OPEN ACCESS
Journal of Computer Science Advancements
Vol. 3 No. 6. December 2025, pp. 321-329 DOI. 10.70177/jsca.v3i6.2416

Research Article

WEB-BASED FINANCIAL MANAGEMENT INFORMATION SYSTEM FOR MSMES USING RAD METHOD

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Article Info

Received: June 5, 2025
Revised: September 15, 2025
Accepted: November 20, 2025
Online Version: December 15, 2025

Abstract

Micro, Small, and Medium Enterprises (MSMEs), such as the Sukamurni Cracker Factory, often rely on manual financial recording, a practice prone to human error, data loss, and significant inefficiencies in generating financial reports. This research addresses these challenges by developing a web-based financial management information system tailored to the operational needs of MSMEs. The primary objective was to design and implement a system that improves the effectiveness, efficiency, and accuracy of financial record-keeping. The study employed the Rapid Application Development (RAD) methodology, encompassing requirements planning, user design, rapid construction, and system validation. The resulting system was built using the Laravel framework, PHP programming language, and a MySQL database. Functional validation was conducted through Black Box testing, which confirmed that all system modules including income and expense tracking, automated report generation, and role-based access control for Admins and Staff operate as specified. The novelty of this work lies in its practical application of the RAD model to create a user-centric and rapidly deployable solution for a resource-constrained MSME environment. This research provides a functional model for digital transformation in small-scale businesses, demonstrating that a well-designed system can significantly enhance operational efficiency and support strategic decision-making.

Keywords: Black Box, Information System, Laravel, MySQL, PHP

Journal Homepage	https://research.adra.ac.id/index.php/jcsa
How to cite:	Hamidi, S. A., Hashimi, F. U., & Rahmati, A. (2025). Web-Based Financial Management Information System for Msmes Using Rad Method. *Journal of Computer Science Advancements, 3*(6), 321-329. https://doi.org/10.70177/jsca.v3i6.2416
Published by:	Yayasan Adra Karima Hubbi

INTRODUCTION

In the current digital era, the adoption of information technology has become a critical component of business management, including financial record-keeping (Saleem et al., 2025). However, many Micro, Small, and Medium Enterprises (MSMEs) still utilize manual methods, such as physical logbooks, for their financial transactions (Bagozi et al., 2026). This approach presents numerous weaknesses, including a high risk of recording errors, potential data loss, and difficulties in conducting timely financial evaluations (Hidayatika et al., 2024). Manual financial recording is highly susceptible to issues like data loss or damage, which complicates an owner's ability to make strategic long-term decisions (Nababan & Margaretha, 2020). As a business grows, a robust system for managing income and expenditure reports becomes essential to accurately display information about the company's assets (Three et al., 2021). This need for digitalization is not unique to for-profit enterprises but is also prevalent in non-profit and community-based organizations, such as foundations (Dharmawan, 2023) and churches (Panja & Manongga, 2023), highlighting a widespread need for accessible financial management tools.

The transition to a web-based information system offers a relevant solution to these problems, providing accessibility across various devices without being tied to a specific machine (Rohman et al., 2022). The Sukamurni Cracker Factory, the case study for this research, handles over 7,600 transactions annually (Ahmed et al., 2025). Managing this volume manually is time-consuming and risks inaccuracies (Walek & Müller, 2025). The implementation of a digital system with distinct user access levels has been shown to enhance work effectiveness and financial transparency (Susilo et al., 2023). Therefore, The purpose of this research is to design and implement a web-based financial management information system adapted to the requirements of the Sukamurni Cracker Factory, offering a structured, efficient, and accurate solution for financial management.

RESEARCH METHOD

Research Design

The selection of the RAD model was a strategic decision aligned with the MSME context. The RAD model's emphasis on speed and flexibility makes it a practical alternative to longer, more rigid traditional models like Waterfall (Sumirat et al., 2023). This approach facilitates rapid development and incorporates active user involvement, which is ideal for non-technical stakeholders. The system itself is a form of Management Information System (MIS), designed to provide information that supports operational activities, managerial functions, and decision-making processes within an organization (Imamuddin, 2023). It directly aids the core functions of management, such as planning, organizing, directing, and controlling (Widiana, 2020).

Research Target/Subject

The target of this research is the Sukamurni Cracker Factory, an MSME located in West Jakarta (Mehta et al., 2025). The research subjects were the personnel directly involved in the factory's financial management processes (Sasmoko et al., 2024). This included the financial staff responsible for daily bookkeeping and the business owner, who acted as the primary informants during the data collection phase through interviews and direct observation of their manual workflow.

Research Procedure

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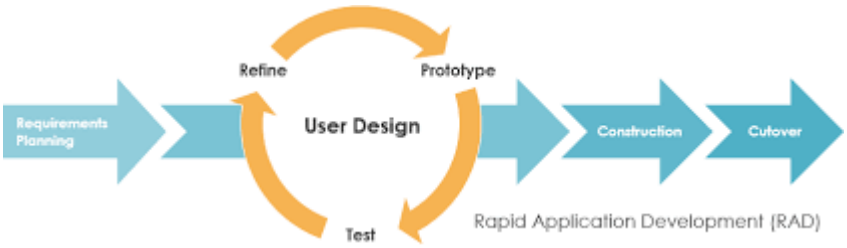

Figure 1. Stage Rapid Aplication Development

The system development procedure in this study follows several structured phases to ensure effective implementation. The process begins with the requirements planning phase, which involves a thorough analysis of existing manual processes at the Sukamurni Cracker Factory (Gwizdalski, 2025). Through direct interviews and observations, key problems are identified to define both functional and non-functional system requirements. This is followed by the user design phase, where the identified requirements are translated into system models and interface prototypes (Pérez-Mercado et al., 2023). Unified Modeling Language (UML) is used to design the system architecture, including use case, activity, and sequence diagrams (Rusli & Triandini, 2022). The next phase is rapid construction, in which the system design is implemented as a functional prototype through coding using the Laravel framework, PHP, and a MySQL database (Siswanto, 2023; Fitri, 2020). The prototype is developed iteratively to allow continuous improvements based on user feedback. Finally, the cutover phase involves deploying the system into the user's operational environment (Gómez-Valverde et al., 2024), including installation, final testing, and user training to ensure a smooth transition and effective system adoption.

Data Collection Techniques

Data collection was conducted through direct observation and semi-structured interviews (Hartini et al., 2025). To evaluate the system's functionality, the Black Box Testing approach was applied, focusing on user-oriented performance assessment without reference to the internal code structure, thereby ensuring compliance with the specified requirements (Fithrie, 2024).

RESULTS AND DISCUSSION

The development process resulted in a web-based financial management information system designed to address the inefficiencies of the manual recording process at the Sukamurni Cracker Factory (Karami et al., 2024). The system architecture supports a multi-user environment with two distinct roles: Admin and Staff (Xiao et al., 2023). The Admin role has full access to all system functionalities, including user management and comprehensive financial reports (Radhitanti et al., 2025). The Staff role has limited access for daily operational tasks. This Role-Based Access Control (RBAC) directly addresses the lack of control identified in the old system (Ahmed et al., 2026). The core functionalities are visualized in the Use Case

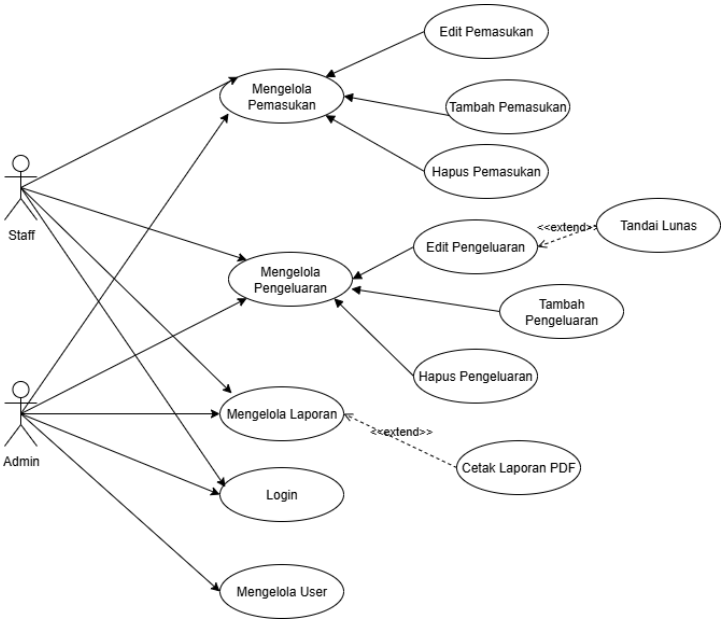

Figure 2. Usecase Diagram

Figure 2 presents the Use Case Diagram of the system, which illustrates the interactions between users and the system's main functionalities. It identifies key actors and their roles in performing tasks such as data management, process execution, and system monitoring. The diagram provides a clear overview of how users engage with the system to ensure efficient and organized operations.

The system's implementation yielded several core modules:

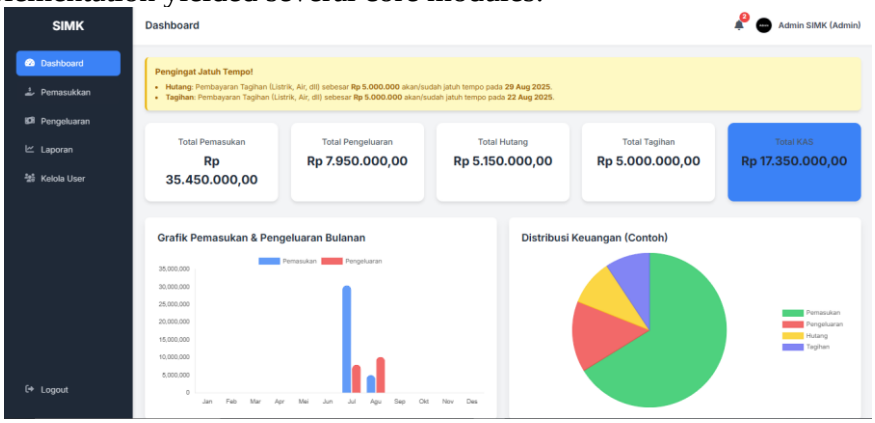

Figure 3. Dashboard

Figure 3. Dashboard: A central hub providing a real-time financial summary and automated notifications for upcoming payments. Figure 3 displays the Dashboard, which serves as a centralized hub for users to access real-time financial information. It provides an up-to-date summary of the user's financial status, including balances, expenditures, and any outstanding amounts. This streamlined view helps users quickly assess their financial health at any given moment. In addition, the Dashboard is equipped with automated notifications, alerting users about upcoming payments or deadlines. These timely reminders ensure that users stay on top of their financial commitments, reducing the risk of missed payments and promoting better financial management. Overall, the Dashboard enhances user convenience by offering a comprehensive, easily accessible overview of their financial situation.

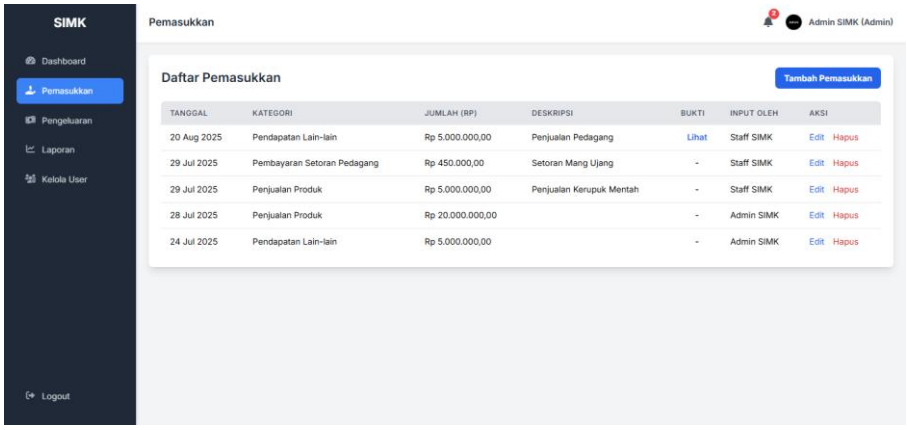

Figure 4. Income Transaction

Figure 4 presents the Income Transaction view of the system, which records and manages incoming financial transactions. This view typically includes details such as transaction date, amount, source of income, and related notes, allowing users to track revenue accurately. It supports effective financial management by ensuring that all income data is properly documented and organized.

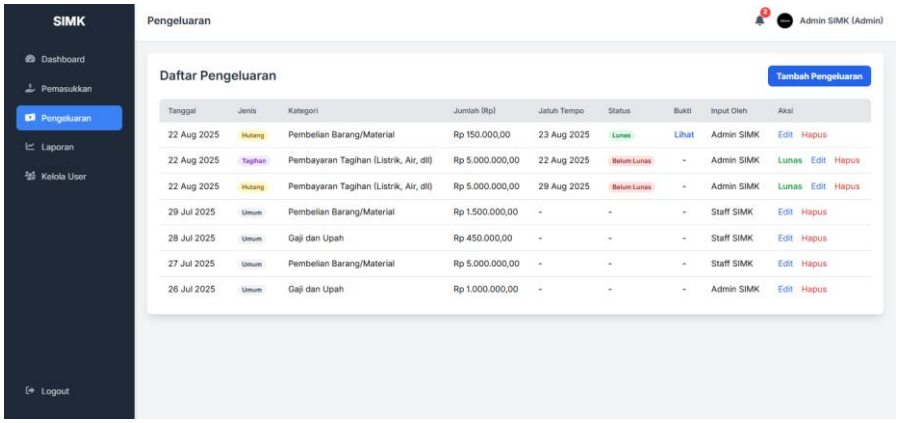

Figure 5. Expenses Transaction

Figure 5 presents the Expenses Transaction view of the system, which records and manages outgoing financial transactions. This view typically includes details such as transaction date, expense category, amount, and descriptions, allowing users to track expenditures accurately. It supports effective financial control by ensuring that all expense data is well-documented and easily monitored.

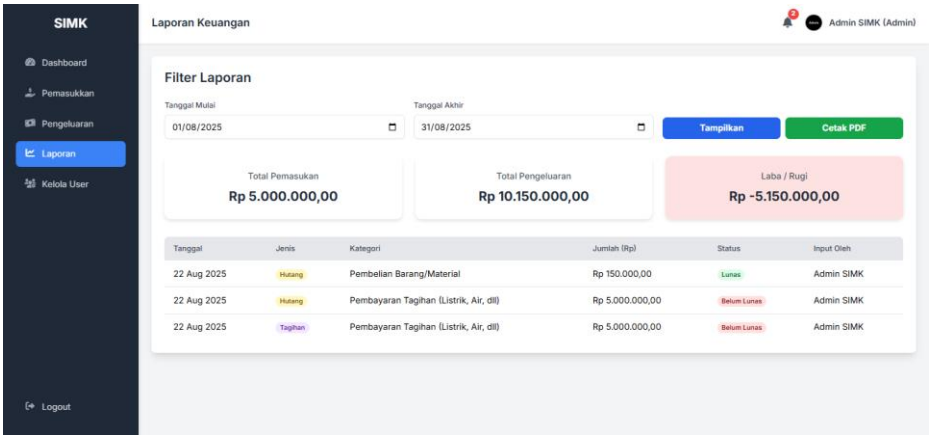

Figure 6. Report Menu

The system was validated using Black Box Testing. A total of 21 test scenarios were designed to cover the full spectrum of system features (Hany Fawzy et al., 2023). The test results, summarized in Table 1, confirmed that all scenarios were successful, and the system was declared functionally valid. A key test confirmed the effectiveness of access control, where a Staff user's attempt to access the user management page was correctly blocked with a 403 (Forbidden) error

Table 1. Black Box Testing Method

No.	Test Scenario	Expected Output	Actual Output	Status
1	Successful Admin Login	System displays the admin dashboard.	Admin dashboard was displayed.	Valid
2	Failed Login (Wrong Password)	System denies login and shows an error message.	Login was denied; error message appeared.	Valid
3	Add Income Transaction	Data is saved and appears in the income list.	Data was successfully saved and displayed.	Valid
4	Edit Expense Transaction	Changes are saved and updated in the list.	Data was successfully updated.	Valid
5	Delete Transaction	Data is removed from the system after confirmation.	Data was successfully deleted.	Valid
6	Mark Debt as "Paid"	The status of the debt transaction changes to "Paid".	Status successfully changed to "Paid".	Valid
7	Generate and Print Report	System generates a downloadable PDF report for the selected period.	A PDF file was successfully generated and downloaded.	Valid
8	Admin Adds a New User	The new user account is created and listed.	New user was successfully added.	Valid
9	Staff Access to User Management	Access is denied (Error 403).	Access was denied with a 403 error.	Valid
10	Due Date Notification	A notification for an upcoming payment appears on the dashboard.	Notification appeared correctly.	Valid

Table 1 outlines the results of black box testing for the web-based financial management system at the Sukamurni Cracker Factory. Each test scenario was executed to verify the system's functionality, with the actual outputs aligning perfectly with the expected results, confirming the system's reliability. Successful operations such as admin login, transaction management, and report generation were all carried out as expected, while error handling, like failed logins and restricted access, also performed correctly. This testing ensures that the system meets its operational goals, and future improvements could include adding features like data visualization, expanded export options, and an accounts receivable management module to further enhance its effectiveness.

CONCLUSION

This research successfully developed a web-based financial management information system that effectively addresses the operational inefficiencies of manual recording at the Sukamurni Cracker Factory. The application of the Rapid Application Development (RAD) methodology proved to be a highly suitable framework for developing an agile, user-centered solution within the MSME context. For future development, it is recommended to add features such as data visualization through graphs, expanded data export options, and a module for accounts receivable management.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Methodology; Software; Formal analysis; Investigation; Data curation; Writing original draft; Visualization.

Author 2: Conceptualization; Conceptualization; Supervision; Validation; Writing – review & editing; Project administration.

Author 3: Supervision; Validation; Writing review & editing.

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