JINAV: Journal of Information and Visualization *ISSN: 2746-1440 (online)*
Vol. 5 No. 2 (2024)
https://doi.org/10.35877/454RI.jinav3044

A Smart Accounting System for Real-Time Mosque Financial Fund Management Based on Android and Web Mobile through The Implementation of The Agile Development Scrum Method (Case Study: The Baiturrahim Mosque is Located in Uteun Bayi Village, Banda Sakti District, Lhokseumawe City)

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Abstract

The Smart Accounting System (SAS) is an accounting system that optimizes the financial administration of an entity or company by utilizing artificial intelligence and information technology to streamline the accounting process. Mosques may encounter a variety of financial challenges; among these are fund management, income, and expenses. Distrust among the congregation may result from a lack of transparency in mosque financial management. Consequently, it is crucial to preserve transparency and furnish transparent financial statements. In order to resolve these financial challenges, it is crucial to implement effective financial management, establish a realistic budget, enhance transparency, and engage the congregation in the mosque's financial management. The Agile Development Scrum method is employed to design the Smart Accounting System, which is based on Android mobile and web. The Agile approach enables the team to effortlessly adjust to changes during the development process, as it fosters congregational engagement throughout the entire development cycle. The mosque treasurer or finance team's participation is indispensable in the context of the Smart Accounting System to guarantee that the appropriate requirements are satisfied. Agile ensures superior system quality by emphasizing continuous testing and feedback from the mosque congregation. The proper location for field studies and initial data sources for the development of the Smart Accounting System is Baiturrahim Mosque, located in Uteun Bayi Village, Lhokseumawe City. Additionally, the Agile Scrum methodology will be implemented to execute the system design. The subsequent phase involves the implementation of the Black Box system testing method and User Acceptance Testing (UAT).

Keywords: Smart Accounting System; Mosques; Agile Development Scrum; financial management; User Acceptance Testing

Received: 20 September 2024 Revised: 27 November 2024 Accepted: 10 December 2024

1. Introduction

Accounting information systems are not exclusively presented by commercial entities; they can also be presented by non-commercial entities, which are typically referred to as non-profit entities or non-profit-oriented entities. The general objective of accounting information systems is to furnish a substantial number of users with information that is beneficial for the purpose of making economic decisions, including the financial position, performance, and changes in the financial position of a shariaentity. (Salman, 2020) Some examples of non-profit organizations that are involved in the religious sector include mosques. A social organization that is established by an individual or group of individuals who voluntarily provide services to the public with the intention of not seeking profit from the activities, is referred to as a non-profit organization (Hantono et al., 2021).

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The operations of a mosque necessitate a significant amount of funding. Mosque financial administration necessitates meticulous and precise documentation and calculation of all financial transactions. Mosques are mandated to oversee their finances in a transparent and accountable manner (Haq & Dewi, 2013).

The Baiturrahim Mosque, situated on Jalan Kenari Gampong Uteun Bayi in the Banda Sakti District of Lhokseumawe City, occupies a land area of 1,000m2 and a building area of 2,638m2. It is classified as waqf land. Baiturrahim is frequently employed in community social events; consequently, it is imperative that all mosque activities, regardless of their nature, be effectively administered. After conducting an initial data survey and interviews with the administrators/treasurers of the mosque, issues were identified regarding the receipt and expenditure of cash funds. These issues included the processing of infaq funds, development funds, worker honorarium funds, and daily mosque needs funds. The mosque continues to use a recording system that utilizes a ledger, which impedes the ability to accurately track the receipt and expenditure of funds, manage finances, and generate reports that are less efficient and effective. The congregation is provided with information through information boards that are not consistently updated. Other issues may arise from the congregation, which may not be aware of the specifics of the financial funds, as the report summary is only submitted on Fridays. The Smart Accounting System (SAS) is an accounting system that optimizes the financial administration of an entity or company by utilizing artificial intelligence and information technology to streamline the accounting process. SAS is capable of offering sophisticated solutions for the management of financial transactions, the recording, reporting, and analysis of financial data. SAS can assist mosques in reducing human error, improving data accuracy, and allowing for a more concentrated concentration on economic growth and financial strategy. Additionally, it can save time. It is believed that actual-based recording can generate financial reports that are more comprehensive, relevant, and accurate for decision-making. Supporting factors, including human resources, organizational commitment, and the utilization of information and communication technology, are required to facilitate the establishment of a competent and effective accrual basis (Yusra,2021). Using the Agile Development Scrum method, which is a software development approach that is based on the Scrum framework within the Agile framework, the Smart Accounting System is designed for Android and web platform. The Agile Scrum methodology guarantees that the system will continue to evolve in accordance with technological advancements and requirements, as it offers the adaptability and flexibility necessary to address evolving requirements. The Agile approach enables the team to effortlessly adjust to changes during development, as it fosters the congregation's involvement throughout the development cycle. The mosque treasurer or finance team's involvement is crucial in the context of the Smart Accounting System to guarantee that the appropriate requirements are being met. Agile ensures superior system quality by emphasizing continuous testing and feedback from the mosque congregation.

2. Research Methods

2.1. Agile

Agile development is a software development approach that emphasizes the interaction and collaboration between team members with clients, rather than the process and type of device employed (Martin, 2003). The agile method is appropriate for software that must be adaptable and tolerant of rapid changes in requirements. The primary objective of incorporating agile into software is to ensure that software products produce ongoing consumer satisfaction. One of the agile principles that supports this is the process of presenting results within a two to four week time frame, with a predilection for a shorter time frame (Martin, 2006).

2.2. Software

Software is a computer program that facilitates communication between consumers and hardware (Pfleeger, 2006). Software is developed through a structured engineering process that employs a variety of methods, contingent upon the anticipated final result and the functionality requirements.

2.3. Scrum

Scrum was created by Jeff Sutherland in 1993 with the objective of serving as a development and management methodology that adheres to agile principles (Pham (2011). Schwaber and Beedle pursued additional scrum development. The final result is influenced by a multitude of factors, which is why Scrum is a complex process. Scrum is comprised of a scrum team and the requisite roles, events, artifacts, and norms of the game (Pressman, 2012). The scrum implementation's core is the iteration. A sprint is a time limit that is established to address a problem. Paperlust establishes a two-week timeframe for each iteration that is conducted. Sprint Planning, Daily Meeting and Report, Sprint Review, and Weekly Meeting comprise the sprint stages that are operational. The

framework's implementation procedure is characterized by the following key practices: (1) Scrum enables the simultaneous collection of requirements, architecture, and interface design. (2) The team must be able to determine the priority scale for the previously compiled product backlog list and focus on sprints, review of results, and work schedules. (3) The team must adhere to the agreed-upon schedule. (4) All work must be marked as a product backlog. (5) The basic product backlog for sprints must be able to be determined by the team. (6) The team must be able to decide on the priority scale for the previously compiled product backlog list. (7) Conduct regular meetings, (8) The Scrum master is accountable for the receipt and assessment of sprint results (Martin, 2010).

The Scrum Model is employed in this study to implement agile software development methods. The collision is divided into the following stages:

1) Backlog gathering priority information regarding the features that will be implemented in the forthcoming Smart Accounting System. At any given moment, the features may be completed and the pat applied.
2) Sprints assembling activities that are to be completed within a 30-day timeframe to satisfy the requirements outlined in the backlog.
3) Scrum meeting conducting a meeting with the designated team to consider the advancement of the Smart Accounting System development activities.
4) Demonstrations showing the software features that have been developed for the purpose of evaluating them by users (mosque treasurers and congregations) within the designated time frame.

Concurrently, the development activity is comprised of a sequence of activities in each iteration, as detailed:

1) Assessment of System Requirements

During this phase, an evaluation is conducted on users (treasurers and congregations) to delve into the specific software requirements that users require. The treasurer requires specific information to facilitate the administration of mosque finances.

2) Design

During the design phase the process of system design is initiated, which encompasses the development of the system architecture, business processes, databases, and user interfaces. For database design, the instruments employed in this design stage are the Unified Modeling Language (UML) and the Entity Relationship Diagram (ERD)/Logical Relational Structure (LRS).

3) Code Generation

The flutter and android studio programming languages are employed to compose the program code at this juncture.

4) Testing

The blackbox method is employed to test functions at this juncture. The objective of this test is to identify systemic errors and determine the extent to which the system can function effectively and meet user expectations. The blackbox testing technique concentrates on the information domain of the software by conducting test cases and partitioning the input domain of a program in a manner that ensures rigorous testing coverage. Interface testing and form validation comprise the scope of blackbox testing. The anticipated objective of blackbox testing is to develop a design that is compatible with the requirements of the user. Testing is conducted using the User Acceptance Test (UAT) in addition to blackbox testing.

5) Support

Once the output has been submitted to the user, support activities are conducted to address any requested modifications. Errors that are not detected during testing or adaptation to new needs/environments can result in changes.

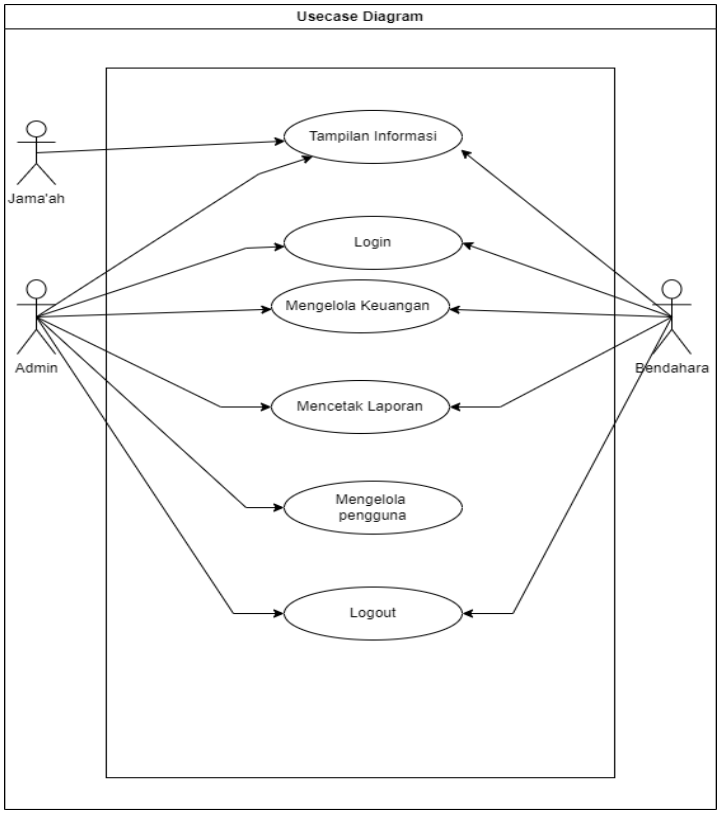

Figure 1. Use case diagram

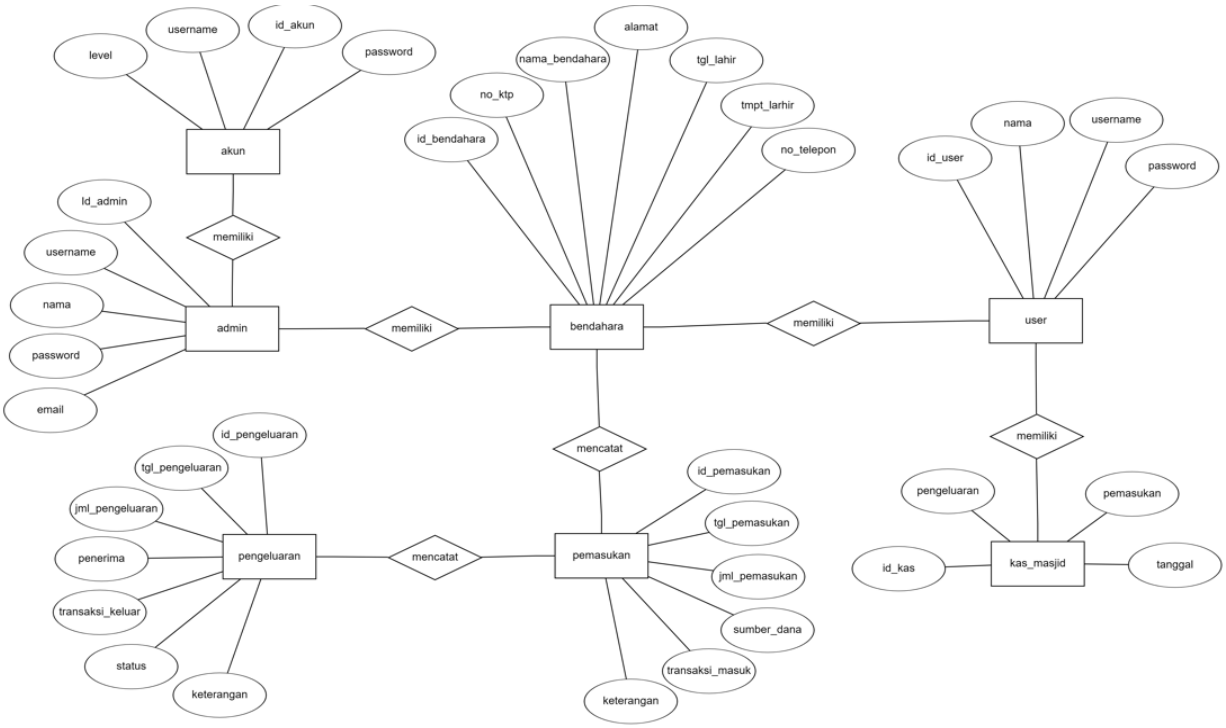

Figure 2. Entity relationship diagram

3. Results and Discussions

The study on a Smart Accounting System for real-time financial fund management of mosques, utilizing mobile Android and web platforms. The deployment of the Agile Development Scrum Method remains in the development and execution phase of the proposed system. Following discussions with mosque financial management, significant advancements have been made in the system's deployment. This study solely addresses the construction of the mosque financial fund management system web. Additional stages are required for Android-based development. Subsequently, system testing and direct field installation were conducted, encompassing BIMTEK operations for financial management of mosques. This document outlines the phases involved in the development of the Smart Accounting System Research for real-time financial fund management of mosques, utilizing mobile Android and web platforms. By implementing the Agile Development Scrum methodology.

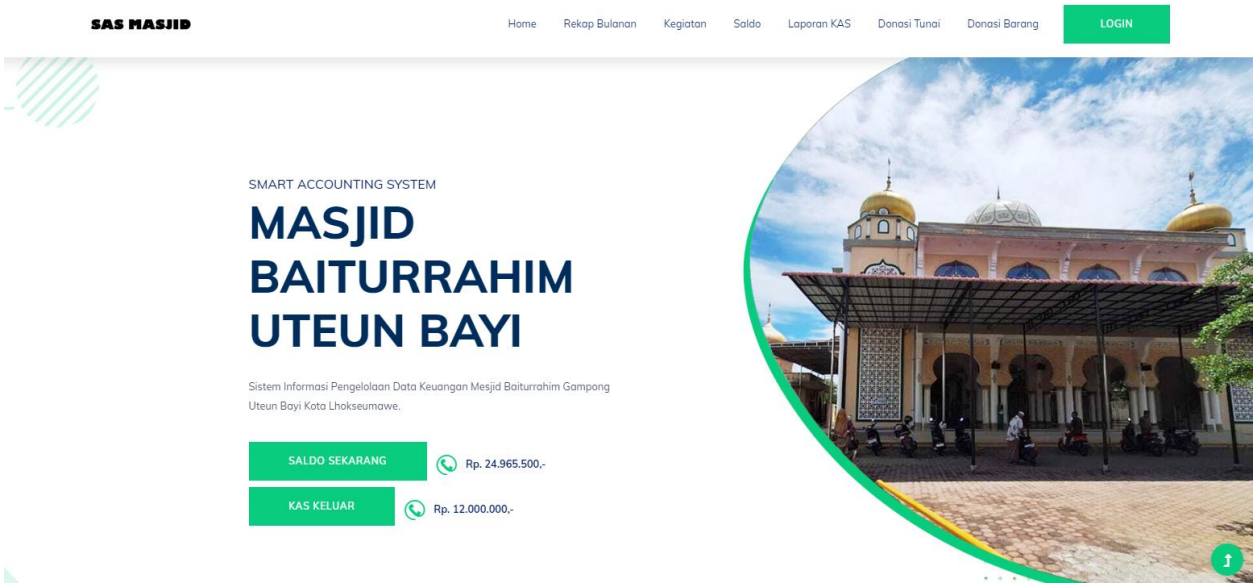

Figure 3. Dashboard System

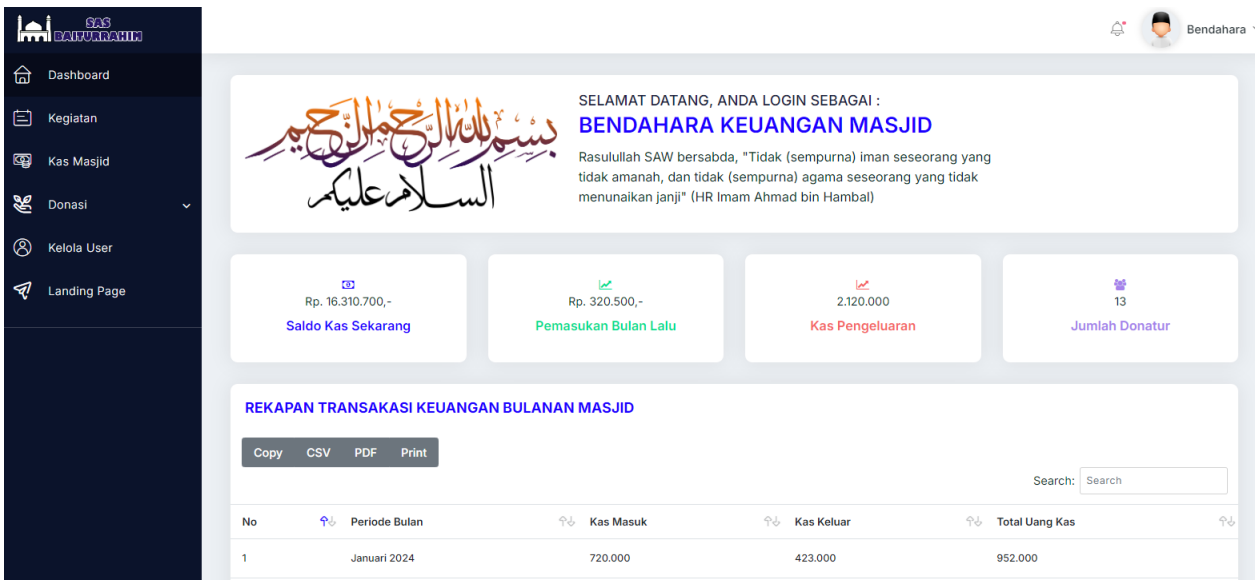

Figure 4. Admin dashboard

DFD Level 1 is the outcome of the proposed diagram decomposition that elucidates cash management operations and the management of monthly report data. The suggested Level 1 data flow diagram is outlined as follows:

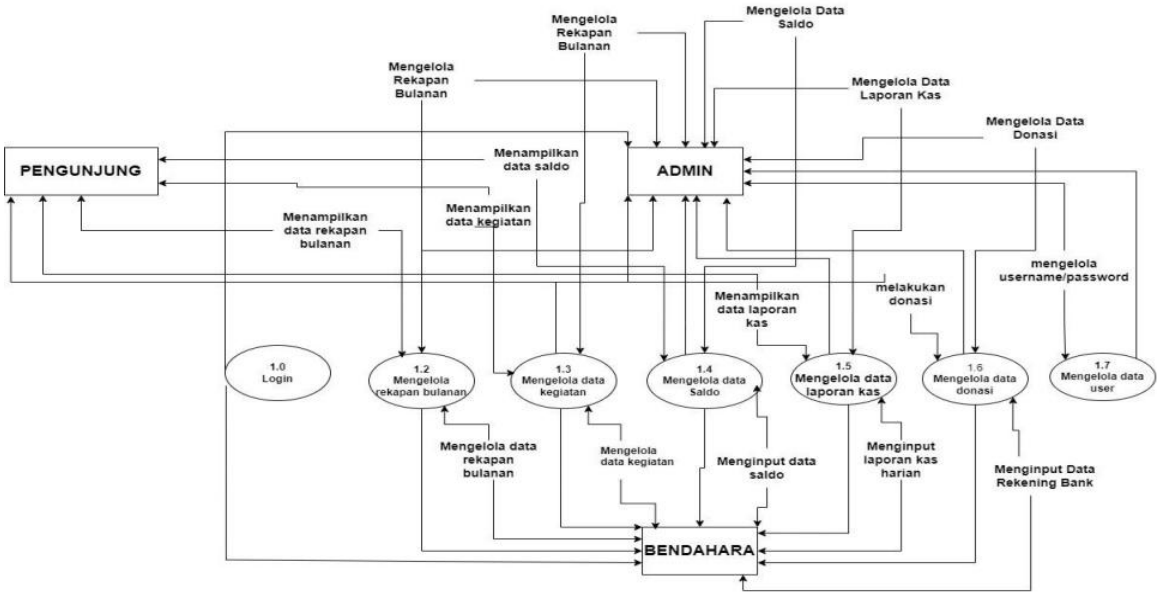

Figure 5. DFD Level 1

The level 2 data flow diagram for process 1 of the proposed system delineates the management of cash receiving transactions, cash disbursements, and the generation of monthly cash reports. Displayed in the Figure 6.

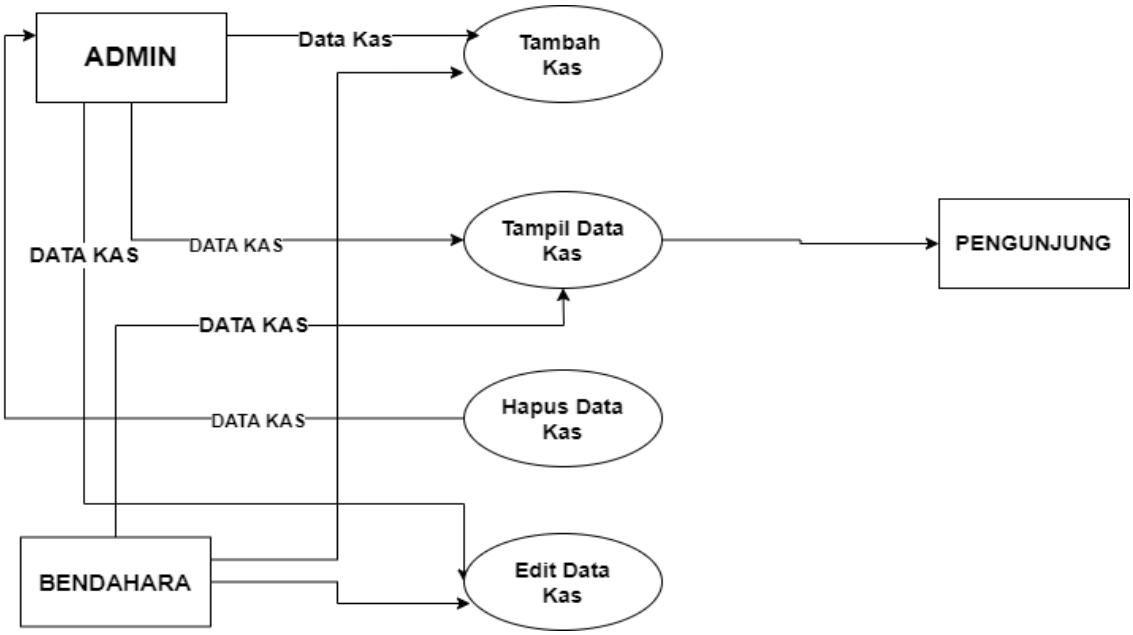

Figure 6. DFD Level 2

In order to make it easier for the congregation to access financial features, an Android-based system has been introduced which will make it very easy for the congregation to find out the balance and routine expenditures from the Baiturrahim Mosque.

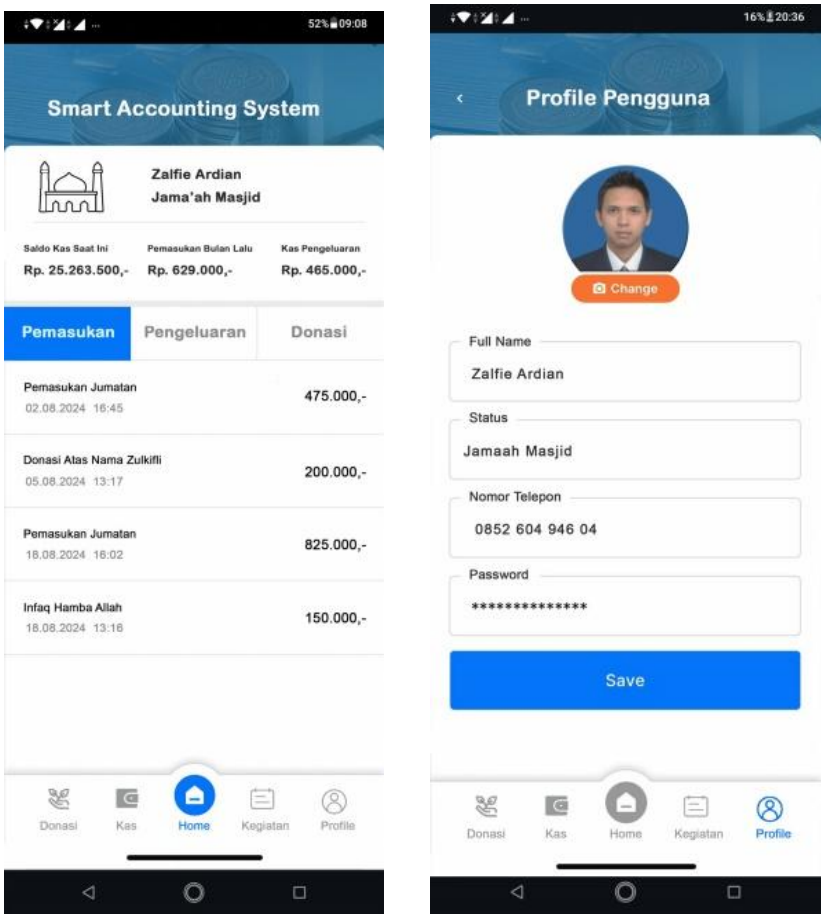

Figure 7. Android SAS application

User Acceptance Testing (UAT) is crucial for evaluating SAS applications. Users do tasks on the application independently, and documents are generated as proof of the tool's efficacy. The objective is to guarantee that the application fulfills user requirements. Testing comprises inquiries with categorical evaluations: SS (Strongly Agree), S (Agree), C (Quite), TS (Disagree), and STS (Strongly Disagree). Information is available in Table 1.

Table 1. User Acceptance Testing (UAT) Evaluation

Rated aspect	No	Question
Design	P1	Is the appearance of the SAS application attractive?
	P2	Are the features of this SAS application easy to understand?
	P3	Is the use of color and contrast in this application appropriate?
	P4	Is the information and instructions in the SAS application easy to understand?
	P5	Do the icons utilized in this application's interface elucidate its functionality?
Convenience	P6	Is the app easy to learn even for new users?
	P7	Does the app offer sufficient assistance for problem resolution?
	P8	Does the SAS app allow you to do the tasks you want to do quickly and efficiently?
	P9	Do you feel the app provides enough feedback for the actions you take?
	P10	Do you feel the app provides an intuitive and easy-to-use user experience?
Efficient	P11	Do you feel that the SAS app takes less time to complete tasks compared to similar apps?
	P12	Do you feel like the app doesn't require many actions or clicks to complete simple tasks?
	P13	Do you feel the app has features or functions that increase efficiency for use?
	P14	Do you feel that the performance or speed of the application is good?
	P15	Does the app provide useful suggestions or recommendations to help you complete tasks more efficiently?

Table 2. Results of User Acceptance Testing Analysis

No	Variable	Question	Amount	Number/respondents	(%)	AVG	Information
1	Design	P1	431	3.88	77.7%		
		P2	376	3.39	67.7%		
		P3	404	3.64	72.8%	71.2%	Agree
		P4	395	3.56	71.2%		
		P5	369	3.32	66.5%		
2	Convenience	P6	417	3.76	75.1%		
		P7	382	3.44	68.8%		Agree
		P8	408	3.68	73.5%	72.4%	
		P9	413	3.72	74.4%		
		P10	389	3.50	70.1%		
3	Efficient	P11	394	3.55	71.0%		
		P12	373	3.36	67.2%		
		P13	409	3.68	73.7%	71.2%	Agree
		P14	406	3.66	73.2%		
		P15	395	3.56	71.2%		
Average Total Score						**71.6%**	

4. Conclusion

The implementation of the Smart Accounting System (SAS) in mosques addresses critical financial management challenges by leveraging artificial intelligence and information technology. This system is designed to enhance transparency, streamline accounting processes, and engage the congregation in financial management, thereby reducing distrust among members. The Agile Development Scrum method, which is employed in the design of SAS, facilitates adaptability and continuous feedback, ensuring that the system meets the specific needs of the mosque's financial team.

The development and testing of SAS are conducted at Baiturrahim Mosque in Uteun Bayi Village, Lhokseumawe City, using the Agile Scrum methodology. This approach ensures high system quality through continuous testing and feedback, with the involvement of the mosque treasurer being crucial to meeting the system's requirements.

The survey results indicate a positive reception of the SAS, with an average agreement score of 71.6% across three key variables: Design, Convenience, and Efficiency. Each variable received favorable responses, with Design scoring 71.2%, Convenience 72.4%, and Efficiency 71.2%. These results suggest that the SAS is well-designed, user-friendly, and efficient, aligning with the needs and expectations of the mosque congregation. Overall, the Smart Accounting System is a promising solution for improving financial transparency and management in mosques, fostering trust and engagement among the congregation.

References

Abdullah, D., & Ul-Saufie, A. Z. (2023). Hasil item tolakan pengiraan zakat pendapatan dari kumpulan fokus muzzaki M40 untuk zakat Pulau Pinang. *Enhancing Innovations in e-Learning for Future Preparation*, 31.

Abdul Hadi, D., Agustina, I., Arnan, S., Se, S., Apriliana, T., Bagja, H., & Ikram, S. (2021). Implementation of accounting for mosque in some mosque in Bandung Regency. *RIGEO*, 11(6), 205-216. https://doi.org/10.48047/rigeo.11.06.25

Ardian, Z., & Rahmayani, S. (2021). Perancangan dan pengembangan sistem informasi manajemen Masjid Oman Al-Makmur berbasis web dan Android. *Journal of Informatics and Computer Science*, 7(1), 1-9.

Ashadul Haq, J. A., & Dewi, M. K. (2013). Praktik manajemen keuangan masjid dan potensi dana masjid (Studi kasus pada beberapa masjid di Kota Bogor). *Accounting Department*.

Asrori, A., Kiswanto, K., Fachrurrozie, F., & Amal, M. (2020). Development of mosque accounting information systems based on non-profit entity reporting standards and sharia compliance: A case study at the X Great Mosque. *Jurnal Dinamika Akuntansi*, 12, 55-67. https://doi.org/10.15294/jda.v12i1.23930

Bashynska, I., & Volodymyr, F. (2020). Risk management of smart accounting system implementation in urban passenger transport based on integration of smart innovations, information technologies and marketing tools.

Bastian, I. (2005). *Akuntansi sektor publik: Suatu pengantar*. Erlangga.

Faqih, H., Hikmah, A., & Azizah, W. (2022). Implementasi metode rapid application development pada pengembangan aplikasi e-Fin Mosque Z. *Indonesian Journal on Software Engineering (IJSE)*, 8, 83-91. https://doi.org/10.31294/ijse.v8i1.13007

Halim, A., & Kusufi, M. S. (2016). *Akuntansi sektor publik*. Salemba Empat.

Hall, J. A. (2018). *Accounting information systems* (6th ed.). South-Western, Cengage Learning.

Hantono, L. I., Husain, S. A., Widiasmara, A., Dhany, U. R., Sululing, S., Novitasari, M., Hendra, J., Amerieska, S., Suryaningsi, T., Amani, T., Ariyanto, S., Werastuti, D. N. S., & Muchlis, S. (2021). *Akuntansi sektor publik*. Bandung: Media Sains Indonesia.

Kasmir. (2020). *Pengantar manajemen keuangan*. Prenadamedia Group.

Panduwiyasa, H., Saputra, M., Azzahra, F., & Aniko, A. (2021). Accounting and smart system: Functional evaluation of ISO/IEC 25010:2011 quality model (a case study). *IOP Conference Series: Materials Science and Engineering*, 1092, 012065. https://doi.org/10.1088/1757-899X/1092/1/012065

Martin, R. C. (2003). *Agile software development: Principles, patterns, and practice*. Pearson Education.

Martin, R. C., & Martin, M. (2006). *Agile principles, patterns, and practice in C#*. Pearson Education.

Pham, A. E. A. (2011). *Scrum in action: Agile software project management and development*. Course Technology PTR.

Pressman, R. S. (2012). *Rekayasa perangkat lunak: Pendekatan praktisi* (7th ed.). ANDI.

Pfleeger, S. L. J. M. A. (2006). *Software engineering: Theory and practice*. Pearson Prentice Hall.

Salman, K. R. (2020). *Akuntansi syariah pendekatan akad dan wa'd* (S. Nurachma, Ed.; 1st ed.). PT RajaGrafindo Persada.

Salman, K., Ilham, R., Djunaedi, A. Z., Suparno, & Sa'diyah, H. (2023). Pengembangan sistem informasi akuntansi masjid (SIMAS) pada Masjid Ash-Shobirin Rungkut Surabaya. *Jurnal Terapan Abdimas*, 8, 132-140. https://doi.org/10.25273/jta.v8i1.14429

Yahaya, L. (2022). E-MAS: A prototype of mosques' accounting information system in Malaysia. *International Journal of Advanced Technology and Engineering Exploration*, 47-51.

Yusra, M., & Yunita, N. A. (2021). Analysis of determination of the implementation accrual-based accounting standards in Lhokseumawe Regency. *International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration (IJEBAS)*, 1(2), 307-320.