ENTERPRISE ARCHITECTURE DESIGN USING TOGAF ARCHITECTURE DEVELOPMENT METHOD AT PT. TRAKINDO BANDAR LAMPUNG

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Abstract

This research employs The Open Group Architecture Framework (TOGAF) alongside the Architecture Development Method (ADM), which encompasses several phases: Preliminary Phase, Requirements Management, Architecture Vision, Business Architecture, Information System Architecture, Technology Architecture, Opportunities and Solutions, Migration Planning, Implementation Governance, and Architecture Change Management. The outcome of this methodology will include a comprehensive business architecture blueprint, data architecture, application architecture, technology architecture, gap analysis matrices for each architectural component, and a roadmap for application implementation tailored for PT. Trakindo. The design of the enterprise architecture aims to optimize the utilization of IS/IT to facilitate the automation of systems, particularly through the integration of procurement and sales application architectures across all departments. This initiative is anticipated to enhance the company's service delivery.

Keywords: *Enterprise Architecture, TOGAF, ADM.*

A. Introduction

The evolution of information systems (IS) and information technology (IT) has significantly accelerated the dynamics of business operations, compelling organizations to adapt in order to maintain their competitive edge. Enterprise Architecture (EA) plays a crucial role for organizations, as it facilitates the alignment of IS/IT with business requirements.

PT. Trakindo operates within the distribution sector, specializing in the sale of wall paint, oil paint, wood products, hardware, and various other items. Established in September 2016, the company has focused its sales efforts on military and building supply stores, as well as computer shops across the Lampung region. PT. Trakindo has experienced substantial growth, achieving monthly sales that reach approximately 2 billion across its various retail partners. Consequently, the implementation of Enterprise Architecture (EA) is essential for the company to effectively strategize and oversee its business expansion. Enterprise Architecture (EA), as defined by The Open Group (2009), serves as a comprehensive framework that outlines the business, information, and technology components necessary for fulfilling an organization's mission. It encompasses a set of principles, methodologies, and models that facilitate the design and implementation of an enterprise's organizational structure, business processes, information

systems, and infrastructure. This infrastructure includes hardware, software, and networks, all of which must function cohesively to support the organization's mission, goals, and objectives, thereby enhancing the efficiency of its business processes through the use of information technology.

Based on the background explained above, the following problems can be identified, PT. Trakindo does not yet have an Enterprise Architecture (EA) design for aligning business strategy and IS/IT strategy, PT. Trakindo already has more than one computer device owned by each part of the organization, but this investment has not been able to fully utilize IS/IT for data management, PT. Trakindo has problems in the internal and external environment, PT. Trakindo does not yet have an IT section in its organizational structure and does not even have employees who understand IT, so IT problems are only handled by experts or *freelance staff*.

Based on the problem formulation above, the limitations of this research problem are as follows, This research was conducted at PT. Trakindo to all employees / company divisions, The business processes carried out include the company's main processes such as the process of receiving goods from the factory, maintenance, delivery and sales as well as company support activities such as procurement, finance, employee organization and staffing, *The framework* used in this research is *The Open Group Framework (TOGAF) using the Architecture Development Method (ADM)* as an architectural development method, *Tools* used to describe architectural models use *Rich Picture, Value Chain Analysis, UML (Unified Model Language), Principal Catalog, Stakeholder Map Matrix, Data Dissemination Diagram, Application Portfolio Catalog, Technology Portfolio Catalog, Communication Engineering diagram, Matrix Gap Analysis, and Roadmap.* The UML diagrams used are *Use Case Diagrams and Class Diagrams.*

This research does not discuss how to prepare the budget required for the IS/IT strategic plan. From the problems that have been identified, the problem can be formulated: How to design an EA at PT. Trakindo can optimize the use of IS/IT in line with the company's business strategy. There are two objectives in this research, namely general and specific objectives.

B. Theoretical Basis

B.1 Understanding Design

The design process involves the selection of components, an analysis of their characteristics and physical properties, and the development of a schematic circuit through an evaluation of their functions. This approach ensures the creation of a tool that aligns with the desired specifications (Iqbal, 2013).

B.2 Enterprise Architecture Concept

Enterprise Architecture has three main components, namely business architecture, information systems architecture (divided into data and application architecture) and technology architecture. There are several criteria that are taken into consideration in choosing *a framework,* namely*: Taxonomy completeness, Process completeness, Practice guidance, Maturity model, Governance guidance, Portioning guidance, Vendor neutrality, Information availability, Time is value.*

B.3 Enterprise Architecture Framework

TOGAF provides a detailed method on how to build, manage and implement enterprise architecture and information systems called the *Architecture Development Method* (ADM) (Surendro, 2009). The combination of data and application architecture is also called information system architecture: Business architecture, Data Architecture, Application architecture.

B.4 Framework Selection

The Open Group Architecture Framework Architecture Development Method (TOGAF ADM) also explains the principles used as a measure to assess the success of Enterprise Architecture (EA) development where these principles are: Enterprise Principles, Principles of Information Technology, Architectural Principles.

The following is The Open Group Architecture Framework Architecture Development Method (TOGAF ADM) according to The Open Group along with the following explanation: Preliminary Phase, Phase A: Architectural Vision, Phase B: Business Architecture, Phase C: Information Systems Architecture, Phase D: Technology Architecture, Phase E: Opportunities and Solutions, Phase F: Migration Planning, Phase G: Implementation of Governance, Phase H: Architecture Change Management, Requirements Management.

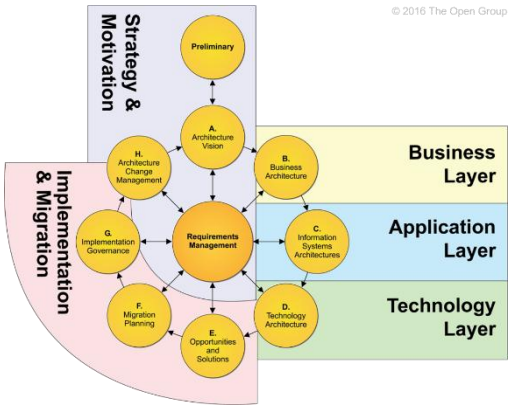

Figure 2.1. Stages in Modeling *the Open Group Architecture Framework Architecture Development Method (TOGAF ADM)* (Source: *The Open Group*)

B.5 Architectural Design Tool

This principle is also used as a tool to assist architectural governance that has change initiatives. (*The Open Group*, 2009).

1) *Principle Catalog*
2) The value chain aims to identify and group activities into two parts, namely main activities and supporting activities. The main activities consist of *inbound logistic, operations, outbound logistics, sales and marketing, servicing*.
3) *Stakeholder gap analysis matrix is* often used in the field of management and is one of the tools used to measure service quality (*quality of service*), there are 4 (four) gap gaps, namely: Management perception gap, Quality specification gap, Service delivery gap, Marketing communication Data dissemination gap.
4) *Application portfolio catalog is* useful for identifying and maintaining all existing application lists in the company.
5) *Communication engineering diagrams* describe the means of communication between technological architectural assets.
6) *The platform decomposition diagram* describes the technology platform that supports the operations of the information system architecture.
7) *Technology Portfolio Catalog* is to identify and maintain a list of all technologies used throughout the company, including *hardware, software* infrastructure and *software* applications. (*The Open Group*, 2009).
8) *A roadmap* is a direction for strategic, large-scale and long-duration development efforts.
9) UML is a consistent communication tool in supporting current system developers. UML is applied for certain purposes, including: Designing software, Means of communication between software and business processes, Describe the system in detail for analysis and find out what the system needs, Describe the system in detail for analysis and find out what the system needs.

C. Research Methodology

Business modeling at the Enterprise Architecture (EA) stage of this business modeling stage will be carried out in the following steps: The type of research used is 10 phases, Data collection methods, Research stage, Research Timeline.

This methodology provides a clear structure for conducting research on business modelling at the EA stage, ensuring thorough analysis and validation of the proposed business model. Let me know if you need any modifications or additional details on any section.

D. Results And Discussion

PT. Trakindo and *enterprise architecture* (EA) design using the *TOGAF ADM framework* starting from:

1) *Preliminary Phase* is the initial stage of design preparation (EA). After the principles have been established, a principal catalog is created. After the architectural principles have been determined, the next step is to identify *where, what, why, who, when* and *how for enterprise architecture design at* PT. Trakindo.
2) PT. Trakindo. In the *requirements management* phase, activities are needed before developing activities, first to analyze the system currently running at PT. Trakindo:
   a) Current system with richpicture and flowcharts for marketing, receiving, maintenance, delivery, sales, procurement, finance and personnel activities at PT. Trakindo.
   b) Organizational Issues found several problems experienced by PT. Trakindo to provide IS/IT support and Information system solutions only focus on application development.
3) *Phase A: Architecture Vision Organizational structure of PT. Trakindo Lampung branch is shown in Figure 4.1*

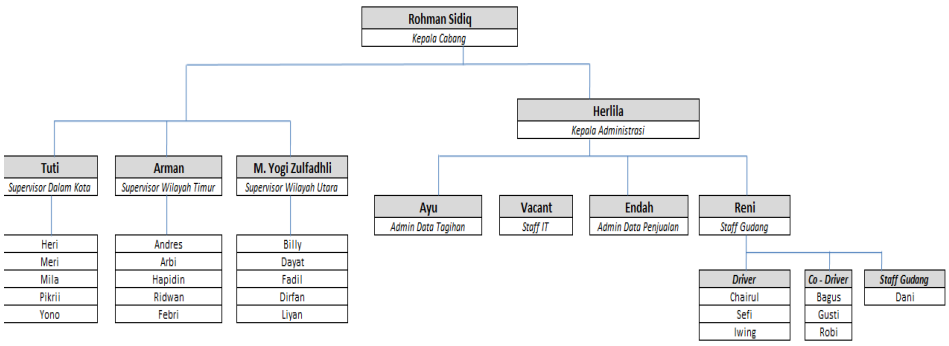

Figure 4.1. PT Organizational Structure. Trakindo Lampung Branch.

4) *Phase B*: Business Architecture PT. Trakindo. Activities in the *value chain* are divided into two groups, namely main activities and supporting activities. *Value chain* PT. Trakindo is shown in Figure 4.2.

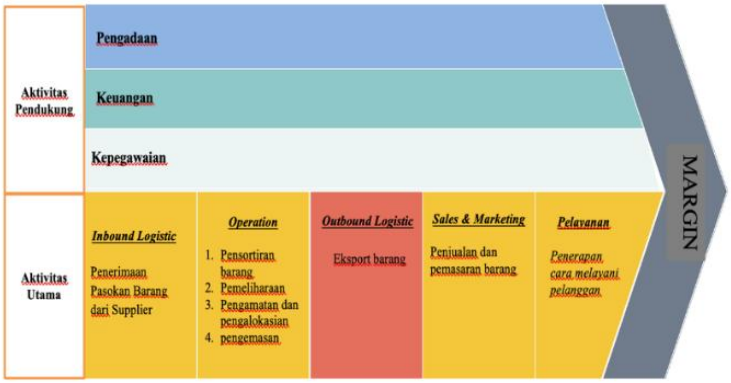

Figure 4.2. Value chain PT. Trakindo.

a) The main activities included in *value chain* activities consist of *inbound logistics, operations, outbound logistics, sales & marketing and servicing activities.*

b) Supporting activities consist of procurement, finance and personnel.

5) *Phase C: Information System Architecture* has application data consisting of: *Application Architecture* PT. Trakindo, namely the company website, sales application, procurement application, financial application and personnel application. The following is an explanation of each application design, Data Architecture is shown in Figure 4.3. connecting PT services. Trakindo applications and data.

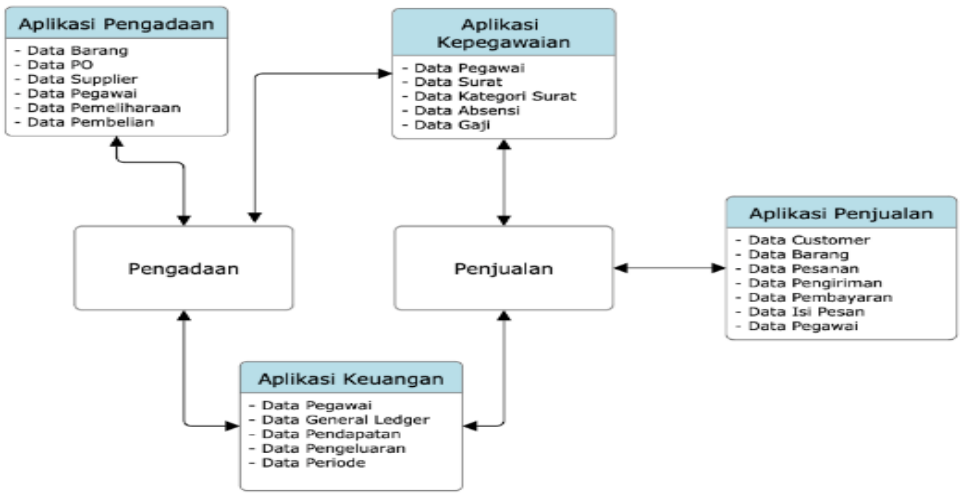

Figure 4.3. Data Design / Dissemination Diagram

6) *Phase D: Technology Architecture.*

a) Internal Network Configuration in Figure 4.4. illustrates the proposal network at PT. Trakindo where the two rooms are connected using *switches and wireless*.

Figure 4.4. Proposed Network Architecture

b) *The technology platform* describes that entire proposed system. At the client *interface level, external users* can access via a *web browser and the internet*. From the results of the technology architecture design previously presented, identification of technology architecture development or what is known as a technology portfolio can be produced as presented in Table 4.7.

Tabel 4.7. *Technology Portfolio Catalog*

Application	**Sales Applications**	**Procurement Applications**	**Financial Applications**	**Personnel Application**
Domain				
Persentation	MozillaFirefox	MozillaFirefox	MozillaFirefox	MozillaFirefox
DBMS	MySQL	MySQL	MySQL	MySQL
Web Platform	Windows *Server* 2018	Windows *Server* 2018	Windows *Server* 2018	Windows *Server* 2018
Application Platform	Apache& PHP	Apache& PHP	Apache& PHP	Apache& PHP
Database Platform	Microsoft SQL *Server* 2018	Microsoft SQL *Server* 2018	Microsoft SQL *Server* 2018	Microsoft SQL *Server* 2018
LAN	Ethernet	Ethernet	Ethernet	Ethernet
WAN	Internet	Internet	Internet	Internet
WAN *security*	*Firewall*	*Firewall*	*Firewall*	*Firewall*

7) *Phase E: Opportunities and Solution*

This phase will evaluate opportunities and solutions in the model that has been built using Matrix gap analysis.*Gap Analisys* Arsitektur Bisnis, *Matrix Gap Analysis of Application Architecture and Technology Architecture Gap Analysis Matrix.*

Tabel 4.9. Shows Application Architecture Gap Analysis Matrix.

	FUTURE	Website PT. Trakindo	Procurement Applications	Sales Applications	Financial Applications	Personnel Application	**Eliminated**
Existing							
New		**Add**	**Add**	**Add**	**Add**	**Add**	

8) *Phase F: Migration Planning* In this phase, the sequence of implementing information system applications will be described according to priority.

The implementation sequence uses an operational perspective to determine the implementation sequence of information system applications. The operational perspective is divided into two parts: *Front Office System and Back Office System.*

Based on the perspective above, the sequence of implementation of candidate applications is as follows:

Tabel 4.13. Implementation Sequence

No.	**Application name**
1.	*Website PT. Trakindo*
2.	*Procurement Applications*
3.	*Sales Applications*
4.	*Applications Financial*
5.	*Personnel Application*

9) *Phase G: Implementation of Governance* to maximize value creation and profits while minimizing risks associated with reform programs.

10) *Phase H: Architecture Change Management* to make changes to management/organization within the company. Main duties and functions (job Dest) of the position of additional IT staff employees on duty and supervision of the running of IS/IT in the Trakindo Company.

E. Conclusion

The business modelling analysis at PT. Trakindo offers significant insights into the intricate connections between the company's business functions and units. This detailed understanding highlights how different business functions rely on one another, emphasizing that each unit's responsibilities and outputs are essential to the overall operational success of the organization. By identifying these interconnections, the organization can now advance through further stages of enterprise architecture (EA), moving towards developing more robust data architecture and enhancing technology applications. This foundational work not only strengthens PT. Trakindo's internal processes but also supports more cohesive, aligned decision-making at every level.

Additionally, the data analysis has uncovered a shortage of IT personnel within the company, an issue that could impact productivity and the effective deployment of enterprise architecture solutions. To address this, PT. Trakindo may consider expanding its IT team by recruiting specialists with expertise tailored to the company's unique needs. Such strategic hiring would enable smoother implementation of advanced technology applications and improve overall productivity, aligning with the organization's goal of achieving operational excellence.

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