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Enterprise Architecture Repository to Support the Company IT-Strategic

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Abstract*: The objective of this study is to identify the role of information technology in companies. The use of IT should create a synergy between business strategies, business processes and technologies to achieve the vision, mission and objectives of the company, and to offer excellence in the future. For this reason, the study uses the EA framework, where there are artifacts that are stored digitally in the repository. This study uses the EA implementation method when the main points of the EA development steps are implemented. The results achieved are the integration of new applications that are expected to be properly implemented so that companies can read their strategies to deal with competitors. The conclusion is that the proposed application can help the company achieve its vision, mission and objectives. And all business processes can be managed effectively and efficiently so that the company can compete with its competitors today and in the future.

Keywords: Enterprise Architecture, Repository, Strategy, business

I. INTRODUCTION

The development of information systems and technology today experiences unprecedented growth. This resulted in the emergence of fierce competition in each business sector and organization between companies. Therefore, many companies are beginning to realize the use of information systems and technology as a key component to achieve success and achieve excellence in competitiveness. With the development of science and technology, particularly information technology, the company's business activities also grow and cause a change in the concept of business competition. The capacity of a modern business depends heavily on the company's information system and the IT infrastructure that supports it. Therefore, companies require optimal alignment between IT and business, using Enterprise Architecture Management (EAM). To achieve this objective, through the EA framework, we can create, maintain and analyze the current business model. The model consists of several concepts, including business and IT perspectives, and the necessary steps in response to the ongoing transformation. In practice, the use of EA in companies that are growing more and more, requires the participation of stakeholders from diverse backgrounds and should contribute information relevant to the architecture.

With the planning of the business strategy and technology and with the support of the application of appropriate Business Architecture methods, an effective and efficient business flow will be generated in accordance with the methods applied in Business Architecture.The Enterprise Architecture application is compatible with all the commercial and technological functions of an organization to carry out its activities and place it in a superior position in the competitive business there. Implementation of information technology in an organization as a basis for the creation of quality services and to optimize business processes. The EA application uses artifacts that are stored digitally in the repository.The common measures to achieve the objective of reconciling the business with this technology are the creation of an EA architecture, which as a model represents the functional side of the organization, and the documentation that supports the economic dependence of information systems with the support of connections. IT Infrastructure The model is used to analyze the current architectural framework, formulate gaps between business objectives and reality and then plan the transformation for the future in optimal conditions. Some EAM frameworks provide a general guide to implement this management function and information models for storing EA artifacts.From previous research literature studies [1-3] it can be seen that several parameters of goal, structure, environment, activity, architecture have been commonly used in studies related to Enterprise Architecture. In this study [4-6] using three important parameters namely artifacts, enterprise architecture, and repositories to make decisions on companies that have not been found in several scientific publications. In this study, the researchers used a case that occurred in the manufacturing company PT. Poly Jaya Medical. This company discovered the lack of use of existing information technology, which made it less efficient and effective in the company.The literature study was conducted to determine the contribution and innovation of this study in comparison to the studies conducted in accordance with Table 1.

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Table 1: List of peer review journal article of the EA

Framework	Title	Factors	Context	Author
Enterprise Architecture	A situational method for semi-automated Enterprise Architecture Documentation.	infrastructure, business-IT alignment, Enterprise Architecture Management (EAM)	Using the EA method for documentation of artifacts, which are implemented in the EA prototype repository to support IT planning in the company	1
Enterprise Architecture	Using an enterprise architecture model for assessing the resilience of critical infrastructure.	Artifact : goal, environment, structure, activity, evolution	Enterprise Architecture (EA) allows for managing and visualizing integrated model repositories	2
Enterprise Architecture	THE INTEGRATION OF BUSINESS INTELLIGENCE AND KNOWLEDGE MANAGEMENT.	business intelligence (BI) and knowledge management(KM)	These systems will blend, from each other (BI and KM), and inspiring new approaches that can analyze data and text together, seamlessly. They call this blended technology BIKM	3
Enterprise Architecture	ArchiMate Customization and Architecture Repository Management Practices: For a Technology-Intensive Enterprise.	architecture description language	By adapting Archi Mate, this solution applies the standardization and the uniform management of the architectural model for business information systems.	4, 12
Enterprise Architecture	Using Enterprise Architecture For CIO Decision-Making: On The Importance of Theory.	decision-making, Enterprise Architecture, *Architectural theory diagrams*	CIO responsible for the manage the enterprise information systems. An approach suggested on architectural models of both the enterprise information systems	5
Enterprise Architecture	Modeling enterprise architecture and strategic management from fuzzy decision rules.	Decision making, Enterprise Architecture	This document shows a new framework for analyzing EA scenarios based on business models. This allows decision-makers to flexibly classify the EA scenario.	6, 14

In addition, the lack of planning in the development of technological architecture and business architecture means that the need for the commercial functions of an organization is not achieved as expected. Based on the concept of business architecture, the direction of activities and strategies that support business planning and management decision making among coordination opinions about the company's availability.

II. LITERATURE STUDY

According to Bernard [7], Enterprise are the activities and general objectives of the organization or among many organizations, the place of exchange of information and other resources. Enterprise Architecture (EA) is a new professional and management practice that aims to improve the performance of the company by understanding itself as a holistic and integrated vision of its strategies, focused business practices, information flow and technology resources. EA is intended to help readers remember the clear differences between EA and other types of IT planning, since EA is based on strategic objectives and business needs. EA is two programs between the iterative method and the documentation method that, together, provide insight, followed by the strategic approach of the company, commercial services, information flow and utilization.

$$EA = S + B + T$$

Enterprise Architecture = Strategy + Business + Technology

Bernard argues that the EA component consists of objectives, processes, standards and resources that can still be changed to cover the entire organization or can be accommodated within certain limits. Examples are strategic objectives, information flow, information systems, and software applications. The EA component is represented in two viewsEA components are objectives, processes, standards and resources that can be changed, which includes the entire company or can be collected within certain restrictions. Examples are strategic objectives, information flow, information systems, and application software, as in figure 1:

- Vertical components: components that only serve one line of business.

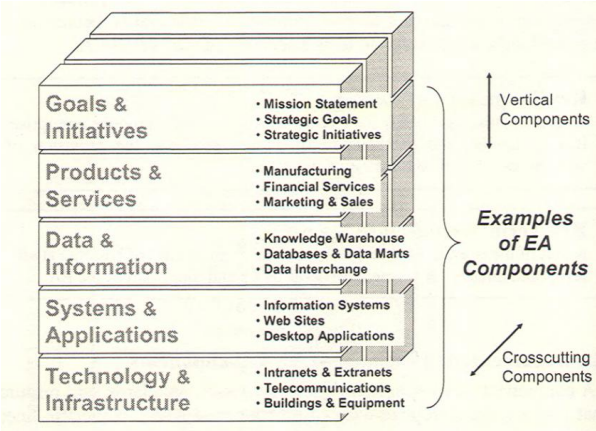

Figure 1: The EA Components (Bernard, 2012, p39)

- Horizontal components: flexible components that serve more than one business line.

III. METHODOLOGY

An enterprise architecture repository is a collection of artifacts that describes an organization's current and target IT landscape. The goal of the enterprise architecture repository is to reflect the organization's inventory of technology, data, applications, and business artifacts and to show the relationships between these components. Traditionally, in a non-cloud environment, organizations were restricted to choose expensive, off-the-shelf products to meet their enterprise architecture repository needs. The method of development is as follows:

1. Preliminary study and resources gathering
   The study was carried out to identify the scope of the technology architecture to be developed within a company and the EA framework used for the construction of relationships between company units in architecture. The scope of work is reflected in the geometric design and the area to be documented. This EA framework is an abstraction from the "perspective" of the company and describes the information architecture and enterprise of a company.
2. Meta-model analysis
   The architecture repository enables to create meta-models, user's models and instance modes. For example, a meta-model could exist of the object like 'process' and 'application' and a rule that every process must be supported by at least one application. A user model could exist of entity types like 'sales process' and 'procurement process' and a 'CRM application' that supports both processes. And then, they can choose whether or not this user model has to be compliant to the meta-model.
3. Designing a repository architecture model
   An instance model could exist out of the instance of the processes and applications. Maybe the organization has five locations where the sales process is executed and maybe there are 10 installations of the CRM system.
   The Architecture Repository is Application which the company can use for documenting all of your enterprise architecture. It is perfect storage and management of systems and all elements of the enterprise. With the architecture repository, you can build a single source for all of enterprise components. This increases productivity because people can find the right version of enterprises component are looking for much more quickly. They can enter the component and combine them into lists, called catalogs, and next manage and moderate these catalogs.
   The Architecture Repository can be in the form of databases that are stored digitally for reuse. The application can use a Document Management System, or Knowledge Management Systems (KMS), to implement the repository for EA artifacts architecture repository.The concept of an Architecture Repository which can be used to store different classes of architectural output at different levels of abstraction.

IV. RESULT AND DISCUSSION

Centralized repositories [7] can be in the form of databases that are stored digitally for reuse. Some organizations use a document management system to implement repositories for EA artifacts. The main aspect of a repository is the reuse of artifacts in the form of models and information. In the repository, each object is stored only once and can be reused to create other diagrams for which the object is relevant. The repository acts as a central repository for all object, relationship, and attribute information in which the model is continually maintained and updated. A good repository has many features for managing and publishing model content, including versioning, input capabilities, output capabilities, and role-based authorization. The EA Repository [8], intends to allow repeated use of models containing artifacts from the organization and allow a more satisfactory future modeling. In a large and evolved organization, it generally has a number of applications, services, organizational units, business processes, IT infrastructure and complex data sets. While all of these assets are well taken care of, they often lose the fact that they are all represented, with all their interconnections. A mapping of repository artifacts can begin in earnest, as shown in figure 2. Catalogs of existing applications and services [9], [10] will be registered, then along with future process models generated for application programs that support the company's initiatives. General data models meet and are linked to the flow between data creation and use.

1. Preliminary study and resources gathering

An EA Framework can be used to identify the scope of the technological architecture that will be developed in a company and show the construction of relationships between the units of the company in the architecture. The scope of the work is reflected in the geometric design and the areas to be documented. This EA framework is an abstraction of the "perspective" of the company and describes the information architecture and company of a company.

2. Meta-model analysis

The framework has a cubic shape with three dimensions related to various aspects of the company's abstract modeling. This framework is known as EA3 Cube Framework ™, which is at a hierarchical level so that the sub-architectures are different and can logically relate to each other. This is achieved by positioning objectives, high-level strategic initiatives at the top, products, business services and data flow, information in the middle and support systems, applications and technology / infrastructure at the bottom. In The use of the EA framework, will display harmony between strategy, information and technology, which support the planning of information technology.

		Change and Governance	Business Architecture			IT Architecture		
			Strategy	Capability	Process	Application	Information	Technology
Scope Context		Architecture Stakeholder & strategy	Benefit Case	Business Capability Catalog	Mega Scenario Catalog	Application Catalog	Semantic Data	
		Architecture Principle Catalog	Target Operating Model	Business Capability Map	Business Process Catalog	Application Map	Information Map	
		Architecture Artifact Catalog	Enterprise Value Map	Business Scenario Matrix	Business Process Map			
Business Context	Business Diagram	Architecture Design Strategis & Standard	Value Chain Diagram	Solution Capability	Mega Scenario Diagram	Solution Capability Map	Information Diagram	
		Organizational Diagram	Value Stream Diagram		Mega Scenario Matrix	Building Blocks	Data Objects	
		Role Catalog	Business Capability Matrix		Business Process Matrix	Business Process	Application Matrix	
		High Level requirement Catalog	Business Scenario Matrix		Business Capacity Matrix	Organization Matrix		
		Functional Requirement			Role Matrix	Integration Catalog		
					Business Use Case			
Systems		Detail Functional Requirement Catalog			Business Process Flow	Collaboration Diagram	Logical Data Diagram	System Context Diagram
		Non Functional Requirement Catalog				Application Integration		
Technology		Requirement Master List				Interface Diagram	Data Object Definition	System Landscape
		Organizational Master List						
		Busniess Role Master List	KPI Master List	Capability Master List	Business Process Master List	Interface Master List	Master Data Object List	<-- Queries

Figure 2. Structure approach to managing artifact of the enterprise information

An efficient implementation method for EA Framework is also being implemented, which is also specified in different activity segments called Business Lines (LOB). This example is a complete sub-architecture with five hierarchical levels of the EA3 framework. As a result, LOBs within the company can be independent, with the exception that data, applications and network functions are duplicated if each LOB is truly independent. A five-tier architecture of a frame that focuses on multiple LOBs can be called a generic EA segment.

Concept Of Operation Diagram and Scenario.

CONOPS [7], [11] as shown in figure 3, is a document to describe the commercial operations in a system proposed from the point of view of the people who will use the system out [13] and the monitoring. This is used to communicate the quantitative and qualitative characteristics of the system to all stakeholders [15].

The operations in a system proposed as is follow:

- Customers request products by phone / fax / come directly to the company or customers request products online.
- Customers who place orders online and the data automatically enter the database, taking data from the database
- The service creates a purchase order and enters data in the database, then receives a payment of 30%, which receives the Administration and Finance and places it in the database
- The manufacture of spare parts sends the work in the Engineering Section, while the Engineering Department works on the system to obtain the plans and then make a Materials List to prepare the necessary materials and components in the production and enter the Database. The list of materials is to determine the materials or materials needed in production according to the order
- Manufacture of parts that fill production materials that contain materials or materials needed in production according to the orders in the database
- The purchasing department must order and the Raw Materials entered in the database as pre-production history and print them to be sent to the Supplier. Purchasing section, purchase of raw materials, purchases and purchases from suppliers
- Suppliers receive raw material suppliers and process the raw materials the company needs, then send raw material suppliers to the purchasing department
- The Manufacturing Department will issue Production Forms to the Manufacturing Section to audit each production process executed by each part of the Production Division. Prefabrication of parts to work with raw materials in parts of the main product and then sent to the Assembly Department. This section is the parts to do the job of unifying the main parts of the prefabricated section and classifying raw materials and non-metallic metals.

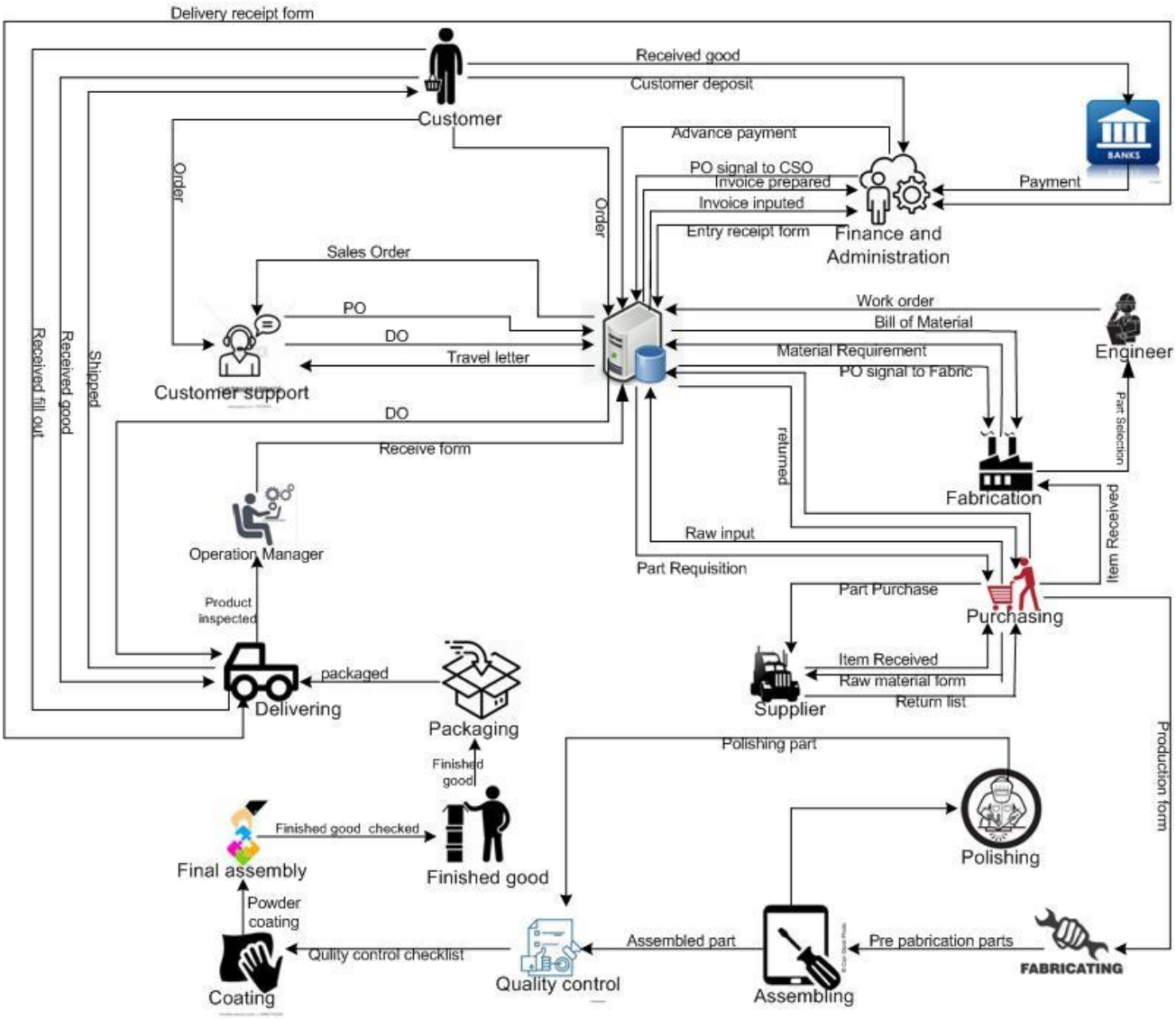

Figure 3: Concept of Operation Diagram and Scenario

- The masts that must be removed from the connection part / weld surface of the metal material and then go to the Control Section
- Quality control department to regulate incoming goods. This Quality Control Section will return items that are appropriate or that do not conform to the standards for repairing / reworking parts.
- Assembly The final part will assemble and check all the functions of the product, such as the hinge system, the locking system, etc., perfectly and then it will be sent to the Finished Products Department. This unit will receive the products that are assembled and inspected and then include the production number, verify the integrity of the list, the initial quality control that meets the requirements and the name of the client / client that will be sent. Then the goods will be sent to the Packaging Department
- Pack spare parts orders to the packing unit ready to be sent, then sent to the Shipping Department. The packaging provides results of the production section that has been completely filled out by the Production Division consisting of the Prefabrication Section, the Assembly Section, the Polishing Section, the Quality Control Section, the Powder Coating, the Final Assembly Section and the Finished Products Section, to the Production Manager. The production manager receives the form and immediately enters the production database
- The system in the Customer Service Section accepts the signage to verify the Production Forms and immediately make a Travel Letter. The Customer Service section enters a pass in the database
- The System Administration and Finance Section receives the signage and immediately verifies the Production Form in the database that will be made for the Invoice. Administration and Finance enter invoices in the database
- The delivery system in the Section accepts the signage to verify invoices and letters, which are contained in its database and prints a receipt form to send to the customer along with the ordered items. Shipments send the items ordered along with the invoice, the receipt form and to allow the Customer.

- The client receives the goods, permits and the shipping department and makes payments to the company (Administration and finance)
- Customer payment transfer money through e-Banking, updated directly into the existing system in the Administration and Finance

3. Designing a repository architecture model

The Knowledge Management Systems (KMS) model for implementing digital repositories at PT Poly Jaya Medikal is illustrated below. In the figure 4 provides a detailed description of how knowledge, information and data are shared throughout the company. Knowledge Management Plan includes descriptions and diagrams to share information between systems, applications, knowledge store and database.

Figure 4: Propose of Knowledge Management Plan

During the analysis it was carried out directly in the company, did not reveal any Knowledge Management in the corporate strategy that is currently being executed. Therefore, we propose adding Knowledge Management as one of several strategies for companies in the future. Figure 5 is Interface of Knowledge Management. It is expected that the implementation of Knowledge Management will have a positive impact on the company that first maximizes the performance and skills of the company's human resources to monitor the extent to which the performance and quality of human resources in their capacity to generate profits and the precision of the targeting achieved by the company, since the business run by a company produces a product where the product process is not far from interference and creative ideas, as well as the capabilities of the human resources themselves. Here is Figure 5 that is an interface to the Knowledge Management system that will be owned by the company for the future.

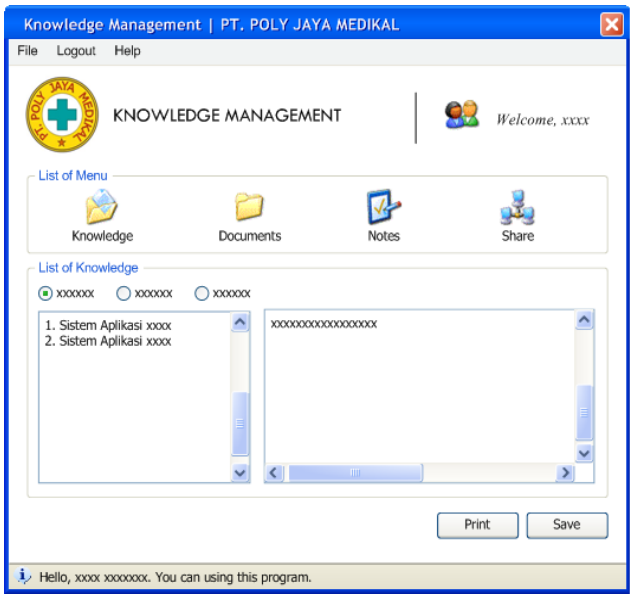

Figure 5: Interface of Knowledge Management

V. CONCLUSION

The Enterprise Architecture application is compatible with all the commercial and technological functions of an organization to carry out its activities and place it in a superior position in the competitive business there. An efficient implementation method for EA Framework is also being implemented, which is also specified in different activity segments called Business Lines (LOB). This example is a complete sub-architecture with five hierarchical levels of the EA3 framework. A five-tier architecture of a frame that focuses on multiple LOBs can be called a generic EA segment.

The implementation of information technology in an organization as a basis for the creation of quality services and to optimize business processes. The EA application uses artifacts that are stored digitally in the repository.The application can use a Document Management System, or Knowledge Management Systems (KMS), to implement the repository for EA artifacts architecture repository. The Architecture Repository can be in the form of databases that are stored digitally for reuse.

The Architecture Repository is Application which the company can use for documenting all of your enterprise architecture. It is perfect storage and management of systems and all elements of the enterprise. With the architecture repository, you can build a single source for all of enterprise components. This increases productivity because people can find the right version of enterprises component are looking for much more quickly.After analyzing the business architecture method applied in manufacturing company as PT. Poly Jaya Medical, the researchers concluded that this company did not achieve its vision of the company as seen in an analysis of internal and external business factors. And to facilitate the application of business architecture methods to improve business strategies and technology, the steps are as follows:

- Implement a Knowledge Management System with the objective that each Knowledge is distributed to employees to be more competitive when employee turnover occurs.
- Establishment of a repository to help companies help executives and decision-making strategies.

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Tri Pujadi was born in Indonesia, in 1953. He received the B.S. and M.S. degrees in information system management from the Bina Nusantara University, Indonesia, in 1998. From 2012 to 2019, he was a Research Coordinator with the School of Information Systems – BINUS University. Since 2010, he has been an Assistant Professor with expertise in Information Systems Plan and Design. His research interests include database management, e-commerce and e-business, disaster management.

Wihendro was born in Indonesia on 1979. His B.S. degree in Informatics Engineering was obtained in 2002, and completed his Master's in the Management of Information Systems at Bina Nusantara University on 2004. During his 19-year career at Binus University, he began as a programmer in 2000, and was trusted to the role of System Analyst, Senior System Analyst, IT Specialist, Software Development Manager, Instructure Apple Developer Academy, Senior IT Consultant and an IT Business Process Specialist. As a lecturer, his career began in 2012, received an Assistant Level of Academic in 2014, and obtained lecturer certification in 2015.