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Implementation of a Web-Based Sales Information System for Culinary MSMEs: A Case Study of Bakmi Jogja and Mie Ayam Bangka

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Abstract: Micro, small, and medium enterprises (MSMEs) play a vital role in the local economy, yet many still rely on manual recording of sales transactions and financial reports, increasing the risk of calculation errors and delaying report preparation. This operational constraint was identified at Bakmi Jogja and Mie Ayam Bangka, a culinary MSME outlet in Cipinang Besar Selatan, East Jakarta, that offers two flagship menu lines within a single business establishment. This study aimed to design, implement, and evaluate a web-based sales information system to address these operational challenges. A descriptive qualitative case-study method was applied, with empirical data gathered through interviews, direct observation, and literature review. System development followed the Prototype model comprising communication, quick planning, modeling, prototype construction, and deployment with user feedback. The system was developed using the CodeIgniter 4 framework, a MySQL/MariaDB database, and the Midtrans payment gateway for QRIS-based digital payments, followed by deployment on commercial cloud hosting for actual operational adoption rather than offline simulation. Black box testing evaluating authentication, product management, transaction recording, payment integration, order-status tracking, promotional banner management, and financial reporting yielded valid results across all twelve test scenarios spanning seven functional modules. As early empirical evidence, the system logged five operational transactions over a seven-day observation window, four of which were completed with confirmed revenue of IDR 224,000, identifying Bakmi Jogja Godog Special as the top-selling menu item. These findings demonstrate that the system transitioned manual record-keeping to automated, database-backed transactions, accelerated financial report generation from approximately one week to an on-demand summary, and provided a digital storefront facilitating online ordering and marketing for the enterprise.

Keywords: Sales Information System; Website; MSME; CodeIgniter 4; Prototype Method.

1. Introduction

The rapid development of information and communication technology (ICT) has brought significant transformation across industry sectors, including micro, small, and medium enterprises (MSMEs). Digital adoption is no longer regarded merely as an administrative support mechanism; it has become an essential instrument determining business competitiveness, operational efficiency, and long-term sustainability. In Indonesia, MSME digitalization represents a strategic priority given the sector's vital contribution to the national economy. Systematic digital adoption streamlines inefficient operational chains, minimizes manual recording errors, and broadens market reach. In the culinary sector, service velocity, order accuracy, and transaction transparency directly shape customer experience and retention. Delays resulting from conventional order handling diminish customer satisfaction, while inaccurate sales records obstruct sound operational evaluation. Timely financial reporting remains essential for culinary enterprises: structured records of daily transactions, monthly profit-and-loss balances, and net capital are prerequisites for evaluating financial health, controlling operational costs, and securing external commercial financing or partnerships. This operational context was observed directly at Bakmi Jogja and Mie Ayam Bangka, a family-operated culinary enterprise located in Cipinang Besar Selatan, East Jakarta. The establishment has operated intermittently for approximately ten years and currently employs two staff members. Although the proprietor possesses substantial operational experience in culinary management, daily transactions rely entirely on conventional practices. Customer orders are written into a paper ticket book, payments depend on physical cash and an unintegrated static QRIS graphic, and completed sales are manually transcribed into a physical sales journal without digital synchronization or secondary backup.

This manual workflow causes operational vulnerabilities across daily processes. Physical paper records remain susceptible to loss, ink fading, and environmental damage. Marketing outreach remains localized, preventing customer acquisition beyond the immediate neighborhood. Online ordering capabilities are equally restricted because the outlet is not registered on major food-delivery platforms, leaving remote orders dependent on personal requests from regular patrons. Furthermore, compiling daily sales data into a monthly financial report (profit-and-loss and capital statements) requires up to a full working week, manual change calculations carry a high risk of error, and identifying consumer menu preferences remains cumbersome without a structured recording system. These constraints hinder business growth despite an estimated daily turnover ranging between IDR 700,000 and IDR 1,500,000. Notably, the owner expressed willingness to adopt a web-based sales information system if provided with hands-on training. Recent empirical studies demonstrate that digital payment adoption, including QRIS and e-payment services, is associated with improved operational performance and financial inclusion among MSMEs (Kilay *et al.*, 2022; Samat & Bashri, 2025), underscoring the relevance of integrating a payment gateway directly into the sales workflow rather than relying on a static QRIS code. To resolve these operational bottlenecks, this study designed and implemented a web-based sales information system built with the CodeIgniter 4 framework, a MySQL database, and a Bootstrap front-end interface, deployed on commercial web hosting for multi-device access without local installation. The system architecture integrates a public customer portal featuring active promotional banners, a full menu catalog, and self-service ordering for dine-in and takeaway patrons, complemented by an administrative console. Through this administrative dashboard, outlet personnel manage order fulfillment states, confirm cash or dynamic QRIS transactions, update menu and banner contents, print thermal receipts, and view real-time best-seller statistics and periodic revenue recapitulations across customizable date ranges. Compared with prior studies on web-based sales information systems for MSMEs, which have generally focused on inventory management, promotion, or general point-of-sale functionality, this research is distinguished by its integration of an end-to-end workflow specific to a dine-in culinary outlet: online ordering, transaction recording, order-status tracking from payment to completion, receipt printing, and a revenue recapitulation feature designed explicitly to support the preparation of financial reports that were previously compiled by hand.

2. Related Work

Several prior studies have examined the development of web-based sales information systems for MSMEs across various business sectors. Putra and Sari (2024) developed a web-based sales application for Toko Kue Teratai using the Waterfall method with Laravel and Tailwind CSS, incorporating product management, financial reporting, shipping-cost estimation, and online payment features to address conventional, market-constrained sales operations. Mulyana *et al.* (2024) designed a web-based application for UMKM HJM Garage featuring inventory management, order tracking, and sales reporting to eliminate manual record-keeping and lack of systematic stock monitoring. Applying the Waterfall SDLC with PHP and MySQL, Sinaga *et al.* (2026) established real-time stock control, automatic transaction logging, and a monitoring dashboard to improve

operational efficiency for micro-enterprises previously dependent on manual records. Similar Waterfall and UML approaches were implemented by Rojiyanti *et al.* (2025) for point-of-sale ordering at UMKM Towjo Innovation, by Hibatullah *et al.* (2025) for retail computer equipment e-commerce evaluated through black box testing, and by Hansen *et al.* (2024) for purchasing and sales management at Toko Sumber Jaya to minimize item and pricing discrepancies. In addition, a systematic literature review by Aldiansyah *et al.* (2026) covering fifteen empirical articles underscored the decisive role of web-based transaction platforms in increasing transaction speed, inventory precision, and service reliability for post-pandemic MSME resilience. Beyond linear development frameworks, iterative and agile methodologies have increasingly been explored to accommodate evolving micro-business workflows. Aryantoro *et al.* (2025) developed a prototyping-based sales application utilizing Next.js, NestJS, PostgreSQL, and payment-gateway integration to resolve promotional inconsistency and manual transaction logging at Rano Cake. In the culinary domain, Dwiyanti *et al.* (2025) implemented an agile-developed sales system for Warung Bunda to improve order-tracking reliability. Further investigations have demonstrated the applicability of Waterfall frameworks with PHP and MySQL for retail establishments and frozen-food vendors (Parlina & Sari, 2026; Permata *et al.*, 2024), alongside Rapid Application Development approaches for retail outlets (Suprianto, 2024) and research-and-development paradigms with Bootstrap and MySQL for property transactions (Waruwu *et al.*, 2024). Overall, existing literature demonstrates that web-based sales systems significantly enhance recording precision, administrative efficiency, and information accessibility, frequently utilizing frameworks such as CodeIgniter, prototyping paradigms, digital payment gateways, and automated report generation. However, the specific operational context of Bakmi Jogja and Mie Ayam Bangka introduces an unaddressed workflow requirement: migrating paper-based sales journals to an integrated web environment while simultaneously providing a customer-facing digital storefront, dynamic order fulfillment progression from payment verification to kitchen completion, wireless receipt printing, and periodic sales recapitulations that directly feed into formal financial statements. Unlike prior systems that treat web platforms primarily as static promotional portals or generic POS cash registers, this study establishes an interconnected order-to-report architecture specifically configured for dine-in culinary operations. Table 1 summarizes the development methods, technology stacks, functional coverage, and operational limitations of closely related studies relative to the prototype-based approach implemented in this research.

Table 1. Comparison of Closely Related Prior Studies

Study	Method	Technology	Feature Coverage	Reported Limitation
Putra & Sari (2024)	Waterfall	Laravel, Tailwind CSS	Product mgmt., financial report, shipping-cost check, online payment	Limited to shop-scale catalog; no order-status workflow
Mulyana *et al.* (2024)	Not specified	Web-based (PHP)	Inventory mgmt., order tracking, sales reporting	No payment-gateway integration
Sinaga *et al.* (2026)	Waterfall SDLC	PHP, MySQL	Real-time stock mgmt., automatic transaction recording, monitoring dashboard	No dine-in order-status tracking
Rojiyanti *et al.* (2025)	Waterfall + UML	Web-based (PHP)	POS-style ordering, order status	No payment-gateway or reporting module described
Hibatullah *et al.* (2025)	Waterfall	PHP, MySQL	E-commerce catalog and checkout	General retail scope; no dine-in workflow
Hansen *et al.* (2024)	Waterfall + UML	PHP, MySQL	Purchasing and sales recording	No online ordering or payment integration
Aryantoro *et al.* (2025)	Prototyping	Next.js, NestJS, PostgreSQL	Promotion, transaction recording, payment-gateway integration	No structured financial-report recapitulation described
This study	Prototype	CodeIgniter 4, MySQL/MariaDB, Midtrans	Online ordering, order-status tracking, receipt printing, Midtrans QRIS payment, financial-report recapitulation	Single-outlet, seven-day operational evidence; no third-party delivery-platform integration

3. Methodology

This study employed a descriptive qualitative case-study approach focused on Bakmi Jogja and Mie Ayam Bangka, an MSME outlet operating in Cipinang Besar Selatan, East Jakarta. This empirical approach was selected to capture real business operations contextually, encompassing order workflows, transaction recording, promotional limitations, customer ordering channels, and periodic revenue compilation. Primary empirical data were gathered through semi-structured interviews and direct field observations, while a targeted literature review established the theoretical foundation and justified the selected software development lifecycle model. Data collection comprised three complementary techniques: semi-structured interviews were conducted with the business owner to examine the enterprise profile, product catalog, sales mechanisms, payment handling, recording procedures, operational constraints, reporting timelines, technological readiness, and explicit functional requirements; direct field observations were conducted on daily operational transactions, including patron menu selection, order dispatch, cash and static QRIS payment processing, order handling by staff, and physical journal transcription; and a literature review of scientific articles, books, and technical documentation provided theoretical framing for web-based sales systems, the CodeIgniter 4 framework, relational database design, UML and ERD modeling, payment-gateway integration, and black box testing methodologies. System development followed the Prototype model, selected because an evolutionary working prototype allowed the business owner to evaluate features iteratively and clarify emergent operational requirements. The model was executed through five distinct stages. During the Communication stage, initial in-depth interviews with the owner delineated core business constraints, functional priorities, and operational expectations. In the Quick Plan stage, foundational features were prioritized, comprising menu catalog and category management, order fulfillment tracking, Midtrans payment-gateway integration, and on-demand financial reporting modules. In the Modeling stage, system architecture was articulated through process workflows, use case diagrams, activity diagrams, an Entity Relationship Diagram (ERD), and initial user-interface wireframes. During the Prototype Construction stage, a working software prototype was developed utilizing the CodeIgniter 4 framework and a MySQL/MariaDB database, establishing administrative consoles for menu, category, promotional banner, and order management alongside customer-facing ordering portals. Finally, in the Deployment and Feedback stage, the deployed prototype was provided directly to the enterprise owner for operational evaluation, with iterative refinements cycling back to the Quick Plan or Modeling phases until all operational specifications were fully satisfied. System functionality was evaluated using the black box testing method (Supriyono, 2020), which assesses whether software components execute expected operational behaviors across defined boundary inputs without inspecting internal source code. Testing protocols encompassed core administrative and customer workflows. Administrative test scenarios covered session authentication, category and menu configuration, banner updates, order inspection, status progression, order cancellation, and on-demand report generation and printing. Customer-facing scenarios evaluated catalog navigation, cart management, checkout workflows, order-type designation (dine-in or takeaway), dynamic payment processing, and transaction status verification. Each functional scenario was tested against predetermined input parameters and expected outcomes, with test validity determined by the exact correspondence between observed system outputs and expected operational results.

4. Results and Discussion

4.1 Results

The web-based sales information system was implemented using the CodeIgniter 4 framework with PHP 8.2, a MySQL/MariaDB database, and Midtrans payment-gateway integration for QRIS-based digital payments. The system was deployed on commercial cloud hosting and utilized to record actual sales transactions rather than simulated test entries, providing empirical evidence of its operational performance. The relational database architecture complied with the conceptual design established during the modeling phase, comprising the users, customers, categories, products, transactions, transaction-details, and payments tables. During system evaluation, the administrative dashboard managed 39 menu items distributed across 11 categories, with customer orders recorded automatically in the transaction and transaction-detail tables upon checkout, verifying that the schema accommodated live transactional loads. The software interface comprises an administrative console for management workflows and a public portal for customer ordering. Administrative access is secured via PHP session-based authentication, directing authenticated personnel to the dashboard summary displaying aggregated menu items, active categories, and total orders (recording 39 items, 11 categories, and 6 cumulative lifetime orders during the evaluation). This cumulative count reflects total database entries without date filters, whereas the 5 transactions recorded between 1 and 7 August 2026 were strictly filtered to that operational window; this single-order variance represents an untraced initial test record and is acknowledged as an operational logging limitation. The administrative portal provides dedicated

navigation for category management, menu items, promotional banners, order processing, and financial recapitulation. The customer interface showcases featured dishes and the outlet's signature Mie Ayam Bangka, supported by an "Order Now" action and an interactive cart module enabling item verification prior to checkout. The order-management module displays all incoming transactions with specific order identifiers, customer names, timestamps, total amounts, settlement methods, order types, and fulfillment stages. Staff can filter orders across five discrete states (All, Awaiting Payment, Processing, Completed, Cancelled), replacing paper-ticket tracking. Each transaction record can be expanded into an itemized invoice detailing order quantities, subtotals, settlement channels, and fulfillment progression from kitchen preparation to final handover. Staff can also generate hardcopy receipts via wireless thermal printing, satisfying the proprietor's requirement for physical transaction verification.

The financial reporting module resolves the manual reporting bottleneck that previously required up to a week. Outlet personnel specify a reporting date range, prompting the system to aggregate gross revenue, total transaction volume, completed orders, and cancelled orders automatically. During the evaluation period of 1–7 August 2026, the system recorded five transactions, comprising four completed orders, zero cancellations, and one order remaining in an unresolved status. In accordance with system accounting rules, unresolved transactions are excluded from revenue totals, yielding a verified operational revenue of IDR 224,000 across the four completed orders, as summarized in Table 2.

Table 2. Best-Selling Menu Items, 1–7 August 2026

No	Menu Item	Units Sold	Revenue (IDR)
1	Bakmi Jogja Godog Special	6	150,000
2	Kentang Goreng	1	15,000
3	Bihun Goreng Special	1	25,000
4	Lemon Tea	1	8,000
5	Teh Tawar	1	1,000
6	Bakmi Jogja Goreng Special	1	25,000
	Total (11 portions)	11	224,000

Beyond revenue aggregation, the system generates itemized sales analytics indicating quantities sold, item revenue, percentage contributions to overall turnover, and visual distributions of order states. This functionality automates product performance tracking for management. The reporting interface also provides a export utility generating standardized printable and PDF-formatted financial summaries containing enterprise headers, reporting windows, revenue metrics, and itemized sales breakdowns, eliminating manual journal transcription. Functional verification was conducted using black box testing across twelve predetermined scenarios spanning seven core modules, with the Login and Midtrans Payment modules evaluated through two distinct operational conditions. All twelve scenarios executed successfully without runtime exceptions or data mismatches, confirming that the operational logic satisfied functional requirements, as detailed in Table 3.

Table 3.Black Box Testing Results

No	Module	Test Result	Conclusion
1	Login	Admin logs in successfully with a registered email and password and is redirected to the dashboard.	Valid
2	Login	System rejects login with an incorrect email or password and remains on the login page.	Valid
3	Product Mgmt.	Newly added menu data is saved correctly, reflected in a dashboard total of 39 items across 11 categories.	Valid
4	Product Mgmt.	Changes to menu price and availability are saved and displayed immediately without a full page reload.	Valid
5	Sales Transaction	System automatically computes subtotal, e.g., 2 portions of Bakmi Jogja Godog Special at IDR 25,000 yields IDR 50,000.	Valid
6	Midtrans Payment	System displays a QRIS payment code and "Awaiting Payment" status upon order creation.	Valid
7	Midtrans Payment	Admin can cancel an unpaid order while it is in "Awaiting Payment" status.	Valid
8	Order Mgmt.	Order status progresses automatically from Paid to Kitchen Processing to Completed; orders can be filtered by status.	Valid
9	Sales Report	System displays total revenue of IDR 224,000 from 5 transactions (4 completed, 0 cancelled) for a selected date range.	Valid

10	Report Printing	System generates a print/PDF preview of the financial report with best-seller details.	Valid
11	Best-Seller Stats	System correctly identifies Bakmi Jogja Godog Special as the top seller (6 units, IDR 150,000).	Valid
12	Banner Management	Admin adds/edits a promotional banner; the new banner is saved and displayed correctly on the customer homepage.	Valid

These testing outcomes demonstrate that all functional components executed in accordance with system specifications, confirming the operational validity of the platform in supporting the daily transactions of Bakmi Jogja and Mie Ayam Bangka.

4.2 Discussion

The implementation and functional testing outcomes indicate that the web-based system directly resolved the primary operational constraints identified at the outset of this investigation. The conventional reliance on handwritten paper ledgers has been superseded by automated, database-backed transaction logging, verified by the order-management module's itemized capture of customer selections, fulfillment stages, and settlement methods. The on-demand financial reporting utility compiles transaction tallies, gross revenue, and itemized menu rankings instantly across customizable intervals. This automated process replaces manual journal balancing, which previously required up to a week according to owner interviews. However, because this baseline reporting duration reflects retrospective verbal testimony rather than a formally logged time-motion baseline, it should be interpreted as an empirical before-and-after observation rather than a controlled comparative benchmark. Similarly, the seven-day observation window comprising five transactions represents a constrained operational sample relative to normal enterprise turnover, functioning as an initial proof of operational feasibility rather than a longitudinal assessment of commercial impact. The promotional and channel limitations of the enterprise are addressed through the public-facing web portal, which provides continuous catalog visibility with item descriptions, pricing, and visual banners. Remote ordering capabilities are supported by integrated self-service checkout paired with Midtrans dynamic QRIS processing, establishing a direct customer ordering channel. Nonetheless, direct integration with external commercial food delivery aggregators remained outside the development scope, consistent with predefined project parameters. Taken together, the valid black box testing results across all twelve scenarios and the successful logging of live operational transactions confirm the technical feasibility and practical applicability of the web-based sales system for Bakmi Jogja and Mie Ayam Bangka. Establishing statistically significant, sustained gains in commercial revenue and administrative labor reduction will require longitudinal monitoring across extended operational cycles, representing a logical avenue for future empirical investigation.

5. Conclusion and Recommendations

This study designed, implemented, and empirically evaluated a web-based sales information system for Bakmi Jogja and Mie Ayam Bangka utilizing the Prototype development methodology, the CodeIgniter 4 framework, a MySQL/MariaDB database, and Midtrans dynamic QRIS payment-gateway integration deployed on commercial cloud hosting. The resulting platform successfully transitioned the enterprise from paper-based ledger recording to an automated, relational database architecture; introduced an always-accessible digital storefront featuring dynamic checkout and electronic payment settlement; enabled real-time order-fulfillment tracking from payment validation to kitchen completion; and delivered automated, on-demand revenue recapitulations that replace a manual reporting procedure previously requiring up to a week. Functional verification via black box testing across twelve scenarios spanning seven operational modules demonstrated complete functional validity without operational errors. Furthermore, initial field deployment across a seven-day operational window captured five live customer transactions yielding IDR 224,000 in confirmed revenue from four completed orders, substantiating the practical applicability of the system in a live culinary micro-enterprise environment. Several operational and methodological boundaries warrant acknowledgment. The system provides structured sales recapitulations to facilitate financial reporting but does not constitute a comprehensive, double-entry accounting platform, nor does it integrate with third-party on-demand delivery aggregators. Additionally, the manual reporting baseline of "up to a week" relies on retrospective owner testimony rather than a formally logged time-motion metric, and the seven-day observation sample remains modest relative to long-term enterprise capacity; both factors serve as preliminary operational validation rather than conclusive measures of macroeconomic impact. Furthermore, a single-order variance between the lifetime dashboard counter and the date-filtered transaction ledger (noted in Section 4.1) represents an untraced initial test record. Future research should prioritize integrating application programming interfaces (APIs) for multi-channel food delivery platforms, incorporating double-entry ledger and inventory reordering modules,

systematically logging user interaction times during developmental testing, and conducting longitudinal evaluations across multiple quarters to quantify the sustained impact of digital adoption on micro-enterprise profitability and labor efficiency.

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