Design and Implementation of a Website-Based E-Commerce Application Information System at PT. Fajar Lestari Sejati

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Abstract

The purpose of this research is to create a website-based E-Commerce platform that can connect sellers with buyers. The method of this research uses qualitative methods through a descriptive approach. The qualitative research method is used by the author based on the goal of understanding the phenomenon occurring in the object under study. The descriptive approach is used by the author based on the goal of reflecting the existing situation or conditions in a structured and objective manner. The theory of this research uses the Software Development Life Cycle (SDLC) method with the Waterfall system life cycle model approach as the main approach in designing and implementing the website-based E-Commerce application information system. The result of this research is the creation of a website-based E-Commerce application information system which includes interactive website page displays, registration features, login features, sales menu features, product catalog features, payment transaction detail features, order status features, communication message features, product search features, product ordering features, shopping cart features, to payment transaction features that support various types of payment methods. The conclusion of this research is that the design and implementation carried out on the website-based E-Commerce application program produces an overview of the system process flow in the form of diagrams and produces several functional features that can be run and applied to online product sales and purchase activities or operational activities.

Keywords: E-Commerce, Website, Software Development Life Cycle (SDLC), Waterfall.

1. Introduction

Information technology (IT) has now become one of the most widely used supporting needs for humans. Over time, information technology (IT) will always change and continue to develop.

The rapid development and advancement of information technology (IT) has created a new perspective. Gradually, the emergence of information technology (IT) has become one of the primary needs in human life. This is due to the functions and features possessed by information technology (IT) that can provide ease and speed in obtaining and accessing information quickly, so that information technology (IT) has now become a common foundation to be applied.

Until now, information technology (IT) has been widely applied in various fields of human life sectors. Therefore, with the common behavior of using information technology (IT), humans must adapt and be able to know the use of information technology (IT).

One application that uses information technology (IT) is E-Commerce. E-Commerce is a type of business that facilitates a business or individual to conduct transactions in the form of buying and selling a product online (Ghani et al, 2022, p.99). With the E-Commerce platform, consumers and company actors obtain easy and fast mobility, starting from online interaction, fast delivery of information, fast and dynamic product or service offerings, real-time product stock management, effective communication, to fast and easy transaction processes.

Over time, E-Commerce continues to experience rapid and fast development, both in terms of features, users, and its application, so E-Commerce tends to experience positive growth every year. According to the Digital Economy Outlook report in 2025 published by CELIOS shows that E-Commerce is one of the main sectors contributing to the increase in the largest digital economic transactions in Indonesia (Putri, 2025).
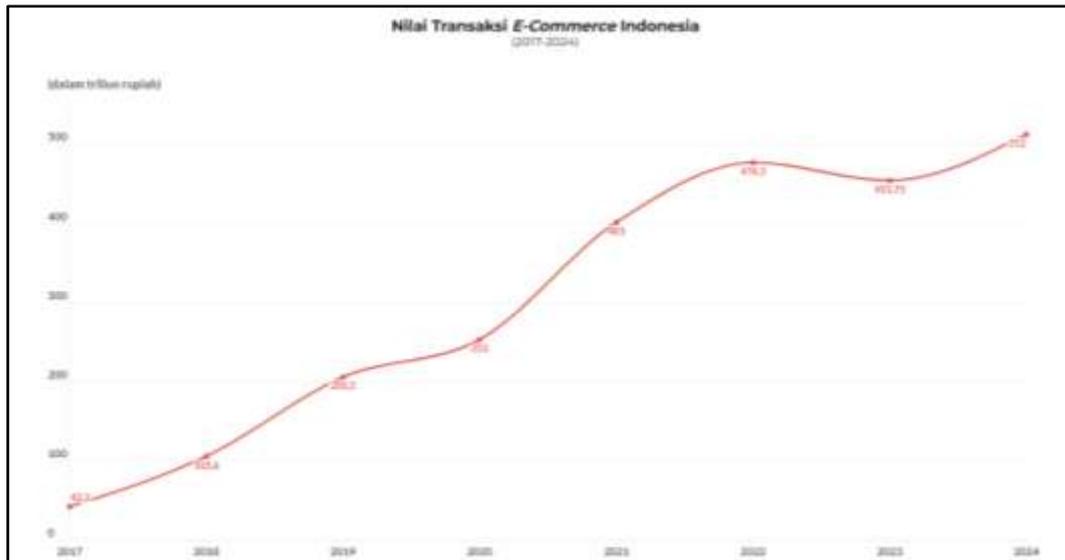
Figure 1. Indonesia E-Commerce Transaction Value

PT. Fajar Lestari Sejati is a company that is a major producer and supplier of architectural building hardware, such as doors and windows. In addition, PT. Fajar Lestari Sejati produces and distributes various other architectural building hardware products, from key devices to sliding door accessories, to providing special products for consumers with special needs.

PT. Fajar Lestari Sejati has implemented the concept of digitalization to support the company's activities and operational activities, especially in terms of product sales and offerings. The digital platforms implemented by PT. Fajar Lestari Sejati include marketplaces, website product catalogs, and official social media. Product offerings are made through official social media platforms and website product catalogs. Meanwhile, product sales are conducted using marketplace platforms.

Although the platforms used offer ease of use and provision, one of the platforms used, namely the marketplace platform, still has several operational limitations. Based on an interview with Mr. Agus, as an employee of PT. Fajar Lestari Sejati in the digital marketing division, he said:

"*We have been using the Tokopedia and Shopee applications for about 5 years. During our use of the Tokopedia and Shopee applications for product sales, there are several obstacles we face while using those applications. Some obstacles that are really problematic are the large number of sellers selling products similar to ours, there are already many sellers with the same products, plus the many price offers that are the same as ours, some are even cheaper than ours. Besides that, other problems we also experience are not being able to have full control to change the layout of the product sales page display, so the display of the products we provide is limited, besides that, what we face is that the website page display cannot be changed according to the company's needs or tastes*".

Based on the statement and input obtained through the interview with Mr. Agus, as an employee of PT. Fajar Lestari Sejati in the digital marketing division, several problem points experienced by PT. Fajar Lestari Sejati while using the marketplace application platform can be found, namely the enormous sales competition in terms of product offerings and price offers made by business actors engaged in the same field of sales. According to Kusumaningsih et al (2021, p.38), sellers who use marketplace platforms are obliged to compete with other sellers who offer similar sales products. In addition, the problems experienced are in the form of limitations of authority for companies that want to manage product sales on the marketplace platforms they use. The limitations of authority make the company not have full control in arranging and managing the needs they require.

PT. Fajar Lestari Sejati currently has not implemented a website-based E-Commerce platform as an online sales medium. Currently, PT. Fajar Lestari Sejati only uses a website-based application platform as a product offer catalog. The website-based application platform used still has several shortcomings. Based on brief interviews with several users, several reviews and inputs were found stating deficiencies in the website interface, boring

product offer features, navigation menus that still have shortcomings, and the absence of a payment transaction method.

According to Dimas, 34 years old, as a customer, he said:

"*Often I see scrolling down, navigating between menus, it's a bit troublesome to find what I want to choose*".

The testimony given by Dimas states that the available menu display can appear twice at the top when scrolling for product search, so the display looks crowded and difficult to understand.

According to Surya, 30 years old, as a customer, he said:

"*I'm confused, what is the use of that category menu?*".

The testimony given by Surya states that the display in the product offer section appears without symbols indicating the function of the product, so it looks boring and the user needs to read the text first.

According to Saidah, 35 years old, as a customer, she said:

"*The display of options in the material menu on 'Find Dekkson Products' is very long, scrolling up and down seems endless, so I'm lazy*".

The testimony given by Saidah states that there are too many options included in the "material" menu section, so the resulting display becomes longer and more numerous.

According to Adam, 27 years old, as a customer, he said:

"*What I see from the website is that there is a mix of language use on that website*".

The testimony given by Adam states that there is inconsistency in the use of language on the website, considering that consumers have diverse backgrounds, especially in understanding and knowing the language context, so this confuses consumers.

According to Sulis, 31 years old, as a customer, she said:

"*If I pay attention, the use of images to represent the product offers is small in size, very difficult to see directly, have to zoom and everything*".

The testimony given by Sulis states that the use of images as product offers still has shortcomings, so this can affect consumer interest in making purchases on the offered products.

Based on the exposition discussing the phenomena and field problems that occurred, the author is motivated to conduct a research study at PT. Fajar Lestari Sejati by designing and implementing an E-Commerce application based on a website platform. Design is a process or stage to create or plan something using techniques to formulate the goals to be achieved (Fauzi et al, 2023, p.437). According to Aziz in Fauzi et al (2023, p.437), design is a stage to determine something that will be implemented by utilizing various techniques and includes explanations related to the structure and details of elements and constraints that may be faced during the implementation process. Implementation boils down to activity, action, or a mechanism of a system, implementation is not just an activity, but a planned activity to achieve the goal of the activity (Usman in Sari, 2022, p.9). The research study conducted by applying design and implementation aims to create a website-based E-Commerce application platform that can be used for the process of selling or buying a product. With the research study conducted, it is expected to provide facilities for PT. Fajar Lestari Sejati in carrying out activities or product sales activities offered easily and effectively. In addition, it is also hoped that the website-based E-Commerce application can be a dynamic digital media means that can increase sales widely and quickly.

2. Research Methods

This research was conducted by applying qualitative research methods through a descriptive approach. Qualitative research methods are used with the aim of understanding the phenomenon occurring in the object under study. The descriptive approach is used with the aim of reflecting the existing situation or conditions in a structured and objective manner.

The use of qualitative research methods is relevant to the research being undertaken. This research begins by knowing and understanding the phenomena and field problems occurring at PT. Fajar Lestari Sejati, then overcoming the existing problems by describing the stages of the resolution process in a structured and objective manner.

This research uses data analysis methods with the Software Development Life Cycle (SDLC) concept approach with the Waterfall model. Software Development Life Cycle (SDLC) is a broad and common methodology to be applied in developing a system. The Waterfall model is one approach from the Software Development Life Cycle (SDLC) concept that is commonly used and known as a traditional model. The Waterfall model has a systematic that resembles a waterfall approach, where each stage carried out is completed, then it will proceed to the next stage gradually.
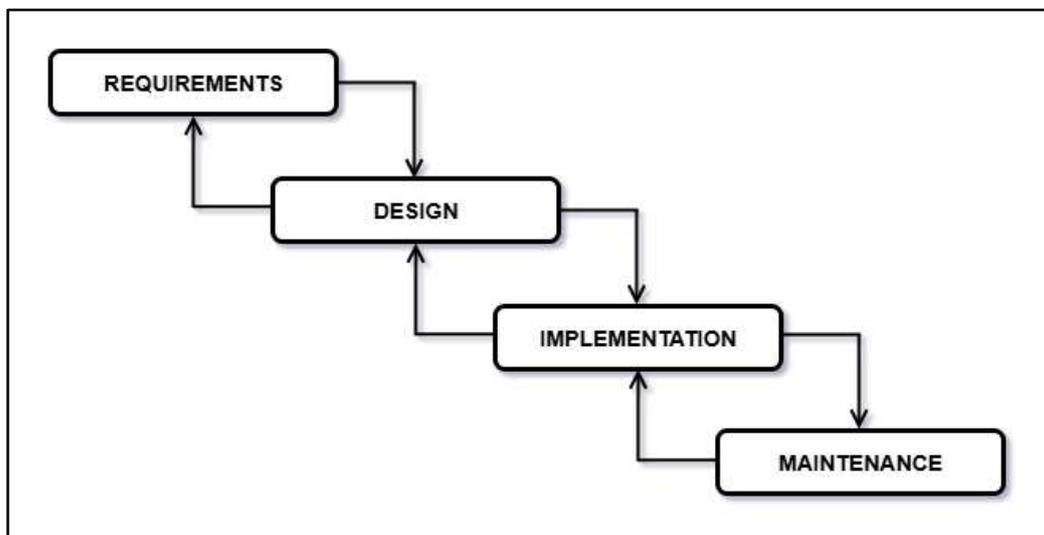

Figure 2. Waterfall Model System Development

This research applies several stages that will be used to design and implement the E-Commerce application information system using the Waterfall system development model, including:

2.1. System Requirements Analysis, research is conducted by analyzing the needs required to develop the website-based E-Commerce system application. The analysis is carried out by determining what needs are needed to develop the website-based E-Commerce system application. In this process stage, there are several needs that have been determined in this research, namely the needs required by the company.

2.2. System Design, research is conducted by designing the website-based E-Commerce system application based on the predetermined needs. The design of the website-based E-Commerce system application is carried out by displaying illustration images in the form of diagrams that show the stages in the form of interaction process flows that occur in a system cycle to be developed. This research applies the Unified Modelling Language (UML) method. The application of the Unified Modelling Language (UML) method involves several design models, namely Use Case Diagram and Activity Diagram.

2.3. Implementasi System Implementation, research is conducted by translating the previously created website-based E-Commerce system application design into a program form that can be operated through computer devices. In this research, the researcher will implement a programming language that represents a particular program code using a text editor software program to carry out the implementation activities of the website-based E-Commerce system application.

2.4. System Maintenance, research is conducted by performing maintenance on the website-based E-Commerce system application. At this stage, the operational website-based E-Commerce system application will experience a decrease in function or addition of features needed for the required needs. System maintenance aims to evaluate various components connected to the operational website-based E-Commerce system application by determining periodic scheduling.

3. Results and Discussions

3.1. System Requirements Analysis

This research was conducted by performing system requirements analysis to meet the needs for the development of the website-based E-Commerce system application. System requirements analysis is carried out by determining the required needs based on several category groups, namely:

1) Analysis of the Previous System Process Flow, at this stage, the cycle of the process flow that occurred in the use of the Website Products Catalogs system has been understood and known. The process flow that occurred in the Website Products Catalogs system involved several actor roles during the activities or use cycle of the Website Products Catalogs system.

Figure 3. Previous System Process Flow Diagram

2) Proposed New System Process Flow, After analyzing the previous system, the research continued by examining the previous system and proposing a new system process flow design by developing a new website-based E-Commerce application system.
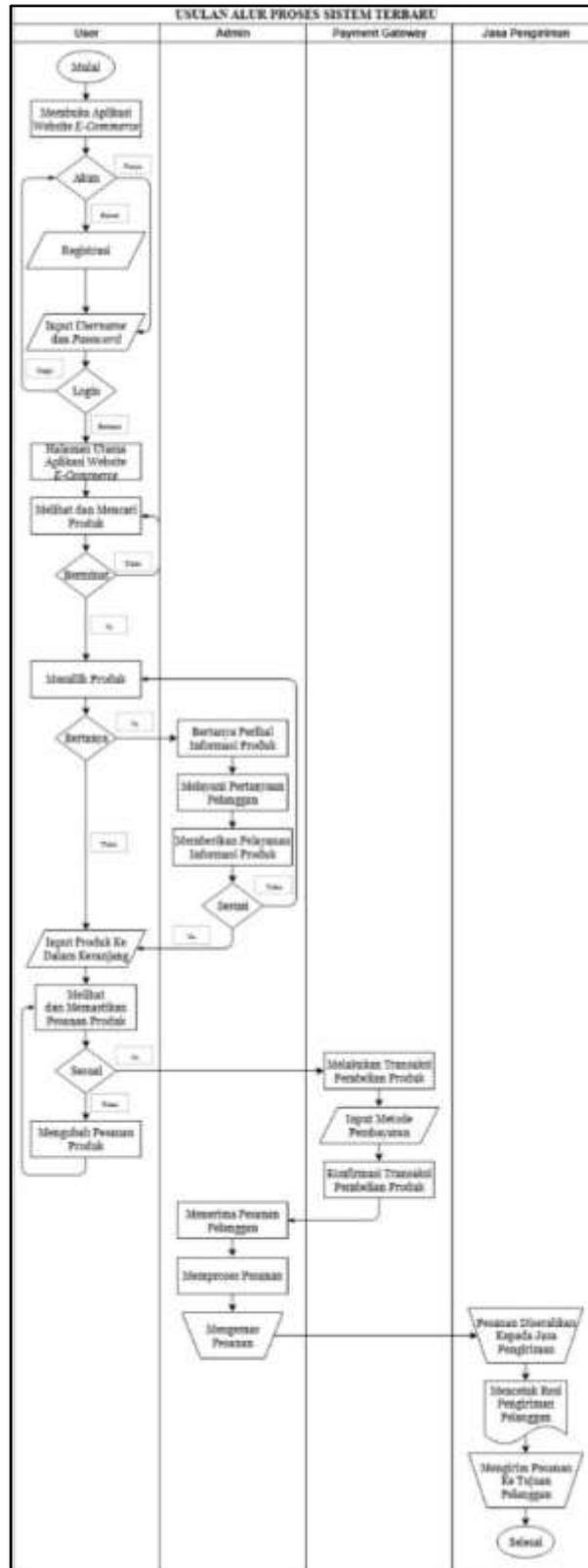
Figure 4. New System Process Flow Diagram

3) Analysis Comparison of the Previous System with the New System, After knowing and understanding the process flow cycle that occurred in the previous system and proposing the design of the latest system process flow, the next research is conducted by analyzing the comparison that occurs between the previous system and the new system, namely between the Website Products Catalogs system and the website-based E-Commerce application system.

Table 1. Analysis Comparison of the Previous System with the New System

FITUR	PERBANDINGAN SISTEM	
	TERDAHULU	TERBARU
Halaman Utama Website	✓	✓
Tampilan Umum Website	✓	✓
Katalog Penjualan Produk	✓	✓
Registrasi Akun	✗	✓
Halaman Login	✗	✓
Layanan Pesan Singkat	✗	✓
Informasi Stok Produk	✗	✓
Keranjang Pesanan	✗	✓
Metode Transaksi Pembayaran	✗	✓

3.2. System Design

System Design is carried out by displaying illustrations of interaction activities that occur in the form of process flow diagrams for the website-based E-Commerce application system. System design is done using the Unified Modelling Language (UML) method which functions to provide visual illustrations in the form of diagrams describing the activities and behaviors that occur in the system process flow cycle.

1) Use Case Diagram
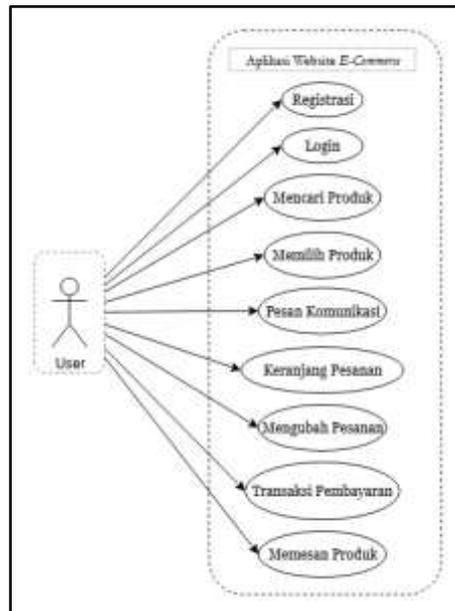
Figure 5. Use Case Diagram for User

The Use Case for the User has several activities that occur while using the system, namely: 1) performing account registration, 2) accessing the E-Commerce application system by inputting username and password, 3) performing product search, 4) selecting products, 5) performing short communication contact, 6) using the shopping cart feature, 7) managing owned orders, 8) performing the payment transaction process, 9) placing an order for the products that have been ordered.
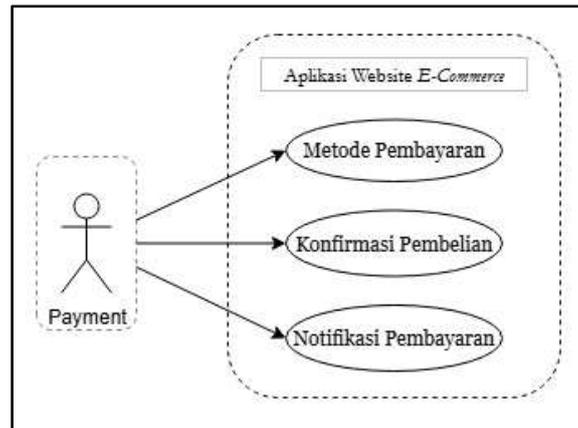
Figure 6. Use Case Diagram for Payment Gateway

The Use Case for the Payment Gateway has several activities that occur while using the system, namely: 1) providing payment method features, 2) providing purchase confirmation features, 3) providing and giving transaction notification message features.
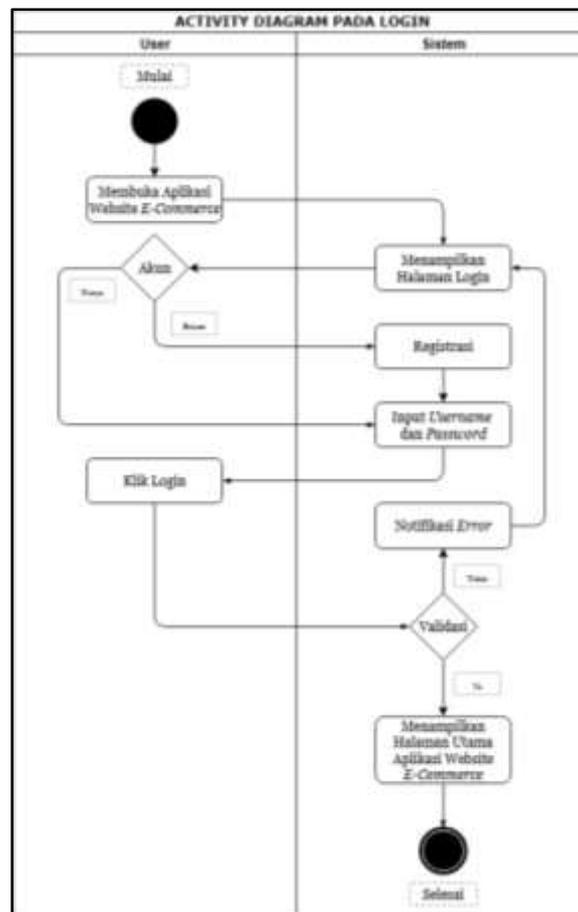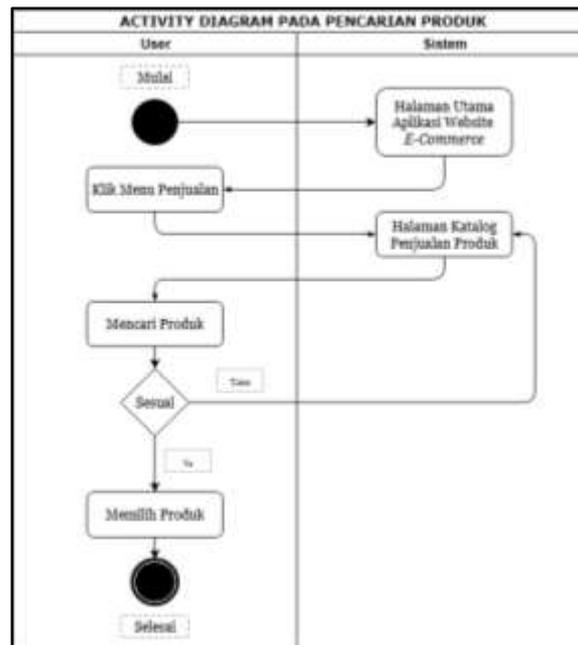
2) Activity Diagram

Figure 7. Activity Diagram for Login

The Activity Diagram that occurs in the Login process displays the interaction process flow involving the user and the system. This Activity Diagram describes in detail how the user performs the activity process when wanting to access the login page on the E-Commerce application system.
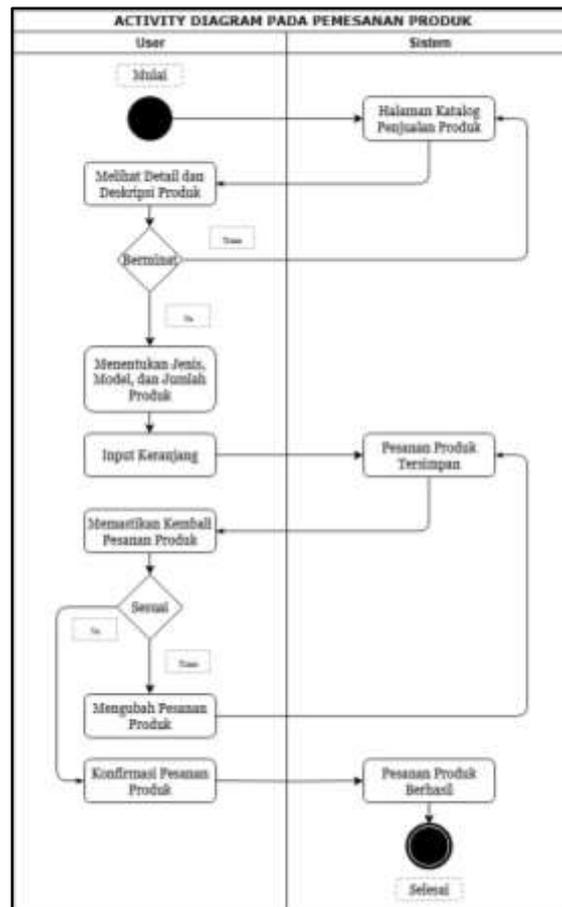
Figure 8. Activity Diagram for Product Search

The Activity Diagram that occurs in the Product Search process displays the interaction process flow involving the user and the system. This Activity Diagram describes in detail how the user performs the activity process when searching for the desired product by the user on the E-Commerce application system.
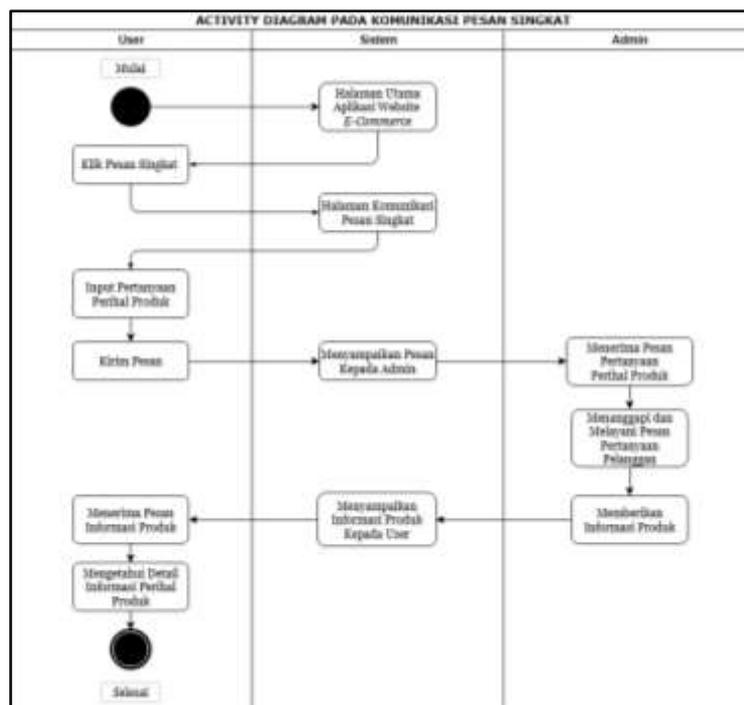
Figure 9. Activity Diagram for Message Communication

The Activity Diagram that occurs in the Short Message Communication process displays the interaction process flow involving the user and the admin connected through the system intermediary. This Activity Diagram describes in detail how the user can make a short message call by contacting the admin directly in order to obtain information related to sales products through the available short message feature. Besides the user, the admin can also send short messages to the user on the E-Commerce application system.

Figure 10. Activity Diagram for Product Ordering

The Activity Diagram that occurs in the Product Ordering process displays the interaction process flow involving the user and the system. This Activity Diagram describes in detail how the user performs the product sales ordering activity process on the E-Commerce application system.
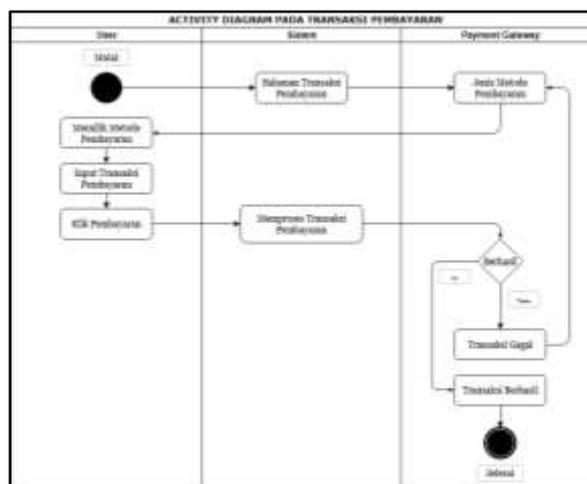

Figure 11. Activity Diagram for Payment Transaction

The Activity Diagram that occurs in the Payment Transaction process displays the interaction process flow involving the user and the payment gateway connected to the system. This Activity Diagram describes in detail how the user performs the payment transaction activity process for product orders through the payment gateway actor which is the main access in conducting payment transactions on the E-Commerce application system.

3.3. System Implementation

System Implementation is carried out by applying and executing the translation of the previously designed system design, then applied and implemented into a tangible form. The implementation stage plays a role in translating the created system design and creating the website-based E-Commerce application system program.
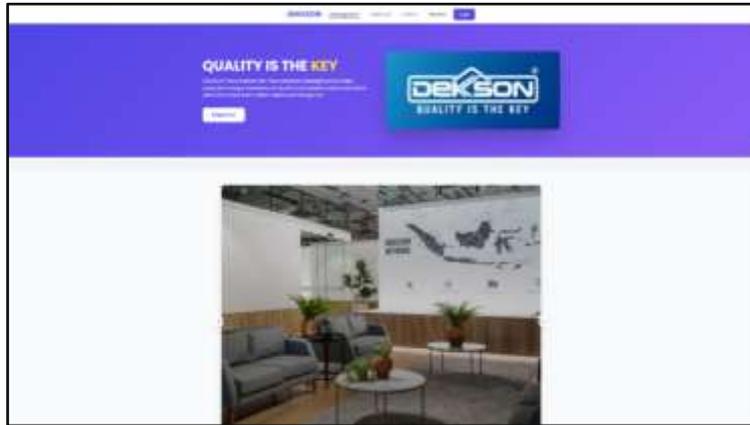
1) Landing Page

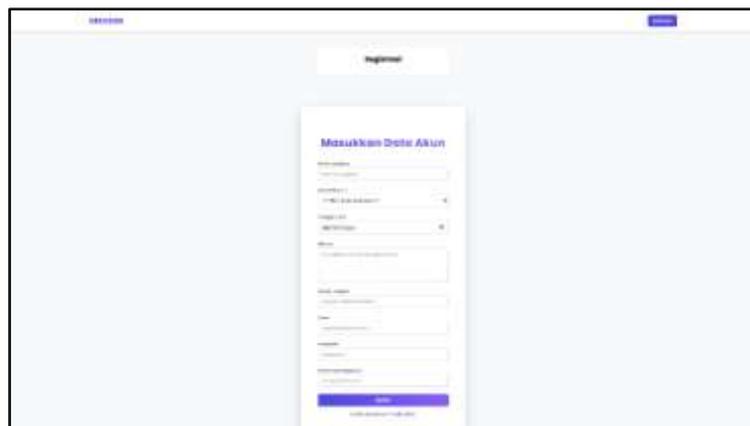

Figure 12. Landing Page Display

2) Registration Page
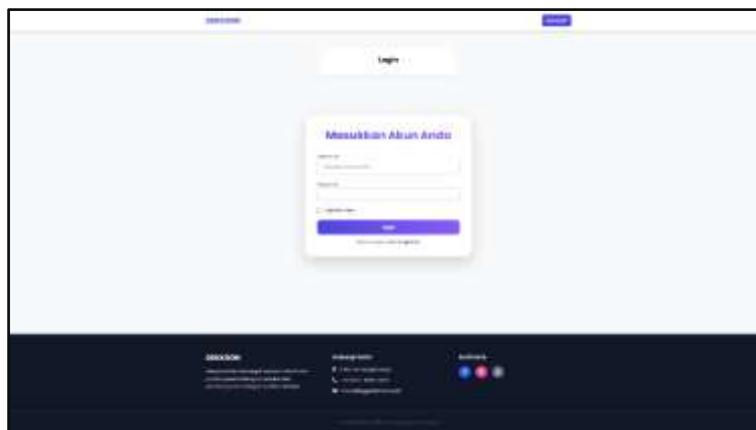

Figure 13. Registration Feature

3) Login Page

Figure 14. Login Feature

4) Main Page
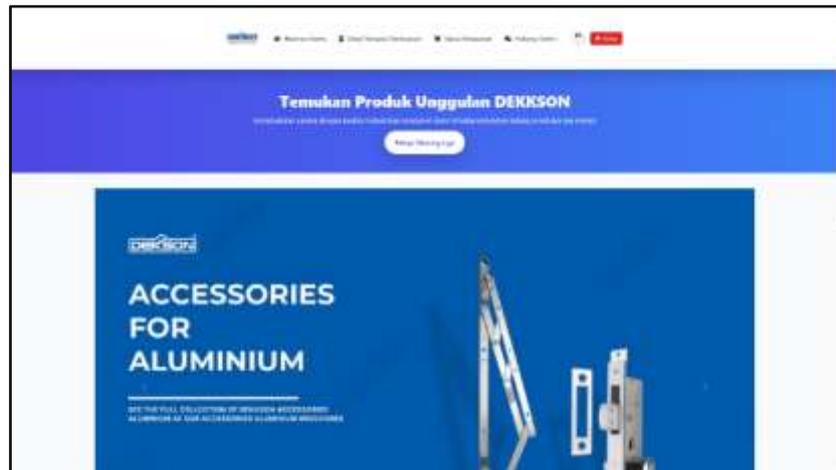
Figure 15. Main Page Display

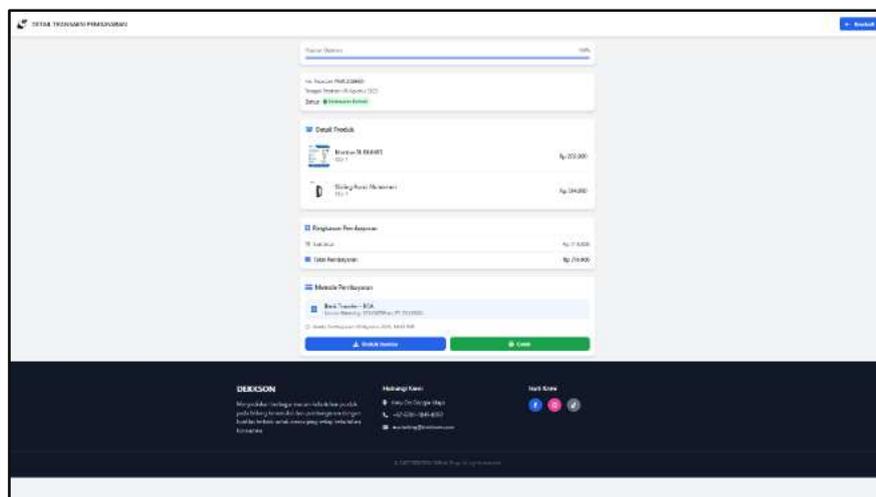5) Payment Transaction Detail Page

Figure 16. Payment Details Feature
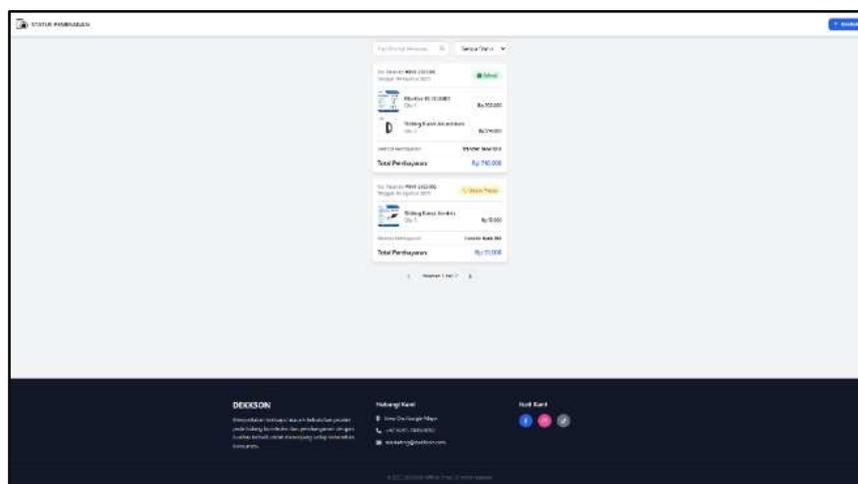
6) Order Status Page

Figure 17. Order Status Feature

7) Communication Message Page

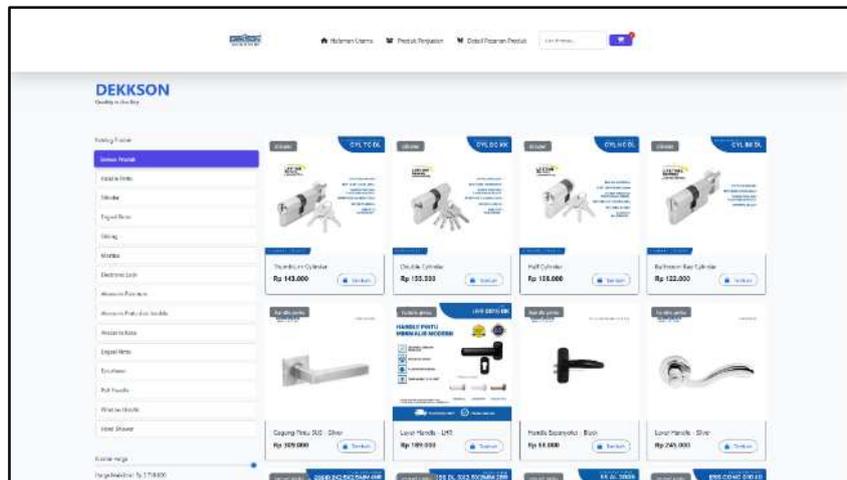Figure 18. Communication Message Feature

8) Product Sales Page

Figure 19. Sales Page Display

9) Shopping Cart Page

Figure 20. Shopping Cart Feature
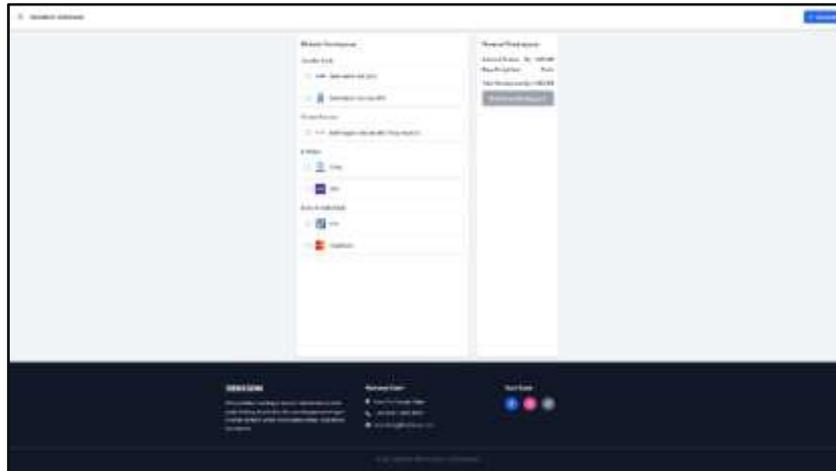
10) Payment Gateway Page

Figure 21. Payment Transaction Feature

3.4. System Maintenance

System Maintenance can only be performed if the system experiences operational problems when used, in addition, the system can be maintained if changes are desired by improving or adding several features needed for the operational needs of product sales.

4. Conclusion

The conclusion that can be obtained from this research is that the use of the Software Development Life Cycle (SDLC) method has become a system development method by presenting a structured picture of work stages. In addition, the Waterfall model has provided an easy-to-apply and understand picture of work stages, so that the workflow for system development and design becomes more structured and directed.

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