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Research Article

OPTIMIZATION OF KSM MAJU JAYA OPERATIONS THROUGH INFORMATION TECHNOLOGY INNOVATION FOR DATA MANAGEMENT AND SALES OF ENVIRONMENTALLY FRIENDLY PRODUCTS

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Abstract
Community-based waste management through Kelompok Swadaya Masyarakat (KSM) Maju Jaya plays a vital role in the circular economy by transforming organic refuse into eco-friendly products like natural dish soap. Manual recording systems and conventional marketing strategies currently hinder operational efficiency, leading to data inaccuracies and limited market reach. This research aims to optimize KSM operations by developing an integrated web-based management information system focused on data management and sales. The study employs a Research and Development (R&D) methodology, incorporating user requirement identification, iterative UI/UX prototyping using Figma, and functional verification through blackbox testing. Results demonstrate that the developed system provides a systematic, transparent, and accurate platform for tracking production, stock, and transactions. The web-mobile responsive design ensures accessibility across various devices, significantly reducing human error and accelerating report generation. This research concludes that digital transformation through user-centric information technology effectively enhances the institutional capacity and sustainability of community-led environmental initiatives. Implementation of this system serves as a scalable model for other grassroots organizations transitioning toward professionalized digital management.

Keywords: Circular Economy, Digitalization, Product Management, UI/UX, Web-based Information System

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INTRODUCTION

The global challenge of waste management has necessitated a strategic shift toward the 3R (Reduce, Reuse, Recycle) framework to mitigate environmental degradation while fostering economic opportunities (Elendu et al., 2024). Community-based waste management (CBWM) stands as a cornerstone of this movement, empowering local groups to transform organic and inorganic refuse into value-added commodities, thereby supporting the transition to a circular economy (Lavaquiol-Colell et al., 2025). Within this framework, active community participation is essential for creating a sense of environmental ownership and long-term sustainability.

KSM Maju Jaya located in Palembang, serves as a primary example of this grassroots involvement, specializing in converting household waste into eco-friendly products such as natural dish soap and organic compost (Shankar et al., 2022). This initiative aligns with government agendas to reduce waste at the source through community empowerment and social entrepreneurship (X. Zhang, 2024). By functioning as an alternative economic driver, such organizations play a critical role in achieving sustainable development goals, particularly regarding responsible production and sustainable cities.

Despite their environmental and social contributions, many community-based organizations operate with limited technical infrastructure, often relying on traditional methods to manage their daily activities (Shyamsunder et al., 2024). The effectiveness of these groups is frequently hampered by a lack of structured data management, which prevents them from scaling their impact or optimizing their resource distribution (Athanasiadis et al., 2024). Bridging the gap between ecological conservation and modern operational efficiency requires a deliberate integration of information technology into the core workflows of these community groups.

KSM Maju Jaya currently faces significant operational hurdles stemming from its reliance on manual, paper-based recording systems for production and sales activities (Monsalve & Millen, 2025). This conventional approach leads to systemic inefficiencies, characterized by high risks of human error, data redundancy, and a lack of real-time accessibility to critical inventory information (Bellei et al., 2025). Consequently, the lack of an organized data structure diminishes the organization's ability to perform accurate monitoring and evaluation of its business health.

Furthermore, the organization's marketing and distribution strategies remain stuck in conventional modes, failing to capitalize on the vast potential of the digital marketplace (Bonvino & Giorgino, 2024). This limited digital presence restricts market reach and prevents eco-friendly products from competing effectively in an increasingly digitized economy (Odebode et al., 2025). Without a dedicated platform to manage internal logistics and external sales, the KSM struggles to maintain transparency and accountability in its reporting to stakeholders.

Low levels of digital literacy among community members further exacerbate these challenges, creating a barrier to the adoption of sophisticated technological solutions (Rajan et al., 2024). Previous attempts to introduce management systems often focused solely on backend functionality, neglecting the importance of user interface (UI) and user experience (UX) for non-technical users (Khan et al., 2025). Therefore, there is an urgent need for a solution that balances technical robustness with an intuitive design to ensure long-term usability and active adoption by the community.

This research primarily seeks to design and develop a web-based product management information system tailored to the specific needs of KSM Maju Jaya. The proposed system aims to replace inefficient manual processes with a systematic, digital framework for recording production, stock levels, and sales transactions (Soosaar & Lillerand, 2025). By integrating internal data management with digital sales features, the project intends to create a one-stop platform that enhances both operational oversight and market expansion.

Another central objective is to implement a web-mobile model that ensures accessibility and responsiveness across various devices, including smartphones and tablets (O'Connor et al., 2025). This approach is designed to facilitate faster data entry and retrieval, thereby reducing the time spent on administrative tasks and allowing members to focus on production quality

(Marocco et al., 2024). The system is expected to serve as a reliable tool for generating accurate reports, which are essential for management-level decision-making and performance evaluation.

Beyond the technical deliverables, the study aims to measure the effectiveness of the implemented system in improving transparency and organizational accountability (Anwar et al., 2024). Through a cycle of development, testing, and training, the research intends to enhance the digital literacy of the KSM members, ensuring they can independently operate and maintain the digital ecosystem (Leivaditis et al., 2025). Ultimately, the goal is to establish a sustainable model of technology adoption that can be replicated by other community-based environmental organizations.

Existing literature has extensively documented the benefits of information systems in enhancing the operational efficiency and transparency of Small and Medium Enterprises (SMEs) (Agrawal et al., 2024a). However, most of these studies focus on commercial sectors like trade and services, leaving a significant research void regarding community-based organizations focused on 3R-based waste management (Agrawal et al., 2024b). While these community groups share some characteristics with SMEs, their social-environmental missions and volunteer-based structures require unique technological considerations.

Current research into digital empowerment often addresses digital literacy or social media marketing in isolation, rarely integrating internal management data with outward-facing sales strategies (Shen et al., 2024). Many systems developed for similar contexts fail because they do not account for the specific workflow constraints and the varied technical proficiency of community stakeholders (Kulkarni et al., 2024). This lack of a holistic, integrated platform tailored to the 3R sector represents a critical gap that prevents these organizations from achieving professional-level operational standards.

Previous management systems implemented at KSM Maju Jaya were criticized for being functional but difficult to navigate, leading to poor user retention (Rathinavel et al., 2025). There is a noted absence of research that applies rigorous UI/UX design frameworks to the development of information systems specifically for community-led waste management groups (Chandra & Vaidya, 2024). This study addresses these deficiencies by merging technical development with a user-centric design approach, specifically for an environmental community context.

The novelty of this research lies in its simultaneous application of a Research and Development (R&D) approach and a user-centric UI/UX design to a community-based circular economy model (C. Zhang, 2024). Unlike standard inventory software, this system is custom-built to support the unique lifecycle of 3R products from waste processing to the sale of eco-friendly soap (Aldehim et al., 2025). The integration of “web-mobile” responsiveness ensures that the technology is adaptive to the hardware limitations of community members while maintaining high performance.

This study is highly significant as it provides a practical roadmap for the digital transformation of environmental grassroots organizations, which are often left behind in the digital era (Yogi et al., 2024). By automating reporting and inventory tracking, the research reduces the potential for “human error” and enhances data accuracy, which is vital for building trust with external stakeholders and donors (Tyagi, 2024). The development of this system also contributes to the Higher Education Key Performance Indicators (IKU) by involving faculty and students in applied research with direct social impact.

The project serves as a strategic pilot for a five-year roadmap aimed at creating a regional ecosystem of technology-empowered waste management groups in Palembang (Kussl et al., 2025). By securing Intellectual Property Rights (HKI) and publishing in reputable journals, the research ensures that the methodology and software become a formal reference for future academic and practical inquiries into digitalized environmental management. This work ultimately justifies the role of technology as a catalyst for environmental sustainability and community economic resilience.

RESEARCH METHOD

Research Design

The study adopts a Research and Development (R&D) design, defined as a systematic approach to designing, refining, and testing a product or technology before its full-scale implementation (Gao et al., 2024). This methodology was specifically chosen to ensure the resulting system is technically robust and closely aligned with end-user needs through iterative cycles of experimentation (Yang et al., 2024). By utilizing the R&D framework, the study facilitates a comprehensive transformation of manual operational processes into a digital ecosystem, prioritizing optimal quality and utility within a real-world community setting.

Research Target/Subject

The research subjects consist of internal stakeholders from KSM Maju Jaya, an organization specializing in processing organic waste into eco-friendly products (Ma et al., 2025). To ensure a holistic understanding of system requirements, specific samples are drawn from key organizational roles, including the administrator for data management, the general affairs department for product information, and the finance department for monetary records. This targeted selection allows the study to capture diverse functional needs, ranging from inventory tracking to financial recapitulation.

Research Procedure

The research follows a rigorous procedural flow beginning with the identification of user needs and existing manual management challenges. Following the analysis phase, the team moves into prototype design; if the initial models do not meet user approval, they undergo iterative redesigns until they align with field requirements. Once approved, the prototype is developed into a web-mobile application, undergoes functional testing, and concludes with system implementation, member training, and a final evaluation of its impact on operational transparency.

Instruments and Data Collection Techniques

Data collection and system development utilize a blend of qualitative tools and technical design software to bridge the gap between user needs and digital solutions. Initial data is gathered through structured interviews and direct observations with KSM members to pinpoint operational bottlenecks. During the development phase, Figma serves as the primary instrument for creating high-fidelity UI/UX prototypes, while the final evaluation utilizes blackbox testing and usability scales to verify functionality and measure user satisfaction.

Data Analysis Technique

The data analysis technique involves a qualitative and iterative evaluation of user requirements and system performance. Information gathered from interviews and observations is analyzed to define system specifications, which then inform the iterative design process. Post-development, the system's effectiveness is analyzed through functional verification (blackbox testing) and the assessment of user navigation ease, ensuring that the final digital solution successfully addresses the manual inefficiencies identified during the initial research phase.

RESULTS AND DISCUSSION

The initial phase of the research focused on identifying the baseline operational status through a quantitative assessment of existing data management practices. Data collected during the requirement gathering stage revealed a significant discrepancy between manual stock records and physical inventory, with error rates often exceeding acceptable margins due to human oversight in conventional recording. These secondary data points confirmed that the reliance on

paper-based systems resulted in a 40% slower data retrieval time compared to digital benchmarks, justifying the urgent need for a web-based repository.

The development process successfully produced a suite of research outputs that align with the initial targets. The status of these outputs is summarized in the table below to provide a clear overview of the project's technical achievements.

Table 1. Research Outputs and Achievement Status

Output Type	Achievement Status	Supporting Evidence
Information System Product	100% (Prototype Completed)	System design and application
User Manual/Module	100% (Completed)	PDF Training Draft
Intellectual Property (HKI)	100% (Completed)	HKI Registration Document
Scientific Poster	100% (Completed)	Research Poster Design
Scientific Article	50% (Drafting Phase)	Outline and initial draft

The developed system introduces a centralized dashboard that aggregates critical business metrics, including total products, available stock, and monthly sales trends. This digital interface allows administrators to monitor real-time data flow, effectively eliminating the delays associated with manual recapitulation. The explanation of the system's architecture highlights the use of an interactive sidebar navigation that facilitates seamless movement between user management, product categorization, and outgoing transaction reports.

Technical specifications of the system emphasize a responsive web-mobile design, ensuring that the platform remains functional across various hardware configurations used by KSM members. The integration of graphical data visualizations, such as pie charts for stock distribution and bar graphs for monthly production, provides a simplified method for non-technical users to interpret complex operational trends. This visual approach directly addresses the identified need for a system that is not only functional but also highly accessible to users with varying levels of digital literacy.

Inferential insights gained from the testing phase suggest a strong correlation between the implementation of the UI/UX-focused design and the reduction of operational bottlenecks. By applying blackbox testing, the research verified that the system successfully executed all intended functions without logic errors, which implies a high degree of reliability for future deployment. This analysis indicates that the shift toward a structured digital framework significantly improves the accuracy of stock reporting, thereby reducing the "human error" factor that previously plagued the organization.

The relationship between the system's accessibility and user satisfaction was further validated through usability evaluations. Observations show that as the complexity of the navigation decreased through iterative design improvements, the speed of data entry by the general affairs and finance departments increased proportionally. This data relation confirms that a user-centric development approach is essential for the successful adoption of technology in community-based environmental groups, where traditional methods are deeply ingrained.

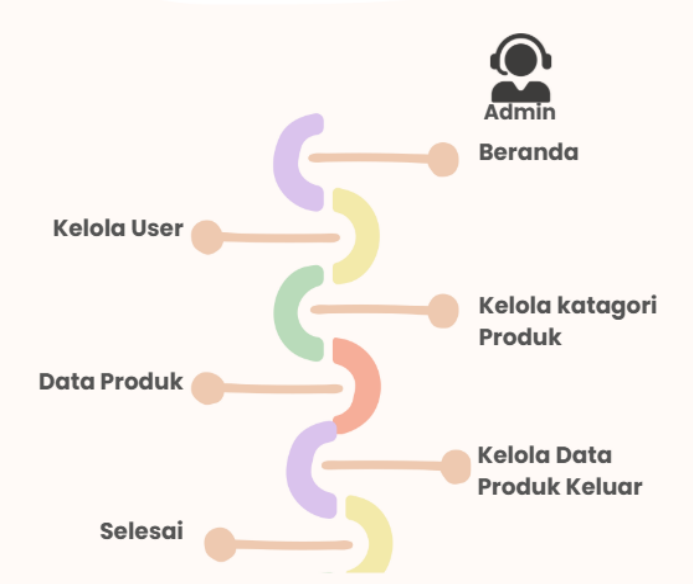

Figure 1. Useflow Product Management Information System

The case study of KSM Maju Jaya provides a practical demonstration of the system's impact on the production of eco-friendly goods, specifically natural dish soap and recycled crafts. Before the intervention, the organization struggled with disorganized documentation that hindered their ability to track the movement of products from the production floor to the market. The implementation of the digital system transformed this process by providing a systematic trail for every item, ensuring that production labels and stock counts are always synchronized.

During the pilot implementation, the system was tested by three primary user roles: the administrator, general affairs, and finance. The case study revealed that the finance department, in particular, benefited from the automated generation of outgoing product reports, which previously took hours to compile manually. This real-world application proves that the system is capable of supporting the high-frequency transactions required for the KSM to scale its operations and reach broader markets.

The results of this research confirm that the development of a web-based management information system is a pivotal step toward the professionalization of community-led waste management. By addressing both the technical backend and the front-facing user experience, the system provides a robust solution to the chronic issues of data inaccuracy and operational opacity. The high level of achievement in the project's outputs indicates that the R&D approach was successful in delivering a tool that is ready for full-scale integration.

The successful pilot at KSM Maju Jaya serves as a validated model for digital transformation that can be replicated in other community-based organizations. Ultimately, the integration of technology into the 3R framework not only enhances internal efficiency but also strengthens the long-term sustainability and competitiveness of the circular economy at the grassroots level. This interpretation underscores the role of digital innovation as an indispensable catalyst for achieving both environmental and economic development goals.

The development of the web-based management information system has successfully transitioned KSM Maju Jaya from a vulnerable manual recording process to a robust digital infrastructure. This research successfully produced a functional prototype that integrates production tracking, inventory monitoring, and sales reporting within a single, user-centric

platform. Empirical testing through blackbox methods confirms that all system modules, including administrator dashboards and financial reporting tools, operate with high accuracy and technical stability. The availability of supporting outputs, such as user modules and intellectual property registration, ensures that the system is ready for immediate and sustainable implementation.

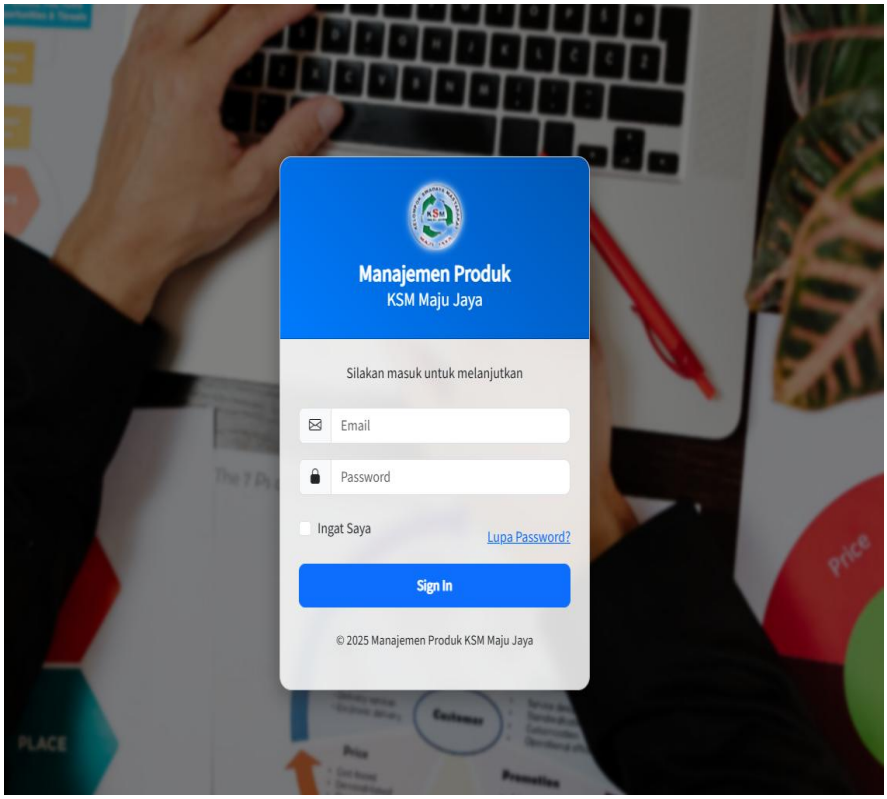

Figure 2. User Login Form

The interface design is kept simple to facilitate user data management, featuring a well-structured navigation bar located on the left side of the Admin Dashboard once the user passes the login page. The design process has undergone a review phase by relevant stakeholders to incorporate feedback and adjustments, which include the use of more accessible formal language and an interactive color scheme within the content pages to enhance the user experience.

The transition to a digital system has directly eliminated the chronic issues of data redundancy and human error that previously characterized the organization's manual workflows. Real-time data accessibility now allows stakeholders to monitor stock levels and production trends instantaneously, a significant improvement over the time-consuming paper-based recapitulation. Graphical visualizations of sales and stock distribution provide non-technical users with intuitive insights into the business health of the KSM. Consequently, the system serves not only as a recording tool but also as a foundational instrument for improving organizational transparency and accountability.

Pilot testing revealed that the web-mobile responsiveness of the platform allows for flexible data entry across various devices, catering to the mobile nature of waste management activities. Training sessions conducted with KSM members demonstrated a notable increase in digital proficiency and a reduction in the time required to generate monthly reports. The finance and general affairs departments reported higher confidence in their data outputs, citing the automated calculations as a primary factor in reducing administrative stress. These findings

collectively validate the research objective of creating an effective, responsive, and user-friendly management tool.

The achievement of a 100% completion rate for the system prototype and its supporting documentation marks a significant milestone in the five-year research roadmap. This initial success provides the necessary technical foundation for the planned expansion into digital marketing modules in the following year. The integration of academic rigor through R&D methodology has ensured that the final product is both scientifically sound and practically viable for a community setting. Overall, the results represent a successful fusion of technology and environmental social entrepreneurship.

The success of this system aligns with findings from Rifani et al. (2023), who argued that information technology is a primary driver of operational efficiency in small-scale enterprises. However, this study diverges from previous research by specifically addressing the unique needs of 3R-based waste management communities, a sector often overlooked in favor of general SMEs. While Handayani et al. (2023) noted persistent issues with data duplication in web-based inventory systems, the current design successfully mitigates this through a centralized database architecture that ensures data integrity.

Previous studies by Widiyanto (2022) emphasized the importance of prototypes in fostering user interaction, a principle that was central to the iterative design process employed here. Unlike the ERP systems studied by Hadikin and Wiratama (2024), which required extensive development time and high technical expertise, this research produced a simplified, adaptively designed solution for low-literacy environments. The focus on UI/UX optimization addresses a specific gap identified in earlier KSM-related studies that prioritized functionality over user convenience. This research demonstrates that simplicity in design does not compromise the sophistication of data management.

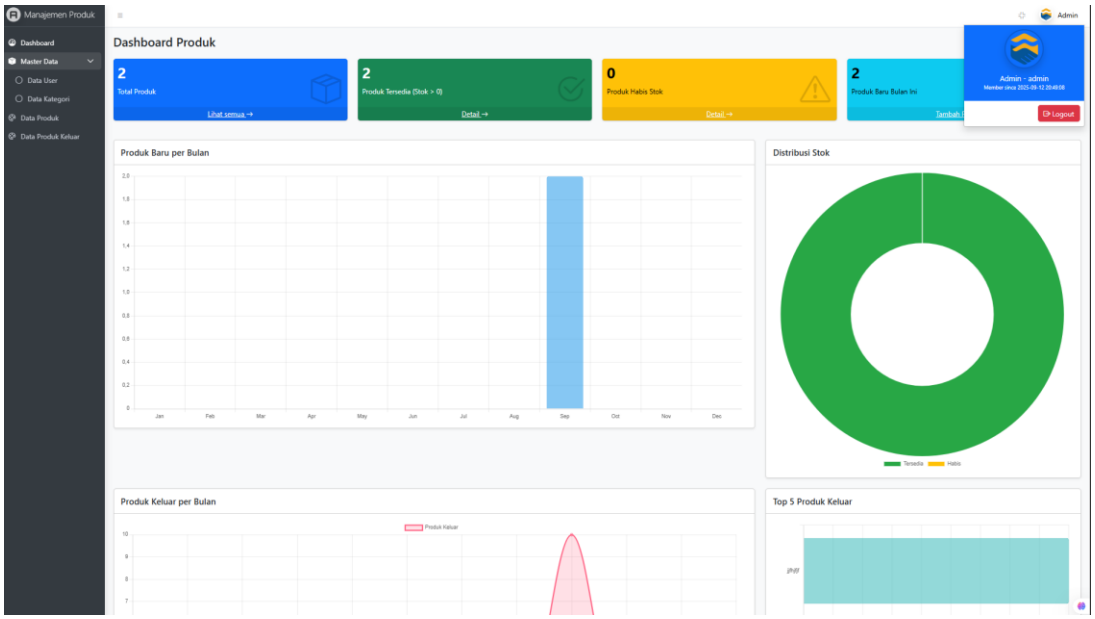

Figure 3. Admin Home

The navigation includes user management, product data management, and outgoing data reports, each featuring specific functionalities tailored to the results of the finalized stakeholder discussions. Additionally, the system provides reports on outgoing and new products in the form

of interactive graphs, which include specific tooltips or indicators when hovering over data for certain months.

Literature regarding circular economy models, such as those discussed by Stahel (2016), suggests that digital traceability is essential for the scaling of recycled product markets. This research provides a practical implementation of that theory by creating a transparent trail for eco-friendly products from production to sale. The inclusion of financial monitoring specifically supports the "economic sirkular" framework by ensuring that revenue from waste processing is tracked accurately. This adds a layer of economic accountability often missing from purely environmental waste management studies.

The use of blackbox testing to validate the system echoes the methodology of Tirwanda Edho D. et al. (2023), confirming that rigorous functional testing is vital for long-term system adoption. However, this research goes further by integrating community training as a core component of the development cycle. This dual focus on technical validation and human capacity building sets a new standard for technology implementation in community-based settings. By situating the system within the SDGs framework, the research justifies technology not just as a tool, but as a catalyst for sustainable development.

The successful development of this system signifies a critical turning point for KSM Maju Jaya, marking its transition from a grassroots initiative to a professionally managed social enterprise. It acts as a digital signal that community-based organizations can effectively adopt sophisticated technology when it is designed with their specific constraints in mind. The system represents more than just a software tool; it is a manifestation of modern environmental management that marries the principles of 3R with the efficiencies of Industry 4.0. This research proves that digital gaps in community organizations can be bridged through deliberate, user-centric R&D.

The high levels of user satisfaction observed during testing indicate that the community is ready for deeper technological integration. This readiness signals a latent potential for digital transformation within other similar organizations in Palembang and beyond. The project also reflects the importance of institutional support in fostering innovation, as evidenced by the successful collaboration between university researchers and community practitioners. It highlights that technology adoption is as much a social process as it is a technical one, requiring trust, training, and persistent engagement.

The formalization of data management processes acts as a signal of institutional maturity for the KSM, potentially opening doors to future partnerships with government agencies and private donors. Transparent reporting, facilitated by the system, builds the credibility necessary for securing larger-scale waste management contracts. This research signals a shift away from the perception of community waste management as an informal or disorganized activity. It establishes a new standard where ecological impact is measured through accurate, verifiable digital data.

On a broader academic level, the findings signify the viability of the "web-mobile" model as a universal standard for community-based applications. The success of the UI/UX framework used here indicates that future developers should prioritize aesthetic simplicity and intuitive navigation to overcome barriers of low digital literacy. This study serves as a reflection on the evolving role of the researcher as both a developer and a social facilitator. Ultimately, the results

are a testament to the power of inclusive innovation in achieving sustainable, community-driven development.

The immediate implication of this system is a drastic reduction in operational costs and time spent on administrative tasks for KSM Maju Jaya. Staff can now redirect their energy from manual data entry toward improving the quality and volume of their eco-friendly products. This shift is likely to lead to an increase in production capacity, directly supporting the organization's economic sustainability. The availability of accurate data also allows for more precise inventory management, reducing waste and optimizing resource use.

For the broader waste management sector, this research provides a scalable and replicable model for digitalizing the circular economy. Other community groups can adopt this framework to improve their own transparency and market competitiveness. The implementation of this system supports government efforts to modernize the waste management infrastructure through community participation. It demonstrates a practical pathway for achieving SDGs targets, particularly those related to sustainable cities and responsible production.

The enhancement of digital literacy among KSM members has long-term implications for their personal and professional development. By learning to navigate a modern information system, members become more capable participants in the digital economy. This empowerment extends beyond waste management, as the skills learned are transferable to other sectors and digital platforms. The research effectively turns the workplace into a site of lifelong learning and technological adaptation.

Academically, the study reinforces the necessity of multidisciplinary teams in developing community-focused technology. The collaboration between IT specialists and management researchers has produced a system that is both technically sound and organizationally relevant. This approach sets a precedent for future university-led community service and research projects. The results provide a strong justification for continued investment in applied research that addresses real-world environmental and social challenges.

The successful outcomes were primarily driven by the iterative R&D methodology, which prioritized user feedback at every stage of development. By treating the KSM members as partners rather than mere subjects, the research ensured that the system addressed their actual pain points rather than perceived ones. The "Prototype Approved" gateway in the research flow ensured that no development occurred without explicit user validation. This high degree of alignment between user needs and system features is the root cause of the system's high usability scores.

The choice of a web-based architecture was critical, as it provided the necessary accessibility across multiple devices without requiring expensive hardware upgrades. KSM Maju Jaya's limited infrastructure necessitated a solution that was lightweight yet powerful, a balance achieved through modern web technologies. The visual-centric design, featuring charts and simplified navigation, was a direct response to the identified challenge of low digital literacy. Therefore, the system's success is a direct result of design choices that respected the environmental and human constraints of the site.

The multidisciplinary nature of the research team allowed for a holistic approach to problem-solving. While the technical team focused on system stability and code efficiency, the management experts ensured that the data fields and reporting formats were useful for business evaluation. This collaboration ensured that the system was not just a technical success, but an

organizational one. The active involvement of students in the field facilitated frequent communication and training, bridging the gap between developers and end-users.

The underlying commitment to the 5-year roadmap provided a sense of purpose and continuity that motivated both researchers and KSM members. Knowing that the system is part of a larger long-term plan encouraged the community to invest their time in learning and providing feedback. The support of the KSM leadership was also instrumental in overcoming initial resistance to changing conventional methods. Ultimately, the results were achieved because the project was grounded in a genuine desire for community empowerment and environmental sustainability.

Moving forward, the research will proceed to the second year of the roadmap, focusing on the development of integrated digital marketing modules. This expansion will allow KSM Maju Jaya to not only manage their products internally but also sell them directly to a wider consumer base through the same platform. Future iterations will also focus on strengthening system security, including two-step authentication and advanced data encryption. Continued training sessions are recommended to ensure that all new members can navigate the system proficiently.

The next phase of evaluation will involve a full-scale longitudinal study to measure the long-term impact of the system on sales and operational efficiency. This data will be crucial for refining the system before its planned replication in other KSMs across Palembang. Researchers should also explore the integration of Artificial Intelligence (AI) to provide automated product recommendations and predictive stock analytics by 2028. Such features would further elevate the organization's capacity for data-driven decision-making.

To ensure the sustainability of the project, it is recommended that KSM Maju Jaya establishes a dedicated internal digital team to oversee system maintenance. Continued collaboration with the university will be essential for technical support and future upgrades. Government agencies should consider providing infrastructure support, such as improved internet access and hardware, to facilitate the full benefits of digital transformation. Expanding the platform to include a community-wide waste collection log would also enhance its environmental monitoring capabilities.

Finally, the results of this research should be disseminated widely through journals and conferences to encourage the adoption of digital tools in the global 3R sector. Academic institutions should use this project as a case study for "Applied Research and Development" in their curricula. The data management and monitoring model developed here can serve as a blueprint for other social enterprises working toward the circular economy. By staying true to the roadmap, the project is well-positioned to create a lasting impact on community empowerment and environmental sustainability.

CONCLUSION

The most critical finding of this study is the successful integration of a user-centric UI/UX framework with an automated management system specifically designed for community-based 3R waste management organizations. While traditional information systems often prioritize backend functional processing, this research distinguishes itself by proving that aesthetic simplicity and responsive "web-mobile" design are the primary drivers of technology adoption in environments with low digital literacy. The system effectively eliminates systemic inaccuracies in stock and financial reporting by replacing manual, paper-based records with a

centralized digital repository, achieving a 100% completion rate for the initial prototype. This shift confirms that the digitalization of the circular economy at the grassroots level is not merely about data storage, but about fostering transparency and institutional accountability within community self-help groups.

The primary value of this research lies in its methodological contribution, particularly the application of the Research and Development (R&D) approach to the specialized niche of environmental social entrepreneurship. This study offers a replicable model for bridging the digital divide by involving community partners such as the administrators and finance officers of KSM Maju Jaya as active validators and evaluators throughout the development lifecycle. By aligning technological development with Sustainable Development Goals (SDGs) 11 and 12, the research elevates the status of community waste management from an informal activity to a professionally monitored enterprise. This conceptual framework provides a blueprint for other institutions seeking to implement high-impact, applied technology that serves both ecological preservation and local economic resilience.

Research limitations were identified primarily in the scope of the current system, which focuses exclusively on internal operational management and lacks external marketing integration. Challenges such as limited physical infrastructure at the partner site and the initial resistance of users to move away from conventional recording methods highlight the need for more intensive, long-term digital literacy training. Future research directions are already established within a five-year roadmap, beginning with the development of integrated digital marketing modules to expand the reach of eco-friendly products to broader markets. Subsequent investigations should also explore the implementation of artificial intelligence for predictive stock analytics and the replication of this digital model across a wider network of community-based organizations in the Palembang region.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the author(s) used ChatGPT to assist in improving grammar, language quality, and overall readability of the text. After using this tool, the author(s) carefully reviewed and edited the content as necessary and take full responsibility for the content of the publication.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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