Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

Implementation of Enterprise Architecture Zachman Framework at PT. Shopee Internasional Indonesia (Shopee Application)

Annisa Paramaswary Aslam*[1], Widuri Rahayu[2], Andika Isma[3]

[1,2,3]*Faculty of Economics and Business, Universitas Negeri Makassar, Indonesia*

**Corresponding e-mail: annisa.paramaswary@unm.ac.id*

ARTICLE INFO

Keywords: Information architecture; Information technology; Zachman Framework.

Received: 19 Juli 2023
Accepted: 18 Agu 2023
Published: 31 Agu 2023

ABSTRACT

The development of information technology and increasingly fierce competition in business life requires companies to have a strong and efficient information architecture to optimize their business. The framework that can be used to develop information architecture is the Zachman Framework. The purpose of this research is to examine the implementation of the Zachman Framework in the context of developing information architecture at Shopee. The results showed that the Zachman Framework provides a comprehensive framework for the development of Shopee's information architecture. Elements of the Zachman Framework such as perspectives (who, what, when, where, why, how), objects (data, activities, networks, people, time, motivation), and usage can be used to describe and organize various aspects of an enterprise's information architecture. The implementation of the Zachman Framework helps Shopee design, analyze, and design information systems that suit the company's business needs and strategies.

1. INTRODUCTION

In the rapidly evolving digital era, companies around the world are facing new challenges in managing the complexity of information technology and ensuring alignment between their business objectives and technology infrastructure. PT Shopee International Indonesia, as one of the leading e-commerce companies in Southeast Asia, is no exception. In a bid to maintain competitiveness and market advantage, Shopee has adopted a comprehensive digital transformation strategy, which involves developing and enhancing their Shopee app.

In the face of this complexity, the concept of enterprise architecture is becoming increasingly important. Enterprise architecture is a comprehensive view of the structure and components of an organization, including business processes, information technology, and human resources, geared towards achieving business goals (Wiyana & Winarno, 2015). In this context, the Zachman Framework has emerged as one of the effective approaches for planning, managing, and implementing enterprise architecture (Kotusev, 2019; Suryana, 2012).

The Zachman Framework offers a powerful model for organizing the various perspectives involved in enterprise architecture (Bondar et al., 2017). It describes six main perspectives, namely What, How, Where, Who, When, and Why. Each of these perspectives is analyzed in six different categories of thinking: data, function, network, people, time, and motivation. By understanding and applying each of these aspects, companies can develop a structured plan to integrate technology with business goals.

According to Korhonen & Halén (2017), enterprise architecture can also be used as a way to improve the efficiency of information technology when business innovation is developed by the company. How the implementation of enterprise architecture can be used by the organization, the organization should adopt a method or framework that can be used in developing the enterprise architecture. So that the

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

enterprise architecture method is expected to manage complex systems and can align business and information technology to be invested (Kandjani et al., 2013).

Zachman Framework is one of the Enterprise Enterprise methods that is widely used throughout the world in system design where in this method planning is carried out with systematic steps, easy to understand, and can be used as control for the development of information systems in the future (Tannady et al., 2020). Zachman identifies a framework with six levels of architecture starting with the conceptual level to the detailed design and construction of a system. Another important aspect is the clear definition and distinction of the three architectures, namely: data architecture, process architecture (applications), and network architecture (technology). The Zachman Framework does not specify where application development activities start. The use of assumptions can be used to determine control over the scope of system design. To confirm the validation of assumptions, organizations can use Zachman rows crossed with Zachman colums to get true drivers (Wisandra, 2019).

John Zachman defines the columns in the matrix to describe the data, functions, locations (where the business is located), people who should exist and be involved in the organization, the time for events to occur, and the motivations that determine how the business runs. Then, the rows describe the aspects of the development process, namely: scope, business model, information system model, technology model, model components, and system functions. Zachman Framework describes organizational architecture in general and describes it as a complex enterprise system (Ranggadara, 2017). In the business world, organizations will be required to manage change. The purpose of change management is related to the competitive advantage between the organization and its competitors.

According to Masuda & Viswanathan (2019) the Zachman framework describes the normal organizational architecture and cancels it in the form of a complex business system, then including global specification plans, lists and diagrams can be and easily understood. With a system design that fits this framework, developers can create a clear and easy-to-understand design. The columns of the Zachman Framework define different foci or describe product abstractions from various perspectives (Iyamu, 2018). Each focus refers to a question where the way the question is answered depends on the perspective. In other words, the perspective requires the form and details needed to make each question clear and understandable.

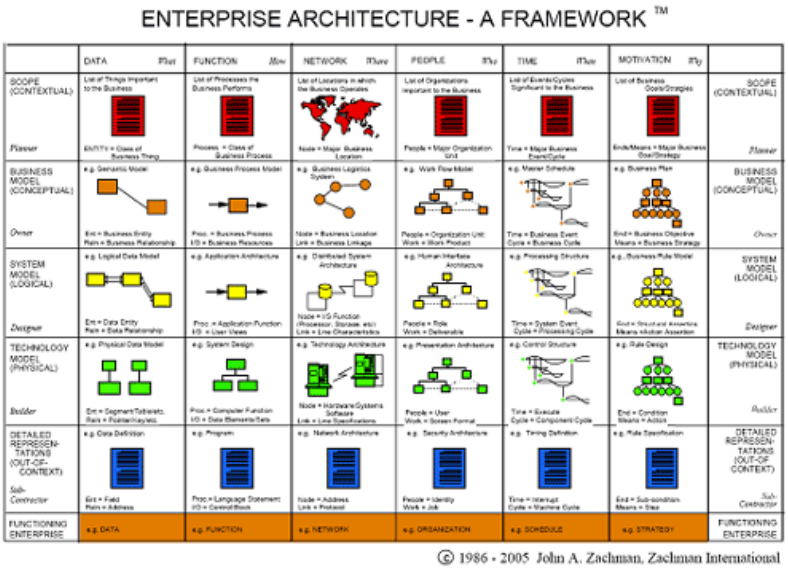

Figure 1. Zachman Framework Standards

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

The order on the side of the column has 6 types of descriptions which include:

a. The what (data) column, focuses on the relationship between entities by describing the relationship between one data and another.
b. The how column (process or function), focuses on stating the function or input and output by describing the overall process that occurs in the organization, the process of activities to meet stakeholder needs, and the input and output processes that occur in the organization.
c. The where column (network), focuses on nodes and links that explain the operational location of the organization, building structure and location to the network installation map owned by the organization.
d. The who column (human resources), focuses on roles and responsibilities that describe the allocation of human resources according to the structure and responsibilities in the organization.
e. The when column, focuses on the time cycle that describes each time a process occurs in an organization that has a relationship in building performance criteria and qualitative levels for organizational resources.
f. The why column focuses on the vision, mission, and goals of the organization that describe the motivation and ultimate goals of the organization along with the strategies and methods of achievement used by the organization.

While the sequence on the line side there are 6 types of descriptions which include:

a. Goal and scope defines the global functional business model and the various external requirements or needs of the organization.
b. Enterprise model defines each business model, allocation of business functions, elimination process of any overlapping and ambiguous functions.
c. System model defines each logical model, project management, and defining requirements and needs.
d. The technology model defines each physical model, technology management, and solution definition and development.
e. Detail representation defines the concept of system configuration management and system development implementation.
f. Organizational or company performance defines various kinds of guidelines for users so that they can use the system, perform operations management, and evaluate the system.

One example of the Zachman Framework implementation that will be carried out is at PT. Shopee Internasional Indonesia or Shopee Application. As a complex and rapidly growing e-commerce platform, Shopee faces challenges in maintaining consistency and flexibility between their various system components. By implementing the Zachman Framework, Shopee can map their system components, from user transaction data to backend workflows, in a clear and structured framework.

This paper will explain how the implementation of the Zachman Framework at PT Shopee International Indonesia in the development and improvement of the Shopee application. This will involve an in-depth analysis of each perspective of the Zachman Framework applied in the context of Shopee, as well as the benefits that resulted from this approach. By understanding Shopee's experience, other companies in the e-commerce industry as well as other industries can take valuable lessons on the importance of enterprise architecture in facing the demands of digital transformation.

2. METHOD

In this section, the method used in the shopee company case study uses a qualitative approach with a case study of the Shopee company. The methodology used in designing this research is to use the Enterprise Architecture (EA) methodology with the Zachman framework method as a tool for the documentation process, as well as literature studies as a reference for obtaining process designs including several ways, as follows:

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

a. Literature search, which is research conducted by searching relevant libraries and regarding the research topic under study.
b. Direct observation carried out to the location (observation) in order to see firsthand the processes that occur during production related to the material needed in the preparation of research such as studying documentation.

The study involved stakeholders related to Shopee's information architecture, such as business architects, developers, product managers, and related IT staff. The number and profile of participants were determined based on the need to obtain relevant and representative data. The results of the analysis will be interpreted holistically to compile a picture of the implementation of the Zachman Framework in the development of information architecture at Shopee company. The research findings will be linked to related literature and communicated in the form of a research report.

3. RESULTS AND DISCUSSION

The initial stage of the EAP methodology; Defining the initial planning system as the subject of organizational research with information system design vision, scope and objectives, in the hope of determining the development of information architecture occurs in accordance with business processes.

3.1. Value Chain

The business processes contained in Figure 2 represented by the value chain are existing processes to list existing business processes and determine the activities in each business process modeled after the business process.

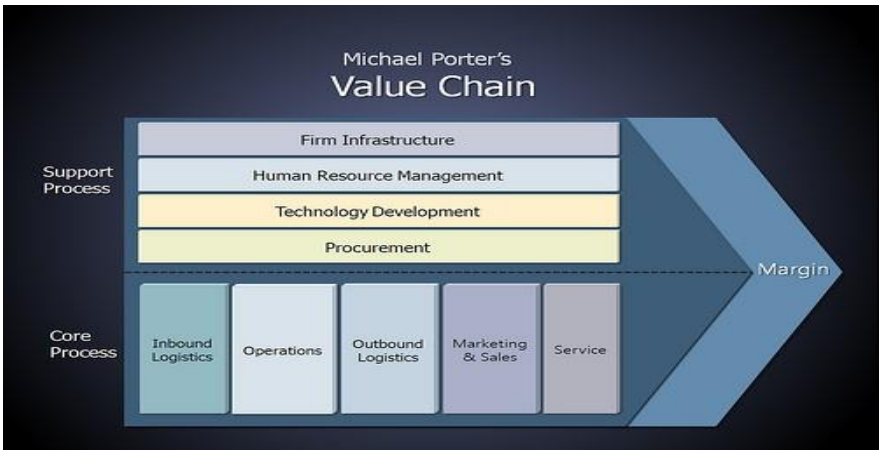

Figure 2. Shopee's Value Chain

With respect to information architecture development, this approach helps Shopee design and implement the right technology solutions, maintain data integrity and security, and enhance user experience when making transactions on the Shopee platform.

3.2. Zachman Framework

After entering the value chain of shopee's business process, the next approach is used to analyze, plan, and develop information architecture within the shopee company. This framework has six different perspectives, namely Who, What, When, Where, Why, and How.

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

Table 1. Implementation of Zachman Framework for Development

Aspect/ Perspective	What	How	Where	When	Who	Why
Architect	Data and information	Designed the structure and architecture of shopee's data and information management system.	Company data center at shopee	During the development of information systems at shopee	Information system development team	Provide a competitive advantage for shopee companies in the e-commerce industry.
Owner Bisnis	Kebutuhan bisnis	Identify the business problem or opportunity that the information system needs to address, and define the goals and expectations to be achieved.	Dari masing-masing departemen dan unit bisnis.	Before starting the development of an information system	Business owners and department managers	Information systems can improve operational efficiency and effectiveness throughout an organization.
Services	Infrastructure	Provide the necessary infrastructure to run the information system	The whole organization	After the development of the information system is completed	Technical support team	To ensure information systems run smoothly and are available to the entire organization.
User	Business usability	Using information systems to perform business functions	The whole organization	After the development of the information system is completed	All employees and other stakeholders	To improve the efficiency and effectiveness of the organization's operations
Auditor Internal & External	Security and compliance	Ensure the security and compliance of information systems with applicable regulations and standards.	The whole organization	After the development of the information system is completed	Team of internal and external auditors	To ensure information systems are secure and comply with applicable regulations and standards

3.3. Zachman Framework Results

The results of the analysis using the Zachman framework method are described below:

a. Architecture

The approach method used in enterprise architecture planning (EAP) consists of the following stages:

1) What = Information data
2) How = designing the structure and architecture of data and information management systems at Shopee.
3) Where = Shopee Enterprise data center
4) When = During the development of information systems at Shopee
5) Who = Development team
6) Why = provide a competitive advantage for the Shopee company in the e-commerce industry.

b. Business Owner

1) What = Business Functions

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

2) How = Identify the business problem or opportunity that the information system needs to address, and determine the goals and expectations to be achieved.
3) Where = each department and Business unit
4) When = Initiating Information System Development
5) Who = business Owner and Department Manager
6) Why = Information systems can improve operational efficiency and effectiveness throughout the organization.

c. Services

1) What = Infrastructure
2) How = Provide the necessary infrastructure to run the information system.
3) Where = Entire Organization
4) When = After Information System Development
5) Who = Technical Support Team
6) Why = To ensure information systems run smoothly and are available to the entire organization.

d. User

1) What = business usability
2) How = Using information systems to perform business functions
3) Where = Entire Organization
4) When = After Information System Development
5) Who = All employees
6) Why = To improve the efficiency and effectiveness of the organization's operations

e. Internal Auditor

1) What = Security
2) How = Ensure information system security and compliance with applicable regulations and standards.
3) Where = Entire Organization
4) When = After Information System Development
5) Who = Entire Audit Team
6) Why = To ensure information systems are secure and comply with applicable regulations and standards

The results of the analysis conducted using the Zachman framework method provide an in-depth understanding of the various aspects involved in planning and implementing information systems at Shopee, a leading e-commerce company. In the Architecture dimension, the planning method used is Enterprise Architecture Planning (EAP). The steps in this approach have been clearly outlined, starting from the "What" pertaining to the information data taken care of, the "How" regarding the design of the structure and architecture of the data and information management system at Shopee, to the "Why" highlighting how this implementation gives Shopee a competitive advantage within the e-commerce industry. In addition, "Where" points to the company's data center, "When" signifies the development period of the information system, and "Who" refers to the development team responsible for the implementation.

In the Business Owner dimension, the role of business owners and department managers in identifying the problems, opportunities, goals and expectations to be achieved from the information system is described. They act as directors of the effort, pointing out the direction that the implementation team needs to take. The Services dimension underscores the importance of the infrastructure needed to run the information system. This includes the maintenance and technical support required after system development is complete. In the User dimension, the role of all employees in utilizing the information system to perform business functions in the organization is emphasized. This aims to improve operational efficiency and effectiveness.

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

In the Internal Auditor dimension, the security and compliance of information systems with regulations and standards are clearly outlined. The internal audit team plays a key role in ensuring that information systems are secure and in accordance with applicable regulations. The results of the analysis with the Zachman framework on Shopee are in accordance with several studies conducted by Saoud & Bellabdaoui (2023), Mani et al. (2015), and Nogueira et al. (2013) where the Zachman framework provides a holistic picture of how information system planning and implementation is carried out. Each dimension has its own role, and collaboration between all parties involved will ensure the successful implementation and use of this information system.

4. CONCLUSIONS

The implementation of the Zachman Framework in the development of information architecture at Shopee Company helps in designing, analyzing, and implementing an effective and integrated architecture. The Zachman Framework provides a structured and comprehensive framework for understanding business, technology, and data perspectives in organizations. By using the Zachman Framework, Shopee Company is able to clearly identify and describe the business objectives, operational processes, data needed, technology infrastructure required, and the roles and perspectives involved in the organization. This helps in aligning the information architecture with the business strategy and user needs.

REFERENCE

Bondar, S., Hsu, J. C., Pfouga, A., & Stjepandić, J. (2017). Agile digital transformation of System-of-Systems architecture models using Zachman framework. *Journal of Industrial Information Integration*, *7*, 33-43.

Iyamu, T. (2018). Implementation of the enterprise architecture through the Zachman Framework. *Journal of Systems and Information Technology*, *20*(1), 2-18.

Kandjani, H., Bernus, P., & Nielsen, S. (2013). Enterprise architecture cybernetics and the edge of chaos: Sustaining enterprises as complex systems in complex business environments. In *2013 46th Hawaii International Conference on System Sciences* (pp. 3858-3867). IEEE.

Korhonen, J. J., & Halén, M. (2017). Enterprise architecture for digital transformation. In *2017 IEEE 19th Conference on Business Informatics (CBI)* (Vol. 1, pp. 349-358). IEEE.

Kotusev, S. (2019). Fake and real tools for enterprise architecture: The zachman framework and business capability model. *Enterprise Architecture Professional Journal*, 1-14.

Mani, M., Uludag, S., & Zolinski, C. (2015). On evaluating the use of Zachman framework in computer science and information systems classes. *Journal of Computing Sciences in Colleges*, *31*(1), 47-59.

Masuda, Y., & Viswanathan, M. (2019). *Enterprise architecture for global companies in a digital it era: adaptive integrated digital architecture framework (AIDAF)*. Springer.

Nogueira, J. M., Romero, D., Espadas, J., & Molina, A. (2013). Leveraging the Zachman framework implementation using action–research methodology–a case study: aligning the enterprise architecture and the business goals. *Enterprise Information Systems*, *7*(1), 100-132.

Ranggadara, I. (2017). Zachman Framework Approach For Designselling Batik Application Based on Cloud. *International Research Journal of Computer Science*, *4*(12), 6.

Saoud, A., & Bellabdaoui, A. (2023). Towards generic platform to support collaboration in freight transportation: taxonomic literature and design based on Zachman framework. *Enterprise*

Indonesian Journal of Enterprise Architecture
P-ISSN: 3035-6410; E-ISSN: 3035-6402
Journal Homepage: http://journal.lontaradigitech.com/IJEA

Information Systems, *17*(2), 1939894.

Suryana, T. (2012). Perancangan Arsitektur Teknologi Informasi dengan Pendekatan Enterprise Architecture Planning. *Majalah Ilmiah UNIKOM*.

Tannady, H., Andry, J. F., Sudarsono, B. G., & Krishartanto, Y. (2020). Enterprise architecture using Zachman framework at paint manufacturing company. *Technol. Reports Kansai Univ*, *62*(4), 1869-1883.

Wisandra, A. (2019). Pemodelan Sistem Informasi Senayan Library Management System (SLIMS) Dengan Framework Zachman. *Ensiklopedia of Journal*, *1*(2).

Wiyana, W., & Winarno, W. W. (2015). Sistem panjaminan mutu pendidikan dengan togaf adm untuk sekolah menengah kejuruan. *Register: Jurnal Ilmiah Teknologi Sistem Informasi*, *1*(1), 7-14.