



ECOSYSTEM EMPOWERING WOMEN-OWNED MSMES THROUGH A SMARTPHONE APPLICATION FOR DIGITAL INVENTORY MANAGEMENT AND DIGITAL MARKETING WITHIN THE RED AND WHITE COOPERATIVE ECOSYSTEM

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Abstract

Women-owned Micro, Small, and Medium Enterprises (MSMEs) play an important role in strengthening household and local economies. However, many women entrepreneurs still face challenges in managing business operations, particularly in digital inventory recording, production cost calculation, and the utilization of digital marketing. This community engagement program aims to empower women-owned MSMEs through the development and implementation of a smartphone-based application for inventory management and digital marketing within the Red and White Cooperative ecosystem. The program was conducted with members of IPEMI PC Bojongsari through participatory training, hands-on application practice, mentoring, and evaluation. The activities introduced Smart-POS UMKM to support digital inventory recording, sales transactions, cost management, and business reporting, complemented by training on production cost and Cost of Goods Sold (COGS) calculation and data-driven digital marketing. The program emphasizes the integration of inventory and sales data to support pricing, promotional strategies, and business decision-making. Through this integrated approach, participants are expected to improve their digital financial literacy, operational efficiency, inventory management, pricing accuracy, and digital marketing capabilities. The program also strengthens the role of the Red and White Cooperative as a community-based ecosystem for supporting women-owned MSMEs through digital innovation. This initiative contributes to the achievement of Sustainable Development Goal (SDG) 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 9 (Industry, Innovation, and Infrastructure).

Keywords: Women-owned MSMEs, digital empowerment, Smart-POS UMKM, inventory management, digital marketing, Red and White Cooperative, Community Engagement

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play an important role in supporting economic growth, employment, and household income, particularly in developing countries such as Indonesia. Women-owned MSMEs have an important contribution to local economic activities and family economic resilience. However, many women entrepreneurs still face challenges in managing their businesses, particularly in inventory management, production cost calculation, transaction recording, and the utilization of digital technology for marketing. These limitations can affect operational efficiency, pricing accuracy, business decision-making, and the long-term competitiveness of MSMEs.

Digital transformation provides an opportunity to address these challenges by introducing simple and accessible technologies that are relevant to the daily activities of MSME owners. The use of mobile-based applications can support business owners in recording inventory, monitoring sales transactions, managing costs, and generating basic business information. In addition, digital marketing enables MSMEs to expand market access, promote products through social media and marketplaces, and utilize business data to develop more targeted marketing strategies.

The women-owned MSMEs targeted in this community engagement program are members of the Ikatan Pengusaha Muslimah Indonesia (IPEMI) PC Bojongsari within the Red and White Cooperative Ecosystem. Based on the needs identified in the program proposal, the partner MSMEs face challenges related to non-digitalized business records, inventory management, production cost and Cost of Goods Sold (COGS) calculation, and the optimization of digital marketing. The proposal also identifies that business transactions and inventory are often recorded manually or irregularly, making it difficult for entrepreneurs to understand their actual business conditions and make data-based decisions.

To respond to these challenges, the community engagement program introduces SmartPOS UMKM, a mobile-based application designed to support inventory and transaction management. The application is complemented by training and mentoring on inventory management, production cost and COGS calculation, and digital marketing. The program adopts an integrated approach in which inventory and sales information can support pricing decisions, promotional activities, and business planning.

The program also positions the Red and White Cooperative as part of an ecosystem for empowering women-owned MSMEs. Within this framework, the cooperative is expected to support business capacity development through digital literacy, business management, marketing, and technology utilization. The integration of university assistance, digital technology, cooperative support, and MSME participation is expected to create a more sustainable mechanism for strengthening women entrepreneurs.

Therefore, this community engagement program aims to empower women-owned MSMEs through the implementation of smartphone-based inventory management and digital marketing. Specifically, the program seeks to improve participants' ability to manage inventory digitally, calculate production costs and COGS, utilize business data for pricing and marketing decisions, and strengthen their digital marketing capabilities. The program contributes to SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 9 (Industry, Innovation, and Infrastructure) through inclusive digital empowerment and innovation for MSMEs.

LITERATURE REVIEW

Women-Owned MSMEs and Business Empowerment

MSMEs are important contributors to local economic development because they provide employment opportunities, generate household income, and support community-based economic activities. Women-owned MSMEs have an additional role in strengthening household economic resilience and women's participation in economic activities. However, women entrepreneurs may face limitations in accessing business knowledge, financial management skills, technology, and wider markets.

Business empowerment therefore requires more than simply providing financial assistance. It involves strengthening entrepreneurs' managerial capabilities, improving access to appropriate technology, and providing continuous mentoring that enables business owners to apply new knowledge to their daily operations. In the context of this program, empowerment focuses on practical capabilities related to inventory management, production cost calculation, digital transactions, and digital marketing.

Digitalization of MSME Business Management

Digitalization can improve the efficiency and accuracy of MSME business management by replacing manual recording processes with more structured digital systems. Mobile applications are particularly relevant for MSMEs because smartphones are widely used in daily activities and can provide accessible tools for recording transactions and monitoring business operations.

The proposed program responds to this need through a mobile-based inventory application that supports manual data entry, barcode or QR scanning, and simple calculation features. The application is intended to facilitate real-time recording of inventory movements, sales transactions, and business costs. Digital inventory management is important because poor inventory records can result in stock shortages, excess inventory, inefficient use of working capital, and difficulties in determining product availability. Integrating inventory records with sales information can provide MSME owners with more reliable information for operational and business decisions.

Inventory Management and Cost of Goods Sold

Inventory is a critical component of MSME operations, particularly for businesses operating in food, beverage, retail, and trading sectors. Accurate inventory records enable business owners to monitor stock movements and understand the relationship between purchases, production, and sales. In addition to inventory management, MSME owners need to understand production costs and Cost of Goods Sold (COGS). Accurate cost calculation is important for determining appropriate selling prices and evaluating business profitability. The program therefore combines digital inventory management with training on production costs and COGS so that participants can make pricing decisions based on actual business costs. The program proposal specifically identifies the ability to calculate production costs and COGS consistently and based on inventory data as one of its objectives.

Digital Marketing for MSMEs

Digital marketing provides MSMEs with opportunities to reach consumers beyond their immediate geographical markets. Social media, marketplaces, and digital content can be used to promote products, build brand identity, and communicate directly with customers. However, digital

marketing should not be separated from business management. Marketing activities need to consider product availability, selling prices, sales performance, and customer demand. Therefore, integrating inventory and sales information with digital marketing can help MSME owners determine which products should be promoted, maintain appropriate stock availability, and develop more relevant promotional strategies. The program proposal specifically emphasizes the integration of inventory data with digital marketing to support promotion, product availability, and pricing.

Cooperative Ecosystem and Digital MSME Empowerment

The Red and White Cooperative is positioned in this program as a center for MSME empowerment. Rather than functioning only as a financial institution, the cooperative can support business development through training, mentoring, marketing access, financing, and technology adoption. The program integrates the roles of higher education institutions, cooperatives, and women-owned MSMEs. Through this collaborative approach, MSMEs receive not only technology and training but also continued assistance in applying the knowledge to their business activities. This ecosystem approach is expected to strengthen operational efficiency, business governance, market access, and the sustainability of women-owned MSMEs.

METHOD AND PROCEDURES

This community engagement program employed a participatory mentoring approach involving women-owned Micro, Small, and Medium Enterprises (MSMEs) who are members of IPEMI PC Bojongsari within the Red and White Cooperative Ecosystem. The approach actively involved participants in identifying business problems, participating in training, practicing the use of digital technology, receiving mentoring, and evaluating the implementation of the program. The activities were designed to strengthen participants' capabilities in digital inventory management, production cost and Cost of Goods Sold (COGS) calculation, and digital marketing. The implementation consisted of several integrated stages, beginning with program socialization and needs identification, followed by training, technology implementation, mentoring and evaluation, and sustainability strengthening. This participatory approach is consistent with the proposed methodology, which emphasizes active involvement of the partner throughout the planning, implementation, evaluation, and sustainability stages.

The first stage involved socialization and needs identification through discussions with IPEMI PC Bojongsari members to establish a shared understanding of the objectives, benefits, and implementation process. The initial assessment focused on participants' existing practices in inventory recording, sales transactions, production cost calculation, and digital marketing. The program identified that business records were generally not yet systematic and digitalized, while inventory and transaction recording were still conducted manually or irregularly. Participants also

faced difficulties in calculating production costs and COGS and had not fully integrated digital marketing activities with inventory and sales data.

The second stage consisted of practical training covering digital inventory and transaction management, production cost and COGS calculation, and digital marketing. Participants were introduced to the importance of systematic inventory recording and the relationship between inventory, sales, production costs, and pricing decisions. The training was delivered using practical examples relevant to participants' business activities. The third stage involved the implementation of SmartPOS UMKM, a smartphone-based application designed to support inventory and transaction management. Participants practiced entering product information, recording inventory movements, recording sales transactions, and managing business-related costs. The application supports manual data entry, barcode or QR scanning, and simple calculation features to facilitate inventory recording and business management.

The fourth stage involved mentoring and evaluation to ensure that participants could apply the knowledge and technology to their actual business activities. Mentoring focused on daily digital inventory recording, production cost and COGS calculation, and the integration of inventory information with digital marketing activities. Evaluation was conducted by examining the level of application use, the accuracy of COGS calculation, and the utilization of digital marketing through observation, questionnaires, and business case studies. The final stage focused on program sustainability through continued mentoring, digital communication, cooperative support, and periodic monitoring. Participants were encouraged to continue using SmartPOS UMKM, maintain regular digital business records, and utilize business data for pricing and marketing decisions. The program also promotes the development of a digital women-owned MSME community to facilitate knowledge sharing, collaborative marketing, and sustainable business management.

The details of the community engagement activity are as follows: The activity was conducted on Thursday, 30 July 2026, from 08:30 a.m. to 05:00 p.m. WIB, at Bumi Gumati Sentul, Bogor, West Java, Indonesia, in collaboration with IPEMI PC Bojongsari. The activity focused on empowering women-owned MSMEs through the implementation of smartphone-based inventory management and digital marketing within the Red and White Cooperative Ecosystem. The program included training, hands-on practice, and mentoring on SmartPOS UMKM, inventory management, production cost and COGS calculation, and digital marketing.

RESULTS AND DISCUSION

The pre-test results indicated that participants had varying levels of knowledge, experience, and readiness in managing their businesses using digital technology. Participants generally understood basic business management activities, but the use of smartphone applications for inventory

management, systematic stock monitoring, marketplace utilization, and the use of sales data for promotional decisions still required strengthening. These initial conditions confirmed the relevance of the program intervention and provided a basis for introducing SmartPOS UMKM as a practical digital solution.

The implementation of SmartPOS UMKM provided participants with direct experience in digital inventory and transaction management. Participants were introduced to product recording, stock monitoring, sales transaction recording, and the utilization of business information through a smartphone-based application. The hands-on approach enabled participants to understand how digital technology could be applied to their daily business activities rather than being introduced only as a theoretical concept.

Digital Inventory Management

Digital inventory management was one of the main components of the program. Participants received training on recording incoming and outgoing stock, monitoring product availability, and identifying the need for inventory replenishment. Through SmartPOS UMKM, participants practiced recording products and transactions digitally to support more systematic inventory management.

The post-test responses demonstrated generally positive perceptions toward digital inventory management. Participants showed a high level of understanding regarding the importance of knowing available stock and the benefits of using smartphone applications to manage business inventory.

These findings indicate that practical training and direct application of SmartPOS UMKM helped participants recognize the importance of maintaining more structured inventory records. Digital inventory management is particularly relevant for MSMEs because inaccurate stock information can affect purchasing, production, sales, and business cash management. By introducing digital recording practices, the program encouraged participants to develop more systematic business management habits and use inventory information as a basis for operational decisions.

Production Cost and COGS Calculation

The second major component of the program was production cost and Cost of Goods Sold (COGS) calculation. Participants were introduced to the relationship between production costs, COGS, selling prices, and business profitability. Understanding these components is important because appropriate pricing requires business owners to have a clear understanding of the costs associated with their products. The post-test responses indicated a generally strong understanding of production costs and COGS-related concepts. Participants demonstrated positive responses regarding their understanding of production costs, ability to calculate COGS, determination of selling prices based on COGS, and recognition of the importance of COGS in pricing decisions.

The integration of COGS calculation with digital inventory management provides an important foundation for better business control. When product, inventory, and transaction information are

recorded systematically, MSME owners can obtain more reliable information to support pricing and profitability decisions. Thus, the program connected COGS calculation with actual business practices rather than treating it solely as an accounting concept.

Digital Marketing

The third focus of the program was digital marketing. Participants were introduced to the use of social media, promotional content, marketplaces, digital marketing strategies, and the utilization of sales data for promotional decisions. The post-test responses indicated positive perceptions toward digital marketing activities. Participants generally recognized the importance of social media and digital platforms for promoting their products. However, differences remained in the extent to which participants regularly created promotional content, used marketplaces, and utilized sales data to develop promotional strategies. This indicates that digital marketing capability remains an area that requires continuous practice and mentoring.

The program emphasized the relationship between digital marketing and business information. Sales and inventory data can help business owners identify products with higher demand, determine promotional priorities, and ensure product availability. Therefore, digital marketing can become more effective when it is supported by reliable business information.

Digital Technology Readiness

The program also strengthened participants' digital technology readiness. Participants were introduced to smartphone-based technology as a practical tool for supporting business management. They were encouraged to learn how to use new applications and understand the potential benefits of digital technology for improving business efficiency and competitiveness.

The post-test responses generally demonstrated positive attitudes toward the adoption of smartphone applications. Participants showed willingness to use digital inventory management applications and confidence in the ability of digital technology to improve business efficiency. This finding suggests that direct practice and mentoring can strengthen participants' confidence in adopting digital tools.

Digital readiness is an important component of sustainable MSME digital transformation. The availability of technology alone does not guarantee successful adoption. Business owners also require practical knowledge, confidence, and continued assistance. Therefore, the combination of technology introduction, hands-on practice, and mentoring used in this program represents an appropriate approach for strengthening digital readiness among women-owned MSMEs.

Business Management Practices

In addition to digital technology adoption, the program encouraged participants to strengthen their business management practices. The evaluation included participants' readiness to record business transactions, separate personal and business finances, check inventory regularly, establish business targets, and conduct periodic business evaluations.

The positive post-test responses indicate that participants were willing to apply the knowledge obtained during the program to their daily business activities. This is an important outcome because the effectiveness of community engagement should not be measured only by knowledge acquisition but also by participants' willingness to implement improved practices in their businesses.

The use of SmartPOS UMKM therefore has potential benefits beyond transaction recording. When used consistently, digital business information can help entrepreneurs monitor operations, evaluate business performance, identify problems, and make more informed decisions.

Discussion

Overall, the results demonstrate that the integration of SmartPOS UMKM, digital inventory management, COGS calculation, and digital marketing provides a practical approach to empowering women-owned MSMEs. The program addressed several interconnected business challenges rather than focusing exclusively on the introduction of a digital application.

The use of smartphone-based technology is particularly relevant because it provides an accessible tool for MSME owners. More importantly, SmartPOS UMKM was introduced together with practical training and mentoring, enabling participants to understand not only how to use the application but also how digital information can support inventory management, pricing, marketing, and business decision-making.

The program also highlights the importance of the Red and White Cooperative Ecosystem in supporting the sustainability of women-owned MSME empowerment. Continued assistance through the cooperative can provide opportunities for further mentoring, knowledge sharing, collaborative marketing, and strengthening of digital business practices. This ecosystem approach can help transform digital adoption from a one-time training outcome into an ongoing business development process.

From a broader perspective, the program contributes to strengthening women's participation in the digital economy by improving their access to practical digital knowledge and business management tools. The integration of digital inventory management, COGS calculation, digital marketing, and technology readiness can support greater operational efficiency, more informed pricing decisions, broader market access, and stronger business competitiveness.

Overall, the community engagement program provides a practical empowerment model for women-owned MSMEs through the integration of digital inventory management, production cost and COGS calculation, digital marketing, and smartphone-based business technology. The program

supports the achievement of SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 9 (Industry, Innovation, and Infrastructure) by strengthening women's economic participation, supporting MSME development, and promoting inclusive digital innovation.

The documentation of the offline seminar activity under the program titled “*Empowering Women-Owned MSMEs through Digital Inventory Management and Digital Marketing within the Red and White Cooperative Ecosystem,*”, onducted at Bumi Gumati Sentul, Bogor, West Java, Indonesia, is presented as follows:



Figure 1. Activity Banner



Figure 2. Opening Remarks by the Community Engagement Program Leader



Figure 3. Presentation of IPEMI Batik Cloth to the Team Leader



Figure 4. Presentation of Training Materials to Participants



Figure 5. Documentation

CONCLUSION

This community engagement program successfully supported the empowerment of women-owned MSMEs through the introduction of smartphone-based digital technology for business management. Conducted in collaboration with IPEMI PC Bojongsari, the program focused on digital inventory management, production cost and Cost of Goods Sold (COGS) calculation, digital marketing, and the use of Smart-POS UMKM. Through training, hands-on practice, and mentoring, participants gained practical knowledge and experience in applying digital tools to their daily business activities.

The program also strengthened participants' readiness to adopt digital technology for improving business efficiency and competitiveness. The integration of inventory management, COGS calculation, and digital marketing provided participants with a more comprehensive approach to managing their businesses. The involvement of the Red and White Cooperative Ecosystem further provides opportunities for continued mentoring, knowledge sharing, and collaborative business development. Overall, the program contributes to SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 9 (Industry, Innovation, and Infrastructure) by supporting women's economic empowerment, MSME development, and inclusive digital transformation.

To ensure the sustainability of the program, continuous mentoring is recommended to support participants in consistently applying SmartPOS UMKM for inventory and transaction management. Further assistance should also focus on strengthening COGS calculation, digital marketing, marketplace utilization, and the use of sales data for business decision-making. The Red and White Cooperative Ecosystem can play an important role in facilitating follow-up training, knowledge sharing, and collaborative marketing among women-owned MSMEs. Future community engagement programs may also expand the implementation of SmartPOS UMKM to other MSME communities and strengthen cooperation between universities, cooperatives, and local business communities to support sustainable digital transformation and improve MSME competitiveness.

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