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Bridging Digital Service Gaps: Integrating Chatbots and Product Catalogs in BUMDes Baturiti

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ABSTRACT
Digital transformation has become an essential driver for improving public service quality in Village-Owned Enterprises (BUMDes). However, many BUMDes still rely on manual information services, resulting in slow responses, limited accessibility, and low visibility of local products. This study addresses these challenges by examining the integrated implementation of chatbot technology and a digital product catalog on the BUMDes Baturiti website. A qualitative single case study approach was employed, involving in-depth interviews, participatory observation, and conversation log analysis conducted from January to June 2025. The findings reveal that chatbot adoption significantly enhances service efficiency through real-time automated responses, while the digital product catalog increases product visibility and market reach. The integration of both technologies reduces service complaints from 10 to 3 cases per month and increases user satisfaction to 85 percent for chatbot features and 80 percent for the product catalog. Key success factors include technological readiness, human resource capacity, stakeholder collaboration, and adequate infrastructure. This study contributes a practical model for digital service innovation in rural economic institutions and demonstrates how integrated digital solutions can strengthen transparency, accountability, and public trust in BUMDes operations.

Kata Kunci: *BUMDes; Chatbot; Digital Transformation; Product Catalog; Public Service Quality.*

1. Introduction

The massive digital transformation over the past two decades has reshaped organizational management across sectors, including community-based economic institutions such as Village-Owned Enterprises (BUMDes). In the post-pandemic era, the strategic adoption of digital marketing has significantly enhanced market penetration, brand visibility, and business performance (Ena, Widyatania, & Hina, 2023; Rai & Chauhan, 2023; Wijaya, 2024). As digital technologies become increasingly embedded in economic ecosystems, their adoption is no longer optional but essential for ensuring organizational relevance and competitiveness.

Baturiti Village-Owned Enterprise operates within a rural context characterized by diverse demographic needs and limited communication infrastructure. The institution faces persistent challenges in delivering high-quality public services, including slow dissemination of information, restricted access to service and product information, and ineffective manual-based customer service systems. These limitations are compounded by rising community expectations for faster, more accurate, and easily accessible digital services, expectations that conventional service models cannot adequately fulfill.

The reliance on manual processes has resulted in delays in responding to inquiries, inconsistencies in information delivery among staff, and limited-service hours, all of which diminish user experience. Furthermore, the absence of a comprehensive digital platform has constrained the visibility of BUMDes product offerings, contributing to low

public awareness and suboptimal revenue generation. These issues demonstrate the urgency of digital transformation as a mechanism for revitalizing local enterprises.

Digital technologies, including artificial intelligence, present new opportunities for enhancing public service performance. Chatbot systems allow organizations to provide automated, accurate, and real-time responses that can operate 24 hours a day and handle multiple user inquiries simultaneously. This capability positions chatbots as a promising solution to address BUMDes service bottlenecks and to improve information accessibility. In parallel, website-based digital product catalogs provide an interactive medium for showcasing products, expanding market reach, and integrating backend systems such as inventory management and customer relationship management.

Existing literature underscores the potential of these technologies. Nurmahya and Diana (2023) highlight that intuitive chatbot interfaces increase user satisfaction, while Qalimaturrahmah and Santoso (2024) demonstrate the effectiveness of Natural Language Processing-based chatbots in bridging information gaps. Similarly, Evitasari et al. (2025) reveal that chatbots contribute not only to service efficiency but also to customer loyalty, an important consideration for BUMDes sustainability. In addition, studies on digital product catalogs (Hesniati and Andrew, 2024; Setiono et al., 2023; Nungsiyati, 2024) confirm their role in improving marketing strategies and expanding market reach.

Despite these insights, previous studies have focused on isolated implementations of either chatbots or digital catalogs, leaving a gap in understanding whether an integrated approach can produce synergistic benefits, particularly within the BUMDes context which requires tailored technological solutions that accommodate operational complexities and diverse community needs. This unaddressed gap forms the basis of the present study.

This research aims to analyze the integrated implementation of chatbots and digital product catalogs on the BUMDes Baturiti website to enhance public service quality. It specifically examines: (1) the implementation process, considering technical, organizational, and user-experience dimensions; (2) the key determinants of implementation success using technological, organizational, and environmental perspectives; and (3) the impacts of this digital integration on service quality.

The theoretical contribution of this study lies in developing an integrated framework for adoption of digital technology within rural economic institutions. By combining the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology Organization Environment (TOE) framework, this research provides a comprehensive perspective on how digital tools can be effectively adopted and sustained in BUMDes operations.

From a practical standpoint, the study offers actionable recommendations for BUMDes entities planning digital transformation initiatives and guidance for policymakers in formulating supportive regulatory frameworks. Ultimately, this research seeks to demonstrate how integrated digital innovation can strengthen transparency, accountability, and service performance in rural economic governance.

2. Method

This study employs a qualitative approach with a single case study design to investigate the implementation of chatbots and digital product catalogs on the BUMDes Baturiti Village website in optimizing service quality. The qualitative design was selected for its capacity to capture and interpret complex social processes in depth, particularly

those related to technology adoption, user interaction, and the resulting transformation in service delivery.

The research was conducted at BUMDes Baturiti Village, located in Tabanan Regency, Bali Province, over a six-month period from January to June 2025. The research participants consisted of strategic stakeholders, including BUMDes managers, village government representatives, community service users, and MSME actors whose products are marketed through the BUMDes digital platform. Participants were selected using purposive sampling based on their involvement and relevant experience with the technological implementation.

Data was collected through semi-structured in-depth interviews with key informants, participatory observation to capture the real-time dynamics of chatbot use in service delivery, and conversation history analysis to assess the relevance, responsiveness, and linguistic accuracy of chatbot interactions.

The collected data were analyzed using a thematic analysis approach following Braun and Clarke's (2006) six-phase framework. The process began with familiarization with the data through repeated reading of interview transcripts, observation notes, and conversation logs. Subsequently, initial codes were generated to capture salient features of the data relevant to the research objectives. These codes were then organized into potential themes, such as "perceived usefulness of chatbot technology," "challenges in digital literacy," and "service personalization through automation." The next phase involved reviewing and refining themes to ensure coherence and consistency across the dataset. Thereafter, themes were defined and named to represent distinct aspects of technology implementation and its influence on service quality. Finally, a narrative synthesis was developed to link thematic findings with theoretical and practical implications for rural digital transformation.

Thematic analysis enabled the researcher to systematically identify and interpret patterns related to user experiences, managerial adaptation, and institutional support mechanisms underlying chatbot and digital catalog utilization. Through this analytical process, the study not only illuminates the factors facilitating and constraining technological integration in BUMDes operations but also provides a grounded understanding of how digital tools contribute to enhancing public service quality in rural governance contexts.

3. Result and Discussion

BUMDes Desa Baturiti, established in 2018, is a manifestation of efforts to optimize the village's economic potential and improve community welfare through the management of diversified strategic business units. This village-owned enterprise operates several comprehensive business units, including a savings and loan unit, a waste management unit, a clean water management unit, and a trading unit that commercializes various local MSME products.

Prior to the implementation of digital technology, BUMDes faced constraints in providing responsive and accurate information to the community, as well as limitations in marketing MSME products that were mostly confined to the local market. Based on an interview with the Director of BUMDes Desa Baturiti, the strategic decision to implement a chatbot and a digital product catalog on its website was motivated by aspirations to optimize service quality and amplify the marketing reach of MSME products. The implementation of this digital technology was initiated at the beginning of 2024 with collaborative support from the village government and technical assistance from a technology development team. The BUMDes website can be accessed through

www.bumdesbaturiti.desa.id, integrating chatbot features for information services and a digital catalog of village MSME products (Lin et al., 2013).

3.1 Chatbot Implementation Methodology and Digital Product Catalog

The implementation process of the chatbot and digital product catalog on the BUMDes Baturiti Village website was carried out through a systematic approach consisting of four strategic stages: planning, development, implementation, and evaluation. This methodology adopts a prototype framework aligned with the studies of (Nurmahya & Diana, 2023) and (Purwani et al., 2024) in the development of artificial intelligence–based chatbots. The planning stage began with a comprehensive needs analysis through collaborative discussions with strategic stakeholders, including BUMDes managers, village government, MSME actors, and the village community, to identify the functional specifications of the chatbot and product catalog. The results of the analysis indicated that the chatbot required the capability to respond to frequently asked questions about BUMDes, the products and services offered, as well as procedures for accessing BUMDes services, while the product catalog required comprehensive presentation of MSME product information including descriptions, prices, and ordering mechanisms.

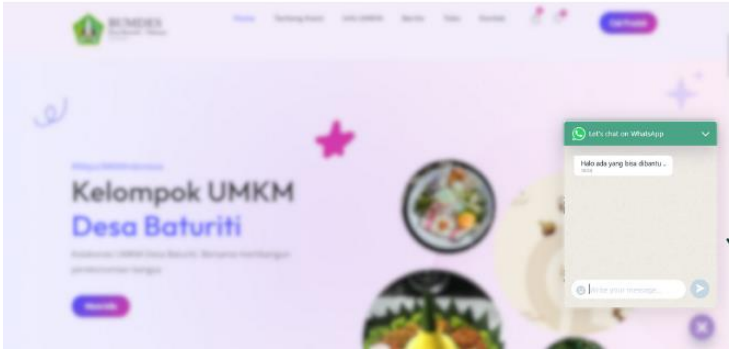

Figure 1. Chatbot Implementation

The development stage implemented the chatbot using the Chatbase platform with Natural Language Processing integration, enabling accurate understanding and responses to user queries, in line with the study of (Qalimaturrahmah & Santoso, 2024). The product catalog was developed using the WordPress Content Management System with systematic product categorization and high-quality visualization to optimize user experience. The implementation stage was executed gradually through internal testing, limited testing with representative users, and a public launch with continuous feedback mechanisms for ongoing improvement (Yonkers et al., 2001).

3.2 Determinants of Successful Digital Technology Implementation

A comprehensive analysis identifies four critical determinants influencing the successful implementation of chatbots and digital product catalogs on the BUMDes Baturiti Village website. First, the quality of the technology implemented is a fundamental factor in the success of digital technology adoption. The chatbot, developed using the Dialogflow platform, demonstrates superior Natural Language Processing (NLP) capabilities, enabling accurate understanding and responses to user inquiries. This is consistent with the findings of Qalimaturrahmah & Santoso (2024) regarding the effectiveness of NLP in improving chatbot response accuracy. The digital product catalog integrated into the BUMDes website shows superior quality with attractive visuals, comprehensive product information, and intuitive navigation, aligning with Hesniati &

Andrew's (2024) research emphasizing the significance of website quality in digital marketing strategies.

Second, the readiness of BUMDes human resources to adopt and manage digital technology is a critical determinant that requires capacity building through comprehensive training programs on the use and management of chatbots and product catalogs. Third, collaborative support from strategic stakeholders including village government, MSME actors, and the local community in the form of policies, budgets, infrastructure, and active participation in the development and implementation process. Fourth, adequate information technology infrastructure encompasses hardware, software, stable internet connectivity, and robust security systems to ensure the optimal operation of the chatbot and digital product catalog.

3.3 Impact of Implementation on Optimizing Service Quality

The implementation of a chatbot and a digital product catalog on the BUMDes Baturiti Village website has resulted in a significant transformation in service quality across several strategic dimensions. The service efficiency dimension shows a dramatic improvement, with the chatbot providing real-time responses with an average response time of less than one second a stark contrast to conventional services via telephone or in-person visits, which require several minutes to hours. The chatbot's capability to serve multiple users simultaneously eliminates queues and delays in information acquisition, aligning with the findings of Purwani et al. (2024) regarding improved efficiency of academic information services through chatbot implementation.

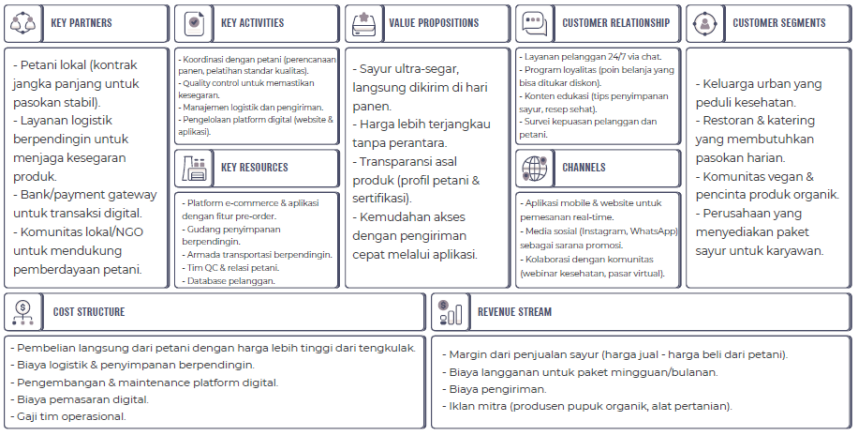

Figure 2. Business Model

The business model presented in the image illustrates a comprehensive framework for a digital agribusiness platform that connects local farmers directly with consumers. This model adopts the Business Model Canvas (BMC) approach, which consists of nine interconnected elements describing how value is created, delivered, and captured. The design reflects an integrative strategy that leverages digital technology to enhance agricultural supply chain efficiency, ensure product freshness, and empower local farmers through equitable and transparent trade practices.

The key partners in this business model include local farmers engaged through long-term contracts to secure a consistent supply of fresh produce, logistics and cold storage service providers responsible for maintaining product quality, and financial institutions or payment gateways that facilitate smooth digital transactions. Additionally, local communities and non-governmental organizations (NGOs) play an important role in supporting farmer empowerment initiatives, ensuring that the business aligns with social and sustainability goals. key activities revolve around coordinating crop planning

and harvesting schedules with farmers, managing logistics and cold-chain distribution systems, and maintaining as well as upgrading the digital platform that serves as the backbone of the business. These activities are complemented by strategic marketing operations that enhance consumer engagement and brand awareness. To support these activities, the key resources include an e-commerce platform integrated with a mobile application, cold storage infrastructure, trained personnel for operational and marketing functions, and a customer database that enables personalized services.

The value propositions emphasize the delivery of ultra-fresh vegetables that are harvested and shipped on the same day, ensuring optimal quality and nutritional value. The direct trade model allows the company to offer competitive prices by eliminating intermediaries, resulting in fairer earnings for farmers and more affordable prices for consumers. Transparency in product sourcing is also a key differentiator, as each item includes detailed information about its origin, certification, and farmer profile. Furthermore, the platform provides customers with convenience and accessibility through rapid ordering and delivery via a user-friendly mobile application.

Customer engagement is managed through a strong focus on customer relationships, featuring 24/7 support channels, personalized delivery schedules, and loyalty programs that reward recurring customers. The distribution channels primarily involve digital platforms such as mobile applications and websites, complemented by social media platforms like Instagram and WhatsApp for communication and promotional activities. Direct delivery systems supported by cold-chain logistics ensure that products reach customers in optimal condition.

The target customer segments include urban families with health-conscious lifestyles, restaurants and catering businesses that require a steady supply of fresh produce, vegan and organic product communities, as well as companies offering healthy meal packages for their employees. This segmentation strategy highlights the platform's versatility in addressing diverse market needs across both individual and institutional buyers.

In terms of financial structure, the cost structure comprises expenditures on direct purchases from farmers at above-average market prices, logistics and cold storage maintenance, digital platform development, and operational and marketing team salaries. Conversely, the revenue streams are generated from sales margins between buying and selling prices, subscription fees for weekly or monthly delivery packages, shipping charges, and advertising partnerships with agricultural input suppliers such as fertilizer or equipment producers.

This business model demonstrates a sustainable and technology-driven approach to agricultural commerce. By integrating farmers into a digital ecosystem and ensuring transparent, efficient, and fair value distribution, the model not only enhances service quality for consumers but also contributes to rural economic empowerment. It exemplifies how digital innovation can serve as a bridge between traditional farming practices and modern consumer expectations, thereby supporting both economic and social development in the agricultural sector.

The customer satisfaction dimension also demonstrates substantial improvement, with a satisfaction survey conducted three months post-implementation indicating that 85% of respondents expressed satisfaction with the chatbot service and 80% expressed satisfaction with the digital product catalog. Contributing factors to customer satisfaction include response speed, information accuracy, ease of chatbot use, completeness of product information, visualization quality, and intuitive navigation within the product catalog. This transformation is further reflected in the reduction of complaints, from an average of 10 complaints per month before implementation to 3 complaints per month

after implementation, indicating a substantive improvement in service quality. The positive impact of the digital product catalog on enhancing product visibility and user engagement aligns with the findings of Marlina et al. (2024), who emphasize that digitalized marketing initiatives significantly strengthen market reach and economic outcomes for rural producers. This is also consistent with the research of Evitasari et al. (2025) on the effectiveness of AI chatbots in enhancing customer loyalty.

3.4 Implementation Challenges and Mitigation Strategies

The implementation process of chatbots and digital product catalogs faces several strategic challenges that require comprehensive mitigation strategies to ensure successful technology adoption. Challenges related to limited human, financial, and technological resources are addressed through collaboration with external technology development teams, intensive training programs for BUMDes staff, and the development of comprehensive documentation and guidelines for managing the chatbot and product catalog. Technical issues, including the chatbot's limitations in understanding specific questions or the use of local languages, compatibility with various devices and browsers, as well as data security and privacy aspects, are addressed through continuous development and improvement, collaboration with technology development teams to resolve technical problems, and the implementation of best practices in web development and data security.

BUMDes also developed a feedback mechanism that allows users to report technical issues or provide improvement recommendations, which are then analyzed and used as a basis for continuous development and optimization. These mitigation strategies emphasize that chatbots and digital product catalogs function as complements and amplifiers of the effectiveness of existing services, not as substitutes for the roles of BUMDes staff or conventional marketing methods, with BUMDes staff maintaining a critical role in technology management and handling complex situations that cannot be resolved by chatbots (Wulandari & Wibowo, 2023).

4. Conclusion

The implementation of a chatbot system and digital product catalog platform on the BUMDes Baturiti Village website has demonstrated a significant transformation in the dimension of community services. The chatbot system has successfully revolutionized communication patterns with the community by providing instant and highly accurate information available in real-time without operational time limitations. Meanwhile, the product catalog platform has opened new horizons for village micro, small, and medium enterprises (MSMEs) to expand market penetration, as evidenced by the notable increase in website visits and product order transactions. This transformative impact is further reflected in the improvement of BUMDes consumer satisfaction indices, where a substantial proportion of respondents expressed satisfaction to high satisfaction with the quality of services provided. Furthermore, the implementation of these technologies has acted as a catalyst for enhancing transparency and operational accountability within BUMDes, directly contributing to the strengthening of public trust in the institution.

Holistically, this research confirms that the adoption of chatbot technology and digital product catalogs represents an effective strategic approach to optimizing the quality standards of BUMDes services. The implementation of these digital tools not only improves the effectiveness of information systems and expands product marketing reach but also amplifies customer satisfaction and strengthens institutional transparency. Nevertheless, the sustainability of this successful implementation is contingent upon several critical variables, including the quality of technological infrastructure, the maturity

of human resource capacity, stakeholder commitment, and the adequacy of information technology management.

Future research is encouraged to further explore the longitudinal impact of chatbot and catalog system adoption on BUMDes performance metrics, particularly in relation to financial sustainability and community empowerment. Comparative studies across multiple village-owned enterprises in different socio-economic and geographical contexts would also enrich the understanding of best practices and contextual challenges in digital transformation at the village level. Moreover, mixed methods approach integrating quantitative performance data and qualitative stakeholder perspectives could provide a more comprehensive insight into how digital innovation shapes governance, participation, and local economic development within rural enterprises.

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