Framework Zachman for Design Information System Logistics Management

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Abstract: Computerized transaction recording and documentation is very important in supporting work effectiveness and improving good service for shipping service companies, where speed in receiving shipments, making documents and good customer data management can be used by companies as capital to see how many company customers have use the service, and the data can be used as an important company document. Making transaction documents is often wrong in writing, entering prices, calculating total prices and recording sales transactions. This requires an information system that can record transactions, invoices, sales reports, customer data and vendor data integrated by the database, which can be accessed via the internet. This research focuses on designing a logistics management information system using the Zachman framework and cloud-based, where the zachman framework can play a role to unite the perspectives of company owners and IT support, to match the needs needed..

Keywords : Information System, Recording, Shipping Services, UML, Zachman Framework.

I. INTRODUCTION

Information technology is needed in all fields to support business processes in the company[1]. The technology that is highly developed nowadays is computer technology where computers can help work become easier, practical and fast, computers can be connected to the internet and can access the information needed. For now without the support of information technology, a company might be impossible to develop[2]. Shipping companies as one of the transportation companies play an important role in distribution channels between one region and another[3]. The business opportunity for freight forwarding services is very good and growing rapidly, and is becoming very tight competitiveness. Competitive advantage is something every company looks for, and all the products in the market it enters[4]. Efficient and fast service needs to be applied to shipping services in order to give customers confidence. The development of

information technology is utilized by various companies including shipping service companies to facilitate data processing, document processing, producing accurate information and making time-efficient at work.

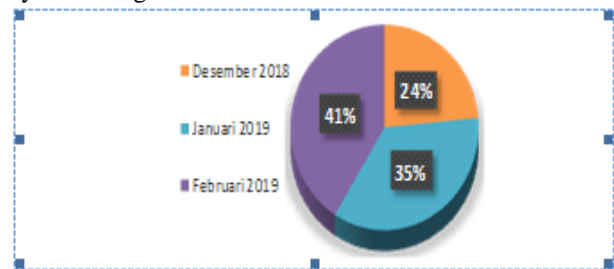Based on the data available, the following chart shows the delay in making invoice:

Fig. 1 Data Creation Invoice

A. Research Problem

Based on the above background the researcher has the following problem limits: How do you design a logistics management information system? and how to design information systems to improve efficiency and accuracy in recording transactions?

B. Limitation Research

In this issue so that the discussion is not widespread, the problem limitation is in the Design of Logistics Management Application: The design of management logistics refers to the Zachman framework and the cloud computing operating system (PaaS) as database storage. The design of this information system is only for making shipping documentation, invoices, sales reports, and stock management. The design of this information system is implemented using a web base.

C. Object and Benefits

The objectives and benefits to be achieved in this study are:
Creating a web-based logistics management design based on the Zachman framework, designing a shipping management system, the features that will be obtained in the design are making goods shipping transaction documents, making invoices, making daily sales reports, handling management, and payment vendor management.

The benefits that can be drawn from this study include:
Recording Transactions and making computerized documents, knowing how to design, analyze a web-based logistics management system with the Zachman framework method and cloud computing operating system (PaaS), increasing efficiency and speed in conducting a transaction.

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II. METHODOLOGY

This paper aims to design a logistics management information system for making shipping documents and recording incoming and outgoing goods, recording transactions, vendor payments, and monitoring receivables. The result of this information system can contribute to making all sales reports, incoming and outgoing goods, accounts receivable reports and customer and vendor data reports.

A. Step Research

Researchers conduct research by carrying out the following steps:

The first step is to determine the topic you want to do research by looking for problems that exist in the field that have not been resolved. The second step is to determine the problem formulation which then analyzes the problem using the SWOT method. The third step is to conduct a literature review obtained through books and research journals that have been done before. The fourth step is to study the research that has been done before and then compares it with the research that we are doing. The fifth step is to directly interview the company's employees how the process of making transactions that are currently running in the field. The sixth step is to collect data obtained in the field which is then used as reference material in making questionnaires given to employees as material for analyzing existing problems. The seventh step is to analyze the data obtained by the SWOT method. The eighth step is to analyze and design information systems based on existing problems based on the results of the SWOT analysis with the aim of resolving these problems. The ninth step is to design using UML. The final step is to make conclusions and suggestions for the research conducted.

B. SWOT Analysis

SWOT analysis, which stands for Analysis of Strengths, Weaknesses, Opportunities and Threats, is a system or process that considers internal and external factors that affect an organization's performance in relation to competitors or the market situation[5].

SWOT analysis is the systematic identification of several factors to formulate a company's strategy. This analysis is based on a logic that can maximize strengths (Strengths) and opportunities (Opportunities) but simultaneously can minimize weaknesses (Weaknesses) and threats (Threats)[6]. SWOT analysis is simply understood as an examination of the internal strengths and weaknesses of an organization, as well as the opportunities and threats of its external environment. SWOT is a general tool that is designed and used as a first step in the decision-making process and as strategic planning in various applications.

C. UML (Unified Modeling Language)

UML is a visual language in modeling that allows system developers to create a blueprint that can describe their vision of a system in a standard format, easy to understand, and provides a mechanism to be easily communicated with others[7]. In this study, the UML diagrams used are use-case diagrams, activity diagrams, sequence diagrams, and class diagrams.

According to[8], Unified Modeling Language is a diagramming technique that can model every system development project from analysis to design. In some cases, the diagramming technique is used throughout the development process. In this case, the diagram starts as very conceptual and abstract. When the system was developed, diagrams evolved to include details which ultimately led to the creation and development of code. In other words, the diagram moves from documenting the requirements to laying out the design. Overall, consistent notation, integration between diagramming techniques, and application of diagrams throughout the development process makes UML a powerful and flexible language for analysts and developers.

D. Zachman Framework

Zachman Framework is the most widely known, used and adapted architectural framework because the design is carried out with systematic and easily understood steps for the development of information systems. Zachman framework has 6 perspectives consisting of[9] :

- The Planner Perspective (Scope Context): List of scope of explanation of business elements recognized by strategists as theorists.
- The Owner Perspective (Business Concept): The semantic model of business connectivity between business components is defined by the chief executive as the owner.
- The Designer Perspective (System Logic): More detailed logic models that contain the needs and design boundaries of the system are represented by architects as designers.
- The Builder Perspective (Technology Physics): A physical model that optimizes design for specific needs within the limits of specific technology, people, costs and time scope specified by the engineer as the builder.
- The Implementer Perspective (Component Assemblies): Specific technology, about how components are assembled and operated, is configured by the technician as the implementation.
- The Participant Perspective (Operation Classes): System events are manifestly used by technicians as participants.
- The Zachman Framework is expected to provide an understanding of any particular aspect of a system at any point in the development of the system.

Fig. 2 Framework Zachman[9]

The Zachman framework is a corporate architecture framework that presents perspectives and provides a formal definition of the company and is structured from various perspectives or points of view[10].

There are 6 components of the point of view in the zachman framework, which are What, Where, When, Why, Who, and How, along with the explanation:

1. What (data): This column is used to connect between entities by translating data relationships with each other to illustrate the needs of the company to be maintained.
2. How (function): this column focuses on the process and the resulting function by describing the whole process that takes place within the organization, the process of activities in meeting the needs of stakeholders, and the processes of input and output that occur within the organization.
3. Where (network): this column focuses on the various nodes and links that describe the operational location of ogranization, the building structure to the network installation map owned by the organization.
4. Who (people): according to the structure and responsibilities that exist within the organization. This column focuses on roles and responsibilities in describing human or human resource allocations.
5. When (time): focuses on useful time cycles to describe the processing time in organizations that have relationships in building performance criteria and qualitative levels of organizational resources.

Why (motivation): focuses on the organization's vision, mission and goals that describe the organization's motivation and objectives as well as the strategies and methods of achievement used by the organization.

III. DESIGN ANALYSIS WITH ZACHMAN AND SWOT FRAMEWORK

In this case, the researcher uses the SWOT method to identify problems from running business processes as comparative data for the proposed process.

Table- I SWOT analysis

SWOT	Strength	Weakness
	• Recording of transactions becomes computerized • The process of making invoices becomes more efficient and timely	• Office internet that is often down
Opportunity	SO	WO
Designing applications can encourage employee work performance in making transactions and making invoices quickly and on time	Creating an application design that can make it easier for employees to make goods delivery transactions and manufacture and record invoices so that nothing is missed and on time.	Designing the application so that the transaction making becomes computerized and recorded in the database so that no transactions that are not recorded or late invoices are made
Threat	ST	WT
• The internet is often down • Adjustment with employees	Make computerized transactions to minimize writing errors and make time-efficient in making transaction documents	Designing an application so that it can be implemented in the future, in order to help improve services in transactions

The table above explains the formulation of the problem identified by the SWOT method as a proposal and comparison. In the table above explains the existing problems. In making invoices that are currently being done less effectively and done slowly, therefore this swot analysis helps find problems in the company by measuring the strengths, weaknesses, opportunities, and threats contained in the current business processes so that SWOT can answer the Zachman matrix perspective.

In this section, we will explain the results of the research in the form of a matrix for designing a logistics management system module which is seen from the perspective of the owner and planner, the results can be seen in the table below:

Table- II The owner and planner perspective with the Zachman Matrix

Perspektive	Owner - Company owner	Planner – IT Manager
Asset Data (What)	Information Collection Process	Servers, Databases & Resources
Motivation (Why)	Objectives of the Logistics Management Module	Application Development Objectives
Function Process (How)	Use Case Diagram	Activity Diagram
People in Charge (Who)	Operations, Customer Service, Invoice Section, Accounts Receivable & Finance Section	Division Supervisor
Location (Where)	Aplikasi Sistem	System Application
Time (When)	Project Duration	Time Schedule

The table above shows the design for the recruitment system module with the zachman method. Basically, Zachman has taken architectural and engineering disciplines to get an IS architecture framework that basically contains what categories, how, where, who, when, and why. Detailed explanation from the perspective of the owner and planner will be explained below:

A. *Asset Data (What)*

1. Owner Perspective

In the owner's view, the process of sending goods up to making invoices and distributing invoices is explained in the process below:
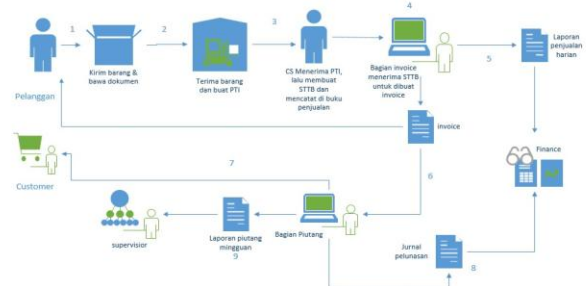

Fig. 3 Rich Picture Business processes are running now

2. Planner Perspective

The planning side has several plan perspectives: CPU Power 1.5 Core, 1Mbps Bandwidth,

10GB Memory, Unlimited Traffic Limit, 2GB Database & Mailbox, Addon Domain 10, UNLIMITED MySQL / MariaDB, Server Location: IIX / US / SG, WP Premium themes & plugins, spam expert.

B. *Motivation (Why)*

1. Owner Perspective

In this section, in line with the company's vision is to become the most valuable freight and logistics partner in the eyes of our clients and the company's mission is to focus on international freight forwarding, transportation, logistics and express solutions and want to exceed our clients' expectations. Fair competition and welcome, because it will create a stable and healthy relationship with our clients and employees. Therefore, by providing important solutions, it is necessary to facilitate the process of making computerized documents in order to facilitate employees in managing data and improve services and work performance available.

2. Planner Perspective

In accordance with the perspective of the owner, motivation as a plan is to design a management logistics application created by implementing cloud computing to improve service to customers, thereby increasing high trust in the company. The activities carried out at this stage are, Analysis and selection of cloud computing services, Application, and planning of cloud procurement, Governance, and planning of the cloud-computing life cycle, Decision making of the cloud computing program whether or not to continue. The next stage is the implementation phase of cloud computing, which consists of a reference to the implementation of cloud computing, governance planning, and planning of cloud computing security, management activities, monitoring, operation and support of cloud computing, evaluation of feedback and strategies applied to the implementation of cloud computing.

C. *Function Process(How)*

1. Owner Perspective

In the owner's view, the desired system process is explained in the use case below:
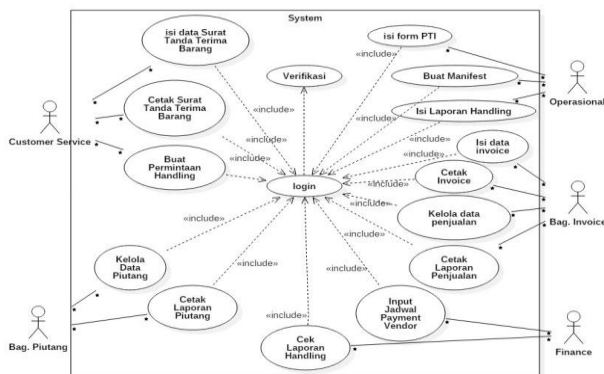

Fig. 4 Use Case

Fig 4 shows there are 5 actors consisting of Customer Service, Operations, Invoice Section, Accounts Receivable Section, and Finance who have their respective roles in carrying out tasks in accordance with the specified job desk. Customer service has several important roles, one of which is to make request handling and print a letter of receipt. Operations have several important roles, one of which is to create manifests,

the invoice section has one of the roles of managing sales data, the accounts receivable section has the role of managing accounts receivable data and the last actor is financing has the role of input vendor payment schedules.

2. Planner Perspective

In accordance with the owner's perspective, the following is an example of an activity diagram in the process of making invoices and distributing invoices.
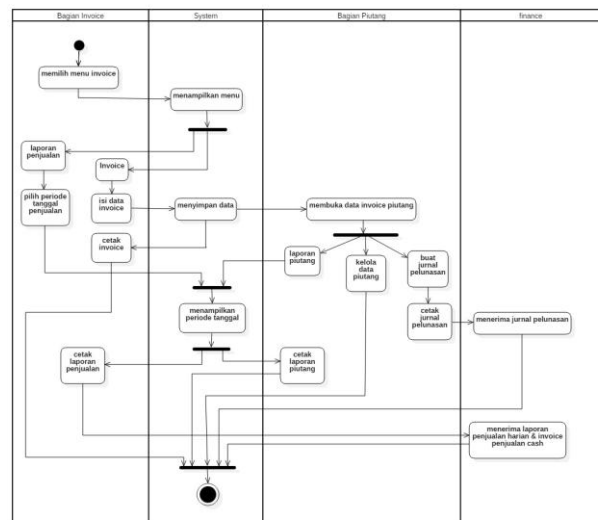

Fig. 5 Activity Diagram Pembuatan Invoice

Figure 5 illustrates the making of an invoice made by the invoice section which will be distributed to the receivables and finance sections. Starting with the invoice section by selecting the invoice menu in the invoice menu there are two other menus namely sales and invoice reports, in the report menu there is a sales date period and in the invoice menu there are contents of the second invoice data menu that can be used by the invoice section in making sales reports and printing the report can be seen by the accounts receivable section and the report is managed and a repayment journal is made and the report is printed and directly provided to finance.

D. *People in Charge (Who)*

1. Owner Perspective

In this section whoever is assigned to operate this application is Operational responsible for making documents of goods received and goods to be issued and is responsible for handling reports that are carried out, Customer Service is responsible for making transaction documents and making request handling data, the Invoice Section is responsibly responsible for issuing invoices and sales reports, the Accounts Receivable Section is responsible for invoices issued by the credit payment method, which will be billed to the customer, and is responsible for the accounts receivable repayment journal and accounts receivable report, and Finance is responsible for checking the handling reports undertaken by Operations and is responsible for the vendor's payment schedule.

2. Planner Perspective

In this section whoever is assigned as the operator of the application is IT. IT will help maintain the system, if there are problems IT also helps to solve system problems and prevent system damage.

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E. *Location (Where)*

   1. Owner Perspective

In this section to answer the problems that have been explained, the owner's focus on the system that can achieve the entire data created can be integrated with a cloud-based database that serves to accommodate customer data, transactions, and sales. The use of cloud is limited by the user and password that has been created for each operator as authentication.

   2. Planner Perspective

Planners plan to choose a web that is easy to build and can be used by employees who use this information system. With the above plan integrated by the cloud, the cloud used is PaaS (Platform as a Service) with the services provided by users getting facilities that include application planning, development, hosting, web service integration, and database integration. PaaS users also do not have control over basic computing resources such as memory, storage media, processing power. The advantage of PaaS, developers or users can focus on the application being developed.

F. *Time (Time)*

   1. Owner Perspective

This section explains the owner's perspective on implementation, which is expected to be done for 1 Year in 2019.

   2. Planner Perspective

This section explains the proposed time schedule in the design of logistics management information systems:

Fig. 6 Time Schedule

Fig.6 explains the planning time needed to create a logistics management information system.

IV. CONCLUSION

In this paper, we analyze the requirements needed in logistics management based on the Zachman framework which provides a way of viewing and defining an ongoing enterprise to be more structured and integrated with IT development. Predicting each user's needs, we propose this design method using the Zachman framework and a database that is implemented with a cloud. From the above research, the researcher applied the Zachman framework method and produced a management logistics system module design. There are 6 columns of the perspective of the owner as the owner of the company and the perspective of the planner as IT that must be explained to support the logistics management module in the Logistics Management application according to Zachman. In this framework method is divided into several questions that are generated namely What, Why, How, Who, Where, and Time, these questions produce application module designs that can provide solutions to problems that exist in logistics

management. The resulting modules are the transaction module, the invoice module, the handling management module, the Stock Management module and the Payment Vendor Management module, from which these modules can answer the user's needs in doing work.

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