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Web-Based Thrifting Platform for Selling Second-Hand Goods (Your Favorite Shirt)

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ABSTRACT
This study examines the development and implementation of *Your Favorite Shirt*, a web-based platform designed to modernize thrift shop operations through digital transformation. Many thrift businesses in Indonesia still rely on manual processes or social media, leading to inefficiencies in inventory management, transaction tracking, and reporting. To address these challenges, a prototype-based development method was applied, involving requirement analysis, initial design, prototype construction, user testing, and iterative refinement. The system integrates key features such as multi-role login, product catalogues, transaction management, payment options, and order tracking. Evaluation through functional testing and the PIECES framework demonstrated positive results across performance, efficiency, control, and service dimensions, with an average system response time of under one second. User Acceptance Testing (UAT) with a Likert-scale questionnaire produced a mean score of 1.85, indicating strong user satisfaction. Beyond improving operational efficiency, the platform also supports sustainable fashion practices by curating quality secondhand products and reducing textile waste. However, risk assessment identified several areas requiring improvement, including the absence of a Business Continuity Plan, limited access control mechanisms, and lack of systematic documentation. Future development should focus on integrating social media APIs, implementing product recommendation systems, enhancing layered security, and deploying analytical dashboards to support data-driven decision-making.

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Thrift Shop; MSMEs; Digitalization; Prototyping; Information Systems.

1. Introduction

The rapid advancement of digitalization has become a pivotal driver in accelerating the growth of Indonesia's creative economy, particularly within the *micro, small, and medium enterprise* (MSME) sector. Recent reports from the Ministry of Cooperatives and SMEs indicate that MSMEs adopting digital technologies demonstrate up to 30% higher revenue growth compared to non-digitalized businesses (Kementerian Koperasi dan UKM RI, 2023). This transformation is reinforced by the increasing level of digital literacy across Indonesian society, which has fueled the adoption of information technologies in trade and commerce (Badan Pusat Statistik, 2022). One subsector that has experienced significant momentum is second-hand fashion, or *thrifting*, which has emerged as a lifestyle among younger generations. Thrifting offers affordability while simultaneously contributing to environmentally conscious consumption patterns.

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Despite its potential, many thrift businesses in Indonesia remain dependent on manual operations or social media platforms, leading to structural inefficiencies such as unorganized inventory records, limited transaction tracking, and the absence of integrated reporting systems. These challenges restrict business scalability and diminish the competitiveness of MSMEs in an increasingly digital marketplace (Aditya, Purwanto, & Dewi, 2021; Ramadhani & Prabowo, 2022). Previous studies have explored the application of information systems in MSME contexts and e-commerce platforms (Syarif, Nugroho, & Sari, 2018; Hidayat, Firmansyah, & Wicaksono, 2021), yet these efforts have not fully addressed the specific needs of thrift enterprises. Such businesses demand not only digitalized operations but also curated product management and sustainable business processes (Maulana, Anjani, & Pradana, 2023).

Recent scholarship highlights the role of *web-based platforms* as effective tools to strengthen MSME competitiveness through structured transaction processes, payment automation, and improved customer interaction (Savitri & Prasetyo, 2022; Putu Candra, Rahayu, & Wulandari, 2024). However, the lack of a dedicated system tailored for thrifting activities suggests a significant research gap. To respond to this gap, there is a need for an integrated platform capable of supporting both functional requirements—such as product catalogues, multi-role access, and order tracking—and non-functional aspects, including security, accessibility, and device compatibility (Jogiyanto, 2005; Pressman, 2015). By designing such a system, thrift businesses could improve efficiency, enhance service quality, and sustain environmentally responsible fashion practices.

2. Methodology

This study employed a *prototyping* approach as the primary method for system development. Prototyping was selected because of its iterative and user-centered characteristics, allowing continuous refinement based on feedback while ensuring that system functionality evolves in alignment with user needs. The process followed a cyclical sequence consisting of requirement identification, initial design, prototype construction, testing, revision, and final implementation (Jogiyanto, 2005). Such an approach reflects established principles in software engineering, where iterative refinement minimizes risks associated with incomplete requirements while promoting adaptability (Pressman, 2015). The first stage involved problem identification and requirement gathering, conducted through direct observation and interviews with traditional thrift entrepreneurs. The findings revealed both functional needs, such as login authentication, transaction management, and order tracking, as well as non-functional requirements including security, accessibility, and cross-device compatibility. The second stage focused on preliminary design, which included the creation of wireframes for user interface visualization and system modeling through *Unified Modeling Language (UML)* diagrams—covering use case, activity, and class diagrams—to illustrate user interactions, process flows, and database structures. These practices align with established recommendations for systematic modeling and design in *e-commerce system development* (Laudon & Traver, 2021).

Following the design, an initial prototype was implemented using PHP as the programming language and MySQL for database management, supported by Visual Studio Code and XAMPP as the local development environment. The prototype integrated key features such as multi-role login for administrators and customers, product management, transaction processing, and historical record-keeping. Subsequent testing was carried out using the black-box method to validate functional integrity. Feedback was collected from five selected respondents representing both administrators and customers, with evaluation focusing on *usability*, interface design, and system responsiveness. This stage resonates with broader insights into user-centric information system testing, which

emphasize iterative evaluation and continuous adjustment (Turban, Pollard, & Wood, 2018). Based on testing results and user feedback, revisions were implemented to improve interface design, strengthen input validation, and optimize response time. Once refined, the prototype was designated as the final version, ready for operational deployment. The system was then subjected to evaluation through *User Acceptance Testing (UAT)*, using a Likert-scale questionnaire to measure user satisfaction with ease of use and overall functionality. Complementary assessment was conducted using the PIECES framework (Jogiyanto, 2005), enabling structured analysis of system performance, efficiency, information management, control, and service delivery. The integration of this evaluation framework is consistent with international practices emphasizing structured governance in digital business systems (OECD, 2021).

From a technical standpoint, the system was deployed on Windows 11, programmed in PHP, and supported by MySQL for database management. The minimum hardware specifications included 8GB RAM, a 128GB SSD, and an Intel i3 processor or equivalent. The evaluation results showed significant improvements across multiple dimensions: transaction processing speed, organized data storage, cost reduction in manual promotion, and enhanced role-based access control, which collectively supported operational efficiency and customer service quality. In line with Rogers' (2003) *Diffusion of Innovations* theory, the iterative adoption of such a system among thrift entrepreneurs illustrates how innovation spreads through incremental improvements, user engagement, and demonstrated benefits in practice. By applying the *prototyping* methodology, the system development process remained flexible, interactive, and user-oriented, resulting in an application that is not only functionally reliable but also strategically relevant to the evolving needs of thrift-based MSMEs. This combination of technical refinement and governance considerations ensures that the platform is capable of sustaining long-term growth while fostering responsible digital transformation.

3. Results and System Demonstration

The implementation of the *Your Favorite Shirt* platform resulted in a functional web-based system that accommodates the operational needs of thrift shop businesses. Two primary actors interact directly with the application: the administrator and the customer. Administrators are responsible for managing product data, verifying transactions, updating order statuses, and reviewing sales performance. Customers, on the other hand, are able to create accounts, browse the catalogue, place orders, choose between payment methods, and track their transaction history. These two roles are central to the system architecture and are visualized in both workflow and UML diagrams, which outline their respective responsibilities and system interactions. The administrator workflow begins with login authentication, followed by product registration, stock and price adjustments, and verification of customer orders. Administrators can also update shipping statuses and monitor total sales, thereby consolidating management activities in one platform. Conversely, the customer workflow focuses on accessibility and usability, starting with account registration or login, then continuing with catalogue exploration, shopping cart management, order placement, payment selection, and tracking of purchase history. Both workflows are presented in Figure 1, highlighting the structured paths that ensure smooth operation for each user group.

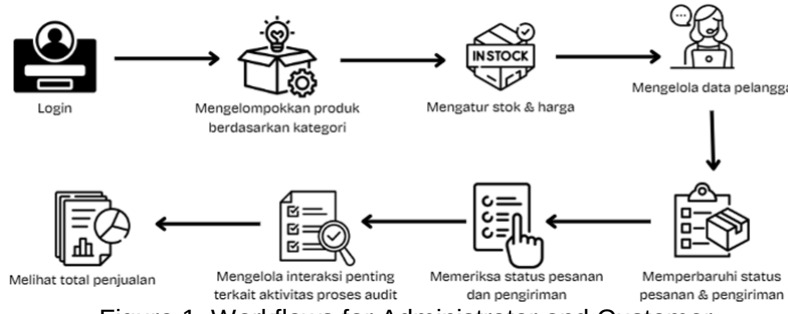

Figure 1. Workflows for Administrator and Customer

Figure 1 illustrates the main workflows for both system actors. The administrator workflow begins with login authentication and continues through product management, stock and price adjustments, transaction verification, and order status updates, culminating in sales monitoring. This sequence ensures operational efficiency and accountability in daily management tasks. In parallel, the customer workflow starts with account registration or login, followed by browsing the product catalogue, adding items to the cart, proceeding to checkout, selecting payment methods, and tracking purchase history. Together, these workflows demonstrate how the platform provides a structured and user-friendly experience for both roles.

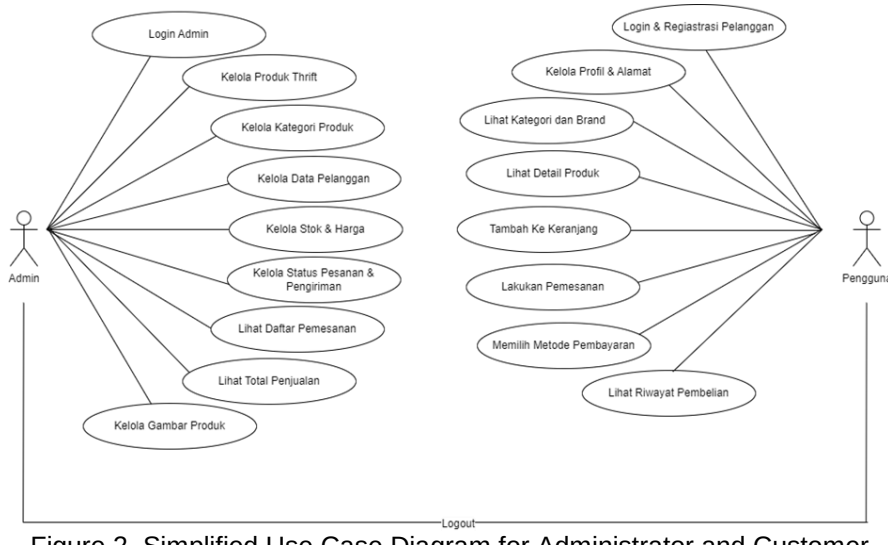

Figure 2. Simplified Use Case Diagram for Administrator and Customer

Figure 2 presents a *use case diagram* that maps the interaction between users and system functionalities. Administrators have access to use cases such as product and category management, transaction verification, and order updates. Customers, by contrast, interact with functions including registration, browsing, order placement, payment, and history tracking. The diagram clarifies the distinction between the two roles while simultaneously highlighting their interdependence within the system.

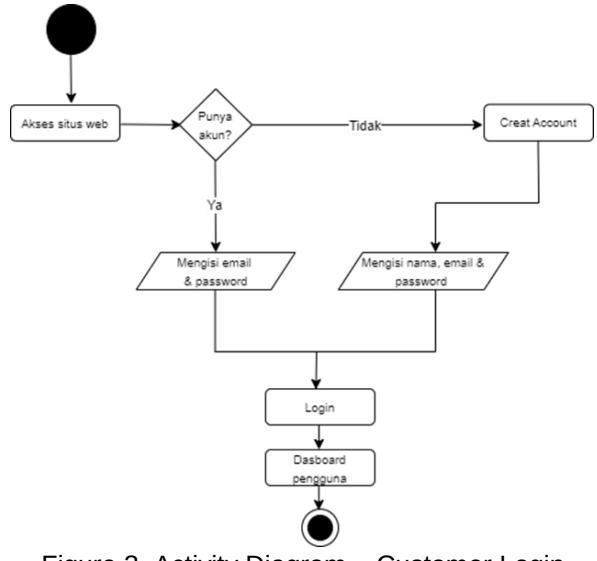

Figure 3. Activity Diagram – Customer Login

Figure 3 depicts the *activity diagram* for customer login. The process starts when the user accesses the website and is prompted either to create a new account or log in with existing credentials. New users are required to complete fields such as name, email, and password. Upon successful authentication, the customer is directed to the main dashboard. This flow emphasizes simplicity and security in the login process.

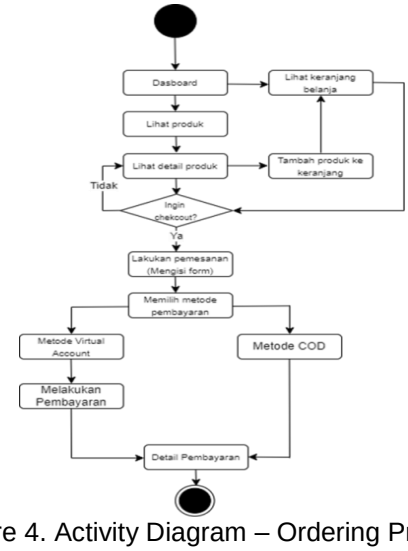

Figure 4. Activity Diagram – Ordering Process

Figure 4 demonstrates the activity flow for placing an order. The customer browses products, views details, and adds selected items to the cart. Checkout involves completing a form and selecting a payment method: either *virtual account* for online payment or *cash on delivery* for offline transactions. The process concludes with a confirmation page displaying order and payment details. This diagram underscores the platform's ability to support flexible purchasing options and provide transparent transaction tracking.

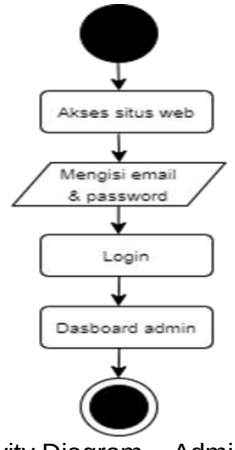

Figure 5. Activity Diagram – Administrator Login

Figure 5 outlines the administrator login process. Similar to the customer workflow, administrators begin by accessing the site and entering their email and password. Successful authentication redirects the administrator to the dashboard, where system management functions—such as product updates, order tracking, and sales reporting—are accessible. The diagram highlights the role of authentication in securing administrative access to sensitive operational data.

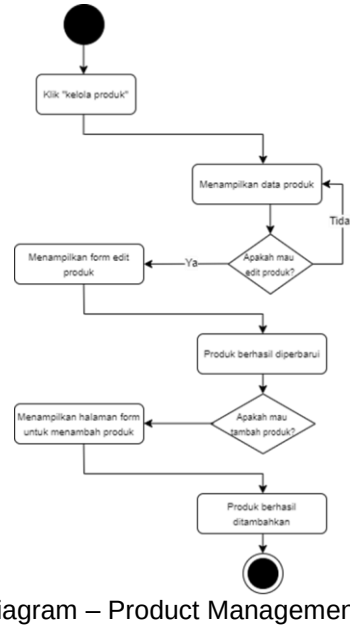

Figure 6. Activity Diagram – Product Management and Order Updates

Figure 6 captures two essential administrative tasks: product management and order status updates. The product management flow shows how administrators can view product lists, edit existing entries, or add new items through input forms. Once saved, the system generates a notification confirming the update. Similarly, the order update process allows administrators to change statuses—such as *Processing*, *Shipped*, or *Completed*—with the system automatically notifying users of the change. This diagram emphasizes efficiency in managing inventory and transactions.

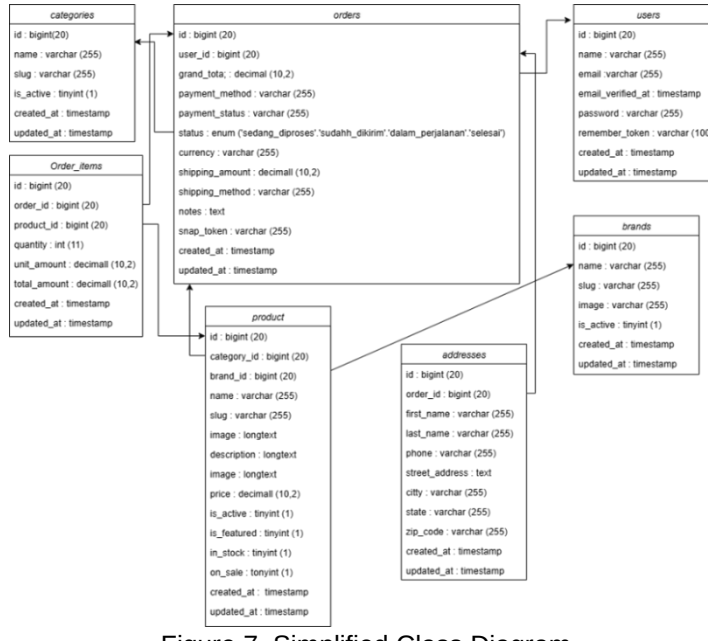

Figure 7. Simplified Class Diagram

Figure 7 presents the *class diagram*, which models the static structure of the system. It identifies four primary classes—*User*, *Product*, *Order*, and *Payment*—along with their attributes and methods. For example, the *User* class contains attributes such as ID, name, and email, while methods include login. The *Order* class connects to both *User* and *Product*, reflecting the transactional relationship, while *Payment* is associated with order processing. Relationships such as association and aggregation are depicted to demonstrate system coherence. This diagram provides developers with a structured blueprint for database design and software logic.

4. Discussion

The implementation of the *Your Favorite Shirt* system demonstrates significant improvements in both operational efficiency and service quality for thrift-based businesses. Compared to manual practices previously used by small-scale entrepreneurs, the platform reduces transaction errors, accelerates order processing, and enhances customer satisfaction through features such as automated payments, real-time order status updates, and a user-friendly interface (Savitri & Prasetyo, 2022). These findings align with Maulana *et al*. (2023), who argue that digitalizing business processes enables SMEs to expand market reach and strengthen competitiveness in the digital economy. Functional testing confirmed that the main modules—login, product management, transaction handling, and order tracking—operated smoothly without critical errors, while response times averaged under one second, even under multiple concurrent user sessions (Hidayat *et al*., 2021). Beyond digitalizing thrift transactions, the system also creates added value by curating quality products, ensuring selective verification, and supporting sustainable fashion practices through the reuse of secondhand clothing, thereby contributing to reducing textile waste.

Risk assessment of IT governance, conducted through a Likert-scale questionnaire, revealed several critical areas requiring improvement. As summarized in Table 2, the highest risks included the absence of a *Business Continuity Plan*, insufficient evaluation mechanisms, weak access authorization structures, lack of change management

procedures, and incomplete documentation of business processes. Risk scores ranged from 1.25 to 2.25, placing them in the moderate-to-high category, particularly in aspects of continuity planning and access control. The overall mean score of 1.85 indicates a generally positive perception of IT governance but highlights urgent areas that must be addressed to ensure reliability and scalability. Recommended mitigation strategies include implementing layered access control, establishing regular IT audits, developing formal continuity plans, and producing standardized process documentation.

Table 1. IT Governance Risk Assessment Results

Respondent	Identified Risk	Mean Score	Risk Level	Potential Impact	Recommended Mitigation
Heravi Atha Setya Putri	Lack of Business Continuity Plan	1.25	High	Service cannot be recovered quickly during major disruptions	Develop and test Business Continuity and Disaster Recovery Plans
Vicky Vidiana Zakialdy	No periodic IT performance evaluation	1.76	High	Performance issues remain undetected; risk of user migration to competitors	Implement governance framework and conduct regular IT audits
Tisa Tri Anggira	Absence of structured access authorization	1.87	High	Sensitive data accessible without restriction, risk of data leakage	Enforce role-based access control and two-factor authentication
Pramaysella Ayu Rosanda	Lack of change management procedures	2.07	Moderate	Sudden system changes cause service disruption	Create and implement standardized change management procedures
Bu Intan Oktaviani	Insufficient business process and system documentation	2.25	Moderate	Difficulties in system maintenance and future development	Develop standardized documentation for processes and system architecture

Despite the positive results, the system still has limitations. Testing was conducted internally with a small, homogeneous group of users; broader testing is necessary to validate performance under diverse market conditions. The system also lacks marketing automation features such as social media API integration and product recommendation engines, and current security mechanisms require reinforcement to be suitable for enterprise-level scaling. Future development should therefore prioritize multi-factor authentication, automated marketing integration, and advanced analytical dashboards to strengthen IT governance and align the platform with complex user needs.

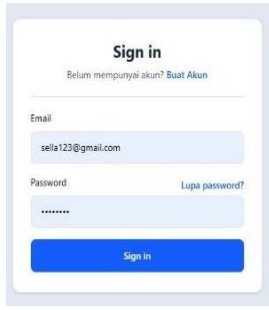

Figure 8. Login

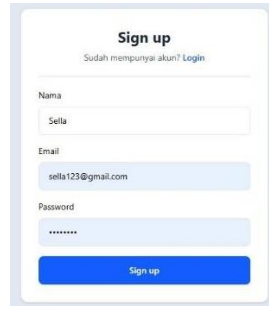

Figure 9. Register

Figure 8 shows the login page for users. Customers are required to enter their registered email address and password in order to access the main features of the platform. This process ensures account security and provides personalized access to the system. Figure 9 illustrates the registration page where new users can create an account. The page requires users to fill in essential information such as name, email, and password. Once registered, users can log in to the system and begin exploring available thrift products.

Figure 10. Homepage

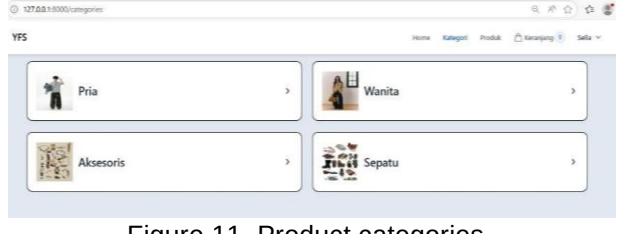

Figure 11. Product categories

Figure 10 presents the homepage of the platform. This page serves as the main interface for users, displaying featured products, promotional highlights, and quick navigation menus. From here, customers can easily access product categories, their shopping cart, and user account settings. Figure 11 shows the product categories available in the system. Items are grouped into categories such as shirts, trousers, jackets, and accessories, allowing users to filter and browse products more efficiently according to their preferences.

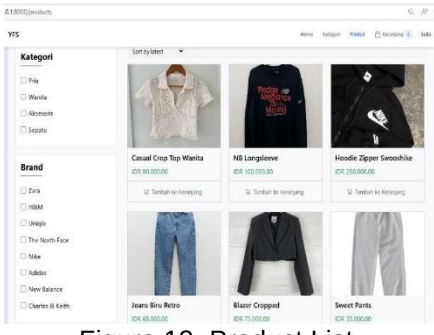

Figure 12. Product List

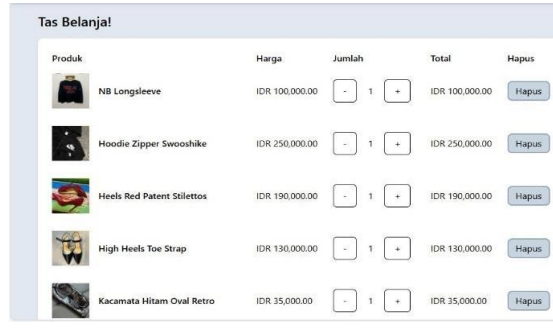

Figure 13. Shopping Cart

Figure 14. Order History

Figure 15. Order Details

Figure 12 displays the product list within a selected category. Each item is presented with its name, price, stock availability, and product image, enabling users to review and compare before making a purchase. Figure 13 illustrates the shopping cart page. This feature collects all items chosen by the user and provides options to adjust quantities, remove products, or proceed to checkout for payment. Figure 14 shows the order history page. Users can track all their past transactions, with information on order dates, product details, and current status, such as pending, shipped, or completed. Figure 15 presents the order details page. It provides comprehensive information for each transaction, including ordered products, quantity, total cost, chosen payment method, and shipping address.

Figure 16. Admin Login

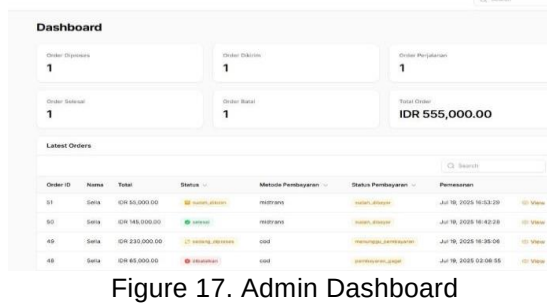

Figure 17. Admin Dashboard

Figure 16 shows the login page for administrators. Admins are required to enter their registered email and password to gain access to system management features. This process ensures that only authorized personnel can manage sensitive data and transactions. Figure 17 presents the admin dashboard, which acts as the control center for administrators. From this page, admins can monitor sales performance, view transaction summaries, and access various management menus such as users, products, and categories.

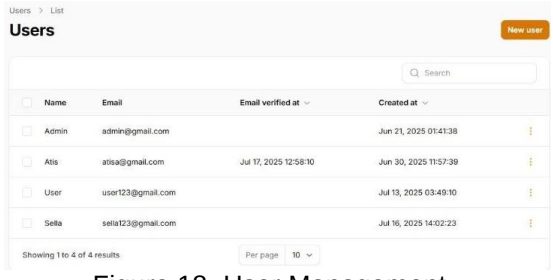

Figure 18. User Management

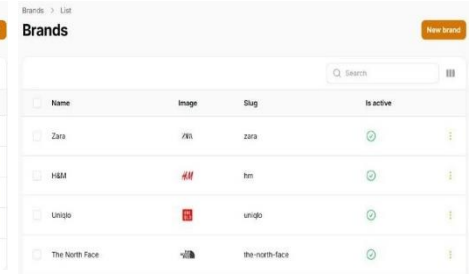

Figure 19. Brand Management

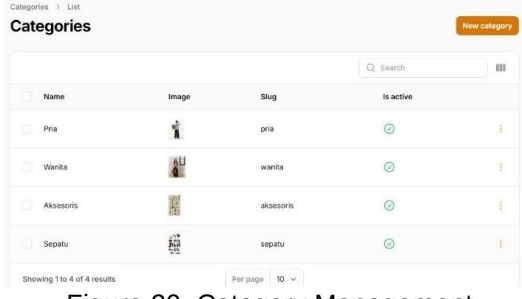

Figure 20. Category Management

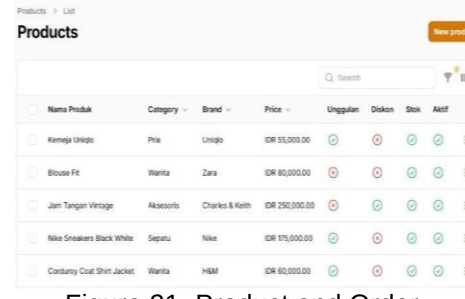

Figure 21. Product and Order Management

Figure 18 illustrates the user management page for administrators. Through this feature, admins can view, add, edit, or delete user accounts to ensure that the platform is used only by verified customers. Figure 19 shows the brand management interface. Administrators can register new brands, edit existing ones, or delete unused brands, ensuring that all thrift products are properly categorized by their respective labels. Figure 20 presents the category management page. Admins can add, modify, or remove product categories to maintain an organized and user-friendly product catalog. Figure 21 displays the product management page, where administrators can upload new items, update product information, or delete outdated stock. In addition, this page also includes order management features that allow admins to verify payments, update delivery statuses, and monitor customer transactions.

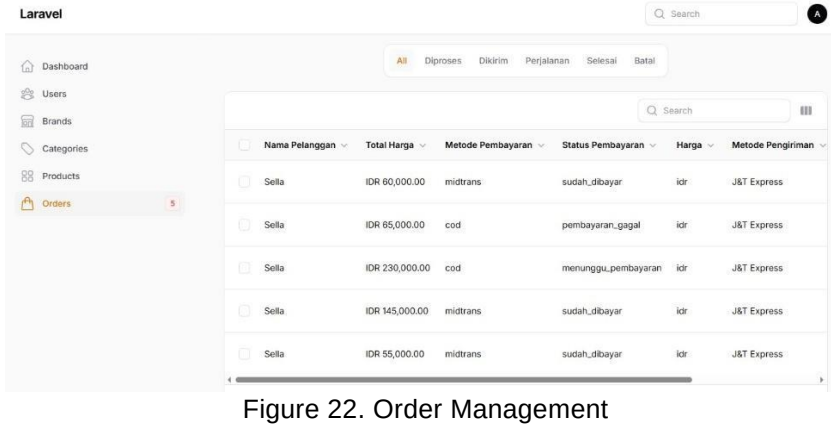

Figure 22. Order Management

Figure 22 displays the order management page from the administrator's perspective. The page provides a structured table containing key transaction details, including the customer's name, total price, payment method, payment status, product price, and chosen shipping method. Administrators can monitor multiple orders at once, identify

successful or failed payments, and verify transactions in real time. The sidebar menu on the left offers navigation to other management modules such as dashboard, users, brands, categories, and products. At the top of the page, filtering options (Processed, Shipped, On Delivery, Completed, Canceled) and a search bar support efficient tracking and management of customer orders.

5. Conclusion

Based on the findings of this study, the *Your Favorite Shirt* web platform has successfully modernized thrift store operations by digitalizing business processes that were previously manual. Core features such as product management, online ordering, and transaction status tracking have been shown to enhance operational efficiency, broaden market reach, and support sustainable fashion initiatives through curated product offerings and environmentally responsible sales practices. System testing using the *prototyping* approach and evaluation through the PIECES framework produced positive outcomes across performance, control, efficiency, and service quality. All essential modules functioned as intended, with an average response time of under one second and no significant functional errors detected. Furthermore, user satisfaction assessment through a Likert-scale questionnaire yielded an average score of 1.85, reflecting strong acceptance of the system's usability and functionality.

Nevertheless, the analysis highlights areas requiring further development. Key recommendations include integrating social media APIs to expand promotional reach, implementing product recommendation systems to improve customer experience, and developing analytical dashboards to support data-driven decision-making. From an IT governance perspective, long-term strategies emphasizing layered security and system scalability are essential to ensure that the platform remains adaptable to evolving business dynamics and user needs in the future.

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