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Implementation of a Web-Based Tofu Sales Information System at Sari Murni

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Abstract

Sari Murni, a tofu manufacturer in Pondok Labu, relied partly on manual records for orders, payments, and transaction documents, making records difficult to trace and increasing the risk of inconsistent information. This study implemented a web-based sales information system integrating product and customer management, orders, production, delivery, invoices, payments, accounts receivable, and reporting. Requirements were collected through a literature review, direct observation, and interviews with the enterprise owner, and development followed the iterative Prototype model. The application was constructed using PHP, CodeIgniter 3, MySQL, and Apache through XAMPP, with separate Administrator and Customer access roles. Black-box testing examined authentication, master data, orders, transaction documents, financial records, and reporting, while white-box inspection evaluated authentication and payment-processing logic. All documented functional testing categories produced their expected outcomes. The implemented application centralized transaction records, generated invoices and delivery notes, recorded full and partial payments, updated outstanding balances, retained payment histories, and presented period-based sales reports. These findings demonstrate functional integration of sales and receivables administration tailored to the enterprise's operational workflow. However, improvements in processing time, error frequency, and operating costs were not quantitatively measured. Further evaluation should investigate sustained use, system reliability, and operational performance under routine sales and production operating conditions.

Keywords: *Information System, Prototype Model, Receivables, Tofu Sales, Web Application.*

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INTRODUCTION

The digitalization of micro, small, and medium-sized enterprises (MSMEs) increasingly requires transactional information to be managed through integrated information systems rather than fragmented administrative records. Evidence from Indonesian enterprises indicates that digital adoption is associated with business performance, although its effectiveness depends on the organizational and financial capabilities supporting technology utilization (Affandi et al., 2024). Firm-level research on information and communication technology infrastructure further demonstrates its relevance to the development and implementation of online sales activities (Hagsten, 2023). Studies involving food and beverage SMEs identify electronic commerce as a strategic component of business adaptation, particularly when enterprises must maintain commercial operations under changing market conditions (Ballerini et al., 2023). Research on digital transformation frameworks also emphasizes the importance of aligning technological solutions with organizational requirements and existing business processes (Garay Gallastegui & Reier Forradellas, 2024). For small food manufacturers, sales administration involves interconnected activities comprising customer orders, production coordination, product distribution, payment recording, and financial reporting. These operational relationships establish the need for web-based information systems capable of maintaining consistent transaction records while supporting coordination across business functions.

Existing research on web-based sales information systems demonstrates substantial development in transaction processing, inventory management, and digital ordering, although the operational coverage of individual applications differs according to business characteristics. Food and beverage ordering systems primarily address the electronic submission and management of customer requests, illustrating the importance of structured order processing in service-oriented enterprises

(Andryani et al., 2023). Research integrating inventory and sales information emphasizes the relationship between product availability, transaction records, and administrative data consistency within MSME operations (Angellin et al., 2023). Web-based sales applications developed through the Waterfall method further incorporate cashier operations and product management, extending system functionality beyond basic order registration (Awaluddin et al., 2025). Similar applications developed for culinary enterprises demonstrate the applicability of web-based architectures to food-related businesses with specific transactional requirements (Yuliandari et al., 2024). These developments indicate that digital sales systems have progressed from isolated transaction interfaces toward applications supporting multiple administrative functions, although integration requirements remain dependent on the operational structure of each enterprise. The existing literature consequently provides established technical approaches but does not establish a universally applicable configuration for connecting ordering, production coordination, delivery documentation, and financial administration.

The contextual limitations of existing applications become apparent in the operational activities of Sari Murni Tofu Production Enterprise, located in Pondok Labu, which has manufactured and sold tofu since 1992. Preliminary observations and interviews indicated that the enterprise employed 23 workers and produced approximately six quintals of tofu daily, with output increasing to as much as one metric ton during major holidays. Its products included Bandung-style tofu, white cut tofu, yellow cut tofu, takus tofu, and fried tofu, while customer orders were received through WhatsApp or directly at the market. An administrator consolidated incoming orders before forwarding them to production personnel, and deliveries were conducted twice daily, while customer records, payment information, invoices, delivery notes, and sales reports remained distributed across handwritten documents and separate applications. Previous studies on integrated inventory and sales systems establish the relevance of connecting commercial records, but their application designs do not directly address the documented production and distribution procedures of this tofu manufacturer (Angellin et al., 2023). Research examining web-based sales data management in culinary MSMEs further emphasizes administrative information requirements, although the integration of outstanding payments with production and delivery activities remains a distinct operational consideration for Sari Murni (Nurjanah et al., 2026). The research gap therefore concerns the need to establish a coherent transaction-management workflow tailored to Sari Murni, particularly because existing e-commerce performance research recognizes multiple evaluation dimensions rather than treating the availability of a digital platform as sufficient evidence of operational effectiveness (Salazar-Kovaleff & Mauricio, 2024).

Fragmented administrative procedures create potential inconsistencies when information from individual sales transactions must be transferred among ordering, production, delivery, payment, and reporting activities. Separate records increase the complexity of tracing transaction histories, verifying customer payment status, and retrieving documents required for routine administrative decisions. Research concerning sales data management in culinary MSMEs identifies structured information handling as a relevant consideration for improving the organization and accessibility of business transaction records (Nurjanah et al., 2026). Studies examining information technology infrastructure and online sales indicate that digital commercial activities depend on technological conditions supporting the processing and availability of information (Hagsten, 2023). Web-based systems incorporating cashier operations and product administration further demonstrate the relevance of connecting transaction processing with consistent product information within a structured application (Awaluddin et al., 2025). For Sari Murni, the practical urgency concerns administrative continuity and document traceability, while the technical requirement involves organizing interconnected data entities and workflows that correspond to the enterprise's ordering, production, distribution, and payment procedures.

The present study is positioned as an implementation-oriented investigation focusing on the integration of sales administration within the operational structure of a small tofu manufacturing enterprise. Previous research on food and beverage ordering applications provides a foundation for electronic order management, but its primary emphasis does not directly represent Sari Murni's combination of production handoffs, scheduled deliveries, and customer receivables (Andryani et al., 2023). Studies integrating inventory and sales information establish related principles of data consistency, although the functional requirements of the investigated enterprises differ from the transaction sequence identified at Sari Murni (Angellin et al., 2023). Research on SME digital transformation emphasizes the importance of configuring technological solutions around organizational

processes, supporting the need for business-specific requirements analysis rather than unrestricted replication of existing applications (Garay Gallastegui & Reier Forradellas, 2024). Literature examining e-commerce performance factors also indicates that system evaluation should consider operational outcomes rather than relying exclusively on the introduction of digital sales facilities (Salazar-Kovaleff & Mauricio, 2024). The proposed contextual contribution consists of integrating product and customer management, order processing, production coordination, delivery documentation, invoicing, payments, receivables, payment histories, and sales reporting within a unified administrative workflow. The implementation adopts the Prototype development approach to support iterative requirements validation, with PHP, MySQL, and CodeIgniter identified as the application technologies, while claims concerning system effectiveness remain subject to the results of development and testing.

This study aims to implement a web-based tofu sales information system at Sari Murni that accommodates the enterprise's documented operational and administrative requirements. The implementation focuses on organizing product and customer information, recording sales orders, and connecting order processing with production coordination and delivery documentation. It also seeks to integrate invoice generation, payment recording, customer receivables, payment histories, and sales reporting within a centralized information system. The Prototype development approach is intended to support progressive refinement of system functionality and user interfaces according to operational requirements identified through communication with intended users. The technical contribution lies in adapting established web application development practices to the interconnected sales, production, distribution, and financial administration processes of a tofu manufacturing enterprise. The anticipated practical contribution is improved consistency and traceability of transaction documentation, while the actual functionality and operational effectiveness of the implemented system must be established through documented testing and evaluation.

RESEARCH METHODS

This study adopted a software development approach using the Prototype model within the System Development Life Cycle (SDLC) to implement a web-based tofu sales information system at Sari Murni in Pondok Labu. Requirements were collected through a literature review of information systems and web technologies, direct observation of order collection, production coordination, deliveries, cash payment recording, and sales documentation, and interviews with the enterprise owner. The needs assessment focused on the enterprise's sales and production workflows rather than a statistically sampled population. Development proceeded iteratively through communication, quick planning, quick modeling, prototype construction, and deployment, with subsequent refinement informed by user feedback, consistent with iterative approaches discussed in web-based sales system development (Indriani et al., 2024). Business activities and actor–system interactions were represented using Unified Modeling Language (UML) diagrams during the modeling stage (Narulita et al., 2024). Database entities and their relationships were organized through an Entity–Relationship Diagram (ERD) before implementation to establish a structured representation of the application's data requirements (Aulia et al., 2025).

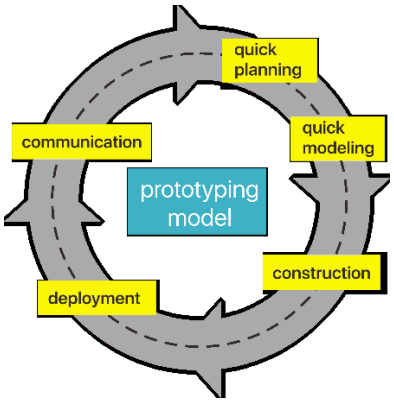


Figure 1. Stages of the Prototype Model
Source: Research findings (2026)

The system specified two access roles, Administrator and Customer, with permissions corresponding to their respective responsibilities within the sales workflow. The Administrator was authorized to manage products, customers, orders, production, deliveries, invoices, payments, arrears, payment histories, configuration settings, and sales reports. Customers could browse available products, submit orders, review order histories and statuses, view invoices, and maintain their profiles. The application was developed using PHP, CodeIgniter 3, MySQL, and Apache through XAMPP, with Visual Studio Code supporting implementation and source-code management (Sinlae et al., 2024). MySQL was employed to store and manage application data according to the entity relationships established during database modeling (Siregar et al., 2024). System evaluation comprised black-box testing of authentication, master data, transactions, documents, payments, and reporting against expected outcomes, alongside white-box inspection of decision branches, input validation, session handling, and database updates in login and payment-saving routines, without a quantitative before-and-after performance assessment (Hardika et al., 2024).

RESULTS AND DISCUSSION

Business Process Analysis and Functional Requirements of the Proposed System

The business-process assessment at Sari Murni identified fragmented sales documentation as a principal constraint on transaction traceability. The enterprise relied on multiple recording media for customer information, orders, production coordination, invoices, payment status, and sales reporting. Because records were maintained separately, administrative personnel had to reconcile information when transactions moved between operating stages. This arrangement exposed the workflow to potential duplication, missing documents, and discrepancies, although the study did not quantify their frequency. Research on integrated inventory and sales systems in Indonesian MSMEs identifies consistent records as a relevant requirement for coordinating operational information (Angellin et al., 2023). Evidence on digital adoption likewise indicates that technological benefits depend on the capabilities and arrangements through which enterprises use information systems (Affandi et al., 2024). The resulting design problem was to establish a shared transactional reference connecting activities that had previously been documented through disconnected procedures.

At the order-entry stage, customers contacted Sari Murni through WhatsApp or placed orders directly at the market. An administrator recorded the ordered tofu variants and quantities for each customer before aggregating the information for production. The consolidated order list was subsequently circulated to production personnel through an internal WhatsApp group. Sari Murni's product range included Bandung-style tofu, white cut tofu, yellow cut tofu, takus tofu, and fried tofu, requiring product-level identification during order preparation. Previous research on web-based food and beverage ordering systems identifies structured order submission as a central function of electronic sales applications (Andryani et al., 2023). For Sari Murni, that function also needed to preserve the link between individual customer requests and the consolidated production workload.

Production activities followed the accumulated customer orders and were organized across soybean grinding, tofu molding, and frying operations. Before dispatch, personnel inspected the type, quantity, and condition of the products prepared for delivery. Delivery staff then transported the inspected products according to customer destinations during afternoon and evening delivery rounds. The existing payment arrangement allowed settlement in cash or by bank transfer after customers received the goods. Delivery personnel also confirmed quantities and transferred payments received to the responsible administrative unit. The development of web-based sales applications for food enterprises provides a relevant basis for coordinating orders with transaction records, although specific manufacturing handoffs vary by business (Yuliandari et al., 2024). These observations established that the proposed system required distinguishable order, production, delivery, and payment statuses instead of treating a sale as a single undifferentiated event.

The financial administration process was particularly affected by the separation of invoices, payment notes, and customer account information. Unpaid balances were recorded on transaction documents and followed up when subsequent orders were placed. Administrators therefore had to consult earlier records to determine how much an individual customer had paid and what amount remained outstanding. The existing workflow did not automatically consolidate receivables or produce period-specific sales reports from a common dataset. Research on sales data management in culinary MSMEs provides a relevant comparison because the organization of transaction records is closely

connected to administrative information retrieval (Nurjanah et al., 2026). Table 1 summarizes the recorded operating practices, their information-management limitations, and the corresponding application requirements.

Table 2. Business Processes, Identified Problems, and System Requirements

Business Process	Existing Operational Practice	Identified Problem	Proposed System Requirement
Customer ordering	Orders received through WhatsApp or directly at the market	Order information distributed across separate communication and recording media	Centralized customer order recording
Production coordination	Orders summarized and forwarded to production personnel through an internal WhatsApp group	Repeated administrative handling and limited integration with individual order records	Order-linked production management and status tracking
Product delivery	Products inspected and distributed during afternoon and evening delivery rounds	Delivery documentation maintained separately from transaction records	Integrated delivery records, delivery notes, and status updates
Invoice management	Invoices and receipts prepared and maintained with other transaction documents	Difficulty retrieving and reconciling historical transaction information	Invoice generation linked to recorded customer orders
Payment and receivables	Payments recorded through paper-based and basic digital records, with unpaid balances noted on transaction documents	Outstanding balances require manual verification	Integrated payment recording, receivables calculation, and payment histories
Sales reporting	Sales information compiled from separate administrative records	Consolidated reports are not generated automatically from a common dataset	Period-based sales reports generated from stored transactions

Table 1 indicates that data fragmentation affected the entire transaction chain rather than a single administrative task. Within the organizational structure, a supervisory function oversaw the enterprise and advised its leadership. The managing director coordinated financial and operational decisions and established operating policies. Finance personnel maintained receipts, expenditures, customer payments, sales records, and financial summaries. Operations personnel coordinated production readiness, work allocation, and delivery schedules, while production tasks were divided among grinding, molding, and frying activities. Delivery personnel prepared shipments, confirmed quantities, transported products, and transferred received payments to the responsible unit. This distribution of responsibilities informed role-oriented system design, consistent with research describing the adaptation of sales application development to organizational workflows (Indriani et al., 2024).

Quick planning translated these operating responsibilities into two software access roles, Administrator and Customer, rather than creating separate accounts for every production unit. The Administrator role included maintenance of product and customer records, order approval, production and delivery status, invoices, payments, receivables, configuration settings, and reports. The Customer role was restricted to browsing products, placing orders, viewing order histories and invoices, inspecting transaction status, and updating personal profile information. Authentication directed valid users to their respective interfaces and rejected login attempts when the supplied credentials were invalid. UML use-case modeling provides a means of specifying actor permissions and functional boundaries before software construction (Narulita et al., 2024). Figure 2 presents the proposed actor–function arrangement documented for the application.

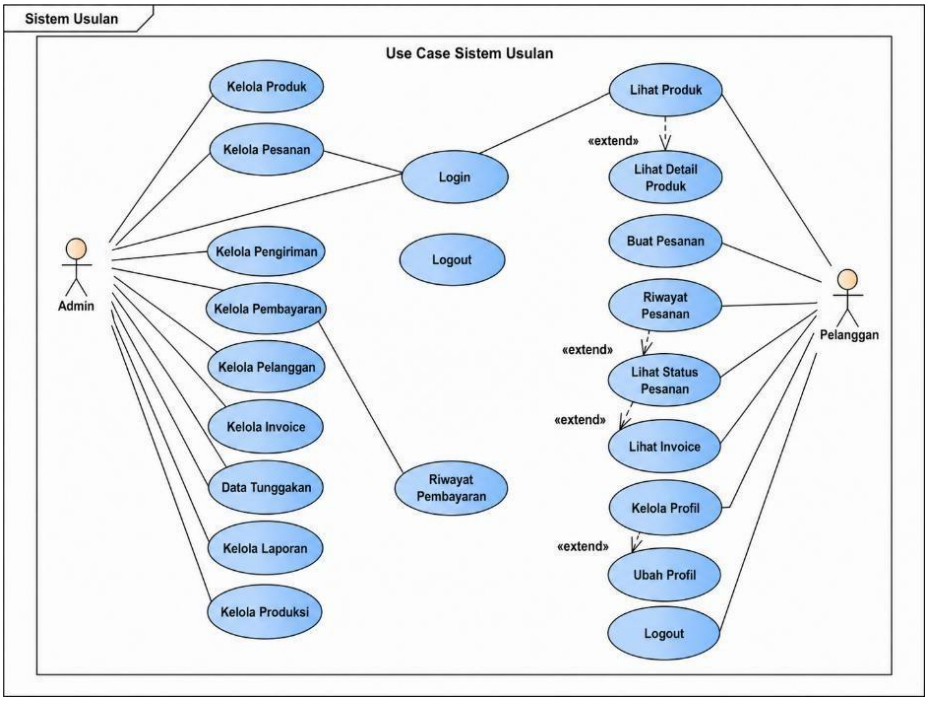


Figure 2. Use-Case Diagram of the Proposed System
Source: Research findings (2026)

The use-case description associated with Figure 2 distinguishes customer-facing interactions from internal sales administration. Authentication provides a common entry point, but successful login does not grant both user categories equivalent privileges. Administrator functions encompass transaction verification, operational status updates, billing, receipt recording, and management reporting. Customer interactions are limited to product selection, ordering, access to personal transaction documents, and profile maintenance. These boundaries support the separation of business control functions from self-service operations and reduce unnecessary exposure of internal financial information. Related research on UML in information-system design supports the explicit representation of actors, functions, and their relationships as part of design documentation (Fadillah et al., 2025). The diagram specifies intended authorization behavior, although confirmation of access enforcement requires the functional tests addressed later in the study.

The requirements analysis established the customer order as the principal reference for connecting previously separate operational records. Each order needed to retain product and customer details while supporting production coordination, delivery updates, and related transactional documents. Invoice generation and payment recording also had to remain linked to the same order so that partial settlements could be reconciled against outstanding balances. The application therefore required persistent relationships among orders, invoices, payments, receivables, and payment histories rather than independent administrative files. Research on web-based sales applications incorporating cashier and product management illustrates the broader relevance of integrated administrative functions, although it does not establish the effectiveness of this specific implementation (Awaluddin et al., 2025). These requirements define the functional basis for the database architecture and web application implementation examined in the subsequent section.

System Architecture, Database Design, and Web Application Implementation

The database architecture developed for Sari Murni employed an order-centered relational structure to connect sales transactions with production, delivery, and financial administration. The users table stored authentication credentials and access roles, while the konsumen and produk tables maintained customer identities and product information. The pesanan and detail_pesanan tables represented sales transactions and their individual product entries, allowing multiple tofu products to be associated with a single customer order. Additional relationships connected orders with the produksi,

pengiriman, pembayaran, piutang, and riwayat_pembayaran tables to support operational tracking and financial documentation. Relational database design emphasizes the definition of entities, attributes, and relationships to organize information and support consistent data management (Akmal & Suhada, 2025). The resulting structure established a common transactional reference through which different application modules could retrieve and update information without maintaining independent records for each administrative activity.

The logical data model incorporated relationships among transaction entities to represent the sequence of activities from customer ordering to payment settlement. Individual orders could contain multiple product entries and payment-history records, allowing transaction details and successive payments to remain associated with their corresponding sales records. Supporting structures included testimoni and app_settings, which accommodated additional application content and configuration information. The class model represented components such as User, Customer, Product, Order Detail, Payment, Receivable, Payment History, Production, and Delivery, with their respective responsibilities distinguished according to the information processed. Product and order-detail components maintained item identity, quantities, prices, and subtotals, while financial components recorded payment amounts, settlement status, and outstanding liabilities. Research on Entity–Relationship Diagram modeling emphasizes the importance of explicitly representing relationships among data entities before implementing database operations (Aulia et al., 2025). Figure 3 presents the entity relationships documented for the system and provides the structural basis for interpreting the integration of order processing, production, distribution, and financial records.

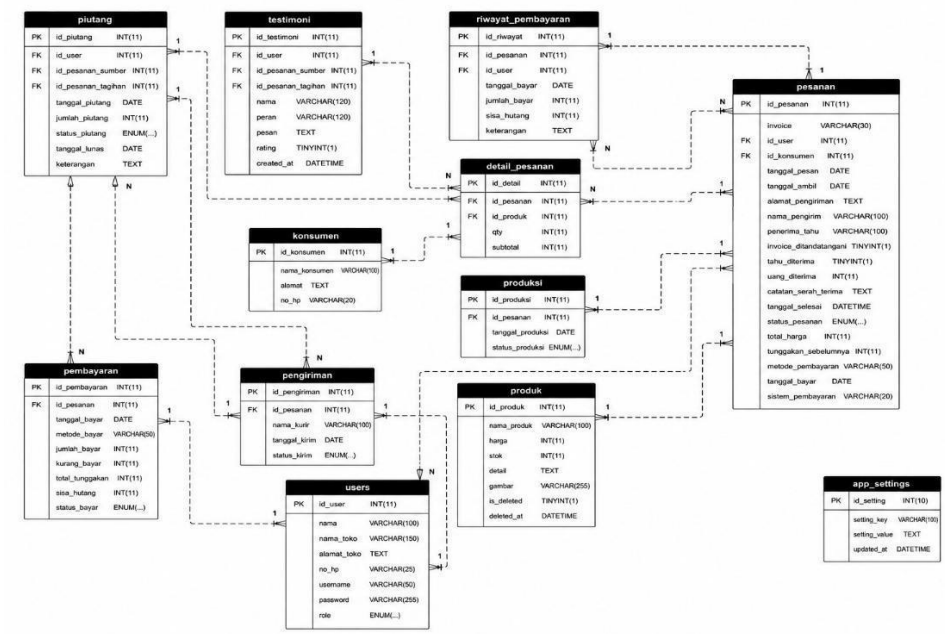


Figure 3. Entity–Relationship Diagram of the System
Source: Research findings (2026)

The modeled interaction sequences described how application interfaces communicated with controllers, models, and database records during transaction processing. Customer authentication began with username and password entry, followed by field validation, account verification, session establishment, and redirection to the authorized dashboard when the submitted credentials were valid. The ordering process retrieved product information, updated shopping-cart quantities and subtotals, validated checkout information, and stored the order with its associated product details. Invoice generation subsequently retrieved saved transaction information through the relevant controller and model before displaying the document or producing its printable PDF representation. UML-based system design provides an analytical basis for separating user interactions from processing responsibilities and documenting the sequence of operations required to complete application functions

(Narulita et al., 2024). Table 2 summarizes the implemented modules, their authorized users, and the principal operational functions represented in the application.

Table 3. Implemented System Modules and Operational Functions

System Module	Access Role	Documented Operational Functions	Principal Records or Outputs
Authentication and user access	Administrator and Customer	Login, credential validation, session management, and logout	User accounts and authorized dashboards
Product and customer management	Administrator	Add, display, modify, and delete product and customer records	Product and customer master data
Ordering and checkout	Customer; Administrator for order management	Product selection, shopping-cart management, order submission, and order-status management	Orders and order details
Production management	Administrator	Display production schedules, update production status, and print production receipts	Production records and production receipts
Delivery management	Administrator	Manage delivery information, courier details, and delivery status	Delivery records and delivery notes
Invoice management	Administrator and Customer, according to access permissions	Generate, display, print, and retrieve invoices	Customer invoices
Payment and receivables	Administrator	Record full and partial payments, update outstanding balances, and display payment histories	Payments, receivables, and payment-history records
Sales reporting	Administrator	Filter transactions by reporting period and print sales summaries	Sales reports
Customer account management	Customer	View order history, inspect transaction status, and update profile information	Customer profiles and transaction histories
Application configuration	Administrator	Manage website logo, carousel images, and application settings	Configuration and website display settings

Table 2 indicates that application functionality was organized around the distinct responsibilities of administrators and customers while maintaining shared transaction information. The system was implemented using PHP, CodeIgniter 3, MySQL, and the Apache web server through XAMPP, with PHP version 8.4.21 identified in the source manuscript. Visual Studio Code supported source-code development, while the web application was accessed through a browser without requiring a separately installed client application. Server-side routines handled authentication, product and customer maintenance, order processing, production and delivery administration, payment recording, and reporting through interconnected functional modules. Previous research has documented the use of CodeIgniter for organizing components in integrated web-based information systems, providing a relevant technical comparison for the adopted framework (Antarajaya & Ambara, 2023). Studies

examining PHP and MySQL development also establish their application in dynamic web systems requiring persistent data storage and server-side information processing (Sinlae et al., 2024). Figure 4 presents the administrator dashboard, which consolidated operational navigation and displayed information concerning outstanding customer balances, payments received on the current day, and customers with active receivables.

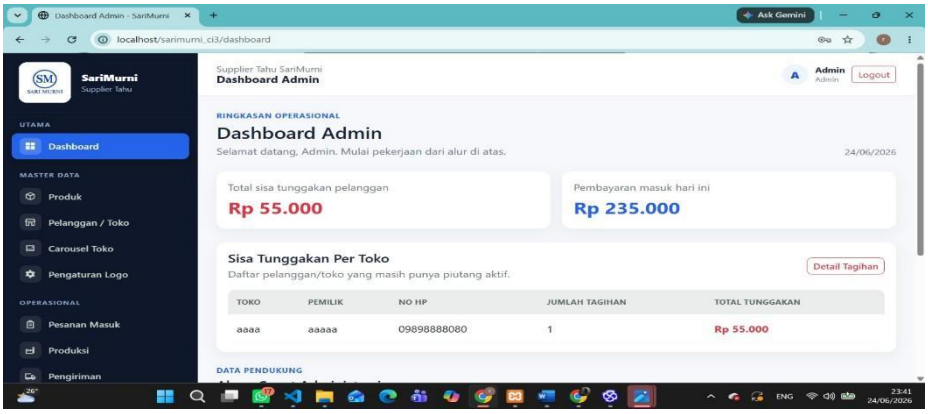


Figure 4. Administrator Dashboard Interface
Source: Research findings (2026)

The administrator interface organized business functions into master-data management and operational transaction modules to maintain consistency between product records, customer information, and sales activities. Product management supported the creation, modification, deletion, and retrieval of items with their respective descriptions, prices, images, and stock information. Customer records were centrally maintained and reused during ordering, while production and delivery modules allowed administrators to retrieve relevant transactions and update their processing statuses. Financial information was accessible through payment and receivables modules, enabling administrators to identify outstanding customer balances without reconstructing payment records from separate documents. Research concerning sales data management in culinary MSMEs provides a relevant comparison for the importance of organizing transaction information into accessible administrative records (Nurjanah et al., 2026). Figure 5 illustrates the implemented sales reporting interface, through which administrators could filter transaction records by date or reporting period and produce printable summaries based on stored sales data.

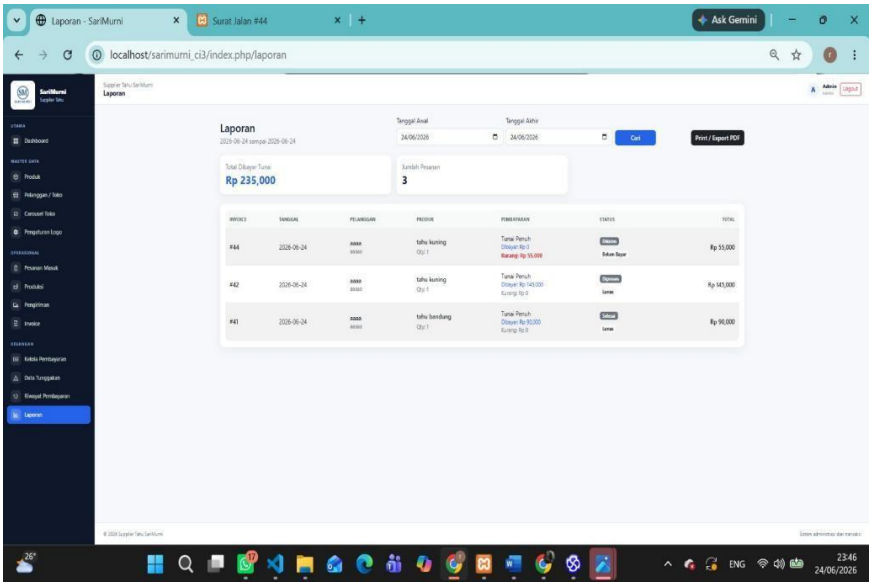


Figure 5. Sales Report Interface
Source: Research findings (2026)

The customer interface provided browser-based access to product information, order creation, transaction histories, invoices, and personal account management. Product listings displayed the available tofu items together with their names, images, prices, descriptions, and recorded stock information, allowing customers to inspect offerings before initiating transactions. Shopping-cart functions supported adding products, modifying quantities, removing selected items, and recalculating subtotals before checkout. During order submission, customers provided the required transaction information, including the order date and delivery address, which was subsequently processed and stored by the application. Research on web-based food and beverage ordering systems establishes the relevance of structured product presentation and electronic order management in customer-facing sales applications (Andryani et al., 2023). The separation between customer and administrator interfaces restricted customer access to internal financial administration, reporting, and configuration functions while preserving access to individual transaction records. Figure 6 displays the customer dashboard and product interface implemented to support these interactions.

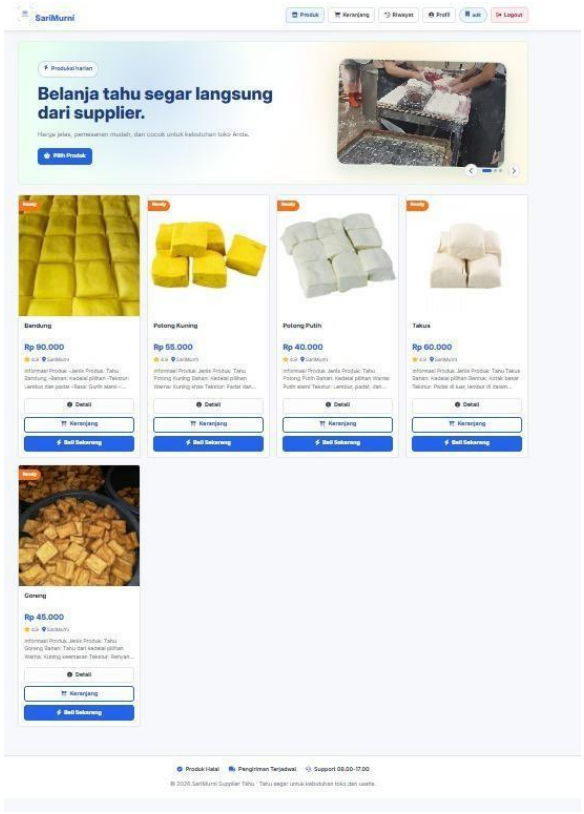


Figure 6. Customer Dashboard Interface
Source: Research findings (2026)

Invoices were generated using stored order information and could be retrieved by customers through their transaction histories. Each invoice presented the relevant customer identity, ordered products, transaction amounts, and payment information, with the application supporting document printing or retrieval in PDF format. The payment module accommodated full and partial settlement, while the associated receivable records maintained the unpaid balance and payment history for the corresponding transaction. Administrators could inspect customer liabilities through records displaying the order number, billed amount, accumulated payments, and remaining balance, allowing successive settlements to be traced without consulting disconnected administrative documents. Previous research on web-based sales systems integrating cashier and product management provides a relevant comparison for linking transaction processing with financial administration, although the specific implementation requirements depend on the enterprise's business procedures (Awaluddin et al., 2025). Figure 7 presents the customer invoice interface, illustrating how the implemented application reused recorded order information to produce transaction documents.

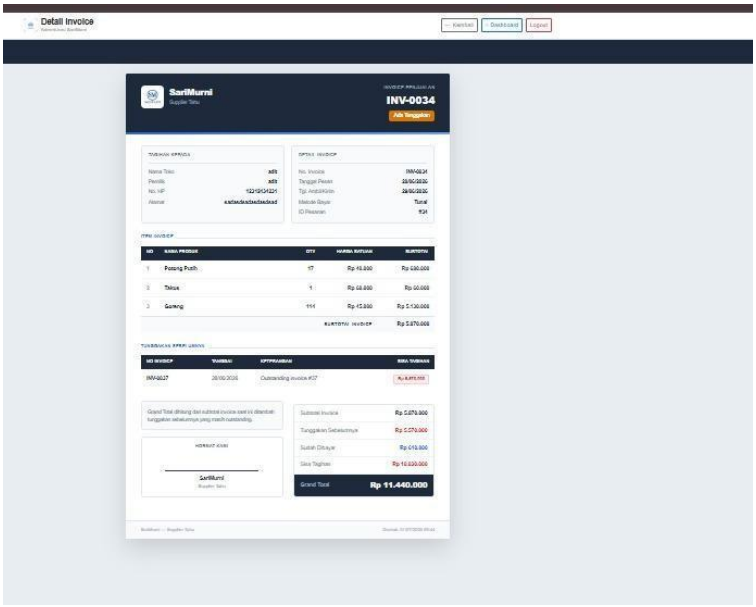


Figure 7. Customer Invoice Interface
Source: Research findings (2026)

The implemented application established relationships among ordering, production coordination, delivery documentation, invoice generation, payment recording, and receivables management through a centralized database structure. This integration addressed the documented administrative requirement to retrieve related transaction information across operating stages without maintaining separate primary records for each activity. The controller and model components supported the retrieval, validation, modification, and storage of application data, while role-specific interfaces determined the functions accessible to administrators and customers. Supporting configuration facilities also enabled administrators to maintain the website logo, manage carousel images, activate or deactivate displayed content, and store the corresponding application settings. Previous case-study research on sales information systems in manufacturing enterprises provides a relevant comparison for designing applications around organization-specific transaction procedures and administrative requirements (Atmadja & Oetama, 2024). The implementation findings establish the availability of integrated application functions but do not demonstrate a quantified reduction in processing time, administrative expenditure, transaction errors, or other operational performance indicators. Claims concerning functional correctness must consequently be evaluated through the documented black-box and white-box testing results, while broader effects on organizational efficiency require evidence beyond the implementation records presented in this study.

Functional Testing, System Evaluation, and Implementation Implications

Functional evaluation of the web-based tofu sales information system at Sari Murni was conducted using black-box testing of observable application behavior. The documented scope covered authentication, master-data maintenance, customer ordering, production, delivery, invoices, payment administration, reporting, configuration settings, customer profiles, and logout. Test scenarios included valid and invalid credentials, missing mandatory inputs, record creation and modification, status updates, document printing, and full or partial payments. Each scenario was assessed by comparing the observed application response with the expected result specified for the corresponding function. Black-box testing is relevant to functional requirements because it examines externally visible responses without relying on knowledge of internal program paths (Hardika et al., 2024). The recorded outcomes were reported as successful for the tested scenarios, providing evidence of functional conformity within the assessed scope. These outcomes do not establish that all possible input combinations, operational conditions, or security threats were examined.

Authentication testing examined the application's responses to valid credentials, incorrect usernames or passwords, missing required fields, and attempts to access restricted functions after

logout. Successful authentication was expected to redirect authorized users to their respective dashboards, whereas invalid credentials were required to generate an error response without granting access. Master-data testing covered the creation, modification, deletion, and retrieval of product and customer information, including the validation of required fields and product images. Order-processing scenarios examined product selection, quantity validation, transaction confirmation, and the generation of associated invoice records. Production and delivery testing assessed status updates and document generation to determine whether the application responded correctly to changes in transaction processing stages. Research on the analysis and testing of MSME sales information systems emphasizes the relevance of validating interconnected application functions rather than evaluating individual interface elements without considering their operational relationships (Ambayu & Hartomo, 2022).

Financial testing examined the relationship between invoice values, recorded payments, outstanding balances, and the persistence of transaction histories within the application. The documented scenarios distinguished full payments, partial payments, missing payment amounts, values exceeding the billed total, and the saving of payment-history records. Under full settlement, the expected system behavior was to recognize completion of the payment obligation and update the corresponding transaction status. Under partial settlement, the application was expected to retain the unpaid amount as a receivable while recording the amount received in the payment history. The outstanding-payment and payment-history interfaces were subsequently used to retrieve processed transactions and examine the consistency of their recorded financial information. Research concerning web-based point-of-sale systems identifies integrated transaction management as a relevant component of retail information-system implementation (Permana et al., 2025). Although the documented financial scenarios produced their expected outcomes, the testing did not quantify reductions in accounting errors, payment discrepancies, or the time required to reconcile customer balances.

The functional evaluation relied on documented test inputs and expected outputs rather than a statistical comparison of operational performance before and after implementation. No measured differences in transaction-processing time, operating expenditure, inventory accuracy, or workforce productivity were reported. A *Passed* designation consequently indicates agreement between observed and expected behavior for a specified scenario rather than a numerical success rate or a comprehensive assessment of software quality. Research concerning web-based sales applications in food enterprises provides relevant implementation precedents, although findings from other businesses cannot substitute for direct performance evidence at Sari Murni (Yuliandari et al., 2024). Interpreting the test outcomes within their documented boundaries prevents functional correctness from being presented as verified improvement in organizational efficiency. Table 3 consolidates the recorded functional testing outcomes into six categories corresponding to the principal application modules and transaction processes.

Table 1. Summary of Functional Testing Results

No.	Module	Main Test Scenarios	Result
1	Authentication and sessions	Valid/invalid login, required-field validation, logout, restricted access	Passed
2	Master data	Products, customers, profiles, logo, and carousel	Passed
3	Order transactions	Ordering, production, and delivery	Passed
4	Transaction documents	Invoices and delivery notes	Passed
5	Financial records	Payments, receivables, and payment history	Passed
6	Reporting	Period filtering and report printing	Passed

As presented in Table 1, all six reported functional categories received a *Passed* result, indicating conformity with the expected outputs of the documented test scenarios. The authentication category demonstrates that the specified login, input-validation, logout, and restricted-access functions responded according to their established requirements. Master-data and order-transaction testing covered information maintenance and the processing stages connecting customer orders with production and delivery activities. The transaction-document and financial-record categories confirmed the expected behavior of invoice generation, delivery documentation, payment recording, receivable management, and payment-history retrieval. Reporting tests also covered period-based transaction

filtering and report printing, establishing that the corresponding functions operated under the examined conditions. The integration of these administrative functions is consistent with research examining web-based inventory and sales information systems as mechanisms for organizing related MSME transaction records (Angellin et al., 2023). Because Table 1 presents grouped outcomes rather than a complete case-by-case testing log, its results should not be interpreted as exhaustive evidence of software reliability or successful performance under unexamined operating conditions.

White-box testing focused on the authentication and payment-saving routines because both processes contained consequential decision branches and database operations. The login routine was inspected through request-method verification, required-field validation, account lookup, password matching, session creation, and role-based redirection. Payment-saving inspection examined amount validation, transaction-status updates, outstanding-balance recalculation, receivable creation or modification, and payment-history storage. The examined logical paths were reported to be consistent with the expected functional scenarios, indicating that the inspected processing sequences corresponded to their documented behavior. The relationship between order records, payments, and outstanding liabilities reflects the importance of explicitly defined database entities and relationships in information-system design (Aulia et al., 2025). However, the study did not document measured statement or branch coverage, an independent security audit, or comparative execution-time results, limiting conclusions concerning untested processing paths and nonfunctional software characteristics.

The implementation and testing findings indicate that the application can administer customer orders, production status, delivery records, invoices, payments, and receivables through interconnected information structures. This configuration addresses the documented fragmentation of administrative records by allowing related transaction information to be retrieved and maintained within a shared database environment. At Sari Murni, the integration of partial payments, outstanding balances, and payment histories represents a relevant operational adaptation because the previous procedure required administrators to inspect separate documents to determine customers' remaining liabilities. Research on sales data management in culinary MSMEs similarly identifies structured electronic records as an important consideration in organizing and retrieving business transaction information (Nurjanah et al., 2026). Studies concerning digital adoption among Indonesian enterprises further indicate that technological implementation must be considered alongside organizational capabilities, making functional availability distinct from sustained operational effectiveness (Affandi et al., 2024). The documented testing demonstrates correct application behavior under specified conditions but does not establish measured improvements in processing efficiency, payment collection, customer satisfaction, or business profitability. The contribution is consequently supported as an integrated functional implementation adapted to the enterprise's operational requirements rather than as evidence of quantified improvements in organizational performance.

Several implementation considerations remain beyond the operational outcomes examined in the present study. Sustained system operation requires attention to database maintenance, user training, routine data backups, and continued assessment of whether application functions correspond to actual business procedures. Potential extensions include mobile access, order-status notifications, raw-material and inventory management, sales-trend visualization, automated backups, audit logs, and additional security controls, although these capabilities were not documented as completed and tested functions. Further evaluation should collect comparable observations of transaction-processing times, administrative error rates, payment reconciliation accuracy, and user assessments to establish whether implementation produces measurable operational improvements. Research reviewing performance factors and evaluation metrics in SME electronic commerce reinforces the need to distinguish technological implementation from demonstrated organizational outcomes (Salazar-Kovaleff & Mauricio, 2024). The available evidence supports the functional correctness of the examined application modules while leaving long-term reliability, security, usability, and measurable business benefits for subsequent empirical investigation.

CONCLUSION

The analysis, modeling, development, and testing stages produced a web-based tofu sales information system for Sari Murni in Pondok Labu that integrates product and customer records, orders, production, deliveries, invoices, payments, receivables, payment histories, and sales reports. Developed using the Prototype model, the application translated observed administrative workflows and user

requirements into an integrated transaction structure. Its relational database connects customer orders with subsequent production, delivery, invoicing, and payment records, providing centralized information management instead of relying on separately maintained administrative data. Role-based interfaces distinguish administrator functions from customer access to product catalogs, order submission, transaction histories, and invoices. The implemented system also accommodates full and partial payments, outstanding-balance updates, payment-history retrieval, and period-based sales reporting. Documented black-box testing produced the expected outcomes across six functional categories, including authentication, master data, order transactions, transaction documents, financial records, and reporting. White-box inspection of authentication and payment-saving routines indicated that the examined validation, session management, decision branches, and database-update procedures followed their intended processing logic.

The findings establish the functional implementation of interconnected sales administration processes but do not demonstrate a measured improvement in enterprise efficiency or financial performance. No quantitative before-and-after comparison of transaction-processing time, administrative error frequency, payment discrepancies, or operating expenditures was conducted. The study consequently supports conclusions concerning conformity with documented functional requirements rather than statistically verified improvements in organizational productivity. Its principal contribution lies in adapting an integrated, order-centered information system to the production, delivery, invoicing, and receivables management procedures of a small tofu manufacturing enterprise. Sustained implementation requires appropriate user training, database maintenance, routine data backups, and periodic assessment of application functionality against operational requirements. Future system development may incorporate mobile access, automated notifications, inventory and raw-material management, sales-trend visualization, automated backups, audit logging, and enhanced security controls. Subsequent empirical evaluations should examine user experience, system reliability, transaction accuracy, and operational performance through documented field observations and comparable transaction data to establish the practical effects of continued system utilization.

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