An Enterprise Architecture Plan For Balai Riset dan Standardisasi Industri Bandar Lampung

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Abstract—**Baristand Industri Bandar Lampung is a government agency that has a vision and mission to become a professional and competitive testing, inspectionand calibration service agency. In order to realize its vision and carry out its mission, Baristand Industri Bandar Lampung requires the support of adequate facilities to carry out its business processes as a Testing Institute, Technical Inspection Institute and Calibration Institute. In carrying out its business processes, the Baristand Industri Bandar Lampung does not yet have an automated and integrated system. So far, the services provided have been carried out using computer aids, but have not used special centralized applications. This study aims to design Enterprise Architecture (EA) using the Federal Enterprise Architecture Framework (FEAF) with the aim of producing a blueprint containing business, information and technology architecture modeling that is used as a reference for creating and developing information technology in accordance with the business objectives of the Baristand Industry Bandar Lampung. The results of this study are to design information systems at the Baristand Industri Bandar Lampung, in the form of semantic models, activity diagrams, Entity Relationship Diagrams (ERD), sitemap, network architecture, table structures in databases, information system input and output, hardware and software requirements for operating systems, Data Definition Language (DDL), methods and addressing for internet connection.**

Keywords—Baristand Industry Bandar Lampung, Enterprise Architecture, FEAF

I. INTRODUCTION

The application of information technology (IT) in government organizations is fundamental in realizing organizational efficiency and effectiveness. It aims to improve the organization's ability to process, distribute, and distribute information, as well as to provide public services. Therefore, good strategic planning is needed to determine the direction of IT implementation in government organizations.

The strategic planning as outlined in the Blue Print Enterprise Architecture (EA) can be a guideline for government organizations to implement IT in the next 5 years. This is expected to be able to encourage the achievement of the vision and mission that has been set by the organization. However, most government organizations have human resources (HR) constraints in compiling the right Blue Print EA to support the performance of the organization.

EA is an architectural model to map the business structure in depth and provide clear specifications that function for coordination and supervision of business parts to achieve goals. To maximize the use of EA, a framework is needed that can model and detail the various phases of EA[1].The existence of the framework is expected to facilitate the management of complex systems and align the business with the technology to be developed. So far, there are several frameworks commonly used in EA modeling, including: Zachman Framework, TOGAF (The Open Group Architecture Framework), FEAF (Federal Enterprise Architecture Framework), and TEAF (Treasury Enterprise Architecture Framework)[2].

This research is aimed at developing an EA at Balai Riset dan Standardisasi Industry Bandar Lampung or abbreviated as Baristand Industri Bandar Lampung which has a vision of "becoming a professional and competitive testing, inspection and calibration service institution". To support the business processes of Baristand Industry Bandar Lampung needs to design an automated and integrated system.

Related to these problems, it is necessary to have an IT development solution at the Baristand Industry Bandar Lampung which is carried out in a planned and measurable manner according to the capabilities of the institution. The IT development plan is outlined in the form of an EA Blue Print which is prepared using FEAF. The selection of FEAF as a framework for designing EA at the Baristand Industry Bandar Lampung is based on that FEAF is considered quite good and suitable to be applied to systems in government agencies.

II. LITERATURE REVIEW

A. Enterprise Architecture (EA)

EA is an explanation of how an organization designs a system to support business and technology needs in realizing its mission and vision as well as achieving targeted results[3].The emergence of EA begins with a complex system of how organizations have to spend huge amounts of money in designing or developing their own systems and business alignment with technology, how organizations have difficulty aligning business needs with technology[4].

B. Federal Enterprise Architecture Framework (FEAF)

In developing EA, one of the techniques used is FEAF, which was introduced in 1999 by the Federal CIO Council, aimed at developing EA within the Federal Agency or a system that crosses multiple inter-agency boundaries[5].Provides standards for developing and documenting architectural descriptions in areas of high priority, as appropriate for describing architecture for the Federal government.

In Figure 1 FEAF supports enterprise architecture components, namely business, data, application, and

technology architectures and adopts the three main columns of the Zachman framework consisting of data descriptions, function descriptions, and network descriptions which have six parts of the architecture, each part has a reference models that can be used as architectural models, namely; strategy, business, data, applications, infrastructure, and security[3].

FEAF produces four processes, each level providing an understanding or frame of reference for the following year.In level three, describes the development of the eight components in more detail that leads to a logical structure for classifying and organizing the descriptive depiction of Federal companies at level IV[5]. FEAF Component Structure can be seen in Figure 1.
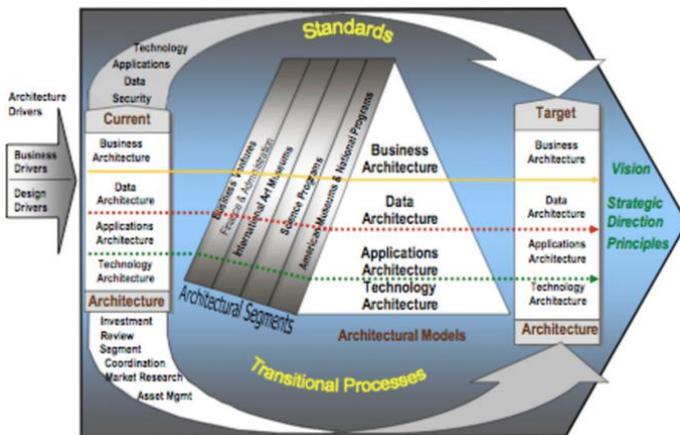

Fig. 1. FEAF Component Structure[1]

Research related to EA modeling is to compare enterprise architecture frameworks consisting of the Zachman, TOGAF, FEAF and Garner frameworks, each of which has weaknesses and strengths, such as Zachman who has strengths in taxonomy completeness, TOGAF in process, Gartner has strengths in practice guidance and business focus, while in the FEAF framework is in the partitioning guidance and prescriptive catalog[4]. The FEAF provides a structure for developing, maintaining and implementing the top-level operational environment and supporting the implementation of IS/IT systems. The objectives of the FEAF are to enable federal governments and organizations to achieve improvements in technology and reduce government IT overspending, facilitate IT integration and data sharing between institutions, use common architectural practices, serve customer needs better quickly and cost-effectively and help institutions meet EA's legislative mandate.

The characteristics and advantages of the Zachman, TOGAF and FEAF EA frameworks can be seen in table 1 and table 2 below;

TABLE I. CHARACTERISTICS OF EA FRAMEWORK

Enterprise architecture framework	Characteristics
Zachman	- Positioning framework - Results catalyst - EA's limited usability - History in manufacturing - Wide acceptance - Limited holistic perspective - Planning tool

TOGAF	- Enterprise architecture development methodology - History in defense - Open standard - Neutral - Wide acceptance - Holistic perspective - Process/planning tools
FEAF	- EA Reference Model - Federal government enterprise architecture - Standards adopted by the United States government - Displays a comprehensive view perspective - It is a tool for planning and communication

TABLE II. ADVANTAGES OF ENTERPRISE ARCHITECTURE FRAMEWORK

Enterprise architecture framework	Advantages of enterprise architecture
TOGAF	- Widely used, has strength in process - Can be accessed publicly - Full support for technology architecture.
Zachman	- Generate different viewpoints - Pioneer of enterprise architecture and well-known.
FEAF	- Simple and easy to use - Specially designed for government - Have a reference model

C. PEST

PEST is an analysis of business external environmental factors covering the political, economic, social and technological fields[6]. PEST is used to assess the market of a business unit or organization, the direction of PEST analysis is a framework for assessing a situation and assessing the strategy or position, direction of the company, marketing plans or ideas. In this analysis can be taken a new opportunity or threat for the company. The four factors that are components of PEST are as follows:

- Political factors, including government policies, legal issues, and include formal and informal rules of the environment in which the company conducts activities.

- Economic factors, including all factors that affect the purchasing power of customers and affect the climate of a company's business.

- Social factors, including all factors that can affect the needs of customers and affect the size of the existing market share.

- Technological factors, including all things that can help in dealing with business challenges and support the efficiency of business processes.

D. SWOT Analysis

SWOT analysis is a method for identifying various actors systematically to formulate strategies based on the logic obtained, maximizing strengths, and opportunities, then simultaneously minimizing weaknesses and threats[7]. SWOT analysis compares the external factors of opportunities and threats with the internal factors of strengths and weaknesses.

III. RESEARCH METHODOLOGY

The research methodology is shown by research with steps based on the FEAF framework which has four stages to produce an information system blueprint, these stages refer to four levels, as shown in Figure 2.
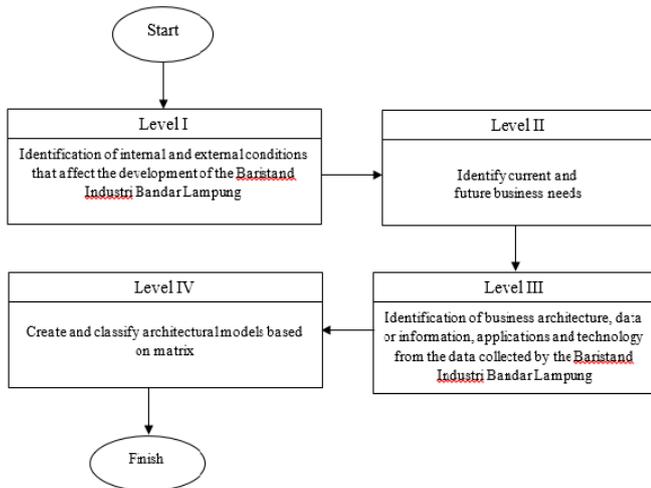

Fig. 2. Research Steps

The stages in the research based on the FEAF framework are as follows;

1) Level I

This stage is an important stage in the FEAF adaptation process because this stage is a preparation process to define what kind of EA you want to build in accordance with the needs and strategic goals of the organization. This stage uses SWOT (Strength, Weakness, Opportunities, Threat) analysis tools and PEST (Politic, Economy, Social, and Technology) analysis. Analysis tools are used to identify the current state of the organization and will provide analysis results for use in the next stage.

2) Level II

At this level, value chain analysis techniques are used to identify the current process or service needs of the Baristand Bandar Lampung Industry services and the need for it in the future. By using value chain analysis techniques, it is expected to facilitate the grouping of main activities and supporting activities. The results of the value chain analysis on the Baristand Industry Bandar Lampung business process can be seen in Figure 3.1.
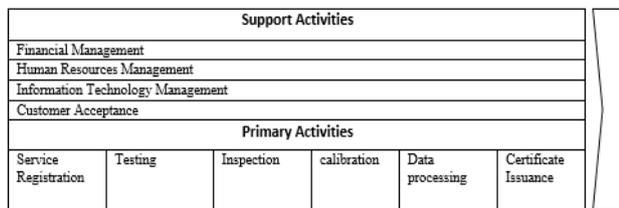
Fig. 3. Results of Value Chain Analysis

3) Level III

At this level using the analysis technique of Business System Planning (BSP), carried out in two stages, namely;

a) Identifying the organization's business goals, at this stage the researcher makes details and modeling of the information architecture of the organization's business processes such as vision and mission, service announcements, main tasks and organizational functions and organizational governance in the Baristand Industry Bandar Lampung.

b) Identify business processes, business processes that have been identified using the value chain are described again in more detail using the identification and business process analysis form.

4) Level IV

At this level, identify the details of the object of each architectural model, namely data, applications, and technology using the FEAF matrix. The FEAF matrix divides the four architectures into 5 perspectives, namely scope, business model, information systems model, technology model, and detailed specifications.

a) The scope is how big the system will be, the development environment

b) The business model is the business process handled by the system

c) Information system model, namely the type of data, data flow, and its function in business processes

d) Technology models, namely programming languages, input/output devices and other supporting technologies to develop the system

e) Detailed specifications, namely development modules and system structure.

Based on the five perspectives, it will be further divided to be more focused with the help of the questions of what (entity), how (activity), and where (location).And finally the proposed information system is issued in this phase, which is expected to help the organization. The FFAF matrix can be seen in Figure 4.

Fig. 4. Matriks FEAF Level IV

The explanation of the five perspectives is as follows;

a) Planner Perspective

Provide an overview of the scope that will be developed in Baristand Industry Bandar Lampung. The three cells defined are as follows:

• Column What (List of Business Object) column contains data or information needed for the continuity of the business process functions at the Baristand Industry Bandar Lampung, namely service registration, testing, inspection,

calibration, issuance of service certificates and financial management.

- Column How (List of Business Process), contains the business processes that occur at the Baristand Industry Bandar Lampung with the aim of achieving organizational performance. The business process is divided into two activities, namely main activities and supporting activities.

- Column Where (List of Business Locations), contains a general description and geographical conditions located at the Office of Baristand Industry Bandar Lampung, which is located at Jl.By Pas Soekarna Hatta KM.1 Rajabasa Bandar Lampung.

b) Owner Perspective

This Owner's perspective is a business design and shows business entities, processes and their relationships. The three cells are defined as follows;

- Column What (Semantic Model), contains a semantic model that is used to explain the relationship between data in a logical database[8], the model is divided into business processes including service registration, testing, inspection, calibration and payment.

- Column How (Business Process Model), contains activity diagrams (flowcharts), namely the manual flow of business processes that occur, namely other services registration, testing, inspection, calibration and payment.

- Column Where (Business Logistics System), contains the location used to carry out business processes at the Baristand Industry Bandar Lampung, namely the service registration service, the process of issuing certificates and payment services, the testing process, the inspection process and the calibration process.

c) Designer Perspective

The designer's perspective explains that the system model that is designed must take into account the data elements, logical process flows and functions that describe the business entities of data and processes. The three cells are defined as follows;

- Column What (Logical Data Model), contains an Entity Relationship Diagram (ERD) one of the modeling class diagrams that describes the structure of the system in terms of defining the classes that will be created to build the system. Classes have what are called attributes and methods or operations[9].

- Column How (Application Architecture), contains the application architecture that describes the proposed information system.

- Column Where (System Geographic Deployment Architecture), contains a logical model of the relationship between nodes on a network and an overview in the form of a network topology.

d) Builder Perspective

Describes the technology model that must be adapted to the information system model such as input/output devices or other technology requirements. The three cells identified are as follows:

- Column What (Physical Data Model), contains a physical data model that is represented as a table and attributes that will be used to build the system

- Column How (System Design), contains input data to be processed and the output generated by the system.

- Column Where (Technology Architecture), in this column provides a physical description of the technology needs at the Bandar Lampung Industry Baristand office. These needs are in the form of hardware and software.

e) Subcontractor Perspective

Describe the detailed specifications used before the system is implemented. The three cells identified are as follows:

- Column What (Data Definition), contains Data Definition Language (DDL) which are the commands used to define the structure of the database

- Column How (Program), contains the methods or actions needed to build the system.

- Column Where (Network Architecture), contains the network architecture, namely addressing each node on the network so that they can communicate with each other.

IV. CONCLUSION

From the research that has been done, it is concluded that the design of a service EA on Baristand Industri Bandar Lampung which using FEAF can produce a blueprint containing business, information and technology architecture modeling, information and technology.The resulting blueprint can be used as a reference to create and develop information technology in accordance with the business objectives of the Baristand Industri Bandar Lampung, EA that has been generated can be applied to three institutes in the Baristand Industri Bandar Lampung, namely testing, inspection and calibration

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