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WEB-BASED COFFEE SALES INFORMATION SYSTEM : (A Case Study Of Cerita Teras Coffee Shop)

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Abstract

The rapid advancement of information technology has encouraged business owners to adopt digital systems to improve operational efficiency and service quality. Cerita Teras Coffee Shop still relied on a manual sales process, which often resulted in delayed transaction recording, difficulties in managing sales data, and less effective promotional activities. This study aims to design and implement a web-based coffee sales information system to improve transaction management and business operations. The research employed a developmental research method with a qualitative approach through observations and interviews to identify system requirements, followed by a quantitative approach to evaluate system performance. The research stages consisted of problem identification, data collection, requirement analysis, system design using the Waterfall method, system implementation, and testing through Black Box Testing and User Acceptance Testing (UAT). The developed system provides features for online ordering, product management, customer management, transaction processing, and automated sales reporting. The testing results indicate that all system functions operated successfully according to user requirements, while the User Acceptance Test achieved a satisfaction score of 90.91%, indicating that the system was highly accepted by users. Therefore, the proposed web-based sales information system effectively improves operational efficiency, facilitates transaction management, and enhances service quality at Cerita Teras Coffee Shop.

Keywords:
Sales Information System;
Web-Based Application;
Waterfall Method;
Black Box Testing;
User Acceptance Testing.

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1. Introduction

The rapid advancement of information technology has accelerated digital transformation across various business sectors, including Micro, Small, and Medium Enterprises (MSMEs). The implementation of information systems enables organizations to improve operational efficiency, facilitate data management, and support decision-making through accurate and timely information [9]. In addition, web-based information systems provide flexibility, accessibility, and scalability, making them suitable for supporting business activities in the digital era [4], [5], [6].

Cerita Teras Coffee Shop is one of the MSMEs operating in the food and beverage sector. Currently, its sales activities, including transaction recording, product management, and sales reporting, are still performed manually. This condition often results in delays in transaction processing, inaccuracies in data recording, difficulties in managing sales reports, and limited promotional activities. Similar problems have also been reported in previous studies on web-based sales information systems for MSMEs [2], [10].

Several previous studies have developed web-based sales information systems using different software development approaches. Setyaningsih [1] developed a web-based coffee sales information system to improve sales transactions and product promotion. Astuti [2] designed a web-based sales information system using BPMN, DFD, and ERD to support business process management. Hidayat et al. [3] implemented a web-based coffee sales information system using PHP and MySQL with the Waterfall development method. Syahadiyanti et al. [10] also demonstrated that website-based sales information systems improve operational efficiency and transaction management. Dennis et al. [5] explained that structured system analysis and design contribute to the development of reliable information systems.

Although previous studies have successfully implemented web-based sales information systems, most of them mainly focused on system development and implementation. Studies evaluating user acceptance through User Acceptance Testing (UAT), particularly for coffee shop MSMEs, remain limited. Therefore, this study aims to develop a web-based coffee sales information system for Cerita Teras Coffee Shop using the Waterfall model. The system was implemented using PHP, HTML, CSS, JavaScript, and MySQL [4], [6], [8].

Therefore, this study aims to design and implement a web-based coffee sales information system for Cerita Teras Coffee Shop using the **Waterfall** software development model. The system was developed using **PHP, HTML**, and **MySQL**, while system modeling was carried out through **Use Case Diagrams** and **Entity Relationship Diagrams (ERD).** System functionality was evaluated using **Black Box Testing**, whereas user satisfaction and system acceptance were assessed through the **User Acceptance Test (UAT).**

The main contribution of this study lies in the development of an integrated web-based sales information system that combines online ordering, product management, customer management, transaction processing, and automated sales reporting within a single application. In addition, this study provides empirical evidence regarding user acceptance through the results of the **User Acceptance Test (UAT),** demonstrating the effectiveness of the proposed system in improving operational efficiency and service quality. The findings are expected to serve as a valuable reference for the development of web-based sales information systems in similar MSMEs.

1. Methods

This study employed a **developmental research** approach to design and implement a web-based coffee sales information system for Cerita Teras Coffee Shop, located in Surakarta, Central Java, Indonesia. The research combined qualitative and quantitative approaches. The qualitative approach was used to identify system requirements through direct observations and interviews with the business owner, while the quantitative approach was applied to evaluate the system's functionality and user acceptance.

The overall research procedure applied in this study is presented in Figure 1. The research began with problem identification and literature review, followed by observation and interviews to collect system requirements. The collected data were analyzed to determine the functional and non-functional requirements of the proposed system. Subsequently, the system was designed using the Waterfall software development model, implemented as a web-based application, and evaluated through Black Box Testing and User Acceptance Testing (UAT).

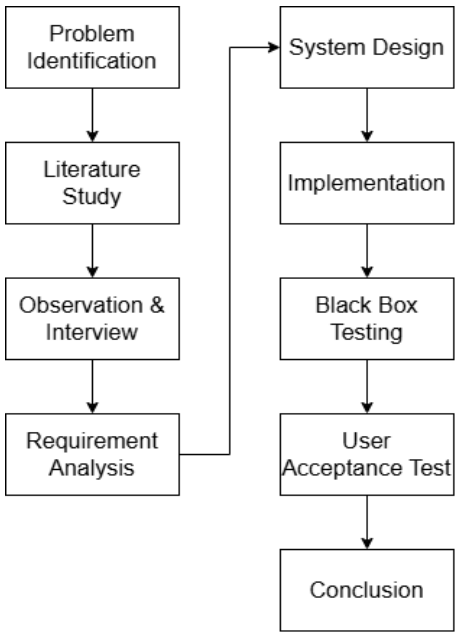

Figure 1. Research Stages

Data were collected using three techniques: literature review, observation, and interviews. The literature review involved examining books, scientific journals, and previous studies related to web-based sales information systems, software development methods, and supporting technologies. Direct observation was conducted to analyze the existing business processes at Cerita Teras Coffee Shop and to identify problems associated with the manual sales system. In addition, interviews with the business owner were carried out to obtain detailed information regarding product

management, transaction procedures, customer requirements, and sales reporting. The collected data were subsequently analyzed to define the functional and non-functional requirements of the proposed system.

The system was developed using the Waterfall software development model because it provides a systematic and sequential software development process consisting of requirements analysis, system design, implementation, testing, and deployment [5]. During the requirements analysis stage, both functional and non-functional requirements were identified based on the findings from observations and interviews. The system design was modeled using **Use Case Diagrams** and **Entity Relationship Diagrams (ERD)** to represent the business processes and database structure. The implementation stage involved developing the application using **PHP, HTML, CSS,** and **JavaScript,** while **MySQL** served as the database management system [4], [6], [8]. The application was developed using **Visual Studio Code** as the integrated development environment (IDE).

System evaluation was conducted using Black Box Testing to verify that all functional requirements operated according to the specified system requirements. Furthermore, User Acceptance Testing (UAT) was conducted to measure user acceptance of the developed system. Testing was conducted by distributing questionnaires to 11 respondents. The evaluation covered several aspects, including functionality, usability, effectiveness, and overall user satisfaction. The results of these evaluations were used to determine the feasibility of the web-based sales information system in supporting the operational activities of Cerita Teras Coffee Shop.

2. Results and Discussion

3.1 System Requirements Analysis

The system requirements analysis was conducted to identify the functional and non-functional requirements of the proposed web-based coffee sales information system for Cerita Teras Coffee Shop. The analysis was based on direct observation of the existing business processes and interviews with the business owner. The findings revealed that the current sales process was still performed manually, including product management, transaction recording, payment confirmation, and sales report preparation. As a result, the business frequently experienced delays in transaction processing, difficulties in managing sales data, and inefficiencies in preparing sales reports.

Based on the analysis, two categories of system users were identified, namely administrators and customers. The administrator is responsible for managing product information, processing customer orders, confirming payments, maintaining customer data, updating operational hours, and generating sales reports. Meanwhile, customers are able to register an account, browse available products, place online orders, confirm payments, and monitor their transaction history. These functional requirements were determined based on the operational activities carried out at Cerita Teras Coffee Shop.

In addition to functional requirements, several non-functional requirements were identified to ensure that the system operates effectively. The developed application should provide a user-friendly interface, responsive access through various devices, secure authentication for users and administrators, and reliable database management to maintain data consistency and integrity.

The identified requirements served as the basis for designing the proposed system. Figure 2 presents the Use Case Diagram, illustrating the interactions between users and the system. In addition, the system flowchart and the Entity Relationship Diagram (ERD), presented in the following subsection, were used to describe the system workflow and database structure before the implementation stage.

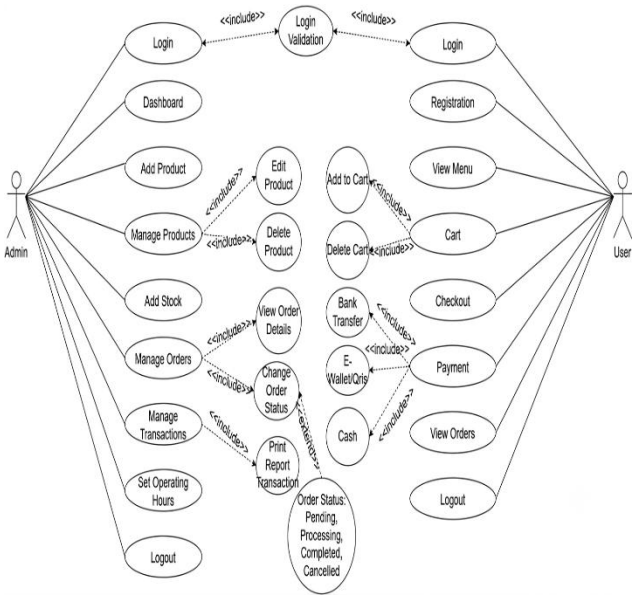

Figure 2. Use Case Diagram

2.2 System Design

Following the system requirements analysis, the proposed web-based coffee sales information system was designed using the Waterfall software development model. The design phase aimed to translate the identified functional and non-functional requirements into a structured system architecture before implementation. To achieve this objective, the system was modeled using a Use Case Diagram, an Entity Relationship Diagram (ERD), and system flowcharts.

The database structure of the application was designed using an Entity Relationship Diagram (ERD). The ERD describes the relationships among the primary entities in the system, including users, products, orders, order details, payments, and reports. The database design ensures data consistency and supports efficient transaction processing throughout the application. Figure 3 presents the Entity Relationship Diagram (ERD) of the proposed system.

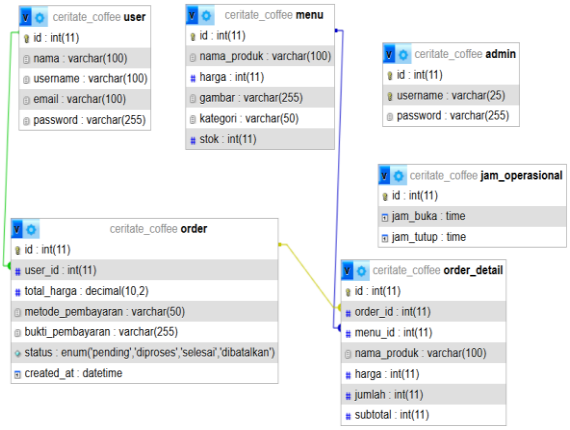

Figure 3. Entity Relationship Diagram (ERD)

To describe the operational workflow of the developed application, system flowcharts were also prepared for both administrators and customers. The administrator flowchart illustrates the process of logging into the system, managing products, processing customer transactions, confirming payments, and generating sales reports. Meanwhile, the customer flowchart illustrates the process of browsing products, placing orders, confirming payments, and viewing transaction history. Figure 4 and Figure 5 illustrate the administrator and customer flowcharts of the proposed system.

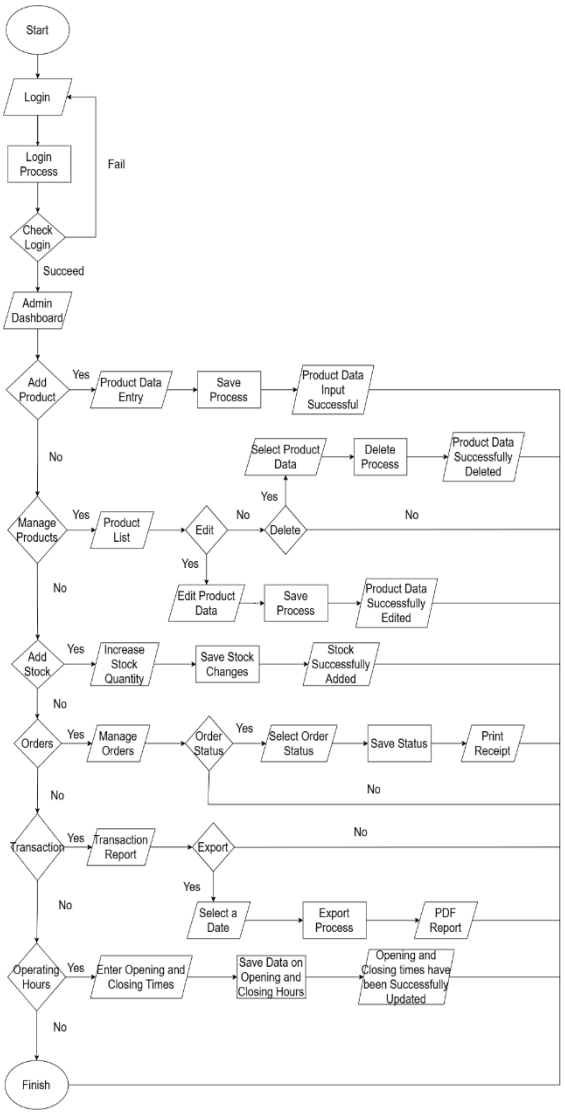

Figure 4. Administrator Flowchart

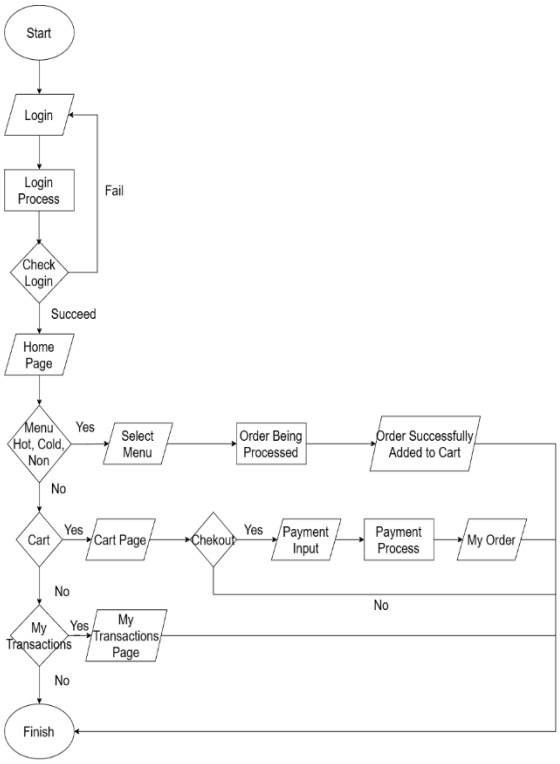

Figure 5. Customer Flowchart

3.3 System Implementation

The implementation results demonstrate that the developed web-based sales information system successfully fulfills the operational requirements of Cerita Teras Coffee Shop. From the administrator's perspective, the system provides an integrated dashboard that facilitates product management, customer transaction monitoring, payment verification, and automated sales report generation. The administrator interfaces are presented in Figure 6, Figure 7, and Figure 8.

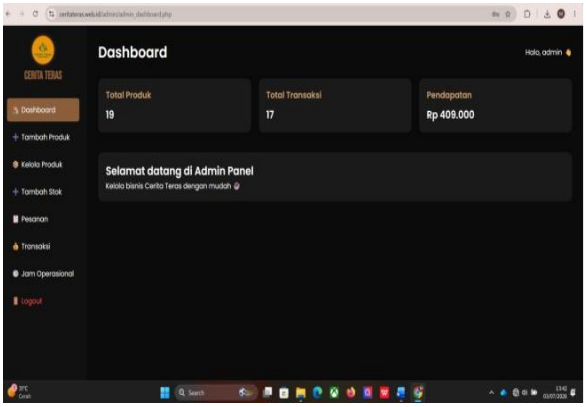

Figure 6. Administrator Dashboard Page

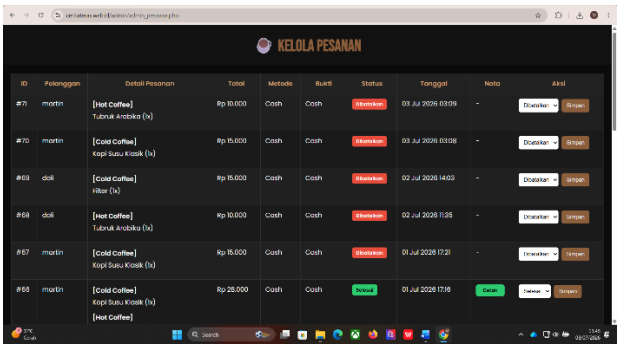

Figure 7. Manage Order Page

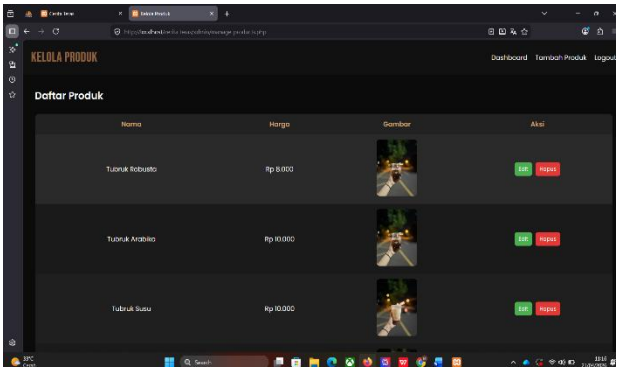

Figure 8. Manage Product Page

From the customer's perspective, the application offers convenient access to product information, online ordering, payment confirmation, and transaction tracking. The customer interfaces are illustrated in Figure 9 and Figure 10.

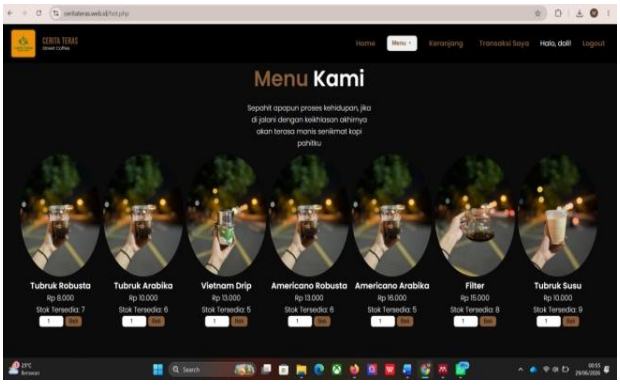

Figure 9. Menu Page

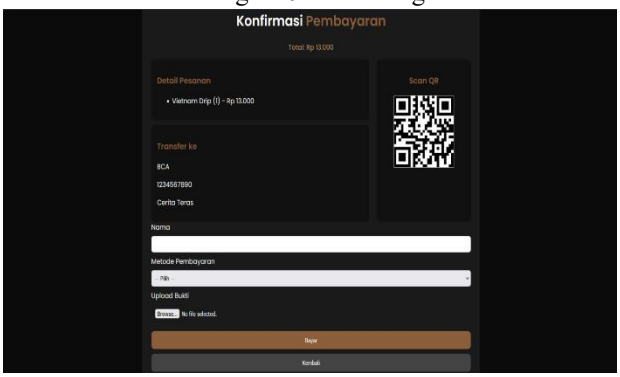

Figure 10. Payment Page

3.4 System Testing and Discussion

The developed system was evaluated using Black Box Testing to verify that all functional requirements were implemented correctly. The testing results are presented in Table 1 and Table 2.

Table 1. Admin Blackbox Testing

No	Tested Menu Items	Methods Employed	Expected Results	Information
1.	Login	Enter the username and password correctly.	Admin dashboard view	Valid
2.	Admin Dashboard	Login	Admin Dashboard Page	Valid
3.	Add Product	Inputting product data	Product added to the menu	Valid
4.	Manage Product	Edit or delete products in the menu	Product data successfully updated or product successfully deleted.	Valid
5.	Edit Product	Modify product data, including product name, price, stock, and product images.	Product data successfully updated.	Valid
6.	Add Stock	Adding daily menu stock	Stock successfully updated.	Valid
7.	Order	Process user orders and print receipts.	Order completed and receipt printed successfully.	Valid
8.	Transaction	Filter the time period for the transaction report and export the report to PDF.	Transaction report data appears for the specified time period, and the PDF export is successful.	Valid

Table 2. Customer Blackbox Testing

No	Tested Menu Items	Methods Employed	Expected Results	Information
1.	Login	Enter the username and password correctly.	Homepage	Valid
2.	Register	Create an account to access the system	Account successfully created.	Valid
3.	Home	Login	Homepage	Valid
4.	Menu	Select a product category and add the quantity of products you wish to order.	Display menu by category and add orders to the cart.	Valid
5.	Cart	Check out	Payment confirmation screen	Valid
6.	Payment Confirmation	Completing payment details	Payment successful; proceeding to the order page.	Valid
7.	My Order	Make a payment	My order page	Valid
8.	My Transaction	Selecting my transaction menu	Transaction history display	Valid

As shown in Table 1 and 2, all tested functions operated according to the specified functional requirements. No functional errors were identified during testing, indicating that the developed system was ready for operational use.

To evaluate user acceptance, a User Acceptance Test (UAT) was conducted involving eleven respondents. The evaluation employed seven assessment criteria covering system usability, user interface design, information quality, ordering process, transaction convenience, system security, and overall user satisfaction. The detailed UAT results are presented in Table 3.

Table 3. User Accaptance Test

No	Question	Answer				
		SA	A	N	DA	SDA
1.	This online coffee sales information system is user-friendly.	8	3	0	0	0
2.	The interface of this coffee sales website is attractive and	7	4	0	0	0

	easy to understand.					
3.	The coffee product information provided on the website is comprehensive and clear.	6	5	0	0	0
4.	The ordering process within the system runs quickly and without issues.	5	6	0	0	0
5.	The payment systems available on the website make it easy for me to conduct transactions.	6	5	0	0	0
6.	I feel secure conducting transactions on this online coffee sales system.	4	7	0	0	0
7.	Overall, I am satisfied using this online coffee sales information system.	6	5	0	0	0

SA: Strongly Agree, A: Agree, N: Neutral, DA: Don't Agree, SDA: Strongly Don't Agree

Based on the questionnaire data above, 11 respondents answered the seven listed questions. The questions utilized a scoring scale of 1 to 5, where 1 represented "strongly disagree," 2 "disagree," 3 "neutral," 4 "agree," and 5 "strongly agree." Across the 11 respondents, the "agree" and "strongly agree" responses yielded a combined score of 350; expressed as a percentage, the calculation is as follows:

Percentage = (Score Obtained / Maximum Score) × 100%

Percentage = (350 / 385) × 100%

= 90.91%

Table 4. Comparison Before and After System Implementation

Business Process	Before	After
Transaction Recording	Manual	Automatic
Product Management	Manual	System-based
Customer Ordering	Offline	Online
Payment Confirmation	Manual	Online Verification
Sales Report	Manual	Automatic

As presented in Table 4, the developed web-based sales information system successfully transformed several manual business processes into an integrated digital system. Transaction recording, product management, payment confirmation, and sales report generation are now performed automatically through the application. In addition, customers can place orders online without visiting the coffee shop, thereby improving service accessibility and operational efficiency.

These improvements are supported by the User Acceptance Test (UAT), which achieved a user acceptance rate of 90.91%. The high acceptance score indicates that users considered the developed system effective in supporting daily business activities and fulfilling operational requirements.

These findings are consistent with previous studies conducted by Setyaningsih [1], Hidayat et al. [3], and Syahadiyanti et al. [10], which reported that web-based sales information systems improve transaction management, operational efficiency, and customer service quality for Micro, Small, and Medium Enterprises (MSMEs).

3. Conclusions

This study successfully designed and implemented a web-based coffee sales information system for Cerita Teras Coffee Shop to support integrated sales and business management processes. The developed system enables customers to place online orders and complete payment transactions conveniently, while assisting administrators in managing product data, customer information, sales transactions, and automated sales reports. The implementation of the system has contributed to improving operational efficiency by reducing manual administrative tasks, minimizing data entry errors, and accelerating the preparation of sales reports.

The results of **Black Box Testing** confirmed that all system functionalities operated successfully according to the specified requirements. Furthermore, the **User Acceptance Test (UAT)** achieved a user satisfaction score of **90.91%**, indicating a very high level of user acceptance. These findings demonstrate that the proposed web-based sales information system effectively enhances business processes, improves service quality, and supports operational performance at Cerita Teras Coffee Shop.

Future research may focus on enhancing the system by integrating additional features, such as an online payment gateway, inventory management, automatic notification services, and improved security mechanisms. These enhancements are expected to further optimize business operations and improve the overall user experience.

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