

IMPLEMENTATION OF AN E-COMMERCE BASED ONLINE SALES SYSTEM AT DAPOER LN MSME KUDUS

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ABSTRACT

This research aims to design and implement an e-commerce-based website specifically tailored to support Dapoer LN MSME in managing and increasing online product sales. Utilizing the Waterfall methodology, the website development employs Windows 11, Visual Studio Code, XAMPP, and Google Chrome as software requirements, Laravel 11 as the framework, and MySQL as the database. The primary goal is to assist Dapoer LN MSME in adapting to digital technology and addressing the challenges of a competitive market. The development process involves MSME business owners as key users to ensure the features align with their operational needs. Research methods include observation, interviews, and literature studies to comprehend business processes and identify effective e-commerce design approaches. Key features for business owners encompass product categories, products, orders, coupons, customer data, reviews, and reports, while features for customers include product browsing, orders, reviews, and payments. This website prioritizes user-friendly interface design, data security, and digital marketing strategies to enhance user experience and expand market reach. Inventory management and customer data analysis are integrated to provide strategic tools for improving competitiveness, reducing costs, and fostering MSME growth. Excluding financial recording systems, this research focuses solely on e-commerce feature development, resulting in an efficient and comprehensive solution expected to empower Dapoer LN MSME to thrive in the modern technological era and promote sustainable growth.

Keywords: MSME, websites, e-commerce, development, digitalization

A. INTRODUCTION

Along with the rapid development of technology, the internet, which connects the virtual world, now seems to control various human activities and is a major factor in global competition. Many people now utilize the internet to find information in various fields, such as education, religion, health, sports, advertising, and business. Among the most attention-grabbing aspects of technology is the presence of the internet. Especially, the presence of e-commerce in the business world, which is one of the important elements in this change. E-commerce has changed almost all aspects of company operations, from buying and selling transactions to advertising, allowing customers to buy and sell goods without the need to come directly to the store.

E-commerce, also known as electronic commerce, involves the purchase, sale, and promotion of products and services through electronic platforms like the internet, television, or computer networks. This type of business has now become part of the information technology industry, given the application of information technology systems and applications involved. In general, e-commerce is the process of buying and selling transactions between two parties through the internet network.

In the ever-evolving digital era, businesses, including MSME, are required to adapt to new ways of doing business. Dapoer LN MSME understand the importance of digital technology in maintaining competitiveness in an increasingly competitive market. Therefore, one of the strategies chosen is the implementation of an e-commerce-based online sales system, which is expected to increase the effectiveness and efficiency of their product sales.

Through the implementation of e-commerce websites, Dapoer LN MSME are expected to expand market reach, strengthen relationships with customers, and increase comfort and convenience in transactions. E-commerce also offers various features that support inventory management, provide a secure payment system, and collect customer data for analysis that is useful in making business decisions.

To overcome the problems faced by UMKM Dapoer LN Kudus, the research in this thesis uses the waterfall system development method because of its linear and systematic approach, allowing each stage to be managed in a structured manner and minimizing errors that may occur. This research focuses on developing an e-commerce-based online sales system specifically designed for the needs of Dapoer LN MSMEs, taking into account aspects of data security, ease of use, and the effectiveness of digital marketing strategies. The implementation of this system is not only to meet market needs, but also as a strategic step to increase competitiveness in global competition, reduce operational costs, and achieve significant growth. The developed website provides features for business owners, such as product category management, products, orders, coupons, customer data, customer reviews, and reports, as well as features for customers, such as product search, ordering, reviews, and payments, designed to provide an easy and secure shopping experience.

B. LITERATURE

1. Related Studies

Related research was selected from various journals and proceedings published in the last five years. Some relevant research regarding the creation of e-commerce websites for Dapoer LN MSME can be detailed as follows:

A study conducted by Sriwidya Lafu with the title *Implementation of an E-Commerce-Based Online Sales System at Ike Suti SME Business Using the Waterfall Method* shows that the development of e-commerce applications can facilitate marketing and product sales by companies. By using a buying and selling transaction process that can be accessed 24 hours a day, this application allows payments to be made directly [1].

Research conducted by Hartanto & Novianus Palit with the title *Design and Creation of E-Commerce Website for MSME Fostered by Petra Christian University* showed success in creating a user-friendly website and supporting online transactions. This website is also designed to be responsive, allowing access on various browsers and mobile devices with different screen resolutions [2].

Research conducted by Iqbal M, Tullah R, & Michael with the title *Designing Web-Based Applications in Small and Medium Enterprises (SMEs)* successfully produced important reports needed by business owners, including information about customer order status, payment status, and employee attendance [3].

Research conducted by Al Ghani et al. with the title *Design of Website-Based E-Commerce Information Systems Using the Waterfall Method* shows that related parties have succeeded in developing a simple website that can be used easily by users and customers practically and quickly [4].

Research conducted by Afghan with the title *Bojana Sari E-Commerce Web Development Using Prototype Method* shows that researchers have successfully developed an e-commerce

website for Bojana Sari with additional features, such as product management, ordering system, payment, and status tracking [5].

2. Theory Basis

a. E-commerce

E-commerce involves conducting buying and selling transactions facilitated online through the use of information technology, accessible via websites or mobile devices connected to telecommunications networks. Both consumers in business-to-consumer (B2C) and business-to-business (B2B) models can benefit from e-commerce technology. One of the reasons companies implement e-commerce is to improve their operational efficiency and effectiveness. E-commerce can lower the cost of marketing, labor, and other expenses. In addition, e-commerce allows companies to reach a wider audience quickly as virtual stores can operate 24 hours a day, providing product information as well as online purchasing procedures. Customers also benefit from easy access to more complete and attractive product information, even with the addition of product animations or videos [6].

b. Website

Website is software that serves to display documents on the internet, allowing users to access information through devices connected to the internet network [7].

c. Application

An application is a computer program designed to process data according to commands given by the user. Applications are composed of different components, including form fields designed with visually appealing layouts to enhance usability for users. This application is run on a computer with certain commands to perform tasks according to the user's instructions [8].

d. Waterfall Method

The Waterfall model is a traditional, step-by-step approach to software development. The process is described in a sequential diagram that shows each step and stage that must be passed [9].

e. Usecase Diagram

Use case diagrams are employed to illustrate how the information system functions during its development. This diagram describes the interaction between one or more actors and the system. The objective is to identify the functions within the system and specify who is authorized to access them. Usecase naming should be simple and easy to understand, focusing on the definition of actors and the usecase itself [10].

f. Visual Studio Code

Visual Studio Code is a code editor created by Microsoft, available on Windows, Linux, and macOS. It offers key features such as debugging tools, git integration, syntax highlighting, intelligent code completion, code snippets, and refactoring capabilities. Visual Studio Code offers extensive customization options, enabling users to modify themes, keyboard shortcuts, and settings, in addition to installing extensions to improve its functionality [11].

g. XAMPP

XAMPP is a software package that integrates several key applications for web development, including PHP, MySQL, and Apache web server [12].

h. MySQL

MySQL is a relational database system designed for storing and managing data in organized tables. Data in tables can be linked to each other. MySQL provides communication between applications and servers using Structured Query Language (SQL), which allows applications to access and manage data efficiently [2].

i. Web Browser

A web browser is an application that enables users to view web pages and interact with documents hosted on a web server [13].

j. Laravel

Laravel is a free, open-source PHP framework used for developing web applications, adhering to the model-view-controller (MVC) architectural pattern. Laravel offers features such as module development, relational database access, and ease of application deployment and maintenance. Since its launch in March 2015, Laravel has become one of the most popular PHP frameworks, competing with other frameworks such as Symfony2, CodeIgniter, and Yii2.

k. Bootstrap

Bootstrap is a HTML and CSS-based framework that also uses JavaScript effects through jQuery. Bootstrap provides various interface components designed to create attractive, lightweight, and responsive websites. Bootstrap's grid feature allows for flexible and easy-to-use layout settings, and allows developers to customize the appearance by adding their own classes or CSS [14].

l. Database Management System (DBMS)

A DBMS is an application designed to organize, manage, and display data in a database. This technology has been developing since the 1960s and in the 1970s, Relational DBMS (RDBMS) was introduced. The relational model developed by Edgar J. Codd organized data in the form of interrelated tables. Today, most commercial and open-source DBMSs use the relational model to manage data [12].

C. METHODOLOGY

1. Research Methodology

The stages of the method used in the data collection process for designing and developing an e-commerce-based online sales system were tailored to the specific needs of MSME Dapoer LN. The initial stage involved conducting an in-depth analysis of the needs of Dapoer LN through interviews with business owners and direct observations at MSME locations to identify operational challenges and requirements. Interviews were conducted with field supervisors, Ms. Fitri Husna Fadhillah, S. Pd, the owner of Business 1, and Ms. Luthfiana Nabella, S. Pd, the owner of Business 2, to gather comprehensive insights into their business contexts. These efforts were complemented by direct observations and demonstrations of the developed website to collect feedback for refinement. Additionally, a review of existing literature was carried out to obtain relevant information about e-commerce-based online sales systems. All collected data were analyzed to guide the creation of a system designed to address the unique challenges faced by MSME Dapoer LN.

2. System Development Methods

The stages of the method used in system development are as follows:

a. Requirement

- 1) Hardware Requirements
 - Intel Core i5 processor
 - 8 GB RAM
 - 512 GB SSD storage
- 2) Software Requirements
 - Windows 11 Operating System
 - Visual Studio Code
 - XAMPP

- Google Chrome
- b. Design

This stage involves designing the system, including the creation of a use case diagram to illustrate how users interact with the system and to outline its various functions.
- c. Implementation

During the implementation stage, all planned designs and requirements are realized by developing the corresponding program or writing the necessary code. The tools used in this process include:

 - PHP language
 - Laravel 11 as the PHP framework
 - MySQL as the database
- d. Verification

The verification stage ensures that the system meets all predetermined requirements through functionality, security, and performance testing. If issues are identified, they are resolved before the system progresses to the maintenance phase. However, if the website still does not meet the needs, the implementation stage is revisited to make necessary modifications.
- e. Maintenance

In the maintenance phase, routine activities are performed to ensure the system functions optimally. These include fixing bugs, improving security, and adapting the system to any changes in user requirements. This step is essential to ensure the system remains reliable and continues to meet user needs effectively.

3. System Design

a. Usecase Diagram

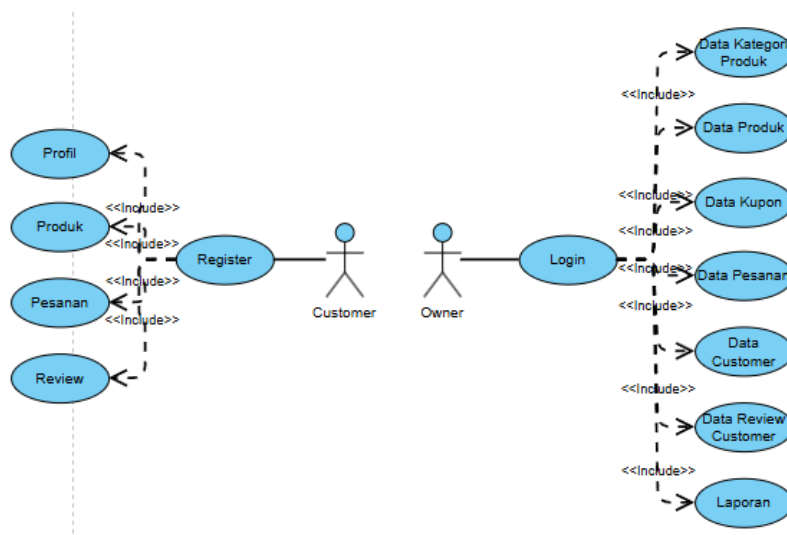


Figure 1. Use Case Diagram of online sales system

D. RESULT AND DISCUSSION

1. Evaluation of the Outcome of the Implementation of an E-Commerce-Based Online Sales System at MSME Dapoer LN Kudus

a. Features for Owners

The system developed for Business Owners includes several key features aimed at improving operational efficiency and simplifying management tasks. Each feature is

explained below, accompanied by a detailed description of its purpose and functionality, supported by figures that illustrate the system's interface and operation:

– Dashboard Page

The Dashboard page is the central feature for Business Owners, providing an overview of critical business metrics in a single, easy-to-navigate interface. This page displays total revenue, the number of available products, registered customers, and received orders. Additionally, it includes revenue charts that visualize business performance over time. These charts are automatically generated based on customer activities, enabling Business Owners to monitor trends and make data-driven decisions. The intuitive layout ensures users can quickly grasp their business's overall status without needing advanced technical skills.

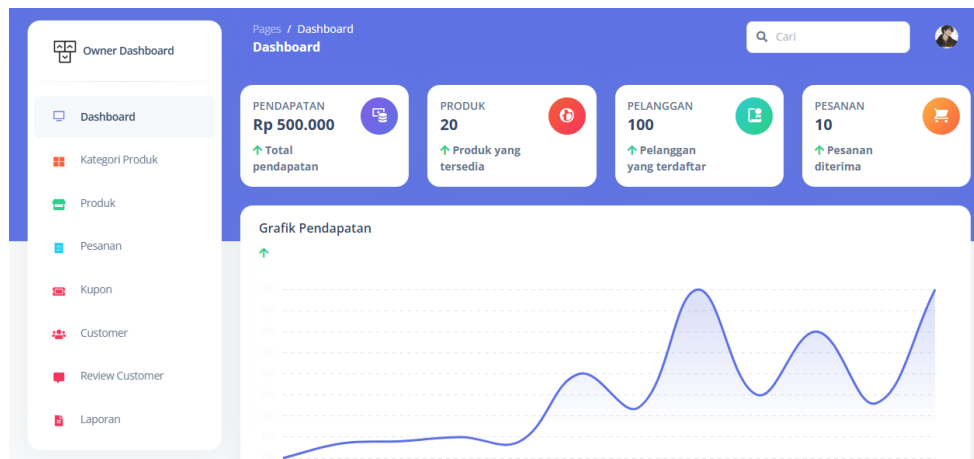


Figure 2. Dashboard page of the online sales system

– Product Category Page

Managing product categories is made simple through the Product Category page. Business Owners can view a list of existing categories and perform essential tasks such as adding new categories, editing category details, or deleting obsolete categories. This feature ensures that product classification remains organized, which is particularly useful for businesses offering diverse product lines. By maintaining an up-to-date category list, Business Owners can ensure customers have a seamless browsing experience when navigating the product offerings.

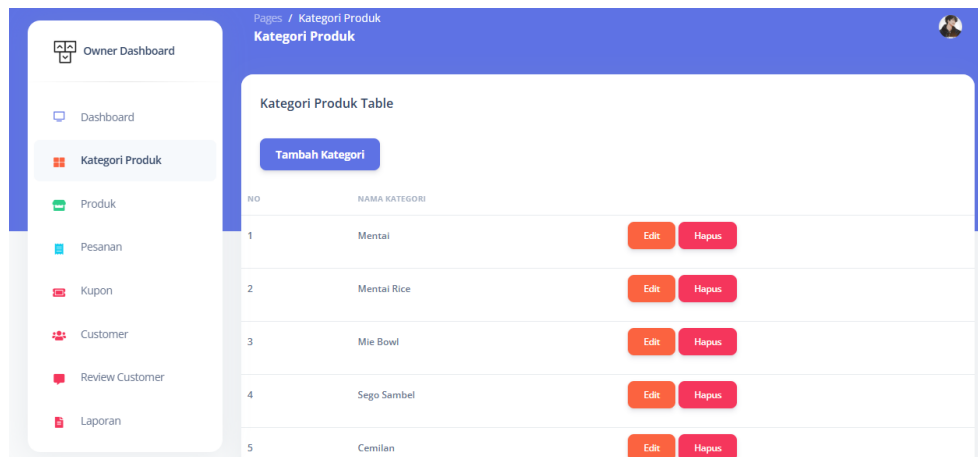


Figure 3. Product Category page of the online sales system

– Product Page

The Product page serves as a centralized location for managing the business's inventory. Business Owners can view the complete list of available products along with their details, including names, prices, and stock quantities. The page also allows users to add new products, edit existing ones, or remove outdated listings. Any changes made on this page are automatically reflected on the Customer Product page, ensuring consistency and accuracy across the system. This feature is crucial for maintaining up-to-date inventory information and streamlining product management processes.

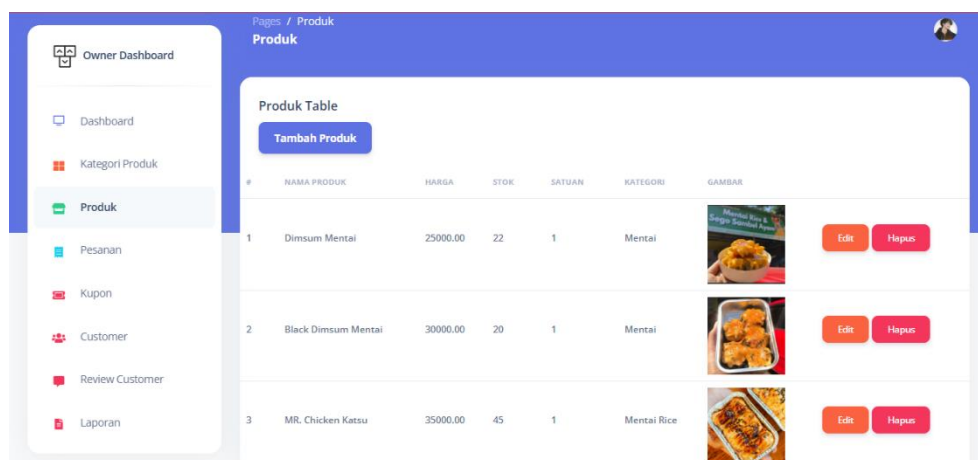


Figure 4. Product page of the online sales system

– Order Page

Efficient order management is facilitated through the Order page, which provides Business Owners with a comprehensive view of customer orders. Each order includes detailed information such as the customer's name, order date, quantity of items, total price, and payment status. Business Owners can also update the order status to reflect progress, such as marking orders as "Processing" or "Completed." This feature is essential for tracking the order fulfillment process and ensuring customer satisfaction by keeping them informed about their orders.

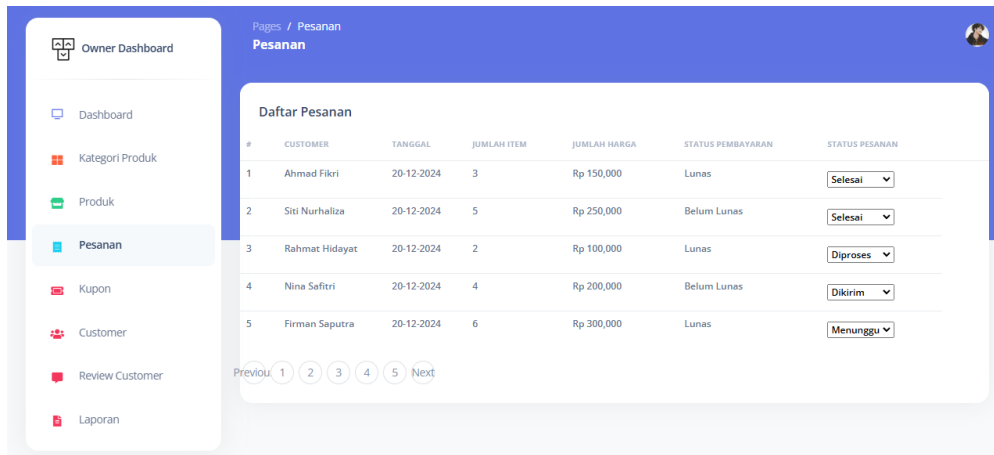


Figure 5. Order page of the online sales system

– Coupon Page

The Coupon page is designed to help Business Owners implement marketing strategies by creating and managing discount coupons. Users can view a list of available coupons, add new ones, and edit or delete existing coupons. This feature not only supports promotional activities but also helps attract new customers and retain existing ones by offering value-added incentives.

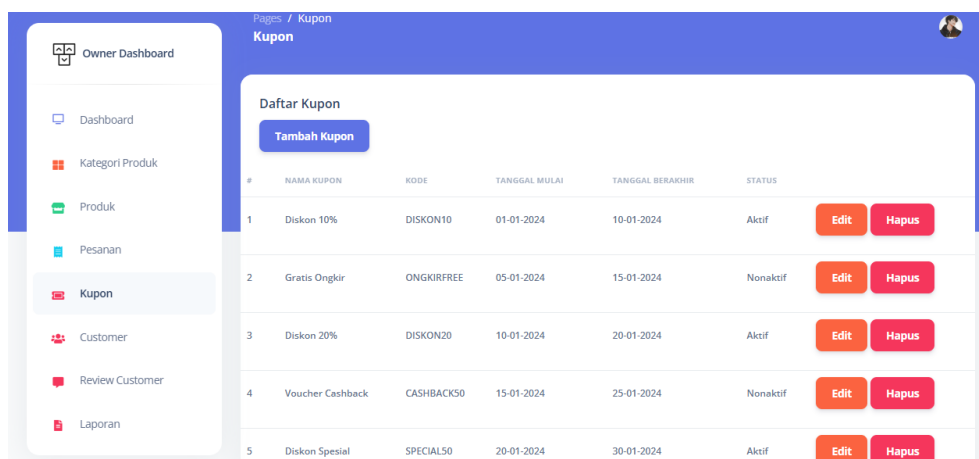


Figure 6. Coupon page of the online sales system

– Customer Page

The Customer page provides detailed information about registered customers, including their photos, names, email addresses, and delivery addresses. Business Owners can manage customer data efficiently and delete records if necessary. This feature plays a significant role in customer relationship management by allowing the business to maintain accurate and organized records of its clientele.

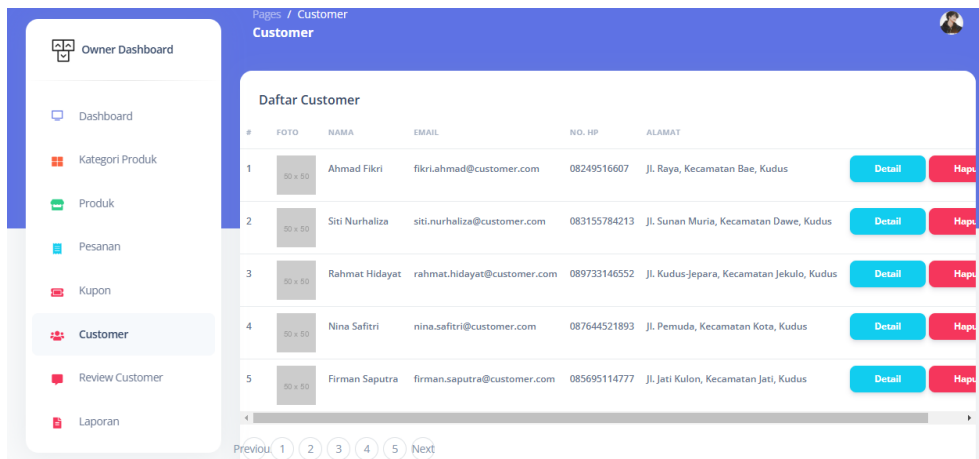


Figure 7. Customer page of the online sales system

– Customer Review Page

Feedback from customers is displayed on the Customer Review page. This page includes details about product reviews, including ratings and comments provided by customers. Business Owners can review this feedback to gain insights into customer satisfaction and identify areas for improvement. The system also provides the option to delete inappropriate or irrelevant reviews if needed.

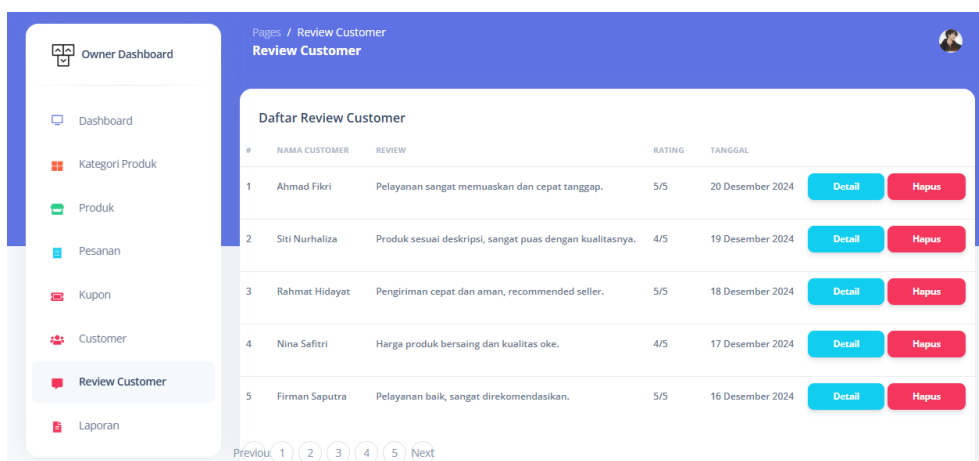


Figure 8. Customer Review page of the online sales system

– Report Page

The Report page consolidates sales and operational data into comprehensive reports. Business Owners can view summaries of monthly sales, detailed records of product sales, daily order trends, coupon usage, and customer feedback. These reports are generated automatically by the system, saving time and enabling data-driven decision-making. By analyzing these reports, Business Owners can assess their business performance and develop strategies to improve efficiency and profitability.

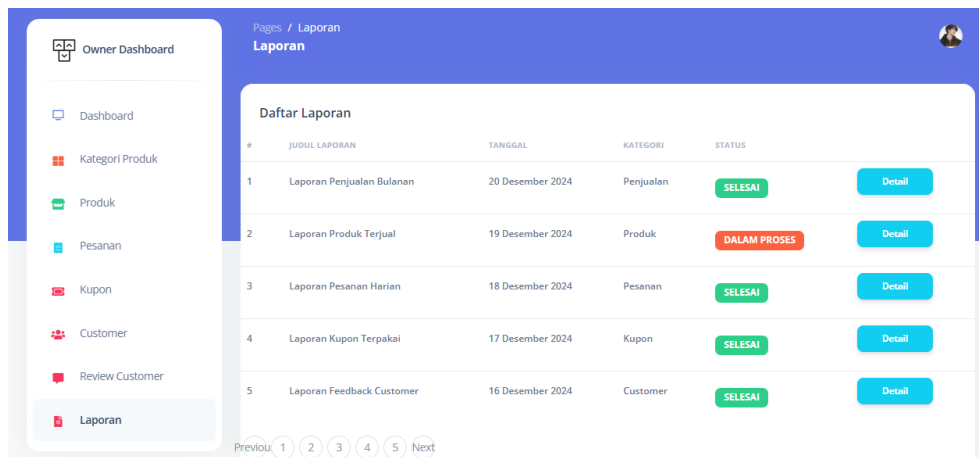


Figure 9. Report page of the online sales system

b. Features for Customers

The system also includes features designed specifically to enhance the customer experience. Each feature is detailed below, with explanations of its purpose and how it benefits customers:

– Dashboard Page

The Customer Dashboard page serves as the starting point for users, providing an overview of all available menu options at Dapoer LN MSME. While customers cannot make purchases directly from this page, it serves as a directory that helps them navigate the system and explore available products.

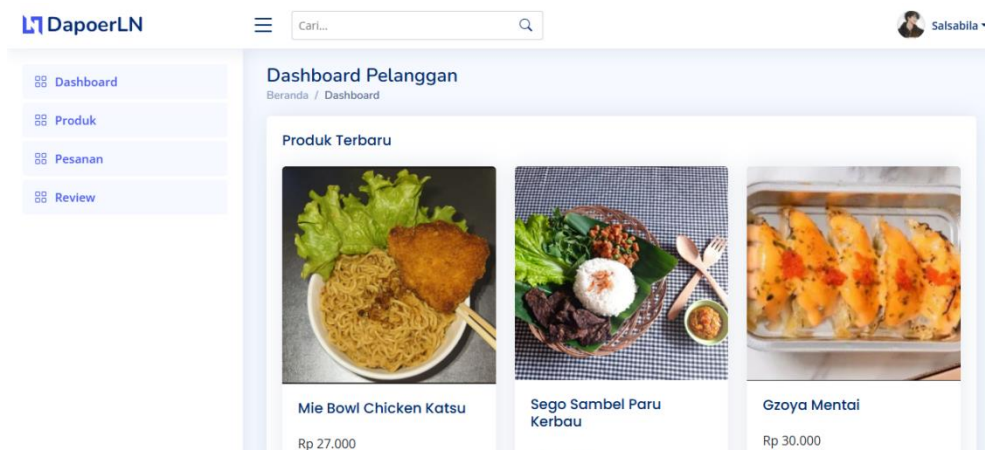


Figure 10. Dashboard Customer page of the online sales system

– Product Page

The Product page is where customers can explore detailed information about the available menu items, including product names, prices, and stock availability. Customers can add items to their cart and proceed with purchases seamlessly from this page. The layout is designed to provide a user-friendly experience, making it easy for customers to find and buy products.

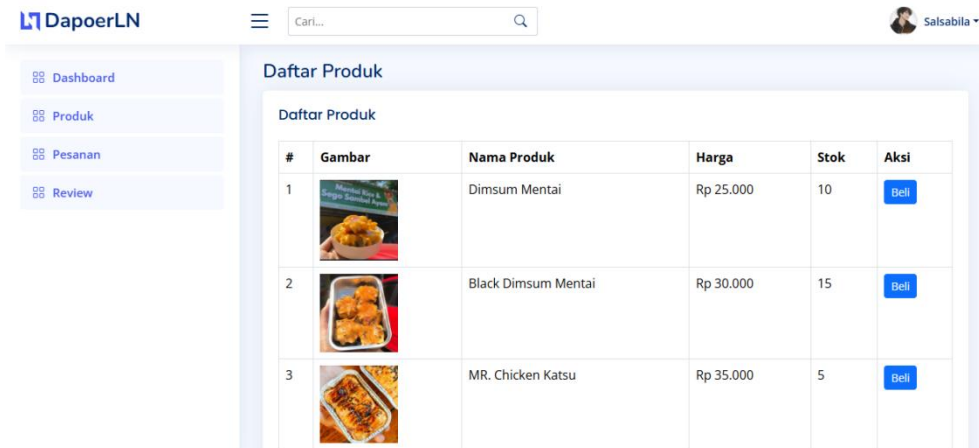


Figure 11. Product Customer page of the online sales system

– Order Page

The Order page allows customers to track their purchase history and monitor the status of their current orders. This page displays detailed information about each order, including product names, quantities, total costs, delivery addresses, payment methods, and order statuses. By keeping customers informed, this feature enhances transparency and trust.



Figure 12. Order Customer page of the online sales system

– Review Page

Customer feedback is facilitated through the Review page, where customers can provide ratings and comments about the products they have purchased. This feature not only helps other customers make informed decisions but also provides valuable insights to Business Owners about product quality and customer satisfaction.



Figure 13. Review page of the online sales system

2. Evaluation of the Testing Outcomes from Implementation of an E-Commerce-Based Online Sales System at Dapoer LN MSME Kudus

Table 1. Black Box Testing of online sales system

NO	Tested Menu	Test Description	Test Step	Expected Result	Test Result
1.	Login	Ensure users can log in to the system.	Enter email and password then click login.	The user can enter the system if the email and password entered are correct.	Success
2.	Product Category Data	Ensure the owner can view, add, update, and delete product category data.	Click Product Category on the menu on the left side to view existing product category data, as well as to add new categories, update or edit existing data, and delete product category data that is no	Owner can view, add, update or edit, and delete existing product category data.	Success

			longer needed.		
3.	Product Data	Ensure the owner can view, add, update, and delete product data.	Click Products on the menu on the left side to view current product data, as well as to add new products, update or modify existing products, and remove product data.	The owner can view current product data, as well as add new products, update or modify existing ones, and remove product data.	Success
4.	Coupon Data	Ensure the owner can view, add, update, and delete coupon data.	Click Coupon on the menu on the left side to view existing coupon data, as well as to add new coupons, update or edit existing coupons, and delete expired coupon data.	The owner can view existing coupon data, add new coupons, update or edit existing coupons, and delete coupon data.	Success
5.	Order Data	Ensure the owner can view customer orders and update the order status.	Click Orders on the menu on the left side to view existing customer order data and to update order status.	The owner can view the order data and update the order status.	Success

6.	Customer Data	Ensure the owner can view customer data and delete customer data.	Click Customer on the menu on the left side to view and delete detailed customer data that has placed an order.	The owner can view and delete customer data details.	Success
7.	Customer Review Data	Ensure the owner can view and delete customer reviews.	Click Review Customer on the menu on the left side to view and delete reviews of customers who have left a review.	Owner can view and delete customer reviews.	Success
8.	Report	Ensure the owner can view the status and details of monthly sales reports, products sold, daily orders, coupons used, and customer feedback.	Click Reports on the menu on the left side to view the details and status of the reports.	The owner can view the details and status of the reports.	Success
9.	Register	Ensure that customers can register to enter the system.	Enter name, email, password, picture, address, phone number, then click register.	The customer can register.	Success
10.	Products	Ensure customers can	Click Products on	Customers can view and	Success

		view and purchase products.	the menu on the left side to view product names, prices, stock, and make product purchases.	purchase products.	
11.	Orders	Ensure customers can view order list details.	Click Orders on the menu on the left side to view details of orders that have been purchased.	Customers can view the order list details.	Success
12.	Reviews	Ensures customers can view, edit, delete, and leave reviews and ratings on orders that have been ordered.	Click Review on the menu on the left side to view, edit, and delete reviews of products that have been ordered.	Customers can view, edit, and delete product reviews.	Success
13.	Logout	Ensure users can exit the system.	Click Logout located to the right of the Delete Account button.	The user can log out.	Success

E. CONCLUSIONS

Based on research on the Implementation of an E-Commerce-Based Online Sales System at Dapoer LN Kudus MSME as an effort to support and facilitate the online sales process, several points can be concluded as follows:

1. The research on the implementation of an e-commerce-based online sales system at Dapoer LN Kudus MSME highlights significant advancements in addressing the digital needs of the business. The developed system effectively caters to the specific operational requirements of the MSME, ensuring its relevance to their sales processes.
2. For business owners, the system includes features such as product categories, product management, orders, coupons, customer data, reviews, and reporting tools. Meanwhile,

for customers, it provides functionalities like product browsing, order tracking, reviews, and secure payment methods, enabling an interactive and user-friendly experience.

3. The Alpha testing results indicate that all system features perform as intended, ensuring seamless interaction between business owners and customers. This demonstrates the system's ability to facilitate efficient sales management and improve the overall online sales process.
4. Evaluation results show that the system effectively simplifies operational activities, enhances transaction accuracy, and supports efficient tracking of sales data. These features contribute to more structured and organized business processes.
5. By enabling data-driven decision-making and improving operational efficiency, the system helps Dapoer LN Kudus MSME adapt to modernization, sustain competitiveness in the digital marketplace, and meet the evolving demands of its customer base.

F. SUGGESTIONS

Based on the results of research on e-commerce-based online sales systems, here are some suggestions for further development:

1. Future research can consider adding analytic features that are able to provide deep insights into customer shopping patterns and sales trends, so that marketing strategies can be designed more effectively.
2. It is important to conduct further studies related to the security of customer data and transactions in the system, to ensure better protection against cyber threats.
3. Future development can be focused on making the system accessible through mobile applications, making it easier for customers and business owners to use this platform.

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