

DESIGN AND DEVELOPMENT OF AN UMKM E-COMMERCE MANAGEMENT SYSTEM INTERFACE USING A RESPONSIVE DESIGN APPROACH

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ABSTRACT

The rapid growth of the digital economy requires Micro, Small, and Medium Enterprises (UMKM) to adopt e-commerce platforms. However, high mobility and limited technical literacy often turn digital store management via mobile devices into a challenge, primarily because most existing management system interfaces are heavy, complex, and unresponsive. This study aims to design a lightweight, modern, and fully adaptive e-commerce management system interface specifically tailored to address the mobility needs of UMKM. The software development method used is Prototyping, which includes observation and requirements analysis, visual layout design (wireframing and mockup), interface implementation, and cross-device responsiveness testing. The system was built using a mobile-first approach through HTML5 semantic structures and the Tailwind CSS utility-first framework. The results show that utilizing Tailwind CSS is effective in designing essential management modules—including the main dashboard, product catalog management, order tracking, and customer records—that transition seamlessly across mobile, tablet, and desktop devices. The use of a dynamic breakpoint system not only ensures that the layout remains proportional without the need for manual screen zooming but also maintains design theme consistency to minimize the user's cognitive load. Furthermore, the utility-first architecture significantly reduces the website's file size, allowing the interface to load rapidly even on unstable cellular network conditions. The implementation of this responsive design is expected to optimize the managerial efficiency of UMKM actors, reduce potential administrative errors, and accelerate daily business operational workflows.

Keywords: E-Commerce, UMKM, Responsive Design, Tailwind CSS, User Interface, Prototyping.

1 INTRODUCTION

Micro, Small, and Medium Enterprises (UMKM) play a crucial role in bolstering the national economy and creating jobs. In today's digital era, technological transformation is no longer merely an option but a necessity for UMKM to survive and compete in an increasingly competitive market. Shifts in consumer behavior—now leaning heavily toward the convenience of online shopping—compel business owners to rapidly adopt e-commerce platforms. Integrating these digital systems has proven capable of unlocking far broader market access, transcending the geographical boundaries that have traditionally hindered the growth of small-scale businesses.

However, the success of this technological integration depends not only on the ability to showcase and sell products in a digital storefront but also, and significantly, on how UMKM owners manage their behind-the-scenes business operations. This is where the real challenge lies. Managing digital transactions—ranging from monitoring daily order flows and periodically updating stock levels to analyzing customer interaction data—requires a robust management system or dashboard. Unfortunately, many currently available business management systems feature interfaces that are overly complex, rigid, and tend to overwhelm users who may lack advanced technical literacy.

Furthermore, these mainstream systems are often optimized for—and most comfortable to use on—desktop computer screens. In reality, however, UMKM owners operate with high mobility. They are frequently required to juggle multiple managerial roles simultaneously and, in practice, rely more on handheld devices to manage daily business activities. When a

M. Shandito Reynaldi Marwanda, Design and Development of an UMKM E-Commerce Management System Interface Using a Responsive Design Approach

dashboard interface lacks an adaptive design, the layout becomes cluttered and disorganized on smaller devices. Text often becomes too small to read, data tables are abruptly truncated, and action buttons overlap. Such conditions not only slow down the workflow but also increase the risk of critical errors, such as mishandling orders or incorrectly adjusting product prices. To address this urgency, a responsive web design approach serves as a fundamental solution that must be implemented in the development of modern business applications. This approach focuses on interface flexibility, ensuring that web page layouts automatically respond to and adjust their form according to various screen sizes. By prioritizing responsive design principles, UMKM operators benefit from a seamless and consistent navigation experience—whether on mobile, tablet, or desktop interfaces—without compromising any of their management system's functional features.

In this study, the interface for an e-commerce management system tailored to UMKM was developed using the Tailwind CSS framework combined with semantic HTML standards. The choice of Tailwind CSS was driven by the efficiency of its "utility-first" approach. Instead of repeatedly writing styling code in separate files, developers can construct the interface visually and precisely by applying utility classes directly to markup elements. This significantly reduces development time, minimizes file size—leading to faster page loads on unstable internet connections—and simplifies cross-device layout adjustments. The framework is particularly adept at handling screen breakpoints, ensuring seamless element transitions from mobile to desktop views.

The design process focused on creating a unified and consistent interface theme for the system's most essential operational management modules. The scope includes a main dashboard displaying metric summaries; a product page for catalog management; an order page for tracking transaction statuses via status badges; and a customer page featuring consumer history tables. All components—ranging from charts, grid layouts, and information cards to navigation panels—were designed to adapt intelligently, maintaining a clear information hierarchy even on the smallest screens.

Ultimately, this research aims to deliver a lightweight, clean, and modern e-commerce management system interface specifically designed to meet the needs of UMKM. This highly adaptive system is intended to provide a practical solution for small business owners to reduce administrative burdens. Simultaneously, this study seeks to enrich academic literature regarding the effectiveness of utility-first frameworks in developing small-scale software ecosystems. By having intuitive management tools right at their fingertips, UMKM owners can better dedicate their energy, focus, and valuable time to scaling sales and business growth strategies.

2 RESEARCH METHOD

The initial phase of the research involved direct observation and a literature review regarding the managerial workflows of UMKM. Observations focused on mapping navigation challenges frequently encountered by users when accessing the system on small screens, with the aim of formulating ideal layout specifications. Meanwhile, the literature review was conducted to gather references concerning User Interface (UI) and User Experience (UX) guidelines, as well as technical documentation for responsive web development.

Prototype Development Stages

- **System Requirements Analysis:** Classifying observational data into key functional modules essential for the dashboard, such as a statistical summary page, product management, order tracking, and a customer directory. This stage was carried out to ensure that the proposed interface accommodates the main managerial activities required by UMKM users. The identified requirements were then used as a reference for determining the content, navigation structure, and priority of information displayed within the system.
- **Design (Wireframing & Mockup):** Creating a visual framework (wireframe) to establish the information hierarchy structure on a blank canvas. At this stage, the

placement of navigation menus, content sections, buttons, and other interface components is arranged without focusing heavily on visual details. This process is followed by the creation of a high-resolution static prototype (mockup), incorporating color schemes, typography, and iconography to simulate the system's final appearance. The mockup provides a clearer representation of the intended interface and serves as a visual reference during the implementation stage.

- **Interface Implementation (Coding):** Translating the mockup design into an interactive interface using HTML5 semantic structures and the Tailwind CSS framework. A strict mobile-first approach is applied during this phase, where the interface is initially designed for smaller screen sizes before being adapted to larger devices. Utility classes are maximized to dynamically build grid and flexbox components, ensuring the layout remains precise, responsive, and well-proportioned across mobile devices, tablets, and desktops without the need for bulky external CSS files. This approach also facilitates consistency between the implemented interface and the previously developed mockup.
- **System Testing:** Conducting final validation of the developed interface to ensure that the implemented design functions as intended. Navigation functionality is tested to ensure all links and interactive elements respond correctly. Additionally, visual responsiveness is rigorously tested using browser-based device simulation tools to calibrate element transitions across various screen breakpoints. The testing process also helps identify minor layout inconsistencies, such as overlapping elements, improper spacing, or components that do not adapt appropriately to different screen sizes. The results of this stage are used to make necessary adjustments before the interface is considered ready for further use.

3 RESULT AND DISCUSSION

This research produced an e-commerce management system interface prototype focusing on four key operational modules for UMKM. All modules were developed in an integrated manner using HTML5 semantics and the Tailwind CSS framework.

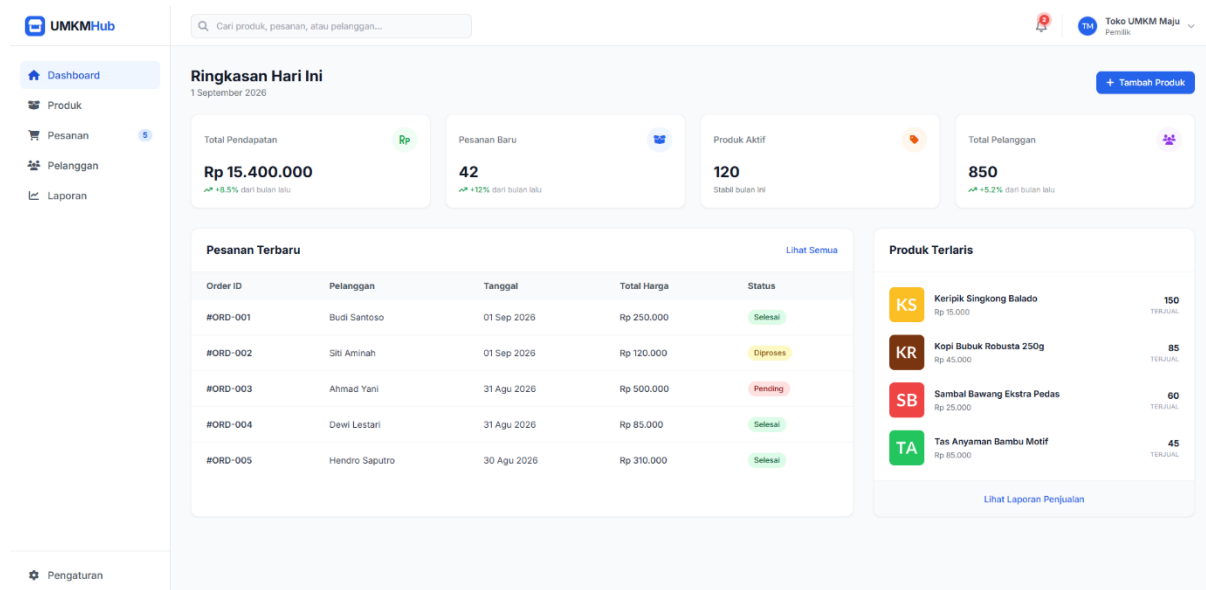


Fig. 1. Dashboard Page

The Main Dashboard page shown in Figure 1 serves as a command center for UMKM managers. It is designed to provide instant visibility through metric cards that summarize essential data, such as total daily revenue, the number of unprocessed active orders, and a monthly sales trend chart.

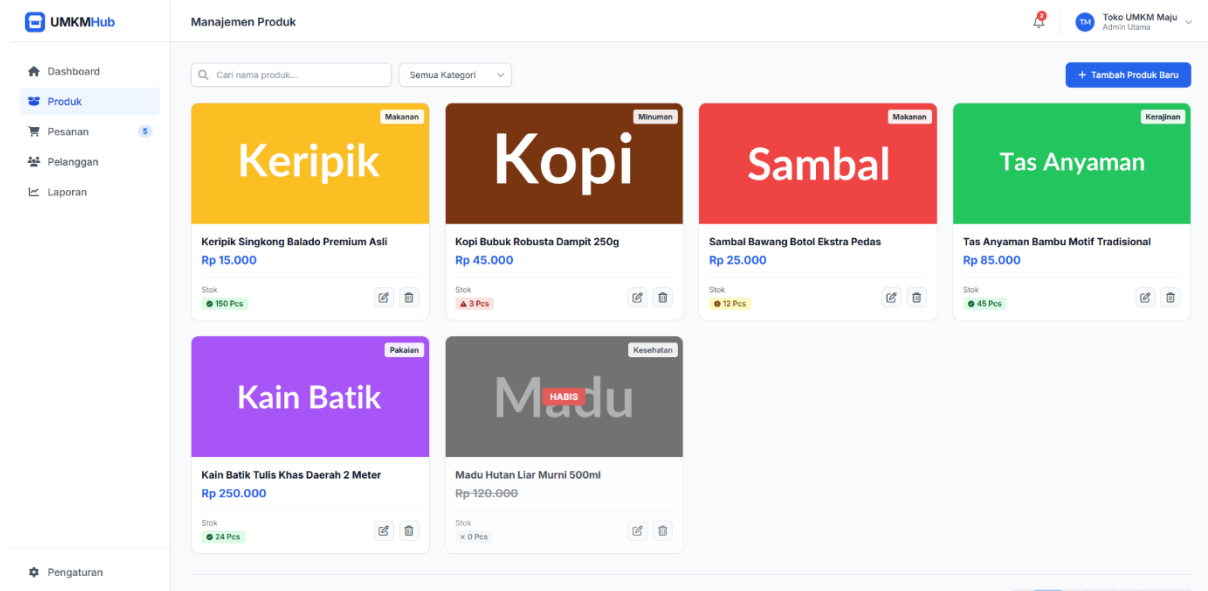


Fig. 2. Products Management Page

The Product Management page shown in Figure 2 utilizes a structured grid layout to facilitate catalog management. Each product is represented by a card displaying a photo, item name, price, and remaining stock, along with quick-action buttons for editing or deleting data without navigating to a new page.

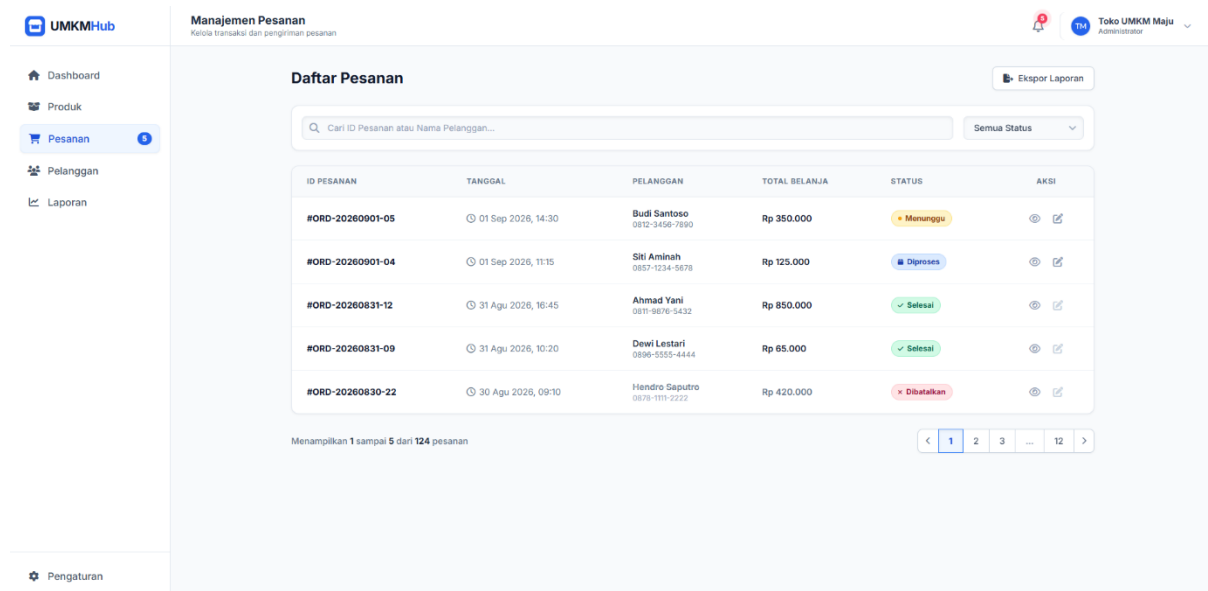


Fig. 3. Orders Management Page

The Order Management page shown in Figure 3 tracks the transaction cycle. Order data is presented in a responsive table featuring time-based filtering and color-coded status badges (e.g., dark yellow for "Awaiting Payment," blue for "In Transit," and green for "Completed").

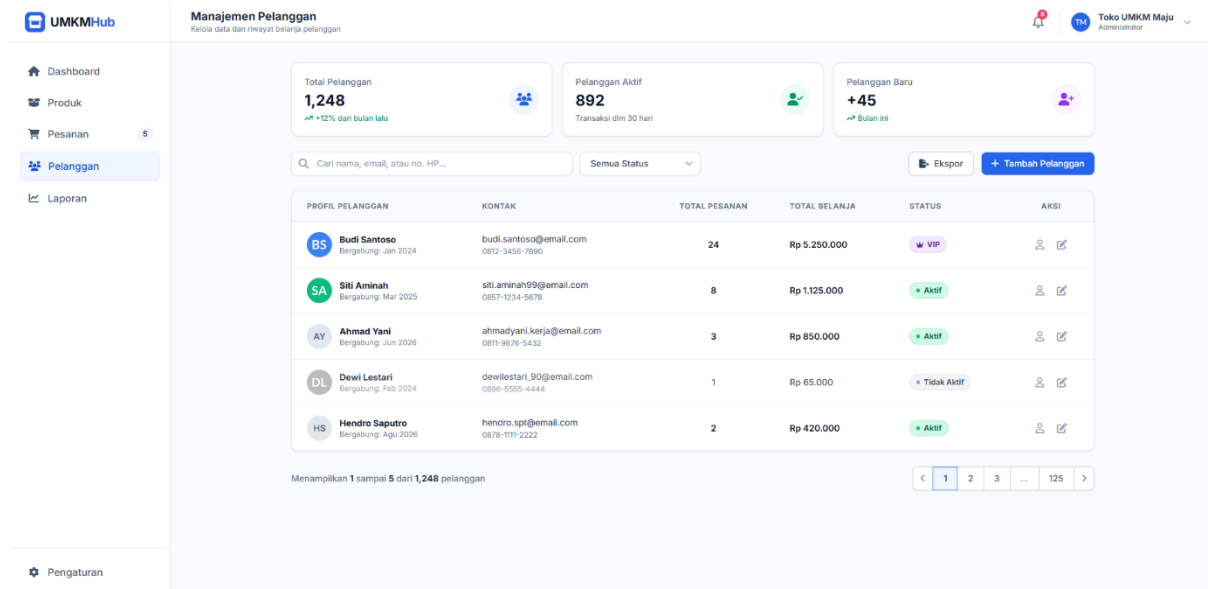


Fig. 4. Customers Management Page

The Customer Management page shown in Figure 4 presents interaction records and consumer demographic data. The table on this page enables administrators to view each customer's purchasing history, which is highly useful for supporting targeted promotions or loyalty programs.

1. Implementation of Cross-Device Responsive Design

The challenge posed by the high mobility of UMKM managers is addressed through a design that fully adapts to various screen dimensions—ranging from mobile and tablet to desktop. Tailwind CSS plays a pivotal role here by leveraging its built-in breakpoint system (sm;, md;, lg:). As a technical example, the Product Management page layout is engineered to form a single column (grid-cols-1) on mobile interfaces, ensuring that text and action buttons remain proportionally sized and easy to tap. When accessed via tablet, the interface automatically adjusts to two columns (md:grid-cols-2) and expands to four columns on desktop monitors (lg:grid-cols-4). This dynamic transition approach eliminates the need for users to zoom in or scroll horizontally, actions that often lead to operational errors.

2. Consistency in Theme and User Experience (UX)

The success of a management system is measured not only by its feature set but also by its usability. To minimize the cognitive load on UMKM operators who may be unfamiliar with complex software, the system enforces strict interface standardization. Fundamental elements—such as the sidebar, color palette, typography sizes, and the border-radius of cards and buttons—are configured using uniform variables. This stylistic and thematic consistency, spanning from the main dashboard to order and customer data archives, ensures an intuitive navigation experience. Once users understand how to interact with one page, they can immediately navigate other management modules with familiarity.

3. Performance Efficiency and System Lightweightness

Tailwind CSS's utility-first architecture directly impacts the web application's technical efficiency. Instead of loading large static CSS files containing significant amounts of unused code, this framework scans the HTML documents and loads only the CSS classes actually in use—effectively purging the rest. This results in a drastic reduction in the interface's file size. For UMKM—particularly those relying on unstable mobile internet connections—this lightweight, fast-loading interface helps prevent operational downtime, saves on data usage, and ultimately boosts daily productivity efficiency.

4 CONCLUSION

This research has successfully designed and built an interface prototype for an e-commerce management system specifically tailored to the characteristics and operational needs of Micro, Small, and Medium Enterprises (UMKM). By employing a responsive design approach based on HTML5 and the Tailwind CSS framework, the system effectively addresses the challenges posed by the high mobility of business owners. Crucial modules—including the main dashboard, product management, order handling, and the customer database—demonstrate the ability to adapt seamlessly and proportionally across various screen sizes, ranging from mobile devices and tablets to desktop monitors.

Utilizing the utility-first architecture of Tailwind CSS offers dual advantages in the system's development. Visually, this approach ensures consistency in themes and interactive elements across all pages, creating an intuitive user experience (UX) and reducing the cognitive load on MSME operators who may be unfamiliar with complex software. From a technical standpoint, the system was developed with a lightweight footprint, ensuring fast and reliable page loading times even when accessed via fluctuating mobile network connections. Ultimately, this clean, modern, and adaptive interface is expected to reduce administrative barriers, minimize operational errors, and boost the daily productivity of UMKM.

For future refinement, it is recommended that subsequent research integrates this interface with a backend architecture and a centralized database system to enable full operational functionality. Furthermore, conducting direct usability testing with the target end-users—utilizing standardized testing instruments—is highly advisable. Such quantitative evaluation will be invaluable for measuring satisfaction levels and the actual effectiveness of the interface during real-world application.

REFERENCE

- [1] A. A. Alfin, L. Kurniasari, and I. Yanuartanti, "INFORMASI (Jurnal Informatika dan Sistem Informasi) Volume 15 No.1 / Mei / 2023," *Inf. (Jurnal Inform. dan Sist. Informasi)*, vol. 15, no. 1, pp. 32–45, 2023.
- [2] A. N. Albalkhi and R. Komalasari, "Sistem Informasi Penjualan (E-Commerce) UMKM DANISA Collection," *SisInfo J. Sist. Inf. dan Inform.*, vol. 6, no. 1, pp. 34–43, 2024, doi: 10.37278/sisinfo.v6i1.789.
- [3] I. Maliki and A. Nudin, "SISTEM INFORMASI E-COMMERCE untuk UMKM SEPEDA MOTOR BERBASIS WEB," *INFOTECH J.*, vol. 9, no. 2, pp. 406–417, 2023, doi: 10.31949/infotech.v9i2.6355.
- [4] M. D. Firmansyah and H. Herman, "Perancangan Web E- Commerce Berbasis Website pada Toko Ida Shoes," *J. Inf. Syst. Technol.*, vol. 4, no. 1, pp. 361–372, 2023, doi: 10.37253/joint.v4i1.6330.
- [5] A. I. Musyaffa, Mulki Indana Zulfa, and Muhammad Syaiful Alim, "Rancang Bangun Purecompute Platform E-Commerce Untuk Belanja Laptop Berbasis Website," *J. SINTA Sist. Inf. dan Teknol. Komputasi*, vol. 1, no. 1, pp. 21–29, 2024, doi: 10.61124/sinta.v1i1.9.
- [6] S. A. Widianana, S. Sintaro, R. Arundaa, E. Alfonsius, and D. Lapihu, "Aplikasi Penjualan Baju Berbasis Web (E-Commerce) dengan Formulasi Penyusunan Kode," *J. Inf. Technol. Softw. Eng. Comput. Sci.*, vol. 1, no. 1, pp. 35–43, 2022, doi: 10.58602/itsecs.v1i1.11.
- [7] M. Febima, L. Jamilah, and J. Juliana, "Rancang Bangun Sistem Informasi E-Commerce Berbasis Web Pada UMKM Raden Madura Distro," *J. Surya Inform.*, vol. 15, no. 2, pp. 83–90, 2025, doi: 10.48144/suryainformatika.v15i2.2159.
- [8] E. F. Febri, B. Imran, and R. Muslim, "Sistem Informasi E-Commerce Penjualan Kerajinan Rotan Berbasis Website Pada Desa Loang Maka Kecamatan Janapria," *J. Comput. Technol.*, vol. 1, no. 1, pp. 32–40, 2023, doi: 10.69916/comtechno.v1i1.83.
- [9] X. Astria, Firman., Wowor, Hans F., & Najoan, "Sistem Informasi Penjualan Online Berbasis Web," *J. Tek. Elektro dan Komput.*, vol. 5, no. 2, pp. 29–36, 2016.
- [10] J. M. Butarbutar, D. Darmansah, and R. N. S. Amriza, "Perancangan Sistem Informasi E-

- Catalogue Berbasis Website Menggunakan Metode Waterfall,” *J. Sist. Komput. dan Inform.*, vol. 3, no. 4, p. 438, 2022, doi: 10.30865/json.v3i4.4165.
- [11] P. G. S. C. Nugraha, I. P. Y. Indrawan, and I. K. A. Asmarajaya, “Rancang Bangun Sistem Informasi E-Commerce Berbasis Website (Studi Kasus Toko Komputer Di Denpasar),” *Inf. Syst. Emerg. Technol. J.*, vol. 3, no. 1, pp. 53–61, 2022.
- [12] H. Yakub, B. Daniawan, A. Wijaya, and L. Damayanti, “Sistem Informasi E-Commerce Berbasis Website Dengan Metode Pengujian User Acceptance Testing,” *JSITIK J. Sist. Inf. dan Teknol. Inf. Komput.*, vol. 2, no. 2, pp. 113–127, 2024, doi: 10.53624/jsitik.v2i2.362.
- [13] T. Rizal, Misriati, “Perancang Sistem Informasi Penjualan Pakaian Berbasis Web,” vol. 07, no. 3, pp. 9–15, 2018.
- [14] M. H. Hibatullah, Tukino, and A. L. Hananto, “Perancangan Website E-Commerce Menggunakan Metode Waterfall Pada Penjualan Alat Komputer,” *J. SINTA Sist. Inf. dan Teknol. Komputasi*, vol. 2, no. 3, pp. 116–124, 2025, doi: 10.61124/sinta.v2i3.61.
- [15] Indra Oktavian and Edy Susena, “Pengembangan Sistem E-Commerce Berbasis Web untuk Meningkatkan Daya Saing UMKM di Pasar Digital,” *Switch J. Sains dan Teknol. Inf.*, vol. 3, no. 4, pp. 53–61, 2025, doi: 10.62951/switch.v3i4.516.