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DESIGN ENTERPRISE ARCHITECTURE IN CPO INDUSTRY USING TOGAF ADM FRAMEWORK

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Abstract

The development of the current era is so rapid and makes technology an important aspect of running a business. This CPO industry is a limited liability company in Indonesia engaged in palm oil manufacturing that is aware of the importance of using technology in the process of achieving their business goals. The CPO industry has used several applications to support the company's business, but there are still some company business activities that have not been assisted by the application. The applications used in a company must also be able to run in harmony with the existing business objectives in the company so that the technology used can help companies achieve corporate goals. To create technology that runs in line with business objectives, then enterprise architecture is used in the process of making these applications. This research will use one of the enterprise architecture frameworks, the Open Group Architecture Framework TOGAF ADM (The Open Group Architecture Framework) to assist in making applications that are useful for the CPO industry. The final results of this study are in the form of a proposed application model that is tailored to the interests of business processes and business needs of existing CPO industries.

Keywords:

TOGAF, CPO Industry, Enterprise Architecture

1. INTRODUCTION

The rapid development of information technology in the current era of globalization cannot be curtailed from influencing on the business world [1]. Limited Liability Company is a business structure that gives the owner responsibility in running the corporation and allows the formation of a partnership business [2]. The CPO industry is a limited liability company established in Indonesia. CPO industry is engaged in industrial agribusiness and palm oil manufacturing [3]. The CPO industrial estate is located in the island of East Kalimantan. By the end of 2007, the CPO industry collaborated with 10 coal mining companies with the largest production in Indonesia with coal mining management that always met environmental management requirements that were recognized well every year from the Environmental Institute. Realizing the inevitability of Information Technology in the current era, the CPO industry uses several IT applications to support its business processes

Information technology becomes an important aspect because information technology provides new business opportunities for companies and increases output from the company [5]. With the increase in company output, the company's competitiveness will also increase [6]. With the use of information technology in a company will help the company in improving the performance of the company [7] and help in solving various company problems.

Information technology must run in harmony starting from software and hardware including the integration of all components in the application of the company [8]. If the information technology does not run in harmony with business processes, the technology will hamper the company's business processes. So, in the development of Information Technology, companies must pay attention to the integration factor [9]. Therefore, in planning an information technology, designing an enterprise architecture is required to help alignment in the planning.

Enterprise architecture can help build or design information technology that will direct the company so that it can have integrated and integrated information technology that supports the company to achieve its goals [10]. In enterprise architecture, there are several frameworks that can be used. In this report, we will use The Open Group Architecture Framework (TOGAF) ADM which is a method used in designing IT Master Plans that adjust to user needs [11].

With the completion of this research, CPO industries are expected to be able to assist in the process of developing and planning helper applications and it is hoped that designing these applications can improve the business of CPO industries. The final results of this study will produce a blueprint of the proposed application design and blueprint of a network design that can be used in the future by the CPO industry.

2. LITERATURE REVIEW

2.1 PREVIOUS RESEARCH

At this point, we will discuss several previous journals related to this research. Following are some of the results from previous studies relating to the design of enterprise architecture using the TOGAF framework:

2.1.1 Research 1:

Based on the journal entitled "Designing Enterprise Architecture Enable of Business Strategy and IS/IT Alignment in Manufacturing using TOGAF ADM Framework" written by Rengga Eko Riwanto, and Johanes Fernandes Andry [12], then it can be concluded as follows:

a. This research aims to design, evaluate, and build appropriate architecture in the Macro Tardeli Group (MTG) using TOGAF ADM.
b. This research shows that there is still a gap between the current business architecture and the target business architecture.
c. From this research, MTG needs to re-evaluate the implementation of the company's architecture from the old system to the new system to create effectiveness and efficiency in the business process of the Tardeli Macro Company.

2.1.2 Research 2:

Based on the journal entitled "TOGAF ADM Planning Framework for Enterprise Architecture Development Based on Health Minimum Services Standards (HMSS) at Cimahi City Health Office" written by Herdiana [13], it is concluded as follows:

a. In the resulting business architecture design business modeling pertaining to the scope of application of HMSS for Health.
b. Based on the results of the data analysis needs, there are several entities data and applications that need to be developed to support the implementation of the information system of HMSS in Cimahi City Health Office.
c. The existing Technology Platform is sufficient to support its candidate's proposed application. But rejuvenation is required in terms of hardware and technology upgrades.
d. This enterprise architecture modeling, provides guidance in making a blueprint for the development of information systems for the implementation of HMSS data, applications, business, and technology.

2.2 INFORMATION SYSTEM/TECHNOLOGY

According to Sutedjo [14], information systems are collections of elements that are interconnected with each other that form a single unit to integrate data, process, and store, and distribute information.

Information technology is a set of tools that helps you work with information and perform tasks related to information processing [4].

2.3 ENTERPRISE ARCHITECTURE

Enterprise Architecture is a management and technology practice aimed at improving company performance by seeing the company as a whole and integrated in accordance with the view of strategic direction, business practices, information flow, and technological resources [15].

Enterprise architecture consists of documents such as drawings, diagrams, textual documents, standards or models and business methods that explain what kind of information system is needed by the company. Enterprise architecture will be used as a reference for the development of information systems. Because, developing a system without having a good architecture will be difficult to achieve maximum results [15].

Enterprise architecture is a statement of how companies align IT implementation with business processes in the company [15].

3. RESEARCH METHODOLOGY

In this study, there is a research framework that covers the entire research process. This research starts with the observation and interview stages to related companies and does an analysis of the results of each data obtained.

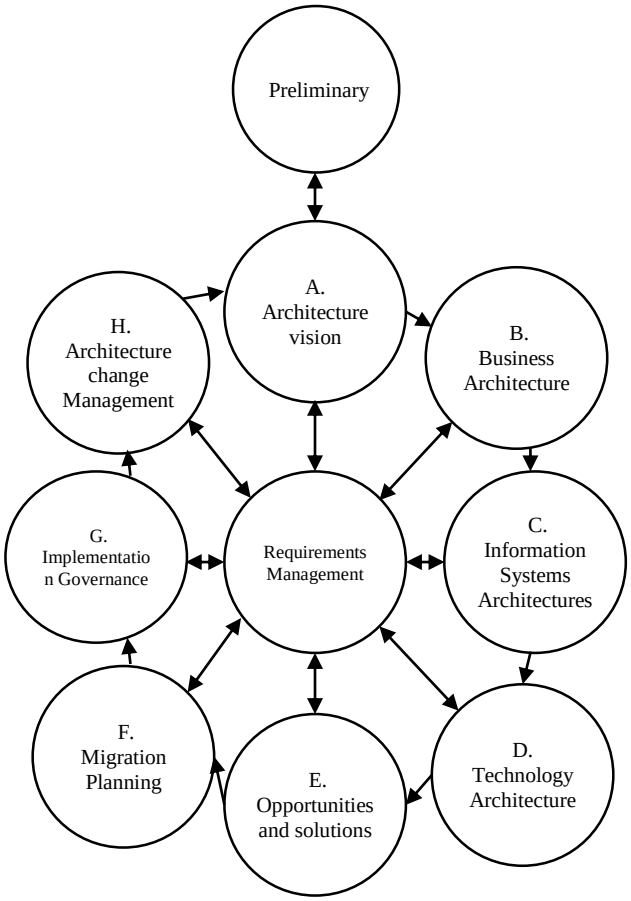

Fig.1. Research Methodology [16]

The research steps will consist of [17]:

1. *Preliminary Phase*, explain the preparatory and initiatory activities needed to prepare to meet business objectives for the new company architecture, including an explanation of the organization-specific architecture framework and definition of principles.
2. *Phase A*: Architectural Vision, describes the initial phase of the architecture development process. This includes information about defining spatial boundaries, identifying stakeholders, creating an architectural vision, and getting approval.
3. *Phase B*: Business architecture, explain the development of business architecture to support the agreed architecture vision.
4. *Phase C*: Information systems architectures, describe the development of information systems architecture for architectural projects, including the development of data architecture and applications.
5. *Phase D*: Technology architecture, describe the development of architectural technology for architectural projects.
6. *Phase E*: Opportunities and solutions, carry out initial implementation planning and identify delivery vehicles for the architecture specified in the previous phase.
7. *Phase F*: Migration planning, discuss the preparation of a series of transitional architecture sequences in detail with a supporting implementation and migration plan.

8. *Phase G*: Implementation governance, provides architectural oversight of implementation.
9. *Phase H*: Architecture Change Management, establish procedures for managing changes to the new architecture.

4. RESULT AND DISCUSSION

4.1 PRELIMINARY PHASE

This phase is the initial stage (preliminary) for designing the Enterprise Architecture. This stage is carried out to produce architectural principles and to convince stakeholders involved in the decision-making process related to the success of the Information Technology (IT) architecture in the organization.

In this study, there will be 6 architectural principles that will become references, views in making proposed applications, and also become the basis of this research as well. These principles are obtained through the analysis of observations and results of interviews in the CPO industry.

The principles are as follows:

1. The architecture created and developed must support the company's business processes and existing vision and mission company.
2. The architecture developed must be safe and well protected.
3. The architecture developed must be safe and well protected.
4. Access to data can be done more easily.
5. The application developed is easy to understand.
6. The application speeds up business processes.

The following is an explanation of the principles and architectural objectives that will be set out in Table.1, the EA Design Principles:

Table.1. EA Design Principles

Principle	Purpose
The architecture created and developed must support the company's business processes and existing vision and mission company	• Supporting business processes in CPO companies • Improve worker performance • Help the CPO companies achieve their business goals
The architecture developed must be safe and well protected	• Resistant to virus attacks and other cybercrime attacks • Protection of data and information from parties who are not obliged • Protect the security and confidentiality of data and information for unauthorized parties
Applications must be integrated with other applications	• Each application can share data with other applications as needed • Improve data processing
Access to data can be done more easily	• In finding data can be done easily in real-time • Data is easily available for those who need it
The application developed is easy to understand	• Ease of understanding of applications and usage that are not complicated • The application is user-friendly so it is easily understood by its users • Rapid response to change and adaptive
The application speeds up business processes	• Make it easy for users to do an activity • Does not take a long time in the business work process • Minimize the time spent on a job

4.2 TOGAF ADM

4.2.1 Phase A: Architecture Vision:

The scope of the discussion in this phase includes the company's vision, mission, business objectives, and products produced by the company.

A. The vision and mission of the CPO Industry are to become an efficient, integrated (upstream-downstream) oil palm plantation company, environmentally friendly, partnering with the community and producing CPO production along with its derivatives of the highest quality in the agribusiness & food industry.
B. The business objective of the CPO Industry is to develop an oil palm industry plantation along with its derivatives that are effective and efficient, integrated, environmentally friendly through sustainable research and development. Creating employment and HR development within the link match concept. Creating a partnership pattern towards an independent, advanced, and prosperous community in accordance with the GERDABANGAGRI program in East Kalimantan district. Encouraging regional economic growth through oil palm plantations and industrial centers towards independent cities. Increasing non-oil exports.
C. The products produced by the CPO industry are palm oil and its derivatives.

In the case of this research, the object of research is the CPO industry where the CPO industry is one of the companies in Indonesia engaged in manufacturing palm oil. In accordance with their fields, the CPO industry produces and processes palm oil into ready-made goods such as palm oil and other CPO derivatives.

The location of the CPO industrial company office is in the Jakarta area of brass while the location of their plantations is in East Kalimantan at the district level. In carrying out their

business, the CPO industry plants and takes care of their palm oil seedlings to become oil palm ready for harvest or FFB (Fresh Fruit Bunches). Only then do they process the oil palm according to their ordering needs

4.2.2 Phase B: Business Architecture:

The scope of the discussion in this phase covers the state of the company's business. Analysis of the business situation of the CPO industry will be carried out using the value chain as shown in Fig.2 of the CPO Industry Value Chain:

From Fig.2 there are five main activities and four activities supporting the company's business.

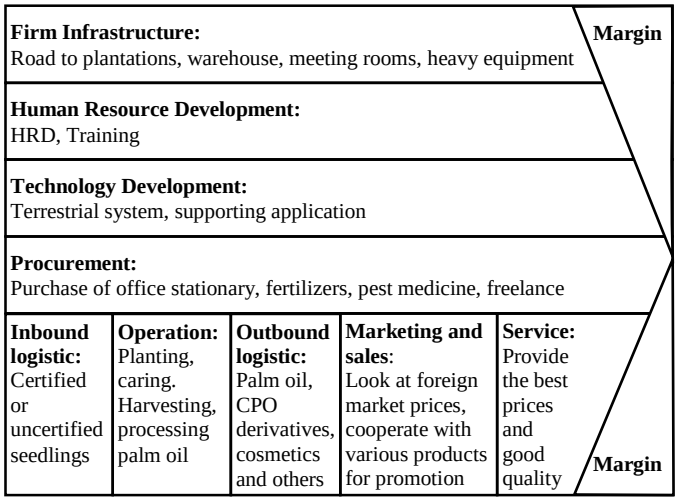

Fig.2. Value Chain CPO Industry

Primary Activities

- Inbound Logistic, purchasing certification seeds / not certification because the CPO industry is a palm oil manufacturing company. CPO industry purchases seeds from suppliers. This purchase was made by an employee. The seeds that are purchased are crossing seeds or non-crossing seeds that are certified or not. Seedlings that have been purchased will be developed and crossed by themselves.
- Operations, before the land is planted with seedlings, the land will be cleared and liming the soil will be done to increase soil pH so that the availability of nutrients in the soil. Maintenance of seedlings is carried out for 3/5 years until the seeds turn into oil palm trees and have ready-to-harvest fruit in the form of FFB (Fresh Fruit Bunches).
- Outbound Logistic, the harvested fruits are then taken to the mill where the harvested palm fruit heads are processed. The palm fruit will be processed into palm oil, CPO (Crude Palm Oil) or can be processed into cosmetics.
- Marketing and Sales, CPO industry provides prices with standard prices from foreign markets.
- Service, provide the best price for consumers as well as by maintaining the quality of the products they provide such as using superior seeds, carrying out soil formulations and protecting oil palm trees to provide the best fruit.

Support Activities

- Firm Infrastructure, a road to plantations where this road is needed to access people who will go to the palm oil plantation.
- Human Resource Development, provide a corporate HRD section where HRD functions to manage expertise, improve and motivate employees, and provide training or development for employees who are less able to improve performance.
- Technology Development, using a terrestrial system where terrestrial itself is a system that does not involve satellite transmission but uses radio waves through a transmitter or antenna
- Procurement, supporting business processes, such as office stationery, fertilizers to fertilize oil palm, pest drugs to eradicate pests that interfere with the growth of oil palm trees, as well as freelance to work to help in the fields that need help.

4.2.3 Phase C: Information System Architecture:

The scope of discussion in this phase is about application proposals that will be applied to the CPO industry going forward. The Table.2 is a proposal from the results of the analysis of CPO industry needs.

Table.2. Proposed Information System

Application	Function
Company Profile Website	To provide information about the CPO industry. It contains vision, mission, company chart, and other information.
Submission of Employee Leave	To assist in the process of filing leave so that it can be done anytime and anywhere
Goods Monitoring	To assist in the process of shipping goods so that goods can be ascertained to the destination properly
Watering Plants Based on Temperature Intensity	To assist in the process of watering plants using sprinkles without having to always be monitored but can water them by checking the existing air temperature
Plantation Geographic Thematic Map	To assist in the process of recording maps according to planted seedlings. Make it easy to find the location of planting seeds
DSS Seed and fertilizer selection	To help companies in the process of making a decision, for this application helps in making decisions to buy the best fertilizers and seeds at the lowest price

4.2.4 Phase D: Technology Architecture:

This phase will discuss the proposed development of technology architecture that is useful for improving system performance so that it can be in accordance with the business objectives of the industry.

The following is the network contained in the CPO industry today, can be seen in Fig.3, the current network architecture.

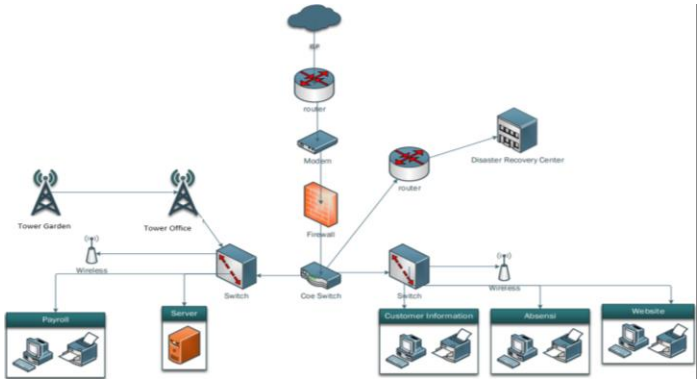

Fig.3. Current Network Architecture

At this time the internal network in the CPO industry is quite complete where there are switches, routers, and connecting towers to the plantation using a terrestrial system, there is also a disaster recovery center. And there are several applications that have been connected with business processes in the CPO industry, one of which is payroll, customer information, absenteeism, and website (not going well).

From the current network architecture, an analysis of its development is carried out so that there is a network architecture to be proposed. This technology architecture can be seen in the Fig.4, the network architecture CPO Industry.

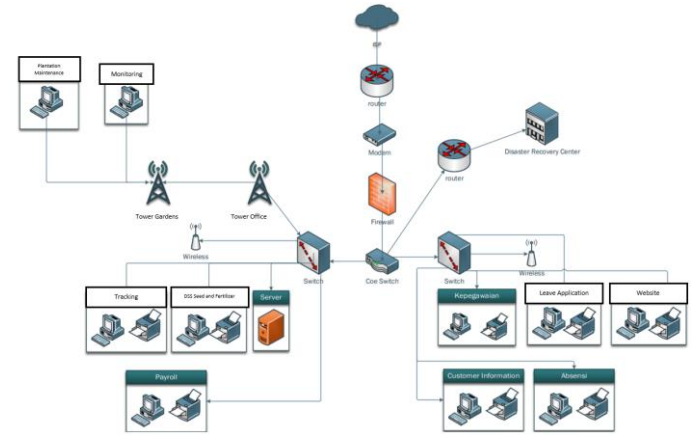

Fig.4. Proposed Network Architecture CPO Industry

In Fig.5, CPO industry network architecture is a recommendation proposed to support the CPO industry information system architecture planning. This recommendation aims to improve the integration and stability of the data so that it can be better maintained. There are two places, namely offices and plantations or factory warehouses. These two places are connected with terrestrial technology which will then be connected to the switch. At the endpoint of data storage, a firewall device will be installed and then connected to the switch industry. Then there is a router that is connected to the Disaster Recovery System (DRC). This DRC aims to overcome if an interruption occurs in an important work unit in the industry. The type of DRC used is the same cold site as the Data Center location.

4.2.5 Phase E: Opportunities and Solutions:

Infrastructure architecture has an important role in supporting business strategies and IS/IT. Infrastructure must be able to manage various units and processes in the organization, and provide a long-term design of how an organization can adjust to the development of time so that the IS/IT can run in harmony and can be further improved.

Based on the results of the analysis of the data obtained, there will be an infrastructure architecture proposal as follows:

- In the website application, it will use a web browser that requires internet or LAN to connect. This application will be based on a web server using PHP and will have a database for data storage.
- In the thematic Map application, it will use a desktop that requires internet or LAN to connect. This application will use using visual studio and .exe and will have a database for data storage.
- In the leave Application, it will use a web browser that requires internet or LAN to connect. This application will be based on a web server using PHP and will have a database for data storage.
- In the monitoring application, it will use a web browser that requires internet or LAN to connect. This application will be based on a web server using PHP and will have a database for data storage.
- In the DSS Seed and Fertilizer application, it will use a desktop that requires internet or LAN to connect. This application will use using visual studio and .exe and will have a database for data storage.
- In the watering Plants application, it will use a desktop that requires internet or LAN to connect. This application will use using visual studio and .exe and will have a database for data storage.

Platform Technology						
	Phase					
Interface	Website	Thematic Map	Leave Application	Monitoring	DSS Seed and Fertilizer	Watering Plants
Presentation	Web browser	Desktop	Web browser	Web browser	Desktop	Desktop
Network	Internet and LAN	Internet and LAN	Internet and LAN	Internet and LAN	Internet and LAN	Internet and LAN
Application	Web server and PHP	Visual Studio and exe	Web server and PHP	Web server and PHP	Visual Studio and exe	Visual Studio and exe
Database	Database	Database	Database	Database	Database	Database
	DB Platform	DB Platform	DB Platform	DB Platform	DB Platform	DB Platform

Fig.5. Proposed Infrastructure Architecture

5. CONCLUSIONS

Based on the results of the research conducted in the previous chapter, it can be concluded that this study aims to map, design, and build the right architecture for the CPO Industry using the TOGAF framework. This company is an agribusiness manufacturing industry which is engaged in oil palm plantations. In operation, this industry has problems in complex business processes and is still not fully supported by the IS/IT department. This research proposes an architectural design in the future which can be considered for implementation.

Suggestions that can be submitted for the CPO industry are in implementing a number of draft proposals, it should be done in stages in accordance with the level of urgency of the needs and must be fully supported by all relevant stakeholders for the achievement of the targets set.

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