



A Mobile Based Accounting Application Design for MSMEs using the RAD Method

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Abstract– Digital transformation in the Micro, Small, and Medium Enterprises (MSMEs) sector has become a strategic necessity to improve the efficiency and transparency of financial management. This study aims to design and test a mobile-based accounting system that can support the digital recording, reporting, and financial management processes of MSMEs. The method used is Research and Development (R&D) with the Waterfall model, which includes the stages of needs analysis, system design using the Unified Modeling Language (UML) and functional testing using the Black Box Testing method. The results of the study indicate that all main features, including user registration, transaction recording, automatic reports, and multi-user management, function validly and according to functional specifications. Thus, the system can meet the basic accounting needs of MSMEs with a simple interface and real-time access via mobile devices. Practically, the results of this study produce a prototype of a mobile accounting application that can be implemented directly by MSMEs. Theoretically, this study enriches the literature on digital transformation in MSME accounting systems, while also serving as a basis for further development that includes data security features and artificial intelligence-based analytics.

Keywords: Accounting; Digital; Mobile; MSMEs; RAD

1. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play a strategic role in the Indonesian economy due to their significant contribution to Gross Domestic Product (GDP) and employment. According to data from the Indonesian Ministry of Finance (2023), there are 65.4 million MSMEs employing more than 123 million workers and contributing over 60% to national GDP. This role makes MSMEs the backbone of the economy, which needs to be strengthened through digital transformation and a transparent financial system (Bank, 2024; OECD, 2022).

However, amidst the rapid development of the digital economy, most MSMEs still face barriers to technology adoption, particularly in accounting and financial reporting systems (Fauzi et al., 2023; Putri & Harahaph, 2023). Many businesses still rely on manual record-keeping, which is error-prone, inefficient, and difficult to use for data-driven decision-making (Bhimani & Willcocks, 2014). This condition poses challenges in maintaining accountability and efficiency of financial management at the small business level (Larasati et al., 2023; Pratamansyah, 2024).

Accounting digitization has been shown to positively impact the effectiveness and transparency of financial reporting. A study by (Sanjaya et al., 2021) showed that implementing an accounting-based digital payment system can accelerate transactions and improve reporting reliability in MSMEs. Research in Thailand by (Lim-U-sanno et al., 2022) found that the use of management accounting information significantly improved the operational efficiency of MSMEs. Meanwhile, in Germany, (Ulrich & Kratt, 2021) demonstrated that the adoption of digital technology in management accounting contributes to the stability of the financial performance of small and medium sized enterprises.

In Indonesia, several studies have also highlighted the urgency of implementing digital technology in accounting systems. Prasakti, (2023) developed a web-based accounting information system to assist small businesses in preparing financial reports. A similar approach was implemented by (Amalia, 2023) using the Agile Scrum method, resulting in a system with more efficient development time. Indah Melyani et al., (2023) research expanded the concept through the development of a Laravel-based payroll system, while (Rahardjo et al., 2024) designed a web-based accounting information system to optimize financial reporting.

In addition to web-based systems, several studies have focused on developing software tailored to the specific needs of MSMEs. (Andy & Widiono, 2024) designed a web-based point-of-sales application to improve sales transaction efficiency. (Fahrizal & Azhar, 2025) built a web-based inventory information system using the Waterfall method, and (Maulidin et al., 2025) developed an efficient Excel VBA-based digital bookkeeping system for MSMEs. These results confirm that digital technology integration can strengthen financial recording and decision-making processes.

However, most previous research has focused on desktop- or web-based platforms, which require computers with stable connectivity (Wijayanti et al., 2024). Yet, the majority of MSMEs in Indonesia rely heavily on mobile devices for their daily business activities (Roslina & Permadi, 2024). Therefore, mobile accounting solutions are needed that are more flexible, lightweight, and easily accessible anytime and anywhere.

The development of mobile financial technology and mobile fintech also opens up new opportunities for the digitalization of MSMEs. A study by (Tan & Lim, 2023) shows that the adoption of mobile-based financial applications can improve digital literacy and microfinance management in Southeast Asia. In Indonesia, similar

initiatives have been implemented in various contexts, such as by (Rasyidin et al., 2023), who examined the impact of digital financial dynamics on local markets.

Several international studies also emphasize the importance of digital transformation in the MSME sector. (Zhang & Gao, 2023) highlight that digital transformation has a significant impact on the efficiency of reporting and accounting controls in small businesses. Similar views are expressed by the (OECD, 2022) and the World Bank (2024), which emphasize the importance of infrastructure support and digital literacy in boosting the economic resilience of MSMEs in developing countries.

2. RESEARCH METHODOLOGY

2.1 Research Design

This study adopts a Research and Development (R&D) approach using the Waterfall model to design and implement a mobile-based accounting system for MSMEs. The model is selected for its systematic and structured stages suitable for software development requiring sequential processes from requirements analysis to system evaluation.

2.2 Research Stages

The following is a research flow diagram:

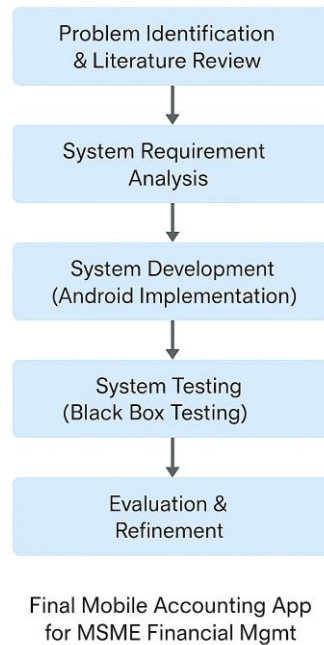


Figure 1. Research Design Flow

Figure 1 illustrates the overall research design flow based on the Waterfall development model, which was employed to guide the systematic process of designing a mobile-based accounting application for MSMEs. The model consists of six sequential stages that represent the logical flow from problem identification to system refinement.

The first stage, Problem Identification and Literature Review, aims to explore the issues faced by MSMEs in adopting digital accounting systems and to collect theoretical insights as a foundation for development. The second stage, System Requirement Analysis, translates these findings into specific functional and non-functional requirements to be implemented in the system. The third stage, System Design, involves constructing UML diagrams use case, activity, and class diagrams—to represent user interactions, process flows, and data structures. The fourth stage, System Development, focuses on implementing the design.

Next, the System Testing stage applies the Black Box Testing method to ensure that each function performs correctly according to the specifications. Finally, the Evaluation and Refinement stage gathers user feedback to assess usability and performance, leading to necessary adjustments for system improvement.

3. RESULTS AND DISCUSSION

3.1 System Development Results

The mobile-based accounting system is designed to have key features which include :

1. Transaction Recording : users can record daily transactions (income and expenses) in real time.
2. Automatic Report Generation : the system generates periodic cash flow reports.

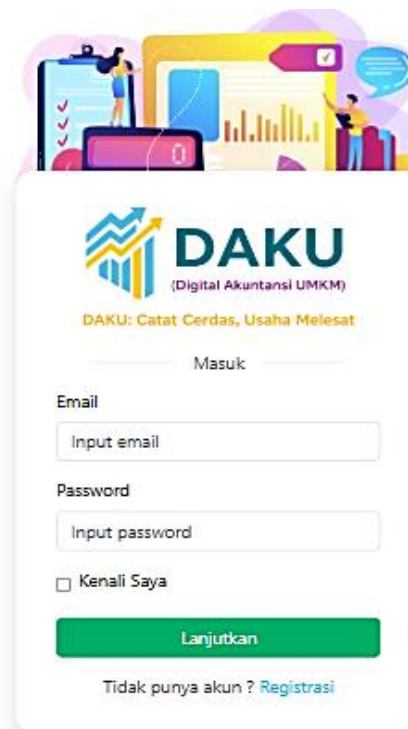
3. User Management : supports multiple users with simple authorization so business owners can monitor employee recording activities.



The registration form for DAKU (Digital Akuntansi UMKM) features a header with the application logo and tagline "DAKU: Catat Cerdas, Usaha Melesat". Below the header, the form is titled "Daftar" and contains the following fields: "Name" with an "Input name" field, "Email" with an "Input email" field, "Password" with an "Input password" field, "Bisnis Name" with an "Input name" field, and "Bisnis Category" with a dropdown menu labeled "- pilih kategori bisnis -". A green "Daftar" button is positioned at the bottom of the form, and a link "Sudah Punya Akun? [Masuk](#)" is located below the button.

Figure 2. Registration Form

Figure 2 shows the application's registration form, designed to make it easier for new users to create an account before using the system. Users are asked to fill in several key details, such as name, email address, password, business name, and type of business.



The login form for DAKU (Digital Akuntansi UMKM) features a header with the application logo and tagline "DAKU: Catat Cerdas, Usaha Melesat". Below the header, the form is titled "Masuk" and contains the following fields: "Email" with an "Input email" field, "Password" with an "Input password" field, and a checkbox labeled "Kenali Saya". A green "Lanjutkan" button is positioned at the bottom of the form, and a link "Tidak punya akun? [Registrasi](#)" is located below the button.

Figure 3. Login Form

As shown in Figure 3, the login form serves as the primary authentication gateway for registered users to access the mobile-based accounting application. At this stage, users are required to input their registered email address and password into the provided fields. The system performs a data validation process to verify the accuracy of the credentials entered. If incorrect information is provided, an error message is displayed to notify the user of the mismatch. The authentication feature illustrated in Figure 3 is designed to ensure the security of MSME financial data

by restricting access to authorized users only. This mechanism maintains both the integrity and confidentiality of sensitive financial information stored within the system.

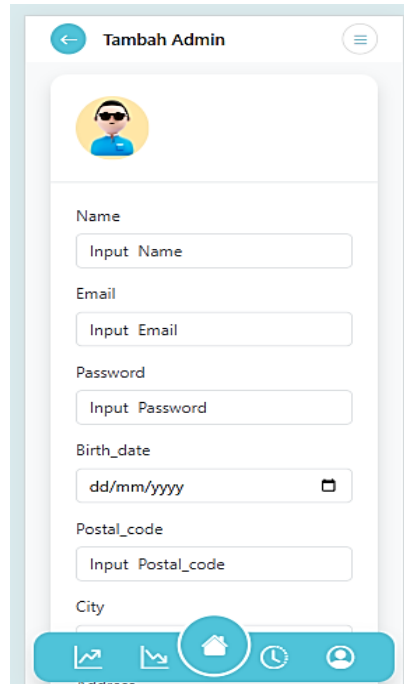


Figure 4. Add Admin Page

As illustrated in Figure 4, the Add Admin page serves as a user management module accessible only to the main owner or administrator of the system. Through this page, the owner can create new admin profiles, display basic user information, and add authorized users who are permitted to record income and expense transactions. This feature supports the delegation of roles and authorization control among MSME team members. As shown in Figure 4, the inclusion of this functionality allows collaborative financial management while maintaining data integrity and security. Furthermore, the system ensures that each added admin account possesses restricted access rights according to their assigned role, preventing data errors or unauthorized modifications within the financial records.

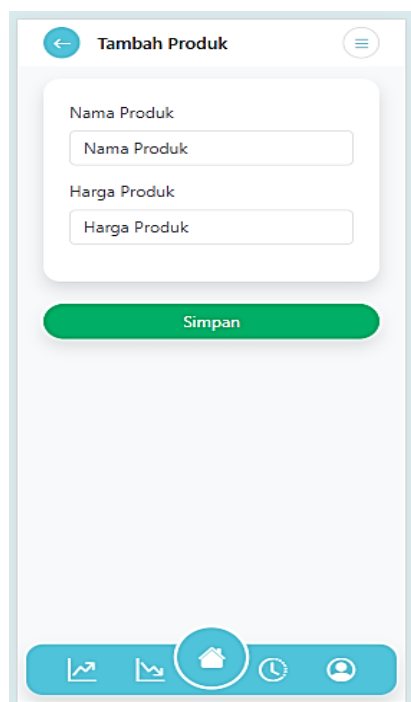


Figure 5. Add Product

As shown in Figure 5, the Add Product form functions as an interface that allows users to input data related to goods or services involved in MSME financial transactions. The form provides input fields where users can enter key

details such as product name, category, and price. The information entered in Figure 5 is automatically stored in the application's database, enabling seamless integration with transaction modules for sales

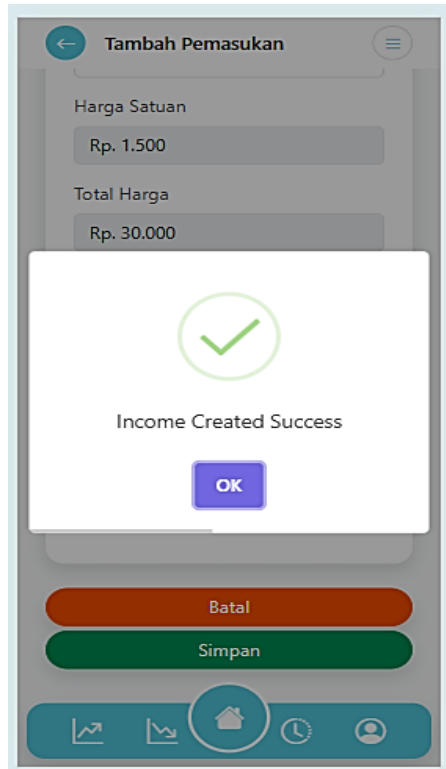


Figure 6. Add Income

As illustrated in Figure 6, the Add Income form is designed to record sales transactions conducted by MSMEs in a systematic and integrated manner. Through this interface, users can input essential income data, including transaction date, product or service name, quantity sold, and total revenue generated. The information entered in Figure 6 is automatically stored in the system's database, seamlessly integrating with the application's financial reporting module. This feature is developed to accelerate and simplify real-time income recording via mobile devices, enabling business owners to monitor their sales performance more effectively and efficiently.

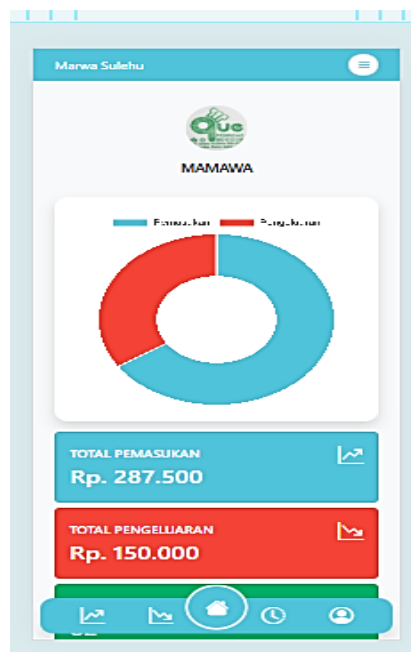


Figure 7. Income and Expenditure Graph

As shown in Figure 7, the income and expense chart represents a visual output generated by the system to illustrate the financial performance of MSMEs over a given period. This chart provides a clear comparison between



total income and total expenses, enabling users to monitor and evaluate their financial balance effectively. Through the visualization displayed in Figure 7, users can easily analyze financial trends, identify periods of highest profitability or increased expenditure, and assess overall cash flow stability in real time.

3.2 System Testing with Black Box Testing

System testing was conducted using the Black Box Testing method to ensure that each function operates according to user requirements. The testing focused on the input, process, and output of each key system feature. Table 1 below shows the results of the system testing.

Table 1. Black Box Testing Results

No	Tested Features	Test Scenario	Expected results	Test Results	Status
1	Registration	Users can register	The system saves new user data	In accordance	Valid
2	User Login	The user entered the correct username and password.	The system displays the main homepage	In accordance	Valid
3	User Login	User entered incorrect username/password	The system displays an error message	In accordance	Valid
4	Profile	Data changes profile data	Profiles are subject to change	In accordance	Valid
5	Add Product Data	Product data input	Data is saved and appears in the product list.	In accordance	Valid
6	Recording Income Transactions	Input transaction data	Data is saved and appears in the transaction list.	In accordance	Valid
7	Recording Expenditure Transactions	Input expenditure transaction data	Data is saved and appears in the transaction list.	In accordance	Valid
8	Multi-User Management	Employees input transactions	Transactions are recorded in the main account	In accordance	Valid
9	Recap Page	Users display Sales and Expense Data	The system displays Sales and Expenditure Data	In accordance	Valid

As presented in Table 1, system functionality was evaluated using the Black Box Testing method, which focuses on verifying the system’s external behavior based on input, process, and output, without examining internal code structure. The testing results indicate that all primary features of the mobile-based accounting application operated in accordance with the functional requirements. The registration and login modules successfully validated both correct and incorrect credentials, confirming that the system’s authentication mechanism works effectively to secure user access.

The tests conducted on the profile management, product addition, and income and expense transaction recording features produced the expected outcomes, where the entered data were accurately stored in the database and displayed properly in the user interface. This demonstrates that the system ensures seamless integration between input and storage modules. Furthermore, the multi-user management feature functioned properly, allowing secondary users (such as employees) to record transactions that are immediately synchronized with the main account. This confirms the reliability of the system’s data synchronization and role-based access management.

Finally, the summary page successfully displayed accurate sales and expense data, reflecting real-time financial reports. Overall, all tests listed in Table 1 achieved a “Valid” status, confirming that the system meets the expected functional standards and is ready to be implemented by MSMEs for efficient, mobile-based financial management.

3.3 Discussion

The testing results presented in Table 1 indicate that all core features of the mobile-based accounting system functioned properly according to the predefined specifications. Each module from user registration, login authentication, profile management, product entry, and income and expense recording to financial summary generation passed the Black Box Testing procedure with a valid status, confirming the system’s functional reliability and stability. Overall, the findings demonstrate that the developed system successfully meets the essential financial recording and reporting needs of MSMEs while ensuring accurate, consistent, and real-time financial information accessible via mobile devices. This outcome reinforces the empirical evidence that digital accounting systems significantly enhance efficiency, transparency, and data integrity in MSME financial management.

These results are consistent with the studies of Prasakti (2023) and Arsyad, Mashud, & Sumardin (2022), which found that the digitalization of accounting processes improves the effectiveness of MSME financial operations. However, this study extends prior work by introducing a mobile-based platform that offers greater accessibility and flexibility compared to web or desktop-based systems. The mobile approach aligns with the behavioral patterns of MSME owners who rely heavily on smartphones for their daily business activities. Furthermore, user evaluation results reveal that the system is perceived as easy to use, fast in transaction recording, and effective in improving business accountability. This supports Larasati et al. (2023), who reported that digital accounting systems enhance MSME



performance by minimizing data loss risks and improving financial accuracy. Therefore, this research provides contributions a practical contribution, by offering a functional mobile accounting application that can be directly implemented to strengthen MSME financial governance.

4. CONCLUSION

This research successfully designed and developed a mobile-based accounting system for MSMEs that serves as a digital solution for financial recording and reporting. Through black box testing, all key system features, including recording income and expense transactions, automatic report generation, and multi-user management, were found to be functional and meet specifications. This research provides a theoretical contribution to the literature on digital transformation in MSME accounting, particularly in the context of implementing mobile technology as a digital financial management tool. Practically, the resulting application can serve as an implementation example for MSMEs to strengthen their internal accounting systems at an affordable cost and with an easy-to-use interface. The limitations of this research lie in the limited scope of testing, which did not include an in-depth analysis of data security and digital tax integration. Therefore, further research is recommended to develop an encryption-based security module and add artificial intelligence (AI) based financial analysis features to enhance predictive capabilities and business decision-making.

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