Web Based Intelligent Shipping Application for LS Logistics Company

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Abstract: **The increasing amount of product consumption has an impact on the increase in the amount of production. The increasing amount of production will also affect the increasing demand for freight forwarding services. The faster a product reaches the end consumer, the faster the economical turnover of a country will occur. However, reality does not always happen like that, especially in Indonesia. The high cost of transportation often weighs on end consumers to buy products. So that there is a decrease in purchasing power from consumers due to the cost of production, which is too expensive. The problem of logistics is one of the crucial things that must always be a concern for all of us. In this study, a web-based freight forwarding application was built to facilitate the integration process between several freight forwarding operators to service the demand for goods distribution from producers to end consumers. The goal is, of course, to accelerate the process of distribution of goods, tidy up the administrative process, and increase the savings in the cost of shipping goods, because the sourcing of resources is integrated and well allocated. So that the difficulty of waiting time can be shortened and used for more useful activities. This project domain is web application and responsive design to improve the user interface. In future using GPS for locate the exact location of the product moving and also globally used for business improvement. The database also changes to cloud to store large amount of data.**

Keywords: **Logistics information system, web-based shipping application, responsive design, order management system.**

1. Introduction

Logistics refers the movement of products or services to a designated location at an agreed upon time, cost and condition. Ancient Roman and Greek wars are the basis for today's logistics systems. Rome developed a highly efficient logistic system to supply its legions. Military officers called "logistikas" were responsible for ensuring the supply and allocation of resources, so that soldiers could move forward efficiently.

During the Middle Ages elaborate supply systems, roads and warehouses were used. Forts and castles became storage depots supported by the economy of the surrounding countryside. During the Industrial Revolution, logistics advanced greatly with the addition of railways and ships. Workers in the logistics and supply chain management field make sure that goods and services get into the hands of consumers. The logistics industry is an important driver of economic growth and development.

All types of businesses, big and small, need logistics managers to help with inventory and accounts receivable.

Management of order processing, inventory, transportation and combination of warehousing, materials handling, and packaging, all integrated throughout a network of facilities. The Goal of logistics is: To support procurement, manufacturing and customer service operational requirements

- *Internally:* To coordinate functional competency into an integrated operation focusing on serving customers (internal).
- *Externally:* Operational synchronization is essential with customers (outside of the firm) as well as material and service suppliers to link internal and external operations as one integrated process.

Logistics creates and increases the value businesses offer by improving merchandise, and ensuring the availability of products. In order to provide more value, businesses either work on improving their own logistic activities or rely on professionals. Distribution logistics has, as main tasks, the delivery of the finished products to the customer. It consists of order processing, warehousing, and transportation. Distribution logistics is necessary because the time, place, and quantity of production differs with the time, place, and quantity of consumption.

2. Background

A. Logistics Systems

A logistics system (LS) is a network of organizations, people, activities, information, and resources involved in the physical flow of products from supplier to customer.

B. Order Management System

An order management system (OMS) is an electronic system developed to execute securities orders in an efficient and cost-effective manner. Brokers and dealers use order management systems when filling orders for various types of securities and can track the progress of each order throughout the system. An OMS is also referred to as a "trade order management system."

3. Method

In this study used the Software Development Life Cycle

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method with the waterfall approach.

- Planning, is the process of understanding why an information system must be built and determining how the project team will build it. A series of activities that identify problems and get approval from the project owner to be able to carry out the development process starts in this planning phase. As an outline, all activities involving planning, organizing, and scheduling projects are included in this development phase.
- Analysis, answer questions about who will use the system, what the system will do, and where and when it will be used. In the analysis phase, the focus is directed at things about finding and understanding the details of problems or requirements and finding out what the system must do to support effective and efficient business processes.
- Design, determine how the system will operate, in terms of hardware, software, network infrastructure, user interfaces, forms, and specific databases and files that will be needed. The design phase also focuses on configuring and compiling system components. This activity uses predetermined requirements (in the analysis phase) to build program structures and system algorithms.
- The last phase in SDLC is implementation and also deployment, where the system is built. The implementation phase is related to how an application (or system) will be run and tested both alpha and beta testing. Moreover, the deployment stage related to an application will be installed and operationalized on the end user device.

In the case study of developing the shipping application, the Waterfall model is considered the most appropriate system development approach, considered that this project is the initial stage of initiation and is a trial mission for the transformation of manual record recording to digital (by the system). The focus of this project development is still in the realm of user acceptance testing. Where in this case are the shipping service company operator (including the drivers), field fleet administrators, and inventory controllers.

4. Result and discussion

A. Planning phase

In the first development phase, it has been determined that the system to be built is web-based using a structured database. The backend structure of the web was built using the PHP programming language with the CodeIgniter framework. We use CodeIgniter because the development method refers to the Model-View-Controller concept, so the task is to do database design, backend programming, and frontend programming; can be done modularly. We can write and configure programs without having to interfere with the functionality of each class

function. Besides, many readymade modules can be immediately implemented into the system so that the development process will be very efficient and solid.

B. Analysis

In the analysis phase, we made observations in the field related to the operational pattern of the business and also the problems that often occur, especially related to interactions between administrators and transporters. The problem that often occurs is the problem of tracking goods. The process of monitoring the location of goods is still conventional. Every two hours, the administrator makes a telephone call or chat with the transporter to receive the report. After that, the administrator communicates to customer service whenever there is a customer who wants to check the shipping position. By using a web-based application system, transporters will get notifications within a particular time to report their position. Moreover, the reporting will provide notifications for members to monitor. Furthermore, members can even pay service fees through payment gateways available through third parties.

C. Design

In the design phase, we carried out several types of drafting. We are starting from mapping features and schemes to use the application. Then proceed with designing logical flow. Design of backend and frontend modules based on Model-View Controller. Database design and design of the User Interface. There is a series of design processes that can be understood as

Fig. 1. Responsive design

i. *Registration section:* During the registration session, tenants from both the transport operator and the freight forwarder register themselves in the database system. Data stored in the database can be connected with various applications that have been maintained by tenants. Every tenant is provided with a public and private key to access their profile. Also, they have the right to make their data accessible to the public or only by certain parties.

ii. *Order section:* In the order session, tenants can make a shipping service ordering mechanism. In this case, the type of carrier can be selected according to the volume of materials to be sent. There are several types of transport fleets, ranging from small pickup cars to

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heavy-duty trailers with 16 wheels and 120 tons of transport capacity. Rental prices are determined by the type of vehicle chosen regardless of the volume of assets to be sent.

iii. *Shipping monitor:* Users can also monitor the progress of the delivery of their goods during the monitoring session. Each item sent will get a unique code or shipping receipt. Start from the transporting operator, the fleet that transports, the name of the driver, the name of the driver assistant, and the name of the consignee. Each time the goods reach the checkpoint specified in each delivery area, the user will be given a notification. Including when there is trouble on the road, the user will remain to be informed by the system.

iv. *Finance administration:* In this section, various types of financial criteria are explained for each tenant, the payment method, and the period for completion. All proof of payment includes permission to authorize the delivery of goods will be recorded in the system.

Fig. 2. API

- *User feedback:* In the user feedback session. Tenants are welcome to give suggestions and complaints about the shipping service they receive. In the mechanism of delivering goods, sometimes there are regularly unexpected obstacles that cause delays in shipping and even damage to goods. In this case, tenants are allowed to participate in improving shipping services from all partner companies that are incorporated as shipping operators network.

- *Chat services:* In chat services, tenants can continue to communicate with administrators about shipping information. Start from the registration procedure until asking for delivery progress; all can be accommodated via customer chat services.
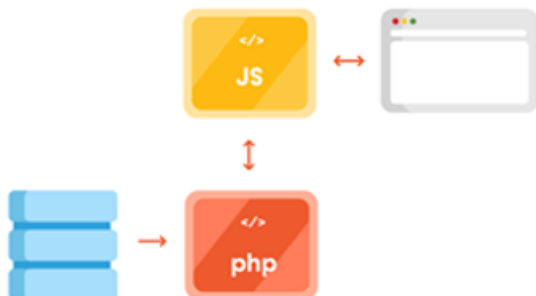

Fig. 3. Frontend to Backend with DB

- *Data export:* This feature is provided to make it easier for administrators to process data. In general, the database used is a structured type (like SQL). However, for data processing and analysis purposes, administrators can export data into other forms such as .csv (Comma Separated Values) or .xls (Excel). The data export feature is also handy when the data migration process is needed in the future. The system that we built always pay attention to replication, backup, and data recovery so that, the administrator does not need to worry whenever a system crash suddenly occurs.

5. Conclusion

With web applications that have been built, it is expected to be able to answer and help companies in transactions with clients starting from the order process, monitoring, payment, and deliveries. The company will also easily do client data collection, scheduling drivers, and allocating vehicles for shipping activities. It is expected that the existing process can help overcome the problems that occur, especially in the transaction and administration. So that the company's business processes can run smoothly, improve decision making, and increase the value given to the company's clients.

In the future, to improve the system that has been built, companies can use real-time GPS (Global Positioning Systems) technology to help monitor the flow and running of vehicles to follow a destined route. So it is not only based on the check-point but is equipped with a GPS. The companies also suggested increasing the number of employees who are specifically assigned to become company administrators in order to provide faster and user-friendly services. Use reports, statistical data, and specific business functions to develop decision-making systems.

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