

Implementation of Web-Based Financial Management System at Nizam Aluminium and Glass

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) in the manufacturing sector often face efficiency constraints in financial management due to manual recording processes. Nizam Aluminium and Glass, a project-based manufacturing workshop, faces problems such as disorganized transaction records, a high risk of losing physical receipts, difficulties in monitoring outstanding customer receivables, and inaccurate project profit-loss analysis. This study aims to implement a web-based financial management system that integrates the Job Order Costing method with multi-role access separation (Owner and Admin) to digitize the workshop's operational workflow comprehensively. To construct the application, this research adopted the Waterfall methodology, progressing sequentially through needs identification, architectural design, coding via the Laravel framework, and functional evaluation. The results show that the system successfully separates the managerial role of the Owner in controlling the price database (Master HPP) and monitoring gross profit analysis, from the operational role of the Admin in recording orders, detailing material requirements, and managing customer receivables in real-time. This implementation is proven to centralize financial data, eliminate manual calculation errors, and present accurate profit margin visualizations for business owners.

1. Introduction

The digitization of business processes and financial management is a fundamental element for the sustainability of Micro, Small, and Medium Enterprises (MSMEs) in the digital economy era. Accurate recording is not just documentation of daily transactions, but an essential instrument for strategic decision-making and operational efficiency improvement [1], [2], [3], [4]. The implementation of digital accounting information systems has been proven to provide real-time data access, which is crucial in preventing operational fund leakage in small-scale business entities [5], [6]. However, in reality, many manufacturing MSMEs are still trapped in conventional financial management relying on physical records. The main issues arising from this manual method are the risk of losing transaction data, disorganized receipt archiving, and bias in determining the cost of goods manufactured, which leads to profit margin uncertainty [7], [8], [9], [10].

Nizam Aluminium and Glass is a manufacturing entity that produces equipment made of aluminium metal, a material widely used in the fabrication industry due to its strong and lightweight nature [11]. As a workshop operating with a project-based system, its financial activities are highly dynamic, including unscheduled

material purchases and gradual payments from customers. The absence of a centralized recording system makes stacks of physical receipts the only data source, which is often misplaced or damaged. The systemic impact of this condition is the difficulty for owners to accurately monitor outstanding customer receivables and the lack of visibility into the net profit generated from each completed specific project. This phenomenon emphasizes the urgency of a system capable of calculating costs automatically and integrally [12], [13], [14].

A substantial body of prior literature has investigated the implementation of web-based platforms for handling manufacturing processes and financial expenditures. Several studies indicate that integrating the Job Order Costing method into digital platforms is effective in improving cost calculation accuracy in the garment and printing industries [8], [15], [16]. Furthermore, the use of the Laravel framework in information system development is proven to provide better data security and ease of system maintenance compared to conventional methods [12], [17]. Nevertheless, most previously developed systems focused more on general stock or production management, without paying special attention to down payment monitoring features and fluctuating remaining balances in aluminium manufacturing workshops [5], [18].

Based on this gap, this study aims to implement a web-based financial management system using the Job Order Costing method tailored to the operational characteristics of Nizam Aluminium Workshop. The novelty of this study lies in the integration of the production cost tracking module combined with real-time customer receivable management features in a single integrated platform. The contribution of this study is expected to provide a digital solution for business owners to automate profit-loss calculations per project transparently, eliminate reliance on physical receipts, and support more precise financial decision-making for MSME business sustainability. Therefore, this study develops a Web-Based Financial Management System using the Job Order Costing method. The novelty of the built system also lies in the strict application of role-based access separation between the Owner and Admin. This segregation of duties is applied so that the Owner can fully control the capital database (Master HPP) and objectively monitor profits, while the Admin focuses on daily operational execution such as recording orders and customer receivables, thereby minimizing the risk of data manipulation at the field level.

2. Research Methods

The development of this software was guided by the Waterfall paradigm, characterized by its linear and methodical progression. This approach is systematic and sequential, starting from the planning stage to maintenance, making it highly advantageous for producing high-quality systems. The Waterfall method is very suitable to be applied in web-based system design because its sequential approach allows each component to be focused on and completed before moving on to the next stage. The development of the Financial Management System for Nizam Aluminium and Glass adheres to the structural stages of the Waterfall model as follows:

2.1 Analysis Stage

At this stage, data collection was carried out through direct observation and interviews with the owner of Nizam Aluminium and Glass to determine the root cause of the workshop's financial problems. Based on the analysis, the functional requirements of the system are divided into two access rights, namely the Owner (requires control over the Master Cost of Goods Sold/HPP and Profit Reports) and the Admin (requires features for recording Project Orders, Material Details, and Managing Customer Receivables).

2.2 Design Stage

This stage uses Unified Modeling Language (UML) based system modeling, specifically using Activity Diagrams to design the workflow of authority separation between the Owner and Admin. In addition, relational database design is carried out focusing on main tables such as customers, standard prices (master_hpps), orders, material details (order_details), and payments.

2.3 Program Code Creation Stage

In this implementation stage, the new system design is translated into programming language. The web application development is carried out using the PHP language utilizing the Laravel framework. Visual Studio

Code (VSCode) is used as a text editor, MySQL as the database management system to execute the Job Order Costing logic, and Laragon as the local server connector.

2.4 Testing Stage

In this final stage, system testing (Black Box Testing) is conducted with the expectation that the developed application design can operate functionally in accordance with expectations. The testing is focused on validating login access rights, the Master HPP input process, and the accuracy of automatic Profit and Receivable calculations.

3. Result and Discussion

The implementation stage in this study has successfully realized a Web-Based Financial Management System specifically designed to overcome operational constraints at the Nizam Aluminium and Glass workshop. This system comprehensively digitizes the transaction recording workflow from the initial stage of receiving orders to the settlement of customer receivables by integrating the Job Order Costing method and Role-Based Access Control.

The implementation of the automated Job Order Costing method in this system has proven to be capable of recording and calculating every cost element centrally, ranging from main raw materials, accessories, to labor wage allocations specifically for each project order. The success of digitizing this calculation process is in line with research conducted by [19], which confirms that computerizing the calculation of order-based cost of goods manufactured is highly effective in suppressing recording deviations and improving the accuracy of real cost estimates in the field.

Furthermore, the calculation accuracy is supported by the implementation of a standard price database (Master HPP) whose management authority is exclusively held by the business owner (Owner). This access rights restriction ensures that operational staff (Admin) can only use price data that has been validated by the system without being able to change it. The implementation of internal control through segregation of duties supports the idea from [20] that protecting master data integrity in a financial information system is highly crucial to prevent recording manipulation and ensure transparent profit-loss reporting for MSME owners.

3.1 System Interface Implementation Results

The final output of this implementation is a web-centric platform engineered upon the Laravel framework, which is structurally organized by the Model-View-Controller (MVC) architectural pattern. The system interface is designed responsively and grouped based on user access rights using session conditionals on the application's security middleware. This division aims to strictly isolate daily operational functions and managerial control.

3.1.1 Authentication System Interface

The login page is the main security gateway for access control into the system. This interface provides input fields for the user's email address and password. The system will match the credentials against the user table in the database to determine the role possessed. If the role is validated as Owner, the user will be directed to a specific managerial URL route, whereas a user with an Admin role will be automatically redirected to the daily operational workspace page.

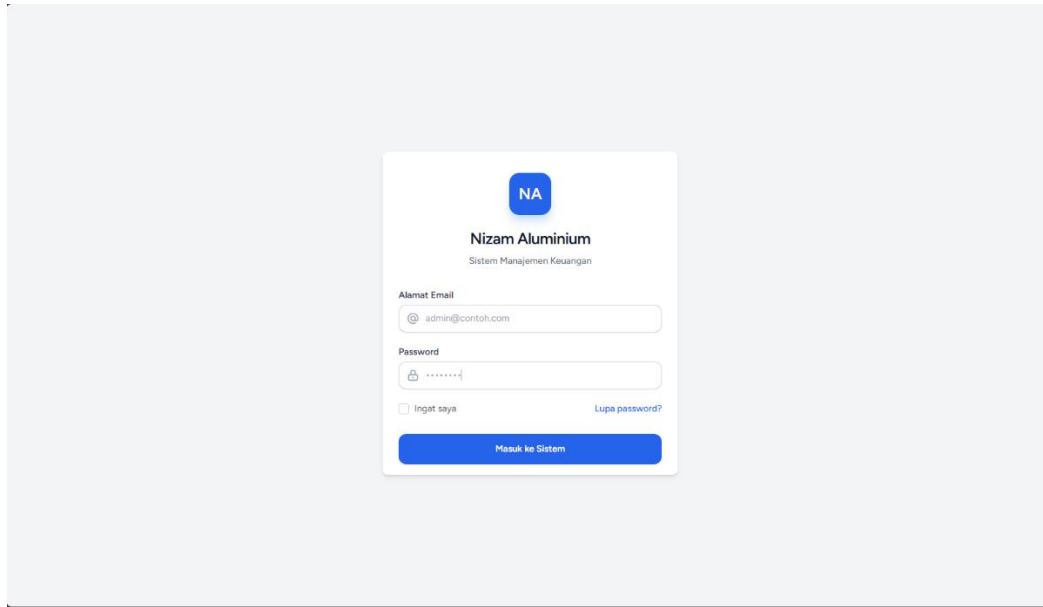


Fig 1. Login Page

3.1.2 Owner Access Rights Interface

The Owner workspace is designed to present financial data at a macro level and maintain control over the determination of the workshop's basic financial parameters.

Dashboard Owner: This page contains an executive summary in the form of informative widgets displaying the total active projects, accumulated down payments (DP) received, and total outstanding receivables outside. This display is equipped with a recent order summary table to facilitate quick supervision.

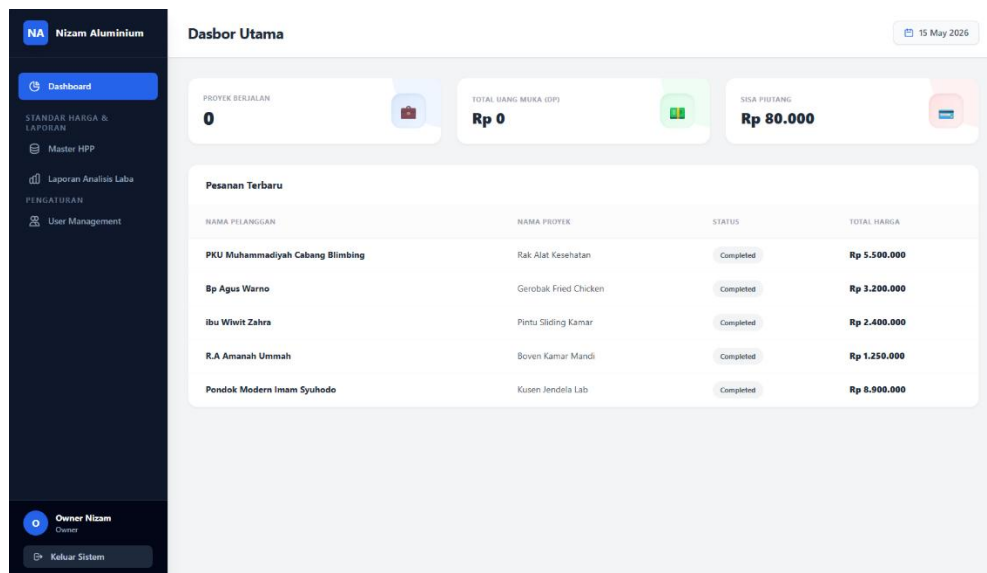


fig 2. Owner Dashboard Page

Master HPP and Item Input Form: This is the main database module for basic material prices (such as aluminium, glass, ACP), accessory components, up to standard assembly service fees and shipping costs. The

input form on this menu allows the Owner to dynamically add or update raw material prices following market price fluctuations.

Data Master HPP

Master HPP (Harga Dasar)
Kelola standar harga bahan baku dan upah operasional.

+ Tambah Item Baru

Cari Nama Bahan / Kode...

KODE	NAMA ITEM	KATEGORI	SATUAN	HARGA DASAR	AKSI
ALR-012	Aluminium ACP (Composite Panel)	BAHAN BAKU	Lembar	Rp 450.000	[Edit] [Hapus]
ALR-024	Berfil / Jalusi Aluminium	BAHAN BAKU	Batang	Rp 155.000	[Edit] [Hapus]
ALR-182	Berfil / Jalusi Aluminium	BAHAN BAKU	Batang	Rp 155.000	[Edit] [Hapus]
ALR-014	Besi Siku (Rangka Dalam Gerobak)	BAHAN BAKU	Batang	Rp 85.000	[Edit] [Hapus]
ALR-009	Hollow Aluminium 1x1 Silver	BAHAN BAKU	Batang	Rp 35.000	[Edit] [Hapus]
ALR-010	Hollow Aluminium 1x1.5 Silver	BAHAN BAKU	Batang	Rp 45.000	[Edit] [Hapus]
ALR-184	Kaca Buram / Es 5mm	BAHAN BAKU	Meter	Rp 135.000	[Edit] [Hapus]
ALR-022	Kaca Cermin 3mm	BAHAN BAKU	Meter	Rp 150.000	[Edit] [Hapus]
KCA-003	Kaca Es (Buram) 5mm	BAHAN BAKU	Meter	Rp 115.000	[Edit] [Hapus]

fig 3. Master HPP Page

Profit Analysis Report: This module displays a real-time comparison table comparing the Agreement Price (Deal) obtained by the Admin with the accumulated Total HPP (capital cost) of the project. The system automatically calculates and displays the nominal Gross Profit along with the profit margin percentage per project.

Laporan Analisis Laba

Laporan HPP & Analisis Laba
Pantau Harga Pokok Penjualan dan margin keuntungan aktual per proyek.

Cari Nama Proyek... Semua Status Filter Export Excel

JOB ID & PROYEK	HARGA KESEPAKATAN (DEAL)	MODAL MATERIAL	MODAL UPAH	TOTAL HPP	LABA BERSIH
Gerobak Fried Chicken Bp Agus Warno • JOB-0029	Rp 3.200.000	Rp 760.000	Rp 700.000	Rp 1.460.000	Rp 1.740.000
Rak Alat Kesehatan PKU Muhammadiyah Cabang Blimbing • JOB-0030	Rp 5.500.000	Rp 950.000	Rp 850.000	Rp 1.800.000	Rp 3.700.000
Pintu Sliding Kamar Ibu Wihet Zahra • JOB-0027	Rp 2.400.000	Rp 475.000	Rp 550.000	Rp 1.025.000	Rp 1.375.000
Boven Kamar Mandi R.A Amarah Ummah • JOB-0028	Rp 1.250.000	Rp 380.000	Rp 400.000	Rp 780.000	Rp 470.000
Kusen Jendela Lab Pondok Modern Imam Syuhodo • JOB-0025	Rp 8.900.000	Rp 2.375.000	Rp 1.600.000	Rp 3.975.000	Rp 4.925.000
Etalase Dagang 2 Meter Mas Mardi • JOB-0026	Rp 1.850.000	Rp 1.045.000	Rp 300.000	Rp 1.345.000	Rp 505.000
Partisi Kaca Kantor Mas Fahmi • JOB-0023	Rp 12.500.000	Rp 1.900.000	Rp 1.600.000	Rp 3.500.000	Rp 9.000.000
Lemari Mukena Masjid Masjid Agung Imam Syuhodo • JOB-0024	Rp 3.800.000	Rp 1.900.000	Rp 900.000	Rp 2.800.000	Rp 1.000.000

fig 4. profit report

User Management: A dedicated interface used to manage credential data for employee or Admin staff accounts granted operational access permissions into the system.

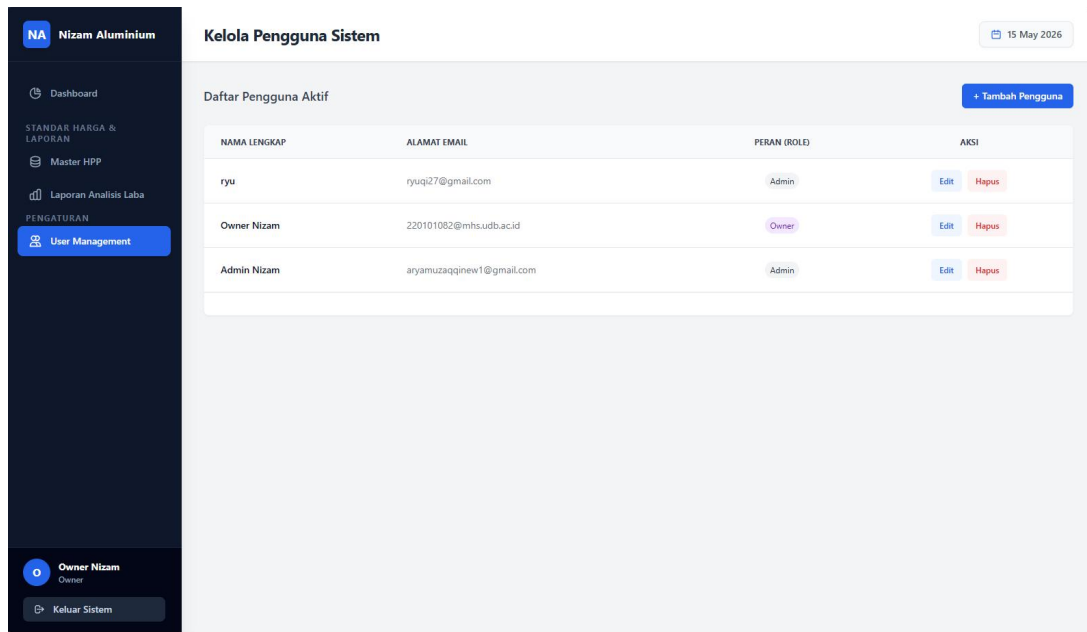


Fig 5. User Management

3.1.3 Admin Access Rights Interface

The Admin workspace focuses on transaction processing, technical production recording, and customer relationship management in the field.

Admin Dashboard and Customer Management: Presents a focus on daily operational metrics and provides a structured form to record new customer identities, including names, active telephone numbers (WhatsApp), and complete delivery addresses.

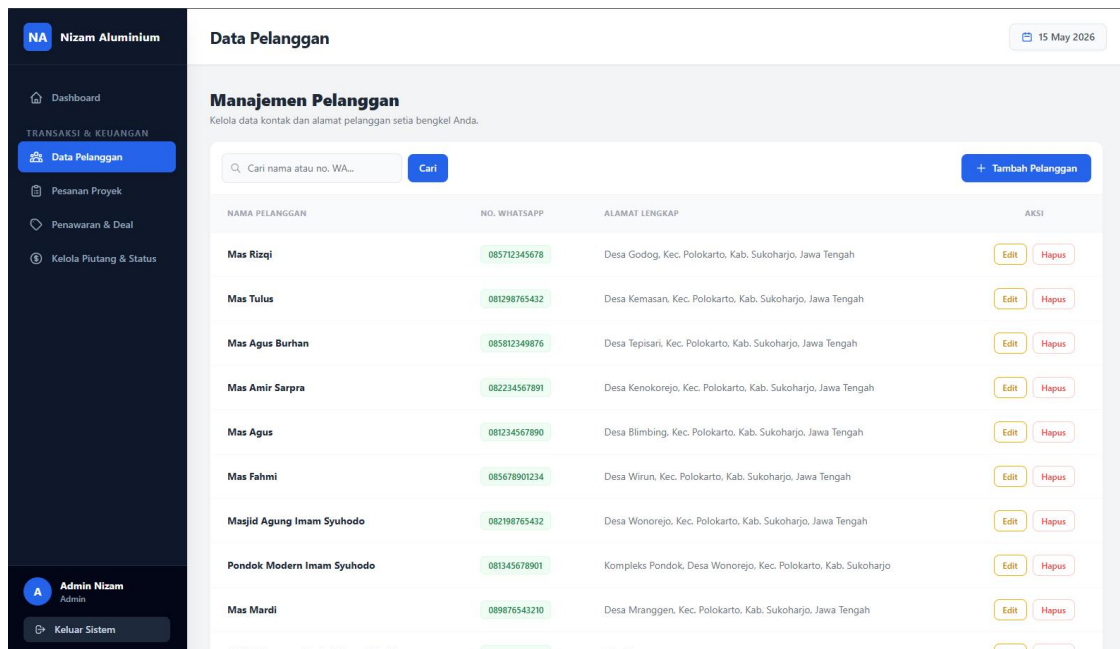


Fig 6. Customer Data page

Project Order Recording: A transactional form where the Admin registers a new project name along with its customized technical specifications details. In this module, the Admin performs Job Costing calculations by selecting the types of materials and services used from the master data.

Fig 7. Project Orders page

Quotation and Edit Deal Price: This screen displays the accumulated initial capital estimate calculated by the system based on the material details. The Admin uses this capital information as a lower limit for the quotation before negotiating the price with the customer. Once an agreement is reached, the Admin inputs the final nominal in the Deal Price column.

Fig 8. Offers and Deals page

Manage Receivables, Payments, and Work Status: An interface to record the history of payment terms (both DP and final settlement) deposited by the customer. On the same page, the Admin can update the physical work progress status of the project in the workshop.

Fig 9. Manage Accounts Receivable and Status Page

3.2 Implementation of Job Order Costing Calculation in the System

To accurately determine the manufacturing expenses for individual projects, this system integrates the Job Order Costing approach. Mathematically, this calculation is divided into two main formula stages that are automatically executed by the database engine:

Calculation of Subtotal HPP per material item or labor wage allocated to a project:

$$\text{Subtotal HPP} = \text{Quantity} \times \text{Master Base Prince} \quad (1)$$

Calculation of Accumulated Total HPP from all items used in one project order number (order_id):

$$\text{Total HPP} = \Sigma (\text{Subtotal HPP}) \quad (2)$$

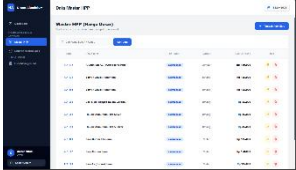
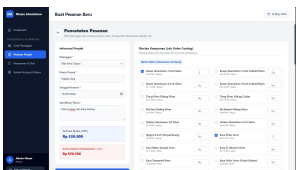
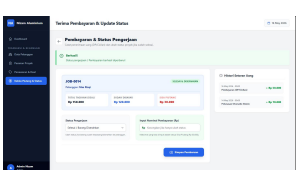
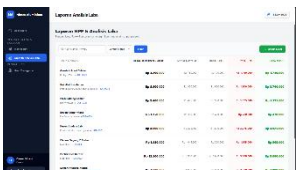
Based on the Total HPP and Deal Price (total_price column) values agreed upon by the Admin and the customer, the system automatically presents the Project Gross Profit calculation on the Owner's Profit Analysis Report page with the formula:

$$\text{Gross Profit} = \text{Deal Price} - \text{Total HPP} \quad (3)$$

3.3 System Testing Results

The testing phase is a crucial step to evaluate whether the built software has met the requirement specifications defined in the analysis stage. Testing on the Nizam Aluminium Financial Management System uses the Black Box Testing method. This method focuses on testing the interface functionality and the suitability between the input and the output generated by the system, without needing to review the internal program code structure. Testing is focused on critical daily operational scenarios, such as user role authentication, master data recording, automatic Job Order Costing calculation, and payment receivable status updates.

Table 1. Black Box Testing Results

No	Testing Scenario	Input	Expected Output	Test Results	Status	Picture
1	User Credential Authentication (Login)	Enter a valid Email and Password according to the role (Owner/Admin).	The system recognizes the user's access rights and directs them to the appropriate Dashboard page (Owner or Admin Dashboard).	As Expected	Valid	
2	HPP Master Data Management (Owner Access)	Adding new material price data along with the base price amount.	The data is stored in the database (master_hpps) and immediately appears in the Master HPP list table.	As Expected	Valid	
3	Automatic Job Order Costing Calculation (Admin Access)	Entering material details (selecting items from the HPP Master and filling in the quantity amount) on the Order form.	The system automatically calculates the Subtotal (Quantity × Base Price) and adds it to the Total COGS column cumulatively.	As Expected	Valid	
4	Project Status and Receivables Update	Enter the payment amount (down payment or settlement) into the Accounts Receivable Management form.	The system reduces the total Deal Price by the payment amount, updates the remaining receivables, and changes the status to "Completed" if fully paid.	As Expected	Valid	
5	Profit Analysis Report Calculation	Access the Profit Analysis Report page in the Owner menu.	The system displays the accurate calculation difference between the Deal Price minus the Total COGS into the Gross Profit amount.	As Expected	Valid	

4. Conclusion

The implementation of the Web-Based Financial Management System at Nizam Aluminium and Glass using the Job Order Costing method and Waterfall model has successfully digitized and centralized the entire financial operational workflow of the workshop to eliminate reliance on physical receipts. The strict application of multi-role access rights is able to create an ideal segregation of duties, where the Owner holds full control over the data determining capital parameters (Master HPP) and the Profit Analysis Report, while the Admin is focused on field transaction execution without the authority to manipulate base costs. This calculation automation at the relational database level has proven successful in eliminating potential human errors caused by manual calculation, and is capable of presenting visualizations of outstanding receivables and project profitability accurately and in real-time as a strong foundation for business decision-making for business owners in the future.

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