



Design of BMT Al-HUDA UNS Savings Information System

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Received: xxxxx xx, 2024; Revised: xxxxx xx, 2024; Accepted: xxxxx xx, 2024

Abstract

This study aims to design a BMT Savings Information System (Baitul Maal wat Tamwil) at Al-HUDA, Sebelas Maret State University (UNS) Surakarta to improve the efficiency of member fund management. This system is designed to facilitate the process of deposits, withdrawals, transaction recording, and real-time web-based financial reporting. The system development method uses the Waterfall approach, starting from needs analysis, design, implementation, to testing. The results of the study show that this system is able to reduce manual errors, speed up the transaction process, and improve BMT financial accountability. With this system, it is expected to support the digitalization of sharia financial services in the campus environment and provide convenience for members in managing savings.

Keyword: Information System, Savings, BMT, Al-HUDA, Waterfall.

1. Introduction

The development of information technology has brought about significant transformation in the management of financial institutions (Alsmadi et al., 2023); (Pramanik et al., 2019); (Wang & Ren, 2021), including Baitul Maal wat Tamwil (BMT) (Aisyah et al., 2021); (Septianingsih & Abdullah, 2023). As a sharia financial institution operating in the Sebelas Maret State University (UNS) Surakarta environment, BMT Al-HUDA requires a more efficient system to manage its members' savings. So far, the transaction recording process still relies on manual methods with ledgers and spreadsheets, which are prone to errors and less than optimal in terms of service speed. In fact, with the number of members continuing to grow, the need for a computerized system is becoming increasingly urgent to ensure accuracy and speed of service.

The main problems in managing BMT Al-HUDA savings currently include time inefficiency in the transaction process, the high risk of manual recording errors, and difficulty in monitoring financial reports in real time. In addition, the limitations of the existing system also make it difficult for managers to present historical transaction data and financial recapitulations quickly. This condition has the potential to reduce member trust in the institution. Therefore, the development of a web-based savings information system is a strategic solution to overcome various operational constraints while improving service quality (Alsudairi, 2012); (Dunn & Varano, 1999).

This study aims to design and implement an integrated and web-based BMT Al-HUDA UNS Savings Information System. This system is designed to facilitate the entire savings process, from member registration, deposits, withdrawals, to financial report preparation. With this system, it is expected to reduce human error, speed up the transaction process, and provide accurate and real-time financial data. In addition, this system is also designed to meet sharia principles in managing member funds.

The significance of this study lies in its contribution to the modernization of Islamic financial management in the campus environment (Javaid & Suri, 2016). The savings information system produced not only improves the operational efficiency of BMT, but can also be a model for the development of a technology-based Islamic



microfinance system. This study uses a waterfall system development approach with stages of needs analysis, design, implementation, and testing. The results of the study are expected to be a reference for the development of similar systems in other Islamic financial institutions, especially those operating in educational environments.

2. The Art of Research

The development of science in the field of Islamic financial information systems has made significant progress along with the rapid adoption of digital technology in the financial sector. Recent studies show a strong trend in the implementation of sharia-based financial technology (fintech), including the development of integrated information systems for BMT and Islamic microfinance institutions (Bashori et al., 2024); (Haidar et al., 2022); (Shulthoni et al., 2023). Research by Pratiwi & Mauliyah (2024) revealed that the implementation of a web-based information system at BMT was able to improve financial governance and strengthening transparency (Marjulin et al., 2023). This finding is in line with the development of the smart Islamic finance paradigm which emphasizes the integration of sharia principles, operational efficiency, and the use of information technology.

This research on the design of the BMT Al-HUDA UNS savings information system directly contributes to the development of science in the field of Islamic financial information systems (Septianingsih & Abdullah, 2023), especially in the context of educational institutions. This study is relevant to three aspects of recent developments: (1) meeting the specific needs of campus BMTs as part of the educational sharia financial ecosystem (Aripin et al., 2022), (2) implementing agile system development principles for microfinance institutions (Bakhri et al., 2022), and (3) strengthening digital financial literacy among academics (Ginanjar & Kassim, 2021). By adopting a modified waterfall framework, this study not only answers the operational challenges of BMT Al-HUDA but also contributes a system prototype that can be replicated by other campus-based BMTs in Indonesia.

This study is also in line with recent developments in the convergence of financial technology and sharia principles, especially in the application of cloud computing and open banking APIs for microfinance systems. A study by the Islamic Financial Services Board (2023) shows that BMTs that adopt digitalized systems have 25% higher operational resilience during economic crises. In this context, the design of the BMT Al-HUDA UNS savings information system not only utilizes web-based technology but is also designed with an architecture that allows integration with future sharia digital payment platforms. This approach strengthens the position of research as part of efforts to transform the sustainable digital Islamic financial ecosystem, while also responding to Bank Indonesia's (2023) recommendations regarding the acceleration of digitalization of Islamic Microfinance Institutions.

3. Method

This study uses the Research and Development (R&D) method with the Waterfall approach consisting of the stages of needs analysis, system design, implementation, testing, and evaluation (Rachma & Muhlas, 2022). The needs analysis stage is carried out through direct observation, interviews with BMT Al-HUDA managers, and literature studies related to Islamic financial information systems. The data obtained are then analyzed to identify the functional and non-functional specifications of the system. At the design stage, use case diagrams, flowcharts, and entity relationship diagrams (ERDs) are created. System implementation is carried out using the PHP programming language and the Laravel framework, as well as the MySQL database to ensure data security and scalability. System testing includes black-box testing to verify functionality and usability testing by involving BMT managers and members as end users.

4. Result

a) Problem Identification and Solution Design

Through direct observation and monitoring of the existing administration system at BMT and conducting interviews with several stakeholders, several problems were found that needed to be solved for the development of the information system design at BMT, including:

1. The database is still in the form of a text file. There is no RDBMS (Relational Database Management System) system so that one data cannot be connected to another.
2. The data storage process is still separate for each customer, so if you want to know several customers at once in one form, it is not possible.
3. The data input process for the same data can still be entered so that there is still duplicate data.
4. The security system is lacking because the application does not use a password system and users can enter

To support the solution to these problems, the research team proposed a design for an information system for effective and efficient data and information processing at BMT AL_HUDA UNS with the hope of improving the performance of the savings information system by using a computerized system. Some factors needed for the development of a new information system are as follows:

1. The data storage process uses an appropriate database system so that later one data can be connected to another.
2. The data storage process is combined for each savings customer.
3. The data input process is protected for the same data so that there is no double data storage with notes that the name and date of birth are not the same.
4. For security in the application, a password system is used.

b) System Design

Information system design is the process of designing or developing a new system to meet the information needs of an organization, or to improve an existing system to be more effective and efficient. This stage will consist of designing CD, DFD and relationships between data.

- CD Design (Context Diagram)

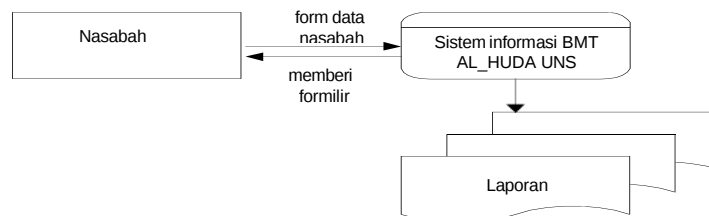


Figure 1. Context Diagram Design

- Designing DFD (Data Flow Diagram) level 0

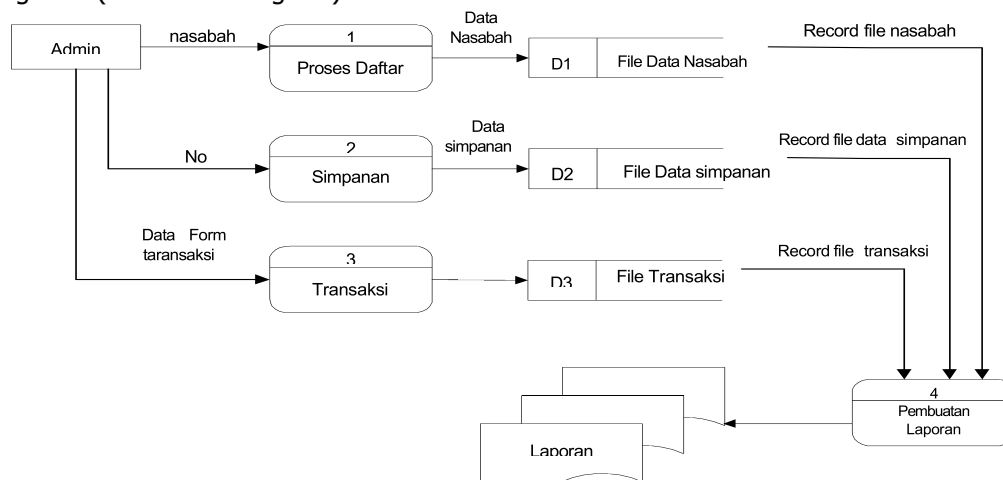


Figure 2. DFD (Data Flow Diagram) level 0 design



- Designing DFD (Data Flow Diagram) level 1 process 3

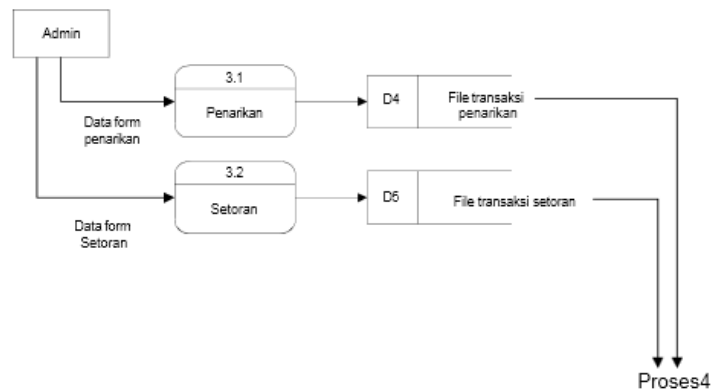


Figure 3. DFD (Data Flow Diagram) design level 1 Process 3

- Entity Relationship Diagram

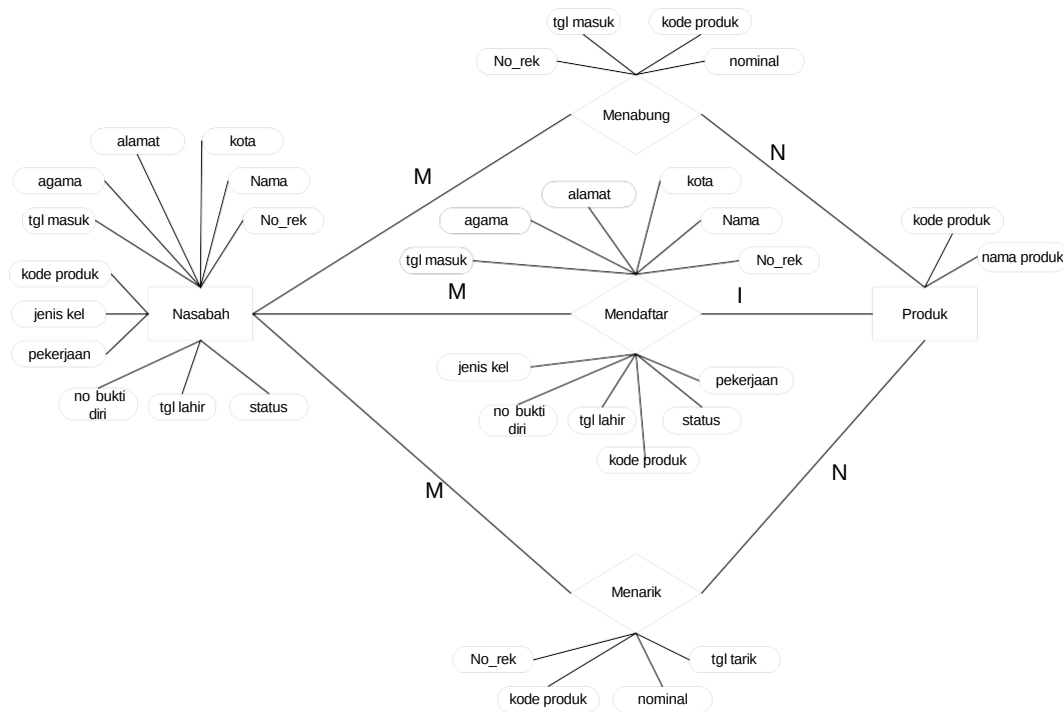


Figure 4. Relationships Between Entities

- Data Dictionary
 1. File Customer

Table Name : Table Customer
 For : To record customer data
 Primary Key : no_rek

Table 1. Customer Table

Nama Field	Type Data	Lebar Field
No rek(*)	Character	10
nama	Character	32
alamat	Character	50
kota	Character	12
pekerjaan	Character	10
status	Character	
Tgl lahir	Date	8
No bukti diri	Numeric	25
agama	Character	
Kode Produk	Character	2
Tgl Masuk	Date	8
Jenis kelamin	Character	

2. File Product

Table Name : Table Product
 For : To record data for all products in BMT
 Primary Key : Code_Product

Table 2. Table Products

Nama Field	Type Data	Lebar Field
Kode Produk (*)	character	2
Nama Produk	character	16

3. File Withdrawal

Table Name : Table Withdrawal
 For : To record savings withdrawal transaction data
 Primary Key : no_rek

Table 3. Table Withdrawal

Nama Field	Type Data	Lebar Field
No rek(*)	character	10
Kode Produk	character	2
Tgl Tarik	character	8
nominal	numeric	20

4. File Saving

Table Name : Table Saving
 For : To record savings transaction data
 Primary Key : no_rek

Table 4. Table Saving

Nama Field	Type Data	Lebar Field
No rek(*)	character	10
Kode Produk	character	2
Tgl Masuk	character	8
nominal	numeric	20



- IPO (Input Process Output) Hierarchy

Hierarchical charts (HIPO) are used to prepare the depiction of data flow diagrams to go to lower levels. The hierarchical chart for the savings information system at BMT Al-Huda UNS is as follows:

A. Input:

1. Input Savings Customer Data
2. Input Savings Withdrawal Transactions
3. Input Savings Deposit Transactions
4. Input Savings Deposit Customer Data

B. Process

1. Registration Process
2. Deposit Process
3. Transaction Process

C. Output

1. Savings Report Form
2. Deposit Recap Form
3. Withdrawal Recap Form
4. Deposit Report Form

c) System Implementation

- Form Login

There needs to be a GUI-based design for the login form and the Information System design for Savings user login at BMT AL-HUDA is as follows:

Figure 5. Login Form

- Form Main Menu

The Main Menu Form of the Savings Information System at BMT AL-HUDA is as follows:

Figure 6. Main Menu Form

- System Configuration Form

The System Configuration Form of the Savings Information System at BMT AL-HUDA is as follows:

Figure 7. System Configuration Form

- Customer Data Input Form

The customer data input form is used to enter customer data obtained from the form that has been filled in by the applicant. The following is a display of the data input form:

Figure 8. Customer Data Input Form

- Savings Form

The savings form is a form for filling in the types of savings transactions. The savings form is shown in the image below:

Figure 9. Savings Form

- Deposit Form

The deposit form is used to input deposit customer data. The deposit form is shown in the image below:



Figure 10. Deposit Form

- Deposit Report Form

The Deposit Report Form contains information about all deposit customers and is equipped with the nominal amount of deposit savings, maturity and deposit interest. The Deposit Report form is shown in the image below:

No Rekening	No Transaksi	Tanggal	Jenis Setoran	Kode Setoran	Penarikan	Saldo Awal	Saldo Akhir	Id Kasir
An Nugroho								
S 7/2007-0000000001	6/9/2007	Setoran Tunai	S	\$20.000.00		\$0.00		
S 7/2007-0000000006	6/9/2007	Setoran Tunai	S	\$5.000.00		\$20.000.00		
B 7/2007-0000000047	7/9/2007	Bunga	B	\$625.00		\$25.000.00		
							\$25.625.00	
An Sihasele								
S 7/2007-0000000002	7/9/2007	Setoran Tunai	S	\$20.000.00		\$0.00		
S 7/2007-0000000008	7/9/2007	Setoran Tunai	S	\$35.000.00		\$20.000.00		
							\$55.000.00	
Eko								
S 7/2007-0000000003	7/9/2007	Setoran Tunai	S	\$20.000.00		\$0.00		
S 7/2007-0000000009	7/9/2007	Setoran Tunai	S	\$40.000.00		\$20.000.00		
							\$60.000.00	
Sri Suharsani								
S 7/2007-0000000004	7/9/2007	Setoran Tunai	S	\$20.000.00		\$0.00		
S 7/2007-0000000007	7/9/2007	Setoran Tunai	S	\$7.500.00		\$20.000.00		
T 7/2007-0000000001	7/9/2007	Penarikan Tunai	T		\$20.000.00	\$33.506.07		
							\$7.500.00	

Figure 11. Deposit Report Form

- Deposit Recap Form

The deposit recap form contains all customer deposit transactions. The Deposit Recap form is shown in the image below:

Tanggal	NoTrans	NoRek	Nama	SaldoAwal	Setoran	Saldo	IdKasir
6/9/2007	S 7/2007-0000000001	0310.0000000001	An Nugroho	0	20000	25625	
7/9/2007	S 7/2007-0000000002	0310.0000000002	An Sihasele	0	20000	55000	
7/9/2007	S 7/2007-0000000003	0310.0000000003	Eko	0	20000	60000	
7/9/2007	S 7/2007-0000000004	0310.0000000004	Sri Suharsani	0	20000	7500	
7/9/2007	S 7/2007-0000000005	0310.0000000005	Mbok Jogo Lemu	0	20000	22500	
6/9/2007	S 7/2007-0000000006	0310.0000000001	An Nugroho	20000	5000	25625	
7/9/2007	S 7/2007-0000000007	0310.0000000004	Sri Suharsani	20000	7500	7500	
7/9/2007	S 7/2007-0000000008	0310.0000000002	An Sihasele	20000	35000	55000	
7/9/2007	S 7/2007-0000000009	0310.0000000003	Eko	20000	40000	60000	
7/9/2007	S 7/2007-0000000010	0310.0000000005	Mbok Jogo Lemu	20000	2500	22500	
7/9/2007	S 7/2007-0000000037	0310.0000000006	poko	0	20000	35000	
7/9/2007	S 7/2007-0000000038	0310.0000000005	poko	20000	15000	35000	
7/9/2007	B 7/2007-0000000047	0310.0000000001	An Nugroho	25000	625	25625	
7/10/2007	S 7/2007-0000000048	0320.0001	adel	0	20000	5500	
7/10/2007	S 7/2007-0000000049	0320.0001	adel	20000	2500	5500	
7/10/2007	S 7/2007-0000000050	0310.0000000008	a	0	20000	20000	
7/12/2007	S 7/2007-0000000051	0310.0000000008	Ani	0	20000	20000	
7/12/2007	S 7/2007-0000000052	310.0000000010		0	20000	20000	

Figure 12. Deposit Recap Form

- Withdrawal Recap Form

The Withdrawal Recap Form contains all customer withdrawal transactions. The Withdrawal Recap form is shown in the image below:

Tanggal	NoTrans	NoRek	Nama	Tarikan	SaldoAwal	Saldo	IdKasir
7/9/2007	T 7/2007-0000000001	0310.00000004	Sri Suharni	20000	33506.07	7500	
7/10/2007	T 7/2007-0000000002	0320.0001	adel	17000	22500	5500	

Rp37.000.00

Tampilkan Semua Cetak Tilik Cetak

Figure 13. Withdrawal Recap Form

- Deposit Report Form

The Deposit Report Form contains information about all deposit customers. The Deposit Report form is shown in the image below.

No Deposito	Nama	Alamat	Kota	Tanggal	Jumlah	Periode	Tgl Jltm	Jumlah yg D.
0320.0000000001	Rina	solo	solo	7/9/2007	10000000	12	7/9/2008	11280000
0320.0000000002	Tina	solo	solo	7/9/2007	20000000	24	7/9/2009	24960000
0320.0000000003	stika	solo	surakarta	7/10/2007	10000000	90	1/10/2015	1908000

Tampilkan Semua Cetak Tilik PriCetak

Figure 14. Deposit Report Form

d) Technology Design

- Hardware

For the creation of an information system, it is inseparable from the need for hardware that must be met. In this Savings Information System, a computer and a printer are required. Computer devices must meet the required standards for the smooth use of the Savings Information System. While the printer is a tool used to print customer data based on the data that has been input.

- Software

The software that supports the creation of this Savings Information System is Borland Delphi 7 with My SQL as the database used.

- Brainware

In order for the new system to run smoothly, employees are required who are proficient in computers so that they do not experience difficulties in operating the Savings Information System.

e) Evaluation

The Savings Information System at BMT AL-HUDA UNS that has been designed has several advantages that have been obtained, including facilitating the process of population data collection, data search. In addition to the existing advantages, this Savings Information System also has disadvantages, namely in the process of printing Savings Books.



5. Discussion

The results of the study showed that the implementation of a web-based savings information system at BMT Al-HUDA UNS Surakarta succeeded in significantly increasing the efficiency of savings management. This system was able to reduce transaction processing time from an average of 15 minutes (manually) to only 2 minutes, and reduce recording errors by up to 95%. his finding is in line with similar research conducted by Tripalupi et al. (2024) on the utilization of BMT digitalization to improve the accuracy of data reporting and financial data management. The advantages of this system lie in the real-time reporting feature that allows managers to monitor daily cash flow instantly, as well as a special module that ensures that all transactions comply with sharia principles. However, the main challenge faced is user adaptation to the new system, where 30% of staff require additional training to operate all features optimally.

6. Conclusion

Based on the research results, it can be concluded that the design of a web-based savings information system for BMT Al-HUDA UNS Surakarta is capable of significantly increasing the efficiency of savings management, reducing transaction time, minimizing manual errors, and providing real-time and accurate financial reporting. This system not only meets the operational needs of BMT in a campus environment, but is also in line with sharia principles, while supporting the digital transformation of Islamic microfinance institutions. For further development, it is recommended to integrate with the mobile banking platform and sharia payment gateway, as well as ongoing assistance to ensure optimal adaptation by users. This research is expected to provide a concrete contribution to the development of Islamic financial information systems, especially in the educational environment, and can be a reference for other BMTs who want to digitize savings services.

This study proves that digitizing the BMT savings system in a campus environment is not only feasible but also has a measurable operational impact. In contrast to the findings of previous research by Bashori et al. (2024) which focused on conventional BMTs, this system is specifically designed to address the unique needs of campus financial institutions such as integration with academic systems and the characteristics of members who are dominated by students. Recommendations for further development include: (1) adding mobile banking features to improve accessibility, (2) integration with sharia payment gateways, and (3) developing a system-based microfinance module. These findings also highlight the importance of ongoing assistance during the transition from manual to digital systems, especially for BMTs with limited resources. This study provides a practical contribution in the form of a system prototype that can be adopted by other campus BMTs with modifications according to the specific needs of the institution.

This study has several limitations, including the scope of testing which was only carried out in the BMT Al-HUDA UNS Surakarta environment so that the results cannot necessarily be generalized to other BMTs with different characteristics, especially those outside the campus context. In addition, this study only focuses on the development of a savings system without covering the financing module or further integration with external financial systems. Limited resources and time also cause usability testing to only involve a limited number of users, so further research is needed with a wider testing scale and a longer implementation period to comprehensively evaluate the effectiveness of the system, including aspects of data security and system resilience in the long term.

Acknowledgments

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