

Design and Functional Evaluation of a Web-Based Sales Information System for a Small Retail Enterprise

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ABSTRACT

Digitalization enables small retail businesses to integrate sales and administrative processes more effectively. This study aims to design and evaluate a web-based sales information system for Depot Marza, which previously relied on manual and spreadsheet-based data management. System requirements were identified through observation, interviews, and SWOT-TOWS analysis. The system was developed using the Waterfall SDLC, modeled with UML, and implemented using PHP, Laravel, and MySQL. Functional evaluation was conducted using Black Box Testing and browser compatibility testing. The developed system integrates authentication, product management, shopping cart, checkout, payment, ordering, and administrative transaction functions. All four documented Black Box test scenarios produced the expected results (100%), while the application operated successfully in Microsoft Edge and Google Chrome without reported functional errors. These findings demonstrate the functional feasibility of integrating customer and administrative sales processes within a web-based platform for a small retail enterprise. Further studies should include broader functional, usability, security, and performance evaluations.

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1. INTRODUCTION

The rapid development of digital technologies has transformed the way organizations manage business processes, interact with customers, and deliver products and services. Digital transformation extends beyond the adoption of individual technologies because it involves changes in organizational processes, value creation, customer interaction, and business models (Vial, 2019; Verhoef et al., 2021; Kraus et al., 2022). The increasing accessibility of internet-based technologies has also created opportunities for small and medium-sized enterprises (SMEs) to digitalize their operational and commercial activities. Digital technologies can support SMEs in improving information accessibility, streamlining operational processes, strengthening customer relationships, and developing more responsive business models (Plekhanov et al., 2023; Sagala & Óri, 2024). Consequently, digitalization has become an important strategic issue for small businesses seeking to maintain their competitiveness in an increasingly digital business environment.

The retail sector is particularly affected by this transformation because sales activities increasingly combine conventional transactions with web-based and electronic commerce mechanisms. The adoption of digital technologies allows retail SMEs to integrate product information, customer interaction, ordering, transaction processing, and other administrative activities within digital platforms (Gouveia & Mamede, 2022). Previous studies have demonstrated that SME digitalization is associated with changes in operational performance and business processes, although the outcomes depend on organizational readiness, technological capabilities, and the manner in which digital technologies are implemented (Kádárová et al., 2023; Merín-Rodríguez et al., 2024). E-commerce adoption can also provide SMEs with additional channels for interacting with customers and managing commercial activities (Santos-Jaén et al., 2023; Salah & Ayyash, 2024). However, technology adoption among SMEs remains heterogeneous because smaller businesses frequently encounter limitations related to resources, technological capability, organizational readiness, and implementation strategy (Bening et al., 2023; Sagala & Óri, 2024).

These conditions are relevant to Depot Marza, a small retail business located in North Bekasi that sells daily necessities, refill drinking water, and packaged drinking-water products. The business initially managed its administrative and sales activities through conventional manual procedures and subsequently used Microsoft Excel to record sales information and product availability. Although spreadsheets provide basic support for data recording, their use in this case does not fully integrate product management, customer ordering, sales transactions, payment information, and administrative data into a unified workflow. From the perspective of digital business strategy, the effective utilization of information technology requires alignment between digital solutions and actual business processes rather than merely converting manual records into electronic files (Bharadwaj et al., 2013; Bouwman et al., 2019). Therefore, Depot Marza requires a more integrated information system capable of supporting both internal administrative processes and customer-oriented sales activities.

Previous research has extensively examined digital transformation, e-commerce adoption, and digital technology implementation among SMEs. Studies have demonstrated the importance of digital technologies for transforming SME business processes (Kraus et al., 2022; Plekhanov et al., 2023), identified critical factors affecting successful SME digital transformation (Sagala & Óri, 2024), investigated digital transformation specifically within retail SMEs (Gouveia & Mamede, 2022), and examined the relationship between e-commerce implementation and SME digitalization (Santos-Jaén et al., 2023). Other studies have

investigated technology adoption strategies (Bening et al., 2023), digitalization and SME performance (Kádárová et al., 2023), and the effects of e-commerce adoption on SME marketing performance (Salah & Ayyash, 2024). Nevertheless, digital transformation does not automatically result in effective operational improvement; its practical value depends on how digital solutions are designed around the specific processes and requirements of individual organizations (Verhoef et al., 2021; Merín-Rodrigáñez et al., 2024). This creates a practical research need for case-based studies that translate the operational requirements of small retail businesses into integrated information-system functions and subsequently evaluate whether the implemented functions operate according to their specified requirements.

To address this need, this study develops a web-based sales information system for Depot Marza using a structured system development process. System requirements are identified through observation and interviews with the business, while SWOT and TOWS analyses are employed to examine existing internal and external conditions and formulate relevant system requirements. The system is subsequently developed using the Waterfall Software Development Life Cycle (SDLC), which provides sequential stages for requirements analysis, system design, implementation, testing, and subsequent maintenance (Sommerville, 2016; Pressman & Maxim, 2020). Unified Modeling Language (UML) is employed to model actors, system functions, data structures, and interactions before implementation. The resulting system is implemented using PHP and MySQL and includes functions for authentication, product information, ordering, shopping-cart management, checkout, payment processing, order management, and administrative data processing. Functional verification is conducted through Black Box Testing, while browser compatibility testing is used to evaluate whether the developed web application operates consistently across the evaluated browsers.

Accordingly, the purpose of this study is to design, implement, and functionally evaluate an integrated web-based sales information system that supports the administrative and sales activities of Depot Marza. The study is motivated by the transition from fragmented manual and spreadsheet-based procedures toward a more integrated digital workflow for a small retail business. The developed system is expected to provide structured management of products, transactions, customer orders, and administrative information within a single web-based platform. Based on the functional evaluation, the tested system functions operate according to the specified requirements, while browser testing indicates consistent system operation across the evaluated web browsers. The contribution of this study therefore lies in demonstrating the design and functional implementation of a web-based sales information system derived from the operational requirements of a small retail enterprise, providing a practical case of how business-process requirements can be translated into an integrated digital sales and administrative system.

2. METHODS

This study employed a system development approach to design and implement a web-based sales information system for Depot Marza, a small retail business located in North Bekasi, Indonesia. The study was conducted in response to limitations in the existing administrative and sales processes, which were primarily performed manually and supported only partially by spreadsheet-based records. These procedures required employees to repeatedly check and reconcile sales and product data, increasing processing time and the possibility of recording inconsistencies. Therefore, the research process was designed to identify the operational problems of the existing system, formulate appropriate system

requirements, develop the proposed application, and evaluate whether its main functions operated according to the specified requirements.

2.1 Data Collection and Existing System Analysis

Data were collected through direct observation and interviews with the business operator. Observation was conducted to identify the existing sales workflow, product-recording procedures, order processing, and administrative activities. Interviews were used to obtain information regarding operational problems, user requirements, and the functions expected from the proposed information system. The collected information was subsequently used as the basis for analyzing the existing system and defining the functional requirements of the web-based application.

The analysis of the existing system showed that several administrative activities at Depot Marza were still conducted manually. Sales transactions and product-related information were recorded using handwritten documents and, to a limited extent, Microsoft Excel. This fragmented recording procedure required manual reconciliation of information and made updating sales and inventory records less efficient. The analysis therefore focused on identifying internal conditions that supported business operations as well as limitations that could potentially be addressed through digitalization.

2.2 SWOT and TOWS Analysis

A SWOT analysis was applied to evaluate the internal and external conditions of Depot Marza. The analysis covered four dimensions: strengths, weaknesses, opportunities, and threats. The identified strengths included established relationships with suppliers, which supported product availability, and the store's location within a residential area with an existing customer base. The main weakness was the limited use of integrated information technology for managing transactions and administrative data, resulting in manual and fragmented data processing.

The identified opportunities included the potential to expand the existing customer base through digital services and the strategic location of the store near a residential area and a relatively busy road. Meanwhile, the major threat was the increasing presence of competing stores and drinking-water agents operating near Depot Marza. These factors were subsequently mapped into a TOWS matrix to formulate strategies that could be translated into system development requirements.

Table 1. TOWS Analysis of Depot Marza

Internal–External Combination	Proposed Strategy
Strength–Opportunity (SO)	Utilize existing business strengths and technological innovation to develop services that respond to customer demand.
Strength–Threat (ST)	Use digital technology to improve product and service differentiation in response to increasing competition.
Weakness–Opportunity (WO)	Introduce an integrated web-based information system to improve administrative processes and extend market reach.
Weakness–Threat (WT)	Improve operational efficiency and focus on market segments in which the business can maintain competitiveness.

The TOWS analysis was not used merely as a strategic business assessment; its results were translated into system requirements. For example, the weakness associated with manual

transaction recording led to the requirement for a centralized sales transaction module, while the opportunity to extend market reach resulted in the development of an online product catalog and ordering features. The need to improve customer services was translated into user registration, product selection, shopping-cart, checkout, payment, and order-status functions. Administrative requirements were translated into product-management, inventory, sales-order, and transaction-management functions for the administrator.

2.3 System Development Procedure

The system was developed using the Waterfall Software Development Life Cycle (SDLC). This model was selected because the development process could be organized sequentially from problem identification and requirement analysis to system design, implementation, and testing. The development procedure consisted of five main stages: requirements analysis, system design, implementation, testing, and maintenance.

During the requirements analysis stage, information obtained from observations, interviews, and SWOT–TOWS analysis was used to identify the needs of administrators and customers. The main functional requirements included user authentication, product information management, product ordering, shopping-cart management, checkout, payment processing, order confirmation, and administrative data management.

During the system design stage, the functional requirements were translated into system models using Unified Modeling Language (UML). Use case diagrams were developed to represent the interactions between users and the system, class diagrams were used to describe the structure and relationships of system data, and sequence diagrams were used to model the sequence of interactions occurring during important processes such as ordering and administrative order validation. Navigation structures were also developed to define the flow between pages and system functions.

The implementation stage transformed the system design into a web-based application. PHP was used for server-side application development, while MySQL was employed as the database management system. Laravel was used as the PHP development framework, and XAMPP provided the local web-server environment required during application development and testing. The application was developed to provide separate access mechanisms for customers and administrators according to their respective roles and functional requirements.

2.4 System Testing

After implementation, the system was evaluated using Black Box Testing. The purpose of this evaluation was to verify whether the major system functions generated the expected outputs for given inputs without examining the internal source-code structure. The testing process focused on user authentication and data-input functions, including valid and invalid input scenarios. A test case was considered successful when the actual system response corresponded to the expected functional requirement.

Browser compatibility testing was also conducted to determine whether the web application could operate consistently across different web browsers. The evaluation examined whether the website could be accessed without functional errors, whether the user interface remained consistent, and whether major customer and administrator functions operated correctly. Microsoft Edge and Google Chrome were used in the compatibility tests reported in this study. The combination of functional and browser testing was used to determine the operational readiness of the developed system within the scope of the evaluated functions.

3. RESULTS

The development process resulted in a web-based sales information system designed to support customer transactions and administrative activities at Depot Marza. The system was developed based on the requirements identified from observation, interviews, existing-system analysis, and SWOT-TOWS analysis. The resulting application consists of two main user roles, namely customers and administrators, with different access rights and functions. Customers are provided with functions for account access, product browsing, shopping-cart management, checkout, payment selection, and order submission, while administrators are provided with functions for managing products, monitoring orders, updating product information, and validating customer transactions.

3.1 System Navigation and User Access

The system navigation structure was designed to distinguish the activities performed by customers and administrators. For customers, the interaction begins from the homepage, followed by account registration or login when authentication is required. After successful authentication, customers can access product information, select products, add items to the shopping cart, proceed to checkout, select a payment method, and complete the ordering process. This navigation structure provides a sequential transaction flow from product selection to order submission.

Administrator navigation was designed to support operational management activities. After logging into the system, the administrator can access product data, customer orders, and transaction-related information. Administrative functions include adding new products, editing existing product information, deleting products, monitoring customer orders, confirming payment information, and validating completed transactions. The separation of customer and administrator navigation ensures that each user role can access functions according to its operational responsibility.

The interaction between users and the system was modeled using use case diagrams. The customer use case includes product browsing, registration, authentication, product selection, shopping-cart management, checkout, payment, and communication with the administrator. In contrast, the administrator use case focuses on authentication and data-management functions, including adding, modifying, and deleting product information as well as processing customer orders. These models were subsequently translated into the implemented application functions.

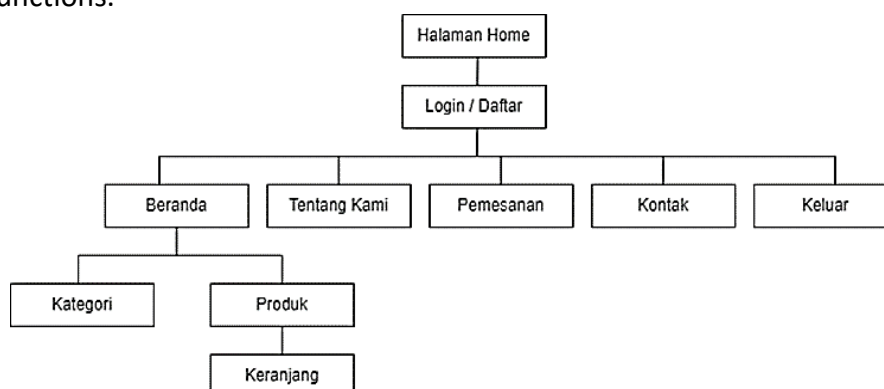


Figure 2. User Navigation Structure

Figure 2 presents the navigation structure for customers. The interaction begins on the Home page, which serves as the initial interface for visitors. Customers can subsequently access the login page and enter the customer menu after successful authentication. The navigation structure defines the sequence through which customers access the available sales functions.

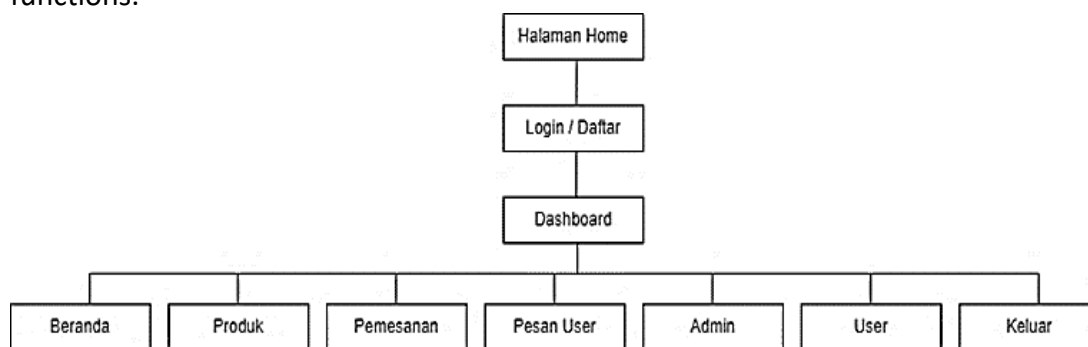


Figure 3. Administrator Navigation Structure

Figure 3 presents the navigation structure for administrators. Administrator access is separated from customer access through authentication. After successful login, administrators can access functions for managing products and transaction-related data. These functions include adding, modifying, and deleting product information and processing data associated with customer orders.

3.2 System Structure and Transaction Workflow

The system data structure was represented through a class diagram describing the main classes, attributes, operations, and relationships required by the application. Sequence diagrams were also developed to represent the chronological interactions between users, system interfaces, and transaction processes. The customer sequence diagram describes the ordering process beginning with homepage access, followed by login or registration, product selection, addition of products to the shopping cart, checkout, payment confirmation, and order completion.

The administrator sequence diagram represents the process used to manage customer transactions. The process begins with administrator authentication, followed by access to product-management functions and order information. Administrators can add, modify, or delete product data, review customer orders, confirm transaction information, and validate orders after payment has been verified. This workflow allows customer purchasing activities and administrative transaction processing to be connected within the same information system.

3.3 User Interface Implementation

The implemented application provides a login page as the primary authentication interface for registered users. Customers are required to enter a registered email address and password before accessing transaction functions. Customers who have not yet created an account can access the registration function from the login page. Authentication therefore acts as the initial control mechanism before customers can proceed to ordering activities.

The product interface displays products available for purchase and allows customers to select items and add them to the shopping cart. After products have been added, customers can modify the quantity of selected items, remove individual products, delete items from the cart, return to the product page, or proceed to checkout. The shopping-cart interface also

displays the total value of products selected before customers continue to the transaction stage.

At the payment stage, the system provides two payment alternatives: cash on delivery and bank transfer. Information related to bank-transfer payments can be communicated through WhatsApp, after which the administrator verifies the payment information. Once the transaction has been confirmed, the administrator can process the customer order and provide a transaction receipt. The implemented ordering workflow therefore connects product selection, shopping-cart processing, checkout, payment selection, and administrative transaction confirmation.

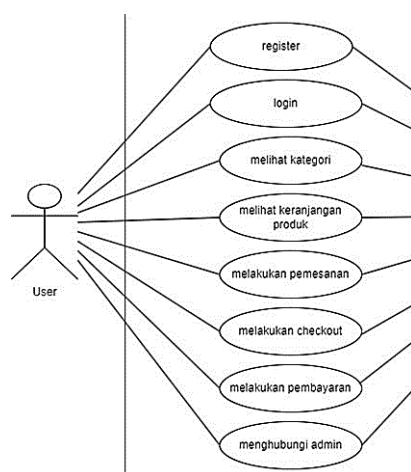


Figure 4. User Use Case Diagram

Figure 4 shows the functions available to customers. Customers can access the homepage and product categories. Authentication through login or registration is required before products can be added to the shopping cart and the checkout process can be completed. The system also provides a communication function between customers and the administrator.

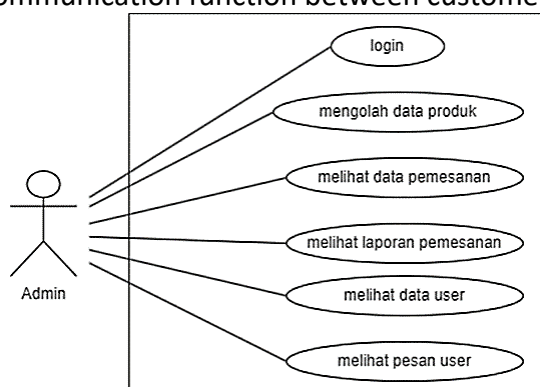


Figure 5. Administrator Use Case Diagram

Figure 5 presents the administrator use case. After authentication, administrators can access website management functions, including adding, modifying, and deleting product-related data.

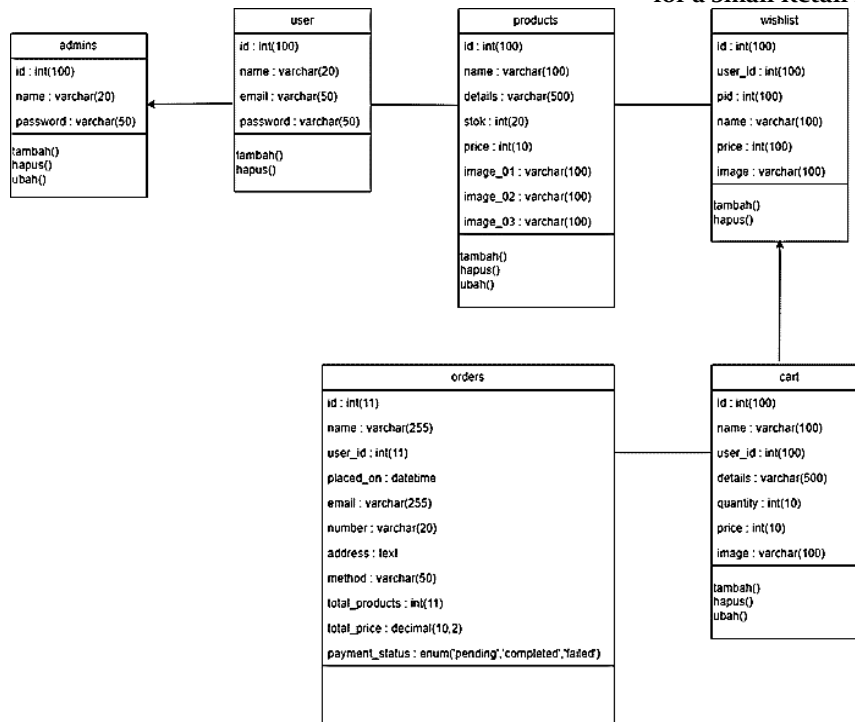


Figure 6. System Class Diagram

Figure 6 presents the class diagram used to represent the structural components of the system. The diagram describes the classes, attributes, operations, and relationships required to support the application.

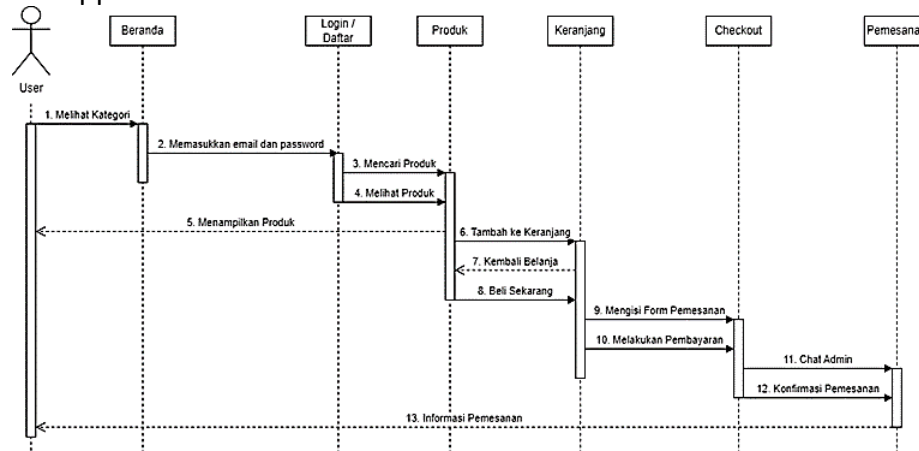


Figure 7. User Sequence Diagram

The customer sequence diagram represents the ordering process from initial system access to order completion. Customers begin by accessing the homepage and logging into the system. Customers without an account can register before proceeding. After authentication, customers can search for products, select products, add them to the shopping cart, proceed to checkout, complete the payment process, and confirm payment. Payment-related information can also be communicated through WhatsApp.

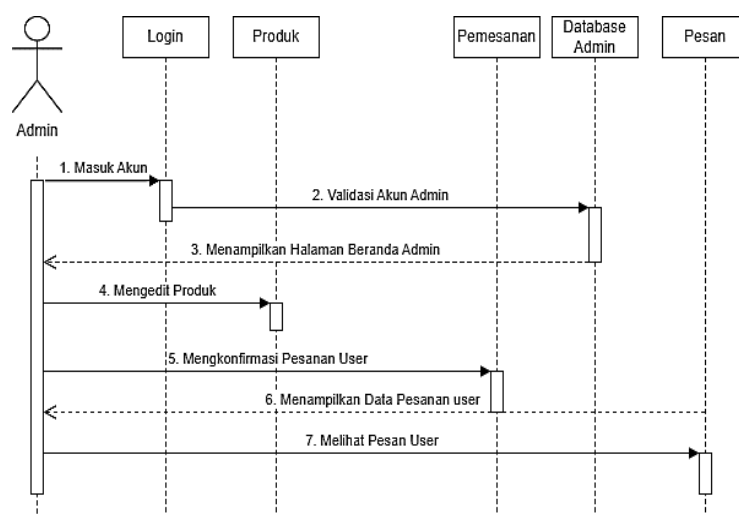


Figure 8. Administrator Sequence Diagram

Figure 8 represents the administrator workflow. After authentication, administrators can access the product-management interface to add, modify, or delete product data and update product availability. Administrators can also review customer orders, confirm order information, verify completed payments, and proceed with order processing.

3.4 Web-Based System Implementation

The system design was subsequently implemented as a web-based sales application. The implemented interfaces support authentication, product selection, shopping-cart management, payment processing, and customer-order management.

The screenshot shows a web application interface for a login page. At the top, there is a navigation bar with links: "Depot Marza.", "Beranda", "Tentang Kami", "Pemesanan", "Produk", and "Kontak". On the right side of the navigation bar, there are icons for search, heart, shopping cart, and a user profile. The main content area features a "LOGIN SEKARANG" (Login Now) form. The form has two input fields: "masukkan email atau username Anda" and "masukkan password Anda". Below these fields is a "User" dropdown menu. There is a blue "Login Now" button and an orange "Daftar Sekarang" (Register Now) button. Below the form, there is a link "tidak memiliki akun?". The footer of the page is divided into three sections: "Tautan Langsung" (Direct Links) with links to home, about, shop, and contact; "Tautan Tambahan" (Additional Links) with links to login, register, keranjang (cart), and orders; and "Contact Us" with a phone number (+62 82111738062), an email address (riskasababau@gmail.com), and a location (Mutiara Gedung Temur 2, Bekasi - 17168) with a link to view the location on Google Maps.

Figure 9. Login Page

Figure 9 shows the authentication interface. Registered customers enter their email address and password to access the system. Customers who do not have an account can use the "Register Now" function before accessing transaction-related features.

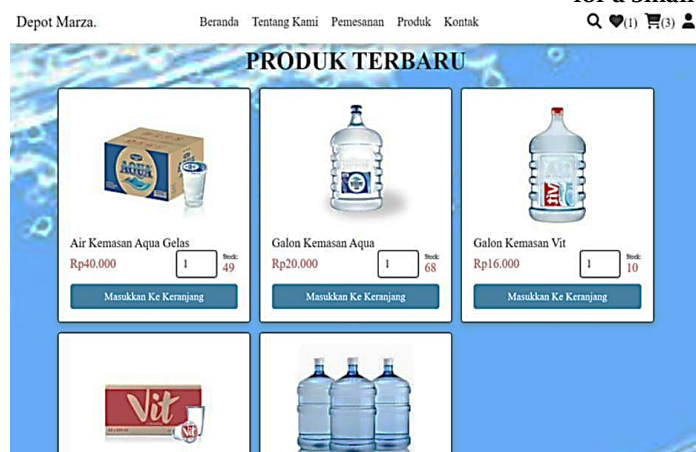


Figure 10. Customer Product Page

Figure 10 presents the product page available to customers. Customers can view the available products, select the required items, and add products to the shopping cart before proceeding to the subsequent transaction stage.



Figure 11. Customer Shopping Cart Page

Figure 11 presents the shopping-cart interface containing the products selected by the customer and the total transaction value. Customers can modify their selections, remove products, return to the product-selection interface, or continue to checkout and payment.



Figure 12. Product Payment Page

The payment process provides two alternatives: cash on delivery and bank transfer. Payment information for bank-transfer transactions can be communicated through WhatsApp. After payment information is received and verified, the administrator processes the transaction and provides the customer with a transaction receipt.

Figure 13. Customer Order Page

Figure 13 presents the customer-order interface following the transaction process. The implemented interfaces shown in Figures 9–13 establish a transaction sequence consisting of authentication, product selection, shopping-cart processing, checkout, payment, and order management.

3.5 Functional Testing Results

Black Box Testing was conducted to determine whether the evaluated functions produced the expected responses for specified input conditions. The first test examined the login function using valid and invalid authentication data.

Table 1. Black Box Testing of the Login Function

Test Condition	Input Data	Expected Result	Observation	Result
Normal data	Username: Admin1234; Password: Admin3456	Valid credentials are accepted and access is granted	Login is according to the expected requirement	Accepted
Invalid data	Arbitrary username and password	Authentication is rejected and an error message is displayed	Access was rejected and an error notification was displayed	Accepted

Both documented login scenarios generated responses corresponding to the expected outcomes. Consequently, 2 of 2 login test scenarios were accepted, representing a 100% success rate within the documented authentication tests.

A second functional evaluation examined customer-data input. The variables included customer name, address, and telephone number.

Table 2. Black Box Testing of Customer Data Input

Test Condition	Input Data	Expected Result	Observation	Result
Normal data	Appropriate customer name, address, and telephone number	Data are accepted to the specified requirements	Customer information was entered according to the expected process	Accepted
Invalid data	Input that does not satisfy the specified conditions	Invalid information is rejected or identified	Input was not processed as valid customer information	Accepted

Both documented customer-data scenarios were classified as accepted. Combined with the authentication testing, the available Black Box evaluation therefore contained four documented test scenarios, all of which produced the expected outcomes (4/4; 100%).

Browser Compatibility Testing

Browser compatibility testing was performed to examine the operation of the application across the browser environments included in the evaluation.

Table 3. Browser Compatibility Testing

No.	Browser	Version	Test Results
1	Microsoft Edge	126.0.2592.102	Website operated successfully; interface remained consistent; no errors were reported; customer and administrator functions operated normally
2	Google Chrome	126.0.6478.127	Website operated successfully; interface remained consistent; no errors were reported; tested functions operated normally

The application operated successfully in Microsoft Edge version 126.0.2592.102 and Google Chrome version 126.0.6478.127. No interface changes or application errors were reported in either browser, and the evaluated functions remained operational. Therefore, both tested browser configurations (2/2; 100%) produced successful results.

Overall, the results show that the developed system provides customer and administrator workflows within a web-based environment. All four documented Black Box test scenarios produced the expected results, while the application also operated successfully in both browser configurations included in the evaluation.

4. DISCUSSION

The results demonstrate that the developed web-based sales information system successfully translates the identified operational requirements of Depot Marza into an integrated digital workflow. The implemented system connects customer-facing functions, including authentication, product selection, shopping-cart management, checkout, payment, and ordering, with administrator-oriented functions for product and transaction management. This integration is particularly relevant because the existing business processes relied on manual records and limited spreadsheet-based data management. The resulting system therefore represents a transition from fragmented administrative procedures toward a more structured digital sales process.

This finding is consistent with the broader concept of digital transformation, which emphasizes that digitalization involves changes in business processes rather than merely replacing paper-based information with electronic records. Vial (2019) describes digital transformation as organizational change triggered by digital technologies, while Verhoef et al. (2021) emphasize its implications for organizational processes and value creation. Kraus et al. (2022) similarly identify business-process transformation as an important dimension of organizational digitalization. Within the context of Depot Marza, the significance of the developed system therefore lies not merely in the use of PHP, MySQL, or web technologies, but in the integration of previously separate sales activities into a connected digital workflow.

The separation between customer and administrator functions also demonstrates the importance of aligning technological implementation with specific user requirements. Customers require a relatively simple workflow for browsing products and completing transactions, whereas administrators require access to product management and order-processing functions. Such alignment is particularly important for SMEs because technological resources and organizational capabilities are generally more limited than those available to large enterprises. Bening et al. (2023) identified technological and organizational factors as important determinants of e-commerce technology adoption among SMEs, while Sagala and Óri (2024) highlighted organizational readiness, resources, and digital capability as important factors influencing successful SME digital transformation. The relatively focused architecture implemented in the present study is therefore appropriate for the operational context of a small retail enterprise.

The transaction workflow further demonstrates that the developed application extends beyond a static product-information website. Product browsing is connected to shopping-cart management, checkout, payment selection, and subsequent administrative order processing. This integration is consistent with the role of e-commerce in SME digitalization. Gouveia and Mamede (2022) emphasized the importance of digital transformation within retail SMEs, while Santos-Jaén et al. (2023) identified e-commerce implementation as an important component of the SME digitalization process. The present findings complement these studies by providing an implementation-level example in which customer ordering and internal transaction-management functions are incorporated into a single web-based application.

The functional testing results provide preliminary evidence regarding the technical feasibility of the proposed system. All four documented Black Box test scenarios produced the expected outcomes. The system correctly distinguished valid from invalid authentication conditions, while the evaluated customer-data input scenarios also behaved according to their predefined requirements. A 100% success rate was therefore obtained within the four documented scenarios. However, this finding should be interpreted specifically within the

boundaries of the reported tests. The application contains substantially more functions than those represented in the Black Box test matrix. Consequently, the 100% result indicates successful execution of the tested functions, rather than evidence that the entire application is completely error-free.

This distinction is important when interpreting software-development results. Successful implementation does not automatically demonstrate improved organizational performance. Previous studies have reported relationships between digitalization and SME performance (Kádárová et al., 2023), while Merín-Rodrigáñez et al. (2024) indicate that the relationship between digital transformation and firm performance can involve changes in business models and organizational processes. In the present study, however, no pre-implementation and post-implementation measurements were conducted. Consequently, the available evidence establishes functional implementation but cannot quantitatively demonstrate reductions in transaction-processing time, administrative workload, recording errors, or improvements in sales performance.

The browser compatibility results provide additional evidence regarding system operation. The application operated without reported errors or interface changes in the two tested configurations, Microsoft Edge and Google Chrome. This result is relevant because browser-based applications should maintain their primary functions across different user environments. Nevertheless, compatibility was evaluated using only two browser configurations. The findings therefore demonstrate compatibility with the tested environments, rather than universal cross-browser compatibility. Additional testing involving Mozilla Firefox, Safari, mobile browsers, different operating systems, and different screen resolutions would strengthen the evidence regarding application portability.

An additional methodological contribution is the connection between the initial business analysis and the implemented system functions. The SWOT–TOWS analysis identified limited technology utilization as an internal weakness and the possibility of expanding services through digital technology as an opportunity. These findings were subsequently translated into functional requirements, including digital transaction management, online product information, customer ordering, and administrator-controlled product management. This relationship between business requirements and technological implementation is consistent with the concept of digital business alignment, in which technological investments should respond to organizational strategy and operational requirements (Bharadwaj et al., 2013; Bouwman et al., 2019).

Several limitations remain. First, the Black Box evaluation covers only four documented test scenarios. Future testing should include registration, product creation, product modification and deletion, shopping-cart modification, checkout, payment processing, order confirmation, inventory updating, logout, empty inputs, duplicate records, boundary conditions, and invalid data formats. Expanding the test matrix would provide stronger evidence regarding overall functional reliability.

Second, the study does not include a formal usability evaluation. Functional correctness does not necessarily indicate that customers and administrators can operate the application easily or efficiently. Future research should therefore include direct user evaluation using instruments such as the System Usability Scale (SUS), complemented by task-completion rate, task-completion time, user-error frequency, and user satisfaction.

Third, the current functional evaluation should not be interpreted as evidence of cybersecurity. Successful rejection of invalid login credentials demonstrates basic authentication behavior but does not establish resistance to SQL injection, cross-site scripting, session hijacking, unauthorized access, or other web-application vulnerabilities.

Dedicated security testing is therefore required before claims regarding system security can be made.

Finally, the study does not quantify the operational impact of system implementation. Future research should compare conditions before and after deployment using measurable indicators such as transaction-processing time, administrative error frequency, inventory discrepancies, order-processing duration, and customer satisfaction. Such measurements would enable the functional feasibility demonstrated in this study to be connected with evidence of actual business-process improvement.

Overall, the contribution of this study lies in demonstrating how the operational requirements of a small retail enterprise can be translated into an integrated web-based sales information system. The system connects customer ordering with internal administrative processes, while the documented functional and browser tests provide preliminary evidence of technical feasibility. Rather than establishing broad claims regarding business performance, the present findings provide a foundation for subsequent evaluation of usability, security, performance, and measurable operational impact.

5. CONCLUSION

This study successfully designed and implemented a web-based sales information system for Depot Marza to support customer transactions and administrative activities within an integrated digital environment. The developed system provides role-based access for customers and administrators and incorporates essential functions including authentication, product information management, product selection, shopping-cart processing, checkout, payment selection, order management, and administrative transaction processing. The system design was supported by navigation structures and UML models that represented user interactions, system functions, data structures, and transaction workflows.

The functional evaluation showed that all four documented Black Box test scenarios produced the expected results, including valid and invalid login conditions and valid and invalid customer-data input conditions. In addition, browser compatibility testing showed that the application operated successfully in both Microsoft Edge and Google Chrome, with no reported interface changes or functional errors during the evaluated tests. These findings indicate that the developed application is functionally feasible within the scope of the tested scenarios and browser environments.

The main contribution of this study lies in translating the operational requirements of a small retail business into an integrated web-based sales workflow that connects customer-facing transaction functions with internal administrative processes. However, the current evaluation is limited to a small number of functional test cases and two browser configurations. The study does not yet provide empirical evidence regarding usability, cybersecurity, system performance, or measurable improvements in administrative efficiency. Future research should therefore expand the functional test matrix, conduct usability evaluation with actual users, perform dedicated security and performance testing, and compare operational indicators before and after system implementation to determine the broader effectiveness of the proposed system.

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