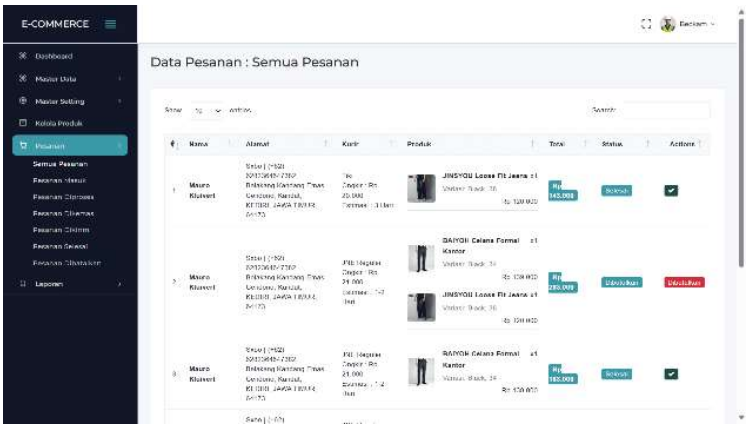

Figure 41. Administrator Order Page

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Reports

The Sales Reports section allows administrators to generate detailed reports by selecting a specific date range, from a chosen starting date to an end date. This functionality enables the analysis of sales performance over a defined period, offering valuable insights into revenue trends, product performance, and overall business activity.

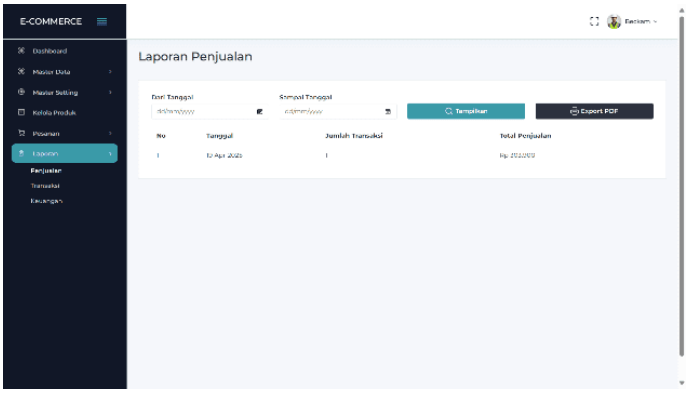

Figure 42. Report Page

User Interface: The user interface is tailored for general users, offering features such as product browsing, order placement, payment processing, and order tracking.

Registration

The user registration page enables new users to create an account on the platform by providing essential personal information.

Figure 43. Registration Page

Addresses

The Address Page enables users to add and manage multiple addresses within their account. Each address includes the full address details, such as the street name, city, postal code, and country. Users can categorize each address by type, such as home or office, to ensure accurate delivery.

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Figure 44. Addresses Page

Orders

The Order Page provides a detailed overview of customer orders, displaying their current status at each stage of the process. It categorizes orders as unpaid, packed, in transit, or completed, allowing users to track the progress of their purchases.

Figure 45. Orders Page

Blackbox testing

Blackbox Testing is a method that verifies the output of an application based on input data to ensure that the functionality of the application meets its specified requirements (Jailani & Yaqin, 2024). This testing approach ensures that all features perform as expected from the user's perspective, ensuring reliability, accuracy, and efficiency.

Administrator features: This section tests the functionalities available to administrators, including managing user accounts, configuring system settings, generating reports, and overseeing platform operations.

Table 1. Blackbox Testing Administrator Features

Feature Name	Expected Result	Status
Login	The system should authenticate using a valid username and password.	Successful
Dashboard	The dashboard should display an overview of key metrics.	Successful
Product Categories	The system should display the details of the products.	Successful
Courier	The system should list courier services with logos, codes, names, types.	Successful

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Service Fees	The system should allow to configure and update service fees for transactions and shipping.	Successful
Banner	The system should allow to manage banners by uploading images and assigning names for promotions or events.	Successful
Admin User	The system should allow existing to add new admins by inputting personal information.	Successful
App Settings	The system should display the platform's logo, name, description, and author, with the ability for administrators to update these details.	Successful
Product Data	The system should allow to manage product information.	Successful
Orders	The system should display customer order details.	Successful
Reports	The system should generate reports based on a selected date range.	Successful
Logout	The system should securely log out the user, terminate the active session, and redirect to the login page.	Successful

User features: This section focuses on testing the features available to regular users, such as browsing products, placing orders, making payments, and accessing their account information.

Table 2 . *Blacbox Testing User Features*

Feature Name	Expected Result	Status
Registration	The system should allow new users to create accounts by inputting personal informations,	Successful
Addresses	The system should allow users to add, categorize, update, and delete multiple addresses for deliveries.	Successful
Orders	The system should display the list of user orders with status indicators.	Successful

The introduction of web-based selling solution with integration to the RajaOngkir API at Toko Hijab By Alya has had concrete component benefits, and that is as it improves efficiency and reliability of online transaction directly and effectively. Core functional requirements of the system in terms of platform accessibility of the information, proper computation of shipping rates, user interface responsiveness and administrative control are easy provided in the system and can greatly improve the efficiency and technical efficacy of online transfer of funds.

The replacement of mobile application-based transactions to a web-based selling platform means that accessibility and convenience of the user is greatly increased. The technical advantages of a browser-based interface are that there is ease in maintenance, updating and ability to work in more environments as well as devices (Mojahed et al., 2024). In practice, the less specific hardware or software setup requirement makes everyday technical obstacles that users face, like the lack of compatibility with a certain type of device, or its performance variations, less likely. The transition therefore leads to a better user experience which entails that it is more reliable, access times become faster, and there is a consistent responsiveness in the interactions (Li et al., 2022).

This incorporation of RajaOngkir shipping-cost API mostly boosts the functionality of the system because it allows shipping costs to be calculated accurately and in RL time on shipping prices of various courier services. This ability is a direct response to the earlier issue of inefficiency in the operations of manual or rough shipping estimates that were the main cause of transaction inaccuracy or customer dissatisfaction. Error handling in the system is highly

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included in the API configuration to tackle outreach of possible network responsiveness, inconsistencies arisen in data, or temporary authority outlets by external couriers. This gives a smooth flow of service delivery as well as portraying the correct data to the users and it reduces the issue of abandoned transactions by the user because of the unforeseen differences in shipping costs.

Besides, the system exhibits significant backend performances with the optimization of data management and transactions. The orderly sorted arrangement and the database-related strategy embraced by the platform enables effective inquiry of data, revising and averting data over all user interfaces, orders and stock arrangements. The automated functions that include live management of stocks, tracking of orders and the automated compilation of reports contribute to the accuracy in the operations and the minimization of handling of data manually, a factor that directly leads to faster processing of orders and delays in operations. These advancements go a long way in reducing chances of human error, facilitating accuracy in transactions, and having prompt decision-making processes based on facts on the ground (Shah, 2024).

Maintenance and the system improvements are necessary and should be continuous to ensure optimal performance and cope with changes in the technological conditions. The need to constantly monitor and update the RajaOngkir API is also necessitated by constant updates made by the external courier providers such as changes in the charge structures and delivery areas. The accuracy of API endpoints and data processing mechanisms will be updated in time, which will allow avoiding shipping estimation breaks (Xie, 2024; Chakraborty, 20250. In practice, automated control measures or built-in updates can be set so in advance that any system malfunctions or unreliably functioning (such as accuracy) could be eliminated over time.

Safety is a continuous concern to ensure transaction integrity and protection of customer information (Ray et al., 2024; Adejumo & Ogburie, 2025). Utilising end to end security measures that include using SSL/TLS encryption to transfer data, strong database security, use of secure authentication systems and frequent vulnerability checks will provide security against data breach or unauthorized access. Regular revision of the security procedures, complete data backup procedures and disaster recovery plans increase the ability of the system to withstand any upcoming technical interventions or/and a malicious attack.

Continued priority to further technical improvements to enhance user experience, system responsiveness and speed of transaction should be the priority. Optimization of the content, proper management of assets, server-side caching, and use of content delivery networks (CDN) are some of the techniques that may considerably enhance responsiveness and speeds of websites (Mathew, 2025; Episkopos, 2022; Bansal, 2024). Such enhancements boost user satisfaction and reduce latency and provide a smooth transaction process even when the network conditions are variable.

Possibility to expand a system and introduce more technical abilities are promising in the future. As a good example, more in-depth functionality, like automatic management of inventory in connection to the warehousing management software, integration of real-time product recommendation systems based on historical user activities, or use of the advanced payment gateway may be a good addition to the overall performance of the platform. Potentially, adopting analytical solutions to analyze specific data of transactions conducted could provide important hints in the case of optimization and performance of its operations.

Conclusion

The online selling solution that combines with the RajaOngkir API at Toko Hijab By Alya has worked out serious sectors of operation and user-experience challenges. The store has

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considerably increased its market scope by offering a convenient, reliable and accessible platform to reach a higher number of customers, especially those who are yet to be convinced about mobile based applications. The feature of the system which allows providing the accurate, real-time shipping calculations simply makes customers more confident in the transaction and lowers the possibility of uncertainty, which directly leads to the increased likelihood of purchase completion.

The well-organized nature of the Waterfall Model helped to create the features of the system and test them thoroughly, which help to assure the great performance and effortless assistance. Complex system schematizations, such as flow chart, activity charts, as well as sequence diagram, elucidated the functionality and simplified the implementation process and were useful both technically and administratively. Next, it will be necessary to ensure the accuracy, security, responsiveness of the system by updating and improving it frequently. Proactive measures such as continual performance optimization, security enhancements, and exploring further integrations will keep the platform agile and responsive to changing user expectations and technological advancements. Ultimately, the successful deployment of this web-based selling system positions Toko Hijab By Alya strongly for sustained growth and innovation in the increasingly competitive digital marketplace.

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