

Supporting Small-Scale Investors Through a User-Driven Investment Lifecycle Web App

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ABSTRACT

Small-scale investors often face significant challenges in managing their investment projects, primarily due to a lack of sophisticated and accessible tools. This deficiency frequently leads to operational inefficiencies and suboptimal financial outcomes. This paper details the design, implementation, and evaluation of "Digital Investment Manager," a user-centric web application tailored specifically for the lifecycle management of small-scale investments. Adhering to an iterative development approach guided by User-Centered Design (UCD) principles, we initiated our research with a comprehensive user needs analysis. This involved conducting semi-structured interviews with 15 small-scale investors to identify key requirements, including integrated project tracking, detailed financial monitoring, and automated status updates. The application was subsequently developed using the PHP Laravel framework, which implements a Model-View-Controller (MVC) architecture, alongside Bootstrap for responsive design, Chart.js for data visualization, and MySQL for database management. To validate its effectiveness, we conducted usability testing with 12 participants, employing the System Usability Scale (SUS), which yielded a score of 78.5, indicating favorable usability. The final application successfully integrates investment project management, financial transaction tracking, automated status updates driven by financial progress, and performance visualization into a single, cohesive platform. This research contributes a practical solution that enhances efficiency, transparency, and decision-making capabilities for small-scale investors. Furthermore, it provides empirical insights into technology adoption within this underserved market segment.

Keywords: Financial Technology, Laravel, Small-Scale Investors, User-Centered Design, Web Application.

1. INTRODUCTION

The management of small to medium-scale investment projects presents a distinct set of challenges that are often overlooked by mainstream financial technology solutions. Individual investors and those managing private portfolios frequently operate without sophisticated tools, instead relying on manual methods such as spreadsheets or physical ledgers (Stevens, 2024). This lack of specialized support leads to significant operational inefficiencies, including unsystematic record-keeping, inadequate real-time progress monitoring, and a limited ability to perform the comprehensive performance analysis essential for effective decision-making and risk management (Klammer, 2025). Consequently, these administrative burdens can directly compromise the quality of strategic choices and, ultimately, the financial outcomes of their ventures.

This problem is particularly acute in emerging economies like Indonesia, where capital markets, despite their growth potential, are often characterized by volatility and limited participation from domestic retail investors (Lestari et al., 2024). In this context, small-scale investors face compounded difficulties arising from constraints in capital, access to timely

information, and financial literacy. The absence of accessible and well-designed digital tools exacerbates these challenges, creating a significant barrier to effective investment management and hindering the broader goal of enhancing financial inclusion. While various software solutions exist, they often represent a poor fit for this user segment. Enterprise Resource Planning (ERP) systems are typically prohibitively complex and expensive, whereas generic accounting applications lack the specific functionalities required for dynamic investment project lifecycle management. This situation reveals a critical research gap: the need for an affordable, intuitive, and tailored tool designed specifically for the nuanced demands of small-scale investment management.

To address this gap, this paper presents the design, implementation, and evaluation of the Digital Investment Manager, a user-centric web application for managing the entire lifecycle of small-scale investment projects. This research seeks to answer the following question: To what extent does an integrated, user-centric web application improve the perceived efficiency and decision-making confidence of small-scale investors? To investigate this, we pursued a multi-phase study that encompassed user needs analysis, iterative development, and a mixed-methods usability evaluation.

This research contributes a validated, practical solution for small-scale investors, an underserved user group. The resulting web application, which achieved a favorable System Usability Scale (SUS) score of 78.5, serves as a case study for applying an MVC architecture and data visualization to this specific financial domain. Furthermore, this study presents empirical findings from user interviews, offering a structured understanding of this segment's technological requirements to inform the design of future financial technology tools for non-expert users.

This paper is structured as follows. We begin by reviewing related work in investment management tools and user-centric financial applications. Next, we detail our methodology, covering the user needs analysis, system design, and architectural decisions. We then present the results of our implementation and the subsequent user evaluation. Finally, we discuss the implications and limitations of our work and propose directions for future research.

2. RELATED WORK

To properly contextualize the contribution of the Digital Investment Manager, it is essential to analyze the landscape of existing tools available to small-scale investors. This landscape can be broadly categorized into professional-grade systems, adjacent digital tools designed for different purposes, and prevalent manual practices. Our analysis reveals a significant gap in tools specifically designed to support the private investment project lifecycle.

2.1 Professional and Commercial Systems

The software market offers a range of sophisticated solutions for financial and project management. Open-source Enterprise Resource Planning (ERP) systems like Odoo and ERPNext provide comprehensive, modular functionalities, including accounting and basic project management (Putra, 2019). Similarly, commercial investment management platforms,

particularly in sectors like real estate (e.g., Appfolio, InvestNext), offer powerful features such as investor portals and the automated calculation of complex return structures (Stevens, 2024).

However, these professional-grade systems are ill-suited for the individual or small-scale investor. Their primary drawback is the significant overhead in both complexity and cost. Implementing and customizing an ERP system requires considerable technical expertise, while the extensive feature set is often excessive, or "overkill," for managing a small private portfolio. Furthermore, the subscription fees for commercial platforms, which can range from several hundred to over \$650 per month, render them economically unviable for our target user segment (Klammer, 2025).

2.2 Adjacent Digital Tools: Mismatched Functionalities

A second category of tools consists of applications that, while accessible, are designed for fundamentally different use cases.

- **DIY Portfolio Trackers:** Applications such as Sharesight and Ziggma are built for the modern retail investor who manages a portfolio of publicly traded assets like stocks, ETFs, and mutual funds (Klammer, 2025). Their core strength lies in tracking market performance, benchmarking against indices, and managing tax implications. However, their data models are predicated on standardized financial instruments and are thus ill-equipped to manage private, project-based investments. Such investments require the tracking of specific initial capital outlays, custom profit-sharing agreements (i.e., bagi hasil), and a project-defined lifecycle (e.g., funding a small business, a property renovation) rather than continuous market trading.
- **SME Accounting Applications:** In emerging markets like Indonesia, a plethora of free or freemium accounting applications (e.g., BukuWarung, Moodah, SI APIK) have gained popularity among small and medium-sized enterprises (SMEs) (Putra, 2019). These tools are highly effective for general bookkeeping, tracking daily operational transactions, and managing accounts payable and receivable. Their critical limitation, however, is the absence of a project-centric framework. They treat all financial flows as part of general business operations and lack the specific affordances needed to isolate an investment project, track its dedicated capital, monitor its unique lifecycle stages (e.g., Preparation, In-Progress, Completed), and calculate its specific return on investment.

2.3 The Prevalent Practice: Manual Spreadsheets

The most common "solution" for small-scale investment management remains the manual spreadsheet, using tools like Microsoft Excel or Google Sheets. While offering flexibility, spreadsheets introduce significant inefficiencies and risks. Existing research and practical observation highlight their key weaknesses: a lack of automation leading to time-consuming manual data entry; a high susceptibility to human error in data input and formula creation; limited scalability as a portfolio grows; and poor data visibility, which inhibits real-time analysis and effective decision-making (Mahesar, 2024). These limitations directly contribute to the operational friction and suboptimal outcomes identified in our problem statement.

2.4 Positioning the Digital Investment Manager

This review of the existing landscape reveals a clear and underserved niche. Current solutions are either too complex and costly (ERPs, commercial software), functionally mismatched (DIY portfolio trackers, SME accounting apps), or too rudimentary and error-prone (spreadsheets). There is a distinct lack of a tool that is both accessible and specifically tailored to the workflow of managing private, project-based investments.

The Digital Investment Manager is designed precisely to fill this gap. It differentiates itself from existing solutions by providing an integrated, project-centric platform that focuses on the entire investment lifecycle. By combining detailed project and transaction recording with automated status updates and performance visualization, our system directly addresses the core challenges of efficiency, transparency, and data-driven decision-making that small-scale investors currently face. It aims to provide the structure of professional software without the associated complexity and cost, and the flexibility of spreadsheets without the inherent risks of manual data management.

3. METHODS

Our research followed a three-phase methodology grounded in the principles of User-Centered Design (UCD) and an iterative development model. This approach ensured that the design and functionality of the Digital Investment Manager were directly informed by the needs of its target users and that its usability was empirically validated. The phases were: (1) user requirements analysis through semi-structured interviews, (2) iterative system design and implementation using synthesized design artifacts, and (3) a mixed-methods usability evaluation.

3.1 Understanding User Needs through Semi-Structured Interviews

The initial phase focused on deeply understanding the practices, challenges, and unmet needs of our target users.

- **Participants:** We recruited 15 small-scale investors from Indonesia. Participants were selected based on their experience in managing at least one private investment project, such as funding a small business, property development, or a joint-venture in agriculture. Their investment experience ranged from 1 to 7 years.
- **Procedure:** We conducted semi-structured interviews, each lasting approximately 45–60 minutes. The interview protocol was designed to elicit detailed narratives about their investment management workflows. Key questions explored how they track project finances, monitor progress against goals, calculate returns, manage multiple concurrent projects, and what tools (if any) they currently use.
- **Data Analysis:** The interviews were transcribed and analyzed using thematic analysis (Silaen, 2025). This process allowed us to identify recurring pain points and derive a set of core system requirements. The key functional requirements that emerged were:
 - **Centralized Project View:** A dashboard to view the status of all projects at a glance.

- Lifecycle Tracking: The ability to manage a project from inception to completion, including defining initial capital and profit-sharing rates.
- Granular Financial Recording: A dedicated feature to log diverse transactions, such as multiple sales from a single project or phased payments to investors.
- Automated Progress Updates: A mechanism to automatically update a project's status based on predefined financial milestones.
- Simplified Performance Visualization: Clear, intuitive charts to facilitate understanding of profitability without requiring advanced financial knowledge.

3.2 Design Artifacts from User

To explicitly connect the insights from our semi-structured interviews to our system's features, we synthesized the collected data into key design artifacts. These artifacts served as a guide for our development priorities.

- User Persona: We consolidated the characteristics of our interviewees into a representative persona, "Budi," to maintain a consistent focus on our target user throughout the design and development process.
 - Persona: Budi, The Part-Time Investor
 - Demographics: 35 years old, full-time professional, living in an urban area in Indonesia. Tech-savvy but not a developer.
 - Goals: To grow his passive income by investing in 2–3 small projects (e.g., funding a friend's coffee cart, a small property renovation). To have a clear, consolidated view of which projects are profitable without spending hours on spreadsheets.
 - Frustrations (Pain Points): "I lose track of payments and profits in different WhatsApp chats and Excel files." "I'm never 100% sure if a project is truly 'finished' or if I still owe someone money." "Creating performance charts manually is tedious and time-consuming."
 - Needs: A single platform to see everything. Automated reminders or status updates. Simple, visual reports.
- User Journey Map (Simplified): This artifact illustrates the intended transformation of Budi's workflow before and after adopting the Digital Investment Manager.

Table 1. Simplified User Journey Map

Stage	Before: Using Spreadsheets & Manual Tools	After: Using Digital Investment Manager
Project Setup	Creates a new, complex Excel file for each project. Worries about potential formula errors.	Fills out a simple form within the application. All calculations are handled automatically.

Tracking Transactions	Manually enters sales and payments. Data is often out of sync across different files.	Logs transactions on a mobile or desktop device. Data is updated in real-time across the system.
Monitoring Status	Subjectively guesses project status ("I think this one is almost done?").	Checks the dashboard to see clear, automated statuses (e.g., Ongoing, Completed).
Assessing Performance	Spends an hour or more updating charts and tables in Excel for a performance review.	Glances at the dashboard and instantly sees up-to-date performance graphs.

These artifacts ensured that key features, such as the automated status engine and the visual dashboard, directly addressed the documented frustrations of our target users.

3.3 Iterative System Design and Implementation

Guided by the requirements derived from our user analysis, we developed the Digital Investment Manager through an iterative process.

- **Architectural Design:** We adopted the Model-View-Controller (MVC) architectural pattern using the PHP Laravel framework. This choice was deliberate, as MVC promotes a clear separation of concerns, which enhances a system's modularity and maintainability—a crucial aspect for financial applications that may require future updates and scaling (Sunardi & Suharjito, 2019). The backend logic and data management (Controller and Model components) interact with a MySQL relational database designed to represent the core entities: Projects, Transactions, and Users.
 - **Key System Modules:** The implementation focused on building core modules that directly addressed the identified user needs:
 - **Dashboard:** Serves as the main landing page, providing a comprehensive overview of the investment portfolio. It utilizes Chart.js (*Chart.js*, n.d.) to render visualizations of capital growth, profit distribution, and project timelines.
 - **Project Management Module:** Allows users to create, edit, and monitor individual investment projects, defining key parameters such as initial capital and the agreed-upon profit-sharing ratio.
 - **Transaction Tracking Module:** A dedicated interface for recording all financial inflows (e.g., sales revenue) and outflows (e.g., operational costs, profit-sharing payments) linked to specific projects.
 - **Automated Status Engine:** Fig. 1 shows a backend process that evaluates financial transactions against project goals to automatically update its status

(e.g., Preparation, Ongoing, Phased Payout, Completed), thus reducing manual administrative work.

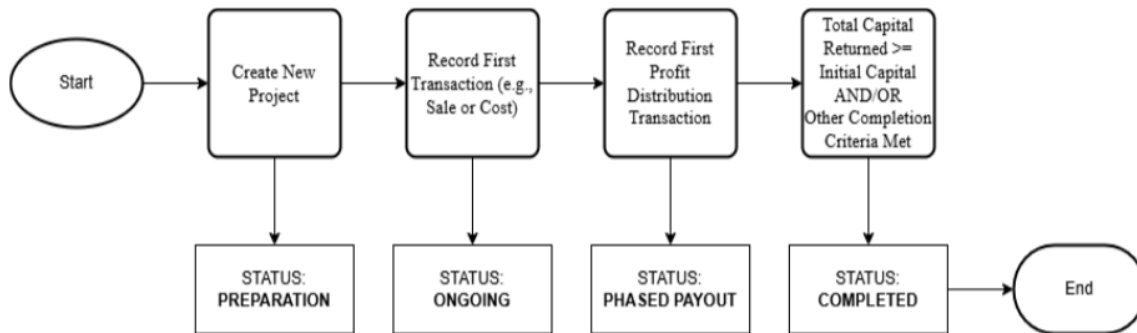


Figure 1. Flowchart illustrating the logic of the automated status engine.

- User Authentication: A secure registration and login system to ensure data privacy and integrity for each user.
- User Interface (UI) and Experience (UX) Design: The front-end was developed using the Bootstrap framework, following a mobile-first design philosophy to ensure responsiveness and accessibility across various devices (Nguyen et al., 2022). The UI was designed to be clean and intuitive, aiming to reduce cognitive load, which is critical for building user trust in a financial application (Lestari et al., 2024).

3.4 Usability Evaluation

The final phase was dedicated to empirically evaluating the application's usability with its intended user base.

- Participants: We recruited 12 participants representative of our target user profile. To ensure unbiased feedback based on a first-time experience, these individuals were not part of the initial interview phase.
- Procedure: We conducted moderated usability testing sessions. Each participant was given a set of realistic tasks to complete using the application, such as: (1) Register an account and log in; (2) Create a new investment project with a starting capital of IDR 50,000,000; (3) Record a sales transaction of IDR 15,000,000 for that project; (4) Check the dashboard to observe the updated performance metrics. We observed their interactions and encouraged them to "think aloud" to vocalize their thought processes.
- Data Collection and Analysis: We employed a mixed-methods approach for data collection.
 - Quantitative: After each session, participants completed the System Usability Scale (SUS), a standardized 10-item questionnaire that provides a reliable, global measure of system usability (Bangor et al., 2008).
 - Qualitative: We collected qualitative feedback through direct observation and a brief post-session interview to understand the reasoning behind their actions and to gather specific suggestions for improvement.

This three-phase methodology ensures a direct and traceable line from identified user needs, through system design and implementation, to a rigorous evaluation of the final product.

4. RESULTS

This section presents the outcomes of our design and development process as outlined in the methodology. We first describe the key features of the implemented Digital Investment Manager application and then present the quantitative and qualitative results from the usability evaluation.

4.1 System Implementation

Following the iterative development process, a fully functional prototype of the Digital Investment Manager was successfully implemented. The application provides an integrated environment for managing the lifecycle of small-scale investment projects. The core functionalities, which directly correspond to the user requirements identified in Phase 1 of our methodology, are detailed below.

- **Comprehensive Dashboard:** Upon login, the user is presented with a central dashboard that serves as the portfolio's command center. As shown in Fig. 2, it provides at-a-glance summaries, including the total number of active investments, total invested capital, and total distributed profits. The dashboard features interactive data visualizations powered by Chart.js, displaying cumulative capital growth and profit accumulation over time, thereby enabling rapid performance assessment.

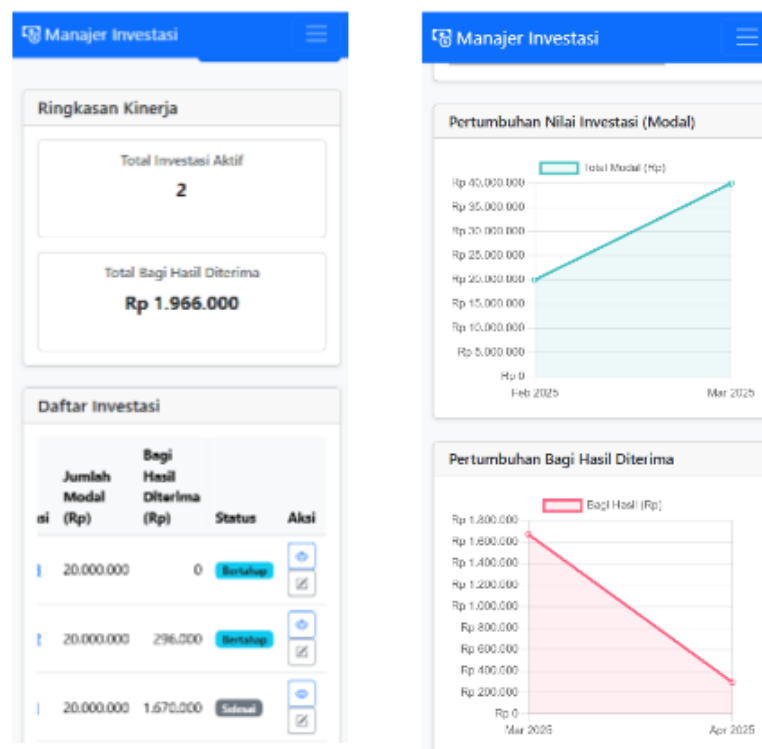


Figure 2. Main dashboard screenshot displaying summary metrics and performance graphs.

- **Detailed Project Management Module:** This module allows users to create and manage individual investment projects. For each project, users can input essential details such as the project name, initial capital, start date, and the agreed-upon profit-sharing rate (rate bagi hasil). This feature provides a structured repository for all project-specific information, effectively replacing fragmented manual records.
- **Granular Financial Transaction Tracking:** A dedicated module facilitates the meticulous recording of all financial transactions associated with a given project. The system supports various transaction types, including multiple revenue entries from a single project (e.g., phased sales) and payments to investors (covering both capital returns and profit distributions). The interface for this function is illustrated in Fig. 3. This process ensures a complete and auditable financial trail for each investment.
- **Automated Investment Status Updates:** A key innovation of the system is its ability to automatically update a project's status based on real-time financial data. The system dynamically assigns one of four statuses: Preparation (project created, no financial activity), Ongoing (first financial activity recorded), Phased Payout (profit distribution has begun), and Completed (investment goals met). This automation removes the ambiguity and administrative burden of manually tracking a project's lifecycle stage. The logic governing these transitions is outlined below.
- **Logic of the Automated Status Engine:** The automated status engine operates on a set of clear business rules triggered by user-recorded transactions. The logic is designed to reflect the natural lifecycle of an investment project without requiring manual user intervention. The state transitions are illustrated in Fig. 1 above. This rule-based automation ensures that the status of each project is always a consistent and accurate reflection of its real-world financial progress, directly addressing a key user need for clarity and reduced administrative effort.

Manajer Investasi

Detail Investasi Utama

Nama Investasi:

Tanggal Investasi:

hh/bb/tttt

Rate Bagi Hasil (misal: 0.10 untuk 10%):

Catatan Tambahan (Opsional):

Rincian Penggunaan Modal

Nama Item Modal Biaya (Rp)

+ Tambah Item Modal

Simpan Investasi

Manajer Investasi © 2025

Manajer Investasi

Invest 3

Tanggal Investasi: 27 March 2025

Rate Bagi Hasil: 20.00%

Status: Bertahap

Ringkasan Finansial

Total Modal Dibutuhkan: Rp 20.000.000

Total Hasil Penjualan: Rp 0

Keuntungan Kotor: Rp -20.000.000

Total Pengembalian Modal: Rp 13.000.000

Sisa Modal Belum Kembali: Rp 7.000.000

Target Bagi Hasil: Rp 0

Total Bagi Hasil Dibayarkan: Rp 0

Sisa Bagi Hasil Belum Dibayar: Rp 0

Rincian Penggunaan Modal

Figure 3. Screenshot of the interface for adding a sales transaction to an investment project.

- **Secure User Authentication:** The application implements a secure registration and login system, ensuring that each user's financial data is private and accessible only to them. This foundational security feature is critical for building user trust in a financial technology application.

4.2 Usability Evaluation Results

The implemented system was evaluated with 12 representative users as described in the methodology. The evaluation yielded both quantitative and qualitative data regarding the application's usability.

4.2.1 Quantitative Results: System Usability Scale (SUS)

- The participants' responses to the 10-item System Usability Scale (SUS) questionnaire resulted in an average score of 78.5 (Fig. 4). According to established benchmarks, a SUS score above 68 is considered above average. A score of 78.5 falls within the "Good" to "Excellent" range and corresponds to an adjective rating of "Good," indicating that the Digital Investment Manager possesses high usability from the perspective of its target users (Putri et al., 2024).



Figure 4. SUS Score

4.2.2 Qualitative Results: Thematic Analysis

Analysis of the think-aloud protocols and post-session interviews revealed three primary themes:

1. **Appreciation for Dashboard Clarity:** The majority of participants (10 out of 12) spontaneously commented positively on the clarity and utility of the main dashboard. They noted that the visual charts allowed them to "quickly understand the health of their portfolio" without needing to examine raw data. One participant stated, "This dashboard is the most important page; I can immediately see where my money is and how it's performing."
2. **Innovative Value of Status Automation:** The automated status update feature was consistently highlighted as a key differentiator. Participants expressed that this feature would save them significant time and reduce mental effort. As one user remarked, "Not having to manually calculate if a project is 'finished' or just 'paying out' is a huge relief. The system just knows." This feedback strongly validates our design goal of reducing administrative burdens.
3. **Area for Navigational Improvement:** A minority of participants (4 out of 12) initially hesitated when attempting to log their first sales transaction, suggesting a minor navigational challenge. They expected to find an "Add Transaction" button directly on the project details page, whereas the primary button was located within a dedicated "Transactions" tab. This feedback provides a clear, actionable insight for future UI refinement.

5. DISCUSSION

The results presented in the previous section demonstrate that the Digital Investment Manager was not only successfully implemented from a technical standpoint but was also well-received by its target users. This section discusses the implications of these findings, relates them back to the identified research gap, acknowledges the study's limitations, and proposes avenues for future work.

5.1 Interpretation of Key Findings

Our quantitative and qualitative findings provide three primary insights into the application's effectiveness and design.

First, the integrated design effectively addresses user inefficiency. The high SUS score of 78.5 and the positive user feedback on the dashboard's clarity confirm that integrating project management, transaction tracking, and performance visualization into a single platform directly solves the problem of tool fragmentation. Where users previously relied on error-prone spreadsheets (Stevens, 2024) and functionally mismatched accounting applications (Putra, 2019), our system provides a coherent, end-to-end workflow. When a user records a transaction, its impact is immediately reflected in the project's status and performance graphs. This tight feedback loop is a fundamental advantage over disparate manual practices.

Second, project status automation is a high-value functional innovation for this user group. The qualitative feedback consistently highlighted this feature as a key differentiator. This indicates that the cognitive and administrative burden of tracking an investment's lifecycle stage is a significant pain point for small-scale investors. By automating the status change from "Preparation" to "Ongoing" or "Completed" based on real-world transaction data, our application reduces ambiguity and allows users to focus on strategic decisions rather than administrative tasks. This represents a practical contribution that directly enhances operational efficiency.

Third, the User-Centered Design (UCD) approach is validated for this specific domain. The achievement of a favorable usability score was not coincidental but rather the direct result of our rigorous three-phase methodology: beginning with a deep understanding of user needs through interviews, proceeding with iterative development guided by design artifacts, and culminating in an empirical evaluation. This result provides evidence that the careful application of HCI principles is crucial when developing financial technology for non-expert user segments, where ease of use and trust are critical factors for adoption (Hidayat-ur-Rehman, 2024).

5.2 Research Implications

Our findings carry both practical and theoretical implications.

- **Practical Implications:** Practically, this research yields a functional prototype with the potential to empower small-scale investors. By providing an affordable and tailored tool, the application can lower the barrier to effective investment management, potentially increasing financial literacy and participation in private markets. The positive feedback on dashboard clarity suggests that such tools can also serve as passive educational instruments, helping users intuitively grasp the relationship between their actions and financial outcomes.
- **Theoretical Implications:** Theoretically, this research provides an empirical case study on the design and evaluation of an information system for an underserved domain. We present a structured understanding of the specific functional and non-functional requirements of small-scale investors, which can inform the design of future fintech applications targeting this segment. Furthermore, we demonstrate how an MVC architecture (via Laravel) and data visualization libraries (via Chart.js) can be effectively applied to solve real-world problems in personal financial management.

5.3 Limitations

It is important to acknowledge the limitations of this study, which in turn open avenues for future research.

- **Generalizability of Results:** The user evaluation was conducted with a relatively small sample (N=12) from a single geographic region. While the results are positive, larger-scale studies with more diverse participants are needed to generalize these findings to a broader population.
- **Scope of Functionality:** The current prototype focuses on the core functionalities identified during the initial needs analysis. Advanced features such as quantitative risk analysis, scenario planning, and team collaboration modules have not yet been implemented.
- **Security Model:** While the application includes a functional authentication system, it has not been hardened with advanced security practices (e.g., data-at-rest encryption, two-factor authentication) that would be required for a production-grade financial application.
- **Long-Term Evaluation:** Our study captured users' first impressions of usability. A longitudinal study is needed to understand how the long-term use of the application affects user behavior, decision-making confidence, and ultimately, investment performance.

6. CONCLUSION AND FUTURE WORK

6.1 Conclusion

This research commenced by addressing a significant challenge faced by small-scale investors: the lack of affordable and appropriate tools to efficiently manage the investment project lifecycle. To address this gap, we designed, developed, and evaluated the Digital Investment Manager, a user-centric web application. Through a systematic UCD methodology, we successfully created a functional system that integrates project tracking, transaction logging, and status automation. The resulting application was proven to have favorable usability, confirmed by a System Usability Scale (SUS) score of 78.5. Our primary contribution lies in providing a validated, practical solution for an underserved market segment while also presenting empirical insights into the user needs and effective design principles pertinent to this domain.

6.2 Future Work

Based on the research findings and identified limitations, we recommend several directions for future development to enhance the application's impact and robustness.

- **Enhancement of Core Functionality:**
 - **Risk Analysis Module:** Develop a feature to help users identify and measure investment risk, for instance, through simple sensitivity analysis or volatility tracking.

- Flexible Profit-Sharing Models: Expand the "profit-sharing rate" feature to support more complex and customizable schemes, including those aligned with Sharia principles like Mudharabah and Musyarakah (Purnomo et al., 2024).
- Collaboration Features: Add team functionality that allows multiple partners to jointly manage and monitor their shared investment portfolio.
- Further Validation and Research:
 - Large-Scale Usability Study: Conduct a formal user test with a larger, more diverse sample to statistically validate our initial usability findings.
 - Longitudinal Study: Deploy a long-term study to measure the tangible impact of the application on users' decision-making and financial success over time.
 - Technology Acceptance Evaluation: Employ a framework such as the Technology Acceptance Model (TAM) (Kuang et al., 2024) to investigate the factors that drive usage intention and sustained adoption of the application.
- Strengthening Technical and Security Aspects:
 - Security Hardening: Implement industry-standard cybersecurity practices (e.g., OWASP Top 10), including sensitive data encryption and regular security audits, to build user trust and prepare the application for a production environment.
 - Performance Optimization: Conduct load testing to ensure the application's scalability and performance as the number of users and data volume grows.

By pursuing these avenues, the Digital Investment Manager has the potential to evolve from a validated prototype into a comprehensive and robust platform that genuinely empowers the community of small-scale investors.

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