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Implementation of a Digital Platform-Based Intelligent Marketing System to Optimize Bed Sheet Sales at Nadia Permata Shop MSME

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Abstract: Digital transformation has become an essential factor for Micro, Small, and Medium Enterprises (MSMEs) to maintain competitiveness and business sustainability amid rapid technological developments. Nadia Permata Shop, an MSME specializing in bed sheet products, faces critical market reach limitations due to heavy reliance on conventional marketing channels while consumer behavior has shifted toward online shopping platforms. To address this challenge, this community service initiative designed and implemented a digital platform-based marketing system. The methodology employed a qualitative approach through semi-structured interviews with the business owner alongside literature studies. Software development followed the Agile Scrum framework structured across two-week sprint cycles, encompassing requirement analysis, system modeling, dynamic catalog development, and deployment. Built upon a WordPress Content Management System supported by Cloudflare CDN and MySQL, the system functions as a 24-hour digital showroom seamlessly integrated with WhatsApp for direct customer communication, Shopee for automated transaction fulfillment, and Google Analytics for traffic monitoring. Validation demonstrated that all six core features functioned reliably through Black Box testing with an average execution latency under two seconds and zero functional anomalies. Furthermore, a User Acceptance Test (UAT) administered to 21 respondents yielded an average score of 4.82 out of 5.00, confirming exceptional usability, clear visual presentation, and high user satisfaction. This platform significantly optimizes the sales workflow and establishes a solid foundation for sustainable digital growth.

Keywords: Agile Scrum; Digital Showroom; E-Commerce Integration; MSMEs; Web-Based Marketing.

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1. Introduction

The rapid evolution of information and communication technology has fundamentally shifted marketing paradigms from conventional brick-and-mortar operations toward digital ecosystems that offer greater speed, interactivity, and measurable performance (Ianenko *et al.*, 2022). Micro, Small, and Medium Enterprises (MSMEs) represent the cornerstone of the national economy, contributing approximately 60.34% to Indonesia's Gross Domestic Product (GDP) and absorbing the vast majority of the domestic workforce [cek referensi: Mashita, 2024]. Within this economic composition, small enterprises account for 93.4% of total business units, while medium enterprises represent 5.1%, underscoring their critical role in domestic production, supply chain resilience, and post-pandemic economic recovery. Despite this strategic significance, substantial macroeconomic contributions are rarely matched by technological readiness at the grassroots level. While digital transformation provides unprecedented opportunities to expand market reach and strengthen competitiveness (Ianenko *et al.*, 2022; Sifwah *et al.*, 2024), widespread adoption among micro-enterprises remains constrained by limited digital literacy, financial constraints, and organizational hesitance to abandon legacy routines (Lianardo *et al.*, 2022; Ziółkowska, 2021). Nadia Permata Shop is a home-scale enterprise specializing in the production and distribution of bed sheet and bedding products. Although the enterprise produces competitive merchandise with high-grade fabrics, appealing motif variations, and neat craftsmanship, its commercial expansion is severely hindered by an overdependence on traditional sales mechanisms (Singh Bist *et al.*, 2022). Operating primarily through physical interactions, the shop faces narrow geographic market reach and vulnerability to shifting consumer habits, as modern buyers overwhelmingly favor digital purchasing environments. Transitioning to a digital paradigm involves significant hurdles for the enterprise, including variable levels of staff digital readiness, the operational complexity of migrating diverse stock specifications into an accessible format, and the absence of a structured marketing workflow. Without an interactive online presence, prospective customers struggle to examine real-time product catalogs, compare fabric dimensions, and verify stock availability prior to transaction. Structured digital marketing adoption has consistently demonstrated significant positive impacts on sales volume, brand awareness, and operational efficiency across various MSME sectors (Rahsel *et al.*, 2025). Rather than building overly complex standalone transactional architectures that demand substantial maintenance costs and complex server configurations, micro-enterprises benefit substantially from hybrid, user-centered digital solutions. A tailored web showroom allows businesses to display complete product portfolios, establish verifiable brand credibility, and retain administrative simplicity (Lianardo *et al.*, 2022; Sifwah *et al.*, 2024). Furthermore, bridging this dedicated web interface with mature consumer channels—such as WhatsApp for direct consultative interactions and established marketplace platforms like Shopee for logistics and secure payment handling—provides an effective, accessible pathway for early-stage digital transformation (Hanifah *et al.*, 2024; Hasibuan *et al.*, 2023). To resolve these operational barriers, this applied community service and system implementation project developed a digital platform-based marketing system for Nadia Permata Shop. Executed through the Agile Scrum framework across iterative sprint cycles, the project delivered a lightweight, responsive web showroom engineered to showcase dynamic product catalogs, streamline customer inquiries, and bridge online engagement directly to established sales channels. By establishing this digital presence, the enterprise overcomes conventional physical constraints, strengthens its visual branding, and establishes an adaptable foundation for sustained commercial competitiveness in an increasingly digital marketplace.

2. Related Work

Digital transformation in Micro, Small, and Medium Enterprises (MSMEs) has attracted substantial scholarly interest, particularly regarding how resource-constrained businesses adopt contemporary information technologies. Prior empirical studies generally emphasize three thematic areas: the strategic role of digital marketing in bolstering business resilience, the pragmatic utilization of social media and commercial marketplaces, and the critical need for hands-on technical mentoring. Various researchers highlight that establishing a structured digital marketing presence directly enhances enterprise visibility, expands market reach, and improves commercial competitiveness (Harwindito *et al.*, 2025; Ianenko *et al.*, 2022; Sifwah *et al.*, 2024; Ziółkowska, 2021). Furthermore, integrating multi-channel digital touchpoints—ranging from messaging platforms and social networks to dedicated e-commerce ecosystems—lowers transaction barriers and builds consumer confidence (Hanifah *et al.*, 2024; Hasibuan *et al.*, 2023; Tampubolon *et al.*, 2024). Nevertheless, effective implementation at the micro-business tier requires overcoming steep operational hurdles. Several studies identify that low digital literacy, fear of technological disruption, and lack of dedicated operational personnel frequently impede full digital migration (Baroroh *et al.*, 2022; Lianardo *et al.*, 2022; Setiawan *et al.*, 2021). In such settings, deploying complex transactional architectures often results in underutilization. Consequently, participatory development paradigms such as Agile Scrum, paired with hybrid transaction

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channels (bridging lightweight web catalogs with established marketplaces and messaging applications), emerge as the most practical strategy for early-stage digital transformation (Rahsel *et al.*, 2025; Singh Bist *et al.*, 2022). Table 1 summarizes the prominent empirical studies that inform the conceptual and technical development of this project.

Table 1. Summary of Related Studies

No.	Author(s) & Year	Research Focus	Relation to This Study
1	Hasibuan *et al.* (2023)	Digital marketing optimization via social media integration to increase online sales	Provides foundational strategies for connecting digital platforms with social media channels to increase brand exposure
2	Rahsel *et al.* (2025)	MSME empowerment through AI-supported e-commerce platforms to promote local products	Informs the structured adoption of e-commerce channels to improve local merchandise turnover
3	Sibarani (2021)	Digital platform optimization for agricultural commodity marketing during the pandemic	Demonstrates the efficacy of dedicated digital platforms in expanding market reach during commercial disruptions
4	Sifwah *et al.* (2024)	Application of digital marketing strategies to strengthen MSME competitiveness	Serves as a theoretical baseline for enhancing micro-enterprise competitive advantage through online visibility
5	Lianardo *et al.* (2022)	Digital marketing mentoring and technical assistance for MSME empowerment	Emphasizes the critical necessity of technical assistance during the digital adoption process
6	Setiawan *et al.* (2021)	Digital literacy education and digital transformation mentoring for village enterprises	Highlights the role of hands-on literacy training in overcoming user resistance to new digital tools
7	Syarofi & Handayani (2025)	Online marketing education for increasing rural MSME competitiveness	Supports the implementation of tailored training models for micro-business operators
8	Puji Rahayu *et al.* (2024)	Digital marketing transformation as an effective sales growth strategy	Reinforces empirical evidence that transitioning to digital channels drives sales performance
9	Arrofi *et al.* (2023)	Application of business digital transformation for culinary sector MSMEs	Informs operational workflow adjustments when migrating conventional trade to digital systems
10	Hasan *et al.* (2021)	Digital transformation of culinary micro-enterprises in East Jakarta	Provides empirical context on the adaptive behavior and constraints of urban micro-businesses
11	Harwindito *et al.* (2025)	Online marketplace expansion strategies for preserved egg micro-enterprises	Demonstrates practical methods for market expansion through digital branding and storefront optimization
12	Hanifah *et al.* (2024)	Product development and commercialization through online marketplaces	Informs the technical bridging between enterprise web catalogs and established marketplace platforms
13	Tampubolon *et al.* (2024)	MSME digital transformation through QRIS, Google Maps, and e-commerce	Supports multi-touchpoint integration including geolocation, payment links, and online commercial profiles
14	[cek referensi: Pengabdian *et al.*, 2023]	Implementation of digital payment mechanisms to improve MSME adaptability	Underpins the operational necessity of integrating frictionless digital payment and ordering pathways
15	Handayani *et al.* (2021)	Utilization of information and communication technology by MSMEs	Documents baseline ICT adoption patterns and infrastructural requirements among small commercial units
16	Baroroh *et al.* (2022)	Online storefront management and smartphone-based mobile marketing	Demonstrates the viability of accessible, mobile-first management tools for home-based enterprises

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17	Astuti & Rosita (2024)	Strategic importance of MSME digital transformation in national economic growth	Establishes the macroeconomic justification for digital transformation at the grassroots level
18	Singh Bist *et al.* (2022)	Managing digital transformation through the fusion of traditional and digital marketing	Guides the hybrid operational model that harmonizes physical inventory with digital display systems
19	Ziółkowska (2021)	Digital transformation and marketing practices across small and medium-sized enterprises	Identifies core managerial and operational determinants affecting digital adoption success
20	Ianenko *et al.* (2022)	Digital transformation of marketing activities in response to shifting consumer behavior	Provides empirical evidence regarding structural changes in customer purchasing patterns toward digital platforms

Based on the synthesis of prior studies presented in Table 1, existing literature predominantly focuses on either broad conceptual frameworks for digital literacy education or the isolated utilization of single channels, such as social media promotion or third-party marketplace onboarding. Few empirical implementations explicitly address the practical integration between a lightweight, self-managed web showroom and established external e-commerce architectures tailored to home-scale textile and bedding retailers. This project addresses that operational gap by developing an interconnected digital ecosystem. By leveraging the Agile Scrum methodology, the proposed system bridges a WordPress-based digital catalog with direct WhatsApp communication and Shopee transactional pathways, delivering a low-maintenance, cost-effective, and highly scalable marketing model designed specifically for the resource constraints of Nadia Permata Shop.

3. Methodology

3.1 Project Execution Method

Adopting a qualitative field-based approach, this applied initiative gathered primary data through semi-structured interviews with the business owner and secondary data through relevant literature studies. The Agile Scrum framework was selected as the software development methodology to maintain operational flexibility and responsiveness toward the specific operational needs of Nadia Permata Shop. The project execution comprised four systematic phases: 1) problem identification and operational analysis conducted via in-depth interviews with the enterprise owner to map commercial bottlenecks; 2) system design and sprint planning to structure the web architecture, catalog flows, and external integration endpoints; 3) sprint execution and iterative implementation using WordPress CMS with custom dynamic catalog modules; and 4) evaluation, validation, and hands-on administrative training covering content management, stock synchronization, and visitor traffic analytics.

3.2 Requirement Analysis and Sprint Planning

System requirements were determined by synthesizing operational constraints identified during initial interviews. A web-based marketing architecture utilizing WordPress as a Content Management System (CMS) was selected due to its operational simplicity, low hosting maintenance overhead, and intuitive back-office usability for non-technical micro-business operators. Development was executed across five sequential two-week sprint cycles over a total duration of ten weeks. The distribution of development parameters across the Scrum sprint cycles is mapped in Table 2.

Table 2. Scrum Sprint Development Timeline

No.	Activity Parameter	Sprint 1	Sprint 2	Sprint 3	Sprint 4	Sprint 5
1	Requirement analysis and operational mapping	✓				
2	Product catalog data collection and asset digitizing	✓	✓			
3	Core website framework development		✓			
4	Dynamic product catalog module engineering		✓	✓		
5	Product detail and specification page layout			✓		
6	E-commerce and WhatsApp API gateway integration			✓	✓	
7	Static content, profile, and policy page setup				✓	

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8	Black Box functional testing and system debugging	✓	✓
9	Business owner and administrative staff training		✓
10	Production deployment and domain mapping		✓

3.3 System Design

The structural and functional design of the proposed marketing platform encompasses behavioral use case modeling, relational data structuring, and multi-tier architectural modeling. Figure 1 illustrates the functional interaction pathways between external actors and system boundaries.



Figure 1. Use Case Diagram of the Proposed Marketing System

As shown in Figure 1, the system distinguishes between two primary user roles: public visitors and system administrators. Unauthenticated public visitors possess direct access to the front-end interface, enabling them to browse the landing page, navigate the organized product catalog, inspect granular bed sheet specifications, and execute external redirection buttons to consult the merchant via WhatsApp or finalize purchases via Shopee. Conversely, the system administrator accesses the authenticated back-end dashboard to perform complete product lifecycle management (creation, modification, and deletion), configure merchandise categorization, and evaluate visitor analytics to guide commercial strategies.

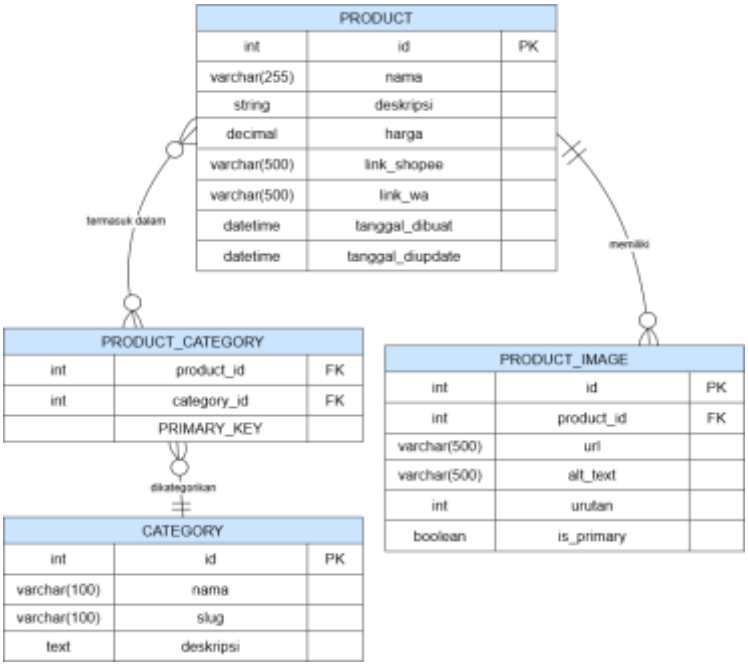


Figure 2. Entity Relationship Diagram (ERD)

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Figure 2 defines the relational database architecture supporting the digital showroom. The database schema organizes critical operational entities, including product specifications (dimensions, fabric material, stock attributes, and visual assets), categorical taxonomies, and administrative user credentials, ensuring referential integrity and rapid indexing during dynamic catalog queries.

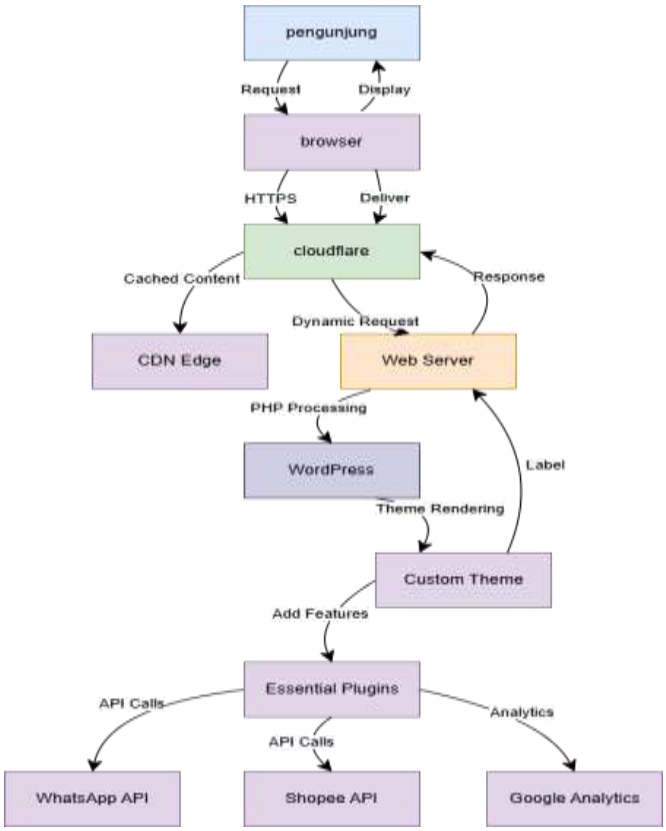


Figure 3. Application Architecture and Infrastructure Flow

The end-to-end technical workflow is depicted in Figure 3. The transaction lifecycle begins when a user initiates a secure HTTPS request via a modern web browser. The request is initially routed through Cloudflare, which functions as a secure reverse proxy, Web Application Firewall (WAF), and Content Delivery Network (CDN) edge cache that delivers cached static assets instantly to minimize page load times. Dynamic application requests are forwarded to the web server running WordPress on a PHP runtime engine connected to a MySQL relational database. Core platform capabilities are extended through lightweight essential plugins interfacing directly with external services via RESTful API calls, specifically WhatsApp API for customer messaging, Shopee API for marketplace transaction routing, and Google Analytics API for tracking real-time user behavior.

3.4 Hardware and Software Specifications

The implementation and evaluation environment comprised both development infrastructure and target testing hardware, as summarized in Table 3.

Table 3. Hardware and Software Specifications

No.	Component	Technology / Specification
1	Operating system	Microsoft Windows 10/11 Pro
2	Development environment	Visual Studio Code
3	Production hosting server	Shared Web Hosting (Rumahweb)
4	Database engine	MySQL Relational Database Server
5	Target web browser	Google Chrome (Latest Stable Release)
6	Third-party integrations	WhatsApp API, Shopee API, Google Analytics API
7	Application framework	WordPress Content Management System (PHP Engine)
8	Development workstation	Intel Core i3/i5 Processor, 8 GB DDR4 RAM
9	Validation devices	Multi-vendor Android Smartphones, Laptop PCs
10	Network connectivity	Broadband Wi-Fi and Cellular 4G/5G Internet

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3.5 Validation and Evaluation Methods

System quality and operational viability were validated through two complementary testing methodologies. First, Black Box testing was conducted to verify functional completeness and behavioral correctness across critical navigation paths. This testing focused strictly on input and output verification—including web page accessibility, product filtering, data persistence during administrative operations, and automated link redirection toward WhatsApp and Shopee—without inspecting backend code syntax. Second, a User Acceptance Test (UAT) was administered to 21 targeted respondents, comprising the business owner of Nadia Permata Shop and 20 prospective digital consumers. The instrument utilized a 5-point Likert scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree") across five operational dimensions: ease of website access, visual interface clarity, feature relevance, information accessibility, and purchase convenience.

4. Results and Discussion

4.1 Results

As the direct realization of the system architecture designed in the preceding section, the production web platform was deployed and made accessible through the public domain at https://www.nadiapermatashop.com/. The platform functions as a 24-hour digital showroom with a responsive, user-friendly interface accessible to general visitors across both mobile and desktop environments without requiring user authentication.

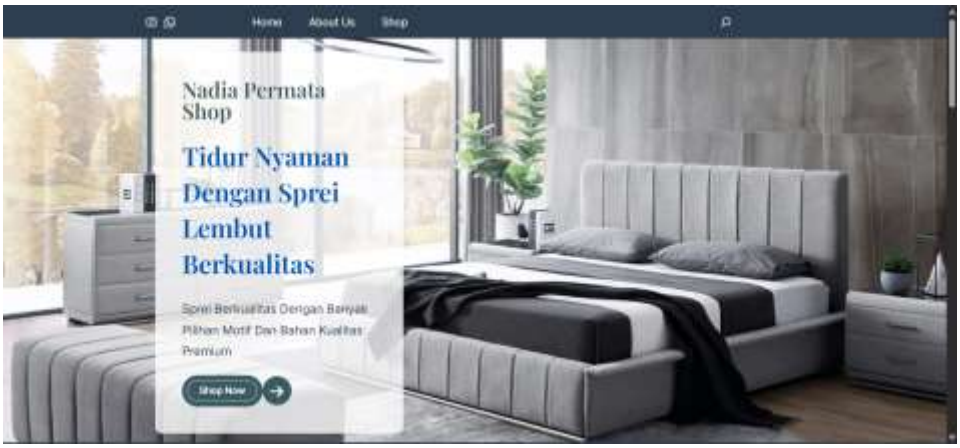


Figure 4. Landing Page Interface of Nadia Permata Shop

Figure 4 illustrates the main landing page of the Nadia Permata Shop website. The landing page serves as the digital front office, featuring a hero banner that highlights brand identity, brief company profile narratives, direct customer service hotlines, and intuitive navigation links that guide visitors toward the merchandise display.

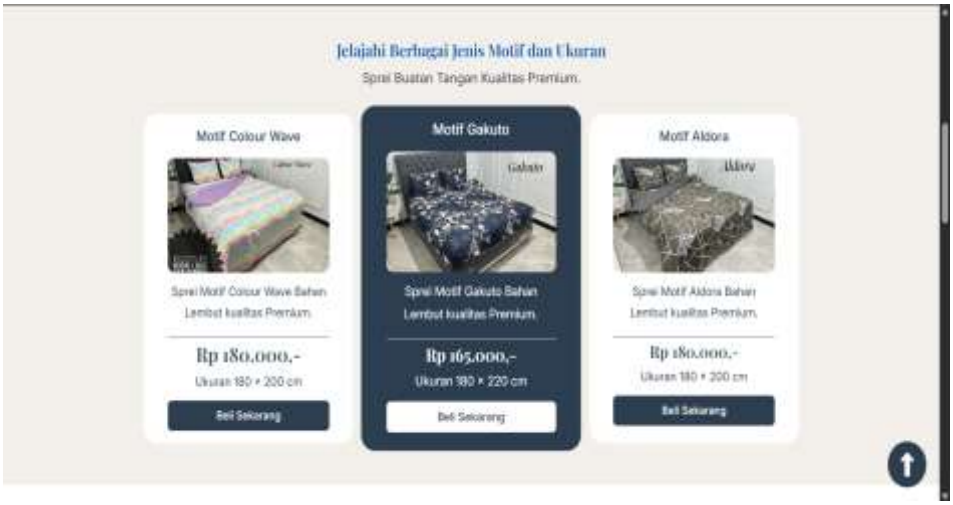


Figure 5. Dynamic Product Catalog Interface

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Figure 5 presents the product catalog interface, where bed sheet items are organized systematically by pattern categories and material specifications. Each product card incorporates high-resolution visual previews, pricing indicators, dimension details, and an integrated action trigger. Clicking the purchase trigger automatically redirects prospective buyers to the official Shopee merchant storefront, allowing transactions to proceed through established e-commerce checkout and shipping mechanisms. Functional validation was conducted using the Black Box testing methodology, focusing strictly on evaluating input and output behaviors across core execution paths without inspecting the underlying source code. The testing scenarios evaluated the operational reliability of critical navigation controls, including page loading, dynamic catalog filtering, external link redirection toward WhatsApp and Shopee, and product detail rendering. The Black Box evaluation results are detailed in Table 4.

Table 4. Black Box Functional Testing Results

No.	Feature Under Test	Test Scenario	Expected Outcome	Observed Result
1	Web Page Access	Request public landing page via browser	Landing page loads completely with valid layout	Success
2	Product Catalog Action	Click individual product item card	Displays complete product specifications and imagery	Success
3	WhatsApp Navigation	Click phone hotline contact button	Launches WhatsApp chat directed to official store admin	Success
4	Email Navigation	Click mail contact button	Opens user email client pre-addressed to store inbox	Success
5	Shopee Store Navigation	Click external purchase redirect button	Redirects user to exact product listing on Shopee	Success
6	Google Maps Navigation	Click store location button	Displays interactive geographic route to physical store	Success

All six core functional parameters successfully fulfilled their expected outcomes without execution errors. The asynchronous navigation triggers operated reliably with an observed response latency of less than two seconds, and no data integrity anomalies occurred during concurrent simulated interactions. Following functional testing, a User Acceptance Test (UAT) was conducted to evaluate real-world usability from the perspective of the business owner and 20 prospective consumers (totaling 21 respondents). The evaluation results across five operational dimensions are summarized in Table 5.

Table 5. User Acceptance Test (UAT) Evaluation Results

No.	Evaluation Dimension	Mean Score (Scale 1–5)
1	Ease of website access	4.80
2	Visual interface clarity and readability	4.70
3	Relevance and completeness of functional features	4.90
4	Accessibility of product information	4.80
5	Purchasing and inquiry convenience	4.90

The mean UAT scores ranged from 4.70 to 4.90 across all dimensions, resulting in an overall average score of 4.82 out of 5.00. This indicates an exceptionally high level of user acceptance. Respondents particularly highlighted the clarity of product descriptions and the convenience of being able to review comprehensive bed sheet dimensions and fabric patterns prior to initiating transactions via WhatsApp or Shopee.

4.2 Discussion

The implementation of this digital platform-based marketing system directly addresses the primary commercial bottleneck confronting Nadia Permata Shop, namely the friction between conventional marketing limitations and modern consumer preferences for digital discovery. These findings align with prior empirical investigations demonstrating that establishing an integrated web showroom significantly enhances digital visibility, visitor traffic, and commercial turnover for small retail businesses (Hasibuan *et al.*, 2023). Connecting the web presence to established e-commerce marketplaces effectively expands geographical market coverage beyond local walk-in boundaries (Hasibuan *et al.*, 2023). For Nadia Permata Shop, the independent web platform acts as a centralized brand anchor that reinforces professional identity (Arrofi *et al.*, 2023), an asset frequently overlooked by micro-enterprises despite its critical role in establishing customer trust in digital environments (Sifwah *et al.*, 2024). The adoption of the Agile Scrum methodology proved instrumental during project execution within this micro-business setting. Its iterative, sprint-based structure enabled developers to produce working prototypes rapidly for direct review by the business owner. User feedback gathered at the

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conclusion of each two-week sprint was immediately integrated into subsequent iterations. This iterative cycle conforms closely to user-centered design principles and prevented costly architectural misalignment at later stages, which is a common hazard in digital transformation initiatives constrained by limited resources (Rahsel *et al.*, 2025). Although the platform does not currently incorporate a standalone direct-checkout payment gateway, rerouting transactions to established commercial channels represents an optimal, risk-mitigated strategy for early-stage digital adoption. Established marketplaces provide mature logistical integration, secure payment escrows, and ingrained consumer trust within the Indonesian digital market (Hanifah *et al.*, 2024). By relying on external marketplace transaction rails, the enterprise avoids complex server maintenance and payment gateway compliance overhead while maintaining a focused effort on catalog curation and brand cultivation. Concurrently, integrating WhatsApp functions as an interactive consultative channel rather than a simple messaging utility, accommodating consumer preferences for personalized communication, product customization, and rapid response times (Lianardo *et al.*, 2022).

5. Conclusion and Recommendations

This applied community service initiative successfully facilitated the digital transformation of Nadia Permata Shop through the design and deployment of an integrated, WordPress-based digital product showroom bridged with external e-commerce and communication channels. Developed under an iterative Agile Scrum framework, the platform effectively resolves core operational constraints associated with legacy brick-and-mortar marketing routines. The empirical evaluation confirms the technical viability and usability of the deployed solution: Black Box functional testing achieved a 100% execution success rate across all core navigation pathways with sub-two-second latency, while the User Acceptance Test (UAT) conducted with 21 respondents yielded an exceptional cumulative score of 4.82 out of 5.00. The established digital presence strengthens enterprise branding, streamlines product portfolio presentation, and provides a sustainable operational foundation for micro-enterprises to enhance commercial competitiveness in an increasingly digital marketplace. To sustain and build upon the operational benefits achieved in this initial implementation, several technical enhancements are recommended for future system iterations. First, subsequent platform engineering should transition from external marketplace routing to a self-managed, direct-checkout architecture incorporating certified domestic payment gateways and an integrated inventory management module for real-time stock synchronization across physical and digital storefronts. Furthermore, the platform can be enriched through artificial intelligence capabilities, such as automated product recommendation engines and conversational chatbots for continuous customer service handling, alongside multi-language localization to accommodate international craft and bedding consumers. Finally, infrastructure security should be reinforced through continuous TLS/SSL cipher suite management, automated off-site database backups, and adaptive firewall protection, complemented by real-time analytics dashboards embedded within the administrative panel to empower data-driven business decisions.

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