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Optimizing spare part monitoring: Innovative dashboard system design for commanditaire vennotschaap using rapid application development

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Abstract: This research focuses on digital transformation at the Try Jaya Mobil workshop, which relies on manual processes for recording spare parts sales transactions and generating financial reports. This manual process causes various challenges, such as mismatches between incoming data and orders and a lack of historical sales records that hinder data search and analysis. The absence of a computerized system also reduces stock management and customer service efficiency. This research uses the Rapid Application Development (RAD) method to design a more sophisticated spare parts monitoring information system. The Rapid Application Development approach enables iterative and rapid software development, involving users at every stage. The information system is designed to improve accuracy, speed, and operational efficiency and enable better stock recording and monitoring. The results show that implementing a RAD-based information system can significantly improve customer service and Try Jaya Mobil's competitiveness in the market. Evaluation of the system after implementation showed improvements in operational efficiency, data accuracy, and user satisfaction. With this digital transformation, Try Jaya Mobil is expected to optimize its services and strengthen its competitive automotive industry position.

Keywords: Decent work and economic grouwth; Transformasi digital; Information system; Service system

1. Introduction

The Try Jaya Mobil workshop still relies on manual processes in various aspects of its operations, from recording spare parts sales transactions to preparing financial reports (Aoun et al., 2021; Widjaja, 2024). The use of paper media for this documentation has shown some challenges, including mismatches between incoming data and expected orders (Barrett & Rose, 2022). The lack of a computerized system leads to a lack of well-recorded sales history, slows down the data search and analysis process, and reduces overall efficiency in stock management and customer service. Digital transformation is necessary for Try Jaya Mobil workshops to modernize their operations. Adopting more advanced information systems is expected to address these challenges by improving accuracy, speed, and precision in transaction handling and stock monitoring (Javaid et al., 2022; Yaqot & Menezes, 2021). Thus, they can optimize their services, strengthen their competitive position in the market, and increase customer satisfaction through a more efficient and responsive experience.

Buying and selling spare parts and making financial reports are still done manually using paper media (Poppe et al., 2023). One of the main problems faced is the mismatch between the incoming spare parts data and the orders that should be fulfilled (Ingemarsdotter et al., 2020; Qin et al., 2020). The lack of historical records regarding spare parts sales is also a severe problem, causing the search for spare parts data to takes a long time due to the large volume of data that must be processed.

This workshop has yet to adopt an integrated computerized system to streamline its operations. All transactions, such as logging spare parts sales, are currently manually recorded in the sales ledger (Ahmad et al., 2023). This also results in the absence of structured sales reports per period, which is essential for efficient stock planning (Filipe et al., 2020). Uncertainty regarding the availability of stock items is also a frequent problem due to the lack of accurate information regarding stock items in the warehouse. This situation can result in stock-outs without prior notice, potentially disrupting the smooth flow of services to customers (Strohhecker & Größler, 2020). Hence, there is an urgent need for Try Jaya Mobil to undertake a digital transformation by adopting a computerized information system. This is expected to improve operational efficiency and data accuracy and enhance their ability to provide better services to customers.

2. Methods

The Rapid Application Development (RAD) research method was used in the study to design an innovative spare part monitoring information system for Commanditaire Vennotschaap (Nazri, 2021; Qi et al., 2023; Saisree et al., 2020). Rapid Application Development is an iterative and incremental software development method focusing on the end user. This approach allows developers to design, build, and test software applications quickly by involving users at every stage (Zorzetti et al., 2022).

First, the needs planning stage involves in-depth identifying the system's needs, such as integrating spare parts sales data, monitoring stock items, and creating financial reports (Samala & Amanda, 2023). Close collaboration with stakeholders from Try Jaya Mobil was conducted to ensure all functional and non-functional requirements were met. Next, the user design was built by creating an initial prototype of the information system dashboard involving an intuitive and functional user interface, with iterations based on feedback from users to ensure the suitability of the design (Prasetya, Fortuna, et al., 2023; Waskito et al., 2024). The construction phase uses appropriate tools and technologies to build responsive and accessible web-based applications, with implementation carried out per phase to enable iterative development and rapid adjustment to changing needs (Oke & Arowoiya, 2022). After that, the implementation or cutover stage is done by implementing the system into the production environment after thorough testing to ensure the stability and quality of the application (Fortuna et al., 2024; Prasetya et al., 2024; Prasetya, Fajri, et al., 2023). End-users at Try Jaya Mobil were trained to operate the system effectively.

System evaluation was conducted to evaluate the performance and response after implementation, including measurements of operational efficiency, data accuracy, and user satisfaction (Waskito et al., 2023). The evaluation results are used to make improvements or adjustments to improve the system's overall performance, so it is expected that the RAD-based information system can provide significant benefits in improving customer service and Try Jaya Mobil's competitiveness in the market. This approach accelerates application development and ensures that the resulting application can address critical challenges in spare parts management and improve overall operational efficiency. Implementing a RAD-based information system is expected to deliver significant benefits in improving customer service and the workshop's competitiveness in the market. The following is a visualization of Rapid Application Development used as a research method presented in Figure 1.

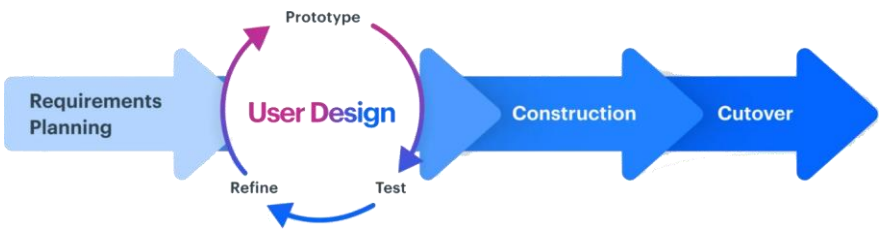


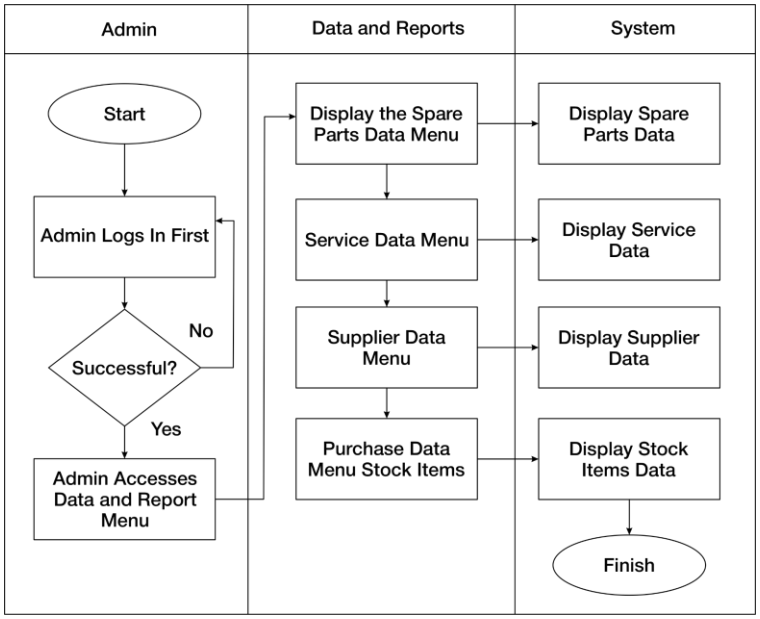
Figure 1. Rapid application development

3. Results and discussion

3.1 System design

The results of this research start from the flowchart shown in Figure 2, which shows the process of managing data and reports by the admin in the spare parts management system and other related data. This diagram is divided into three main sections: Admin, Data and Reports, and System.

Figure 2. Information system flow



The process begins with the "Start" step, where the admin must log in first (Admin Logs In First). If the login is successful (Successful?), the admin can access the data and report menu (Admin Accesses Data and Report Menu). If the login fails, the admin will remain on the login page.

Figure 3. Admin usecase diagram

After a successful login, the admin can select various data menus in the "Data and Reports" section. These menus include "Display the Spare Parts Data Menu," "Service Data Menu", "Supplier Data Menu", and "Purchase Data Menu Stock Items". Each menu will display the relevant data in the system in the "System" section. "Display Spare Parts Data Menu" displays spare parts data (Display Spare Parts Data), "Service Data Menu" displays service data (Display Service Data), "Supplier Data Menu" displays supplier data (Display Supplier Data), and "Purchase Data Menu Stock Items" displays stock item data (Display Stock Items Data). The process ends with the "Finish" step. Subsequently, the use case diagram describes creating spare parts data reports in an information system.

The process begins when the user logs into the system, ensuring only authorized users can access the spare parts data report menu. Upon successful login, the user selects the spare parts data report menu from the system interface. The system then displays the spare parts data in the database, allowing users to view detailed information regarding the stored spare parts. Next, the user can create a report based on the displayed data, with possibilities involving specific data selection and report format settings. Once the report has been generated, the user can save it in the system or print it. The process depicted in the use case diagram ensures a systematic and efficient workflow, making it easy for users to access, report, and store spare parts data in a structured way.

Figure 4.
Transaction menu

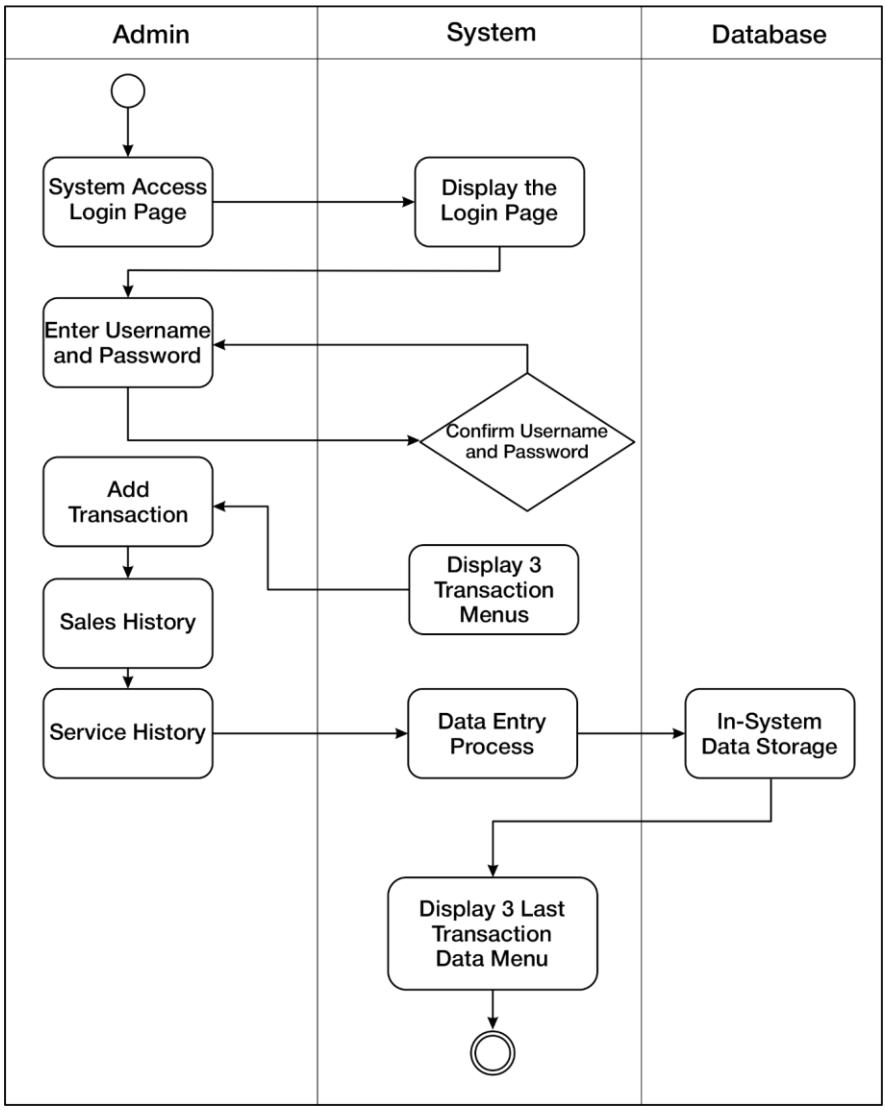


Figure 4 shows a flowchart that illustrates the process of the transaction menu. This diagram consists of several square-shaped boxes connected by arrows, indicating the flow of operations or steps. The topmost box is labelled "Admin," followed by three separate columns titled "System Access," "System," and "Database." Each column contains a series of actions and responses, such as "Enter Username and Password," "Enter Username and Password," and "Enter Database." Each column contains a series of actions and responses, such as "Enter Username and Password," "Display the Login Page," and various other system functions, such as adding transactions, service history, data entry processes, and data storage. This flowchart depicts this administrative system's logical sequence of events as it interacts with the database.

Figure 5.
Sequence diagram

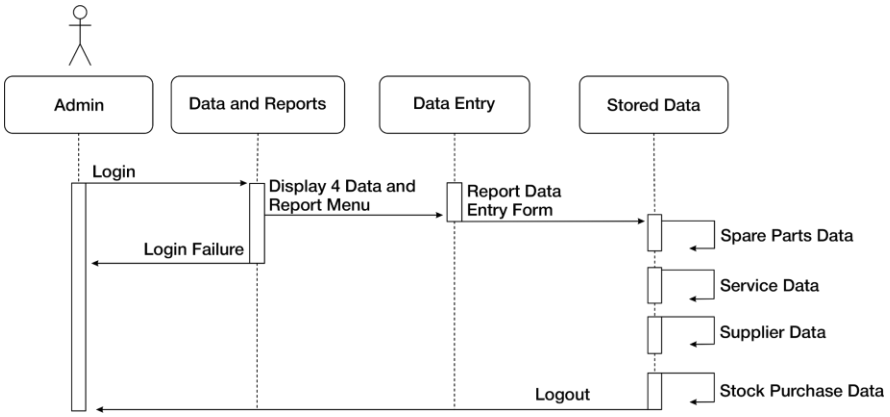


Figure 5 is a sequence diagram depicting a data management system. At the top of the flowchart, there are four boxes labelled: "Admin," "Data and Reports," "Data Entry," and "Stored Data." Presumably, these boxes represent different modules or parts of the system. Underneath is a symbol depicting an individual labelled "Admin," connected to the box labelled "Login." This indicates that an administrator must log in.

From the "Login" box, there are two possible outcomes: one leads to the box labelled "Show 4 Data Menus and Reports," indicating a successful login, and the other leads back to the Admin symbol with an arrow labelled "Login Failed," indicating an unsuccessful login attempt. The successful login path leads to several other boxes that branch off, showing the various functions available after logging in. These functions include the "Report Data Entry Form," which further branches into detailed categories such as "Parts Data," "Service Data," "Supplier Data," and others. At the bottom right corner of the flowchart is an option to log out. This image is interesting because it provides a clear visual representation of how the structure of an administrative data management system can be formed, highlighting the process of user authentication and access to different types of data in the system. This diagram simplifies complex processes into understandable segments, which can be helpful for training or explaining the operation of the system.

3.2 Web design development results

The results of this study utilize web-based technology that admins and users can access to increase the accessibility of Jaya Cars. The following are pictures that show the use of various programs in a system. Figure 6 illustrates how the login form program is used in the system. The login form is used to authenticate users before they can access other features. Users must enter information such as username and password to enter the system.

Figure 6. Login form program usage

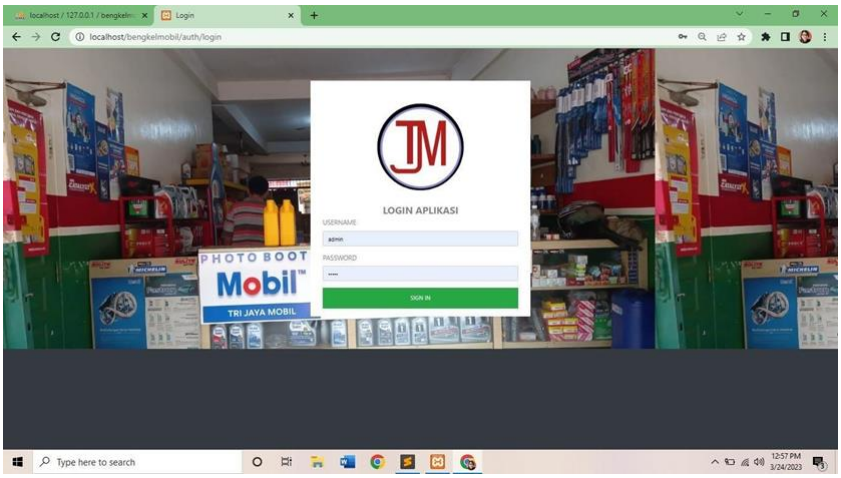


Figure 7 shows the use of the main menu or dashboard in the system. This menu is a starting point for users to access various features and modules. Users can select the relevant menu to proceed to the desired part of the system.

Figure 7. Program usage main menu/dashboard

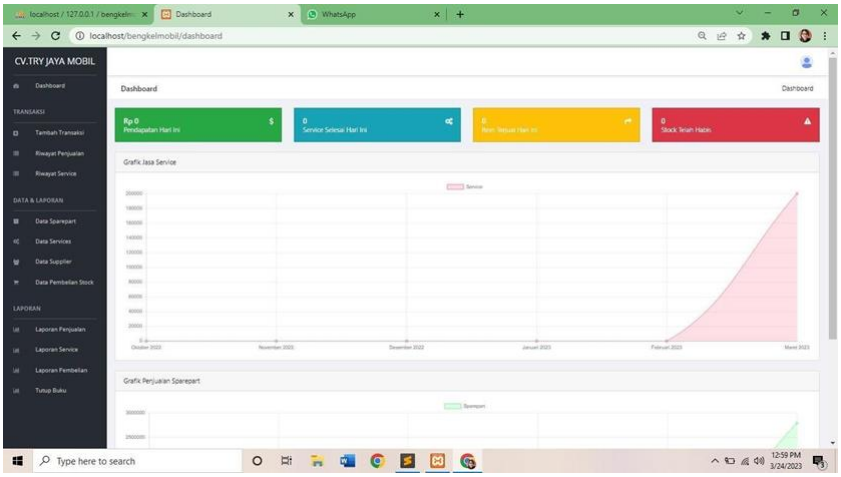


Figure 8 illustrates the use of programmes related to spare parts data. There are functions to view, manage or update information about spare parts available in the system.

Figure 8. Use of spare part data program

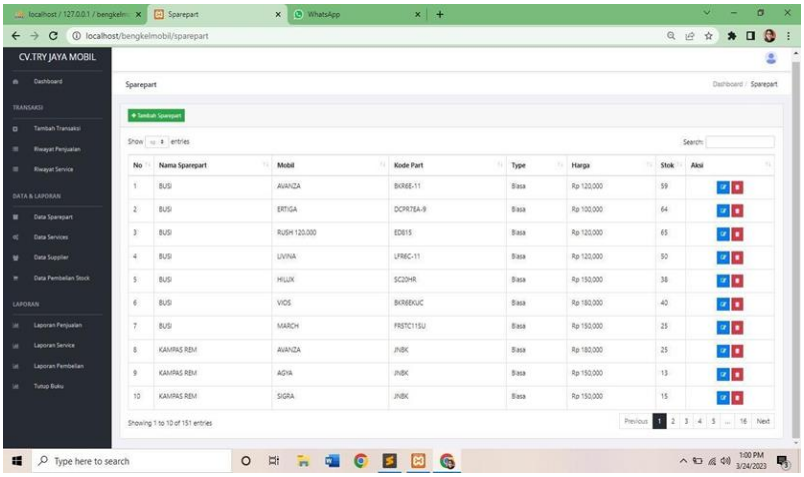


Figure 9 shows how the program to add transactions is used. This feature lets Users enter transaction data, such as sales or purchases, into the system.

Figure 9.
Use of add transaction program

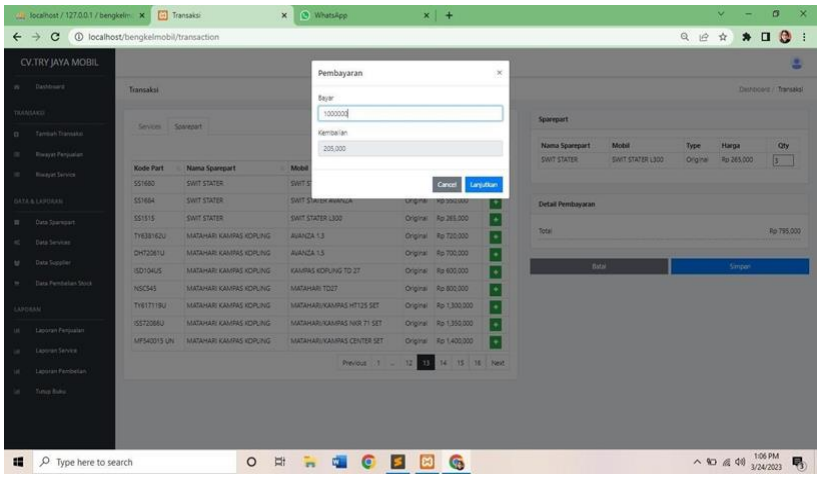


Figure 10 relates to sales history. The program may allow users to view previous sales records, including transaction details, dates, and associated customers.

Figure 10.
Sales history data program usage

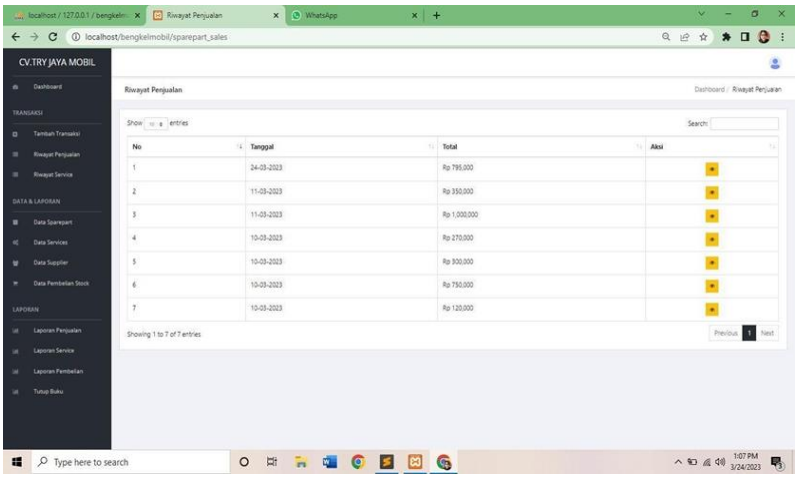


Figure 11 illustrates the use of the program related to stock purchase data. Users can enter information about stock purchases of goods or parts through this feature. The program allows users to add new stock purchase data into the system. This feature can be used to manage the inventory of goods.

Figure 11.
Stock purchase data program usage

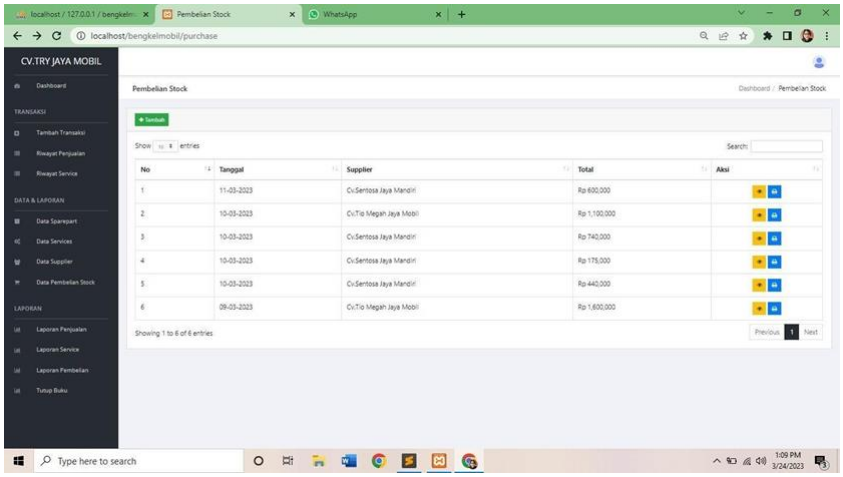
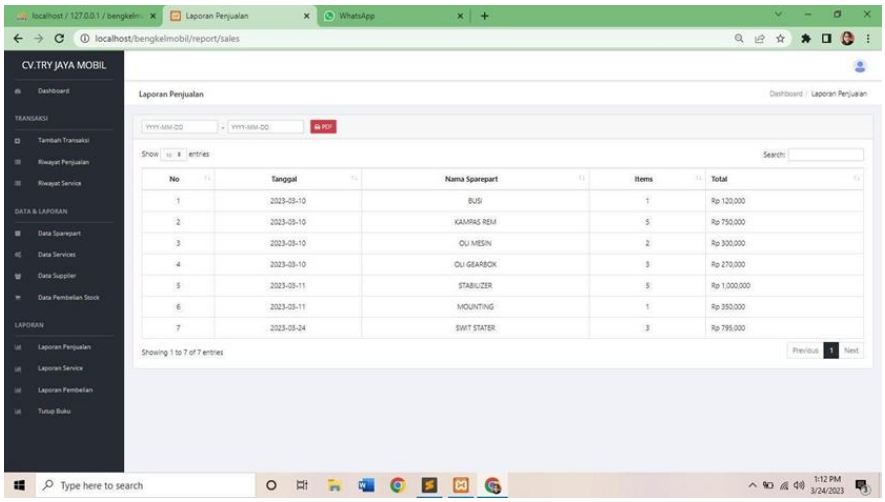


Figure 12 relates to the spare parts sales report. The program may generate reports based on sales data, including statistics, trends, and other analyses.

Figure 12. Use of spare parts sales report program



4. Conclusion

This research successfully designed and implemented a web-based spare parts monitoring information system using the Rapid Application Development (RAD) method at the Try Jaya Mobil workshop. The system addresses various challenges faced by the workshop, such as data discrepancies, lack of historical sales records, and difficulties in stock management. Adopting a computerized information system, Try Jaya Mobil can improve operational efficiency, data accuracy, and the ability to provide better services to customers. The developed system enables more accurate transaction recording, real-time stock monitoring, and structured financial report generation, thus supporting better business decisions and strengthening the workshop's competitive position in the market.

5. Limitations and recommendations

This study has several limitations that need to be considered. First, the scale of implementation of this information system is still limited to one workshop, so its effectiveness and scalability to a more comprehensive workshop network or various branches cannot be ascertained. Second, integration with other systems that workshops may use, such as customer or supplier management systems, has not been tested, so the potential to create an integrated digital ecosystem has not been achieved. Thirdly, although training has been provided to users, it may take them longer to become thoroughly accustomed to and efficiently use the new system. Finally, some of the existing features may still require further development to meet all operational needs that may arise in the future.

Several recommendations can be given to increase the benefits of the information system that has been developed. First, it is recommended that the system be tested on several other branches or workshops to ensure that the system can function adequately in various operational scenarios. Second, it is necessary to integrate the system with other software used by workshops, such as customer management systems (CRM) and suppliers, to create a more comprehensive digital ecosystem. Third, it is recommended that additional features such as predictive analysis for stock management, integration with e-commerce platforms for online sales of spare parts, and more sophisticated inventory tracking be developed. Fourth, periodic evaluation based on user feedback is essential to improve and refine the system to meet evolving business needs.

Additionally, enhanced data security to protect sensitive information from cyber threats, including the implementation of data encryption and strict access control, is highly recommended. Finally, providing advanced training and technical support will ensure that users can utilize all system features optimally and efficiently. By following these recommendations, it is hoped that the Try Jaya Mobil workshop can

further maximize the benefits of the information system that has been developed and continue to improve the efficiency and quality of its services.

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Declarations

Author contribution

Hanafi: Conceptualization, methodology, Validation, data curation and writing - original draft.
Afrina: Investigation, resources, writing - review & editing.
Lorensa Siallagan: Writing - original draft, software, formal analysis, investigation and data curation.

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Conflict of interest

No conflicts of interest in this research

Ethical clearance

There are no human subjects in this manuscript and informed consent is not applicable. The research company has agreed to carry out the research and is willing if the results of this research are published.

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