Package Delivery Management Information System Design for Joyo Express with UML (Unified Modeling Language)

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ABSTRACT

In the era of globalization, the rapid development of the economy and business has led many companies, including Joyo Express, to still rely on manual systems that hinder operational efficiency. This research aims to design a web-based package delivery management information system that can enhance efficiency and accuracy in the delivery process. The method used is system design with Unified Modeling Language (UML), which includes Use Case diagrams and Class diagrams to describe system interactions and data structure. It is expected that with this system design, Joyo Express can implement a solution that is faster, more accurate, and satisfying for consumers. The application of a computerized management information system will assist Joyo Express in improving services and addressing existing issues..

1. INTRODUCTION

Economic and business development in the current era of globalization is growing rapidly and has many innovative and creative variations. This field is competing to provide the best service to its customers, both in terms of timeliness and integrity of the goods to their destination. (Haqqi, H., & Wijayati, H. 2019). Shipments can be small or large in size. Sending goods from one place to another is made easier by using expedition services (Betesda 2024). Consumers need fast, safe, and reliable delivery services (Primadi, A. 2024).

However, sometimes it will face various kinds of problems, these problems become obstacles for the company to continue to be able to develop in the business world including; time management, on-time delivery is the key to customer satisfaction. Delays can damage the company's reputation (Fole, A. 2023). Package tracking, customers have a desire to be able to track the status of their shipments in real time. Without a good system, this type of information is difficult to provide (Syafrial, H. 2023). Resource management, efficient management of vehicle facilities and infrastructure, labor and logistics infrastructure is a challenge that needs to be addressed (Firdausy, C. M. 2021). Customer satisfaction, providing responsive and effective customer service is important to maintain customer loyalty (Ma'rufah, A. 2023). In addition to the lack of applications, the existing system is not computerized in the sense that it still uses a manual method by writing each customer who sends goods using paper receipts.

The implementation of management information systems at Joyo Express provides various benefits, including increased operational efficiency, with faster and more organized processes that will reduce the duration and cost of operations (Christanto, I. F. 2023). Better customer satisfaction, with accurate information and fast service, customers feel more satisfied and tend to be loyal (Aribowo, K. 2024). Better decision making, the data collected can be used to make better strategic decisions in business management (Ramadhana, R. Z. 2024).

Management information systems can help integrate data from multiple departments so that companies can make better decisions based on accurate and real-time information. (Syahputri, K., & Nasution, M. I. P. 2023). Because with the availability of the system, it can add insight, provide a convenience in every job related to data entry, the system can also help every employee who accesses it to be more organized and neat, that way every document is not messed up, it can even cause fatal things and even risk being lost. (Arti, S. D. 2024).

Joyo Express, which is located at Ruko Ngembal Kulon Blok A No 10-11 Kudus, is one of the logistics expedition service providers that until now is still very much using a system that is still manual and data storage using Excel has an impact on the inefficiency of the delivery process. And also there are still several other problems that occur, namely the storage of receipt paper and manifest paper that are still handwritten are currently still stored in the cupboard. receipt paper and manifest paper that are still handwritten when going to Excel are difficult to read and also documents that currently still use a lot of paper are prone to tearing or damage when exposed to water and also folded.

In this study, the authors will apply the system design method using UML. UML is a system design method that has the advantage of being able to facilitate system developers during the process of designing the system to be created, because this method has object-oriented characteristics. In

addition, UML has become a standard for writing blueprints (Sumiati M. 2021). Because it has become a standard for writing blueprints and can be displayed in the form of visualizations, making designs using the UML method is very easy to understand (Ardhana V. Y. 2021).

Based on the above background, it is necessary to design a web-based package delivery management information system at Joyo Express Kudus using UML. With the expected results in the design of this system with the formation of a system design that will make it easier for programmers to create a website that can be implemented in the future by Joyo Express to provide fast, accurate and satisfying services to consumers.

2. RESEARCH METHODOLOGY

A number of studies have been undertaken concerning the development of package delivery management information systems.

(Agustiani 2021) In his research titled "Information System for Goods Delivery Services at Web-based CV Mandiri Trans". This journal discusses developing a Java-based Information System to overcome the problem of manual data management at CV Mandiri Jaya. This research shows that web-based information systems can improve tracking accuracy, management efficiency, customer service and operational cost reduction in the freight forwarding industry. The case study of CV Mandiri Trans is an illustration of the application of this system.

(Isnaniyah, Frastian, and Shedriko 2022) In his research entitled "Design of Electronic Goods Delivery Information System Applications at CV Mandiri Jaya Jakarta Based on Java". This journal discusses the development of Java-based information systems to overcome manual data management problems, thereby increasing the efficiency and accuracy of the goods delivery process. This study aims to design an information system that can minimize errors, simplify employee work, and increase efficiency in the process of shipping goods at CV Mandiri Jaya.

(Ramadhan and Yunita 2022) In his research entitled "Development of a Goods Delivery Information System at PT Kharisma Selaras Indotama Using the Waterfall Method". This journal discusses the development of a freight forwarding information system based on the Waterfall method to increase efficiency, reduce costs, and increase customer satisfaction. This research aims to optimize the logistics process and improve the performance of shipping goods at PT Kharisma Selaras Indotama through the development of information systems based on the Waterfall method.

(Dhamara and Voutama 2024) In his research entitled "Designing a Web-based Goshipp Goods Delivery Application". This journal analyzes GoShipp's need to develop a web-based freight forwarding application to increase efficiency, reduce delivery delays, and increase customer satisfaction. This research proposes the development of a web-based freight forwarding application as a solution to overcome the problems of efficiency and clarity of the delivery process at GoShipp.

(Pernando and Adnyani 2024) In his research entitled "Goods Delivery Information System at CV Toba Indah Mandiri Express". This journal discusses the development of information systems to improve the efficiency of the goods delivery process. This research aims to create a more structured and accurate system in managing goods delivery data at CV Toba Indah Mandiri Express.

2.1 Methods of data collection

The author collects data sources to obtain data that is truly accurate, relevant, and valid:
a. Observing or direct observing is a technique used to collect data by directly observing the activities that occur. In this case, the author went directly to Joyo Express. In order for the author to be able to dig up information about what data is needed when creating an application.
b. Interview, survey and data collection conducted by conducting face-to-face meetings and also asking questions during the interview process to ask about data and the process of shipping goods at Joyo Express.

2.2 Method of system development

The waterfall model is one of the classic approaches to software development. It describes a linear, incremental development approach is shown in figure 1. The model consists of five to seven phases, each of which is defined by different tasks and objectives, and which together describe the software lifecycle up to delivery. After one phase is completed, the next development step follows, and the results of the previous phase flow into the next phase. (Hasanah and Untari 2020)
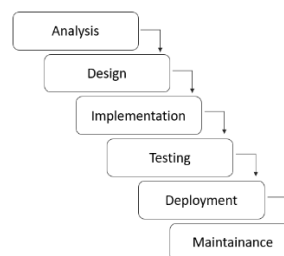

Figure 1. Waterfall Method

2.3 System Analysis

The actors in Joyo Express's Package Delivery Management Information System are:
1. Admin
   Responsible for managing the Package Delivery Management Information System. Manage user accounts, manage package data, and manage reports.
2. Customer
   Provide information related to the data needed to deliver the package
3. Sorting Agent
   Responsible for managing packages in the sortation warehouse. Organize packages in the sorting warehouse
4. Driver
   Responsible for delivering packages to the recipient's address. Deliver the package to the recipient's address, contact the customer to confirm delivery

These actors perform some of the business processes shown in Table 1.

**Table 1.** Business Processes Used in the System Business Processes Used in the System

No	Business Process	Actor	System Use Case
1	Admin enters the customer's data	Admin	Pelanggan

| 2 | Admin enters package details | Admin | Paket |
3	Admin creates a report	Admin	Laporan
4	Admin Manage driver's data	Admin	Driver
5	Admin Manage Vehicle Data	Admin	Kendaraan
6	Sorting Agent Sorting Packages	Sorting Agent	Paket
7	Fuel purchase by driver	Driver	Bahan Bakar
8	Fuel purchase by driver	Driver	Paket

3. RESULTS AND DISCUSSION

3.1 System Design

A system use case diagram that illustrates the use case business process is shown in the following figure. This diagram shows who is involved in the system (actors) and what the system can do. what the system can do can be seen in Figure 2.
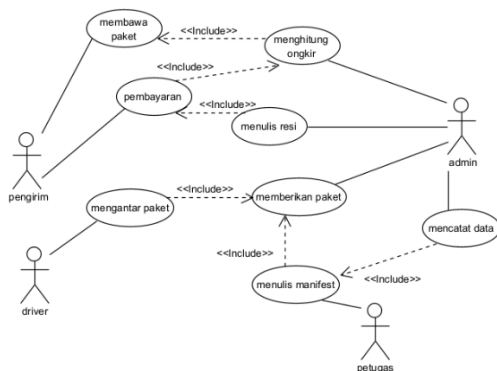
Figure 2. Use Case of the Package Delivery Management Information System Design for Joyo Express with UML (Unified Modeling Language)
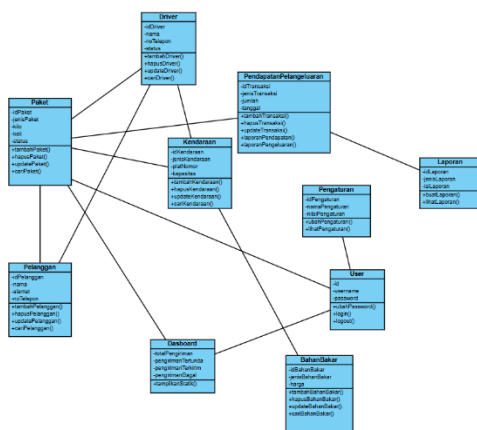
Figure 3. Class Diagram of the Package Delivery Management Information System Design for Joyo Express with UML (Unified Modeling Language)

3.2 System Results

In the creation of this display, the author is using HTML in the creation of the appearance of the program to be designed.

It is also expected that with a minimalist and simple display, users can have access to and use the system more easily. Below is a program display of Joyo Express's parcel delivery management information system design.

1) Main Page View

The front page of Joyo Express has a simple and user-friendly look, the main feature available is package tracking. With a simple menu, it is easy for users to quickly find the features they need. The interface is designed to be user-friendly, with elements that are easy to access. The main page of the program can be seen in Figure 4.
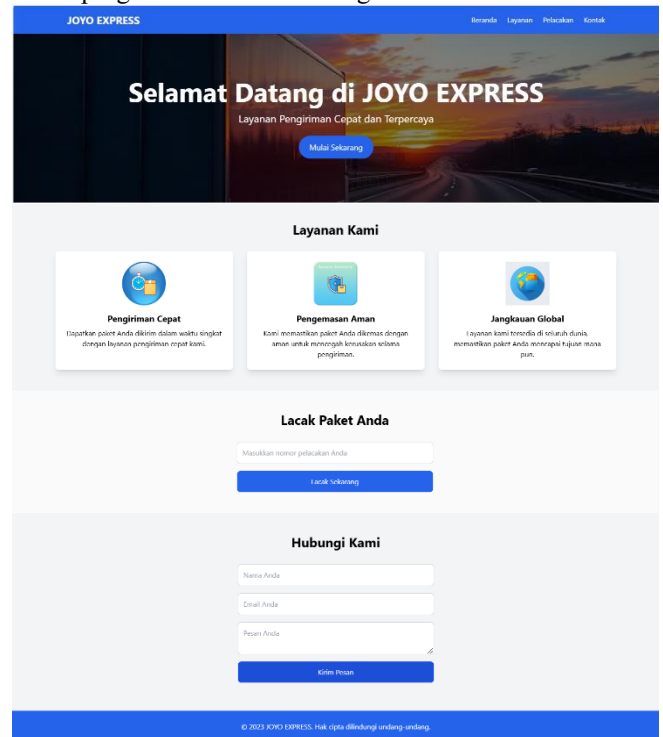
Figure 4. Main Page View

2) Dashboard Page

There are four main items on the Dashboard page. Total Shipments shows the total number of shipments the user has made in a given time period, Pending Shipments shows the number of shipments that are pending. The dashboard page of the program can be seen in Figure 5.
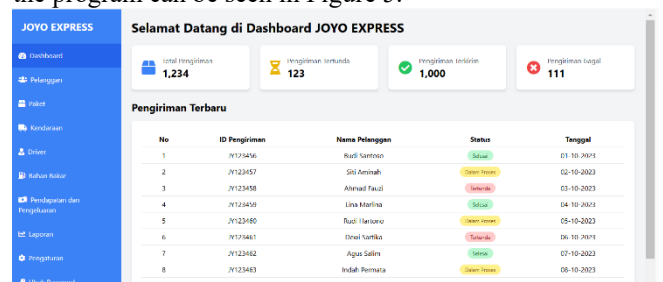
Figure 5. Dasboard Page View

3) Customer Page

The Customers menu view contains a list of customer names, emails, phone numbers, and addresses that can be edited or deleted. This customer data can be used to create various reports related to customers, such as reports on the number of customers, customer distribution by region, and so on. The customer page of the program can be seen in Figure 6.

Figure 6. Customer Page View

4) Customer Add Page

This form is more focused on the process of adding new customer data, if we compare it to the previous image showing the customer list. This form has input fields that are more specific to the data needed in the shipping process. The customer add page of the program can be seen in Figure 7.

Figure 7. Customer Add Page View

5) Add Package Page

An important part of the Package Delivery Management process is the Package Menu view. This form allows you to easily add new shipment data and ensure that all required information is accurately recorded. The add package page of the program can be seen in Figure 8.

Figure 8. Add Package Page View

6) Vehicle Page

In a structured and easy to read way, this page displays the vehicle data stored in the Joyo Express system. By looking at this table, users can easily find information about each vehicle owned by the company, such as police number, vehicle type, capacity, and vehicle status. The vehicle page of the program can be seen in Figure 9.

Figure 9. Vehicle page View

7) Add Vehicle Page

New vehicle data can be added to the Joyo Express database using this form. The data entered will be used for the company's operational purposes, such as delivery planning, vehicle maintenance and report generation. The add vehicle page of the program can be seen in Figure 10.

Figure 10. Add Vehicle Page View

8) Driver Page

The purpose of this page is to display the driver data that is stored in the Joyo Express system in a structured and easy to read way. By looking at this table, the user can easily find out information about each of the registered drivers, such as their name, contact person, address and status. The driver page of the program can be seen in Figure 11.

Figure 11. Driver Page View

9) Add Driver Page

The add driver form allows you to quickly and efficiently add new driver information to the system and is designed to be simple and easy to use. Companies can manage their delivery operations more effectively with complete and accurate driver information. The add driver page of the program can be seen in Figure 12.

Figure 12. Add Driver Page View

10) Fuel Page

The fuel shopping lists are presented in a simple and straightforward manner, making the information easily understandable for the user. To make the purchase data more organized and easier to search, multiple tables are used. The fuel page of the program can be seen in Figure 13.

Figure 13. Fuel Page View

11) Add Fuel Page

This form is a tool to record each fuel purchase transaction made by the driver. A simple and easy-to-use display makes it easy for officials to record each fuel purchase transaction. With accurate and complete data, companies can more effectively manage vehicle operating costs. The add fuel page of the program can be seen in Figure 14.

Figure 14. Add Fuel Page View

12) Income And Expense Page

The Income and Expense view in the Joyo Express system is very useful for managing company finances. With a simple and intuitive interface, users can easily access, analyze and manage company financial data. The income and expenses page of the program can be seen in Figure 15.

Figure 15. Income And Expense Page View

13) Report Page

The report view in the Joyo Express system serves as the center of the company's financial information. By presenting transactional data in a structured and visually appealing manner, it provides valuable insight for decision makers to evaluate financial performance, identify business opportunities, and manage risk. The report page of the program can be seen in Figure 16.

Figure 16. Report Page View

14) Settings Page

The settings page of the Joyo Express system allows users to fully customize their company profile. With intuitive features, users can easily change the company name, address, contacts, and even upload a company logo that matches the brand identity. This gives companies great flexibility to customize their look and information according to their needs. The settings add page of the program can be seen in Figure 17.

Figure 17. Settings Page View

4. CONCLUSIONS

4.1 Conclusion

This research successfully developed a web-based parcel delivery management information system for Joyo Express. This system is also capable of reducing data recording errors, thus improving the accuracy of delivery information. The use of UML in the system design proved to be effective in producing a structured and easy to understand design. The main contribution of this research is the development of a new business model for small and medium-sized expedition service companies. This business model combines information technology with existing business processes to increase the competitiveness of the company.

4.2 Advice

For future research, it is recommended to test the system on a larger scale and involve more users. It is also necessary to develop additional features, such as integration with online payment systems and delivery notifications via SMS or email.

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