Analysis and Designing Enterprise Architecture of PT. Adigas Jaya Pratama on Sales and Service Function Using TOGAF Framework

Alfian Mulya Rachmandany, Rd. Lugina L. Utama, Muharman Lubis*, Nia Ambarsari

Information System, Faculty of Industrial Engineering, Telkom University, Indonesia

E-mail: *muharmanlubis@telkomuniversity.ac.id

Abstract. PT. Adigas Jaya Pratama is a company that distributes various products of Pertamina, which focus on delivering LPG (Liquefied Petroleum Gas) to the distributors. There are still various problems occurred in term of service level agreement (SLA), which in many case merely based on promise, while at the same time there are also the incapability of monitoring and checking for updating items in the inventory and the storages. Meanwhile, the process of handling customer complaints often causes the decreasing in the level of satisfaction and loyalty to the services provided. To overcome these problems, the solution made must take explicit concern to the harmony between business and information technology aspects. It is necessary to design an enterprise architecture (EA) with the TOGAF framework to provide a suitable blueprint for the development of sales and service function that can present respective ability for the company to have well performance leading to the growth and profit. This research provide the respective artefacts from every design stage including preliminary phase to the migration planning, which is expected to be applied in accordance with the business needs of the company to provide solutions for the existing problems.

1. Introduction
PT. Adigas Jaya Pratama is an authorized company engaged in the business of selling and distributing of various Pertamina products, which mostly serving as an official LPG agent, which provides shipping for 12 hours a day, 365 days / year excluding for Sundays and holidays. The speed and accuracy of delivery to consumers has always been a priority for the company. In addition, there are several problems faced by the sales department, one of which is in the business process of making contracts with the customers in term of SLA, where commonly it have not written in the form. The next problem is during the making of a travel permit where the sales department still has to check the goods stock manually every time customer makes an order. Meanwhile, the sales department also needs to remember the prices and various activities manually within the schedule. In the customer service function, one of the problems is the absence of complaint management system, which the administration only handles complaints without recording or tracking their status. Thus, it is hard for the company to determine what kind of activities should be conducted in respect to the priority level. It also does not know about the overall level of customer satisfaction because the company rarely communicate with the customers to find out how the customer's response to the services provided. Meanwhile, it was found there is such a difficulty to collect the relevant data needed if several customers made a complaint using the telephone because there was no proper standard for recording and documentation within the company. In the end,
these kind of problems can lead to the reduction of customer’s loyalty. The analysis and documentation of an enterprise should be presented its current and future states from an integrated perspective by considering the strategic planning, organizational culture and historical event [1]. The concept in designing EA at PT. Adigas Jaya Pratama through implementing The Open Group Architecture Framework (TOGAF) can provides a detailed method of how to build, manage and conduct business process that synergize the technology. This framework is the result of continuous contributions from large number of architecture practitioners from various sector, which bring easier for the company to adopt it because the attribute for the open source present flexibility and customizability in the every stages [2]. This type of standard is mostly used for its process completeness, interoperability or flexibility in using the elements, availability of architectural knowledge, vendor-neutrality and the alignment within the industry standards [3]. The implementation of application used should be abide to the government regulation to avoid worst case scenario that might happened in the future [4, 5, 6].

2. Theoretical Basis

EA is dedicated to improving the organization's performance by allowing the company to look itself from the perspective of the company’s strategic direction, business practices, information flows and a comprehensive as well as the integrated view of technology resources. This kind of practices has objective to improve the sustainability, maintainability and survivability of company in achieving profit, growth and satisfaction to engage the customers in relation to their performance. In addition, the goal of EA to improve many of the legacy system, which often have the fragmented processes to be an integrated environment that can respond automatically and simultaneously to change and deliver business strategies more accurate and meet with the customer demand. Meanwhile, the benefits of applying an EA within the company related to create more efficient business processes and efficient IT operations, increased return on investment (ROI), reduced investment risk and faster or easier or even cheaper purchases within overall domain of service function. TOGAF ADM (figure 1) is an architectural framework providing methods and tools to help accept enterprise structures, production, use and maintenance. It builds on an iterative process model supported by best practices and a reusable set of existing architectural assets [2]. The implementation of ICT within the organization often faces failure due to the absence of a standardized model and rules related to the business process according to the context of the company and the strategic alignment of Information Technology (IT) [14, 15].

3. Methodologies

The study was conducted in 1.5 year from mid of 2018 until end of 2019, which the method of data collection is conducted in the qualitative approach, namely by collecting and analysing data through observation and interview to the head of sales, operation manager, driver, service employee and authorized expert at PT. Adigas Jaya Pratama. EA present holistic views which is top down approach of the system within the company to bring the alignment for business perspective and technology solution in handling the difficulties related data-driven. It is conducted in order to maximize organizational value.
and culture, to generate productivity and agility, supporting the cost reduction, deliver effective operational activities for profit growth and efficient service timeliness. The phases in EA demonstrates multiple layers of abstraction to develop a complete and shared view of information, extension and direction to understand the barriers and solutions that are considered best for the organization by adding testing method and constraints to those solutions.

4. Identification
From the company's main problems, an identification is done to find out the causes and consequences of these problems. The cause and the consequences are displayed in table 1.

| Problems | Causes | Impact | Classification |
|----------|--------|--------|----------------|
| Difficulties in reaching the monthly sales target set by Pertamina | No formal contract agreement between customer and company | A lot of customers don’t follow the agreement made | Behavioral |
| | Not enough marketing done by the company | No increase in sales and customer’s count | Behavioral |
| | Sales application cannot check the stock’s good | Lack of efficiency in the sales process | Technical |
| | Sales application can’t update the stock’s good | | |
| | No price list data for customer who has contract with the company | There’s a mistake in inputting the price which resulted in the customer doesn’t pay the correct amount | Technical |
| The company does not know the level of customer satisfaction | No complaint recording and management | The company does not know which part of the company that has a lot of problems | Behavioral |
| | No application to support service process | | Technical |
| | Company never does check up to the customer | Decrease in customer’s loyalty | Behavioral |

5. Analysis and Design
5.1. Preliminary Phase
It is necessary to describe the preparation to execute operational and required activities in order to fulfill the business orientation within the organization's structure, including defining organization structure and the fundamental principle for work culture [2]. The definition of architectural principles is a set of rules and guidelines that direct and support the approach for an organization to pursue its vision and mission concussively [2], which can be seen in table 2. Therefore, the negative implication of EA should be considering as well before the implementation take place such as the complexity of the used design after the intensive phase of familiarization and initial workshop or training, changing views and mindset of the employee as the project progressed and the inapplicability of TOGAF’s core prescriptions within business process lead to disruption of performance [8].

| Architecture | Principle |
|--------------|-----------|
| Business Architecture | Business Continuity |
| | Legal Compliance |
| | Service Oriented |
| | Principle Priority |
| Data Architecture | Data is Asset |
| | Data Accuracy |
| | Data Security |
| | Data Sharing |
| Application Architecture | Application Availability |
| | Ease of use |
| | Integrated Application |
| Technology Architecture | Technology Security |
| | Change as needed |
| | Maintenance Technology |
5.2. Architecture Vision

It is necessary to explain the initial phase of the ADM, which includes the information about defining the scope, identifying the stakeholders, creating the architecture vision and obtaining approvals [2]. The identification can lead to improve completeness of supporting data from the key performance indicators to target audience as well to increase the overall collection of data taken to produce and search time through reducing cost of conducting the desk evaluation [7].

5.2.1. Requirement Catalogue. Requirement catalogue explains the relationship between capability, problems, objectives and requirements. It captures every things that the enterprise needs to establish to meet its objectives [2], which can be seen in the table 3.

| Capability | Problems | Objective | Requirement |
|------------|----------|-----------|-------------|
| Sales      | No formal contract agreement between customer and company | Improving the quality of cooperation between the company and customers | A clear contract making |
|            | Not enough marketing done by the company | Increasing the customers count | Increasing the marketing |
|            | Sales application cannot check the stock’s good | Improving the sales process | Optimal sales system |
|            | Sales application can’t update the stock’s good |                    |              |
|            | No price list data for customer who has contract with the company |                      |              |
| Service    | No complaint recording and management | Increasing the customer service process | Communication between functions is working correctly |
|            | No application to support service process | | The flow of complaint management is clear |
|            | Company never does check up to the customer | Increasing the customer satisfaction level | Have a good service system. |
|            | | | Maintained communication with customers |

5.2.2. Solution Concept Diagram. A solution concept diagram provides high-level guidance on possible solutions to achieve the objective of participating in the architecture [2]. In actual, it describes how the enterprise structure lifecycle is developed and managed and forms the core of the process standard for company to establish [3]. A solution concept diagram for PT. Adigas Jaya Pratama can be seen in figure 2.

![Figure 2. Solution Concept Diagram](image_url)

5.3. Business Architecture
The Business Service/Function catalogue can be used to identify capabilities of an organization and to understand the level that governance is applied to the functions of an organization [2]. Table 4 shows the Business Service/Function.

| Function      | Business Service                               |
|---------------|-----------------------------------------------|
| Sales         | Acceptance of company cooperation             |
|               | LPG Sales                                     |
|               | Gas Installation                              |
| Customer Service | Customer satisfaction survey                  |
|               | after-sales service                           |

### 5.4. Information System Architecture

It is also necessary to explain the data collaboration and application architecture regardless its order [2]. This phase objective is to develop the Target Data Architecture that enables the Business Architecture and the architecture vision to be identified [2]. Interestingly, the modelling and analysis approach can provides a means to effectively evaluate the infrastructure vulnerability and presents set of alternative for decision making based on the strategy and budget profile [9]. To show the correlations between each data, a logical data diagram (figure 3) can be used, which the key purpose to show logical views of the relationship between critical data entities within the enterprise but the set of viewpoints are required to describe architecture [10].

![Figure 3. Logical Data Diagram Sales](image_url)

### 5.5. Application Architecture

This phase objective is to develop the targeted application architecture that enables the business architecture and the architecture vision [2]. To show how applications interact with each other, an application communication diagram will be used (figure 4). Its objective related to discuss every visualization in order to map the relevant interaction between program or software [2, 3]. Project Architects work at the enterprise level and create the ultimate architectural team, which each of them being responsible for various area in the business, applications, integration, data and infrastructure throughout the organization to develop principles, standards, global roadmaps and other architectural documents relevant to the field. In contrast, solution engineers at the project level work with project teams and spend most of their time developing architectural documents for individual IT projects. Meanwhile, solution engineers work closely with project engineers to ensure that the project structure they create meets the values, principles, and standards set in the relevant field. [8].
5.6. Technology Architecture

The purpose of this stage is to develop a targeted technology architecture that enables the provision of architectural insight, targeted business, data and application building components through technology services components [2]. The UI platform diagram shows the technology platform that supports the operation of the information system architecture, which this figure covers all aspects of the infrastructure system and provides an overview of the enterprise technology platform. The platform decomposition diagram for sales and service function can be seen in Figure 5.

![Application Communication Diagram](image1)

**Figure 4. Application Communication Diagram**

![Platform Decomposition Diagram](image2)

**Figure 5. Platform Decomposition Diagram**

| Project                         | Sub Project                                      |
|--------------------------------|--------------------------------------------------|
| Sales app modification         | Business process improvement                      |
|                                | Application requirements identification            |
|                                | Application improvement                            |
|                                | Application testing                                |
|                                | Application implementation                         |
|                                | Applications integration                           |
|                                | Making manual books                                |
| JayaService app creation       | Business process improvement                      |
|                                | Application requirements identification            |
|                                | Application improvement                            |
|                                | Application testing                                |
|                                | Application implementation                         |
|                                | Applications integration                           |
|                                | Making manual books                                |
|                                | Employee training                                  |
| Infrastructure fix             | Process business improvement                      |
|                                | Requirements identifications                       |
|                                | Infrastructure improvement                         |
|                                | Infrastructure implementation                      |
|                                | Integration of new structures with applications    |
|                                | Infrastructure maintenance                         |
5.7. Opportunities and Solutions
This phase describes the process of identifying delivery vehicles (projects, programs, or portfolios) that effectively deliver the Target Architecture identified in previous phases [2]. Table 5 shows the suggested project for the target architecture.

5.8. Migration Planning
The purpose of this phase is to choose an implementation project that varies into priority based on the interpretation of the risk and benefits of the project to be used as a basis for planning implementation and migration plans, which is shown in the Table 6. It meant for the suggested project based on company’s business objective to improve their performance, which aligned to company vision and mission accordingly.

Table 6. IT Roadmap

| Proyek             | 2020 | 2021 |
|--------------------|------|------|
|                   | 1    | 2    | 3    | 4    | 1    | 2    | 3    | 4    |
| Infrastructure fix |      |      |      |      |      |      |      |      |
| Sales app modification |    |      |      |      |      |      |      |      |
| JayaService app creation |  |      |      |      |      |      |      |      |

6. Conclusions
According to the analysis and design of EA that has been conducted in the sales and service function, it can be concluded that the company can implement better service in delivering logistic and distribute the product to the client after the realization and identification of the architecture have been finished. Actually, TOGAF ADM provides sequenced inputs, stages and outputs for the respected company to follow, which the roadmap produced will evaluate the values and risks in the migration planning phase to help provide the direction and guidance in implementing the target architecture. It also consists of several projects to support the target architecture, namely the infrastructure improvement project that will be carried out at the end of 2020, the Sales application modification project in early 2021 and the JayaService application creation project from the beginning of 2021 to the middle of the year. Therefore, the verification and validation in the qualitative cannot be established due to different paradigm built, though this research focus on creating credibility and dependability to the source to generate the artefact to solve the research problem.

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