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This article contributes to:

Implementation of the Laravel Framework in Developing a Web-Based Credit Application Submission System at KSU Berlian

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Abstract

KSU Berlian in Probolinggo City, serving 720 members, still relies on a manual system for managing credit transactions, resulting in process inefficiencies, low data security, and a high rate of non-performing loans (NPL) reaching 15% in 2024. This study aims to design and implement a web-based credit application submission system using the Laravel framework to address these issues. The system was developed using the Waterfall methodology, which includes requirements analysis, system design, coding, testing, implementation, and maintenance stages. The application development utilized Laravel Framework, MySQL Database, PHP, and Bootstrap CSS. The system is equipped with key features such as online credit application submission, due date notifications via WhatsApp, and integrated data management tailored specifically for KSU Berlian. System testing was conducted using blackbox testing and User Acceptance Testing (UAT), which yielded excellent results with a user satisfaction rate of 82.78%. The research findings indicate that the application significantly improves data management efficiency, reduces physical document usage, facilitates remote customer access, and assists management in monitoring and decision-making processes. Furthermore, the application helps minimize non-performing loans through enhanced monitoring and communication systems.

Keywords: Laravel, Cooperative, Waterfall Method, Credit, Web Application

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1. Introduction

KSU Berlian is a credit union cooperative located in Probolinggo City, serving 720 members with only three staff members, yet facing significant operational challenges due to the continued use of a manual system [1]. These issues include

transaction records still being managed on paper for savings, installments, and reporting; inefficient processes with low data security; loan billing checks that are time-consuming and prone to errors; discrepancies in savings transaction data; lengthy report generation susceptible to writing mistakes; and a high rate of non-performing loans (NPL), with over 15% of members experiencing payment defaults by 2024 [2-5]. To address these challenges, this study proposes the development of a web-based credit application submission system utilizing the Laravel Framework, MySQL Database, PHP, and Bootstrap CSS. The goal of this system is to enhance operational efficiency, simplify member access to services, and reduce non-performing loans through better data management and process automation [6].

The core research problem addressed in this study is how to design and implement a web-based credit application submission system using the Laravel framework at KSU Berlian, with the objective of facilitating data processing, report generation, and transactional operations in a more effective and efficient manner [7]. By transitioning from manual to digital workflows, the system is expected to streamline administrative tasks, reduce human errors, and provide real-time data access to both staff and members [8-9]. Additionally, automated notifications and integrated reporting features are designed to assist management in monitoring loan performance and making timely, data-driven decisions. This research contributes to the digital transformation of microfinance cooperatives by demonstrating a scalable and practical solution to common operational inefficiencies found in small-scale credit institutions [10].

2. Methods

2.1 Research Methodology

In this study, data collection was conducted through three primary methods, namely:

1. **Observation**

   Direct observation was carried out by observing the actual activities related to the operational problems identified in this research. The purpose of the observation was to understand the existing business processes and system workflows currently implemented at KSU Berlian. The observation targeted the daily transaction management processes, including credit applications, savings transactions, and report generation activities.

2. **Interviews**

   Structured interviews were conducted with key stakeholders within KSU Berlian, including cooperative staff and management. The interviews aimed to identify the limitations and strengths of the existing manual system, understand user needs, and gather detailed insights on operational

bottlenecks. This qualitative method provided valuable contextual information to ensure that the proposed system addresses real user pain points effectively.

3. **Literature Review**

An extensive literature review was conducted by analyzing relevant books, scientific articles, research journals, and academic theses related to credit application systems, cooperative management, and the Laravel framework. This approach was essential to establish a theoretical foundation for the system design and to identify best practices in web-based credit application development.

For software development, this research adopts the Waterfall Model as the software development life cycle (SDLC) methodology [11]. The Waterfall Model was chosen due to its structured and sequential nature, which suits the linear process of requirement analysis, design, coding, testing, implementation, and maintenance. Each phase in the Waterfall approach must be completed before proceeding to the next, ensuring thorough documentation and validation at every step [12].

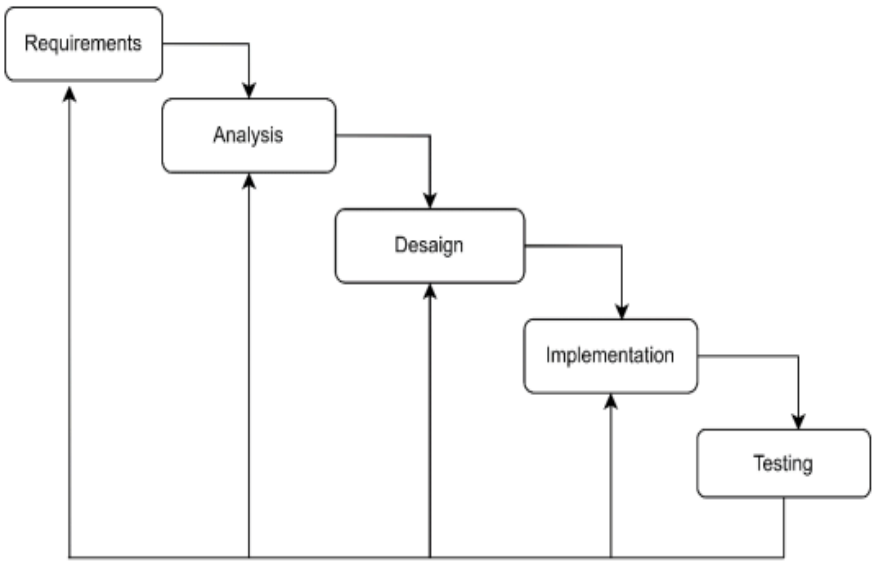

Figure 1. Waterfall Development Methodology

Furthermore, the implementation phase involves the use of Laravel as the primary development framework, coupled with MySQL for database management, PHP for backend development, and Bootstrap CSS for responsive user interface design. The system will be hosted on a web server with integrated communication APIs such as WhatsApp for notification services. System testing will utilize Blackbox Testing to validate functional requirements and User Acceptance Testing (UAT) to assess the application's usability and user satisfaction. This methodical approach

ensures that the final product not only meets technical specifications but also aligns with user expectations, thereby enhancing operational efficiency and reducing the credit delinquency rate at KSU Berlian [13-15].

2.2 System Design

To ensure that the system meets the functional needs of all stakeholders while enhancing operational efficiency, a detailed system design phase was conducted. One of the primary modeling tools used in this stage is the Use Case Diagram, which visualizes the interaction between system users and the application's core features.

Figure 2. Use Case Diagram

The Use Case Diagram illustrates the interactions between the system's actors—Administrator, Member (Nasabah), and Management (Pimpinan)—and the system's core functionalities. The Management role is granted access to various reports, including member data reports, savings reports, loan and installment reports, cash flow reports, SHU (Sisa Hasil Usaha) reports, and administrative data. The Administrator is responsible for managing member records, registering new members, handling savings and loans, and generating loan reports. Members (Nasabah), on the other hand, can perform activities such as registration, loan applications, viewing installment histories, and adding savings transactions. All these activities require user authentication through a login process to ensure data security and access control.

The system also incorporates an automated WhatsApp notification feature, designed to remind members of upcoming payment due dates and other relevant notifications. This reminder system is programmed to trigger alerts when payments

are due within seven days. Furthermore, while all system functionalities necessitate user login, the logout function is considered optional (denoted as an "extend" in the use case diagram).

To ensure scalability and maintainability, the system architecture follows a modular approach where each functional module (User Management, Loan Processing, Savings Management, Reporting, and Notification Service) is developed as an independent yet interconnected component. This modularity allows future enhancements, such as the integration of payment gateways or analytics dashboards, to be implemented with minimal disruption to existing operations. The application is also designed with a mobile-first interface, ensuring accessibility across devices and providing a seamless experience for field agents and members accessing the system remotely. This comprehensive system design is expected to significantly enhance the operational efficiency and service quality of KSU Berlian.

3.Results and Discussion

3.1 User Interface Testing Results

The user interface (UI) testing was conducted to ensure that every screen of the application functions correctly according to its intended design and that users can navigate seamlessly through the system features. The testing focused on three user roles: Pimpinan (Management), Admin, and Nasabah (Member/Customer). Each interface was evaluated based on functionality, layout consistency, accessibility, and responsiveness.

1. **Pimpinan Account Interface Testing**

   The testing of the Pimpinan (Management) account interface began with the login page, which successfully authenticated users with valid credentials, while invalid inputs were correctly handled with appropriate error notifications. Upon successful login, the Dashboard provided a comprehensive overview of key financial metrics and facilitated smooth navigation to detailed reports. The Loan Data section displayed accurate listings of active and completed loans, with fully functioning filter options. Savings Types and Savings Data allowed management to access categorized savings information and export reports seamlessly. The Cash Report interface displayed real-time cash flow data, which updated accurately upon transaction entries. SHU (Profit Sharing) reports presented profit distributions with detailed breakdowns for each member. Additionally, the Member and Admin Data interfaces operated correctly, allowing for efficient data management, search, and updates.

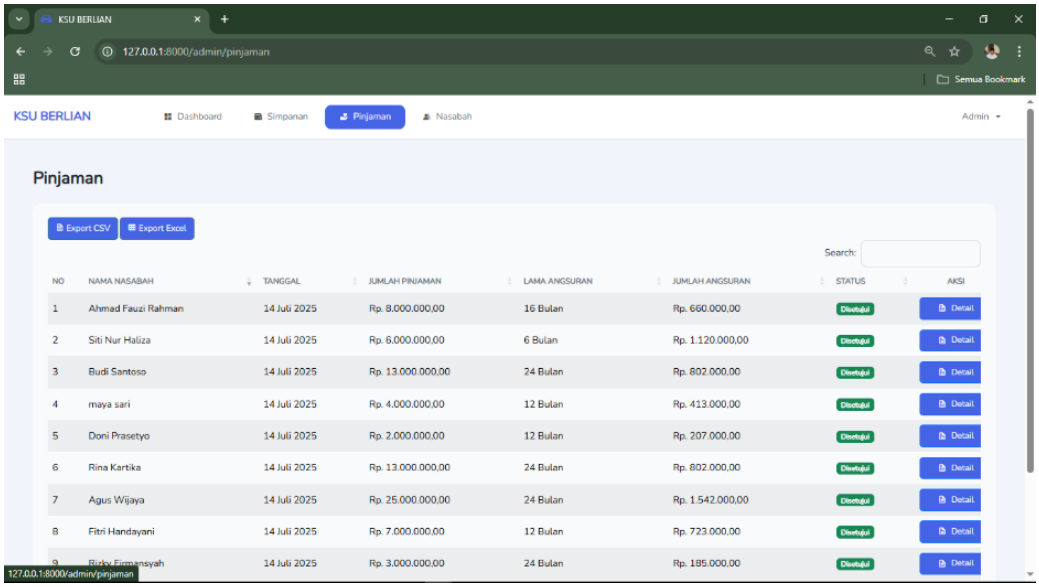

Figure 3. Pimpinan Account Interface

2. **Admin Account Interface Testing**

An extensive literature review was conducted by analyzing relevant books, scientific articles, research journals, and academic theses related to credit application systems, cooperative management, and the Laravel framework. This approach was essential to establish a theoretical foundation for the system design and to identify best practices in web-based credit application development.

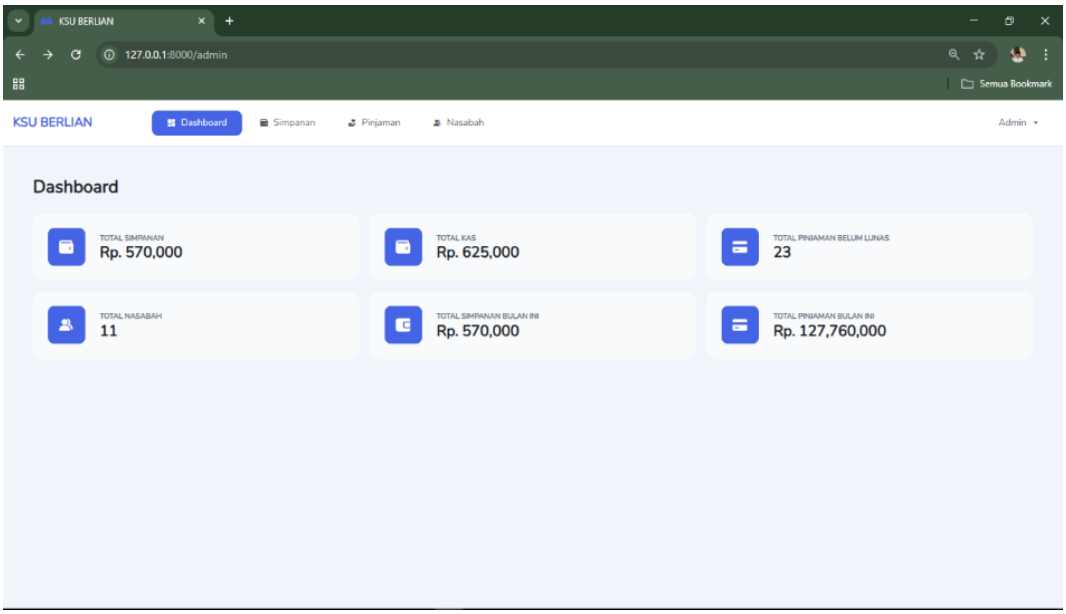

Figure 4. Admin Account Interface

3. **Nasabah Account Interface Testing**

Testing on the Nasabah (Member) account interface verified that the login process successfully authenticated members and provided clear feedback on

login errors. The Member Dashboard displayed a user-friendly summary of personal financial data, including loan balances and savings information. The Savings History page allowed members to track their deposits and transaction histories in a structured and easily navigable format. Similarly, the Loan History interface accurately presented both active and completed loans, alongside a clear installment payment history. The overall interface was designed for ease of use, ensuring members could access essential financial information conveniently.

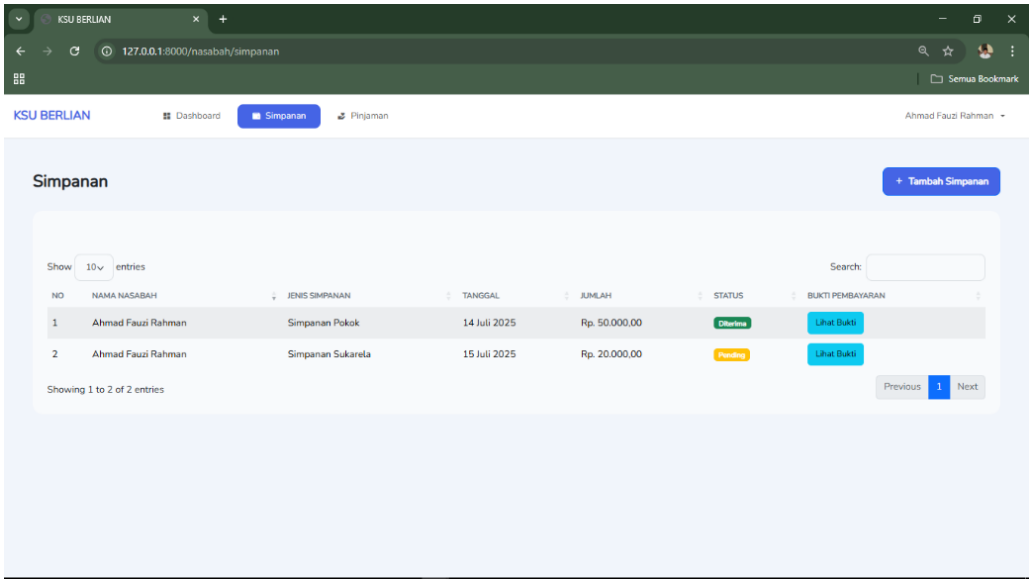

Figure 5. Nasabah Account Interface

3.2 Overall Testing Result

Across all user roles, the application interfaces performed according to design expectations, with an intuitive navigation structure and responsive layouts for both desktop and mobile platforms. Loading speeds were satisfactory, and all interactive elements functioned correctly without critical bugs. The WhatsApp notification system was also tested and validated, successfully delivering automated payment reminders. User Acceptance Testing (UAT) resulted in a high satisfaction score of 82.78%, indicating that the application's interface met user needs in terms of usability, functionality, and visual clarity.

4. Conclusion

This study successfully designed and implemented a web-based Credit Application Submission System at KSU Berlian using the Laravel Framework, addressing inefficiencies in manual credit processes such as slow transactions, data inaccuracies, and a high non-performing loan (NPL) rate. The system, developed through the Waterfall method, integrates features like online credit submission,

automated WhatsApp notifications, and comprehensive data management dashboards. User Acceptance Testing (UAT) yielded a satisfaction score of 82.78%, indicating significant improvements in data processing efficiency, ease of remote access for members, and enhanced decision-making capabilities for management. Additionally, the system demonstrated potential in reducing NPL rates through proactive monitoring and streamlined communication. Despite these achievements, future development is recommended to include predictive analytics for credit risk assessment, broader scalability for multi-branch cooperatives, and robust data security measures to align with data privacy regulations, thereby reinforcing the system's role in accelerating digital transformation within the microfinance sector.

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