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Page 1-11

Development Of Batitune: A Customer Relationship Management (CRM) Based Sales Information System For Batik Tulis Negeri

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ABSTRACT

The Micro, Small, and Medium Enterprise (MSME) Batik Tulis Negeri faces significant operational challenges due to manual sales processes, non-integrated promotions, and inefficient data recording, which hinder its growth and customer service quality. This research aims to develop BATITUNE, a web-based sales information system with the implementation of a Customer Relationship Management (CRM) strategy, to enhance operational efficiency and customer satisfaction. The development methodology used is Rapid Application Development (RAD), which allows for an iterative and flexible development process. The system is built using the PHP programming language with the Laravel and Filament framework, a MySQL database, and integrates the Midtrans payment gateway to ensure secure and varied transactions. The system's functionality was thoroughly tested using the Black Box Testing method to verify each workflow. The result of this research is a functional and centralized information system that successfully transforms manual business processes into an automated digital workflow. Key features include product and order management for the admin, as well as ease of transaction and access to order history for customers. Black box testing results show that all functionalities, from both the customer and admin perspectives, operate validly and in accordance with expected specifications. In conclusion, the implementation of the BATITUNE system with its CRM approach effectively addresses the operational problems at Batik Tulis Negeri, improves service quality, and builds a foundation for stronger customer relationships. The RAD methodology proved suitable for the dynamic and fast-paced development needs of an MSME-scale project.

INTRODUCTION

In the digital age, the rapid development of technology has significantly transformed the way businesses interact with customers. Advances in digital communication tools have enabled individuals and companies to transmit, receive, and process information seamlessly, anytime and anywhere (Timoty Agustian Berutu et al., 2024). In this context, Customer Relationship Management (CRM) has emerged as a strategic business approach that leverages information technology to foster competitive, trustworthy, and customer-centered companies. CRM prioritizes the perspective of customers, focusing on sustaining and enhancing mutually beneficial relationships(Acheampong et al., 2023), (Tallulembang et al., 2024).

The sales information system is a technology-based solution designed to support product marketing through digital platforms, such as websites. Its main objectives are to enhance marketing efficiency, expand customer reach, and optimize the transaction process(Das & Hassan, 2022), (Robby Novianto & Maryam, 2022). As the benefits of digital sales systems become increasingly evident, many Micro, Small, and Medium Enterprises (MSMEs)

have started adopting information technology to increase their competitiveness (Mandal, 2022), (Tkachenko et al., 2021).

MSMEs play a crucial role in national economic development by contributing 61% to the Gross Domestic Product (GDP) and employing 97% of the workforce(Aliyah, 2022). However, despite their potential, MSMEs still face numerous challenges, such as marketing constraints and limited technological innovation. One example is Batik Tulis Negeri, an MSME in the fashion and crafts sector that produces traditional Indonesian batik with high cultural and artistic value.

Field observations, interviews, and document studies reveal that Batik Tulis Negeri continues to rely on manual sales processes, leading to inefficiencies. Product promotions are conducted through disconnected platforms like social media stories and WhatsApp statuses, which are neither optimal nor integrated(Al-Gasawneh et al., 2021), (Lin & Chen, 2025). Orders and payments are handled via text messaging, posing security risks and making data management difficult. Sales data is recorded manually, hindering effective analysis.

To address these challenges, a web-based sales information system that incorporates a CRM strategy is required. Such a system would automate transactions, centralize customer data, and enhance the overall shopping experience. CRM, as a philosophy and strategy, aims to foster long-term relationships with customers to improve loyalty, minimize customer attrition, and enhance business sustainability (Mukhamedjan kizi, 2025), (Izzati & Dermawan, 2023). CRM implementation has been shown to improve customer satisfaction, operational efficiency, and sales revenue(Oktafiyani et al., 2025), (Guerola-Navarro et al., 2024).

This research utilizes the Rapid Application Development (RAD) methodology to develop the BATITUNE system. The RAD approach, proven effective for small-scale projects requiring flexibility and rapid iteration, contrasts with the more rigid Waterfall model(Cahyadi & Sutisna, 2023). RAD supports fast prototyping, early testing, and user feedback, ensuring the final product aligns with real business needs(Shandra Dewi et al., 2024).

To ensure the system's reliability and functionality, black box testing is employed. This method verifies the system’s behavior based on input and output specifications without delving into the internal code structure(Fahrezi et al., 2022). The BATITUNE system is developed using PHP with the Laravel Filament framework and integrates Midtrans as a secure and versatile payment gateway(Fatman et al., 2023).

Through the implementation of a CRM-based web sales information system, this study aims to improve Batik Tulis Negeri’s customer service quality, operational efficiency, marketing effectiveness, and transaction security. This effort is expected to support the business’s digital transformation and contribute to sustainable MSME growth.

RESEARCH METHOD

This chapter describes the research method applied in the design and development of a web-based sales information system with the implementation of Customer Relationship Management (CRM) at Batik Tulis Negeri. The research process begins with the problem identification stage through observation, interview, and documentation techniques to collect relevant primary data. This stage is followed by a literature study and needs analysis to formulate a theoretical foundation and determine strategic solutions for CRM implementation. The system development methodology used is Rapid Application Development (RAD), which consists of four main phases: requirements planning, system design, construction, and implementation(Faqih et al., 2022). The RAD approach was chosen for its iterative and flexible characteristics, which can accelerate the development process. The final stage of this research is system evaluation and report preparation to systematically document the entire process and the achieved results.

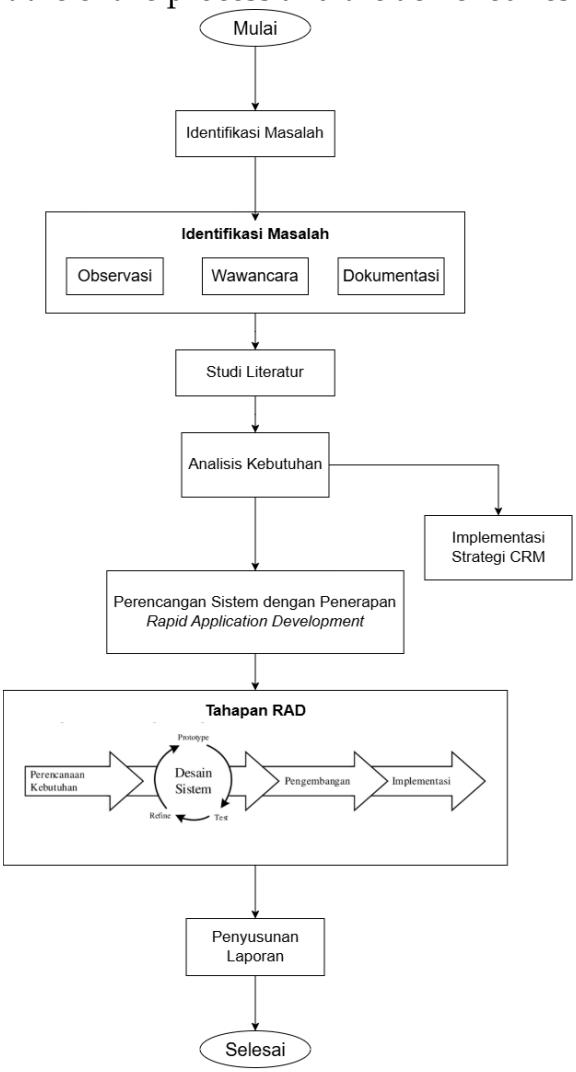

Figure 1. Research Flow

This research begins with problem identification through observation, interviews, and documentation to obtain relevant data. Subsequently, a literature study and needs analysis are conducted to determine the appropriate solution for implementing the CRM strategy.

The main stage in this research is system development using the Rapid Application Development (RAD) methodology, which includes requirements planning, system design, construction, as well as system implementation and evaluation. The RAD approach was chosen because it is capable of accelerating the development process with flexible iterations. After the system is developed, the final stage of the research involves the preparation of a report to document the entire process and the achieved results. By following these stages systematically, this research is expected to produce an optimal CRM system for Batik Tulis Negeri.

A. CRM Strategy Implementation

a. Target market

The target market for this written batik is highly diverse, encompassing both individual consumer and business segments. The individual market targets demographics such as students, young professionals, batik art enthusiasts, and both local and international tourists seeking authentic cultural products for personal use, collections, or as special gifts. On the other hand, the business segment is also a key target, particularly corporations that require batik for employee uniforms or merchandise.

b. Segmentation

Table 1. Market Segmentation

1.	**Demographics**	
	Age	18–45 years old.
	Gender	Men and Women.
2.	**Geographics**	
	Geographic Location	Near Pasar Duwur, Jolotundo village, Lasem, Rembang, Central Java.
3.	**Behavioral**	
	Shopping Behavior	Customers tend to seek written batik (batik tulis) with unique designs and high quality, and they appreciate the authenticity and craftsmanship in batik products.

c. Differences in strategy

The Customer Relationship Management (CRM) strategy in this research is implemented through three main stages: Acquire, Enhance, Retain. The differences between the current system and the proposed system are detailed in the following tables.

Table 2. Acquire

Acquire Stage	
Current System	**Proposed System**
Customers must contact the admin via WhatsApp and wait for a reply before they can fill out an order form.	Customers can directly order batik through the website, which facilitates the online purchasing process. This means customers do not need to visit the physical store and can make purchases from anywhere and at any time.

Table 3. Enhance

Enhance	
Current System	**Proposed System**
Customers must inquire with the admin to find out product details, stock, and prices.	Customers can directly view product details and prices on the website without needing to ask the admin.
Payment methods are limited to specific bank transfers only.	Payment methods are more varied with the integration of a payment gateway (Midtrans) to facilitate transactions.
Order recording is done manually in a notebook, which risks being lost or damaged and slows down the process.	Order recording is done digitally with a computerized system for better efficiency and accuracy.

Table 4. Retain

Retain	
Current System	**Proposed System**
Customers have no platform to provide critiques and suggestions.	Customers can provide reviews, critiques, and suggestions through the website.

B. Rapid Application Development Stages

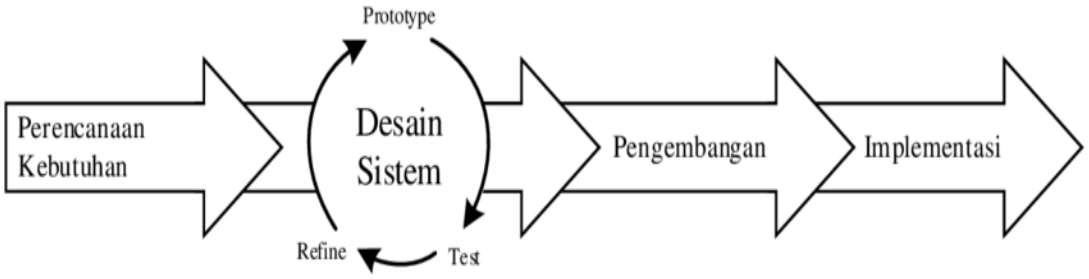

Figure 2. Rapid Application Development Architecture

The Rapid Application Development (RAD) methodology in this research was applied through four main stages. The process began with requirements planning, which included observation and interviews with the MSME owner to identify business needs, feature requirements, and current system problems. The next stage was system design, where the MSME owner was actively involved in an iterative cycle of Refine, Test, and Prototype, with the prototype developed using Figma to visualize the system's workflow and functionality. Once the design was refined, the development stage commenced, where all features were implemented into program code using the Laravel framework. The final stage was implementation, in which

after testing, the application was ready for deployment in a production environment for use by end-users to support their business processes

C. System Design

This section presents the system design in the form of diagrams to illustrate the workflow, user interactions, and the structure of the system to be built.

a. Use case diagram

Figure 3. Use Case Diagram

The system is designed with three main actors, each having distinct roles: the Public Customer, the Registered Customer, and the Admin. Public Customers have limited access to view products and register, whereas after logging in, Registered Customers can access full functionalities, from selecting products and making payments to checking order status, providing reviews, and managing their accounts. The Admin, on the other hand, acts as the system manager with access rights to manage all data such as products, orders, customers, payments, and reviews, as well as monitor sales performance through reports. Overall, the system's workflow is designed to be

systematic and efficient, with the login process serving as a primary prerequisite for accessing most features, ensuring each process aligns with user needs.

b. Class diagram

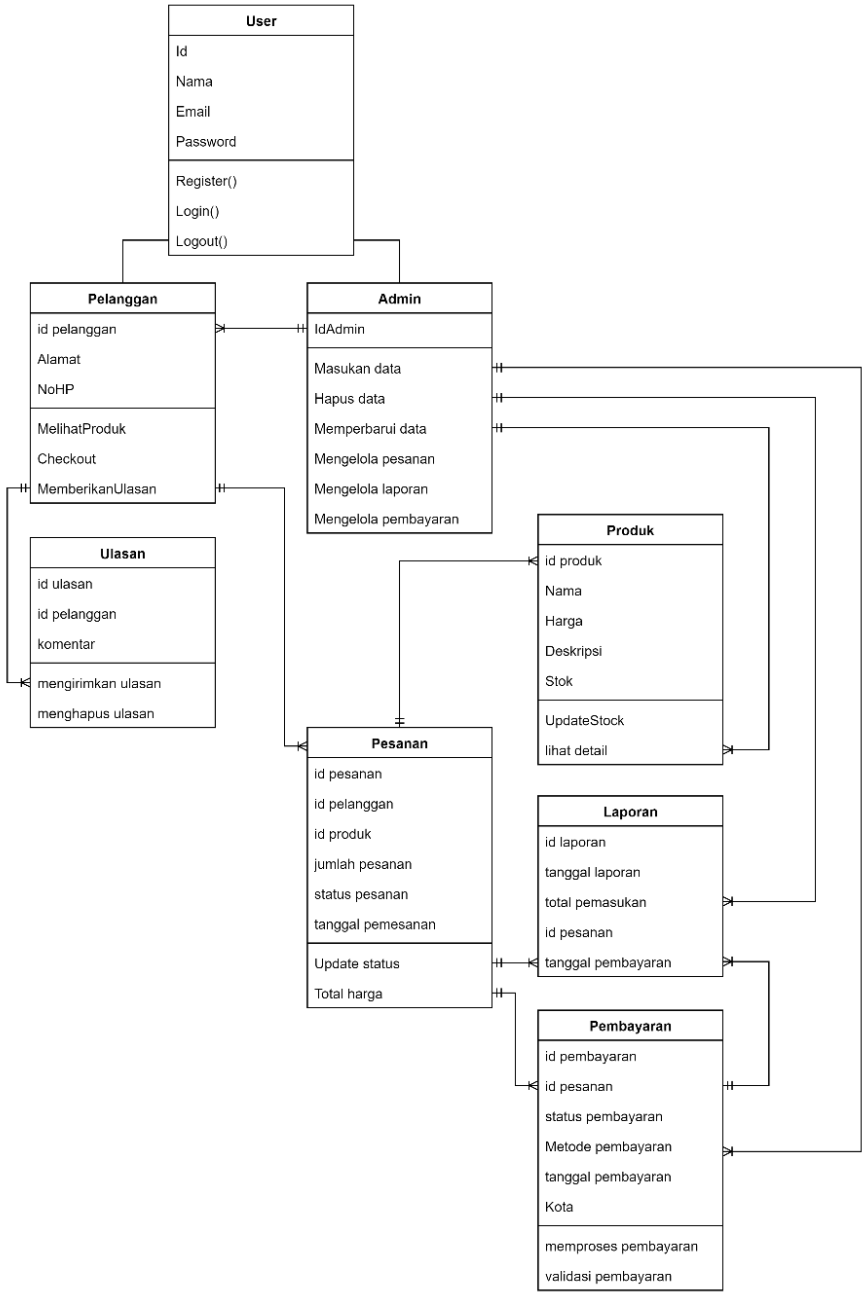

Figure 4. Class Diagram

This class diagram illustrates the relationships between the main entities in the e-commerce system, including customers, admins, products, orders, reviews, payments, and reports. The primary relationship is one-to-many, where a single Admin can manage multiple other entities like Customers, Orders, and Products. Similarly, one Customer can have many Orders and Reviews , and one Product can receive many customer Reviews. A more specific relationship is the one-to-one connection between an Order and its corresponding Payment. Finally, a single Report

can contain many processed orders, which also constitutes a one-to-many relationship.

RESULTS AND DISCUSSION

This section presents the implementation results of the system developed using the Rapid Application Development (RAD) methodology, along with an analysis of the functional testing that was conducted. The implementation process was preceded by a comprehensive needs analysis stage, where data was collected through observation, interviews, and documentation. Based on this analysis, a system design was formulated and approved before being developed into a functional system.

Technically, the system was built using the PHP programming language, supported by the Laravel and Filament frameworks. The development environment utilized Laragon, with Cursor as the code editor and MySQL as the database management system. After the implementation stage was completed, a series of tests were conducted using the black-box testing method to verify that each system feature functioned according to its expected specifications. The following is a detailed presentation of the implementation and testing results.

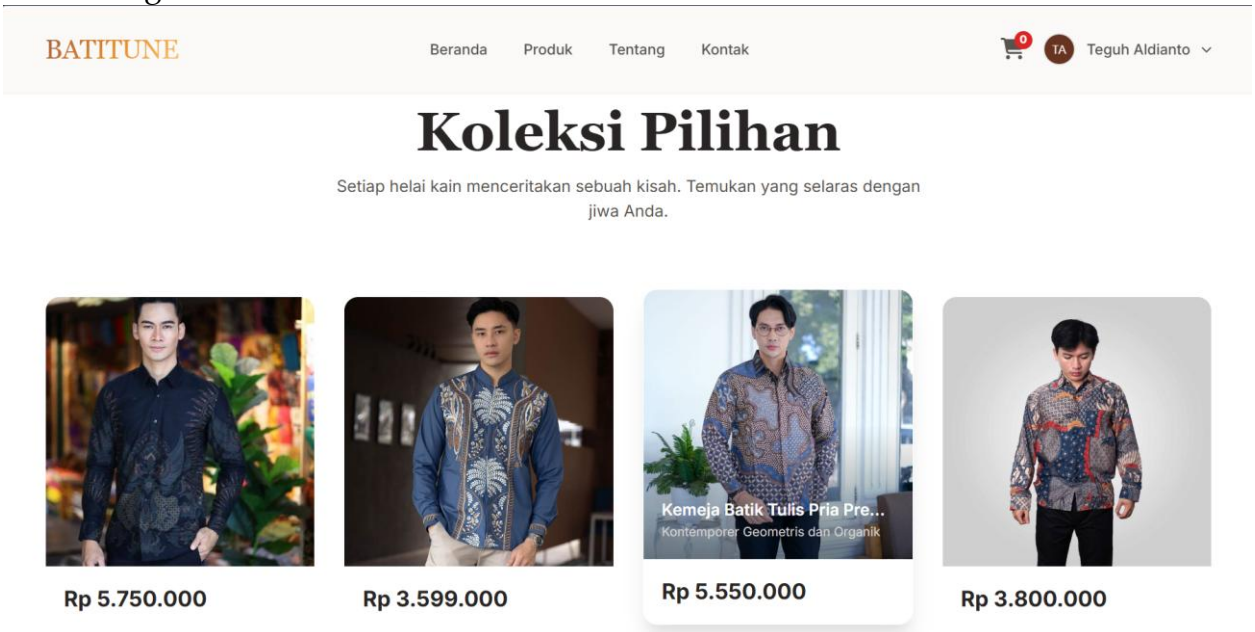

Figure 5. Customer Home Page Interface (Login Condition)

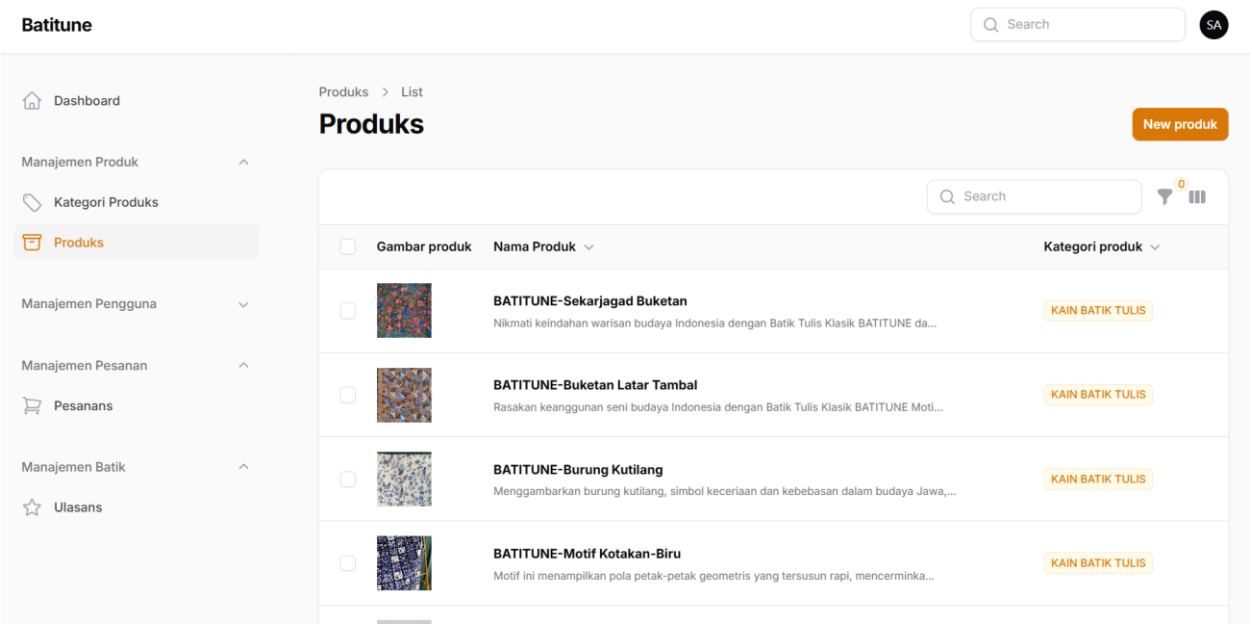

Figure 6. Admin Home Page Interface

System functionality was evaluated using the black box testing method, which focuses on verifying inputs, outputs, and user workflows without knowledge of the internal code structure. Based on a series of test scenarios, all primary functionalities of the BATITUNE website, from both the customer and admin perspectives, were proven to operate according to the expected results. The system successfully handled standard workflows and input validation correctly. Therefore, it is concluded that the system has passed the functional testing phase and is ready for implementation.

CONCLUSION

Based on the analysis, design, and implementation of the BATITUNE sales information system, the following conclusions can be drawn:

a. The implementation of the Customer Relationship Management (CRM) strategy integrated into the web-based sales information system has significantly enhanced operational efficiency and customer service quality at the MSME Batik Tulis Negeri. The system successfully transformed manual business processes, such as product promotion, order recording, payment verification, and customer data management, into an automated, secure, and centralized digital workflow. This not only minimizes the risk of human error and time inefficiency but also builds a foundation for stronger customer relationships through features like detailed order history and a platform for providing reviews.

b. The Rapid Application Development (RAD) methodology proved to be an effective, fast, and adaptive approach for system development on an MSME scale. The iterative nature of the RAD methodology allowed for close and continuous collaboration with the owner of Batik Tulis Negeri. This flexibility ensured that each prototype and feature developed was aligned with the actual and specific needs of the user, thereby reducing the risk of discrepancies in the final product and accelerating the overall project completion time.

c. Based on the results of functional testing using the Black Box Testing method, all features developed in the BATITUNE system, for both the customer and admin sides, operate validly and in accordance with the expected specifications. Crucial workflows, from account registration and the product catalog to the checkout process and Midtrans payment gateway integration, have functioned without any issues. This validates that the developed system is not only functional but also reliable and ready for full implementation in the operational environment of Batik Tulis Negeri.

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