





Analysis of SAP Integration in Procurement Process Based on TOGAF (Case Study: Pharmaceutical Holding Company)

Siti Alifah Hartaniah¹, R. Wahjoe Witjakcono² and
Muhardi Saputra³

^{1,2,3}School of Industrial and System Engineering, Telkom University, Bandung, Indonesia
¹staniaalfh@student.telkomuniversity.ac.id

Abstract. PT XYZ is a pharmaceutical holding company that wants to implement an Enterprise Resource Planning (ERP) system to create a centralized and integrated system with its entities that complies with applicable regulations. Currently, around 80% of pharmaceutical companies have adopted ERP, and PT XYZ focuses on implementing ERP to modernize the joint procurement process in the procurement division which still uses traditional methods. Then, to find out which ERP system is suitable, an analysis of the SAP system in the procurement process is based on the TOGAF framework. TOGAF has been widely recognized and provides a comprehensive framework for developing IT architecture that matches business needs. The results of this analysis show the suitability of the SAP system in the procurement process with company needs based on the first six (6) phases of TOGAF, namely the preliminary phase, architecture vision, business architecture, information system architecture, technology architecture, and opportunities and solutions. In addition, with three (3) architectures from TOGAF, namely business, information systems, and technology with the use of relevant artifacts. From the three architectures from TOGAF, the business and information system aspects are appropriate, but there are technology components that must be adjusted.

Keywords: ERP, SAP, Pharmacy, TOGAF, Procurement.

1 Introduction

Enterprise Resource Planning (ERP) is a system that supports business processes by providing accurate and integrated information between various functional parts of the company[1]. With ERP, companies will get benefits, such as optimized business processes, reduced inefficient costs, integrated, and real-time information[2]. The use of ERP systems can be implemented from small to large-scale companies[3]. Many companies from manufacturing and service companies in Indonesia are trying to convert their systems to ERP systems. Currently about 80% of pharmaceutical companies have used ERP systems to optimize their business processes and have an

impact on improving financial performance through time efficiency, reducing unnecessary processes, and better control by standardizing work methods [4].

ERP implementation in state-owned companies has been carried out by several state-owned companies [5]. One of these companies is a company engaged in the pharmaceutical sector [6]. The company is an entity of the parent company. A holding company is a company that has shares to lead a group of companies [7]. PT XYZ, as a holding company, is a world-class life science company that has a global competitiveness that plays a role in providing and developing life science products with international standards to improve the quality of life. However, PT XYZ has not fully implemented the ERP system, especially in the joint procurement process in the Procurement division. The procurement process is carried out to fulfill requests for goods or services in accordance with predetermined specifications by managing planning activities and implementing procurement operations based on applicable regulations. This is to avoid running out of stock [8]. Whereas, the reporting system and data recording carried out in the procurement division still use traditional methods, namely Microsoft Excel.

To overcome this, PT XYZ must comply with Ministerial Regulation PER-2 / MBU / 03/2023 concerning Guidelines for Governance and Significant Corporate Activities of State-Owned Enterprises which regulates the Information Technology Strategic Plan, IT governance, and IT architecture that are organized and integrated into BUMN business processes. Not only that, in Ministerial Regulation PER-8 / MBU / 08/2020 there are challenges to ineffective decision-making due to the lack of integration of BUMN performance reporting and assessment systems. In addition, the implementation of the ERP system can meet the objectives of improving the procurement process of goods or services that are more effective, efficient, transparent, and accountable in order to fulfill KPIs [9]. So the application of the ERP system at PT XYZ can help with problems in the procurement division. One of the existing ERP systems is System, Application, and Product in Data Processing (SAP).

However, there are cases that have experienced failures in the implementation of ERP systems in companies in Indonesia [10]. Therefore, before implementing an ERP system, an assessment is needed to determine whether the ERP system to be used is suitable for the company. One of the frameworks that can be used as an assessment is TOGAF. The TOGAF framework is used in developing enterprise architecture to meet the business and information technology needs of an organization/company. There are several advantages possessed by TOGAF, namely open source so that it is flexible to use, can determine structured and organized software technology standards, and is able to take a systematic approach in order to unify the development process [11].

Therefore, this research will focus on conducting an analysis based on the TOGAF framework on the ERP system, with one of the systems, SAP. The results of this research can be used as a reference before implementing an ERP system at PT XYZ, especially in the procurement division.

2 Literature Review

2.1 SAP

System, Application, and Product in Data Processing (SAP) is an application that integrates all parts of the business contained in the company into a system that is intelligently assembled [12]. In SAP, the procurement process is found in the Material Management module. In carrying out the procurement process, there are business processes that must be carried out, and there will be documents made [13], [14].

2.2 ERP

Enterprise Resource Planning is an integrated suite of applications to support the entire enterprise that includes modules to manage finance, human resources, supply chain, customer relationships, and other business processes [15]. Applications commonly used by companies to implement ERP are SAP, Oracle, Peoplesoft, Microsoft Dynamic AX, and others. Each application has its own marketing for use by small to large companies and is also licensed for free and paid [16].

2.3 Procurement

Procurement is a process to obtain goods/services needed by the company, starting with the request for goods until payment [17]. The following Fig 1 is an overview of the Procurement Process.

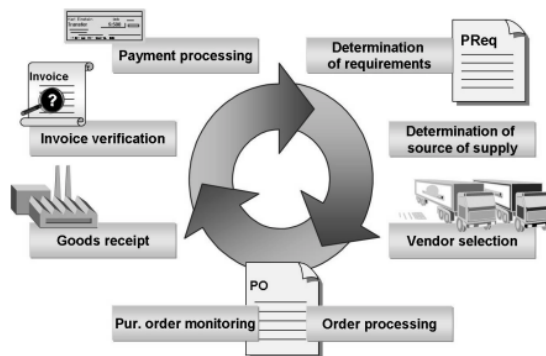


Fig. 1. Procurement Process

2.4 TOGAF

TOGAF was developed and maintained by The Open Group in 1995. TOGAF is a framework that is flexible, sustainable, and easy to implement to develop the architecture needed to meet business needs and is a methodology in enterprise software, which is a standard architecture framework designed for organizations to assist in designing enterprise architecture, so that it becomes structured and systematic. TOGAF

has four dominant features, namely business architecture, application architecture, data architecture, and technical architecture [11].

3 Methodology

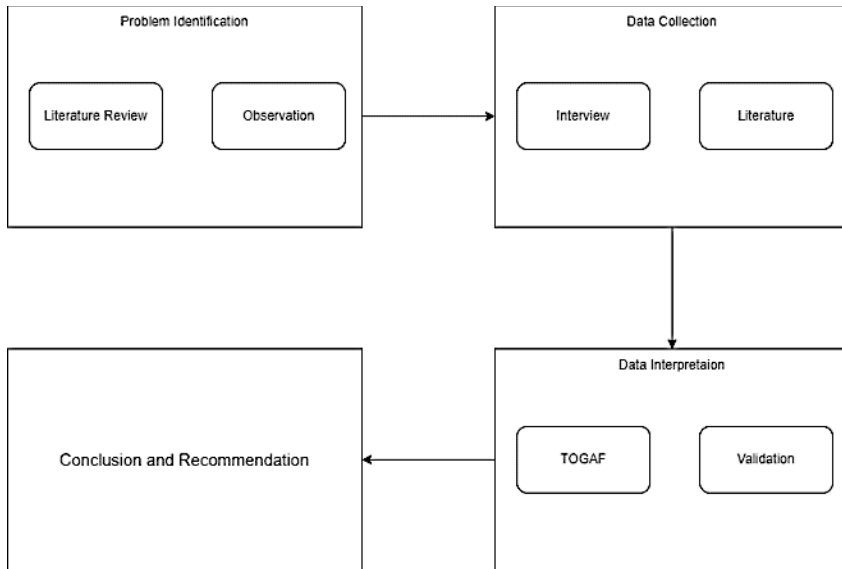


Fig. 2. Research Method

In Figure 3, this research has four stages [18]. With the first stage is identifying problems by conducting observations to the company and literature review. In the next stage, collecting data by conducting interviews with the company and literature. After the data is obtained, analysis will be carried out with the TOGAF framework and validation will be carried out to the company. After obtaining the results of validation, conclusions and suggestions will be made. With the artifacts based on TOGAF ADM in the study can be seen in the table:

Table 1. Artifacts

Phase	Artifacts
Preliminary Phase	Principle Catalog
Architecture Vision	Value Chain Diagram
Business Architecture	Requirement Catalog
Information System Architecture	Application Portfolio Catalog
Technology Architecture	Technology Standards Catalog
Opportunities and Solutions	-

4 Results and Discussion

4.1 Preliminary Phase

This phase is the preparatory stage for preparing the enterprise architecture. The output in this phase is a principle catalog that contains the business principles, data, applications, and technology of the company [19].

Table 2. Principle Catalog

No	Architecture	Principle	Description
1	Business Architecture	Primacy of Principles	Information management applies to all organizations that are in a holding company
		Maximize Benefit to the Enterprise	Information management decisions are made by maximizing benefits for the entire holding
		Compliance with Law	The holding information management process complies with all regulations that have been created or set by the ministry
2	Information System Architecture	Data is an Asset	Data owned by the holding is data that has value and is managed according to needs
		Data is Shared	Users of the holding have access to data to carry out their duties
		Data is Accessible	The users of the holding can access the data to carry out their duties
		Data Trustee	Every data entered by users of the holding has a guardian or person responsible for the quality of the data
3	Application Architecture	Ease-of-Use	The application is easy to use so that users can use it to facilitate their work
		Control Technical Diversity	The diversity of technologies implemented in the company is controlled to maintain expertise and connectivity between technologies
4	Technology Architecture	Interoperability	Software and hardware must conform to predefined standards for compatibility in data, technology, and applications

4.2 Architecture Vision

This phase describes the main objectives and constraints of enterprise architecture by explaining the architectural design to be achieved, and how the final design results. The output of this phase is a value chain that aims to describe the visualization of the value

owned by the organization based on the company's activities [20], [21]. There are two activities, namely the main activity which is an activity that is directly involved in the creation and delivery of products or services, and supporting activities as activities that support the main activity [22]. The following Fig 4 is a Value Chain Diagram.

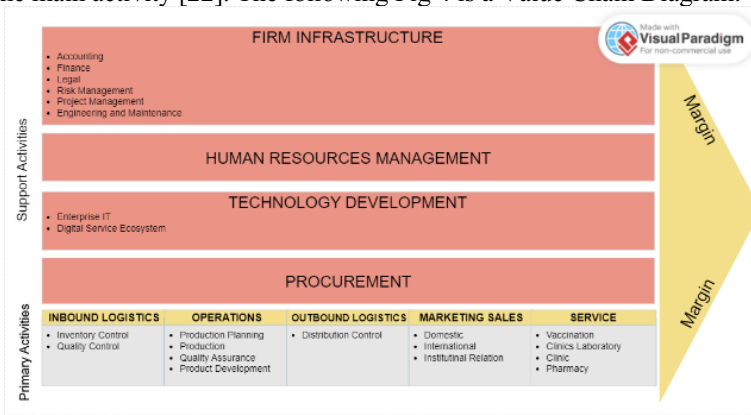


Fig. 3. Value Chain Diagram

4.3 Business Architecture

This phase describes the needs of the company in performing business functions to achieve its needs. The output of this phase is a requirements catalog that explains the needs of the company to design an enterprise architecture [19]. The following table 3 is the Requirements Catalog.

Table 3. Requirements Catalog

Function	Objective	Requirement
Procurement Division	Fulfill the 2020-2024 strategic plan to use an ERP-based system	Using an ERP-based system to run the goods or services procurement business process
	Carry out the goods or services procurement business process according to company needs	The existence of a system that already fulfills the goods or services procurement business process

4.4 Information Systems Architecture

This phase develops a corporate information system that has a standardized output of corporate applications that serves to identify a list of applications in the company [23]. The procurement division of PT XYZ has implemented its own e-procurement system. And for the use of SAP as an ERP system that wants to be used. The following table 4 is the Application Portfolio Catalog. The following table 4 is the application portfolio catalog.

Table 4. Application Portfolio Catalog

No	Physical Application Component	Logical Application Component	Description
1	E-procurement	Vendor management	Features for managing vendor performance, risk calculation and mitigation, and relationship management.
		Tender management	Features for selecting, determining and determining companies that are eligible as goods / services providers.
		Contract management	Features to process the management of all aspects related to the agreement between the two parties that establish cooperation
2	SAP ERP	Procurement (Material Management)	Features for conducting business processes in the procurement of goods / services from Purchase Requisition to Payment to Vendor

4.5 Technology Architecture

This phase describes the relationship between the Logical Technology Component and the Physical Technology Component that supports both device components to support the required business integration [24], according to the standard of the company's existing technology needs and the standard needs of SAP. The following table 5 is the technology standard catalog.

Table 5. Technology Standard Catalog

Logical Technology Component	Physical Technology Component	Standard (Benchmark)	
		Minimum SAP	Existing
Server Platform	Server	2.7Hz (x64) processor	1.4GHz (x64) processor
	OS Server	SUSE Linux, Red Hat Linux	Windows Server 2012
	Database Server	Microsoft SQL Server 2019, SAP HANA 2.0 SPS 05	Microsoft SQL Server 2012
	Application Server	SAP NetWeaver Application Server	Application Object Server
	Web Server	IIS 7.0 or 7.5, ASP.NET	IIS 7.0, ASP.NET 2.0
Data Distribution	Access Point	Local Area Network (LAN)/Wide Area Network (WAN)	Wireless Access Point
Client Platform	User Device	PC	PC

Logical Technology Component	Physical Technology Component	Standard (Benchmark)	
		Minimum SAP	Existing
Platform	Technology Component		
Security	Firewall	Proxy Firewall	Proxy Firewall
	Antivirus	McAfee, bowbridge Anti-Virus	Norton Antivirus
Data Transaction	Internet	32Mbps	100Mbps

4.6 Opportunities and Solutions

This phase conducts a review of the design that has been made [19]. After the analysis of the three architectures, namely business architecture, information systems, and technology, an assessment is carried out to find out whether the requirements needed are appropriate and can provide solutions.

In the business architecture of the procurement division, PT XYZ has an objective to fulfill the 2020-2024 strategic plan to use an ERP system and carry out the business process of procuring goods or services according to company needs. The solution that can be done by PT XYZ to achieve these two objectives is to implement an ERP system that can fulfill the procurement business process. Where the SAP application can be one of the ERP systems that can be used. With the SAP system, it has the ability to automate the checking of goods that was previously done manually. Therefore, PT XYZ can increase the effectiveness and efficiency of checking goods based on the quantity and quality of goods based on the Purchase Order.

In the information system architecture in the procurement division, PT XYZ requires features related to vendor management, tender management, and contract management. To be able to fulfill these three (3) features, the SAP system can be used because the procurement process owned by the SAP system already includes these three (3) features, starting with Purchase Requisition to Payment to Vendor.

In the technology architecture needed in the procurement division, there are minimum system requirements needed by PT XYZ in implementing SAP. Where, in the existing server conditions, the minimum system requirements are still not met. Therefore, PT XYZ must align the company's infrastructure with the software and hardware needs of the SAP system to show how the minimum SAP system can run optimally. With technology alignment for the pharmaceutical sector, it can increase operational efficiency, reduce processing time, and better control for inventory management. With the fulfillment of SAP system technology standards, companies can fully utilize the potential of the system to support other processes, not just the procurement process. Thus, contributing to the availability of high-quality and consistent pharmaceutical products.

5 Conclusions

Based on the analysis that has been carried out on the procurement division at PT XYZ using the TOGAF framework with the business architecture, information system, and technology phases, it is found that one of the ERP systems that can be used by PT XYZ is System, Application, and Product in Data Processing (SAP).

In business architecture, to meet the objectives of PT XYZ, the SAP system can be used, where the SAP system has the ability to automate the checking of goods so that the procurement business process becomes efficient and effective. In the information system architecture, the SAP system already includes three (3) features that fulfill the previous system. However, in the technology architecture, it is necessary to align the software and hardware requirements of the SAP system to run optimally at PT XYZ.

It can be concluded that the SAP system can meet the needs of PT XYZ as a company engaged in the pharmaceutical industry. With the SAP system, the pharmaceutical industry has high hopes of achieving a smooth procurement process, centralized data management, and regulatory compliance. In addition, SAP can help efficiency and effectiveness in reporting activities and procurement of goods and services. This research can contribute to the knowledge base regarding SAP analysis in the use of ERP systems. This research can also provide relevant insights into the use of SAP as an ERP system for PT XYZ in particular, and pharmaceutical industries in general.

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