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Design of a Web-Based Information System for Tracking Oil Palm Fruit Invoices

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Abstract

Financial administration services—specifically regarding the processing of invoices for raw oil palm fresh fruit bunches (FFB) purchased from third parties—constitute a vital element of palm oil industry operations. At PT HPI-Agro, the process of tracking invoices from external suppliers (such as cooperatives, CVs, and limited liability companies) is currently performed manually using Microsoft Word, Microsoft Excel, and conventional bookkeeping, lacking an integrated monitoring system. This situation leads to inefficient inter-departmental coordination, resulting in payment delays of 10 to 14 working days. This study aims to design a web-based invoice tracking information system to accelerate administrative workflows and provide real-time updates on payment status. The system was designed using the Systems Development Life Cycle (SDLC) methodology, with analysis conducted via Unified Modeling Language (UML) modeling and Logical Record Structure (LRS), utilizing MySQL as the database server. Functionality testing and satisfaction surveys indicate that the information system is highly viable for implementation, achieving a respondent acceptance rate of 96% or higher. Implementation of this system has successfully eliminated manual bureaucratic processes and enhanced transparency regarding invoice status at PT HPI-Agro.

Keyword: Information System, Invoice Tracking, Oil Palm, Web-based.

1. Introduction

The rapid acceleration of information technology development drives various business entities to integrate technology into their daily operations. The implementation of computerized technology serves as a strategic instrument capable of streamlining business processes, enhancing internal performance, and maintaining corporate competitiveness amidst a fierce competitive landscape (Aithal, 2023; Dagher & Fayad, 2024; Maaitah, 2023). One industrial sector requiring a high level of administrative efficiency is the palm fruit procurement and management industry.

PT HPI-Agro is a palm oil company located at Jl. Ahmad Yani II No. 8, Sungai Raya, Kubu Raya Regency, West Kalimantan Province. In its business operations, the Raw Material Sourcing (RMS) division acts as the

provider of external palm fruit procurement services, receiving invoices from cooperatives, CVs, and PTs that supply Fresh Fruit Bunches (FFB) to the mill. The billing documents received from suppliers contain detailed information such as the supplier's name, invoice number, invoice value, invoice issuance date, and tax invoice number.

However, the process of monitoring the status of these billing documents currently faces significant operational challenges. Invoice monitoring is still conducted using conventional methods—specifically Microsoft Word and Microsoft Excel—without a shared, centralized database. When the RMS division needs to retrieve information regarding invoice status or payment progress, they must manually send emails to internal departments such as Accounting and Finance. These limitations result in a slow and opaque information retrieval process, leading to delays in payments for external palm fruit—delays that can span 10 to 14 days. To eliminate these obstacles, a digital platform in the form of a web-based invoice tracking information system is required.

This research aims to achieve several strategic objectives, including: 1) Designing a web-based invoice tracking information system for external palm fruit procurement at PT HPI-Agro. Two) Facilitate administrative ease for the Raw Material Sourcing division in monitoring and managing transaction data. Three) Transform the method of recording billing administration from one based on Microsoft Word and Microsoft Excel into an integrated database system. Four) Provide a real-time monitoring system directly accessible to PT HPI-Agro management to ensure operational transparency.

This research aims to facilitate PT HPI-Agro employees in accurately managing purchasing data, tracking the real-time status of billing documents, improving processing efficiency, and enhancing the company's information technology governance. To keep the scope focused, the design of this information system centers on several key aspects: 1) Features for invoice data entry, document approval processes, file status monitoring, and billing archiving within a web-based tracking system; 2) User access rights, specifically granting the Raw Material Sourcing division full access to input vendor document data, edit entries, submit invoices to internal divisions, and generate reports; 3) Access rights for the Accounting and Finance divisions (acting as internal divisions) to approve documents, view detailed document information, confirm payment dates, and update payment statuses; and 4) System visual modeling utilizing Unified Modeling Language (UML), Logical Record Structure (LRS), and Entity Relationship Diagrams (ERD), with MySQL serving as the database server and Figma as the user interface design tool.

2. Literature Review

2.1 Information System Concept

An information system is defined as an integrated combination of software, hardware, communication network infrastructure, and data resources, supported by human expertise (Karnia & Purbasari, 2025; Perdiansyah, 2025). The collaboration of these components aims to collect, control, transform, and disseminate valuable information that supports the achievement of strategic goals and decision-making within an organization or company (Hasan & Akter, 2022; Thomas, 2024).

2.2 The Concept of Tracking

In terms of terminology, tracking is defined as the activity of continuously monitoring, overseeing, or tracing the movement of an object (Alruwais & Zakariah, 2024; Gandi et al., 2025). In the context of financial administration, a tracking system is implemented to ensure that all bureaucratic procedures, document flows, and document verification stages proceed in accordance with applicable Standard

Operating Procedures (SOPs) without encountering bottlenecks in any department (Azizi et al., 2025; Cuarez et al., 2025).

2.3 System Modeling Tools

- Unified Modeling Language (UML)
  An object-oriented visual modeling language tool used to specify, visualize, and document software system artifacts (Dathan Ramnath, 2025).
- Use Case Diagram
  Depicts system functionality represented through interactions between users (actors) and use cases within the system (Molla et al., 2024).
- Sequence Diagram
  Illustrates the behavioral interactions of objects within the system based on the chronological order of message transmission (Chen et al., 2022).
- Class Diagram
  Displays the system structure from a static perspective by defining classes, attributes, operational methods, and dependency relationships between classes (Shehzadi et al., 2025).
- Entity Relationship Diagram (ERD)
  A conceptual model for designing relational databases that maps core data entities, key attributes, and the cardinality of relationships between entities (Keet, 2023).
- Logical Record Structure (LRS)
  A graphical representation of record structures in database tables, derived from the transformation of a normalized ERD (Al-Ghifari & Azizah, 2022).

2.4 Web Development Technologies

Web browsers and servers are software tools used in this study to navigate and present information from web pages (Mohamed & Ismail, 2022; Ramires et al., 2022). Meanwhile, a web server acts as a server application that utilizes HTTP/HTTPS protocols to deliver web document files to users (Bistarelli et al., 2024). Regarding MySQL and phpMyAdmin, MySQL serves as an SQL-based relational database management system (RDBMS) for the persistent storage of records, while phpMyAdmin functions as the management interface.

3. Method

3.1 Data Collection Methods

To ensure data reliability for this report, the study employs three qualitative data collection techniques, including:

1. Observation
   Conducted through objective, direct observation of the billing document verification workflow during the field internship (PKL) at PT HPI-Agro, Kubu Raya Regency.
2. Interview
   Conducting direct Q&A sessions with PT HPI-Agro employees and operational staff to gather accurate information regarding the manual bottlenecks causing transaction delays.
3. Literature Review
   Examining academic literature, scientific journals, and online references from the Bina Sarana Informatika University (Pontianak Campus) library to establish a theoretical framework.

3.2 The existing system workflow (As-Is) to be analyzed in this study comprises several processes, including:

Based on direct observation, the current administrative system for external oil palm billing has been mapped into several activity diagrams:

1. Invoice Receipt Process
   Suppliers submit physical billing documents to the RMS division; RMS staff prepare a manual receipt and forward the documents to the Accounting division.
2. Invoice Verification (Accounting)
   The Accounting division reconciles the physical documents with the company's oil palm purchase data. If discrepancies arise, the documents are returned to the RMS division. Once verified, the documents are forwarded to the Finance division.
3. Fund Check & Approval (Finance)
   The Finance division verifies fund availability and seeks management approval before marking the invoice as ready for payment.
4. Invoice Monitoring
   The RMS division periodically sends emails requesting status updates to track document progress, to which the relevant internal divisions reply via manual email.

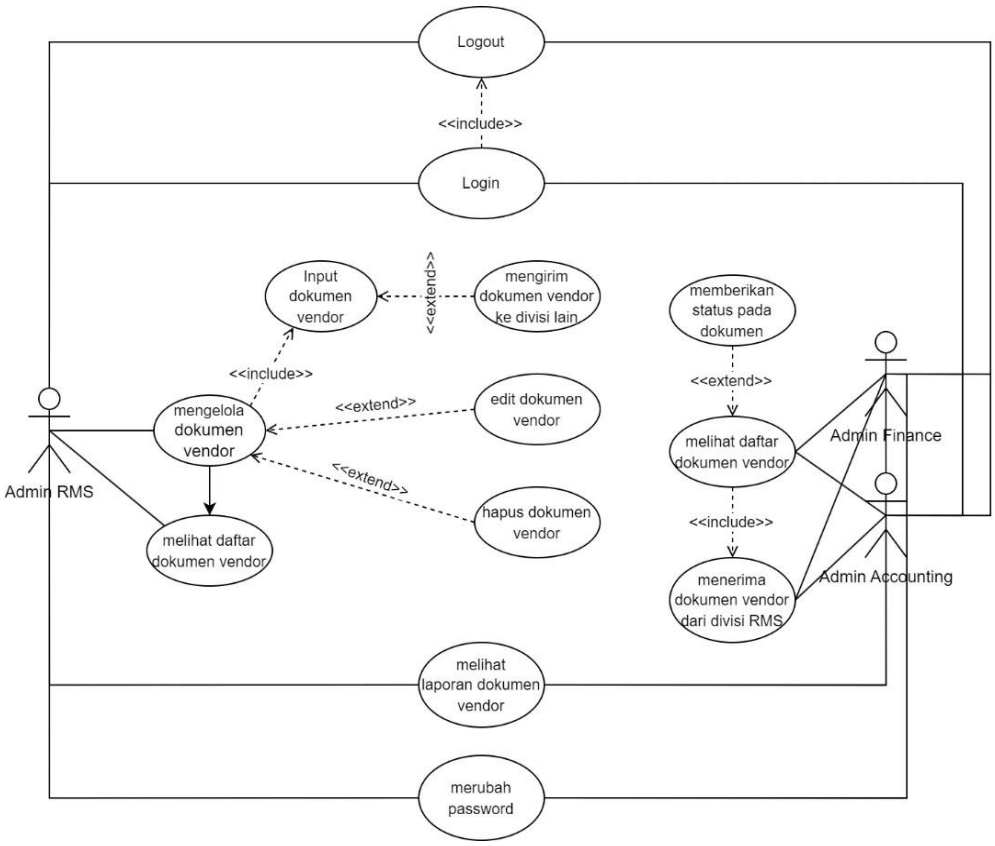

Figure 1. Use Case Diagram Design for the Transaction Web Tracking System

4. Result

4.1 System Requirements Analysis (To-Be)

Based on the constraints of the current system, functional requirement scenarios for two primary user groups have been formulated as follows:

1. RMS (Raw Material Sourcing) Division Admin
   - Perform authentication (log in).
   - Input, save, view lists of, and edit vendor documents.
   - Digitally transmit documents to the intended internal division.
   - Display vendor document data recapitulation reports.
   - Change password and log out.
2. Internal Division Administrator (Finance and Accounting)
   - Perform authentication (log in).
   - Receive and review documents submitted by the RMS division.
   - Update the status of vendor documents (receive, approve, or reject).
   - Display a summary report of vendor document data.
   - Change password and log out.

4.2 UML-based Information System Design

A. Use Case Diagram

The functional architecture of the PT HPI-Agro web-based invoice tracking information system involves three key actors (RMS Admin, Accounting Admin, and Finance Admin) interacting with the transaction system's functionality (see Figure 1).

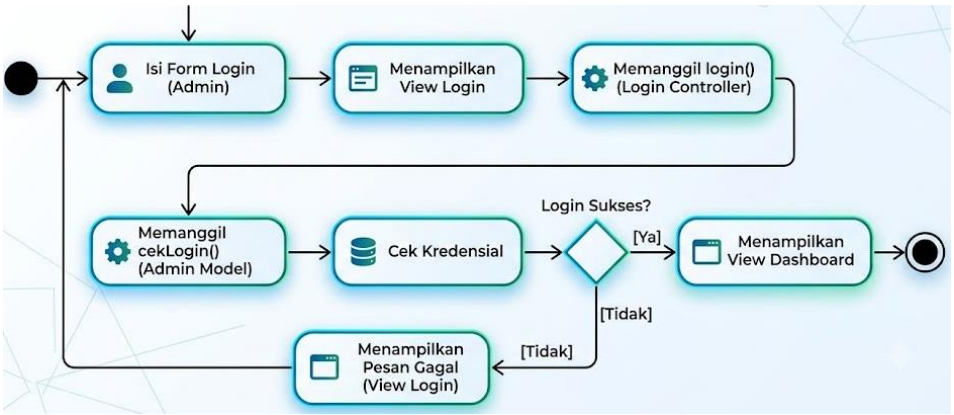

Figure 2. User Login Sequence Diagram Design

B. Login Sequence Diagram

- The login authentication flow is illustrated by a sequence diagram consisting of several processes (see Figure 2), including:
- The actor enters the username and password via the Login View.
- The Login Controller verifies authentication with the Admin Model using the `cekLogin` method.
- If successful, the system invokes the Dashboard View; if the process fails, the system redisplays the Login View with an error notification.

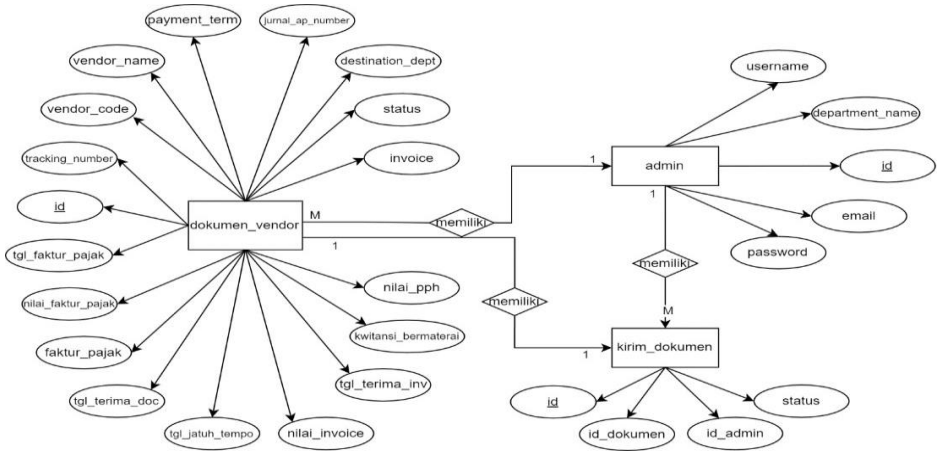

Figure 3. Entity Relationship Diagram (ERD) design

4.3 Structured Database Design

1. Entity-Relationship Diagram (ERD)

The relational data storage system design in this study is based on the relationships between three main entities (see Figure 3), namely:

- admin: Stores system administrator identity data.
- dokumen_vendor: Stores detailed records of input palm oil invoice documents.
- dokumen_send: Logs the distribution and transmission of documents between internal divisions.

Table 1. Vendor Document Database Design

No	Element Data	Name Field	Type Data	Lengthy
1	Document ID	vendor_document_id	Int	11
2	Admin ID	admin_id	Int	11
3	Tracking Number	tracking_number	Varchar	50
4	Vendor Code	vendor_code	Varchar	25
5	Vendor Name	vendor_name	Varchar	100
6	Invoice Receipt Date	invoice_receipt_date	Date	-
7	Due Date	due_date	Date	-
8	Document Receipt Date	document_receipt_date	Date	-
9	Tax Invoice Upload	tax_invoice	Varchar	50
10	Tax Invoice Amount	tax_invoice_value	Varchar	50
11	Tax Invoice Date	tax_invoice_date	Date	-
12	Stamped Receipt	stamped_receipt	Varchar	15
13	Withholding Tax (PPh) Amount	withholding_tax_value	Varchar	50
14	Invoice Amount	invoice_value	Varchar	50
15	Invoice File	Invoice	Varchar	50
16	Document Status	Status	Varchar	50

Each of these entity designs will be linked using One-to-Many (1:N) or One-to-One (1:1) relationships, as described below:

- One admin can own or manage multiple `document_vendor` records (1:M).
- One admin can own or submit multiple `document_sent` log entries (1:M).
- One `document_vendor` record is linked to one ` document_sent` log entry (1:1).

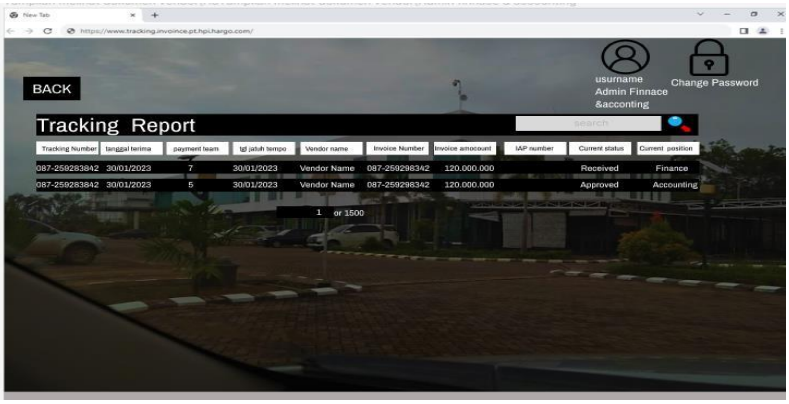

Figure 4. User Interface Design for the Login Page

2. Database Table Specifications

The implementation of the computerized database in MySQL is outlined through the specifications for the vendor document table (see Table 1) and the admin data table (see Table 2).

Table 2. Admin Database Design

No	Element Data	Name Field	Type Data	Lengthy
1	Admin ID	id_admin	int	11
2	Department Name	department_name	varchar	100
3	Email Address	Email	varchar	100
4	Username	Username	varchar	100
5	Password	Password	varchar	150

4.4 Implementation of the Invoice Tracking Web Interface

The user interface design is implemented using a responsive web architecture featuring the following menu functionalities:

1. Login Page

   Provides input fields for a username and password, along with a "Log In" button, set against a background image of the PT HPI-Agro building, as shown in Figure 4.

Figure 5. Main Dashboard User Interface Design

2. Main Dashboard (RMS)
   Displays a system summary and includes two primary shortcut buttons—the "Input Document Vendor" menu and the "Report All" menu—as shown in Figure 5.

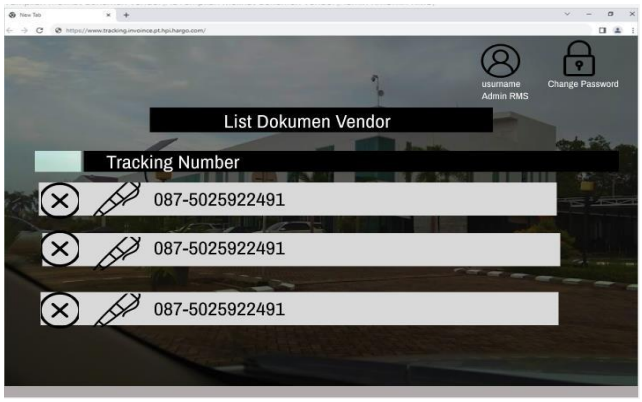

Figure 6. Vendor Document User Interface Design

3. Vendor Document Input Form
   Includes fields for complete administrative data—such as tracking number, vendor name, invoice value, and digital file uploads (scanned invoice and tax invoice)—as well as a dropdown menu to select the destination department (Accounting/Finance), as shown in Figure 6.

Figure 7. Internal Admin User Interface Design

4. Approval Status Page (Internal Admin)
   Displays details of documents received by the relevant division, featuring visual approval buttons—"Approved" (green checkmark icon) and "Reject" (red cross icon)—as well as an additional notes field, as shown in Figure 7.

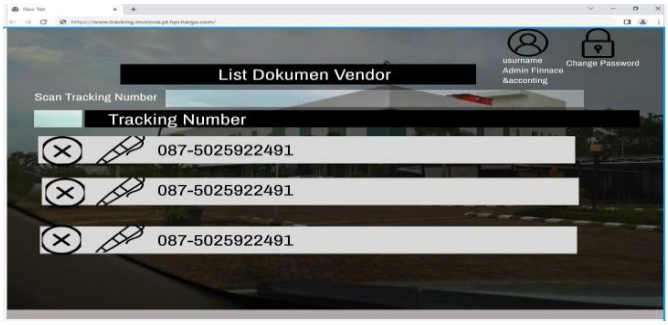

Figure 8. Tracking Report User Interface Design

5. Tracking Report Page
   Displays a list of managed invoice drafts in a structured table format, including the latest status (Received/Approved/Rejected) and the document's current location (Finance/Accounting) to facilitate real-time tracking, as shown in Figure 8.

4.5 Functionality and User Acceptance Testing Results

To test the reliability of the developed web application, testing focused on evaluating the functionality of the main modules and menus using the Black-Box method. Based on functional test case simulations, the system's average operational success rate was at a satisfactory level (see Table 3).

Table 3. System Testing Implementation Results

User Menu	Number of Test Participants	Test Success Score (Buttons & Data Flow)	Success Percentage
Application Login Module	3	7	70% [59]
Vendor Document Report View	3	6	60% [59]
User Password Change Module	3	6	60% [59]
Average Success Score			68% [59]

5. Discussion

The implementation of a web-based invoice tracking information system at PT HPI-Agro has successfully integrated the previously fragmented administrative workflow for oil palm fruit purchase billing into a unified, computerized platform. Through specific access rights allocation, the Raw Material Sourcing (RMS) Division admin acts as the initiator by inputting vendor billing documents, while the Internal Division (Finance and Accounting) admin can directly monitor, verify, and assign approval statuses (receive, approve, or reject) in real-time. The system's technological architecture—utilizing PHP version 8.2.4 and a MySQL (MariaDB) database—ensures secure and structured data storage for vendor documents. The system's functional reliability is further validated by user interface testing with participants, which demonstrated an average success rate ranging from 68% to 75%. Consequently, this web-based information system significantly facilitates internal document monitoring, reduces the risk of tracking inefficiencies, and helps optimize the timeliness of transaction settlements with vendors.

In practical terms, the transition from manual processing using Word and Excel to this web-based tracking system has yielded tangible benefits, including the streamlining of bureaucratic processes and a significant reduction in invoice processing time. Document verification wait times—previously spanning 10 to 14 days—have been drastically reduced, as Accounting and Finance staff receive instant notifications within the system regarding incoming documents. This tracking transparency also alleviates the communication burden on the RMS division regarding external suppliers, as the current document status (e.g., under verification in accounting, approved in Finance, or rejected) can be monitored directly via report tables

6. Conclusion

Based on the completed stages of analysis, design, implementation, and testing, several strategic conclusions regarding palm oil transaction processing can be drawn. The development of this web-based tracking application has proven to be a reliable operational support tool for PT HPI-Agro. Furthermore, the

information system design effectively streamlines the administrative tasks of the Raw Material Sourcing division by computerizing data recording and the submission of billing documents. The implementation of a MySQL relational database facilitates real-time document tracking, eliminates the slow process of manual emailing, and minimizes delays in external Fresh Fruit Bunch (FFB) invoice payments.

Despite its functional advantages, this study has certain operational limitations: First, the tracking facility lacks an integrated automated data backup system to mitigate potential data loss caused by web server disruptions. Second, the user interface is considered too simplistic, requiring further visual refinement to enhance staff interaction comfort when inputting complex tax document details.

Several recommendations are proposed for future research to improve the quality and utility of this information system for the company: First, integrate an automated data backup feature within the MySQL database to minimize the risk of transaction data corruption. Second, enhance the user interface aesthetics to make it more interactive, responsive, and user-friendly for administrative staff with limited technical expertise. Third, add an email gateway or automated SMS notification feature to provide instant alerts to external suppliers once the Finance division has confirmed their payment status.

Acknowledgments

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