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Utilizing CodeIgniter 3 Framework in the Development of an Online Beverage Sales Platform

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Abstract

Web-based information systems have become an effective solution to enhance efficiency and accuracy in online sales transactions, including in the beverage business such as Es Teh Indonesia. This study aims to design and develop a web-based ordering information system using the CodeIgniter 3 framework to simplify the ordering process and manage data related to products, brands, categories, and transaction reports. The methodology used in this study is the waterfall method, consisting of requirement analysis, system design, implementation, testing, and maintenance stages. The system design includes user interfaces (UI) for both customers and administrators, as well as UML diagrams such as use case, activity, and sequence diagrams. The developed system is capable of handling login, user registration, product selection, order form submission, checkout, and order confirmation processes. On the admin side, the system provides features to manage brand, category, and product data, as well as generate transaction reports based on a specific date range. The results of testing using the black box method indicate that all functions perform as expected. In conclusion, this web-based information system successfully improves the convenience and efficiency of the ordering process and business data management at Es Teh Indonesia, while also enhancing service speed and accuracy for customers.

Keywords: Information system, CodeIgniter, online ordering, Es Teh Indonesia, web-based system.

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1. Introduction

In today's digital era, business actors in the food and beverage (culinary) sector are required to adapt to the development of information technology in order to increase service efficiency, expand market reach, and facilitate transactions for customers. One viable solution is the development of a web-based sales information system that enables customers to place orders online. This innovation not only improves operational efficiency but also enhances the user experience during the purchasing process, particularly in the trendy beverage sector, which has shown rapid growth in Indonesia.

The implementation of web-based information systems has proven to offer various advantages for Micro, Small, and Medium Enterprises (MSMEs), such as ease of inventory management, acceleration of transaction processes, and more accurate and structured sales reporting (Rahman, 2021). Furthermore, the development of such systems supports the competitiveness of MSMEs amidst increasingly tight market competition, especially in the post-COVID-19 era, which has shifted consumer behavior towards digital transactions (Husna & Marlina, 2021).

CodeIgniter 3 is considered an appropriate framework for building web-based sales applications due to its open-source nature, lightweight structure, and the use of the Model-View-Controller (MVC) architecture, which facilitates both system development and maintenance. Several studies have demonstrated the effectiveness of CodeIgniter 3 in developing e-commerce applications, particularly for food and beverage product businesses, due to its flexibility and processing speed (Supriyanto et al., 2022).

Research conducted by Prasetyo and Widyanto (2022) emphasized that web-based ordering systems reduce reliance on manual transaction methods and enhance customer satisfaction through improved transparency and service speed. These systems allow customers to view product catalogs, select menu items, specify order quantities, and proceed to

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checkout without direct interaction—an approach that aligns well with the preferences of Millennials and Gen Z consumers who favor fully digital services.

A responsive and user-friendly User Interface (UI) design is also a critical success factor in online ordering systems. An intuitive display and easy navigation help users complete transactions quickly, directly impacting sales conversion rates (Putra et al., 2023).

Given these considerations, this study focuses on a case at Es Teh Indonesia Karundang Branch, which still employs conventional ordering systems. The manual transaction process has led to various issues such as long queues, recording errors, delayed service, and limited transaction reporting. By developing a web-based sales system using the CodeIgniter 3 framework, this research aims to provide solutions to these problems and promote business process digitalization at the MSME level.

2. Literature Review

2.1. Web-Based Sales Information System

A web-based sales information system is a digital platform designed to manage transactions, product inventory, and sales reports online and in real-time. This system provides high efficiency in business processes and allows business owners to reach customers without geographical limitations. According to Zhang et al. (2023), web-based sales systems have been proven to enhance customer satisfaction through ease of access and responsive user interfaces. Additionally, database integration allows for more accurate data management and automation of daily sales transactions.

2.2. CodeIgniter Framework in Web Application Development

CodeIgniter is one of the widely used PHP frameworks in web system development due to its lightweight nature, ease of configuration, and adherence to the Model-View-Controller (MVC) architectural pattern. The MVC architecture separates views, logic, and data, thus supporting system modularity and scalability (Alzahrani & Mahmmod, 2022). This framework is extensively adopted by application developers for e-commerce purposes because it offers comprehensive documentation and high performance in handling dynamic processes such as transactions and user authentication.

In the context of small and medium enterprises, the use of CodeIgniter is considered ideal due to its minimal resource requirements and compatibility with various server types. A study by Herlambang and Arifin (2021) demonstrated that sales systems built on CodeIgniter could reduce employee workload and minimize transaction record errors, particularly during peak demand periods.

2.3. The Impact of UI Design on System Effectiveness

User Interface (UI) design plays a vital role in the success of web-based system implementation. An intuitive and responsive UI simplifies user navigation and transaction completion, thereby enhancing comfort and time efficiency. According to a report by Ghosh and Banerjee (2022), more than 60% of users tend to abandon an app or website if they face difficulties using the interface within the first three seconds. Therefore, UI development must consider visual hierarchy, color consistency, and clear navigation structure to achieve maximum user satisfaction.

2.4. Digital Transformation in Modern Beverage MSMEs

The modern beverage industry has experienced rapid growth alongside changing urban lifestyles that increasingly rely on digital services. Digital transformation is crucial for the sustainability and growth of businesses, particularly in the MSME sector. In a study by Lee et al. (2021), it is stated that digitalization enables MSMEs to manage supply chains, marketing, and sales transactions more effectively while also building stronger customer relationships through online platforms.

MSMEs like “Es Teh Indonesia,” a beverage business targeting the youth market segment, can benefit from digital systems to accelerate services and expand order coverage. Through a web-based system, customers not only gain the convenience of placing orders but also access digital payments, order tracking, and real-time service feedback.

2.5. Related Research

Previous studies related to the development of web-based sales systems using the CodeIgniter framework indicate that this approach has been widely implemented in various Micro, Small, and Medium Enterprises (MSMEs), particularly in the food and beverage sector. The following are five relevant studies that support this research:

A study by Wahyudi & Setiawan (2022) developed a web-based online sales application for a home-based food business using the CodeIgniter framework. The results showed that the system helped business owners manage products, transactions, and sales reports efficiently and in real-time. The system also supported automated checkout and order validation processes.

Research conducted by Rachmawati et al. (2021) designed a web-based beverage ordering system for a local coffee shop. The researchers employed the MVC approach with the CodeIgniter framework to ensure system modularity. Black-box testing evaluations indicated that all features functioned as expected and improved customer convenience during the ordering process.

Hasibuan & Kurniawan (2023) developed a web-based sales information system for a grocery store using the Agile approach and Laravel framework as a comparison to CodeIgniter. The study concluded that MVC-based frameworks generally support system flexibility, with CodeIgniter showing better performance and faster page rendering.

According to Prasetya and Hamzah (2020), the digitalization of transaction systems through web-based applications improved data accuracy and sped up the sales process in fast-food MSMEs. The system, developed with the CodeIgniter framework, supported inventory management and multi-product checkout—both essential features for businesses with high menu variety.

A study by Sari & Utami (2022) presented the development of a web-based ordering information system for a traditional food stall in Yogyakarta. The CodeIgniter framework was chosen for its development efficiency and comprehensive documentation support. The system successfully reduced physical queues and increased digital transactions by 35% after implementation.

3. Methods

This study uses a research and development (R&D) approach aimed at developing a web-based sales information system using Laravel. This approach is applied because the researcher not only analyzes user needs but also designs, builds, and tests the system being developed. The research is applied in nature, with outcomes in the form of a functional application that can be directly utilized by the business partner (Kios Mie Ayam Kangkung Subur) to support sales operations.

3.1. Type and Approach of Research

The type of research used in this system development is software engineering research with a descriptive qualitative approach. This study aims to produce a product in the form of a web-based sales information system equipped with features tailored to user needs. According to Kitchenham et al. (2015), this approach is commonly applied to develop technical artifacts such as software systems and empirically evaluate their performance.

3.2. System Development Method

This study adopts the Waterfall model, a sequential software development methodology comprising several phases executed in order. According to Sommerville (2016), this model is suitable for projects with well-defined and stable system requirements from the outset. The stages include:

3.2.1. Requirement Analysis

Requirement analysis is the initial stage in the system development process, aimed at identifying and defining both functional and non-functional requirements of the system to be developed. This analysis serves as the fundamental basis for designing a system that aligns with user expectations and organizational business goals. According to Sommerville (2016), requirement analysis involves understanding the operational context of the system, user interactions, and the specifications of the services expected from the system.

In this study, the requirement analysis was conducted based on the results of observations, interviews, and documentation review of the business processes at Es Teh Indonesia, Karundang Branch. The manual processes previously carried out by the outlet—such as recording orders in a notebook, calculating transactions manually, and generating unstructured sales reports—highlight the need for a web-based information system.

Table 1. Functional Requirement

No.	Functional Requirement	Description
1	User Registration	The system allows new users to register an account.
2	User Login	Registered users can log in using email and password.
3	View Product Catalog	Users can browse the product list, including name, image, and price.
4	Add Product to Cart	Users can add products to the shopping cart before checkout.
5	Edit/Delete Cart Contents	Users can modify or remove items from the shopping cart.
6	Checkout and Transaction Process	Users can complete purchases and generate order records.
7	Admin Login	Admin can log into the dashboard using special credentials.
8	Product Management	Admin can add, edit, or delete products.
9	Order Management	Admin can view and process incoming orders.
10	Sales Report	Admin can access sales transaction reports.

Table 2. Non-Functional Requirement

No.	Non-Functional Requirement	Description
1	Usability	The interface must be easy to use and user-friendly for all user levels.
2	Availability	The system should be accessible online 24/7 unless undergoing maintenance.
3	Performance	Pages must load within 3 seconds under normal internet conditions.
4	Scalability	The system should be scalable to accommodate increasing users and data.
5	Security	User data and transaction information must be protected using encryption.
6	Maintainability	The system must support easy maintenance and updates.
7	Compatibility	The system must run on various browsers and screen sizes (responsive).

3.2.2. System Design

System Design is a crucial phase in the software engineering process that aims to formulate how the system will be technically built based on the results of the requirement analysis. In this stage, all specifications defined during the requirement analysis phase are converted into technical structures in the form of system architecture, database design, user interface design, and business logic processes.

According to Pressman and Maxim (2019), system design is the process of translating software requirements into an implementable system representation. This design includes planning subsystems, modules, data structures, interfaces, and organized data processing procedures, so that the system can function according to its intended purpose.

Figure 1. Use Case Diagram illustrates the interaction between actors (users) and the contemporary beverage sales application system developed for Es Teh Indonesia, Karundang Branch. In this diagram, there are two primary actors: Admin and Cashier. The Admin has full access rights to the system, including managing product data (adding, updating, and deleting beverage menus), managing raw material inventory, and viewing sales reports. Meanwhile, the Cashier interacts with the system to carry out sales transactions, print receipts, and record customer payments. This diagram depicts the system boundary and all the main functions (use cases) available, while also explaining how each actor is directly connected to relevant features in the web-based system developed using the CodeIgniter 3 framework.

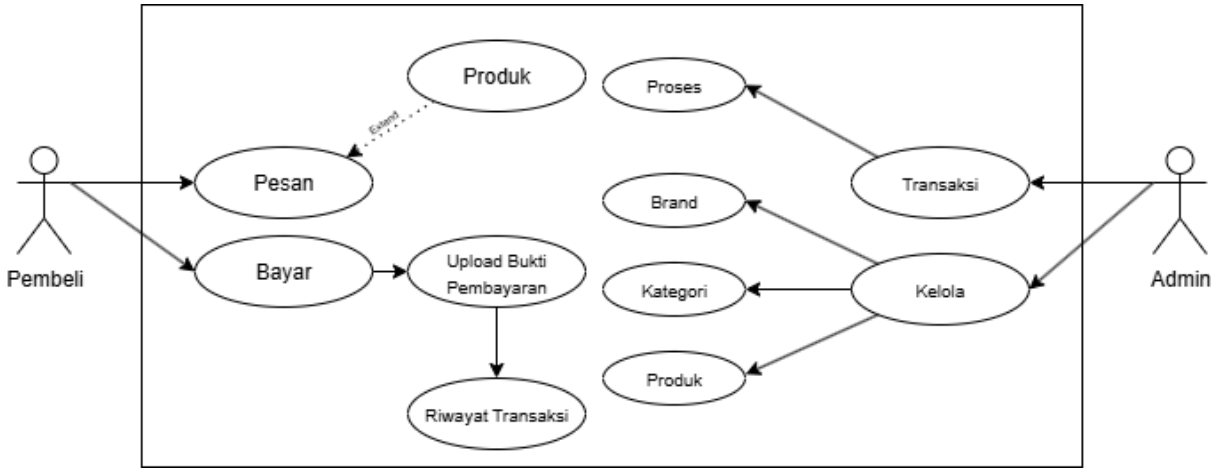

Figure 1. Use Case Diagram

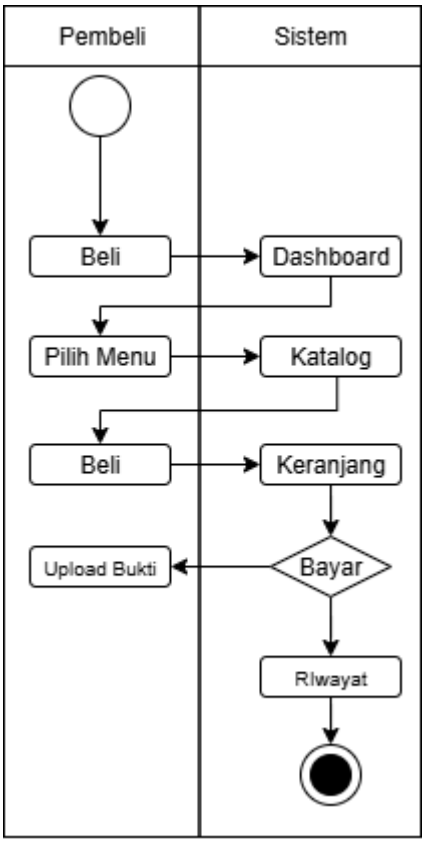

Figure 2. Activity Diagram of Purchase

Figure 2, the Activity Diagram of Purchase, illustrates the sequence of user (buyer) activities in carrying out the beverage purchasing process within the system. The process begins when the user selects the “Buy” menu, which prompts the system to display the Dashboard as the initial page. Next, the buyer chooses the desired menu item, and the system displays a Catalog containing the list of products. After selecting a product, the user clicks the “Buy” button, and the system adds the item to the Cart. The next step is the “Pay” process, which the system verifies to determine whether the payment is valid. If the payment is successful, the system records it in the Purchase History, while the user uploads Proof of Payment. This diagram presents a logical and sequential interaction between the user and the system, illustrating how the system traces each step of the purchasing process from start to finish in a structured manner.

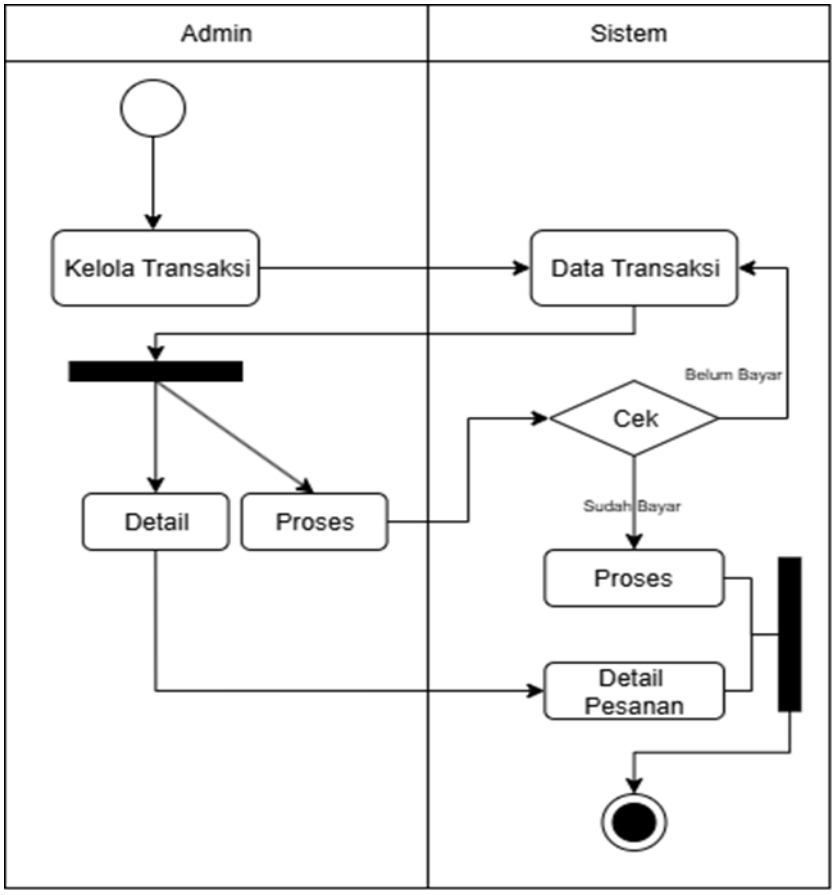

Figure 3. Activity Diagram of Admin Managing Transactions

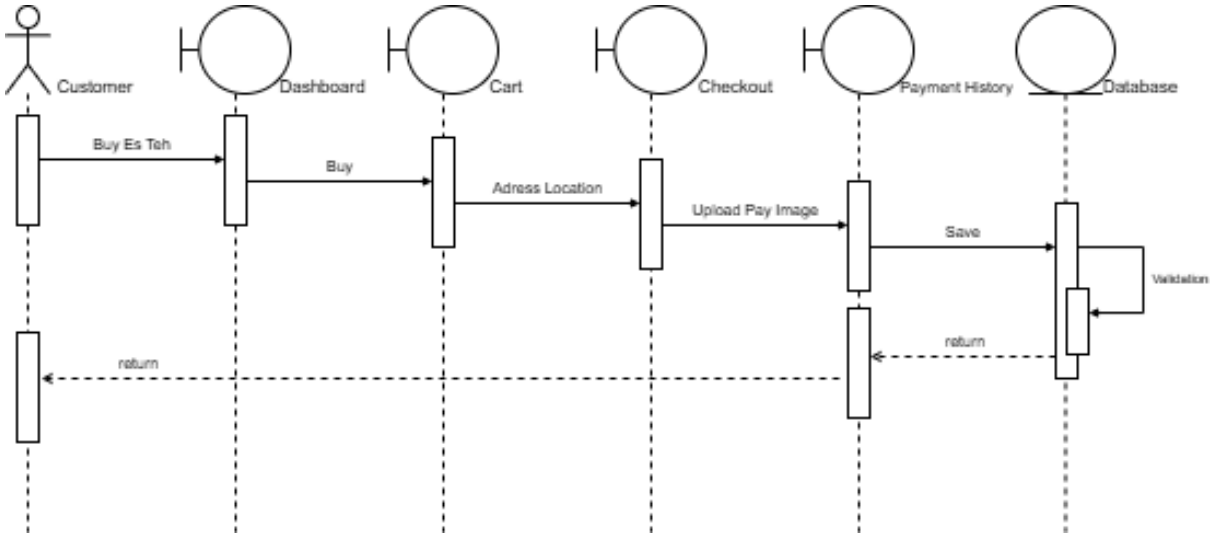

Figure 4. Activity Diagram of Admin Managing Transactions

Figure 3, the Activity Diagram of Admin Managing Transactions, illustrates the sequence of activities performed by the admin in managing order transaction data within the system. The process begins when the admin accesses the "Manage Transactions" menu, prompting the system to display the recorded transaction data. The admin can then choose to view the transaction details or directly proceed with processing the transaction. The system performs a status check through the "Check" activity. If the transaction status indicates "Unpaid," the system will not proceed further. However, if the status is "Paid," the system moves forward to the processing stage and displays the order details to the

admin for further actions, such as packaging or delivery. This diagram demonstrates the logical relationship between the admin's actions and the system's processes in ensuring the validity of transactions before proceeding, thereby supporting accuracy and operational efficiency in managing customer orders.

Implementation

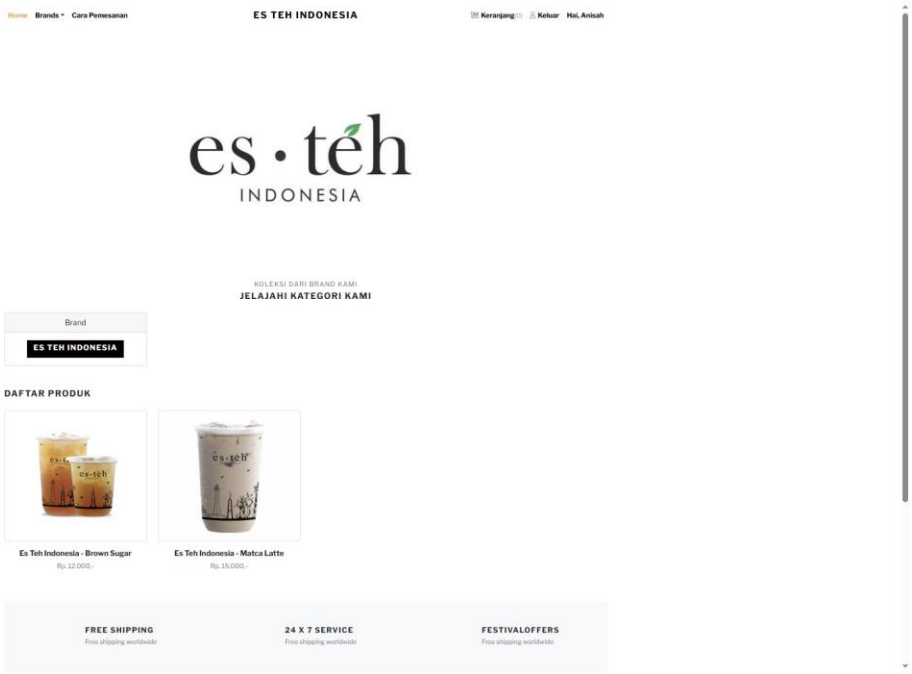

Figure 5. Main Menu of Es Teh Indonesia Website

Figure 5 displays the main menu interface of the Es Teh Indonesia website, which is designed with a clean and elegant layout to facilitate users in ordering beverage products. At the top of the page, the Es Teh Indonesia logo is centered and surrounded by navigation elements such as the "Cart" menu, a "Logout" button, and a welcome greeting for logged-in users. Below, users are offered a product category selection with a navigation button labeled "ES TEH INDONESIA" that leads to the product list. On this page, two main products are showcased: Es Teh Indonesia - Brown Sugar priced at Rp12,000 and Es Teh Indonesia - Matcha Latte priced at Rp15,000, each accompanied by visually appealing product images. The bottom section of the page highlights key service information such as free shipping, 24/7 service, and festival offers, aimed at enhancing customer convenience and loyalty. Overall, the interface demonstrates intuitive navigation and focuses on a seamless user experience for online transactions.

3.2.3. Testing

Black Box Testing is a software testing method that focuses on the system's functionality without considering the internal structure or program code. The goal is to ensure that all features work according to user needs as defined in the requirement analysis. This testing is performed based on input-output scenarios for each major feature that interacts directly with users or admins. The table below summarizes the results of Black Box Testing based on the system's functional requirements:

No	Feature Tested	Test Description	Input Provided	Expected Result	Test Result
1	User Login	Tests user login validation	Valid email and password	System redirects to the user dashboard	Passed
2	Invalid Login	Tests system response when incorrect login credentials are entered	Incorrect email/password	System displays "Login failed" message	Passed
3	View Product List	Tests the system's ability to display available products	Click "Buy Es Teh" menu	System displays a catalog with products, prices, and order buttons	Passed

4	Add Product to Cart	Tests the process of adding a product to the shopping cart	Click “Buy” button on a product	System adds the selected product to the cart	Passed
5	Checkout	Tests the checkout process including address input and uploading proof of payment	Address and upload payment proof	System saves the transaction data and displays a success message	Passed
6	Purchase History	Tests whether the system records the customer’s purchase history	Completed transaction	System displays a list of user's past transactions	Passed
7	Product Management (Admin)	Tests whether the admin can add, edit, and delete products	Input new product data	Product appears in the user's catalog	Passed
8	Transaction Management (Admin)	Tests admin transaction management based on payment status	Click “Manage Transactions” and process check	System verifies payment status and displays order details	Passed
9	Logout	Tests the logout functionality	Click “Logout”	System returns to login page	Passed

4. Result and Discussion

The results of this study reveal that the development of a web-based sales information system using the CodeIgniter 3 framework effectively addresses the operational limitations encountered in conventional sales processes at Es Teh Indonesia Karundang branch. The implementation of this system resulted in improvements across various operational aspects such as transaction accuracy, inventory management, and report generation. One of the key advantages was the automation of order entry and digital transaction records, which significantly reduced human errors in manual bookkeeping, as supported by Wahyudi & Setiawan (2022), who noted that systematized sales management enhances efficiency and reduces transaction errors in SMEs.

The system was evaluated using black-box testing, which showed all core functionalities—such as login, order placement, product catalog management, and checkout—operated successfully and as expected. This aligns with the findings of Kaner et al. (2013), who emphasized that black-box testing is effective in validating functionality without requiring access to the internal code structure.

Furthermore, the user interface design received positive usability feedback. The intuitive layout facilitated easy navigation, which directly contributed to customer satisfaction and streamlined the ordering process. This outcome is consistent with Ghosh and Banerjee (2022), who found that UI design quality has a direct impact on user engagement and retention, especially in web-based e-commerce platforms.

From a technical standpoint, the modularity provided by the Model-View-Controller (MVC) architecture in CodeIgniter enhanced the scalability and maintainability of the system. According to Alzahrani & Mahmmod (2022), adopting MVC frameworks like CodeIgniter simplifies system expansion and debugging due to the separation of concerns between logic, data, and presentation layers.

Finally, the implementation of this web-based system also supports the digital transformation of SMEs in the food and beverage sector. As noted by Lee et al. (2021), digitalization plays a crucial role in helping SMEs survive and thrive in the post-pandemic economy by enabling faster service delivery, broader customer reach, and more structured data management.

5. Conclusion

The development of a web-based sales information system using the CodeIgniter 3 framework at Es Teh Indonesia Karundang Branch has successfully addressed various inefficiencies in the conventional sales process. By digitizing core business operations such as order management, inventory tracking, transaction recording, and sales reporting, the

system has significantly improved operational efficiency and accuracy. The adoption of the Model-View-Controller (MVC) architecture facilitated modular system design, making it easier to maintain and expand in the future.

Functionality testing through Black Box Testing confirmed that all key features—ranging from user login and product catalog navigation to order processing and payment confirmation—worked as intended, aligning with user requirements and supporting seamless user experiences. Additionally, the responsive and intuitive user interface enhanced customer interaction and minimized learning curves, which is crucial in today's digital service environments.

This system not only serves the immediate needs of the outlet but also aligns with broader digital transformation initiatives for SMEs, particularly in the food and beverage sector. It supports sustainable business growth by enabling online transactions, improving service speed, and increasing data transparency. Therefore, the solution presented in this study provides a scalable and practical model for similar businesses seeking to modernize their operations in the digital economy.

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