International Journal of Mechanical, Industrial and Control Systems Engineering

E-ISSN: 3047-4566
P-ISSN: 3047-4558

Research Article

Development of an E-Commerce Website to Empower Kampung Lawas Maspati SMEs

Rizqi Novita Sari [1], Mega Cattleya P.A. Islami [2*], Yekti Condro Winursito [3], Jihan Dwi Sachoya[4], Muhammad Ilham Adi Prayoga[5]

[1-5] Department of Industrial Engineering, Faculty of Engineering and Sains, Universitas Pembangunan Nasional "Veteran" Jawa Timur, Surabaya 60294, Indonesia
* Corresponding Author: mega.cattleya.ti@upnjatim.ac.id

Abstract: The rapid advancement of digital technology has significantly influenced how small and medium enterprises (SMEs) connect with consumers. Kampung Lawas Maspati SMEs encounter obstacles in expanding their market due to limited online visibility and reliance on conventional sales approaches. This study aims to develop an e-commerce website that addresses these challenges by focusing on user-centered innovation. Using the Design Thinking method, which includes stages such as empathizing, defining, ideating, prototyping, and testing, user needs and challenges were explored through interviews, surveys, and observations to inform the website development process. The resulting platform is intuitive, responsive, and accessible, enabling SMEs to display their products, manage transactions, and engage with customers effectively. The application of this method not only improves market reach but also strengthens the competitiveness and digital literacy of Kampung Lawas Maspati SMEs. Evaluation results show a high level of consumer satisfaction, reaching 91.87%, indicating that the developed website effectively meets user expectations and supports SME digital transformation.

Keywords: E-commerce Website; Design Thinking; Kampung Lawas Maspati; Small and Medium Enterprises (SMEs); User-Centered Innovation

1. Introduction

The rapid evolution of digital technology has fundamentally reshaped business practices, enabling small and medium enterprises (SMEs) to reach broader markets through online platforms [1]. However, many local SMEs, especially those rooted in cultural heritage areas such as Kampung Lawas Maspati in Surabaya, Indonesia, still face significant barriers to digital transformation. These challenges include limited technological literacy, lack of digital marketing strategies, and dependence on conventional face-to-face transactions [2]. Consequently, these enterprises struggle to expand their customer base and remain competitive in the modern digital economy [3].

Several methods have been previously employed to address similar challenges faced by SMEs in adopting digital solutions [4]. Traditional approaches, such as providing basic digital literacy training or developing static websites, have been useful in introducing SMEs to online platforms but often fail to produce sustainable engagement [5]. Other user-experience-based methods, like Agile and Lean UX, emphasize iterative design and feedback loops; however, they may overlook deeper user empathy and contextual understanding, which are crucial when developing solutions for culturally embedded communities. In contrast, the Design Thinking method offers a structured yet flexible human-centered approach that emphasizes empathy, ideation, prototyping, and testing, making it particularly effective in aligning technology solutions with users' real needs and behaviors [6].

Despite the advantages of these existing methods, the gap between technology design and user adoption remains a critical issue. Kampung Lawas Maspati SMEs require a tailored

Received: October 01, 2025
Revised: October 13, 2025
Accepted: October 27, 2025
Published: November 06, 2025
Curr. Ver.: November 06, 2025

approach that not only builds a digital platform but also empowers local entrepreneurs to manage and utilize it effectively. Therefore, the main research problem addressed in this study is how to design and implement an e-commerce website that enhances the online visibility, market accessibility, and customer engagement of Kampung Lawas Maspati SMEs through a participatory, user-centered process [7].

To solve this problem, this study proposes the development of an e-commerce website using the Design Thinking methodology. The approach focuses on understanding users' pain points through direct observation, interviews, and surveys; defining key challenges; generating creative ideas; developing prototypes; and testing them with real users [8]. The resulting platform is designed to be intuitive, responsive, and easy to manage, enabling SMEs to independently operate their online stores [9]. Furthermore, this study integrates user feedback and satisfaction analysis to measure the effectiveness of the implemented solution.

The key contributions of this research include: developing a practical framework for implementing Design Thinking in local SME digitalization projects, creating a functional and user-friendly e-commerce website tailored to Kampung Lawas Maspati SMEs' needs, demonstrating how user-centered digital innovation can improve market reach, competitiveness, and consumer satisfaction, providing insights into sustainable digital transformation strategies for culturally based SME communities.

2. Preliminaries or Related Work or Literature Review

E-Commerce

E-commerce represents one of the most significant technological innovations in modern trade [10]. It refers to the use of electronic means and digital technologies to conduct commercial transactions such as selling, purchasing, transferring, or exchanging products, services, and information. In the Indonesian context, e-commerce has opened vast opportunities for business actors to optimize their operations. Previous studies have shown that e-commerce can effectively enhance market access and operational efficiency for small and medium enterprises (SMEs) [11]. However, challenges remain, including limited technological literacy and inadequate access to digital infrastructure, which continue to hinder widespread e-commerce adoption among SMEs [12]. SMEs play a vital role in Indonesia's economy, particularly in job creation and income distribution. They are a key development priority in many countries due to their significant contribution to economic growth and employment absorption. Despite their great potential, research indicates that the rate of digital technology adoption among SMEs remains relatively low. One of the main barriers is the technological gap between urban and rural areas, which limits many SMEs from fully utilizing e-commerce platforms to expand their businesses.

Design thinking

The Design Thinking method has emerged as a widely adopted approach for developing user-centered solutions [13]. Its application in platform development has proven effective in generating creative and practical responses to user needs. Design Thinking encompasses five key stages—empathize, define, ideate, prototype, and test—all structured to produce relevant and innovative outcomes [14]. This approach emphasizes the importance of user involvement throughout every phase of system development to ensure that the resulting design aligns closely with user requirements and expectations.

UI/UX

User Interface (UI) and User Experience (UX) design play a critical role in the effectiveness and acceptance of digital platforms, particularly in e-commerce systems targeting small and medium enterprises (SMEs) [15]. A well-designed UI ensures visual clarity, ease of

navigation, and accessibility, while UX focuses on the overall satisfaction and emotional engagement of users during interactions with a system. Previous studies have emphasized that UI/UX quality significantly affects user trust, purchasing decisions, and platform retention rates [16].

In the context of e-commerce for SMEs, intuitive navigation, consistent visual hierarchy, and responsive design increase users' willingness to complete online transactions. Similarly, another research noted that UX-driven interfaces enhance user satisfaction by integrating functionality, aesthetics, and emotional appeal into a cohesive design [17]. These studies highlight that effective UI/UX is not merely about appearance but about creating meaningful user interactions that foster trust and usability.

Furthermore, recent works integrating the Design Thinking approach in UI/UX development have demonstrated improved outcomes in aligning system functionality with user expectations. Through iterative prototyping and testing, developers can continuously refine visual and interactive elements to ensure accessibility, especially for users with varying levels of digital literacy. For SMEs such as those in Kampung Lawas Maspati, a contextually adaptive interface is crucial — one that accommodates local preferences, product diversity, and limited digital experience.

3. Proposed Method

The Design Thinking process is an iterative approach that involves multiple stages aimed at identifying and understanding users, their problems, and potential solutions. This method enables researchers to define issues from specific perspectives, fostering deeper insight into user needs. Through this approach, Design Thinking encourages the generation of a wide range of ideas and the development of innovative solutions by promoting a democratic design process that emphasizes hypothesis testing and prototyping [18].

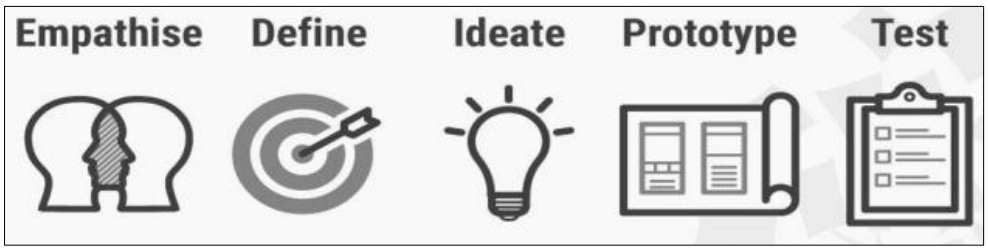

Figure 1. Design thinking method.

Empathize

In the initial phase, a comprehensive understanding of users is developed to identify their challenges, motivations, and daily activities [19]. The goal of this stage is to gain deep insights into user needs and behaviors. Knowledge of psychology is particularly valuable at this point, as it helps interpret user emotions and perspectives. This understanding is typically achieved through direct user engagement methods such as interviews and observations.

Define

The define stage aims to clearly articulate the core problem that needs to be addressed [20]. Insights gathered during the empathize stage are analyzed to pinpoint key user pain points and uncover opportunities for improvement. The problem is then formulated based on research findings, ensuring that the human element remains central to the product's design. This stage establishes the foundation and focus for the subsequent UI/UX prototype development process.

Ideate

During the ideation stage, creative exploration takes place to generate a broad range of possible solutions [21]. Designers challenge existing assumptions and brainstorm innovative concepts that address user needs. This phase results in a set of ideas that are evaluated and refined, ultimately leading to the creation of mockups that serve as the basis for prototype development.

Prototype

This stage involves transforming selected ideas into tangible representations of the product. The chosen concepts are developed into interactive prototypes that simulate real user interactions [22]. These prototypes allow designers and stakeholders to visualize and experience the proposed solutions, making it easier to identify potential improvements before final implementation.

Test

In the testing phase, the developed prototypes are evaluated by users to gather feedback and insights on usability and functionality [23]. User interactions during this stage provide valuable input for refining and enhancing the product. Through continuous feedback and iteration, the design evolves into a more effective and user-friendly solution that meets both user expectations and project goals.

4. Results and Discussion

The ExploreMaspati Web-Based E-Market for SMEs was developed using PHP and operates with a relational SQL database managed through MySQL. MySQL functions as the primary database management system that supports the core activities of the application [24]. The database, named *"exploremaspati,"* consists of multiple interconnected tables such as accounts, promotional banners, advertisements, invoices, categories, carts, user locations, account numbers, notifications, ratings, and various configuration tables including email, footer, header, location, and payment settings. This database structure is purposefully designed to ensure seamless management of user data, transaction handling, and delivery notifications, thereby enabling efficient and well-integrated e-marketplace operations that cater to the needs of local SMEs.

Empathize

Understanding Users' Needs and Context:The website is designed with features tailored to meet the interests of tourists, local SMEs, and community members. It includes profiles of historical sites, local SME product listings, booking options, and contact information—each serving as an entry point to address diverse user needs and interaction goals.

Gathering Insights:Through the site's main sections—Profil, UMKM, Galeri, and Booking Now—designers were able to collect valuable insights into user behavior and preferences. These categories reveal what visitors seek most frequently, such as historical information, product catalogs, and tour booking services, helping guide further design improvements.

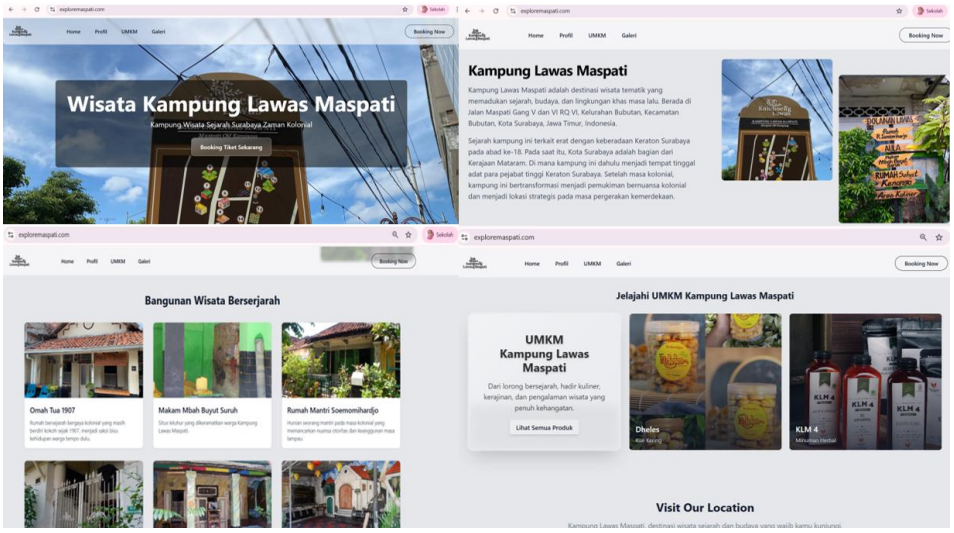

Figure 2. Explore Maspati Website Page.

Empathy Mapping: The design process considers users' motivations—such as learning about local heritage or purchasing local products—along with their challenges, including difficulty accessing local products online. It also observes user behaviors, such as browsing galleries and engaging through social media, to create a more empathetic and user-centered experience.

Define

Problem Statements: Based on the website's content, several key issues can be identified, including the limited visibility of local SMEs and their products in reaching broader markets. Additionally, visitors may face challenges in booking tours or obtaining accurate and up-to-date information about Kampung Lawas Maspati, which reduces engagement and accessibility for potential tourists.

User Personas and Needs: Potential user personas include: (1) a traveler seeking an easy way to explore local history and culture through convenient tour bookings; (2) an SME owner aiming to promote and sell products to a wider audience; and (3) a local community member wishing to support and preserve cultural heritage through active participation in digital promotion efforts [25].

Defining Needs and Insights: Examples of user needs identified during the research include: "An SME owner requires an efficient platform to display products and manage online orders," and "A tourist needs an intuitive system that allows them to book tours easily and preview available experiences." These insights form the foundation for user-centered design and system improvement.

Ideate

Brainstorming Solutions: Possible design ideas include integrating key features such as e-commerce functionality, online tour booking systems, rich visual galleries, detailed vendor profiles, interactive maps, and social media integration to enhance user engagement and accessibility.

Selecting the Best Ideas: The final implementation on the website features selected elements such as a dedicated UMKM section for local product showcases, a Booking Now button for quick tour reservations, Gallery and Profile pages to highlight cultural and historical assets, and Contact and Social Media links to facilitate direct interaction between users and the community.

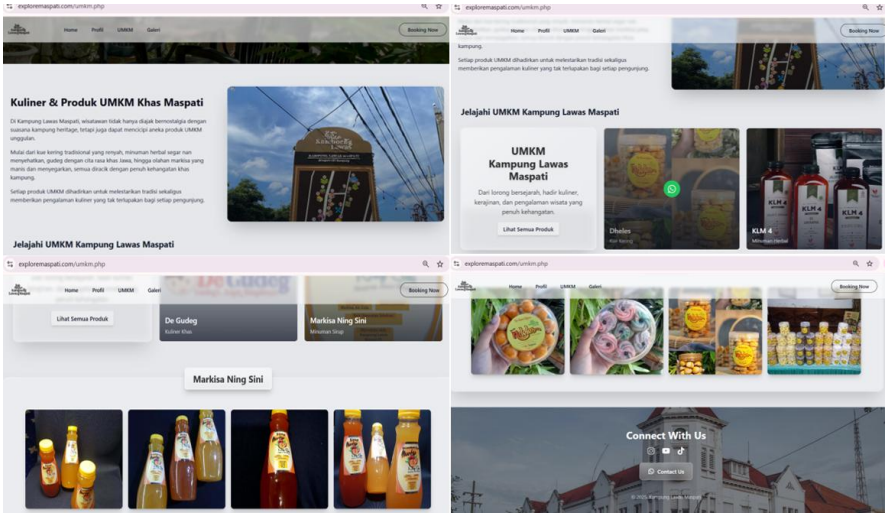

Figure 3. SME's section for local products.

Sketching and Wireframing: The site's navigation structure demonstrates clear organization with menu items like Home, Profile, UMKM, and Gallery, supported by prominent call-to-action buttons such as Booking Now. These design choices were made to ensure intuitive navigation, visual consistency, and an overall appealing user experience.

Prototype

Building a Minimal Working Version: The live website serves as the functional prototype, incorporating essential features such as informational pages, product listings, booking options, and contact sections. This initial version allows for real-time interaction while demonstrating the system's fundamental capabilities.

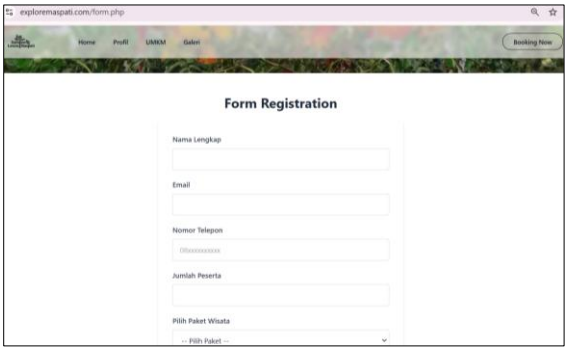

Figure 4. Booking flow.

Simulating Key User Experiences: Users can engage directly with the platform by browsing local *UMKM* products, exploring historical and cultural content, and initiating tour bookings. These interactive experiences reflect the primary user journeys envisioned during the design phase.

Internal Testing: The development team conducted internal evaluations focusing on several key aspects, including navigation flow (e.g., *Home* → *UMKM* → *Product*), the booking process through active links, responsiveness and usability across desktop and mobile devices, and verification of link functionality for social media and contact sections. This testing ensured that the prototype performed reliably and delivered a smooth user experience across various access points.

Test

Collect User Insights: Tourists, SME owners, and local residents test the website and share their opinions on usability, clarity, loading speed, reliability, and overall satisfaction.

Refine and Enhance: Based on the gathered insights, potential updates may include improved product visuals, clearer booking guidelines, better filtering options for UMKM listings, stronger call-to-action elements, or more engaging and dynamic content.

Deploy and Evaluate: After refinements, the website is launched (now active), with continuous monitoring of analytics such as visitor traffic, bounce rates, and conversion rates for bookings or purchases to guide future improvements.

Table 1. User satisfaction level

	Question	ASE (%)
1.	The information on the exploremaspati.com website aligns well with the needs of tourism promotion.	90.67%
2.	The catalog of cultural products and services is neatly organized and easy to understand.	90.67%
3.	The website's visual design (colors and layout) appears attractive and user-friendly.	93.33%
4.	The transaction flow on the website is easy for the general public to follow.	89.33%
5.	The search feature for tourism information and products/services functions effectively.	90.67%
6.	The security of transactions and user data on the website is well guaranteed.	89.33%
7.	Purchase notifications or confirmations through the website assist users.	90.67%
8.	The cultural products displayed on the website appear appealing to tourists	94.67%
9.	Promotional materials (banners/photos/videos) on the website help enhance the attractiveness of the tourism village	94.67%
10.	Using the e-market website makes promotion easier compared to relying solely on social media or WhatsApp	94.67%
	Average	91.87%

Based on Table 1, the average user satisfaction index reached 91.87%, which falls into the "appropriate" or "satisfactory" category. This indicates that most respondents were pleased with their experience using the exploremaspati.com website, particularly in terms of the attractiveness of the visual design, the clarity of cultural product information, and the ease of promotion through the e-market platform. The visual design aspect received a notably high satisfaction level, showing that the website's color scheme and layout successfully created a pleasant and user-friendly interface. Similarly, the promotional content (banners, photos, videos) and display of cultural products were among the most appreciated elements, suggesting that the website effectively captured visitors' attention and enhanced tourism appeal.

However, there remains room for improvement in some areas, particularly in transaction flow and data security, which received relatively lower scores. Strengthening these features such as improving transaction clarity, implementing more visible security indicators, or providing real-time notifications—could further enhance user trust and satisfaction. Overall, even though the satisfaction index is already high, ongoing improvements in website responsiveness, navigation flow, and interactive elements could elevate the user experience from "satisfied" to "highly satisfied." These findings are consistent with previous studies, emphasizing that security assurance and transparency play vital roles in building user trust in digital tourism platforms.

5. Conclusion

This study successfully developed an e-commerce website, ExploreMaspati.com, aimed at empowering SMEs in Kampung Lawas Maspati through digital transformation. By adopting the Design Thinking methodology, the research emphasized user-centered innovation through iterative stages of empathizing, defining, ideating, prototyping, and testing. This

approach ensured that the resulting system aligned with the real needs of users—tourists, local entrepreneurs, and community members—while preserving the cultural identity of the Kampung Lawas Maspati area.The final website provides a responsive, accessible, and intuitive platform that integrates key features such as product listings, booking systems, galleries, and promotional tools. The evaluation results indicate a high user satisfaction level of 91.87%, reflecting positive responses to the website's design aesthetics, ease of navigation, and functionality. These findings demonstrate that a human-centered design process can effectively improve user engagement, market accessibility, and trust in digital transactions among local SMEs.

However, the study also identifies areas for improvement, particularly in enhancing transaction flow, data security, and real-time user feedback features. Addressing these aspects can further strengthen the platform's reliability and elevate user satisfaction from "satisfied" to "highly satisfied." Future work should focus on developing advanced analytical tools for user behavior tracking, expanding mobile compatibility, and implementing AI-based personalization to enhance the overall digital experience. In conclusion, this research contributes to the growing body of knowledge on user-centered digital innovation for SMEs, providing both a theoretical framework and a practical model for sustainable community-based digital transformation.

References

Amornkitvikai, Y., Tham, S. Y., Harvie, C., & Buachoom, W. W. (2022). Barriers and factors affecting the e-commerce sustainability of Thai micro-, small- and medium-sized enterprises (MSMEs). *Sustainability, 14*(14), 8476.

Böckle, M., & Kouris, I. (2023). Design thinking and AI: A new frontier for designing human-centered AI solutions. *Design Management Journal, 18*(1), 20–31.

Cao, J., Zhao, W., & Guo, X. (2021). Utilizing EEG to explore design fixation during creative idea generation. *Computational Intelligence and Neuroscience, 2021*(1), 6619598.

Hansen, P., Fourie, I., & Meyer, A. (2021). *Third space, information sharing, and participatory design*. Morgan & Claypool Publishers.

Hassan, A. (2022). *Handbook of technology application in tourism in Asia*. Springer.

Islami, M. C. P. A., & Sari, R. N. (2023). Penggunaan aplikasi media sosial untuk peningkatan branding inovasi produk baru "Naturally Carbolic" sebagai upaya penunjang bisnis UMKM Kecamatan Karah, Kota Surabaya. *Abdimesin, 3*(2), 28–35.

Kilintzis, P., Samara, E., Carayannis, E. G., & Zotas, N. (2025). Designing digital decisions: A behavioral approach for SMEs. *Journal of the Knowledge Economy*, 1–30.

Kim, H. J., Yi, P., & Ko, B. W. (2023). Deepening students' experiences with problem identification and definition in an empathetic approach: Lessons from a university design-thinking program. *Journal of Applied Research in Higher Education, 15*(3), 852–865.

Kim, S. H., Jin, J., Sevinchan, M., & Davies, A. (2023). How do automated reasoning features impact the usability of a clinical task management system? Development and usability testing of a prototype. *International Journal of Medical Informatics, 174*, 105067.

Li, H., Yang, Z., Jin, C., & Wang, J. (2023). How an industrial internet platform empowers the digital transformation of SMEs: Theoretical mechanism and business model. *Journal of Knowledge Management, 27*(1), 105–120.

Lytras, M. D., Visvizi, A., Chopdar, P. K., Sarirete, A., & Alhalabi, W. (2021). Information management in smart cities: Turning end users' views into multi-item scale development, validation, and policy-making recommendations. *International Journal of Information Management, 56*, 102146.

Martin, A., Pande, C., Witschel, H. F., & Mathez, J. (2024). ChEdBot: Designing a domain-specific conversational agent in a simulational learning environment using LLMs. In *Proceedings of the AAAI Symposium Series* (pp. 180–187).

Peters, M. D. J., et al. (2022). Best practice guidance and reporting items for the development of scoping review protocols. *JBI Evidence Synthesis, 20*(4), 953–968.

Petrakis, K., Wodehouse, A., & Hird, A. (2021). Prototyping-driven entrepreneurship: Towards a prototyping support tool based on design thinking principles. *The Design Journal, 24*(5), 761–781.

Putrevu, J., & Mertzanis, C. (2024). The adoption of digital payments in emerging economies: Challenges and policy responses. *Digital Policy, Regulation and Governance, 26*(5), 476–500.

Qin, Z., Wang, G., Deng, W., & Hao, Y. (2025). *Introduction to E-commerce*. Springer Nature.

Raji, A. N., Olawore, A. O., & Osahor, D. (2023). The impact of E-commerce giants on SMEs: Challenges, opportunities, and the fight for survival in the digital economy. *World Journal of Advanced Research and Review, 20*(2), 1412–1433.

Salminen, J., Guan, K. W., Jung, S.-G., & Jansen, B. (2022). Use cases for design personas: A systematic review and new frontiers. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (pp. 1–21).

Stephanidis, C., & Salvendy, G. (2024). *Designing for usability, inclusion and sustainability in human-computer interaction*. CRC Press.

Sunday, B. O., & Nduka, S. O. (2023). MySQL database server: Deploying software application to enhance visibility and accountability. *Current Journal of Applied Science and Technology, 42*(4), 16–23.

Telukdarie, A., Dube, T., Matjuta, P., & Philbin, S. (2023). The opportunities and challenges of digitalization for SMEs. *Procedia Computer Science, 217*, 689–698.

Waluyo, M., Winursito, Y. C., Islami, M. C. P. A., Sari, R. N., & Waluyo, M. R. (2021). Relationship of exogen variables for customer use and satisfaction of delivery services. In *E3S Web of Conferences* (p. 05013). EDP Sciences.

Wibowo, B. A. A., & Islami, M. C. P. A. (2025). Optimizing organic digital marketing strategy for social media Instagram Arirang with the engagement rate and followers growth method: Optimalisasi strategi pemasaran digital organik terhadap sosial media Instagram Arirang dengan metode engagement rate dan followers growth. *JATI EMAS (Jurnal Aplikasi Teknik dan Pengabdian Masyarakat), 9*(1), 183–188.

Widjajati, E. P., Islami, M. C. P. A., & Wahyudi, E. (2021). Design of ergonomic work facilities to reduce skuble muscle disorders with Quick Exposure Check (QEC) method in CV. XYZ. *Nusantara Science and Technology Proceedings*, 282–287.

Wirdiyanti, R., et al. (2023). How does e-commerce adoption impact micro, small, and medium enterprises' performance and financial inclusion? Evidence from Indonesia. *Electronic Commerce Research, 23*(4), 2485–2515.