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Enterprise Architecture Design Using TOGAF Adm at PT. Industri Telekomunikasi Indonesia

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ABSTRACT

Telecommunications company PT. Industri Telekomunikasi Indonesia (INTI) has several main business lines, such as manufacturing and assembly, management services, digital services, and system integrators. The system integrator requires assistance from all business divisions to support its business activities, one of which is to assist the information technology function, which is responsible for information technology services. However, there are several obstacles that arise in the implementation of the information technology function, including data exchange that has not used the system optimally; lack of manpower; business process flow that is still less effective; and one business process that is still less effective and has not been supported by existing applications. The existing applications are not integrated. Thus, the right solution and in accordance with the needs must be generated through an enterprise architecture that can integrate information technology strategy with business strategy. TOGAF ADM is used to design enterprise architecture, which includes preliminary, architecture, and implementation phases.

1. INTRODUCTION

In technological developments that are becoming more massive from day to day, making changes and accelerations in almost all sectors, including Information Systems. Information Systems Technology in the current era is experiencing growth that is no less rapid (Longley & Cheshire, 2017). Especially for users of up-to-date information, fast and relevant information is needed. According to Lawu & Ali (2022), the factors that influence this are because the role of information technology is very much needed to plan or carry out information systems. The need for information really determines the running of business in an organization or company (Maria & Maulana, 2022). The more complex the business carried out in an organization, the need for information systems must be adapted to business needs (Parviainen et al., 2017). Information systems are used to make decisions in designing business strategies that are in line with business needs (Newell & Marabelli, 2015).

Use of information technology at PT. Industri Telekomunikasi Indonesia (INTI) plays a very important role in supporting the company's goals, vision and mission which can create synergy and develop the integrity of a business. To carry out a design that is in accordance with business strategy, an information system design architecture is needed, namely Enterprise Architecture which can be used as a as a reference in design. Enterprise Architecture helps describe the organization and also describes the status of the organization to improve the current condition of the organization in a better state

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(Foorthuis et al., 2016; Gong & Janssen, 2019). Enterprise Architecture supports information technology-based management regarding the development of integrated company performance across technological resources, information flows, business processes and strategic orientation.

One method in designing Enterprise Architecture is using TOGAF ADM (The Open Group Architecture Framework Architecture Development Method). Togaf ADM was chosen because it has a more complete process compared to other frameworks and is open source (Girsang & Abimanyu, 2021; Kornyshova & Barrios, 2021; Nasution & Hasan, 2021). TOGAF ADM offers flexibility in the use of elements, interoperability between layers, vendor neutrality, and alignment with strategic industry standards (Bondar et al., 2017). The purpose of this research is to find out what the current condition of the company's Enterprise Architecture is and make recommendations for enterprise architecture designs that might be used in the Information Technology function of PT INTI (Industri Telekomunikasi Indonesia).

In this context, the aim of this research is to improve corporate architecture at PT. Inti, a company operating in the technology industry, uses the TOGAF Architecture Development Method (ADM). A mature company architecture will help PT. INTI of improving operational efficiency, reducing costs, and increasing competitiveness in an increasingly competitive market.

In this research, we will discuss the TOGAF ADM framework, which consists of nine different phases: preliminary phase, requirements management phase, vision architecture phase, business architecture phase, information system architecture phase, technology architecture phase, opportunities and solution phase, migration planning, implementation governance phase. As time goes by, it is hoped that PT. INTI will have a clear business plan, an integrated business architecture, and a well-defined implementation roadmap for the proposed architecture.

Therefore, it is hoped that this research can make a significant contribution to the growth and development of an effective and established corporate architecture at PT. INTI. The findings of this study may also provide valuable advice to other businesses in leading industries that wish to use TOGAF ADM workforce standards in their enterprise architecture.

2. METHODS

2.1 Initiation Stage

This initial stage begins with collecting and understanding literature that can be used to study the basic explanation of the theory used to support enterprise architecture planning for this task. Apart from that, we also searched and understood previous research, such as journals related to the subject of the research being conducted. This is done to get an idea of how the research will be carried out.

From several studies that try to implement this enterprise architecture development methodology, we will try to briefly discuss how enterprise architecture can be designed at PT. INTI using the TOGAF ADM method. The reason for using the TOGAF method is because the TOGAF method matches plans and changes implemented based on needs and can evaluate the success of Enterprise Architecture development.

2.2 Data Collection Stage

This step starts with collecting data and going through identifying problems. At this stage, we also formulate what problems we want to address in this research. Data collection was carried out through several stages using understanding from previous literature studies and also supported by previous literature studies, as follows:

1) Previous literature study
   Reading previous literature studies is useful for understanding, providing a general overview and providing PT INTI data from previous research.

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2) Observation

Observations were carried out to collect further data and information regarding PT INTI.

2.3 Analysis and Design Stage

By using the TOGAF ADM structure, the analysis and design stages of company architecture are carried out in 9 (nine) phases. Initial phase, Requirements Management Phase, Vision Architecture Phase, Business Architecture Phase, Information Systems Architecture, Technology Architecture, Opportunity and Completion Phase, Migration Planning Phase, and Management Implementation Phase.

2.4 Analysis and Design Results Stage

This stage is the final stage of all research work carried out at PT INTI, which creates a design plan for the company architecture. Technological capabilities can be used in the development of corporate architecture. Apart from that, draw conclusions from the results of enterprise architecture design to provide suggestions for evaluation materials for future improvements.

3. RESULTS AND DISCUSSION

3.1 The Open Group Architecture Framework (TOGAF)

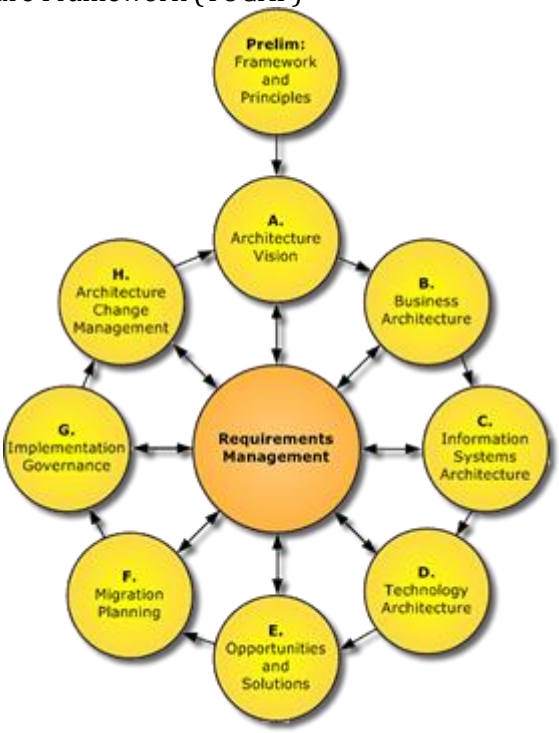

Figure 1. TOGAF ADM

According to Eskaluspita & Sumitra (2020) TOGAF (The Open Group Architecture Framework) is a transformation process that can be implemented systematically and documented strategic ideas and requirements in relation to a product or system. Chege et al. (2018) suggests that TOGAF is a framework originally operated by US Defense but has been used for many years in industries such as manufacturing, banking, and Education. Meanwhile, according to Proença & Borbinha (2017) TOGAF is used to develop enterprise architecture where there are detailed methods and tools to create, implement and maintain enterprise architecture, this differentiates it from other enterprise architecture frameworks.

It can be concluded, TOGAF is an Enterprise Architecture Framework that offers a complex approach in planning, design, implementation and management of information architecture following the depiction of the company's business strategy. TOGAF has several advantages, including that it can be used and accessed freely by all companies and organizations that want to develop Enterprise

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Architecture in their companies or organizations. In addition, TOGAF is also a standard framework architecture that provides methods and tools that can assist in the adoption, production, deployment, and maintenance of enterprise architecture. TOGAF consists of 7 parts, namely:

1) Introduction
2) Architectural development method (Architecture Development Method)
3) ADM Instructions and Techniques (ADM Guidelines and Techniques)
4) Architectural Content Framework
5) Business Suite and Tools (Enterprise Continuum & Tools)
6) TOGAF reference models (TOGAF Reference Models)
7) Architectural Capability Framework (Architecture Capability Framework)

3.2 Enterprise Architecture Design Using TOGAF

Enterprise Architecture Design using the TOGAF ADM framework has 9 (nine) phases that must be passed, including:

1) Preliminary Phase
   The stage of determining the scope of enterprise architecture to build management commitment in developing enterprise architecture.

Table 1. Principle Catalog

Architecture	Principle	Description	Rational	Implications
Business Principles	*Compliance With Law*	Every business operational function or process is carried out within technology functions, policies, procedures, etc. in accordance with applicable regulations	Every company in Indonesia, whether private or state-owned, must comply with these legal requirements and related practices	Operative actions or deviant behavior can be avoided and give customers confidence in the company
	Business Continuity	The company must continue to operate and be treated accordingly if there is a system error	An alternative system is needed that will ensure the continuity of business operations	Continuous and uninterrupted quality of operational activities can increase loyalty and trust of those involved
	Professional Human Resources	Develop the attitude of each HR in the company to be reliable and competent according to standards.	Personnel reliability affects the quality and service available in the company	Establish HR competency standards to recruit and develop the skills of company employees

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Architecture	Principle	Description	Rational	Implications
Data Principles	Data is an Asset	Data is a highly valuable commodity; it must be managed well	Data is one of the *resources* used to support operational decision-making activities for companies and individual interested people	The management of existing data must ensure that the information received is correct or the information received is created to provide accurate and precise information that can support operations
	DataSecurity	Personal information must be protected and also protected from misuse by unauthorized users	Data is a valuable asset and has great value for a company	Information data is the most valuable because the information received is factual and can be trusted
	Data is Accessible	Information can be accessed through all functions with a level of authority	Ease of access to information for stakeholders helps stakeholders collect and search for information according to decisions	Data classification or ownership requires assigned access
Application Principle	Technology Independence	This application does not depend on technology of course, so the application works on various technology platforms	Allows you to update applications, developed and functioning in the most efficient and timely manner	Application maintenance is needed to ensure that the application can work properly according to business needs
	Ease 0f use	Today's enterprise applications can be simple for users to understand and use	Make users feel comfortable using the application and make it better in user productivity in completing needs	There is socialization and education on the use of the application and includes a user manual

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Architecture	Principle	Description	Rational	Implications
	Application Authority	Application user authorization along with responsibilities for each function	The application used must be for business needs	Mapping information technology needs so that power can be distributed according to business needs
Technological Principles	Interoperability	Technology must meet the standards set by the company	Setting standards can help ensure system functionality and reduce operating costs.	Technical skills can maximize the functionality of standards-based applications obsessed
	Technological Reliability	Existing technology can be integrated with existing systems	Reliable technology can be a support in carrying out optimal company operational activities	Reliable technology that can support and optimize operational activities is maintained by the company for production
	Technology Security	This technology still needs to be protected and preserved from existing threats	Because this technique is successful in storing Confidential Information it must be protected by all from external or internal threats	Protection must also increase trust in the use of Company services to increase security

2) Requirements Management Phase
This phase is the second phase after the Preliminary Phase. At this point the aim is to analyze and examine all the needs of the organization and users, as well as identifying the problems faced by the organization and offering solutions to these problems.
3) Vision Architecture Phase
This phase determines the needs for designing an information system such as defining the scope, identifying stakeholders, creating an architectural vision, corporate goals and obtaining approval for architectural development.

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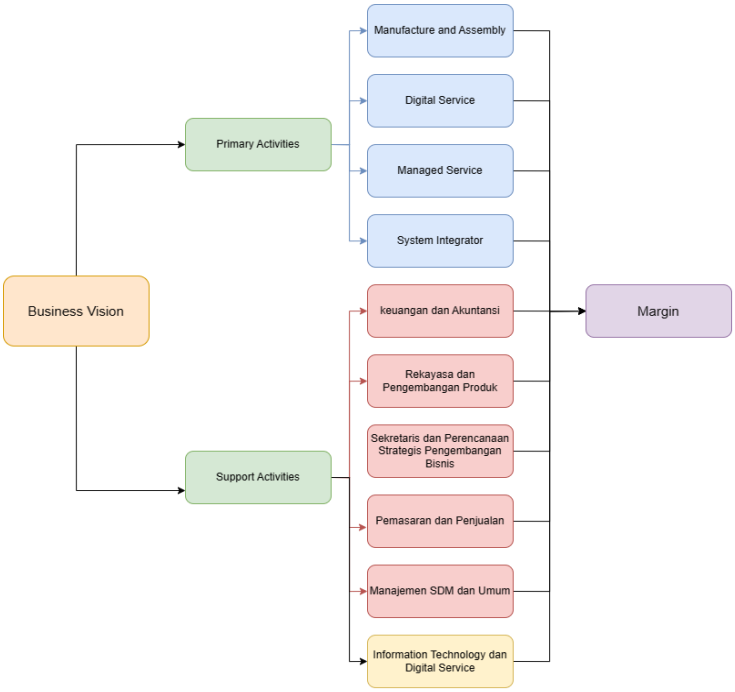

Figure 2. Value Chain Diagram

4) Business Architecture Phase
This phase involves creating a business architecture that supports the agreed architectural vision. The goal is to create a target business architecture that shows how the company should act to achieve its business goals and respond to the strategic drivers defined in phase A.

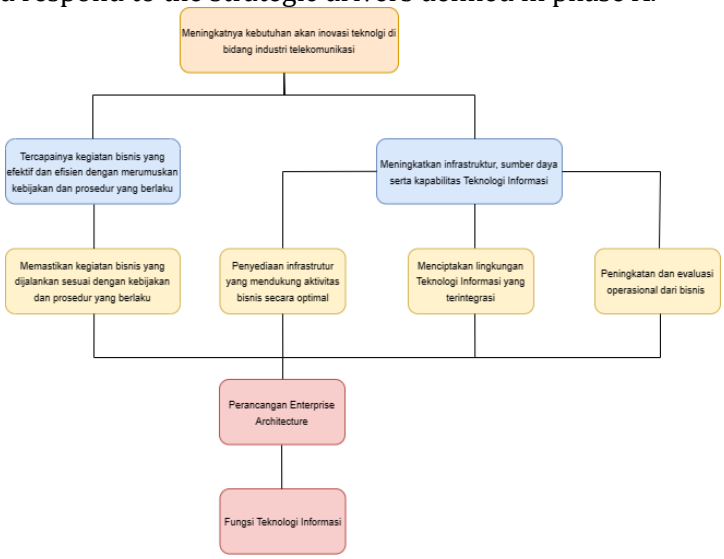

Figure 3. Business Footprint Diagram

5) Information System Architecture Phase
The goal of this phase is to plan the system architecture according to the proposed information. Techniques that can be used include ER-Diagrams, Class Diagrams, and Object Diagrams. This architecture contains 2 (two) domains, namely data and application, namely:

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a. Data Architecture

Data architecture describes relational identification based on existing business architecture. It also explains how data is connected to a process data schema. The relationship between data sets and applications with business services is depicted in a Data Distribution Chart.

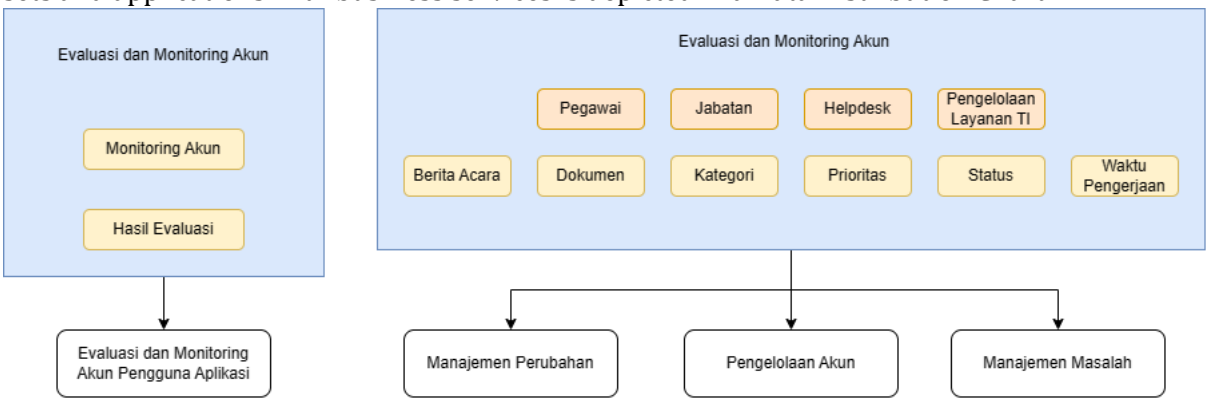

Figure 4. Data Dissemination

b. Application Architecture

The aim of application architecture design is to create a list of applications based on information systems in information architecture design.

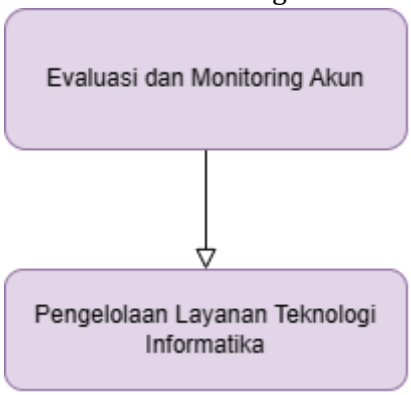

Figure 5. Application Communication Diagram

6) Technology Architecture Phase

Designing the desired technology architecture begins with determining the type of technology required using a technology portfolio catalog, which includes software and hardware. At this stage, we also consider the options required when selecting technology.

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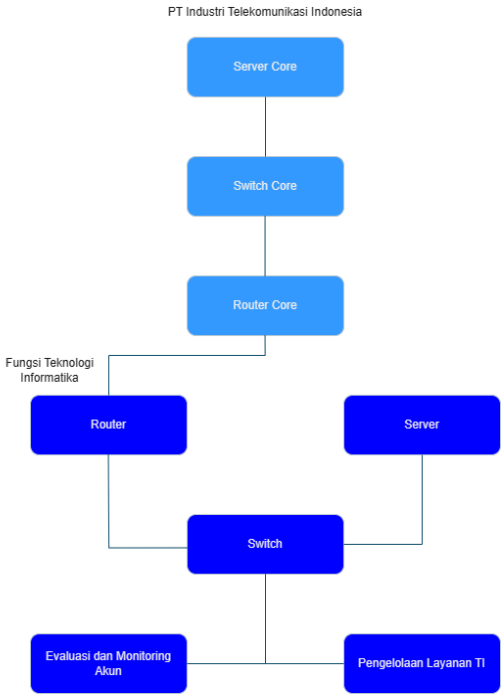

Figure 6. Technology Information Diagram

7) Opportunities and Solution Phase

This phase explains the identification of strategic parameters in the evaluation of the relationship between costs and benefits as well as implementation strategies and implementation plans. So that it becomes the basis for selecting a suitable architecture for stakeholders in choosing the architecture to be implemented.

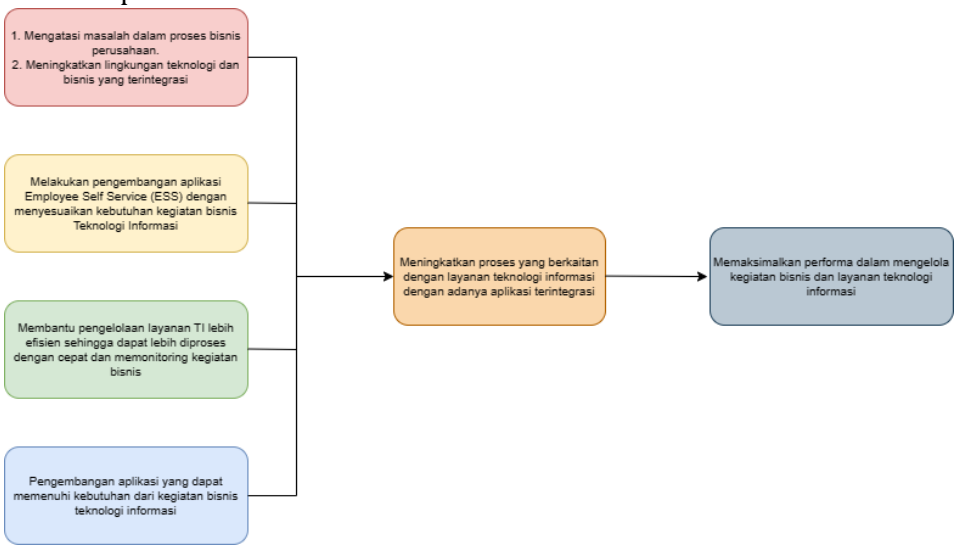

Figure 7. Benefit Diagram

8) Migration Planning Phase

In this phase, the transition plan from the old system to the new system is determined and the sequence of implementation of the proposed application design as well as the planning development plan for each proposed application is determined.

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Figure 8. Business Value assessment

9) Governance Implementation Phase
The phase in which recommendations are prepared to implement the governance that has been implemented. The management applied includes organizational management, information technology management and architectural management. This mapping of measures can also be integrated into frameworks used for management, such as COBITS of the IT Governance Institute (ITGI).

4. CONCLUSION

Enterprise architecture for designing information systems is needed to carry out designs that are in accordance with business strategy. The purpose of this research is to determine the current condition of Enterprise Architecture and make recommendations for Enterprise Architecture design that can be implemented in PT INTI's IT function. In other words, enterprise architecture is a broad field that includes many important subfields, such as information architecture, information security architecture, network architecture, and process architecture.

TOGAF is a transformation process that can be implemented systematically and records strategic ideas and requirements related to a product or system. TOGAF helps develop enterprise architectures and offers comprehensive methods and tools for creating, implementing, and maintaining enterprise architectures. This differentiates it from other enterprise architecture frameworks. TOGAF is an Enterprise Architecture Framework that offers a complex approach to planning, design, implementation, and management of information architecture that follows the depiction of an enterprise's business strategy.

TOGAF is used because this method matches plans and changes implemented based on needs and can evaluate the success of Enterprise Architecture development at the TOGAF analysis and design stage. The end of all research work at PT INTI is the analysis and design results stage. This is the stage of creating a design plan for enterprise architecture. The Vision Architecture phase determines the requirements for designing an information system, including defining the scope, identifying stakeholders, creating an architectural vision, corporate goals, and obtaining approval for architectural development.

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