Information System Architecture Planning with the Open Group Architecture Framework

R A Nugraha, Y Handoko
Faculty of Engineering and Computer Science, Universitas Komputer Indonesia, Bandung, Indonesia.

Email: rizaliahmad@email.unikom.com

Abstract. The purpose if this research is to develop a blueprint that can be used to build Information System Architecture that can integrate business and information technology with the aim of increasing the effectiveness and business efficiency of the company. The method used is TOGAF-ADM so that it is more flexible in verifying various types of modelling techniques used in designing information systems. The results of this study in the form of preliminary data collection from the TOGAF framework stage which in the future can be used for information system development that can be used at PT. Corocot Digital Creative.

1. Introduction
The use of information systems is currently very influential on business development. Almost all lines of business have used information systems to support business operations. With the right business strategy and supported by the existence of an information system in a company that would greatly affect profits and could increase competitiveness very high in the business world. The development of increasingly complex organizations has resulted in the increasing need for information and data. To meet these needs, it is necessary to develop an integrated information system that can support business processes running in organizations that provide quality data or information that aims to reduce costs, increase productivity, provide facilities for sharing data and information and improve customer service [1].

One important strategy in dealing with the development of information technology is the use and improvement of information system support for the enterprise. The implementation of this strategy creates a mission in information systems whose fulfillment requires integrated direction in planning, implementation and control that is aligned with the enterprise business strategy. The driving factor for the use of information technology in organizations is the increasing need for the functions of services being carried out. The impact of all this is that many organizations are competing to implement information systems with their technology, only by paying attention to momentary needs and allowing the implementation of information systems that overlap with each other and the existence of system islands that are different from one another. These conditions make the information system unable to be used as expected based on the mission and objectives of the application of information technology, namely efficiency and effectiveness in meeting organizational needs, starting from meeting the needs at the highest level in the organization to the lowest needs, namely operational needs.[2]

To produce an information system architecture design that is in accordance with the research, it is necessary to have a framework that is used. This study discusses architectural planning for mapping information systems using the Open Group Architecture Framework Architecture (TOGAF-ADM).
results of this study in the form of preliminary data collection from the TOGAF framework stage which in the future can be used for information system development that can be used at PT. Corocot Digital Creative.

2. Method
The method used in planning the development of information system architecture in PT Corocot Digital Creative is using the TOGAF-ADM framework, which will later produce a blueprint that can be used to build information systems. This research is only done until the preliminary process of the entire TOGAF-ADM framework stages.

TOGAF is an architecture framework that enables to design, evaluate, and build the right architecture for an organization. It is a mature Enterprise Architecture framework that is widely adopted by enterprises. TOGAF framework doesn’t specify the architecture style, it is a generic framework TOGAF can be used in developing architecture. It consists of three main parts: The Enterprise Continuum, The TOGAF Resource Base and The TOGAF Architecture Development Method (ADM) [3]. ADM proposed a number of architectures shown and described below in Figure 1.

![Figure 1. TOGAF-ADM [3]](image)

- Preliminary phase: this phase allows defining an Organization-Specific Architecture framework and the architecture principles. According the Dave Hamford, this phase is not a phase of architecture development [3].
- Phase A. Vision Architecture: this phase allows defining the scope of the foundation architecture effort, creating the vision architecture supporting requirements and constraints and obtaining approvals to proceed [3].
- Phase B. Business Architecture: this phase enables developing the detailed business architecture for analyzing the gaps results [3].
• Phase C. Information System Architecture: This phase enables describing the Information Systems Architectures for an architecture project, including the development of Data and Application Architectures [3].

• Phase D. Technology Architecture: This phase enables developing a technology infrastructure that is used as a foundation for identifying all components that will support the development, implementation and deployment processes [3].

• Phase E. Opportunities and Solutions: This phase enables identifying opportunities and solutions and implementation constraints to deliver a more consistent architecture implementation [3].

• Phase F. Migration planning: This phase allows choosing and prioritizing all work packages, projects and to create, evolve and monitor the detailed implementation and migration plan providing necessary resources to enable the realization of the transition architectures [3].

• Phase G. Implementation Governance: this phase allows providing an architectural oversight of the implementation [3].

• Phase H. Architecture Change management: this phase allows establishing procedures for managing change to the new architecture [3].

• Phase Requirement Management: This phase allows managing architecture requirements throughout the Architecture Development Method (ADM) [3].

This study uses a case study descriptive approach. To understand phenomena that have been focused more deeply, the methods used in research are quantitative methods [4].

The methods used in this study are divided into 3 process:

a. Study Literature
   The study of literature as a reference for obtaining a process design includes several ways, as follows:
   1. Library search, namely research carried out by exploring the relevant literature and with regard to the research topic under study [1].
   2. Direct observation of the company by conducting interviews with the parties concerned.

b. Preliminary Stage (TOGAF)
   This phase allows defining an Organization-Specific Architecture framework and the architecture principles. According the Dave Hamford, this phase is not a phase of architecture development [5].

c. Data Collection
   After determining the stages to be carried out in the preliminary stage, then data collection will begin by observing and interviewing the company directly.
The method is illustrated in Figure 2:

![Diagram](image)

**Figure 2. Model Design [6].**

### 3. Results and Discussion

The preparation stage (Preliminary Stage) is a stage to determine the scope of the Enterprise Architecture (EA) to be developed and determine the commitment with management in the development of an information system architecture [7].

#### 3.1. Requirement Analysis

To ensure that the enterprise architecture designed can help enterprises meet their strategic needs and objectives, the enterprise architecture requirements need to be determined. These requirements will be used as references while designing the enterprise architecture [8].
• Company IT and IS Capabilities
  Company has good and structured IT division that running on main company business, it has CTO as the leader ring, IT Manager, Web Division, Mobile Division, Network Division and Designer. It is conclude that the company has the capability to build the information system based on architecture.
• Predefined Application
  Based on observations and interviews, PT Corocot Digital Creative's company still does not have an independent information system that is currently running. All data and company activities are recorded using office applications.
• Infrastructure
  Currently company using third party for managing Infrastructure. Network division only manages system and application in the cloud.

3.2. Organization Structure
PT Corocot Digital Kreatif (CRCT) is a company engaged in IT Consultants and creative digital which was established on November 13, 2015 in the city of Jakarta. The company's Head Office is located at Graha Mampang Suite 101 1st Floor, Jl. Raya Mampang - South Jakarta and Workshop or commonly called Small Headquarters located at Komplek Ruko Lokasari Jl. Nusantara No. Defense A12 of Kelapa Dua - Depok. The company which has the slogan "When Technology Fallin’ In Love with Art" consists of 4 people as the main team or can be called the founder. Instead it is called an IT company, CRCT is more likely to be a gathering place for people who have high motivation to work in creative IT and digital fields.

  After direct observation and interviews with the company, data on the organizational structure that is currently running is obtained. The company is run by two core structures namely the Chief technology Officer (CTO) and the chief executive officer (CEO).

  CTO runs all activities that are directly related to the technology used and will be built by companies, under the CTO there are several positions that help namely IT Manager, Web Division, Mobile Division, Network Division, Designer, Web Programmer and Mobile Programmer.

  The organizational structure that currently used at company is described in Figure 3:

![Figure 3. Organization Structure 1](image-url)
While the CEO holds all business processes that run within the company. A CEO is assisted by several positions namely Sales Manager, Finance Manager, HRD Staff, Sales Head Area, Sales, and Financial Staff as shown on Figure 4.

![Organization Structure 2](image)

**Figure 4. Organization Structure 2**

As illustrated in figures 3 and 4, PT Corocot Digital Creative divides its organizational structure into 2 parts. IT division and Management Staff.

### 3.3. Business Modelling

The main business of the company is developing PPOB (Payment Point Online Bank) products and working on demand projects from other companies as well as marketing products that have been developed in collaboration with several other companies.

a. **Planning**  
   Business analysts build and plan a business framework according to the needs that occur in the field and describe it in the form of flowchart and database design [9].

b. **Developing**  
   After the design of the business model framework was created, then developers and designers built a system based on blueprints and flowchart that had been made before.

c. **Testing**  
   At this stage, the quality control department tests the application to ensure that the system created is in accordance with the planned blueprint.

d. **Implementation**  
   Furthermore, after making sure all application functions are running accordingly, implementation is carried out on the production server.
e. Marketing
   After being implemented, then the sales department then marketing the product.

The product business model is illustrated in Figure 5:

![Figure 5. Current Product Business Model](image)

The planning phase contains map needs, define business model, flowchart, and database design then is given to the developer and designer from the analysts. The development phase contains UI design, prototyping, web, and mobile app which will be given to the QC. The testing phase works on a series of performance, security, and UI test which then is going to be given to the developer. The first implement phase works on the implementation in production stage which will be given to sales while the second works on the product launching, introduction, and training which then be given to the client. In addition to developing product applications, the company's main business also works on applications based on projects or requests from clients.

a. Project Request
   At this stage, the company receives a request for the creation of a system from the client.

b. Planning
   After an agreement with the client is made, the system analyst department starts collecting data from the client by plunging into the field to see how the business process runs and provide questions to the client directly.

c. Developing
   After the design of the business model framework was created, then developers and designers built a system based on blueprints and flowchart that had been made before.

d. Testing
   At this stage, the quality control department tests the application to ensure that the system created is in accordance with the planned blueprint and user need.

After all stages are completed, the application will be submitted to the client. The project business model before being delivered to client is shown on Figure 6.
3.4. Technology Architecture
At present the company uses cloud technology for products or application that are made to support business processes that are running which is shown on Figure 7.

Figure 6. Current Project Business Model

Figure 7. Typical Cloud technology [10]
4. Conclusion
Based on the data collected at the TOGAF-ADM preliminary stage, it is hoped that an information system architecture planning can be built which can integrate all corporate entities, starting from HRD Management, Finance Management, IT Management, Project Management and Product Management.

References
[1] Irfanto, R., & Andry, J. F. (2017). Perancangan enterprise architecture menggunakan Zachman framework (studi kasus: pt. vivamas Adipratama). Prosiding Semnastek.
[2] Sanny, M. Y., Sya’roni, D. A. W., & Suryana, T. (2012). Enterprise Architecture Planning Sistem Informasi Puskesmas Pasirkaliki. Majalah ilmiah UNIKOM, 10(1), 77-92.
[3] Safitri, N., & Pramudita, R. (2017). Pengembangan Kerangka Kerja Arsitektur Enterprise. Bina Insani ICT Journal, 4(1), 73-82.
[4] Setiawan, D. A., Sutomo, E., & Susilo, T. H. (2018). Perencanaan Enterprise Architecture Menggunakan TOGAF ADM Pada Laboratorium Komputer Institut Bisnis Dan Informatika Stikom Surabaya. Jurnal JSIKA, 6(12), 38-48.
[5] Qurratuaini, H. (2018, September). Designing enterprise architecture based on TOGAF 9.1 framework. In IOP Conference Series: Materials Science and Engineering (Vol. 403, No. 1, p. 012065). IOP Publishing.
[6] Taleb, M., & Cherkaoui, O. (2012). Pattern-oriented approach for enterprise architecture: TOGAF framework. Journal of Software Engineering and Applications, 5(1), 45-50.
[7] Nakakawa, A., Bommel, P. V., & Proper, H. E. (2013). Supplementing enterprise architecture approaches with support for executing collaborative tasks—A case of TOGAF ADM. International Journal of Cooperative Information Systems, 22(02), 1350007.
[8] Ahmed, M., & Hossain, M. A. (2014). Cloud computing and security issues in the cloud. International Journal of Network Security & Its Applications, 6(1), 25.
[9] Theorin, A., Bengtsson, K., Provost, J., Lieder, M., Johnsson, C., Lundholm, T., & Lennartson, B. (2017). An event-driven manufacturing information system architecture for Industry 4.0. International Journal of Production Research, 55(5), 1297-1311.
[10] Svee, E. O., & Zdravkovic, J. (2015, June). Extending enterprise architectures to capture consumer values: the case of TOGAF. In International Conference on Advanced Information Systems Engineering (pp. 221-232). Springer, Cham.