# Enterprise Architecture Design for Islamic Boarding School Cooperative Transaction Management System: Technology Solutions to Improve Efficiency and Security

Transaction

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#### Abstract

The development of information technology has had a significant impact on various aspects of life, including in the management of cooperatives, the existence of a transaction management system is also crucial in ensuring efficiency and security in every transaction made. This study aims to design an Enterprise Architecture System for a transaction management system for Islamic boarding school cooperatives, with a focus on increasing efficiency and security in every transaction that occurs. Through an approach using the TOGAF ADM (Architecture Development Method) Model, this study will produce a structured and detailed blueprint, which can be a guide in the implementation of a transaction management system. The successful implementation of this system is expected to improve the quality of service and user satisfaction in Islamic boarding school cooperatives. By facilitating transactions efficiently, providing clarity in every transaction, and improving data security, this platform is expected to provide a better experience for users of Islamic boarding school cooperatives.

Keywords: Enterprise Architecture Design, Transaction Management System, Islamic Boarding School Cooperative, TOGAF (ADM), transaction efficiency, transaction security.

### INTRODUCTION

The development of information technology has had a significant impact on various aspects of life, including the management of pesantren cooperatives. Pesantren cooperatives play an important role in supporting the economic welfare of students and the pesantren community through various business activities, such as providing daily necessities, savings and loan services, and trading goods and services. With advancements in information technology, pesantren cooperatives have a great opportunity to improve operational efficiency, transaction security, and information accessibility for members and cooperative managers.

In practice, pesantren cooperative management still faces various challenges, especially in terms of unsystematic transaction recording, inefficient inventory management, and financial reporting that often takes a long time and is prone to human error. Dependence on manual or semidigital systems often leads to delays in strategic decision-making and reduces transparency in financial management. Therefore, the implementation of information technology in pesantren cooperatives has become an urgent need so that transaction management systems can operate more accurately, quickly, and reliably.

Transaction management systems are a crucial element in maintaining efficiency and security in every transaction that occurs within pesantren cooperatives. In today's digital era, technology plays an essential role in refining transaction management systems so that pesantren cooperatives can optimize their operations and provide better services to their members. With a technology-based system, cooperatives can ensure that every transaction is recorded in real-time, reducing the risk of recording errors and providing better transparency for all cooperative members.

To overcome various challenges in managing pesantren cooperatives, the design of Enterprise Architecture (EA) using the TOGAF ADM model is an appropriate approach. EA helps establish a comprehensive framework by integrating strategic Information Systems/Technology (IS/IT) needs with the business objectives of pesantren cooperatives. TOGAF ADM (The Open Group Architecture Framework - Architecture Development Method) provides a systematic guide in developing an architecture that meets organizational needs, from planning to implementation. With this approach, pesantren cooperatives can design effective, efficient information systems that can evolve according to the organization's future needs.

The main challenge faced in managing pesantren cooperatives is the lack of structured and easily accessible technology utilization in transaction management. This issue causes many cooperatives to still rely on conventional methods that are inefficient and have a high risk of errors. Therefore, the development of a technology-based transaction management system is an essential step in improving operational efficiency and providing a better experience for pesantren cooperative members.

Through EA design with the TOGAF ADM approach, it is expected that the pesantren cooperative transaction management system will not only be a practical solution for members but also make a positive contribution to improving operational efficiency, transaction security, and more optimal interaction between pesantren cooperatives and their members. This study focuses on implementing EA design in enhancing pesantren cooperative transaction management by utilizing technology innovatively. With an integrated and technology-based system, pesantren cooperatives can be better prepared to face digital era challenges and provide better services to their members. This research is expected to serve as a reference for pesantren cooperative managers in adopting information technology to enhance the effectiveness and efficiency of their operations.

### **RESEARCH METHODS**

#### **Research Steps**

In this study, the author applies the TOGAF ADM architecture method, which consists of 10 phases. However, in the implementation of this study, only a few phases will be applied according to the needs of the Islamic Boarding School Cooperative Transaction Management System Information System design, including: Preliminary Phase, Architecture Vision, Business Architecture, Information Systems Architectures, Technology Architecture, Requirements Management, which will be explained as follows:

### **Preliminary Phase**

This phase is the initial stage which is the preparation of enterprise architecture and determines the scope of architecture that can be developed. So the things that must be described include determining the principles as a reference for architecture development (Principal Catalog) and identifying 5W + 1H.

#### **Requirements Management**

In this phase, the aim is to determine the architectural needs in designing the Islamic Boarding School Cooperative Transaction Management system:

- Core Business
- Organizational Issues
- Business Solutions

### **Architecture Vision**

This phase is the initiation phase of the architecture development cycle which includes defining the scope, and submitting approval to start architecture development. The needs explained at this stage include understanding the main key of the vision architecture, the contents of which are:

- Defining vision and mission.
- Determining the purpose of creating architectural planning for the Islamic Boarding School Cooperative Transaction Management System
- Definition of Organizational Structure and Its Duties

# **Business Architecture**

In this phase, the current business activities in the Enterprise Architecture of the Islamic Boarding School Cooperative Transaction Management System are analyzed, aiming to develop a business architecture to support the architectural vision and perform the desired architectural modeling.

- Identify current business activities for Islamic Boarding School Cooperative Transactions
- Designing the proposed business activity architecture using the use case model

# **Information Systems Architecture**

In this phase, it discusses the development of data architecture and application architecture as desired and emphasizes how the information system architecture is built including the data architecture and application architecture used by the Islamic Boarding School Cooperative Transaction Management.

### **Technology Architecture**

This phase is useful for defining the technology architecture to support the required information system architecture. To build a technology architecture, the following stages are needed:

- Network Architecture
- Technology platform.
- Required software and hardware specifications.

# **Data collection**

# Observation

Observation is an appropriate and explicit strategy in collecting information and means collecting data to be used as an object of study in a research. Observation is carried out to directly review the activities in the Islamic Boarding School Cooperative Transaction Management System Interview An interview is a meeting led by two individuals to exchange information or ideas through questions and answers, with the aim of tending to come to a decision or significance on a particular topic. The interviews were conducted to find and collect data by asking directly to the activity managers in the Islamic Boarding School Cooperative Transaction Management System, regarding services, security and other required data.

### Literature review

Literature study is used to make it easier for researchers to find and explore relevant information using theories used in the research process. This information can be obtained from various sources such as scientific works, books, and other sources.

### System Analysis Plan

According to Rosa AS and M. Shalahuddin, Unified Modeling Language (UML) is one of the standard languages widely used in the industrial world to define requirements, create analysis & design, and describe architecture in object-oriented programming. The UML diagram that will be described is:

1. Use Case Diagram

According to Murad, "A use case diagram is a status diagram that shows a set of use cases and actors (a special type of class)".

# 2. Activity Diagram

According to Sukamto and M. Shalahuddin, an activity diagram describes the work flow or activities of a system or business process or menu in software.

# **RESULTS AND DISCUSSION**

# **TOGAF Model Presentation Results 1. Preliminary Phase**

This stage defines the principles of architecture and identification of 5W+1H. The following is a table of Principles of Architecture and Identification of 5W+1H: a. Principles of ArchitectureThese principles help in the process of selecting the architecture used in system design, as in Table 1 below.

	Table 1. Principle Catalog					
NO	Principles of Architecture	Objective				
1.	Business Principles					
	The architecture created must be	Supporting the Islamic Boarding School Cooperative				
	in accordance with the System	Transaction Management System as an effort for				
	Management	Technology Solutions to Increase Transaction Efficiency				
	Islamic Boarding School	and Security				
	Cooperative Transactions:					
	Application Principles					
	In designing application	Ease of use of applications can increase the effectiveness of				
	architecture, the system must be	business processes				
	easy for users to use.					
	and easy in system development					
	Data Principles					
	Data Architecture must be	Data (information) and systems must be protected and data				
	Secure and easy to access	must be easily accessible when needed.				
	Data Principles					
	Technological Independence	Using software, hardware, and platforms to prevent				
		incompatible data				

b. 5W + 1H Identification

The identification of 5W + 1H aims to explain objects related to the Design of Enterprise Architecture for Islamic Boarding School Cooperative Transaction Management System, which can be seen in Table 2.

# Table 2. Identification of 5W + 1H

No Identification Objects and Descriptions
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1.	What	Objects: Scope of Architecture Description: Making the Design of the Enterprise Architecture Design for the Islamic Boarding School Cooperative Transaction Management System using the TOGAF model, which produces a design in the form of a service that provides services in the Transaction Process.
2.	Who	Objects: Who created the Enterprise Architecture Design for the Islamic Boarding School Cooperative Management and Transaction System? Description: Case study researcher
3.	Where	Objects: Where was this research conducted? Description: This research was conducted at the Insan Cendekia Islamic Boarding School
4.	When	Objects: When is the completion time for this design? Description: In December-January 2024
5.	Why	Objects: Why create an Enterprise Architecture design for a Cooperative Islamic Boarding School Transaction Management System? Description: Through the development of Enterprise Architecture (EA) for Islamic boarding school cooperative transaction management system, we aim to overcome the challenges faced by Islamic boarding school cooperatives in managing transactions efficiently and securely. Currently, many Islamic boarding school cooperatives face difficulties in managing transactions in a structured and secure manner, which can result in imbalances in financial records, complexity in transaction tracking, and data security risks. By implementing EA, we strive to create an integrated and structured framework, which allows Islamic boarding school cooperatives to optimize their transaction processes. This includes building a centralized information system to record and track all transactions, integration with secure payment methods, and implementing strict data security protocols. Through this approach, we hope to improve the operational efficiency of Islamic boarding school cooperatives, reduce the risk of errors in transactions, and provide better security for sensitive data and information. In addition, EA will also enable Islamic boarding school cooperatives to provide better services to their members by providing easier and more transparent access to their transaction information. Thus, the implementation of EA in designing Islamic boarding school cooperative transaction management systems will

		bring significant benefits in improving operational efficiency and security
6.	How	Objects: How to design an Enterprise Architecture for a Transaction Management System for Islamic Boarding School Cooperatives ? Description: Leveraging the TOGAF framework by implementing multiple Phases TOGAF ADM in EA design creates Islamic Boarding School Cooperative Transaction Management System

# 2. Requirements Management

# a. Core Business (Main Business Activities)

The Islamic Boarding School Cooperative has a main business activity that involves providing Transaction Management System services, including activities such as transaction recording, payment scheduling, and financial reporting. To improve efficiency and security in transaction management, the implementation of Information System/Technology (IS/IT) design is very important. Some of the objectives of this design include:

1). Utilizing information technology to speed up and facilitate transaction recording.

2). Improve the security and accuracy of transaction data.

# **b.** Organizational Issues

From the results of observations and analysis of business processes and activities at the Islamic Boarding School Cooperative, several problems were found that needed to be addressed, including:

1). Lack of utilization of information technology in recording transactions, where the process is still done manually using notebooks.

2). Limitations in financial reporting and transaction tracking that can cause difficulties in managing cooperative finances.

3). Low transaction data security that can result in the risk of data leakage or manipulation. To overcome these problems, it is necessary to implement technological solutions that can improve efficiency and security in the management of Islamic boarding school cooperative transactions. One approach that can be taken is to design and implement an integrated Enterprise Architecture (EA) that is in accordance with the needs of Islamic boarding school cooperatives.

### c. Business Solutions

The business solutions to existing problems can be seen in Table 3 as follows:

Table 3. Business Solutions

No	The problem		Repair
1	Means of Information	Delivery	Providing IS/IT that supports the delivery of information
2	Technology not optimal	that is	To overcome these problems, it is necessary to implement technological solutions that can improve efficiency and security in the management of Islamic boarding school cooperative transactions. One approach that can be taken is to design and implement an integrated Enterprise Architecture (EA) that is in accordance with the needs of Islamic boarding school cooperatives.

a. . Organizational Objectives

The objective of achieving the vision and mission of designing the Enterprise Architecture for the Islamic Boarding School Cooperative Transaction Management System: Technology Solutions to Increase Transaction Efficiency and Security involves several important aspects as follows:

1. Easy Access:

Ensuring that Islamic boarding school cooperative members and related parties can easily access the transaction management system, including intuitive navigation and a friendly user interface.

2. Excellent Customer Service:

Providing superior customer service to ensure the satisfaction of Islamic boarding school cooperative members and related parties, by providing fast, responsive assistance and effective solutions to questions or problems.

3. Transaction Security:

Ensure the security and confidentiality of transactions in the Islamic boarding school cooperative transaction management system, especially in terms of payments and financial management, so that cooperative members and related parties feel safe and confident in conducting transactions.

4. Operational Efficiency:

Improving operational efficiency in managing Islamic boarding school cooperative transactions, including processing, scheduling, and monitoring transactions. This aims to optimize the use of resources and increase the overall productivity of Islamic boarding school cooperative operations.

# b. Organizational structure

The following is the organizational structure of the Islamic Boarding School Cooperative Transaction Management System Design.

# c. Value Chain Analysis

Analyze the entire work process in the Islamic Boarding School Cooperative Transaction Management System using Value Chain analysis which aims to map all work processes that occur in the organization. The activity categories are divided into two, namely main activities and supporting activities, as in Figure 5 below.



Figure 1. Value Chain Analysis

# d. Main Activities

The main activities in the Islamic Boarding School Cooperative Transaction Management System include the following steps:

1. Member Registration, Prospective members of the Islamic boarding school cooperative first register through the Islamic boarding school cooperative transaction management system. They will be asked to fill out a registration form and provide the information needed to become a member of the cooperative.

International Journal Of Health, Engineering And Technology (IJHET) Volume 3, Number 5, January 2025, Page. 959 - 971 Email : editorijhess@gmail.com

- 2. Financial Transactions, Members of the Islamic boarding school cooperative can perform various financial transactions, such as deposits, withdrawals, or fund transfers. They can perform these transactions through the cooperative's digital platform, either through a mobile application or website.
- 3. Bill Payment, Members of Islamic boarding school cooperatives can use the transaction management system to pay various bills, such as membership fees, loan installments, or purchases of goods and services provided by the cooperative.
- 4. Loan Application, Members of the Islamic boarding school cooperative can apply for loans through the transaction management system. They will fill out a loan application form and apply online. The loan approval and disbursement process will also be carried out through this platform.
- 5. Financial statements, The system will generate periodic financial reports, including member account balance reports, transaction recapitulations, and cooperative financial reports. These reports can be accessed by cooperative members and other related parties for monitoring and evaluation purposes.
- 6. Inventory Management, The system can also be used for inventory management of goods and services available at the Islamic boarding school cooperative. This includes stock monitoring, reordering, and recording inventory changes.
- 7. Information Services, The platform provides clear information about cooperative products and services, membership procedures, loan terms and conditions, and other relevant information. This information must be updated regularly to ensure the accuracy and integrity of information to cooperative members.

### 4. Architecture Business

Architecture of Ongoing Business Activities Ongoing business activities on the System Islamic Boarding School Cooperative Transaction Management a. Described using a Use Case diagram as in Figure 2 below.



Figure 2. Use Case of Ongoing Business Activities b. Proposed Business Activity Architecture The proposed business activities in the Islamic Boarding School Cooperative Transaction Management System are described using a Use Case diagram as shown in Figure 3 below.



Figure 3. Proposed Business Activity Use Case.

- 1. Information Systems Architecture
- a. Data Architecture

This stage is the data architecture design stage. The researcher will describe the design in the form of activity diagram and database design . The following is an illustration:



Figure 4. Activity Diagram Report

Activity diagrams are used to describe the flow of events in a system use case with the aim of facilitating the steps in the flow of events. Activity diagrams do not need to be created for every flow of events, but will be very useful for complex and widening flow of events.



Figure 5. Class Diagram

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2. Technology Architecture

a. Network Architecture

Figure 6 below is a depiction of the proposed network architecture for the Islamic Boarding School Cooperative Transaction Management System.



Figure 11 Network Architecture

b. Blue Print

This Blueprint is designed to ensure that the Islamic Boarding School Cooperative Transaction Management System can operate efficiently, safely, and integratedly. Thus, it can provide better services to members of the Islamic boarding school cooperative and increase efficiency in carrying out daily transaction activities.



Figure 7 . Blue Print

### CONCLUSION

This study concludes that the Islamic Boarding School Cooperative Transaction Management System does not yet have a structured architectural design. The minimal use of technology in the system makes managers limited in providing information related to transactions, data security, and system integration. This affects operational efficiency and user experience in conducting transactions at the Islamic Boarding School Cooperative. As a solution, this study designs an Enterprise Architecture (EA) using the TOGAF ADM model to align the cooperative's business strategy with information technology needs. The blueprint resulting from the EA design includes details regarding the information system architecture and technology that can be integrated to support the business needs of the Islamic Boarding School Cooperative. This design aims to improve user convenience and operational efficiency in the transaction management process.

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