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Preservation of Papua's Local Food through Frozen Sagu Sep Innovation and Multichannel Marketing Strategy

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ABSTRACT

Background: Community-based MSMEs in South Papua face low product shelf life, limited managerial capacity, and weak digital marketing, which constrain competitiveness and market reach. This community service program collaborated with UMKM Mama Juan, a local sago-based enterprise, to address these issues through technology-based empowerment.

Purpose: To enhance production performance, financial management, and market expansion through appropriate production technologies and digital managerial innovations.

Methods: A Participatory Action Research (PAR) approach was applied through socialization, training, technology implementation, mentoring, and evaluation, using observation, interviews, and simple quantitative measurements of shelf life, production volume, and digital adoption.

Results: The program increased Sagu Sep shelf life from 1–2 days to 8 days, nearly doubled daily production capacity, and facilitated the transition from cash-based, offline sales to QRIS-supported digital payments, social media promotion, and online marketplace stores.

Keywords

MSMEs, Frozen Sagu Sep, Appropriate Technology, Management

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Introduction

Indonesia controls approximately 90% of the world's sago plantation area, with the majority located in Papua, covering more than 158,051 hectares. Although the potential production of wet starch reaches 9.07–33.10 million tons per year, the actual realization remains very low, only around 0.20–0.73% of its maximum potential (Kaikatui et al., 2025). In South Papua, sago sep, a traditional food produced through a stone-baking technique using sago as the main ingredient, holds high historical and cultural value as well as significant yet underutilized economic potential (Arif, 2019). However, its production still relies on conventional methods, resulting in a very limited shelf life (Rosida, 2019). Managerial and marketing aspects also face various challenges, including the lack of standardized production procedures, inefficient distribution systems, and traditional marketing strategies. The region's remote geography and limited infrastructure further hinder access to broader markets, despite its rich biodiversity and cultural heritage (Longgy et al., 2024).

The partner, UMKM “Mama Juan,” is a growing microenterprise known for its home-based food products, with sago sep as its signature item that enjoys strong credibility in the market. Operated modestly by four workers, this enterprise has optimized its operations through adaptive, efficient approaches. Its participation in various local and national events reflects a strong commitment to innovation and market expansion. The sago sep products have gained popularity among professionals across sectors, including office employees, government institutions, and others, strengthening “Mama Juan's” position as a leading choice in the culinary industry. By combining authentic traditional processing methods with a spirit of adaptation and continuous learning, this UMKM strives to maintain product quality while gradually building a stronger foundation for business management. Although still in development, its commitment to creating added value for consumers remains a central focus.

The partner's business characteristics stand out in terms of raw materials, production processes, and operational management. UMKM “Mama Juan” relies on locally sourced sago processed using traditional methods without modern preservation technology, resulting in a sago sep product with a shelf life of only 1–2 days. This is due to the use of additional ingredients such as coconut and meat, which naturally have low durability and high perishability, making sales heavily dependent on direct orders. Field observations reveal that production systems rely on tacit, inherited knowledge without written Standard Operating Procedures (SOPs), leading to inconsistent product sizes. Additionally, approximately 98% of financial transactions are cash-based, resulting in 5–7% monthly shrinkage, while the absence of formal contracts with the three main suppliers creates price fluctuations. A lack of understanding of cash flow management principles also results in an inability to accurately calculate the break-even point, underscoring the need for an integrated management system and digitized administration to enhance distribution efficiency and stabilize raw material supply.

In terms of marketing and infrastructure, UMKM “Mama Juan” still faces challenges in optimizing market potential through digital platforms. Digital footprint analysis shows an absence of online presence, even though 75.13% of South Papua's population are active smartphone users (APJII, 2023). Consequently, the product remains known primarily through word of mouth. Sago Sep products are not yet available on e-commerce platforms, despite the number of e-commerce users in Indonesia continuing to rise from 58.63 million in 2023 to a projected 99.1 million by 2029 (Utami, 2025). This condition highlights the urgency of adopting multichannel marketing strategies, including e-commerce optimization through social commerce, marketplaces, and alternative distribution channels, to improve accessibility, reduce reliance on physical sales, and strengthen the product's competitive position in the market.

This activity aims to improve the efficiency of sago sep production through technological optimization, enhancing product quality while preserving local wisdom as Papua South's cultural

and competitive advantage. The initiative supports the national mission of achieving food self-sufficiency by empowering MSMEs to meet market demand independently and sustainably through the implementation of efficient digital management and marketing systems, standardized SOPs, and multichannel marketing strategies. The program contributes to achieving the Sustainable Development Goals (SDGs), particularly SDGs 1, 2, 5, 8, 9, and 12, by focusing on local economic empowerment, gender equality, production efficiency, and the adoption of modern technology. This holistic approach also aligns with higher education performance indicators (IKU 2, 3, and 5) through the active involvement of lecturers, students, and community-oriented research outputs. Furthermore, the initiative supports Asta Cita 3, 4, 5, and 6, which emphasize the creation of quality jobs based on technology and local wisdom, human resource development, value-added product downstreaming, and rural development. It also contributes to the National Research Master Plan (RIRN) in the field of food research based on local natural resources through advancements in storage technology, digital management systems, and the strengthening of the digital ecosystem for MSMEs.

Method

This program is designed as an active contribution to preserving Papua's local food heritage, particularly Sago Sep, through an adaptive, collaborative, and transformative approach. To achieve this goal, the community engagement activities employ the Participatory Action Research (PAR) method, which emphasizes active community involvement, concrete actions, and a continuous research cycle (Rizal et al., 2025). The initial stage begins with an assessment process to fully understand the root of the problem, starting with preliminary planning formulated based on an in-depth analysis of causal factors and their impacts. The next stage involves implementing actions, which include developing and applying the proposed solutions, followed by evaluating the outcomes through observation to ensure their effectiveness. The subsequent stage positions the community as active participants in problem identification, planning, and program implementation. This cycle continues through reflection-driven planning, enabling ongoing refinement of solutions based on observations until the issue is resolved or an agreed-upon solution is achieved.

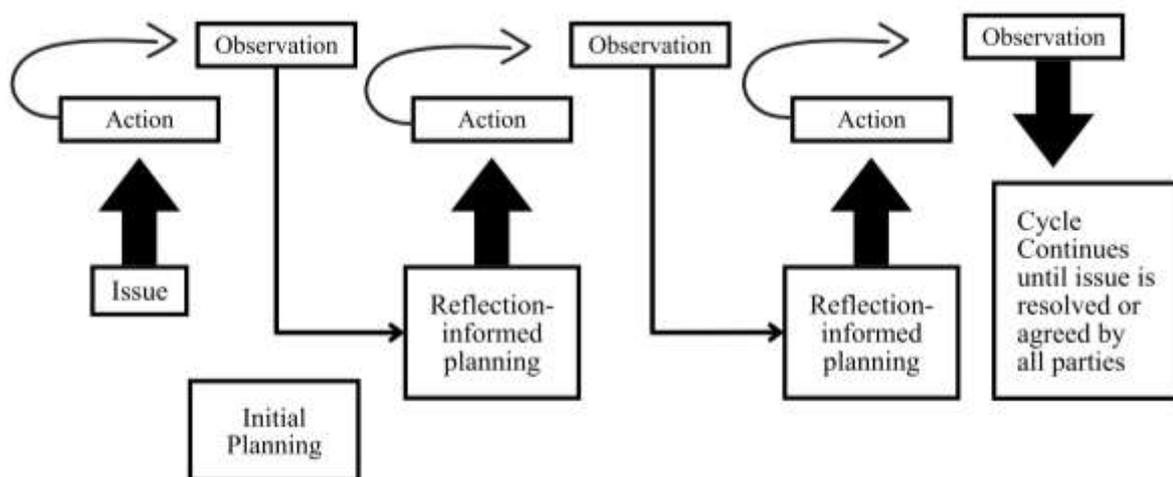


Figure 1. Steps in Participatory Action Research

The PAR approach ensures an adaptive and needs-oriented process, positioning the community as the primary partner in problem-solving (Widjaja & Matitaputty, 2018). The activities carried out include:

1. **Socialization:** The program begins with socialization activities, introducing production technologies (pre-freezing, vacuum sealing, coconut grating machines), the importance of SOPs and financial digitalization, as well as concepts of multichannel marketing, branding, intellectual property rights, and packaging innovation. Partners and stakeholders are guided to understand the program's objectives, benefits, and implementation plan.
2. **Training:** Training is provided to strengthen production, managerial, and marketing capacity. Activities include production techniques, SOP development, financial literacy and accounting applications, as well as digital marketing, content creation, branding, and packaging design. Evaluations are conducted to ensure the participants' mastery of the skills.
3. **Technology Implementation:** The knowledge gained from the training is applied through the installation of production equipment, adoption of the new SOPs, use of financial applications, and management of social media and marketplace platforms. Production trials and market testing are also conducted to evaluate product quality and the effectiveness of marketing strategies.
4. **Mentoring & Evaluation:** Partners receive intensive mentoring in equipment usage, SOP implementation, digital financial management, and online marketing activities. Evaluation is carried out through monitoring product quality, marketing performance, financial records, and consumer feedback to support continuous improvement.
5. **Program Sustainability:** The final stage focuses on long-term strengthening through strategies to enhance production, management, and marketing capacity. Collaboration with supporting institutions and stakeholders is reinforced, and periodic evaluations are conducted to ensure the program remains aligned with market needs and developments.

Result

Mama Juan MSME is a local culinary business in Kelapa Lima, Merauke, specializing in Sagu Sep, a traditional Papuan dish. This analysis shows that Mama Juan MSME has a highly potential product that can be developed as a local food icon of South Papua, but requires integrated intervention. This community service program aims to enhance production capacity by providing equipment and training in modern food processing technology, strengthen business management through digital financial recording and cashless payment systems, and expand market reach through branding strategies and digital marketing.

Table 1. MSME Profile

Aspect	Description
Business Name / MSME	UMKM Mama Juan
Address	Kelapa Lima, Merauke – South Papua
Type of Production	Traditional Papua food production — <i>Sagu Sep</i>
Number of Workers	4 people (family-based business)
Production Volume	Approximately 20–30 trays of <i>Sagu Sep</i> per week
Product Shelf Life	Approximately 1–2 days after production
Monthly Revenue / Profit	Around IDR 2,500,000 – IDR 3,000,000
Main Assets	Basic cooking equipment (stove, pan, baking trays)
Market	Local consumers in Merauke; direct/offline sales

Socialization

The program began with a socialization activity held directly at UMKM Mama Juan's production site. During this stage, the team introduced the program's objectives, benefits, and the series of activities that would be carried out throughout the implementation period. In addition to

delivering general information, the team conducted an initial survey to collect baseline data on the partner's production capacity, the shelf life of Sagu Sep products, the previously manual financial recording practices, and the marketing strategies used prior to the intervention.

Throughout the socialization process, the partner demonstrated strong enthusiasm for the program. They expressed that the extremely short shelf life of their product, lasting only one to two days, had become the main barrier preventing them from expanding their market beyond the local area. The partner also viewed training in business management, packaging improvement, and digital marketing enhancement as urgent needs to help increase the competitiveness of their products.

The partner's response to the program was very positive. They mentioned that cooling and vacuum sealing technologies were innovations they had long needed to maintain product quality. They also expressed interest in entering online marketplaces but previously lacked the knowledge and skills to begin. Additionally, the partner acknowledged that digitalizing their financial records would greatly help reduce errors or discrepancies that frequently occurred under their manual system.

During this socialization stage, a shared understanding was established between the team and the partner regarding the program's direction and the interventions to be implemented. This phase marked a mutual commitment to carrying out product innovation for Frozen Sagu Sep, business management training, improved packaging development, and digital marketing strategies to enhance the sustainability and competitiveness of the partner's business.



Figure 2. Survey dan Socialization

Training

After the socialization phase, the program continued with three training sessions held on June 13, July 18, and August 8–9, 2025, covering production, management, and marketing. These sessions were designed not only to transfer knowledge but also to strengthen the capacity of UMKM Mama Juan so it could transform from a traditional business into a more modern, hygienic, and competitive enterprise.



Figure 3. Production, Management, and Marketing Training

In the production aspect, the partner was trained to apply pre-freezing and vacuum sealing techniques, which successfully extended the shelf life of Sagu Sep from 1–2 days to 7–8 days. The partner also learned to operate an automatic coconut grater with an effective capacity of 50–75 kg per hour, significantly improving production efficiency and product quality. The hands-on training approach enabled the partner to operate all equipment independently. In the management aspect, the training focused on business and financial management. The partner began establishing strategic partnerships with local suppliers, regularly monitoring raw material availability, and transitioning from manual bookkeeping to using QRIS, bank transfers, and simple accounting software to record transactions and support data-based planning. In the marketing aspect, the partner was trained to implement digital marketing strategies, including managing an Instagram account, creating online storefronts on marketplace platforms, and developing a new logo and improved product packaging. The training covered digital marketing, multichannel marketing, brand asset development, and packaging design.

Table 2. Before–After Training Conditions

No	Aspect	Condition Before Training	Condition After Training
1	Product shelf life (Sagu Sep)	± 1–2 days	± 7–8 days after being processed into Frozen Sagu Sep (pre-freezing + vacuum sealing)
2	Use of a coconut grater	Manual grater (capacity depends on labor, not measurable)	Automatic coconut grater with an effective capacity of ± 50–75 kg/hour
3	Ability to operate new equipment	None, as no modern equipment was used previously	Partner is able to operate the equipment independently (as a result of hands-on training)
4	Average daily production volume (efficiency)	± 3–4 batches/day (equivalent to approximately 6–8 kg of Sagu Sep dough)	± 7–8 batches/day (equivalent to approximately 14–16 kg of Sagu Sep dough)
5	Form of financial transactions	± 98% cash transactions, manually recorded in notebooks	Began using digital payment methods (QRIS, bank transfer) alongside cash transactions
6	Business social media accounts (Instagram, etc.)	0 active accounts	≥ 1 active account (Instagram) for product promotion
7	Marketplace store presence	None	At least one online store has been created on national marketplace platforms
8	Digital marketing strategy	No specific strategy	Started using digital marketing and multichannel strategies (Instagram, Facebook, TikTok, etc.)
9	Brand identity (logo, brand name)	Logo/brand identity is still simple and not well established	Logo/brand identity developed to be clearer and more consistent
10	Product packaging design	Simple packaging, less attractive, and less informative	New packaging design that is more attractive, distinctive, and increases perceived product value

Technology Implementation

After the training phase, the program moved to the technology implementation stage, which was carried out directly within the partner's business unit. In the production aspect, the team installed modern equipment, including pre-freezing, vacuum sealing, and an automatic coconut grater machine. These tools were then tested through a gradual production process to ensure optimal performance and consistent product quality in accordance with established standards.

In the management aspect, the team assisted in the installation of financial recording software and digital transaction applications. Small-scale trials were conducted to help the MSME managers adapt to the new system before full implementation. This step aimed to familiarize the partner with modern, accountable, and efficient financial technology practices.

Meanwhile, in the marketing aspect, the team assisted in managing the MSME's social media accounts more professionally by developing a consistent posting schedule and using analytics tools to monitor performance. Additionally, the MSME's online stores were created and optimized across various marketplace platforms. Digital payment systems were integrated, and logistics and delivery mechanisms were developed to ensure smoother product distribution and wider market reach.



Figure 4. Technology Implementation

The technological and innovative products resulting from this community service program encompass both hard and soft technologies. In terms of hard technology, the team implemented several modern production tools, including freezers, coconut graters, ovens, and vacuum sealers. These tools enabled the Frozen Sagu Sep production process to be carried out more hygienically and efficiently, resulting in products with consistent quality and a longer shelf life. The adoption of these technologies not only improved production capacity but also created opportunities for broader market distribution.



Figure 5. Hard Technology

In terms of soft technology, innovations focused on strengthening management and marketing systems. The partner began using QRIS as a digital payment method, providing more convenient, secure, and transparent transactions. Additionally, the team introduced a simple

financial recording application to assist the partner in maintaining neat, accurate, and easily monitored bookkeeping reports.

Further innovations were made in marketing, where the team assisted in developing new packaging designs and a distinctive product logo. This visual identity was reinforced by creating and managing social media accounts that function as both promotional tools and digital sales channels. Through these initiatives, Frozen Sagu Sep now appears more professional and has expanded its market reach through digital-based marketing strategies.

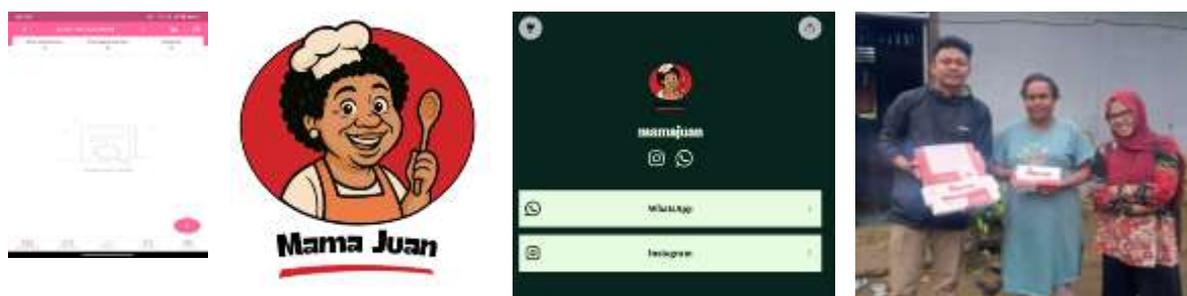


Figure 6. Soft Technology

Table 3. Technology Aspect – Before and After Assistance

Technology Aspect	Condition Before Assistance (Before)	Condition After Assistance (After)
Hard Technology	Simple and mostly manual production equipment; no integration of freezers, vacuum sealers, or modern machines	Use of freezers, automatic coconut graters, ovens, and vacuum sealers results in a more hygienic and efficient production process with longer product shelf life
Soft Technology	Management, financial, and marketing systems were still conventional; digital applications and social media were not utilized optimally	Use of QRIS, financial recording applications, social media, online stores, new packaging and logo designs, as well as scheduled and analytics-based digital marketing strategies

Monitoring and Evaluation

The monitoring and evaluation phase was conducted through regular onsite visits to ensure consistent application of the technologies and skills introduced. In the production aspect, the team observed the daily use of the freezer, vacuum sealer, automatic coconut grater, and oven. The evaluation showed a consistent improvement in product shelf life from 1–2 days to 7–8 days and an increase in production capacity from 3–4 batches per day (\pm 6–8 kg of dough) to 7–8 batches per day (\pm 14–16 kg of dough). All equipment was successfully operated independently by the partner, resulting in a more hygienic, efficient, and stable production process.

In the management and marketing aspects, the team monitored the use of the digital financial recording application, QRIS/bank transfer payments, and the management of Instagram and online marketplace stores. The evaluation indicated a shift from fully manual bookkeeping to a combined system involving digital transactions, improving financial accuracy and traceability. In marketing, the partner, which previously had no active online channels, now manages at least one active social media account and one online marketplace store, supported by more consistent posting schedules and improved branding elements such as a new logo and packaging design.

Program Sustainability

The program's sustainability is designed to ensure that the impact of the assistance continues beyond the activities' conclusion, through the strengthening of UMKM Mama Juan's technical, managerial, and marketing capacities. In the production aspect, sustainability is achieved through the continued implementation of production SOPs, the ongoing use of pre-freezing and vacuum-sealing technologies, and the optimization of modern machinery to support increased production capacity and sales volume. The partner is also encouraged to regularly maintain the equipment and adjust the workflow in response to market demands.

In the management aspect, the sustainability component focuses on the gradual improvement of the MSME's technical and managerial capabilities. The partner is encouraged to consistently use the financial recording application and the digital transaction systems introduced, while also creating opportunities for continued collaboration with research institutions, MSME associations, and relevant government agencies. Such collaboration is expected to support access to further mentoring, additional training, and the potential use of financing schemes or relevant government programs.

In the marketing aspect, program sustainability focuses on long-term marketing strategies and increased brand awareness. The partner is encouraged to maintain consistent digital marketing activities, strengthen brand identity, and explore partnerships with influencers, agencies, and MSME support institutions to expand promotional reach. All of these strategies are supported by regular evaluation and strategic adjustments in line with market dynamics and trends, enabling UMKM Mama Juan to continue adapting and maintaining its competitiveness in the long term.

Discussion

The application of freezer and vacuum-sealing technologies in the Frozen Sagu Sep production process is consistent with previous research and confirms it empirically in the context of Mama Juan MSME. Freezer technology functions to slow product deterioration caused by microbial activity (Rindiani & Purnasari, 2022; VH et al., 2021), and vacuum sealing reduces oxygen levels, thereby slowing oxidation and microbial growth (Abadi, 2021; Sari et al., 2024). In this program, the combined use of these two technologies extended the product's shelf life from approximately 1–2 days to 7–8 days, representing a more than threefold increase. This significant change not only validates the theoretical claims in the literature but also demonstrates a concrete improvement in the preservation of local food products in a real MSME setting. Previous studies have shown that such technologies enhance product competitiveness and MSME economic value (Lasmini et al., 2023; Novita, 2022), a finding supported here by Mama Juan MSME's ability to market Frozen Sagu Sep beyond its immediate local environment due to its longer shelf life and better product stability.

To improve production efficiency, the introduction of an automatic coconut grater has been empirically shown in this program to accelerate production processes and support higher output. Before the intervention, the partner produced only 3–4 batches per day (\approx 6–8 kg of dough); after technology adoption, production increased to 7–8 batches per day (\approx 14–16 kg of dough). This aligns with previous studies that highlight the role of coconut grating machines in increasing production capacity and reducing labor intensity (Sulastri et al., 2021; Waluyo et al., 2023). Thus, the use of an automatic grater in this program does not merely follow best practices from the literature but is quantitatively proven to almost double daily production volume, indicating a clear gain in productivity and potential revenue.

On the financial and marketing side, the adoption of QRIS in the payment system facilitated the shift from an almost fully cash-based system, previously, around 98% of transactions were in cash, with a leakage risk of 5–7% per month, towards a mixed cash–digital transaction

pattern. This transformation supports easier, traceable, and more accountable transactions for consumers and the MSME (Rifani, 2023). At the same time, the implementation of multichannel marketing strategies through social media and online marketplaces has concretely expanded the MSME's marketing reach. Prior to the program, Mama Juan MSME had no active social media accounts and no presence on marketplace platforms; after the intervention, the MSME successfully managed at least one active Instagram account and one online store on a national marketplace. These outcomes corroborate previous findings that multichannel and digital marketing strategies effectively broaden MSME market access (Pandora & Djajalaksana, 2022; Surahman et al., 2023), while also demonstrating measurable progress in the digital visibility of the partner.

Implementation of Technology and Innovation for the Community

The primary objective of this community engagement program is to enhance the competitiveness of local MSMEs by implementing production technologies and sustainable managerial innovations. The quantitative results of the intervention show that the technology applied to Mama Juan MSME is highly relevant to field needs and effectively addresses the main problems identified in the introduction, namely the low shelf life of Sagu Sep products and limited managerial capacity in business operations.

Before the intervention, the production process relied on simple tools and traditional methods, resulting in a product that lasted only 1–2 days and a weekly production volume of approximately 20–30 trays (Table MSME Profile). After introducing a freezer, oven, automatic coconut grater, and vacuum sealer, the production process became more hygienic and efficient, and the resulting Frozen Sagu Sep could last 7–8 days. The increase in daily production capacity from 3–4 to 7–8 batches further illustrates the substantial productivity gains achieved through technology adoption. These empirical findings indicate that the technological innovations implemented have a high relative advantage and compatibility (Ariyanto et al., 2023; Gumilang et al., 2024; Hidayat, 2023), particularly because they were adapted to the local production context and the partner's existing skills.

Beyond technical improvements in production, the implementation of digital management systems such as QRIS-based payments and simple financial recording applications has proven relevant in improving business governance. Previously, almost all transactions were cash-based and many were undocumented, contributing to financial leakage and making it difficult for the MSME to accurately monitor cash flow. Following the intervention, the partner began integrating digital payments and a financial recording application, which strengthened transparency and efficiency in business operations. These changes are in line with findings that emphasize the importance of MSME digitalization for enhancing competitiveness and financial inclusion in developing economies (Bahasoan et al., 2025; Chaerunisak et al., 2024).

From a participation standpoint, community involvement was remarkably high. The Participatory Action Research (PAR) approach applied in this program enabled the community to act as active agents in the change process rather than passive recipients. The partner's direct engagement in every stage, from training and equipment trials to new packaging design and social media management, shows that the innovations were accepted not only technically but also socially and culturally. This aligns with PAR principles, which emphasize reflective collaboration between researchers and communities to achieve sustainable social transformation (Felani et al., 2025).

From a theoretical perspective, these findings reinforce the view that the success of technological adoption at the micro-MSME level depends on two critical factors: the alignment of innovation with local contexts and the active participation of beneficiaries (Handrian & Novita, 2025). In this program, both conditions were met: the selected technologies were compatible with the MSME's existing operations, and the community was involved in all decision-making stages.

Therefore, the application of technology in this program not only addressed technical production needs but also fostered critical awareness and a sense of ownership among the community toward the innovations introduced.

Impact (Usefulness and Productivity)

The outcomes of this program demonstrate tangible, measurable impacts on production capacity, managerial strength, and market expansion for Mama Juan MSME. From a production perspective, the use of modern equipment significantly increased time efficiency and product quality. The innovation of Frozen Sagu Sep extended product shelf life from 1–2 days to 7–8 days, while daily production volume increased from 3–4 batches (\approx 6–8 kg of dough) to 7–8 batches (\approx 14–16 kg of dough). These quantitative improvements directly address the research question of how technological implementation can enhance the added value of local products by enabling longer distribution times, reduced waste, and increased sales potential.

Theoretically, these results support Porter's (1985) Value Chain concept, which posits that every improvement in production efficiency contributes to value creation and product competitiveness (Rahmah & Isnaini, 2025; Wisdaningrum, 2013). The recorded increase in production capacity and shelf life indicates that the primary activities in the value chain, particularly operations and outbound logistics, have been strengthened. Furthermore, the innovation aligns with the principles of perceived usefulness and perceived ease of use as explained in Davis' (1989) Technology Acceptance Model (TAM). The partner's continued use of the freezer, vacuum sealer, and automatic coconut grater, as well as their adoption of digital payment and financial recording applications, suggests that the technologies are perceived as beneficial and manageable in daily operations (Aditya & Wardhana, 2016).

From a managerial perspective, the use of QRIS and simple financial recording applications has enhanced business governance through greater transparency and accountability (Kartikasari et al., 2024; Saputri & Arnilarasi, 2025). In practice, this is reflected in the transition from a fully manual, notebook-based system with high vulnerability to errors and leakage to a more systematic financial management system that combines digital transactions and recorded cash flows. This allows the MSME to evaluate revenues more accurately, calculate profits with greater certainty, and minimize the risk of financial leakage. In the long term, such improvements are expected to support business sustainability, as sound financial management is a fundamental pillar of MSME growth.

In the marketing domain, the development of new packaging designs, product logos, and social media promotions has increased product attractiveness and brand awareness. Concretely, the MSME progressed from having no online presence to managing at least one active social media account and one online marketplace store, supported by regular promotional postings and improved branding elements. The digital marketing strategy, which leverages multichannel marketing across marketplaces, social media, and direct sales, has effectively expanded market reach. This is in line with Kotler and Keller's (2016) perspective that effective marketing strategies in the digital era must emphasize channel integration, allowing consumers to access products through multiple platforms (Mulyono et al., 2025).

The program not only produced an innovative product, Frozen Sagu Sep, but also established a technology-based and community-driven empowerment model that can be replicated by other local MSMEs in Papua. The integration of quantitative evidence, such as extended shelf life, increased production volume, and the transition to digital financial and marketing systems, demonstrates that the interventions generated both practical and theoretical contributions. Future research can focus on strengthening supply chain integration, conducting sustainability analyses, and developing a digital ecosystem for MSMEs rooted in local wisdom.

Conclusion

The Community Service Program, carried out in collaboration with UMKM Mama Juan, has successfully addressed the partner's main challenges in production, management, and marketing. Through a series of training sessions, technology implementation, and mentoring activities, the partner has now acquired new skills to manage the business more professionally.

In the production aspect, the application of technologies such as freezers, ovens, coconut graters, and vacuum sealers has enabled Sagu Sep to be transformed into Frozen Sagu Sep, which is more hygienic, more durable, and has a higher market value. In the management aspect, the partner has adopted QRIS and a simple financial recording application, resulting in more organized, transparent, and efficient business administration. Meanwhile, in the marketing arena, the introduction of new packaging, product logos, social media accounts, and marketplaces has enhanced the product's professional image and expanded its market reach.

This program has produced a significant positive impact, not only by increasing production capacity and product quality but also by strengthening the competitiveness of local wisdom-based MSMEs in South Papua. Moreover, it supports the achievement of Sustainable Development Goals (SDGs) 1, 2, 5, 8, 9, and 12, as well as Higher Education Key Performance Indicators (IKU) 2, 3, and 5, Asta Cita 3, 4, 5, and 6, and the National Research Master Plan (RIRN).

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Conflicts of Interest

The authors declare no conflict of interest.

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