

APPLICATION FOR MANAGEMENT OF BUYING AND SELLING FRESH FRUIT BUNCHES (FFB) OF PALM OIL ON THE PERON BAGAS DUMAI

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Abstract

Peron Bagas still relies on manual record-keeping to manage transactions involving the purchase and sale of Fresh Fruit Bunches (FFB), including daily price inputs, purchase records, and sales calculations. This manual process poses a high risk of data entry errors, duplication, and difficulties in transaction reporting, which negatively impact data accuracy and operational efficiency. To address these issues, the Peron Bagas Application was developed to integrate all operational processes in a structured and digital manner. This application automates transaction recording, sales calculations, and report generation, thereby minimizing errors in data management. The implementation of this system enhances speed, accuracy, and efficiency in business processes and supports better decision-making through real-time data insights. Functional testing using the Black Box method demonstrated that all modules worked correctly, achieving a 100% success rate.

Keywords : peron, management, digitization, payroll, loans.

1. INTRODUCTION

The rapid development of technology today has affected almost all aspects of human life, both directly and indirectly. In the era of globalization that demands rapid information exchange, the role of communication technology is becoming increasingly crucial. Broadly speaking, information and communication technology encompasses all aspects related to technology, engineering, and management techniques used in the control, processing, and utilization of information. A Management Information System is a series of activities carried out by various elements within an organization that are interconnected, with the aim of solving problems. This process utilizes management resources to produce information that supports decision-making. One business sector that requires a management information system is the palm oil PERON, which focuses on the buying and selling process between farmers and PERON owners.

Data management on the Bagas platform often results in errors due to the large amount of data that must be integrated manually. The potential for errors, such as data duplication, is very high when done manually, resulting in losses in both cost and time for the business. To address these issues, a PERON management information system is needed, capable of integrating various data to eliminate errors in managing fresh fruit bunches (FFB) sales and purchases by automating each transaction output. Furthermore, this system supports data-driven decision-making, a key to the success of modern businesses.

The development of a PERON Management Information System not only benefits the organization but also supports the creation of a more transparent and organized work environment. The increasing complexity of systems and their role in various aspects of life require a sociotechnical approach to the study of Management Information Systems. Therefore, implementing this system is an appropriate step in an organization's efforts to adapt to technological developments and increasingly dynamic market needs. Information system development is an activity aimed at creating a computer-based information system to solve problems within the organization or capitalize on emerging opportunities.

Therefore, this research or development was conducted to design and implement the PERON Management Information System that can meet the needs of organizations in managing resources efficiently and effectively. An information system is a structured method for

collecting, entering, processing, storing, managing, controlling, and presenting information, so that companies or organizations can achieve their stated goals. This research was conducted at Peron Bagas which was established in 1994 by Mr. Sihombing located at Simpang Murini, Dumai City, which is currently managed by his son, Ewin Prasetya Sihombing. This Peron still applies a manual recording system in books.

2. REVIEW OF LITERATURE

This study is structured based on references and literature from previous relevant research as a foundation of data for the research framework, encompassing theories, methods, and prior research findings:

- a. (Fedira Arwanda et al., 2023) This research discusses the development of a web-based E-Peron information system portal to simplify financial management in platform and RAM business units, which was previously done manually using books. This system was developed using the SDLC (System Development Life Cycle) spiral model.
- b. (Rahmad Kurniawan et al., 2022) This research focuses on analyzing the palm oil trading system at the CV Ibrahim Putra platform from a sharia economic perspective. The trading process at this platform includes picking up palm fruit from farmers, weighing using a ram, cash payment, and manual recording. The study found that the trading system complies with sharia principles, as transactions are conducted fairly and transparently, and there are no violations of Islamic law.
- c. (Kiki Yasdomi et al., 2024) This research developed a web-based information system for Peron Reskianto to improve the efficiency of managing palm oil sales and purchases, which was previously done manually. The system was designed using PHP and MySQL, with modeling tools such as DFD (Data Flow Diagram) and ERD (Entity Relationship Diagram).
- d. (Anita Lestari et al., 2022). This research, titled "Development of a Desktop-Based Palm Oil Platform Management Application at UD. Sawit Makmur," utilizes the Waterfall method. The application features transaction data input, sales report summaries, and farmer data management. Implementation of this system reduced report generation time from 2 hours to 15 minutes and significantly reduced recording errors.

3. METHOD

This study employed an applied descriptive research approach and utilized the Waterfall System Development Life Cycle (SDLC) model. The research was conducted at Peron Bagas, a palm oil collection center in Dumai, Riau Province, Indonesia. The method consisted of several stages, as described below.

3.1 Data and Tools

The research utilized both primary and secondary data. Primary data were collected through interviews, observation, and documentation of Peron operations, including transaction records, payroll logs, and loan records. Secondary data came from journals and related literature on information system development.

Tools and equipment used :

- a. Hardware: Laptop (Intel Core i5, 16 GB RAM), Android smartphone (Android 10+).
- b. Software: Android Studio, Flutter framework (Dart language), MySQL database, Visual Studio Code, and Draw.io for modeling diagrams.
- c. Modeling tools: Data Flow Diagram (DFD), Entity Relationship Diagram (ERD), and Use Case Diagram for system design.

3.2 Research Procedure

The research procedure followed several systematic stages :

a. Problem Identification

At this stage, the researcher identified problems that occur at Peron Bagas in Dumai City, which still relies on manual bookkeeping for recording sales, purchases, and payroll. This manual process often results in data entry errors, duplication, and inefficiency in financial reporting. Through field observation and interviews with the owner and admin, it was found that a digital management system is needed to streamline operations and ensure data accuracy.

b. Data Collection

Data were collected using both primary and secondary sources:

- i. Primary Data: Direct observation and interviews with Peron Bagas owners, administrators, and farmers to understand business processes, data flow, and system needs.
- ii. Secondary Data: References from previous studies, books, and journals related to management information systems and palm oil trading.

The collected data included transaction records, salary lists, and business process documentation used in daily operations..

c. System Analysis

This stage aimed to analyze the current system's weaknesses and define the requirements for the new system. The analysis used several tools and methods:

- i. Context Diagram and Data Flow Diagram (DFD) were created to represent how data moves between entities.
- ii. Entity Relationship Diagram (ERD) was developed to define database structure and relationships between data entities.
- iii. Requirement Analysis determined both functional (system features such as login, purchase, sales, payroll, and reports) and non-functional (speed, security, and user-friendliness) aspects.

d. System Design

System design translated the analysis results into technical blueprints:

- i. User Interface (UI) was designed using Balsamiq Mockup and Figma, focusing on simplicity and clarity for users such as admins, owners, and farmers.
- ii. Database Design was created using MySQL Workbench, based on the ERD model.
- iii. Process Flow was refined through Activity Diagrams to visualize the logical sequence of system operations.

This design phase ensured that all system components were connected and easily maintained.

e. System Implementation

The system was implemented using both hardware and software tools: :

- i. Hardware: Laptop (LOQ 15IRH8, Intel Core i5-13420H, 16GB RAM).
- ii. Software: Windows 11, Android Studio, Flutter Framework with Dart language, MySQL database, and Draw.io for diagramming.

The application was developed as an Android-based system where admins could manage transactions, sales, and payroll, while owners could monitor reports and performance through dashboards.

f. Testing and Evaluation

System evaluation was carried out through Black Box Testing and User Evaluation:

- i. Black Box Testing verified each function such as login, purchasing, sales, payroll, and reporting to ensure that outputs matched expectations.

- ii. User Evaluation was conducted with the admin and owner to assess usability, accessibility, and accuracy of data.

Testing results confirmed that all features operated correctly, and the system improved recording efficiency and reduced manual errors.

3.3 System Design

System design is carried out to assist in creating the system that will be created. The design carried out is as follows.

1. Context Diagram

The overall workflow of the application is depicted in the Context Diagram, as shown in Figure 2.

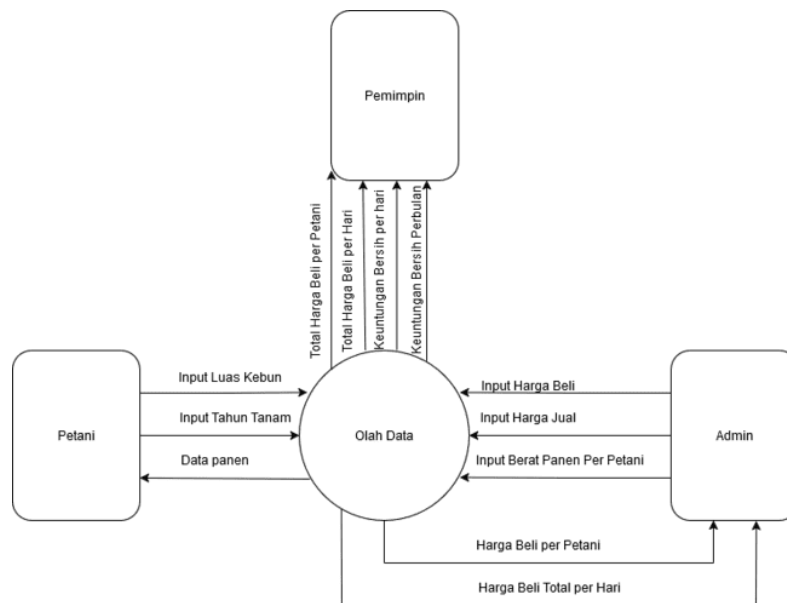


Fig 2. Context Diagram

2. Use Case Diagram

The designed use case has three actors: an admin, a leader, and a farmer. In this application, the admin can log in, manage employee data, and view the purchase price of the farmer's harvest. Meanwhile, the leader can log in, view the purchase price of the farmer's harvest, and view daily and monthly profits. The use case diagram for the Platform Management Information System can be seen in figure 3.

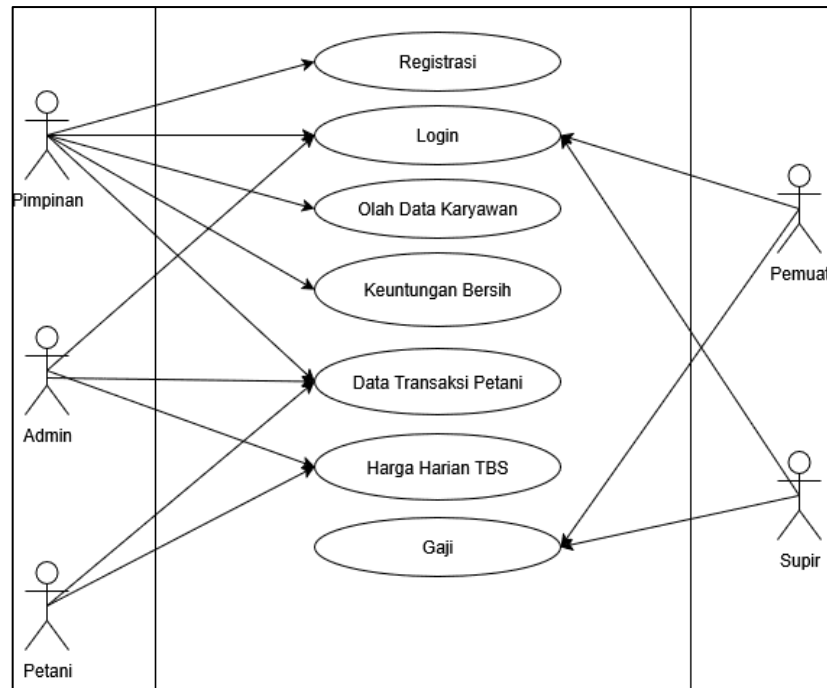


Fig 3. Use Case Diagram

3. Entity Relationship Diagram

The overall workflow of the application is depicted in Entity Relationship Diagram, as shown in Figure 4.

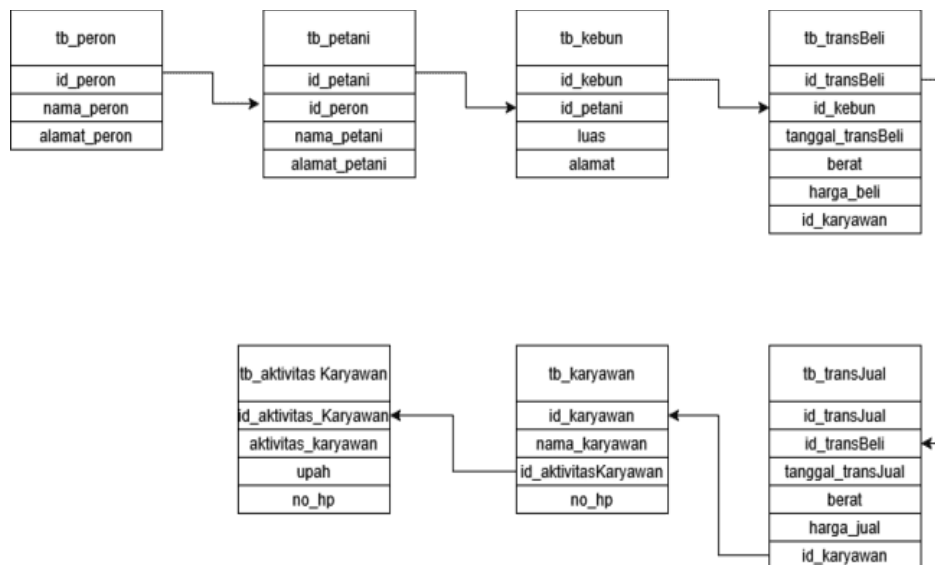


Fig 4. Entity Relationship Diagram

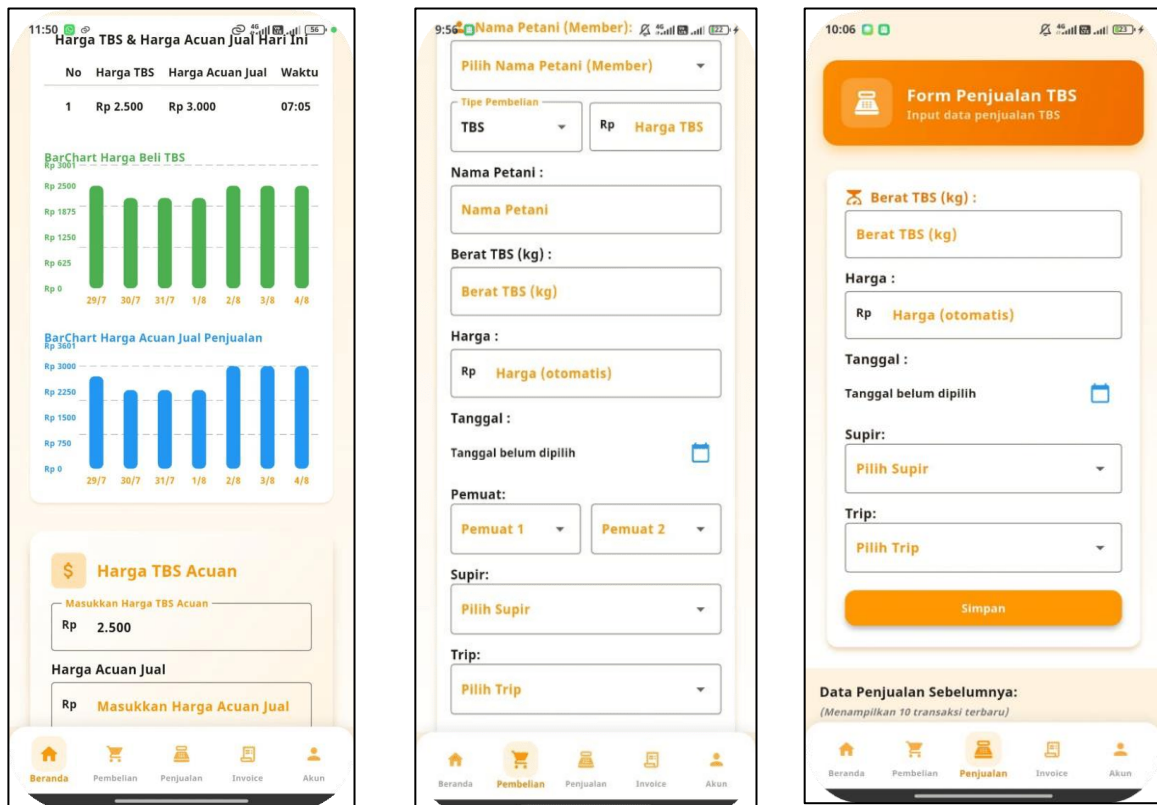
4. RESULT & DISCUSSION

4.1 Application Overview

1. Admin Interface Overview

The system's Admin Dashboard Page presents reference prices for Fresh Fruit Bunches (FFB) and reference selling prices, which must be specified by the administrator prior to performing any FFB trading transactions. The Admin Purchasing Page provides a data input form used to record FFB purchasing activities, allowing the administrator to calculate the total purchase value of fresh fruit bunches obtained from farmers and to determine the employee remuneration associated with each transaction. Furthermore, the Admin Sales Page contains an input form for recording the weight of fresh fruit bunches

intended for sale to the processing factory, supporting the computation of total sales value and ensuring that each sales transaction is properly documented and traceable.



1. Admin Dashboard Page

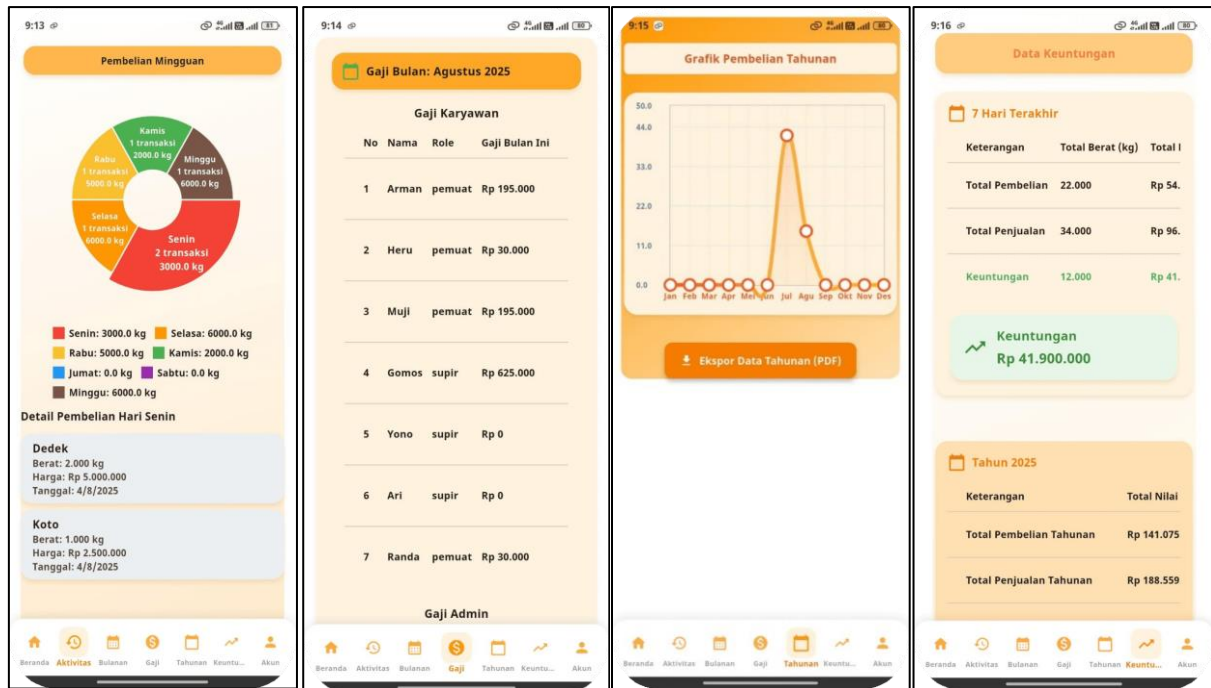
2. Admin Purchasing Page

3. Admin Sales Page

Fig 5. Admin dashboard, purchasing and sales page

2. Owner Dashboard

The Owner Dashboard Page presents an overview of the platform's daily activities and visualizes them through a bar chart. The Owner Weekly Activity Page displays the platform's weekly activities, which can also be exported in PDF format for reporting purposes. The Owner Employee Salary Page provides information on employee salaries, including administrative staff compensation within a one-month period. The Owner Annual Activities Page summarizes the platform's yearly operational activities. Furthermore, the Owner Profit Page presents both weekly and annual profit data, while the Owner User Management Page enables the leader to manage and oversee user accounts effectively.



1. Owner Weekly Activity Page

2. Employee Salary Page

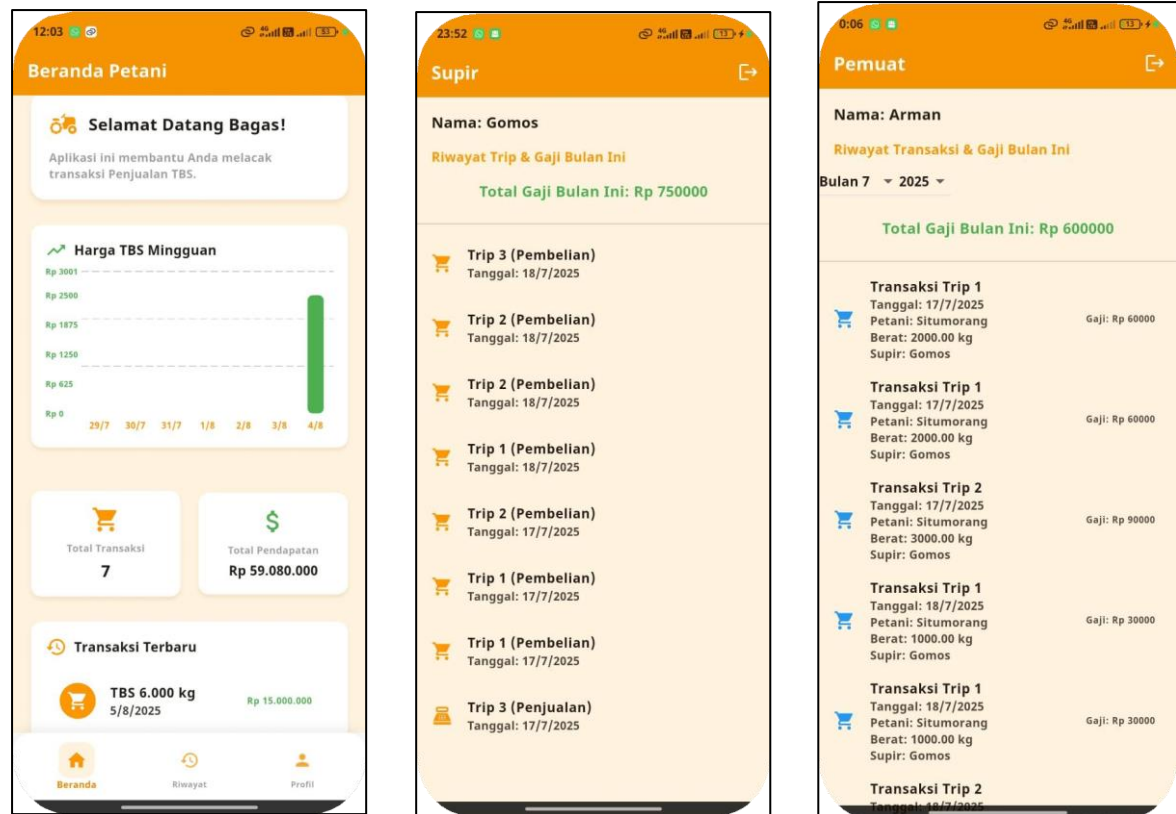
3. Owner Annual Page

4. Owner Profit

Fig 6. Owner Weekly Activity, Salary, Annual and Profit Page

3. Farmer and Worker Interfaces

The Farmer Display represents the interface accessed by farmers upon login, providing information on the daily prices of fresh fruit bunches (FFB), the number of transactions conducted, and the total income generated from FFB sales. The Driver Display presents the driver's salary information, which is calculated based on the number of trips completed. Meanwhile, the Loader Display presents the payroll information for loaders and includes a filtering feature that allows them to view only the transactions in which they were directly involved.



1. Farmer Display 2. Driver Display 3. Loader Display

Fig 7. Farmer, Driver, and Loader Page

4. Functional Testing

Functional testing was conducted using the Black Box Testing method. Each feature was tested to ensure it performs according to the specified requirements.

Table 1. Table Blackbox testing result

Module	Expected Output	Actual Output	Result
Login	Valid users can log in successfully	Successful	Pass
Transaction Input	Save purchase and sales data	Successful	Pass
Payroll	Calculate employee salaries automatically	Successful	Pass
Loan Management	Record and display farmer loans	Successful	Pass
Report Generation	Export data into PDF reports	Successful	Pass
Dashboard Chart	Display accurate statistical data	Successful	Pass
...	...	...	...

All 15 test cases passed successfully, giving the system a 100% success rate in functionality verification. This indicates that each module performs correctly and interacts properly within the database.

4.2. Discussion

The implementation of the Peron Bagas Management Application has significantly improved operational and managerial effectiveness through integrated digital features. Key functions such as daily FFB price input, automated purchase recording, receipt printing, payroll

calculation, farmer loan management, and real-time profit monitoring have streamlined processes, reduced errors, and enhanced data accuracy. The implementation of the Peron Bagas Management Application has significantly improved operational and managerial effectiveness through integrated digital features. Key functions such as daily FFB price input, automated purchase recording, receipt printing, payroll calculation, farmer loan management, and real-time profit monitoring have streamlined processes, reduced errors, and enhanced data accuracy.

4. CONCLUSION

The novelty of this study lies in integrating payroll, sales, and farmer loan features into a single digital system specifically tailored for small-scale palm oil trading operations (Peron) in rural Indonesia.

It can be concluded that the developed application has successfully supported a significant increase in the operational and managerial effectiveness of Peron Bagas through the implementation of various integrated digital features. These features include daily Fresh Fruit Bunch price input, automatic purchase recording by the admin, transaction receipt recording, an automatic payroll system based on the accumulated wages of each transaction, systematic management of farmer loans, and real-time monitoring of Peron's profits and cash flow.

The implementation of this application not only creates a more structured, transparent, and accountable management system, but also increases work time efficiency, minimizes the risk of recording errors, and supports data-based decision-making.

5. ACKNOWLEDGEMENTS

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