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*Research Article*

# Design and Development of a Web-Based Information System for the G-24 Gallon Water MSME Using the Prototype Method

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**Abstract:** The G-24 Gallon Water MSME still conducts its operational processes manually, including order recording, transaction management, and sales report preparation. These manual processes lead to various problems, such as data being easily misplaced, a high risk of recording errors, difficulties in monitoring order and delivery status, and delays in sales analysis and reporting. To address these issues, this study aims to design and develop a web-based information system for the G-24 Gallon Water MSME in order to improve operational efficiency and service quality. The system development method used in this research is the Prototype method, which enables iterative and interactive development based on direct user feedback. The research stages include requirements analysis, system design using Unified Modeling Language (UML) and Entity Relationship Diagrams (ERD), system implementation using the Laravel framework, and system testing. Data were collected through observation, interviews, and literature review. The developed system provides features for customer order placement and coupon redemption, as well as an administrative dashboard to monitor system activities. Administrators can manage product data, coupon redemption, employee attendance, gallon stock, blog or article content, and customer feedback. Black Box testing results show that all system functions operate according to the specified requirements with a success rate of 100%. Meanwhile, the results of User Acceptance Testing (UAT) indicate a satisfaction rate of 91.82%, which falls into the "Very Good" category. These results indicate that the system is well accepted by users and effectively supports customers and administrators in order processing, operational management, and service information delivery in a more efficient, effective, and structured manner compared to the previous manual system.

**Keywords:** Web-Based Information System; MSME; G-24 Gallon Water; Prototype Method; Laravel.

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## 1. Introduction

Information Technology (IT) plays a vital role in driving digital transformation across various business sectors, including Micro, Small, and Medium Enterprises (MSMEs), by enhancing operational efficiency, data accuracy, service quality, and market reach [1], [2]. In Indonesia, MSMEs serve as a critical pillar of the national economy, contributing significantly to gross domestic product (GDP) and employment [2], [3]. Despite their strategic importance, many MSMEs continue to rely on manual operational processes due to limitations in financial resources, human capital, and technological infrastructure, which negatively affect business performance and decision-making [4].

One such MSME is G-24 Gallon Water, a refill drinking water enterprise that emphasizes product quality and fast service. Based on field observations and interviews, operational activities, including order recording, transaction management, sales reporting, and delivery monitoring, are still conducted manually. This manual approach results in recording errors, difficulties in tracking deliveries, and limited capability for sales analysis, highlighting the need for a web-based information system to improve operational efficiency, accuracy, and service quality.

Previous studies on web-based drinking water depot information systems, such as those conducted by [5] for a depot in Bangkinang and [6] for UMKM Deldio Fresh, employed the Waterfall method, which facilitated transaction management and reporting but lacked flexibility in accommodating dynamic user needs. To overcome these limitations, this study adopts the Prototype method, which enables iterative and interactive system development through continuous user feedback, ensuring that the final system aligns with real operational requirements [7].

The system is implemented using the Laravel framework, which provides features such as flexible routing, integrated authentication, database migration, Eloquent ORM, and the Blade templating engine. These features support the development of rapid, secure, and maintainable web applications [8]. The novelty of this research lies in the integration of several operational features, including transaction processing, online ordering, delivery management, employee attendance tracking, coupon management, stock monitoring, order notifications, and daily reporting. In addition, the system evaluation is conducted using both Black Box Testing and User Acceptance Testing (UAT), resulting in a user acceptance rate of 91.82%.

This study aims to design and develop a web-based information system for the G-24 Gallon Water MSME using the Prototype method as a digital solution to enhance operational efficiency, streamline ordering and delivery processes, and minimize errors in transaction and operational data management. Consequently, this research contributes to the development of adaptive, comprehensive, and user-centered information systems for MSMEs.

## 2. Literature Review

### 2.1. System Design and Development

System design and development refers to the process of planning and creating a system or application by translating user requirements into an implementable software solution. This process may involve developing a new system or improving an existing one in order to achieve optimal system performance [9].

Conceptually, system design and development is closely related to system planning processes, which consist of structured steps used to organize and define system components prior to implementation. Through these processes, system requirements can be systematically transformed into functional and deployable software solutions [9].

### 2.2. Information System

An information system is an organizational system designed to manage both operational and strategic activities by processing data into meaningful information for internal and external users [10]. It is developed to meet user needs and functions as a bridge between data and users by providing timely and accurate information that supports effective task execution and decision-making [11].

The quality of an information system is a critical factor in determining the success of its implementation and utilization. This quality is not only determined by technical components but also by the integration of human and procedural elements. These interrelated components form a complex system that enables efficient and effective access to information and facilitates its optimal use within an organization [12].

### 2.3. Micro, Small, and Medium Enterprises (MSMEs)

Micro, Small, and Medium Enterprises (MSMEs) are business entities characterized by a relatively limited number of employees and play a vital role in national economic development. MSMEs contribute significantly to employment generation, economic growth, poverty reduction, and gross domestic product (GDP), particularly in developing countries such as Indonesia [13], [4].

In Indonesia, MSMEs are legally regulated under Law No. 20 of 2008, which classifies enterprises into micro, small, and medium categories based on asset ownership and annual

revenue thresholds. Micro enterprises are defined as productive economic activities owned by individuals or sole proprietorships with limited assets or turnover. Small enterprises operate independently and are not subsidiaries or branches of medium or large businesses. Meanwhile, medium enterprises are productive and independent businesses that exceed the criteria of small enterprises but do not meet the requirements of large enterprises [2].

This classification provides a clear framework for distinguishing MSMEs and serves as a basis for policy formulation, business development strategies, and technological adoption, including the implementation of information systems to enhance operational efficiency and competitiveness [2].

### 2.4. G-24 Gallon Water

Water is a vital necessity for human life; however, not all available water sources are suitable for consumption due to pollution and declining water quality. Water quality is commonly assessed using physical parameters such as odor, total dissolved solids (TDS), turbidity, taste, temperature, and color [14]. The increasing population and the relatively high cost of bottled drinking water have encouraged communities to shift toward refill drinking water depots as a more affordable alternative. Nevertheless, refill drinking water must comply with physical, chemical, and microbiological standards regulated by the Indonesian Ministry of Health to ensure safety and hygiene through proper treatment and distribution processes [15].

Air Galon G-24 is a Micro, Small, and Medium Enterprise (MSME) operating in the refill drinking water sector, focusing on the production and distribution of high-quality gallon water. Established in 2015 in Samarinda, East Kalimantan, Air Galon G-24 was founded to address limited access to delivery services and to improve customer convenience in obtaining clean drinking water [16]. The enterprise offers various products, including refill gallon water, factory-produced mineral water, and supporting equipment, while implementing advanced filtration technology consisting of multi-stage filters, ultraviolet sterilization, and mineral enhancement to maintain water quality. In addition to product quality, Air Galon G-24 emphasizes customer-oriented services such as fast delivery, gallon cleaning, and promotional incentives, ensuring safe, reliable, and accessible drinking water for the community [16].

### 2.5. Prototype Method

The Prototype method is a software development approach that produces an initial model or temporary system design, which serves as a medium for direct interaction between developers and users to facilitate understanding and refinement of system requirements [17]. Application development using the Prototype method follows an iterative process, in which early versions of the application are developed, tested, revised, and progressively improved. The main objective of this process is to obtain a deeper understanding of user needs and to ensure that the final application aligns with actual user expectations and requirements [18].

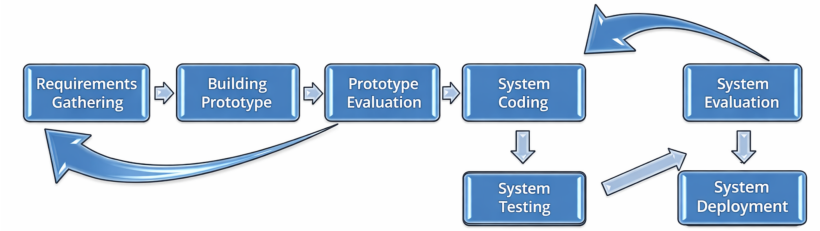


**Figure 1.** illustrates the Prototype method in practice [19].

The stages of the Prototype method can be summarized as shown in Figure 1 [19]:

1. Requirements Gathering: Developers and users identify and analyze system needs, including system format, desired functions, and workflow overview, serving as a foundation for understanding user requirements.
2. Building Prototype: An initial prototype is created to present the user interface, including sample input, process, and output, providing an early view of the system.

3. Prototype Evaluation: Users assess the prototype; if it does not meet expectations, the process returns to the requirements gathering and prototype building stages until approval.
4. System Coding: Once the prototype is approved, developers implement the system using the appropriate programming language, transforming the design into a functional software system.
5. System Testing: Testing, often using Black Box Testing, ensures that the system functions as intended without examining internal code structures.
6. System Evaluation: Test results are reviewed to verify compliance with user requirements; revisions are made if necessary.
7. System Deployment: The fully tested and evaluated system is deployed for real operational use.

The iterative nature of the Prototype method ensures continuous user involvement, making it particularly suitable for dynamic environments such as MSMEs where requirements may evolve during system development.

### 2.6. Framework Laravel

Laravel is a widely used PHP framework for web application development due to its ease of use, security, and development efficiency. It provides several key features, including flexible routing, integrated authentication management, and database migration support that facilitates database schema management. Laravel also includes the Eloquent Object-Relational Mapping (ORM) for intuitive database interactions and the Blade templating engine for efficient view management. Supported by comprehensive documentation, a rich ecosystem of packages, and an active developer community, Laravel enables the rapid and efficient development of modern web applications [8].

Laravel offers several advantages compared to other PHP frameworks. As an open-source and modern framework, it provides various built-in features such as Bundles, Query Builder, Resource Controllers, Migrations, Middleware, and Automatic Pagination. Additionally, the Artisan Command Line Interface (CLI) simplifies and accelerates component generation, while integration with Composer facilitates dependency management. Its expressive and concise coding style improves development productivity for both novice and experienced developers [20].

### 2.7. Black Box Testing

Black Box Testing is a software testing method that treats the system as a closed box. In this approach, testing focuses solely on the inputs provided and the outputs produced, without considering the internal processes of the software [21]. Testers evaluate whether the software operates according to predetermined specifications based on the resulting outputs. Therefore, Black Box Testing is highly relevant for verifying system functionality and ensuring that the system meets user requirements.

This method is effective in detecting errors or deficiencies that may not be explicitly stated in the requirements, such as input validation errors, inconsistent outputs, or functional discrepancies that affect the user experience [22]. However, because testers do not have access to the internal code or structure of the system, certain errors particularly those related to internal logic or architectural design may remain undetected. Therefore, Black Box Testing is often combined with other testing methods, such as White Box Testing, to achieve a more comprehensive software evaluation.

### 2.8. User Acceptance Testing (UAT)

User Acceptance Testing (UAT) is a process in which end-users directly interact with the developed system to evaluate whether it meets their needs and expectations [23]. By involving users, UAT not only assesses system functionality but also determines whether the system can be accepted and used in real operational environments [24].

UAT is generally divided into Alpha Testing and Beta Testing. Alpha Testing is conducted internally by developers to identify early errors, often using Black Box Testing to verify that system functions operate correctly. Beta Testing involves external users to gather real feedback prior to release, typically through instruments such as questionnaires to assess user acceptance and satisfaction [25].

Questionnaires are structured around usability aspects, which consist of five key components [25]:

1. Learnability: the ease with which a new user can accomplish tasks during the first use of the system.
2. Efficiency: the ability of the system to support task completion within a reasonable time.
3. Memorability: the ease with which users can reestablish proficiency after a period of non-use.
4. Errors: the frequency and severity of errors encountered by users and their ability to recover from them.
5. Satisfaction: the overall user satisfaction with the system interface and functionality.

## 3. Proposed Method

This section explains in detail the stages undertaken by the author in conducting the research using the Prototype method approach. The system development process applied in this study is iterative and adaptive, allowing continuous adjustments to be made based on evaluations and feedback obtained at each development stage. The complete research workflow is illustrated in Figure 2.

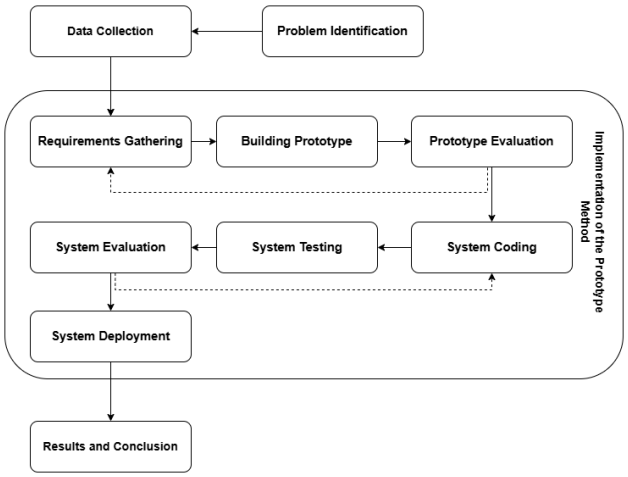


**Figure 2.** Research Methodology Flowchart

### 3.1. Problem Identification

The problem identification reveals that the order processing and customer data management at UMKM Air Galon G-24 are still conducted manually using handwritten records and WhatsApp messages. This manual approach leads to inefficiencies, increased processing time, and a high risk of data loss or inaccuracies. In addition, customers expect a faster and more efficient digital-based ordering system. Therefore, improvements in the existing management process are required to support operational efficiency and enhance customer service quality.

### 3.2. Data Collection

This study employs a qualitative research approach aimed at obtaining an in-depth understanding of the existing problems and operational processes at UMKM Air Galon G-24. Qualitative research focuses on exploring meanings, perceptions, and contextual conditions through direct interaction with participants. Data were collected using three main techniques: literature study, interviews, and observation.

#### *3.2.1. Literature Study*

The literature study was conducted by reviewing relevant journals, books, articles, and previous studies related to information system implementation and the Prototype development method. In addition, documentation and observations of similar applications and refill water business websites were analyzed as references for system design, particularly regarding user interface and system workflow.

#### *3.2.2. Interview*

Interviews were conducted with the administrative staff (cashier) of UMKM Air Galon G-24 to obtain detailed information regarding manual order recording, customer data management, and daily operational issues. The insights gathered from the interviews served as a

primary reference in designing a system that meets user needs and improves the efficiency of the ordering process.

#### *3.2.3. Observation Results*

Observations indicate that all order transactions at UMKM Air Galon G-24 are still recorded manually, including customer addresses, order types, delivery details, quantities, and payments. This manual process increases the risk of data entry errors, data loss, and potential manipulation. With an average daily demand of approximately 200 gallons, the likelihood of recording inaccuracies becomes significant, potentially affecting operational efficiency and service quality. Consequently, the current manual system is inadequate to support accurate, efficient, and reliable data management.

### 3.3. Requirement Gathering

The requirement gathering stage aims to identify existing problems and analyze system requirements through observations, interviews, and literature review. This process focuses on defining both functional and non-functional requirements to ensure the system meets user needs and operational objectives.

Functional requirements cover core system features for administrators and customers, including order management, customer data management, product management, dashboards, reviews, and secure authentication. Customers are also supported with online ordering, order history, profile management, and review submission features.

Non-functional requirements specify technical and operational aspects such as hardware capacity, software environment, system performance, security, and usability to ensure stable, efficient, and reliable system operation.

### 3.4. Building Prototype

This stage involves developing an initial prototype based on the previously identified system requirements. The prototype is designed to provide an early representation of the system's structure, workflow, and functionality. In this study, the prototype is implemented in the form of wireframes that illustrate the user interface layout and interaction flow. The prototype serves as a visual reference to help users understand the system concept and provide feedback. It is also used to identify design and feature deficiencies prior to full implementation, enabling iterative improvements aligned with actual user needs.

#### *3.4.1. Use Case Diagram*

This diagram illustrates customer activities within the UMKM Air Galon G-24 Information System. Customers must log in to access system features, including product browsing, order placement, cart management, and checkout. The system also allows customers to manage their profiles, view order history and invoices, submit reviews, access depot location information, receive real-time order notifications, and utilize user guides and online support. The use case diagram of these customer activities is presented in Figure 3.

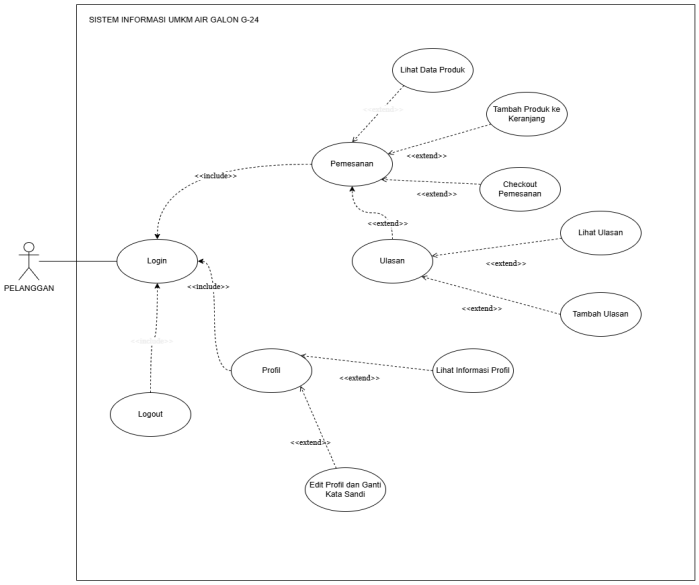


**Figure 3.** Use Case Diagram for Customers

This diagram illustrates the activities performed by the admin within the UMKM Air Galon G-24 Information System. Admin users must log in to access system functionalities, including managing customer data, monitoring sales statistics, and handling operational notes. Admins are also authorized to manage product data, process customer orders (view, edit, delete, and print), and manage blog content and system records. The use case diagram representing these administrative activities is shown in Figure 4.

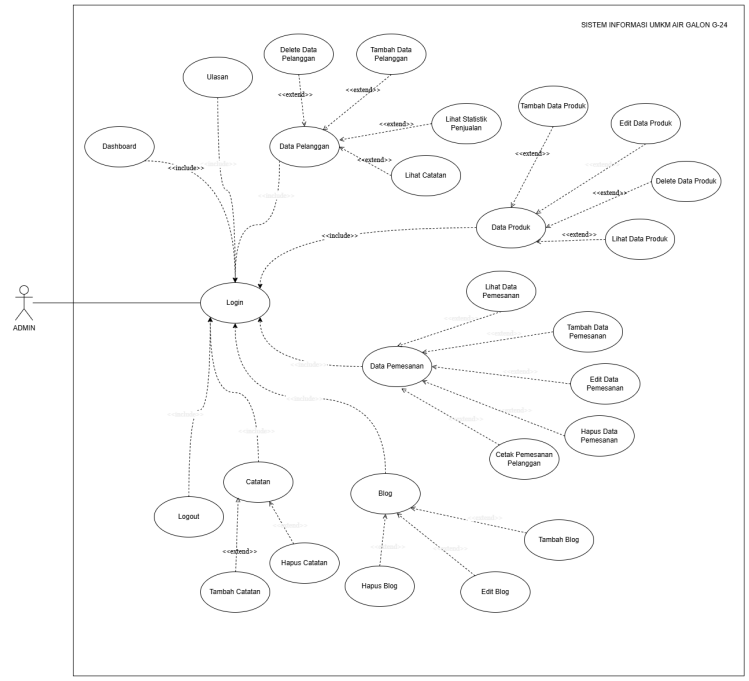


**Figure 4.** Use Case Diagram for Admin

### *3.4.2. Activity Diagram*

This diagram illustrates the user authentication process in the UMKM Air Galon G-24 Information System. When users access the system, it checks whether they are already authenticated. Authenticated users are redirected directly to the main page based on their assigned roles, completing the process. If users are not logged in, the system displays a login form and validates the submitted credentials. Valid credentials grant access to the main system page, while invalid inputs trigger a login failure notification and require users to re-enter their credentials. The user authentication activity diagram is shown in Figure 5.

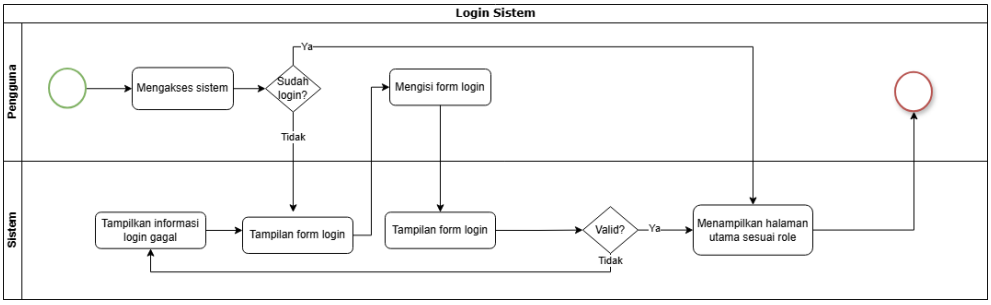


**Figure 5.** User Login Activity Diagram

This diagram shows the customer ordering process in the UMKM Air Galon G-24 Information System. Customers log in, select products, manage items in the cart, and proceed to checkout. The system validates product availability and provides notifications for each action. The process ends when the checkout is successfully completed. Customer Ordering System activity diagram is shown in Figure 6.

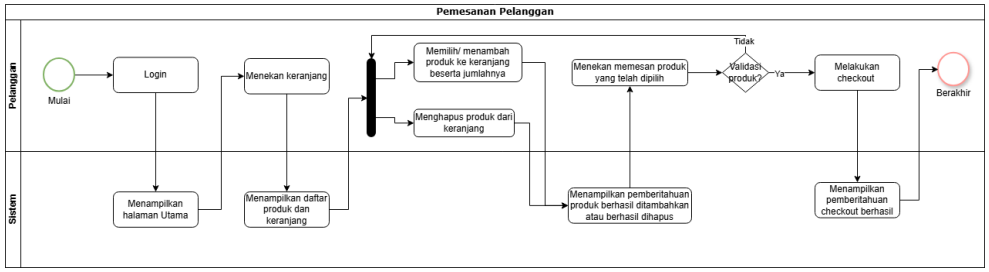


**Figure 6.** Customer Ordering Activity Diagram

This diagram illustrates the admin workflow for managing order data in the UMKM Air Galon G-24 Information System. The process begins with admin login, followed by viewing and verifying customer orders. The admin can update order data as needed, after which the system saves the changes and sends notifications regarding the updates. The activity flow is shown in Figure 7.

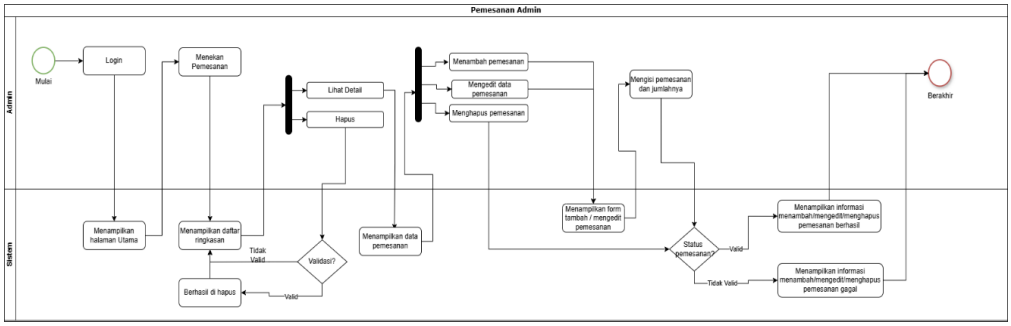


**Figure 7.** Admin Order Management Activity Diagram

This diagram illustrates the admin activity flow in accessing and managing the system through the dashboard of the UMKM Air Galon G-24 Information System. The process begins after the admin successfully logs in, after which the system displays the admin dashboard containing summarized information such as product data, customer data, and order data. From the dashboard, the admin can select the available management menus according to assigned access rights. Once the dashboard information is displayed and the admin proceeds to data management activities, the activity flow depicted in this diagram is completed, as shown in Figure 8.

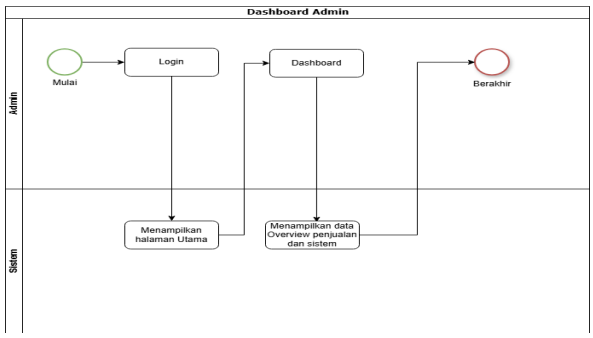


**Figure 8.** Admin Dashboard

### *3.4.3. Database Design*

The database design in this study uses an Entity Relationship Diagram (ERD). The ERD illustrates the structure of the system's database by modeling the tables and the relationships among them. The entities involved in the proposed system are presented in Figure 9.

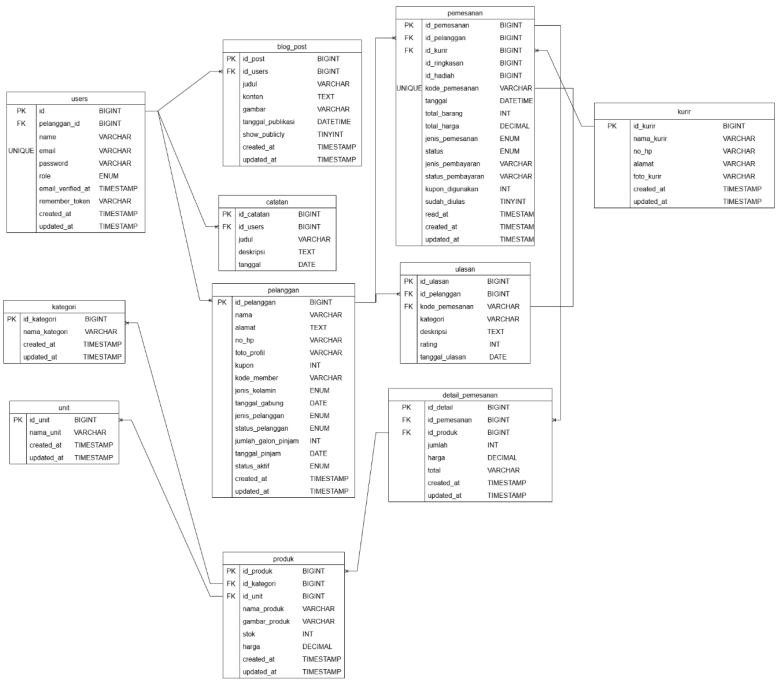


**Figure 9.** Entity Relationship Diagram (ERD) of the Proposed System

## 4. Results and Discussion

This stage was conducted on the developed system, involving prospective system users, namely the UMKM Air Galon G-24 stakeholders, along with several additional features designed to support business needs. The results of the prototype evaluation, which were adjusted according to user requirements and preferences, are presented as follows:

### 4.1. Prototype Evaluation

The prototype of the UMKM Air Galon G-24 information system was evaluated to assess its alignment with user requirements and operational needs. Key stakeholders, including the owner and admin, tested the system's features while researchers observed usability and collected feedback. The evaluation aimed to identify shortcomings, improve workflows, and ensure system efficiency before full implementation. Based on user input, several features were added or enhanced, including employee attendance tracking, expense monitoring, coupon redemption management, gallon stock tracking, notifications for new orders, and a daily transaction summary. These improvements ensured the system better supports both administrative and customer activities, enhancing overall usability, clarity, and operational effectiveness.

### 4.2. System Coding

The system coding phase involves translating the system design into functional program code. During this stage, the program logic, user interface, and database management are developed according to the system requirements. The coding process focuses on core features such as login, registration, order submission, payment processing, and user management, with an emphasis on usability. The result is a functional system with interfaces and features operating as designed.

The landing page is the first interface of the UMKM Air Galon G-24 website, providing an overview of the business, services, and key information. It is designed to be visually appealing, user-friendly, and responsive, allowing users to quickly access essential information before exploring other features. The landing page interface is shown in Figure 10.

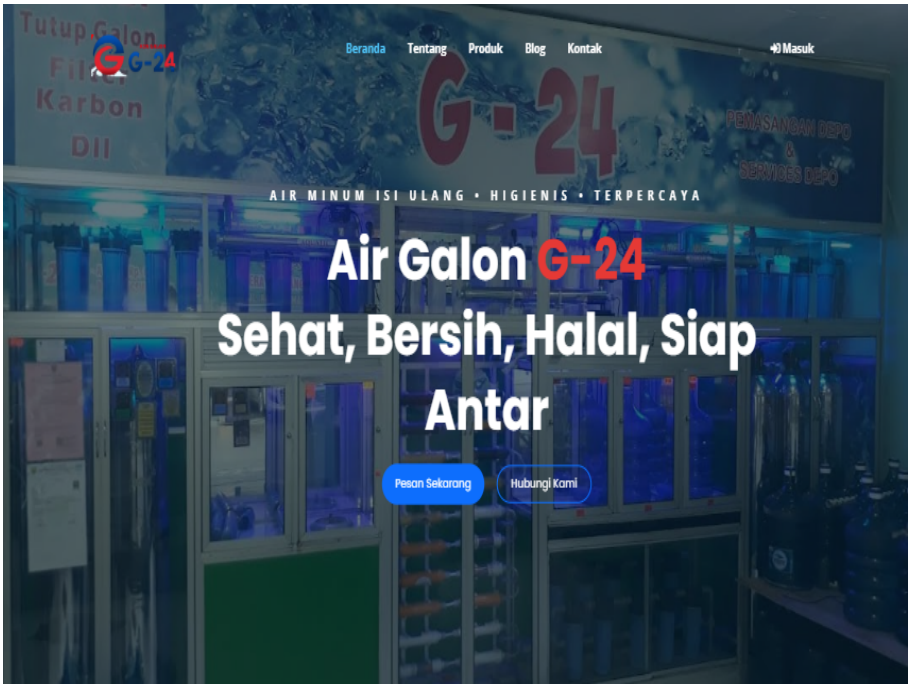


**Figure 10.** Landing Page

The login page is used by users to access the system by entering their registered email or phone number along with a password, and it is equipped with a captcha to prevent login spam. This page functions as the user authentication process before granting access to the system's available features. The login page interface is shown in Figure 11.

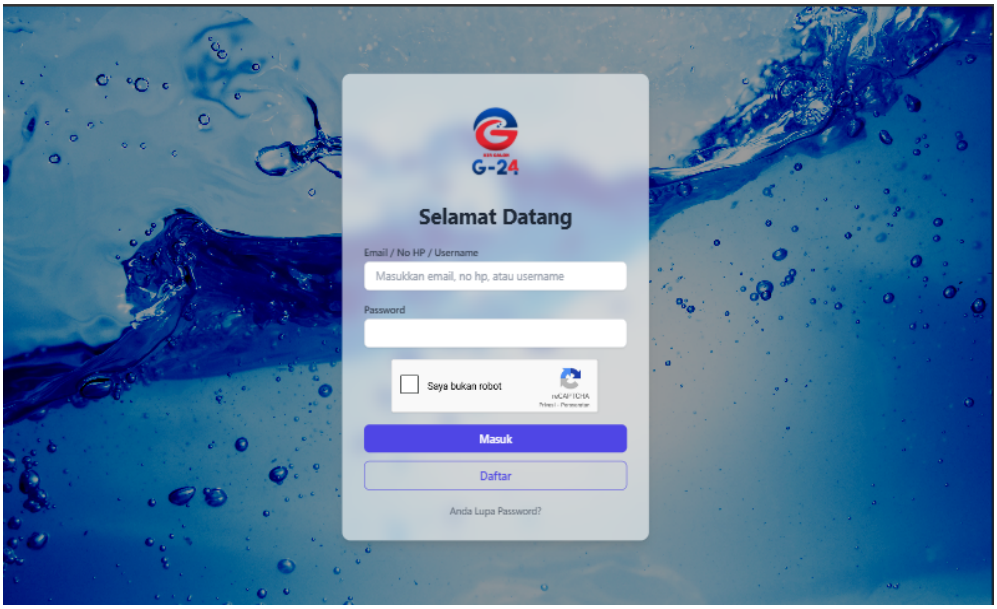


**Figure 11.** Login Page

The cart page displays the list of selected gallon products before proceeding to checkout. Users can review their orders, adjust quantities, add or remove items, and view updated total prices. This page serves as an intermediary step, ensuring accuracy before payment. The cart page interface is shown in Figure 12.

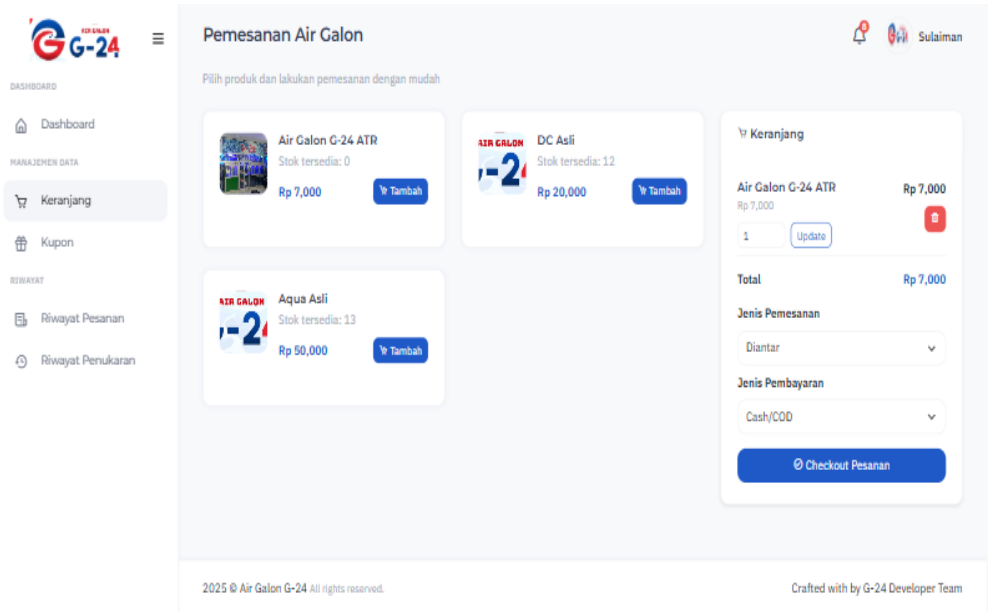


**Figure 12.** Cart Page

The admin dashboard serves as the main page after login, providing an overview of operational activities and system management. Key information, such as total sales, order count, expenses, best-selling products, top customers, and regions with the highest orders, is presented visually through summaries and charts. This layout enables admins to monitor performance effectively, analyze sales, and make informed decisions. The admin dashboard interface is shown in Figure 13.

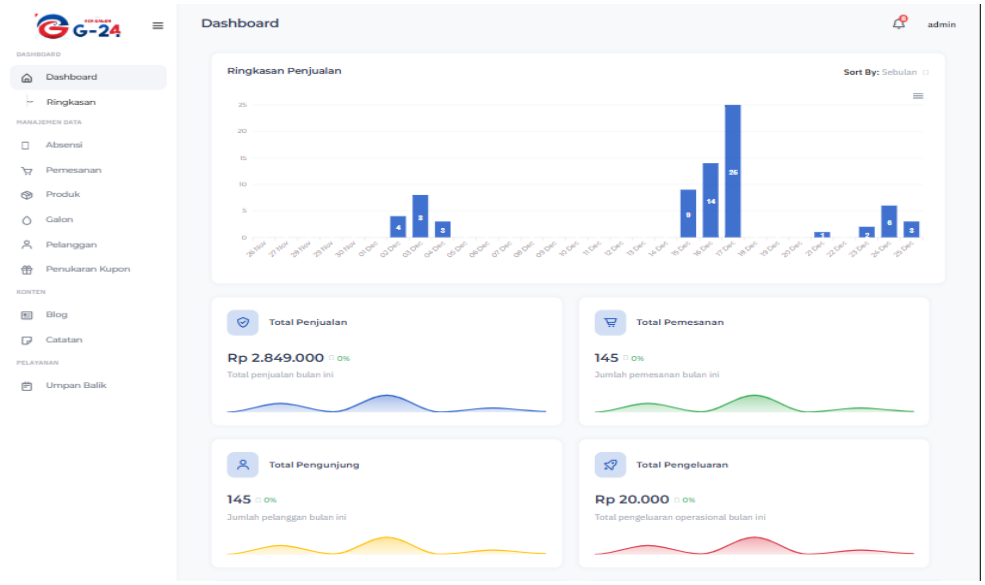


**Figure 13.** Admin Dashboard Page

The order management page allows the admin to oversee all customer orders within the system. It serves as a central hub for tracking orders from new to completed status. Orders are organized by status—new, in process, being delivered, or completed—with detailed information including customer data, quantity ordered, payment method, and total transaction. Admins can update order status and monitor operational activities through expenditure data and order charts. This page enables efficient order management, ensures smooth distribution, and helps admins maintain operational control. The order management page interface is shown in Figure 14.

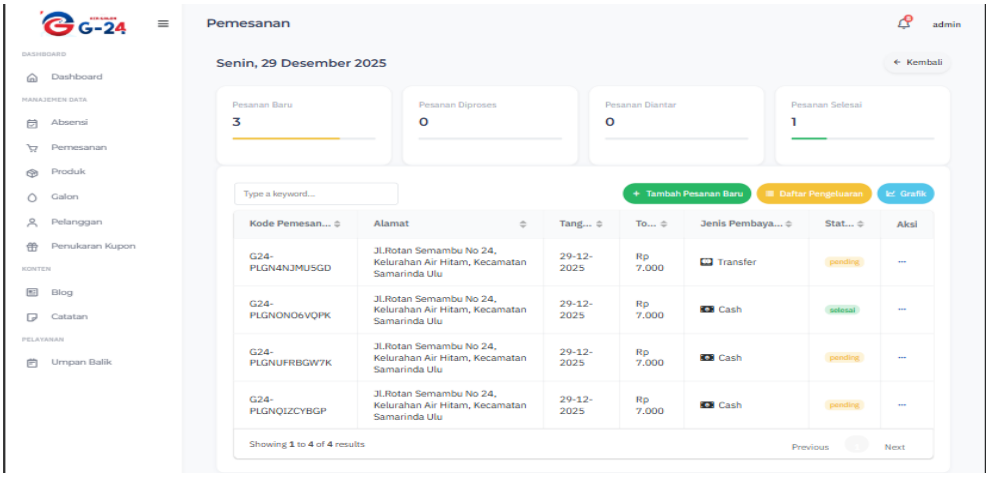


**Figure 14.** Order Page

The coupon redemption page enables the admin to validate and manage customer coupon redemption requests. It ensures that all redeemed coupons comply with applicable rules and are properly recorded in the system. Admins can view a list of redemption requests with supporting details, such as customer information, coupon type, quantity, and redemption status. The admin can also process coupon redemptions directly within the system, either as products or predetermined items, allowing for a fast and controlled process. This page facilitates effective and structured coupon management, ensuring transparency and minimizing errors. The coupon redemption page interface is shown in Figure 15.

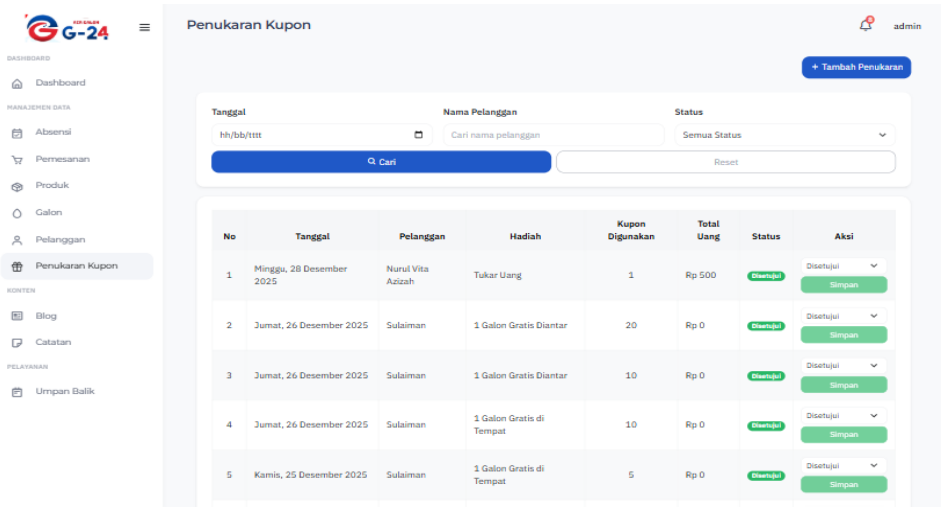


**Figure 15.** Coupon Redemption Page

The coupon page serves as a dedicated interface where users can view and manage all coupons they own within the system. Detailed information is provided for each coupon, including its type, quantity, and specific terms of use, all presented in a structured and easy-to-understand manner. Users can utilize these coupons for various purposes, such as obtaining discounts, redeeming specific products, or exchanging them for other items offered by the system. The page also allows users to identify which coupons are active and ensures that their use adheres to the system's rules and conditions. By providing a clear overview and management tools, this feature supports efficient coupon utilization, enhances user convenience, and adds value to the overall transaction experience. The interface of the coupon page is illustrated in Figure 16.

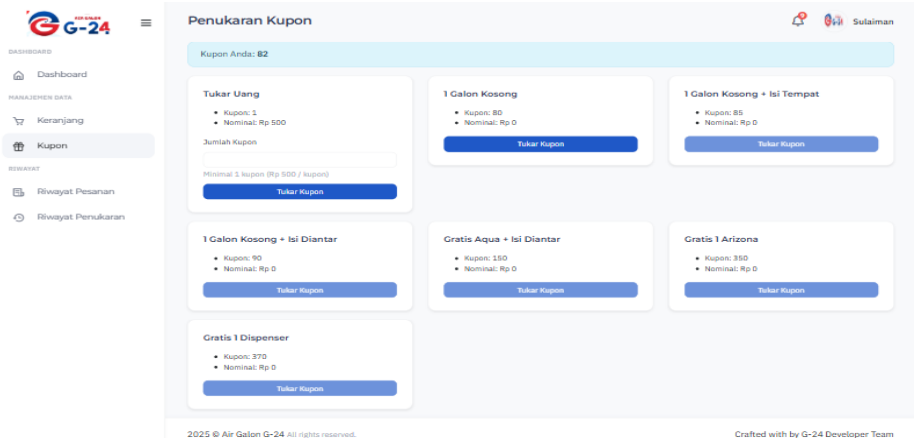


**Figure 16.** Coupon Page

### 4.3. System Testing

The system testing phase in this study involves two main approaches: Black Box Testing, used to evaluate the overall functionality of the application, and User Acceptance Testing (UAT), employed to assess the degree to which the application meets user requirements and expectations. The testing scenarios applied in this research are described as follows:

#### *4.3.1. Black Box Testing*

Black Box Testing was conducted to evaluate the functionality of the UMKM Air Galon G-24 web-based information system without considering the underlying code structure. This testing focused on verifying the consistency between system inputs and outputs to ensure that each feature operates according to the specified requirements. The Black Box tests were performed by stakeholders directly involved in managing UMKM Air Galon G-24 as system users. The results showed an average success rate of 100% with no errors detected, indicating that all system functions operate in full accordance with the designed requirements and specifications.

#### *4.3.2. User Acceptance Testing (UAT)*

Based on the data analysis, the total score obtained was 1,033 from 15 questions answered by 15 respondents. The maximum possible score was 1,125, assuming all respondents answered "Strongly Agree" for each question. From these results, the User Acceptance Testing (UAT) percentage was calculated to be 91.82%. This indicates that the developed system was very well received by users. Most respondents provided positive assessments of various aspects of the system, particularly ease of use, clarity of information, smooth navigation, and the reliability of features related to ordering, data management, and transactions in UMKM Air Galon G-24.

The UAT results demonstrate that the system meets users' needs and expectations, with the percentage falling into the "Excellent" category, dominated by "Agree" and "Strongly Agree" responses. This confirms that the UMKM Air Galon G-24 Information System is well accepted and capable of supporting the ordering process, operational management, and service information delivery effectively. The system is considered to provide users with easier access to UMKM Air Galon G-24 services in a more structured, efficient, and integrated manner, offering significant improvements over the previous manual ordering and management processes. The results of the User Acceptance Testing (UAT) can be seen in Table 1.

**Table 1.** User Acceptance Testing (UAT) Results

| No | Question | Percentage |
|---|---|---|
| Ease of Use | | |
| 1 | Is the system/website easy to use according to your needs? | 92% |
| 2 | Is the system/website interface attractive, clear, and easy to understand? | 80% |
| 3 | Are the menus, icons, and features well-organized and easy to find? | 92% |
| 4 | Does each button or feature function properly? | 93,3% |

| No | Question | Percentage |
|---|---|---|
| 5 | Are you satisfied with the overall user experience of the system/website? | 90, 6% |
| System Performance | | |
| 6 | Can the system/website be accessed quickly on various devices? | 90, 6% |
| 7 | Does the system/website perform as expected? | 93, 3% |
| 8 | Are ordering, data processing, and other activities carried out quickly without delays? | 93, 3% |
| 9 | Is the system/website suitable for regular use in operational activities? | 93, 3% |
| 10 | Are data processing and ordering efficient and error free? | 94, 6% |
| Accuracy and Reliability | | |
| 11 | Is the information about products, orders, or system data always accurate and reliable? | 96% |
| 12 | Are reports or order statuses consistent with the data you input? | 93, 3% |
| 13 | Are customer data, stock, and other system information always up-to-date and relevant? | 93, 3% |
| Functionality | | |
| 14 | Are all essential features available and functioning properly? | 93, 3% |
| 15 | Does the system/website support your specific needs? | 88% |
| | Overall Average Percentage | 91, 82% |

### 4.4. System Evaluation

The system evaluation showed that all features functioned correctly based on Black Box Testing. User Acceptance Testing (UAT) indicated a 91.82% acceptance rate, demonstrating that users found the system easy to use and aligned with their needs for ordering and managing gallon water data. Some feedback on feature and interface improvements was noted for future development. Overall, the system meets user requirements and is considered suitable for operational use.

The implementation of the system significantly improves operational efficiency compared to the previous manual process. Order management, which previously relied on handwritten records and WhatsApp messages, is now integrated into a centralized system that enables real-time monitoring, faster transaction processing, and more accurate data recording.

### 4.5. System Deployment

The system usage describes how users interact with the UMKM Air Galon G-24 system after it has been coded and tested, differentiated by user roles. Customers access the landing page, log in, and use the dashboard to place orders, manage the cart, make payments, and redeem coupons. Admins log in to manage orders, products, customer data, monitor stock, record employee attendance, manage blog content, and review customer feedback. This flow demonstrates that the system prototype fully supports operational needs for both customers and admins, as detailed in the system implementation section.

## 5. Comparison

Previous studies by [5] and [6] focused on developing web-based sales systems for refill drinking water depots using the Waterfall method. Study [5] implemented a system for a depot in Bangkinang that includes features such as login and registration, dashboards, product and order management, cashier functions, PDF reporting, and customer loyalty mechanisms such as discounts and reward points. Meanwhile, study [6] targeted UMKM Deldio Fresh by transforming manual record-keeping processes into a digital system that includes transaction management, customer data management, gallon product management, and a QR code–based coupon system. Both studies applied Black Box Testing to verify that core functionalities, such as login, transaction processing, and coupon management, operated according to the specified requirements.

In contrast, the present research on UMKM Air Galon G-24 introduces several advancements in terms of system design, development methodology, and operational coverage. First, the research object focuses on a refill water depot that integrates sales recording, online ordering, and delivery management, thereby addressing broader operational needs. Second, the

system is developed using the Prototype method, which is more iterative and adaptive compared to the sequential Waterfall method. This approach allows continuous refinement of the system through repeated user evaluation, ensuring that the final system aligns with real user expectations and operational requirements.

Furthermore, the system features extend beyond basic transaction processing. The Air Galon G-24 system includes employee attendance tracking, expense monitoring, coupon redemption management, gallon stock monitoring, notifications for new orders, and daily transaction summaries. These features enhance both administrative management and customer service activities. The use of the Laravel framework also supports efficient coding practices, secure authentication mechanisms, and effective database management, which contribute to system scalability and maintainability.

In terms of testing and evaluation, previous studies relied solely on Black Box Testing. In contrast, this research also implements User Acceptance Testing (UAT), which resulted in a user acceptance rate of 91.82%, indicating a high level of user satisfaction and system usability. The combination of Black Box Testing and UAT ensures both functional correctness and practical usability in real operational environments.

From a conceptual perspective, this research is supported by principles of information system theory and MSME management. As a Micro, Small, and Medium Enterprise, Air Galon G-24 benefits from a tailored information system that integrates operational data processing, user-friendly interfaces, and iterative development practices to improve efficiency, accuracy, and strategic decision-making. The developed system not only automates previously manual processes but also provides reliable, timely, and accessible information for both internal and external users, aligning with best practices in information system implementation.

In summary, this study offers a more comprehensive, adaptive, and user-centered solution for the digitalization of refill drinking water depot MSMEs. By combining advanced system features, the iterative Prototype development method, Laravel-based implementation, and dual testing approaches (Black Box Testing and UAT), this research represents a significant improvement over previous studies in supporting broader operational, administrative, and customer-oriented needs.

## 6. Conclusions

Based on the results of the research, development, and testing of the web-based ordering information system for UMKM Air Galon G-24, it can be concluded that the system developed using the Prototype method successfully provides core features that support business operations, including gallon ordering, coupon management, payment processing, employee attendance tracking, sales reporting, and stock monitoring. The system enables customers to place orders independently through the cart feature, redeem coupons, make payments, and track order status. Meanwhile, administrators can efficiently manage customer data, monitor orders, oversee coupon usage, record employee attendance, and generate structured sales reports. The results of Black Box Testing demonstrate that all primary system functions operate according to the system design without errors, achieving 100% compliance with the specified requirements. Furthermore, the results of User Acceptance Testing (UAT) indicate a user acceptance rate of 91.82%, which reflects a high level of user satisfaction among both customers and administrators. Overall, the developed system meets user requirements, provides a user-friendly experience, and improves the efficiency and effectiveness of operational activities at UMKM Air Galon G-24. Nevertheless, several suggestions related to feature enhancements and interface improvements were identified during the evaluation process and may serve as considerations for future system development. Future research may focus on integrating mobile applications, payment gateway systems, and real-time delivery tracking to further enhance service efficiency and user experience.

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