



Enterprise Architecture Artifacts Enablers for IT Strategy and Business Alignment in Forwarding Services

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ABSTRACT

The development of information technology in this era has grown rapidly and made information technology important in running a company's business. The need for information technology that is fast and reliable becomes the main thing for users of information technology. Therefore, supporting information technology is needed in the current era of globalization is needed in developing information systems. Freight Forwarding Services is a company engaged in the field of land transportation services that is aware of the role of information technology in achieving business goals because it is related, the development of the information technology world demands all that is efficient and effective. FFS Company have several applications to support corporate processes, but there are still a number of business activities that have not used applications to support the process. The application used by the company must be able to match the company's objectives so that the application used can help the company reach an agreement. To create applications that fit business objectives, company architecture is used in making applications. This research will use The Open Group Architecture Framework to help request useful assistance for company. The final results of this study are in the form of a proposed application model that is tailored to the business processes and business needs of the company.

Key words: Technology, Freight Forwarding Services Company, Enterprise Architecture, TOGAF.

1. INTRODUCTION

The development and use of information technology in daily life including business ventures continues to grow rapidly along with the passage of time [1]. One of them is a freight forwarding business which is a service-oriented business and the quality of its services is an important factor for business success. Quality of service is the main goal of the business to pursue customer satisfaction [2]. Therefore,

companies must evaluate and optimize business processes and require strategies to achieve competitive advantage [3].

In achieving competitive advantage, technology development requires good planning. One method for completing improvements in system development and designing information systems in companies is called Enterprise Architecture [4]. Enterprise Architecture often connects the relationship between a company's technological system and strategic management elements [5]. Enterprise architecture is a practice of technology and management that aims to improve the performance and quality of the company by helping to design technology resources, business processes and strategic direction so that the company's goals can be achieved [6]. In addition, the company's architecture also aims to create a suitable environment for the company so that business processes can run well in accordance with the company's strategy. Enterprise architecture frameworks usually consist of business architecture, information architecture, application system architecture, and infrastructure technology architecture [7]. Enterprise Architecture is an important method for company success and has an important role in increasing the demands of speed, agility, efficiency and quality [8].

In this study Enterprise Architecture planning is carried out using the TOGAF framework, TOGAF can provide output in the form of a blueprint in supporting the company's business processes to be implemented with other systems so that development to the next stage will be better [9]. TOGAF can support difficult and detailed frameworks and tools that are useful in supporting business development and helping to improve the performance of a company's information technology. The impact that will occur from the results of information technology is business planning, implementation and information technology [10].

Freight Forwarding Services is a company engaged in the field of land transportation services. With its headquarters in Medan, this expedition company has two branches, namely in Jakarta and Pekanbaru. This expedition company has a business strategy in serving consumers by providing the best service in sending goods quickly and safely. But there are still business activities that are still lacking in the work process. Therefore this company needs an Enterprise Architecture so

that the company's business strategies and objectives can be achieved and in the next section, this company will be called the FFS Company.

In this study, the TOGAF framework was chosen because this framework is widely used by most companies because of a complete architectural process, providing standardization and support for architectural development [30]. The purpose of this research is to produce a blueprint of strategic planning prepared using TOGAF that can support business processes at FFS Company to analyze of business architecture.

2. LITERATURE REVIEW

2.1 Freight Forwarding Services

Freight Forwarding Service is a business venture that provides quality services in land, sea or air transportation. This business venture prioritizes competitive advantage in order to meet customer needs with the goal that customers can feel satisfied with the service [11].

Freight Forwarding Service prioritizes the speed of delivery time and the accuracy of the information available and is responsible for the security of the shipment [12].

Freight Forwarding Services is a business that provides shipping facilities that include shipping services, handling customers by providing assistance with the shipping process and providing information services [13].

2.2 Enterprise Architecture

Enterprise Architecture is an organizational structure derived from business processes and information technology infrastructure in a company. The main idea behind the company's architecture is the need for companies to review, develop and control all parts of the company [14].

Enterprise Architecture is a methodology that aims to help companies with a framework for developing information in business processes using business strategies, proposing strategic alignment between business strategies and information technology [15].

Enterprise Architecture Methodology recommends five steps to practice Enterprise Architecture including documenting the current state of the company in detail, explaining in detail about the future conditions desired by the company, analyzing the gap between current and future conditions, preparing the path for the transition period from the current state this to the future and implement the flow that has been created [16].

2.3 The Open Group Architecture Framework

The history of the development of the TOGAF began before 1990 which was made by the United States Department of Defense which refers to TAFIM (Technical Architecture Framework for Information Management). In 1990, the TOGAF was taken by the Open Group and in 1995

specifications about the TOGAF were first introduced in general [17].

TOGAF has a structure and components namely the Architecture Development Method (ADM) which explains the company's architecture specifically according to the needs and TOGAF ADM has a clear vision and principles in the development of enterprise architecture [18].

TOGAF provides a tested and iterative process for developing Enterprise Architecture which consists of an architectural framework, transitions, developing business processes and information technology as well as regulating the understanding of corporate architecture [19].

TOGAF views Enterprise Architecture in 4 categories, namely: [20]

- Business Architecture describe about how business processes to achieve company goals.
- Application Architecture is a description of how certain applications are designed and how they interact with other applications.
- Data Architecture is a depiction of how the storage, management, and access of data in the company.
- Technical Architecture an overview of the hardware and software infrastructure that supports applications and how they react, the systems will operate without failure for a certain period of time [21].

TOGAF development cycle is a logical methodology consisting of eight main phases for development and maintenance and the following TOGAF framework is shown in Figure 1. The Open Group Architecture Framework (TOGAF) such as:

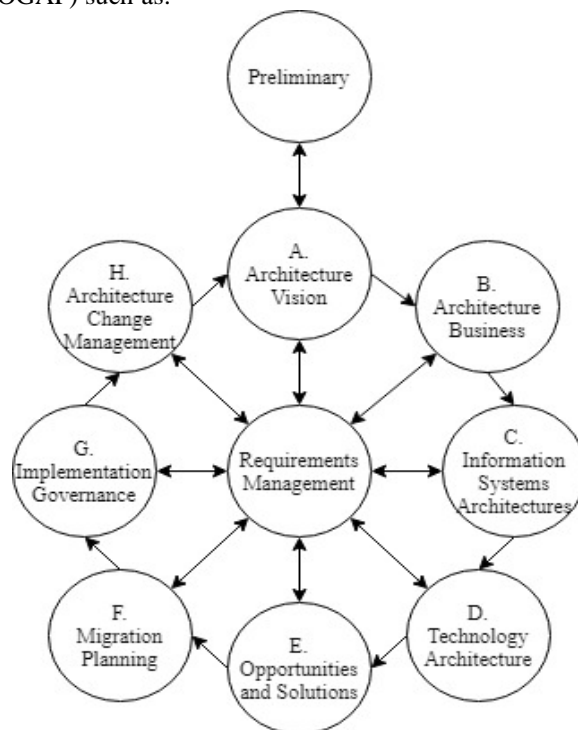


Figure 1: The Open Group Architecture Framework (TOGAF) [21], [23]

Based on Figure 1. The Open Group Architecture Framework (TOGAF) the explanation is as follows:

- Introduction, explains the preparatory activities needed to find business direction for the new Enterprise Architecture.
- Architectural Vision, describes the initial phase of architecture development method (ADM).
- Business Architecture, describes the development of Business Architecture to support the approval of the Architectural Vision.
- Information Systems Architecture, describes Information Systems Architecture for architectural projects.
- Technology Architecture, explains the Business Architecture Data Architecture section.
- Opportunities and Solutions, describe the process of identifying delivery vehicles that effectively deliver the Target Architecture identified in the previous phase.
- Migration Planning, explains how to move from the current architecture to the target architecture by completing a detailed Implementation and Migration Plan.
- Implementation of Governance, explains about providing architectural oversight of implementation.
- Architectural Change, explains about establishing procedures for managing changes to the new architecture.
- Requirements Management, describes the process of managing architecture requirements throughout the Architecture Development Method (ADM).

2.4 Porter’s Value Chain Analysis

Michael Porter was the first to introduce the term "Value Chain" in his book titled *Competitive Advantage: Creating and Maintaining Superior Performance* (Porter 1985) and Michael Porter defines "Value Chain" as a representation of a company's activities that add value based on pricing strategies [24].

Value chain analysis refers to the process by which a company determines the costs associated with a company's activities from purchasing raw materials to production and marketing. Value Chain aims to identify the advantages or disadvantages of a company from low costs in the value chain [25].

The value of Porter's Value is approach to the chain analysis. Porter's Value focuses on analysis of company chains and programs. These systems are connected between systems and operations with each other and can have an impact on costs, benefits and identify the main activities and supporters that add value to the main product and analyze the steps to minimize or reduce costs [26].

Value Chain consists of main and supporting activities. For this main activity consists of logistic in, operations, logistics out, marketing and sales and services. Supporting activities consist of corporate infrastructure, human resource

management, technology development and activities to achieve something, and propose a new more value chain [27], [28].

3. RESEARCH METHODOLOGY

The research method used by the author in this research is descriptive method in FFS Company. Data collection methods by solving problems in the company and by interviewing the company. For the case of this studio, the author only uses 3 TOGAF phases for corporate architecture approval, such as:

- Preliminary Phase
- Phase A: Architecture Vision
- Phase B: Business Architecture

The following Figure 2. Research Methodology.

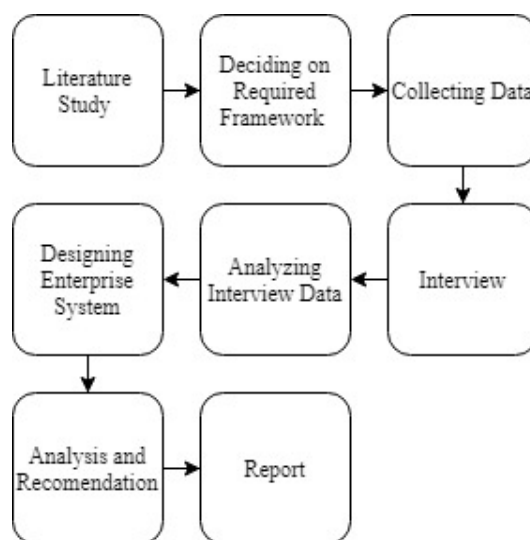


Figure 2: Research Methodology [29]

Based on Figure 2. Research Methodology, the first step of this research is to conduct a literature study for studies related to the study used in this study and gather relevant information, then choose TOGAF as a suitable work effort for FFS Company. The initial step the author will collect various data that will be used in research. Data collection can be done by observing business activities at company. After that the author conducted an interview with FFS Company officials to request data. Then the authors analyze the data from the interviews to be able to create an enterprise architecture. The author will provide analysis and provide for companies based on the enterprise architecture design that has been created. The final step, the writer will make a report and give it to the company.

4. RESULT & ANALYSIS

4.1 Value Chain Analysis

The business model at FFS Company will be analyzed using the value chain. Value chain are used to analyze

primary activities and support activities of a company. In addition, the value chain can also be used to analyze the company's internal activities. The following is a value chain from the analysis of company contained in Figure 3. Value Chain Analysis.

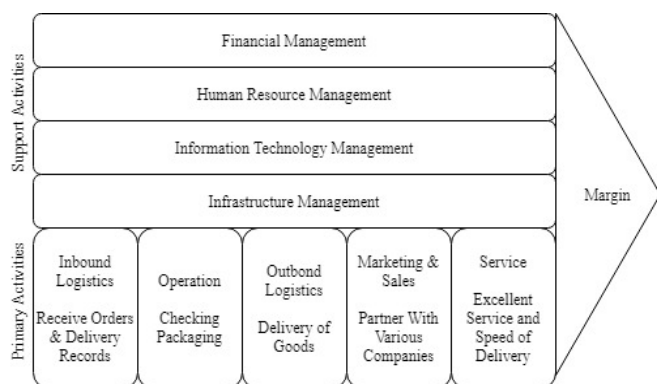


Figure 3: Value Chain Analysis

A. Primary Activities

- Inbound Logistics, the company receives orders for freight forwarding services and records delivery data.
- Operation, the company checks the goods that have been received and packs them.
- Outbound Logistics, the company ships goods in accordance with the purpose of using the company's fleet.
- Marketing & Sales, companies partner with various companies and provide affordable prices in accordance with the delivery destination.
- Service, the company provides excellent and guaranteed service and focuses on the speed of delivery to arrive on time as estimated.

B. Support Activities

- Including Financial Management, Human Resource Management, Information Technology Management and Infrastructure Management.

4.2 Enterprise Planning Model Interaction

This section refers to phase E of the TOGAF, Opportunities and Solutions. This section is intended to identify and position business functions in the company. There are 6 applications that will be implemented, they are tracking application, shipping registration application, marketing application, leave application, loan fund application and company website. Implementation of these applications consists of three parts including short-term, medium-term and long-term. Short-term implementation means that the application is urgent and needs to be implemented in a short time, the medium term is implemented for applications that don't need too long to complete and the long-term implementation for the application is not urgent but the application design requires more time because of its complexity. Based on Figure 4.

Enterprise Planning Model Interaction, the following is an explanation of the 6 systems that will be implemented.



Figure 4: Enterprise Planning Model Interaction

A. Short-Term

- The company website, on this company website will provide information about company, this information includes an explanation of the vision and mission and other information.
- Fund loan applications, this application can facilitate FFS Company employees in making loan funds to be more directed.

B. Medium-Term

- Application for leave application, this application can help every employee when determining leave time and can help reduce paper leave.
- Marketing application, this application can help company in promoting and marketing its services in the field of shipping goods so that the entire region can use its services.

C. Long-Term

- Shipping registration application, this application can make it easier for customers when they want to use FFS Company services online so they can save time.
- Tracking application, this application can facilitate the company in seeing or checking the location of the fleet that is sending shipments online.

4.3 Gap Analysis Business Architecture

Gap Analysis of Business Architecture refers to the second phase in TOGAF, namely Requirement Management. This section explains the business analysis gap between the current business architecture in the company and the target business architecture for future planning in the company. The current business architecture explains what information technology is used in the company today and how much influence it has on the company while the target business architecture explains what information technology planning and technology should be implemented in the future. Look at Figure 5. Gap Analysis Business Architecture below.

Existing	Future										
	Promotion	Financial Data Management	Employee Data Management	Shipment Data Management	Recording and Reporting	Checking the Shipment	Payment Confirmation	Registration of Shipment	Monitoring	Eliminated	
Promotion											
Financial Data Management											
Employee Data Management											
Shipment Data Management											
Recording and Reporting											
Checking the Shipment											
Payment Confirmation											
New											

*) Information :

- : Replace
- : Retain
- : Add

Figure 5: Gap Analysis Business Architecture

Based on Figure 5. Gap Analysis Business Architecture, it can be seen the difference from the old business functions with the business functions that will be proposed. It can be seen that there is one business function that will be maintained, namely in the promotion, financial data management, employee data management, shipment data management, recording and reporting. For business functions that will be replaced namely checking the shipment and payment confirmation. For what is added is the registration of the shipment and monitoring.

4.4 Design Business Architecture

This section discusses business architecture design that leads to phase B of the TOGAF, Business Architecture. Business architecture starts from an analysis of current business processes so that problems can be identified and the goals to be achieved by the company. The gap between the problem that occurred and the target to be achieved will be analyzed to produce gap analysis that is adjusted to the architectural vision of the previous phase.

The following is a business architecture design that is currently running at FFS Company will be explained in Figure 6. Current Business Architecture.

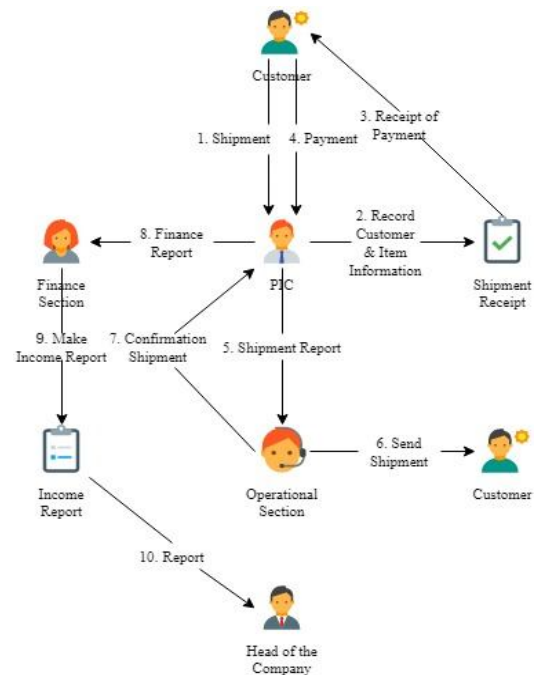


Figure 6: Current Business Architecture

The following is an explanation of business processes from Figure 6. Design Business Architecture.

1. Customers submit goods to the PIC to be sent using the services of FFS Company.
2. PIC records customer and item information in Delivery Receipt.
3. Delivery Receipt is given by the PIC to the Customer.
4. Customers pay according to what is stated on the Receipt of Delivery to the PIC.
5. Delivery Receipts are given by PIC to the Operations Department.
6. Operational Section send goods and then deliver goods.
7. The Operations Section confirms to the PIC that the goods have been sent.
8. PIC provides shipping reports to the Finance Department.
9. The Finance Section makes an Income Report based on the report provided by the PIC
10. The Finance Section reports the Income Report to the Company Management.

Design Business Architecture aims to describe the entire business process in a company with an image in accordance with the needs of the company; in this case the writer makes a rich image. There are five actors who use the application are PIC, Finance, Operations, Sales & Marketing and Company Leaders. In the application system, there will be 6 applications that will be used namely the employee system, inventory system, shipping system, financial system, sales & marketing system and reporting system. The following is a business architecture design proposed at FFS Company that discusses Figure 7. Business Architecture Design.

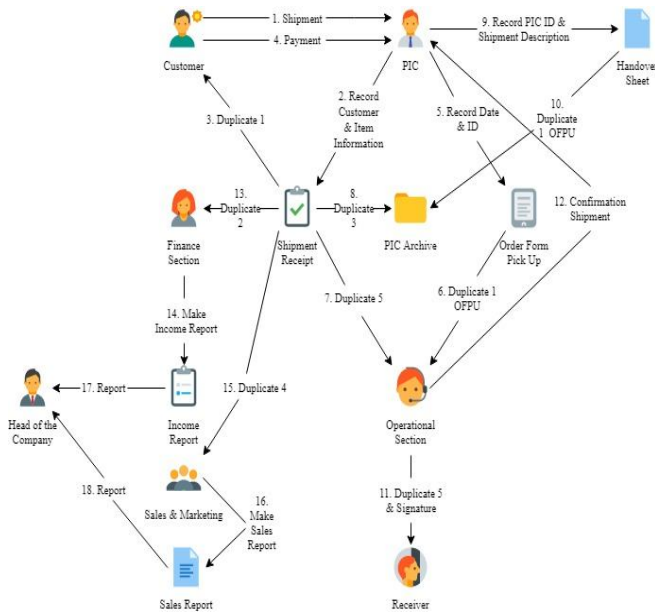


Figure 7: Design Business Architecture

The following is an explanation of business processes from Figure 7. Design Business Architecture.

1. Customers submit goods to the PIC to be sent using the services of FFS Company.
2. PIC records customer and item information in Receipt of Shipment made in 5 Duplicates.
3. Receipt of a Duplicate 1 shipment is given by the PIC to the customer.
4. Customers pay according to what is stated on the Receipt of Delivery to the PIC.
5. PIC records the date and Customer Id into the Pick-Up Order Form.
6. Order Form Pick-Up Duplicate is given by PIC to the Operations Department.
7. Receipt of Duplicate Submission 5 is given by the PIC to the Operational Section.
8. Receipt of Duplicate Shipment 3 is entered into the PIC Archive.
9. PIC records PIC ID and shipment information into the Pick-Up Form Transfer Form as proof of delivery of goods between PIC and Operational Section.
10. The Handover Form Pick Up is entered into the PIC Archive.
11. Operations Section sends goods and then delivers goods and receipts in duplicate, then the recipient of the goods then signs and submits a duplicate receipt of duplicate shipments in the operational department.
12. Operations Section returns to the office then confirms to the PIC that the goods have been sent.
13. PIC submits Receipt of Duplicate Submissions 2 to the Finance Department.
14. The Finance Section makes a Revenue Report based on a Double Delivery Receipt provided by PIC.
15. PIC submits Receipt of Duplicate Shipment 4 to Sales & Marketing.

16. The Sales & Marketing Division prepares Sales Reports based on Multiple Duplicate Receipts provided by PIC.
17. The Finance section reports the Income Report to the Company Management.
18. The Marketing & Sales Section reports the Sales Report to the Company Management.

4.5 Enterprise Architecture Artifacts

This section will explain the Enterprise Architecture Artifacts that were used successfully when designing systems and information technology in a company in harmony with business objectives and connecting 6 types of Enterprise Architecture Artifacts namely Considerations, Standards, Visions, Landscapes, Outlines and Designs. The following is an explanation of the Enterprise Architecture artifact contained in the Table. 1 Enterprise Architecture Artifacts. Based on Table 1. Enterprise Architecture Artifacts, the following explanation is about Considerations, Standards, Visions, Landscapes, Outlines and Designs.

- A consideration is a rule that is in the business. This EA Artifacts is related to general matters identified in the company including business process, principles, policies, architecture strategies and core This artifact explains the considerations for businesses that are relevant to information technology.
- A vision is the structure of a business. This EA Artifacts is related to general things identified in the company including future concept architecture, business context and value chain. This artifact provides a description of the company in terms of business.
- An outline is a change that is found in a business. This EA Artifacts is related to general things identified in the company including architectural concepts, solutions, ideas and assessments. These artifacts provide high-level descriptions of information technology projects that can be understood by business people.

Table 1: Enterprise Architecture Artifacts

	Rules	Structures	Changes
Business - Focused	Considerations	Visions	Outlines
	Identified Artifacts:	Identified Artifacts:	Identified Artifacts:
	Business process, principles, policies, architecture strategies, core	Future concept architecture, business context, value chain	Architectural concepts, solutions, ideas, assessments
	Typical Purpose:	Typical Purpose:	Typical Purpose:
	Help to reach agreement on basic business principles, values and goals	Help to achieve harmony between IT and business results	Help to estimate the overall business value of specific IT projects

IT - Focused	Expected Benefits:	Expected Benefits:	Expected Benefits:
	Can advance conceptual consistency to the maximum and overall	Increase information technology effectiveness	Increase information technology effectiveness
	Standards	Landscapes	Designs
	Considerations	Visions	Outlines
	Identified Artifacts:	Identified Artifacts:	Identified Artifacts:
	Standards, IT principles, patterns, application	Integration context, inventory, platform architecture, enterprise architecture model	Physical design, blueprint solution, technical design, detailed design, integrated solution design
	Typical Purpose:	Typical Purpose:	Typical Purpose:
	Help to achieve consistency and compliance with regulations	Help to rationalize the IT landscape, manage the life cycle of IT assets and plan IT projects.	Help to implement IT projects in accordance with business and architectural needs
	Expected Benefits:	Expected Benefits:	Expected Benefits:
	Reduced risks and costs	Increase reuse and flexibility, and reduce duplication	Improved quality of the project delivery

- Standards are regulations contained in information technology. This EA Artifacts is related to general matters identified in the company including standards, IT principles, patterns and application. This artifact illustrates the standard rules, patterns, and practices that are relevant for information technology.
- A landscape is a structure found in information technology. This EA Artifacts related to general matters identified in this company including integration context, inventory, platform architecture and enterprise architecture model. This artifact provides a high-level technical description of the company's information technology landscape.
- A design is a change found in information technology. This EA Artifacts related to general matters identified in the company including physical design, blueprint solution, technical design, detailed design and integrated solution design. These artifacts provide detailed technical descriptions

of information technology projects that can be followed up for the project team.

5. CONCLUSION

The conclusion of the results and discussion that has been can be concluded as follows:

- Enterprise Architecture at FFS Company was analyzed based on TOGAF analysis and produced a blueprint of the main architecture of TOGAF, namely business architecture.
- Provide good system development application development and business changes that can occur if the company architecture is implemented.
- The impact of implementing enterprise architecture towards company business processes are the creation of effectiveness and efficiency in the process business FFS Company.

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