

Enterprise Architecture Design Using TOGAF ADM: The Case of KotaKita

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Abstract

One of the benefits of implementing enterprise architecture is creating harmony in between business and information technology for the needs of organization, beside that information system architecture is also a management practice and technology that is useful to improve company performance by allowing them to see themselves in terms of a holistic and integrated view of strategic direction, business practices, information flows and technological resources (Wiranti et al., 2020). The application of enterprise architecture is inseparable from how to plan an organization but also in designing enterprise architecture. In carrying out the design required a complete and easy methodology. TOGAF (The Open Group Architecture Framework) as a framework for building generic enterprise architectures provides complete and easy-to-understand and implement stages. Currently there are not many applications or systems that provides local city information, communication and social media (events, tourist sites, business listings, communities, so on and so forth). Although there is, the application or system does not provide information in an informative manner, the information is scattered in various sources. KotaKita is a product which will be build by startup organization to fill the gap and providing the information on the locality of areas throughout Indonesia, KotaKita can be used as a means of communication of local regional social communities. The Implementation of enterprise architecture (EA) in startup organizations is not a must, but the implementation of enterprise architecture will be very useful in building an architectural blueprint that can be used to make better plans and decisions.

Keywords: Enterprise Architecture; TOGAF (The Open Group Architecture Framework); ADM (Architecture Development Method); Archimate

1. Introduction

The rapid development of information technology (IT) presents business with all the challenges that must be overcome in order to run more profitably, efficiently and cost-effectively to provide better, and faster services (Puspitasari & Kamisutara, 2022). The development of this information system needs to be in line with the organization's goals. Many organizations either established or startup (specific to the startup using information technology as their foundation) do not focus on information systems and business process when they are firstly built and as they operate, so there are many startup organizations have lost their way and spent a lot of unnecessary costs causing the organization to suffer losses and not a few also

closed their services. Enterprise Architecture (EA) is the process of developing an abstract perspective of an enterprise that enables those within the enterprise to make better plans and decisions. Enterprise Architecture itself goes beyond technology by adding strategic planning as the main driver of the enterprise, and business planning as a resource most programs and resources needed (*Hawaii International Conference on System Sciences 2020.*, n.d.).

There were many alternative frameworks that were used, such as Zachman Framework, EAP, EAS, BEAM, TOGAF ADM, and GEAF (Hasibuan et al., 2020). The open Group Architecture Framework (TOGAF) is a framework for enterprise architecture that offers a method for

designing, planning, implementing, and managing enterprise information technology architecture (Sukiman & Zulganef, 2023). TOGAF provides a detailed method of how to build, manage and implement enterprise architecture and information systems called the Architecture Development Method (ADM). In addition, TOGAF is also provides complete overview method not only how to build but also how to manage and implement frameworks and information systems which used to describe an enterprise architecture development model for organizations so that it can be used as a recommendation in the development of integrated systems (Ulmi et al., 2020).

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2. Theoretical Framework

2.1 Architecture

Architecture is the art and science of designing the built environment, or the product of such a design. Thus, the term architecture can encompass both the blueprint for a building and the general underlying principles (Lankhorst, n.d.).

2.2 Enterprise Architecture

Enterprise is a group of organizations or governments that have the same goal. Architecture can be said to mean for companies or organizations that can describe buildings and other structures, design styles and methods of construction of buildings and other physical structures. Enterprise architecture is a collection of methods, principles and models that help to design and realize organizational structures, business processes, information systems and infrastructure in enterprises. The main goal is to realize business alignment with information technology. Enterprise architecture produces a blueprint for organizing all enterprise business processes, supporting technologies, and information needed by the

company (Open Group (Reading & Van Haren Publishing., 2009).

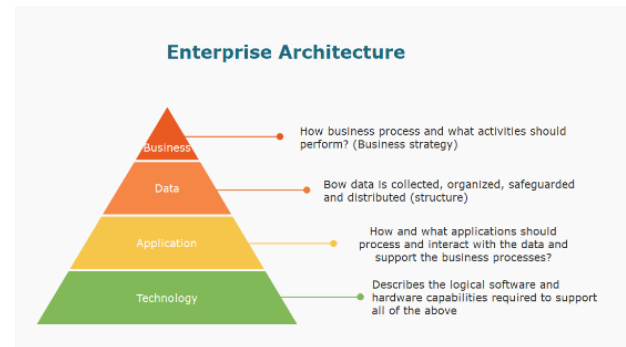


Figure 2. Enterprise Architecture layers

2.3 TOGAF

The Open Group Architecture Framework (TOGAF) originated as a generic framework and methodology for development of technical architectures, but evolved into enterprise architecture framework and method .

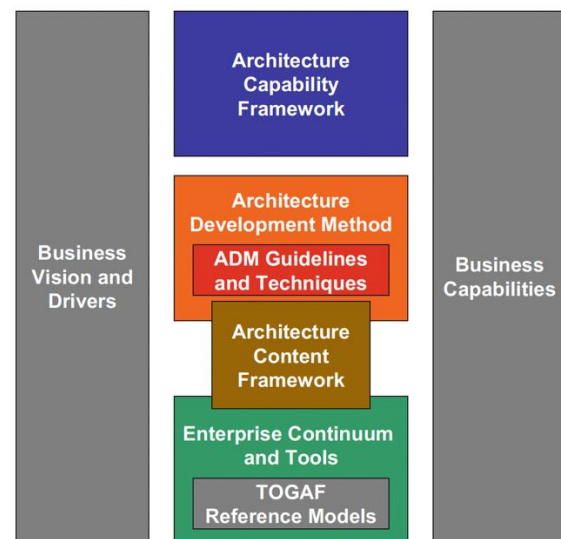


Figure 1. TOGAF 9.1 (The Open Group 2011)

TOGAF has the following main components (Lankhorst, n.d.):

- An Architecture Capability Framework, which addresses the organization, processes, skills, roles, and responsibilities required to establish and operate an architecture function within enterprise.
- The Architecture Development Method (ADM), which provides a 'way of working' for architects. The ADM is

considered to be the core of TOGAF, and consists of a stepwise cyclic for the development of the overall enterprise architecture.

- The Architecture Content Framework, which considers an overall enterprise architecture as composed of four closely interrelated architectures: Business Architecture, Data Architecture, Application Architecture, and Technology (IT) Architecture.
- The Enterprise Continuum, which comprises various reference models, such as the Technical Reference Model, The Open Group's Standard Information Base (SIB), and The Building Blocks Information Base (BBIB). The idea behind the Enterprise Continuum is to illustrate how architectures are developed across a continuum ranging from foundational architectures, to an enterprises's own individual architecture.

2.3 TOGAF ADM

TOGAF ADM is an architectural development method, providing a step-by-step approach as well as guidelines for carrying out the steps to be carried out. TOGAF ADM describes a method for designing an enterprise architecture and designing the core of TOGAF. The goal of TOGAF ADM is to integrate existing documents in TOGAF like other architectural assets to meet the business and IT needs of the company (Fikri et al., 2020).

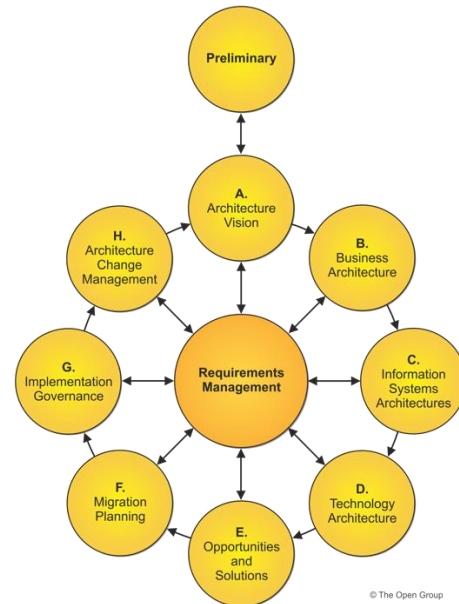


Figure 2. TOGAF Development Cycle

2.4 Archimate

Archimate is an Enterprise Architecture modeling language that can describe and provide visualization of relationships in all business and technical domains, and offers a common language in describing the construction and operation of business processes, organizational structures, information flows, information technology, and technical technology infrastructure (Jonkers et al., 2009).

3. Methodology

The stages of the research start from the literature study to produce a blueprint. The sequence of research implementation can be seen on figure 3.

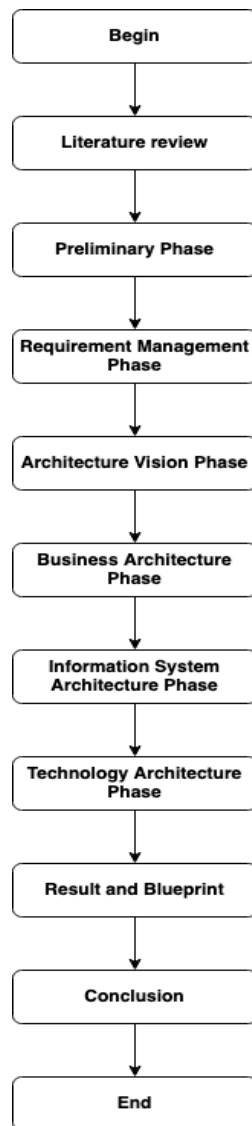


Figure 3. Methodological Stages

The process of designing enterprise architecture from the preliminary phase to the TOGAF ADM technology architecture. Analyze each phase to produce a blueprint. Detailed explanation of the stages of enterprise architecture planning consisting of the preliminary phase and requirements management in companies.

3.1 Preliminary Phase

This phase is the initial stage in developing enterprise architecture (EA), the initial stages are defined as defining the research principles and framework, the methodology to be used, determining the framework. The preliminary phase aims to determine an architecture that can be used by looking back at the state of the organization, as

well as carrying out the process of identifying the scope of enterprise architecture, identifying frameworks, methods and processes that are in accordance with architectural capabilities.

3.2 Requirements Management Phase

This phase aims to obtain detailed requirements by documenting user requirements (Open Group (Reading & Van Haren Publishing., 2009). In this phase there are stages in the process of identifying and managing the needs of the organization, stakeholder satisfaction with the decisions.

3.3 Architecture Vision Phase

This phase conducts several analyzes such as enterprise profile, organizational structure, scope, business goals, business objectives, identification of stakeholders, and obtaining approval to be able to map out all the desired strategies (Yunis & Surendro, n.d.).

3.4 Business Architecture Phase

This phase describes the business architecture, defines the business activities to be used (Open Group (Reading & Van Haren Publishing., 2009). Business Architecture also aims to analyze data requirements for business processes. The purpose of this phase is to find out the business processes which are then made design materials for a system. Another goal of this phase is to describe the current and desired state of the business architecture and analyze the gaps between the two.

3.5 Information System Architecture Phase

The information system architecture phase describes the information architecture to be designed (Open Group (Reading & Van Haren Publishing., 2009). This architecture includes application architecture and data architecture. Data architecture describes how data can be used for the needs of business functions and service processes. The focus of application architecture is on determining the appropriate application system to process, support data and business.

3.6 Technology Architecture Phase

Technology architecture aims to build a technology architecture in accordance with existing requirements by describing the required software,

hardware and network infrastructure and also identifying existing information technology infrastructure. Technology Architecture produces several artifacts, namely technology standards catalog, technology portfolio catalog, application / technology matrix, environments and locations diagrams and platform decomposition diagrams (Herman et al., 2017). The goal in this phase is to support the data and application architecture.

4. Experiment Result

4.1 Preliminary Phase

The initial stages of planning on the KotaKita system are determining the boundaries and describing the principles of enterprise architecture.

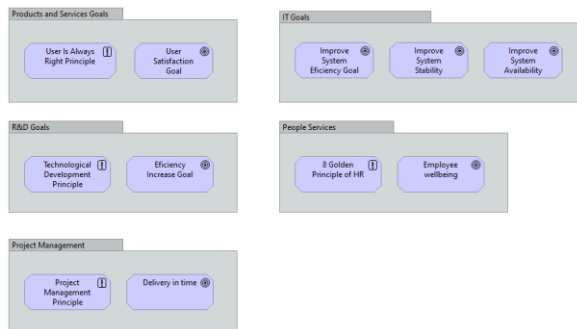


Figure 3. Goals and Principles Viewpoint

4.2 Requirement Management Phase

The requirements management phase is a phase related to KotaKita's business strategy plans and key IT solutions. The steps taken in the business strategy are the process of identifying problems, in the organization, with human resources and time needed. The requirements needed in the information technology architecture include functional and non-functional features.

4.3 Architecture Vision Phase

The stages in the KotaKita architecture vision phase are identifying stakeholders and business drivers, determining the scope and developing the architectural vision.

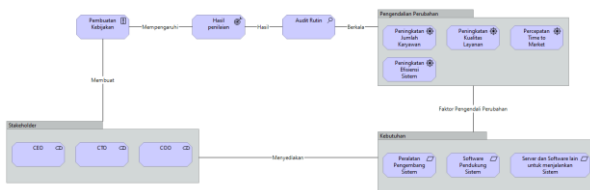


Figure 2. Stakeholders and Drivers

4.4 Business Architecture Phase

In the business architecture phase, the process of describing the business architecture is carried out, starting from the business model canvas and organizational structure.

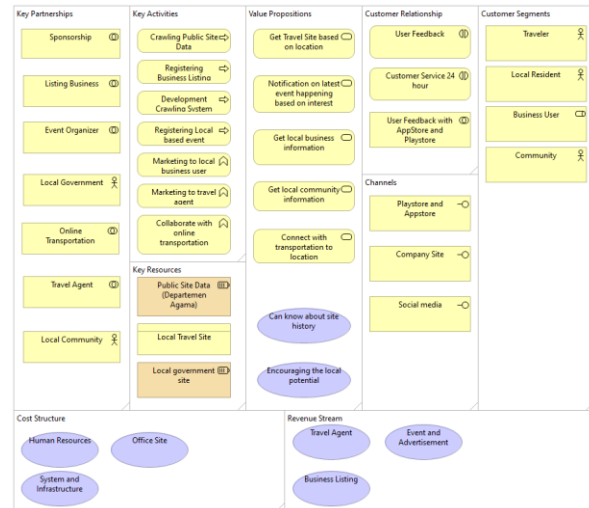


Figure 3. Business Model Canvas

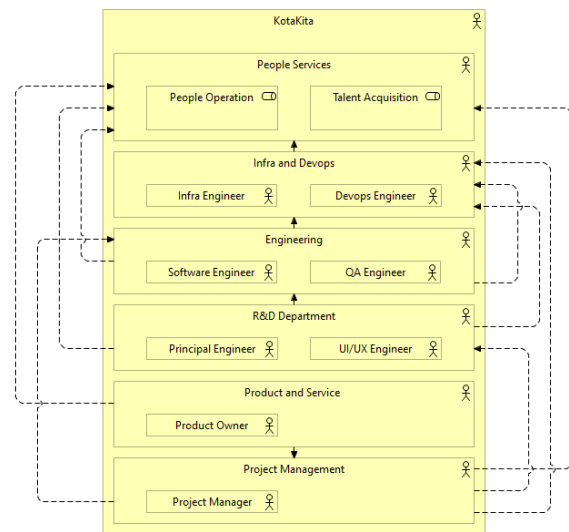


Figure 4. Organizational Structure

4.5 Information System Architecture Phase

There are two architectures, namely application and data in the KotaKita information system. Data architecture is used to design data in information systems, while application architecture discusses the application to be designed.

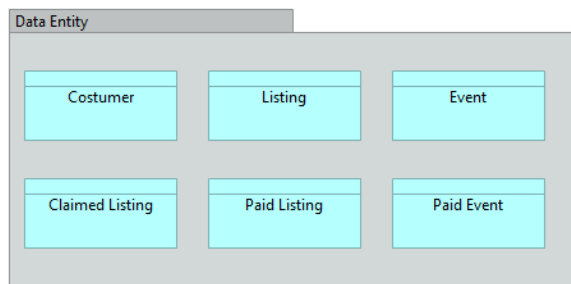


Figure 5. Data Entity

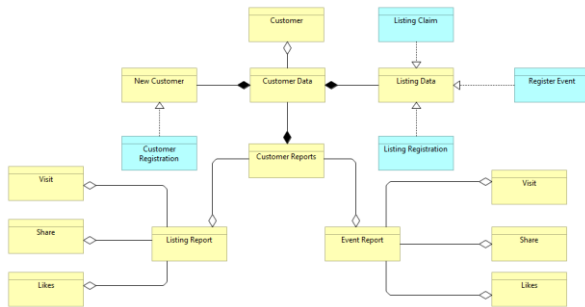


Figure 6. Relationships between data entities and business functions

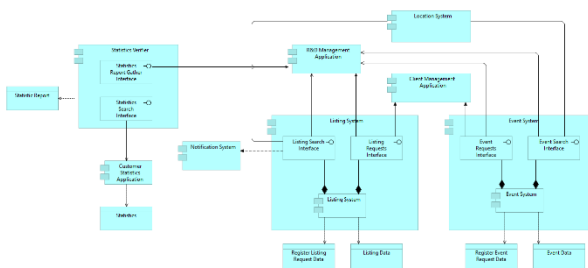


Figure 7. Communication between applications.

4.7 Technology Architecture Phase

Network topology and technology and application relations in the KotaKita technology architecture.

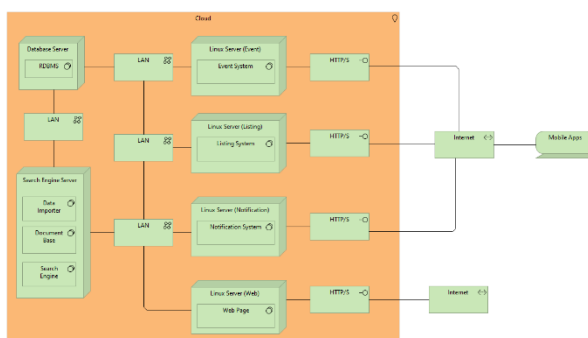


Figure 8. Technology Architecture Baseline.

5. Conclusion

Based on the results of the research made by the author, the following conclusions can be drawn:

Designing enterprise architecture using TOGAF ADM from the preliminary phase. The requirements management phase provides the architectural requirements management process. Phase A of this architecture vision conducts an analysis of the company profile. Phase B of business architecture to define business processes and then create design materials for business process conditions. Phase C information system architecture consists of two parts which include the application architecture and the data used. Phase D of the technology architecture defines the technology needed to help align the application and data architectures.

The design of enterprise architecture is very useful as a foundation for business and technology architecture so that it is easier to develop in the future.

The design in Technology and Architecture phase using TOGAF ADM can be applied only to organization with specific vendor, for agnostic vendor such as the use of cloud computing technology be better to combine TOGAF ADM with CORA model (Elzinga et al., n.d.).

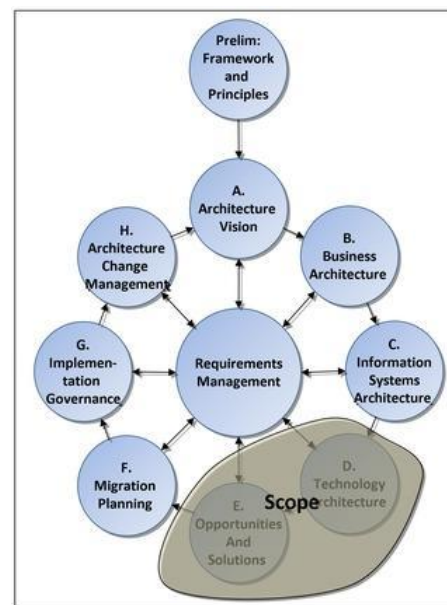


Figure 1. The scope of CORA in relationship with ADM.

6. Future Work

In the next research, it is hoped that the research will be carried out in more detailed phases according to the sequence in TOGAF ADM, namely phase E opportunities and solutions, phase F migration planning, phase G implementation governance, and phase H architecture change management so that the implementation of enterprise architecture planning becomes easier and better.

The use of the CORA model (<https://coramodel.com/>) combined with TOGAF ADM can help provide more detailed information on technology architectures and application architectures that are currently trending using cloud based (Elzinga & Smiers, 2011).

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