

# Empowering Women through the Processing of Shrimp Waste into Local Wisdom-Based Entrepreneurial Products

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## ABSTRACT

This Community service program addresses the pressing issue of environmental pollution caused by shrimp processing waste in the coastal area of Beach of Selumit, Tarakan City. The program aims to empower women by transforming this shrimp waste, which poses an ecological threat, into local wisdom-based entrepreneurial products. Conducted in collaboration with BKM Sejahtera as the community partner, the initiative focused on converting shrimp heads and shells into natural powdered fertilizer and shrimp broth powder. Alongside waste processing training, the program enhanced women's financial literacy through a household financial literacy handbook and promoted digital marketing via the "udangcycle.id" social media platform. The participatory, community-based approach involved 30 female participants who showed progress in product creation, simple bookkeeping, and independent product marketing. This initiative not only improved environmental cleanliness but also strengthened women's roles as economic actors, increased household income, and broader economic empowerment in the coastal community.

**Keywords:** Women Empowerment, Shrimp Waste, Local Wisdom, Financial Literacy, Digital Marketing.

## I. Introduction

Women's empowerment plays a crucial role in improving the quality of life in society. Women are key actors in enhancing community well-being (Maharani & Yuliana, 2020). Not only do men play a significant role, but women also have substantial opportunities to contribute to the economic development of both their families and their communities. Through capacity building, access to resources, and support for entrepreneurial skills, women can become a driving force in creating sustainable social and economic change. Such empowerment not only improves family living standards but also fosters the development of more independent, inclusive, and gender-equal communities. The important role of women is particularly evident

in coastal areas, where many women do not engage in productive economic activities (Rahmawati, 2018). A similar condition can be observed in the coastal area of the Beach of Selumit, Tarakan City, where the majority of women are not engaged in productive economic activities, indicating that women's empowerment has not yet been fully realized. Nevertheless, this coastal area has considerable potential to strengthen women's participation in the local economy, particularly through the fisheries sector. Therefore, the Beach of Selumit in Tarakan City offers significant potential to enhance women's roles in community-based economic activities. BKM Sejahtera (Community Self-Reliance Agency) in Beach, Selumit Village, serves as a driving force for community empowerment through participatory principles. As an organization committed to improving community welfare, BKM Sejahtera actively implements community-based empowerment programs grounded in the values of self-reliance, cooperation, and independence. In the context of women's empowerment, BKM focuses on utilizing local resources to create sustainable economic opportunities.

BKM Sejahtera in Beach of Selumit Village is one of the active community organizations that continues to engage in both economic and social empowerment activities. The organization consists of nine core members listed in the notarial deed and four additional members not registered in the notarial register. Based on the results of a field survey conducted through BKM Sejahtera in Beach of Selumit Village, several issues were identified that require immediate attention. One of the primary concerns is the waste generated from shrimp processing activities at shrimp collection posts in the area. The continuous increase in shrimp production may have a positive impact on the local economy; however, it also creates significant environmental challenges. Organic waste from shrimp processing, such as heads, shells, and carapaces, is often disposed of directly into the water without proper treatment. The accumulation of this waste can degrade water quality and disrupt aquatic ecosystems. Although shrimp waste is organic, its large volume cannot be naturally decomposed by marine microorganisms within a short period of time. As a result, the buildup of this waste can disturb the ecological balance of aquatic environments by increasing organic loads, reducing dissolved oxygen levels, and causing unpleasant odors and water discoloration. In the long term, these conditions may damage marine habitats and threaten the sustainability of local fishery resources. The following figure illustrates the current condition of the field area.



**Figure 1. Location of the Current Field Area**



**Figure 2. Shrimp Collection Posts and Shrimp Waste**

Given the problems associated with shrimp waste, it is essential to manage it by transforming it into valuable entrepreneurial products, such as powdered broth and organic fertilizer. This initiative not only focuses on waste management but also aims to empower women in households and communities by providing training in marketing, social media use, and financial reporting. These efforts are expected to enhance women's economic capacity, strengthen their position within the community, and encourage the development of entrepreneurial activities based on local wisdom (Islami et al., 2025; Utomo et al., 2025). The principles of Gender and Development (GAD) applied in this program emphasize the empowerment of women as active participants in both the planning and implementation of development initiatives. Efforts to strengthen women's economic capacity, particularly through entrepreneurship based on marine resources, contribute to achieving Sustainable Development Goals (SDG) 5 (Gender Equality) and SDG 8 (Decent Work and Economic Growth). Processing shrimp waste into entrepreneurial products can stimulate the growth of small, community-based enterprises while simultaneously improving the skills of program partners. In addition, this program promotes the development of an economy rooted in local wisdom and encourages innovation in marine food technology, in line with the National Research Master Plan (RIRN).

## II. Literature Review and Hypothesis Development

### 2.1. Theoretical Foundations of Gender Empowerment (GAD Framework)

The Gender and Development (GAD) framework, as conceptualized by Kabeer (2005), positions women as active agents in development processes rather than passive recipients of aid. This approach emphasizes three core dimensions: access to resources, agency in decision-making, and the transformation of gender norms that perpetuate inequality. In coastal communities, Cornwall (2016) extends the GAD perspective by highlighting women's roles as builders of resilience, particularly in resource-constrained environments where they manage household economies while simultaneously addressing environmental challenges. Applied to the Beach of Selumit program, the GAD framework supports the full-cycle participation of 30 women from BKM Sejahtera—from the identification of community needs to waste processing training and the independent management of [udangcycle.id](http://udangcycle.id). Unlike the traditional Women in Development (WID) approach, which focuses primarily on economic inputs, the GAD framework ensures that women actively participate in the design and implementation of solutions. Through this approach, shrimp waste is transformed from an environmental liability into a valuable entrepreneurial resource.

### 2.2. Shrimp Waste Management: Environmental Challenges and Economic Opportunities

Shrimp processing waste—such as heads, shells, and carapaces—poses significant ecological challenges in coastal areas. Goebel et al. (2020) report that organic waste accumulation can reduce dissolved oxygen levels, trigger eutrophication, and disrupt aquatic ecosystems. In Indonesia's fisheries sector, shrimp processing generates substantial amounts of waste each day. At the Beach of Selumit alone, shrimp collection posts produce approximately 9 tons of shrimp waste daily. Several studies have explored innovative solutions for utilizing shrimp waste. For instance, Ulya S. (2016) demonstrated the conversion of *Penaeus monodon* shrimp heads into protein-rich animal feed, achieving yield improvements of approximately 25–30%. The study also optimized fermentation ratios for terasi production, balancing salt concentration with microbial safety. Furthermore, household-scale fermentation using lactic acid bacteria has been developed to produce pathogen-free products suitable for micro, small, and medium enterprises (UMKM). These approaches align well with BKM Sejahtera's capacity, which relies on simple, accessible technologies. Through basic processes such as sun-drying, grinding, and sieving, shrimp waste can be transformed into natural broth powder and organic fertilizer, thereby providing both environmental and economic benefits for the community.

### 2.3. Financial Literacy Gaps Among Coastal Women Entrepreneurs

Financial literacy remains a major barrier to the sustainability of micro, small, and medium enterprises (UMKM) among Indonesian women entrepreneurs. Nainggolan et al. (2022a, 2024) found that approximately 87% of women entrepreneurs in Tarakan combine household and business finances, resulting in unclear cash flows and increasing the risk of business failure. Furthermore, Christinawati Putri et al. (2024) demonstrated that implementing simple financial reporting tools, such as SIAPIK, increased record-keeping compliance by 65% among Rizwi SMEs. To address this issue, the program introduces a financial literacy handbook designed with a tiered level of complexity. Level 1 focuses on simple notebook-based income and expense tables, Level 2 introduces Excel pivot tables for basic profit analysis, and Level 3 covers basic break-even point calculations. This graduated learning approach is consistent with successful interventions reported by Nainggolan et al. (2022), in which the use of visual ledger templates reduced participants' cognitive burden by approximately 40% for those with low literacy levels.

### 2.4. Digital Marketing Transformation for Microenterprises

Digital platforms play a crucial role in bridging market access gaps for rural micro, small, and medium enterprises (UMKM). Gurumurthy (2021) reported that the adoption of digital platforms such as Instagram and e-commerce increased sales among rural women entrepreneurs by approximately 35–50% due to expanded geographic market reach. Supporting this finding, data from the World Bank (2023) confirm the significant role of social commerce in ASEAN, where 68% of MSMEs reported revenue growth after adopting digital platforms. At the local level, Kartini et al. (2024) found that UMKM in Tarakan experienced a 28% increase in production following e-commerce training. Similarly, Sulistya Rini Pratiwi et al. (2023) documented the effectiveness of Instagram as a marketing platform for homemakers, with posts optimized with hashtags achieving engagement rates up to 3 times higher. The [udangcycle.id](https://udangcycle.id) platform operationalizes these strategies through a collective branding approach. This includes product photography workshops, the use of standardized caption templates (e.g., "Natural shrimp fertilizer – boosts plant growth by up to 30%"), and a shift-based content management system managed by BKM members. This approach ensures the sustainability of digital marketing activities even after the program funding ends.

### 2.5. Community-Based Participatory Research Principles

Community-Based Participatory Research (CBPR), as emphasized by Israel et al. (2026), promotes the co-creation of knowledge and solutions with community partners, resulting in stronger ownership and greater sustainability of development programs. This approach emphasizes collaboration between researchers and community members throughout the research and implementation process. Six key principles guide the implementation of this program, including ecosystem representation involving BKM, government institutions, and universities; reciprocity in skill-building; and the use of iterative feedback mechanisms to continuously improve program outcomes. These principles ensure that community members are actively involved not only as beneficiaries but also as contributors to the development process. Previous studies have demonstrated the effectiveness of this participatory approach. Maharani and Yuliana (2020) successfully applied CBPR in seafood processing initiatives in Probolinggo, achieving an 85% skill retention rate among participants six months after program implementation. Similarly, Rahmawati (2018) highlights the central role of coastal women in participatory development models, where local knowledge shapes appropriate technical solutions. In the context of BKM Sejahtera, CBPR is implemented through several participatory activities. These include waste audits conducted collaboratively by program participants, the co-design of shrimp waste drying protocols based on local sun exposure patterns, and the formal transfer of program management to BKM through a memorandum of understanding (MoU). This participatory approach strengthens community ownership and supports the program's long-term sustainability.

### III. Research Method

Beach of Selumit Village, located in Tarakan City, is one of the coastal areas with significant economic potential in the fisheries sector, particularly in shrimp processing. However, despite this potential, the community, especially women, still faces several challenges that hinder their empowerment in this sector. Some of the main issues faced by the target partner, BKM Sejahtera, a community empowerment organization, include the following:

a. Lack of Entrepreneurship Training for Women

Most women in the Beach of Selumit lack adequate skills in managing fisheries-based businesses, particularly in processing shrimp waste into valuable products. This condition is caused by the limited availability of entrepreneurship training programs focused on marine waste processing and on developing products from local resources. As a result, the large amount of shrimp waste produced each month is not utilized efficiently, leading to environmental pollution.

b. Limited Access to Information on Business Management and Marketing

Women in this area have the potential to develop businesses; however, their limited knowledge of business management and marketing restricts their ability to expand their market reach. Many women entrepreneurs on the Beach of Selumit lack effective marketing strategies, particularly in leveraging digital technologies such as e-commerce platforms and social media to promote their products.

c. Low Financial and Digital Literacy

Financial and digital literacy among women entrepreneurs in the area remains very low. Many of them experience difficulties managing their business finances, including bookkeeping, financial planning, and using financial applications. This limitation leads to inefficient business management and may create long-term risks to the sustainability of their businesses.

d. Limited Market Connectivity and Distribution Networks

Although marine-based products such as shrimp broth have significant market potential, many women entrepreneurs in Selumit Beach face barriers to accessing broader markets. Limited access to social media utilization and weak local distribution networks restrict their ability to expand their businesses and increase their income.

Based on the issues described above, several solutions can be formulated to address these challenges, as presented in the following table.

**Table 1. Problems and Solutions**

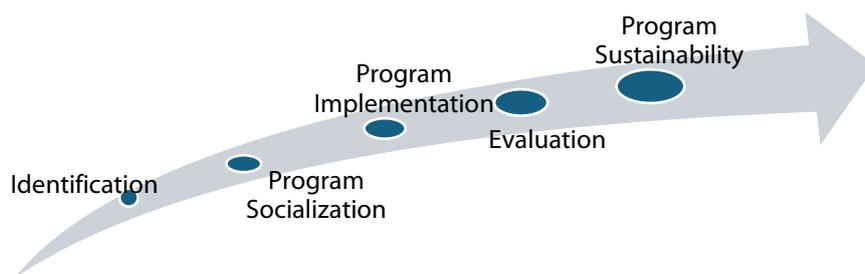
Aspect	Solution	Implementation	Quantitative Target
Support Facilities for Women Entrepreneurs	Community-based entrepreneurship training focusing on shrimp waste processing	Entrepreneurship training using shrimp waste as the main raw material	One to two flagship products made from shrimp waste

Aspect	Solution	Implementation	Quantitative Target
Lack of Mentorship and Financial Education	Financial literacy training for women entrepreneurs	Workshops on business financial management and financial planning	One concise financial management handbook
Limited Market Connectivity and Business Networks	Strengthening digital marketing access through social media	Development of a digital platform or social media account specifically for women MSMEs	One official account under the partner organization to promote flagship products made from shrimp waste

The implementation and outcomes of this program have strengthened the role of women and the surrounding community in improving economic conditions. In addition, this direct involvement can serve as a model for neighboring areas that face similar challenges to adopt comparable initiatives. The implementation and outcomes achieved provide several benefits, including the following:

- a. Entrepreneurship Training Based on Shrimp Waste
  1. Enhancing the knowledge and skills of the community, particularly women, in processing shrimp waste into economically valuable products such as broth powder and organic fertilizer.
  2. Creating new business opportunities based on local potential that are sustainable and environmentally friendly.
  3. Encouraging the emergence of new entrepreneurs who are capable of innovatively utilizing resources available in their surrounding environment.
- b. Social Media Utilization Mentorship Program
  1. Improving the digital literacy of MSME actors, particularly women, in marketing their products through online platforms.
  2. Expanding the market reach of shrimp waste processed products through the use of social media platforms.
  3. Increasing the competitiveness of local products by applying effective and efficient digital marketing strategies.
- c. Business Financial Management and Business Planning Workshop
  1. Equipping MSME actors with knowledge of basic financial management, including transaction recording and capital management.
  2. Increasing awareness of the importance of structured and sustainable business planning.
  3. Reducing the risk of business failure caused by weaknesses in financial management.
- d. Development of a Digital Platform or Social Media Under the Partner Organization
  1. Providing a dedicated platform for women MSME actors to market their products more easily and securely.
  2. Promoting inclusivity and gender equality in the digital business environment.
  3. Facilitating consumer access to quality local products produced by women entrepreneurs.

The steps outlined for implementing these solutions are carried out systematically, based on the partner organization's identified priority issues, as follows.



**Figure 3. Stages of Program Implementation and Sustainability**

The stages of program implementation are described as follows:

a. Identification and Analysis of Partner Needs

The identification and analysis of the partner's needs are conducted before the proposal is submitted. An initial survey is conducted to identify the partner's problems, including the need for training in production, marketing, and financial literacy.

b. Program Socialization to the Community

1. Conducting meetings with local stakeholders, including the village government, community leaders, and BKM representatives.
2. Explaining the objectives and benefits of the program, as well as how community members can participate in the activities.
3. Establishing a community-level implementation team to support the smooth execution of the program.

c. Program Implementation through Training and Technology Application

1. Entrepreneurship training based on shrimp waste processing.
2. Mentorship program on the utilization of social media for product marketing.
3. Workshop on business financial management and business planning.
4. Development of a digital platform or social media account under the partner organization.

d. Ongoing Mentoring and Regular Evaluation

1. Monitoring participant progress through regular meetings.
2. Evaluating the effectiveness of the training programs and the application of technology in business activities.
3. Adjusting strategies based on the challenges encountered during implementation.

e. Program Sustainability

1. Encouraging the community to manage the program independently.
2. Establishing long-term partnerships with cooperatives, government institutions, and the private sector.
3. Monitoring the long-term impact of the program to ensure its sustainability.

The approach applied in this program is based on participatory, sustainable, and technology-based principles. The methods used in the implementation of the program are described as follows:

- a. Community-Based Approach: Encouraging the active participation of women at every stage of the program, including planning, implementation, and evaluation.
- b. Utilization of Digital Technology: Utilizing financial applications and e-commerce platforms to improve business competitiveness and expand market access.
- c. Inclusive Approach: Ensuring that women from diverse backgrounds have equal opportunities to participate in and benefit from the program.
- d. Economic Independence Model: Providing funding and marketing mechanisms through partnership-based collaboration to support the sustainability of women-led businesses.

The implementation and sustainability of the program are evaluated through an initial evaluation stage in which the team measures the number of training participants, assesses business development, and observes improvements in participants' income levels. In addition, a long-term evaluation examines the program's impact on community economic growth and assesses the sustainability of the flagship products developed. The community service program successfully involved 30 women from BKM Sejahtera in Beach of Selumit, Tarakan, over a period of three months and produced three main outputs. These outputs include two processed shrimp waste products—natural broth powder and organic fertilizer—and a financial literacy handbook with an adoption rate of 87 percent, as well as the creation of the udangcycle—ID social media account. Quantitative evaluation using pre- and post-assessments demonstrated significant improvements in participants' knowledge and skills. Competency in shrimp waste processing increased from 12 percent to 89 percent, financial record-keeping skills improved from 0 percent to 83 percent, and the ability to create digital marketing posts increased from 0 percent to 77 percent. In addition, household income increased by an average of 28 percent, rising from Rp1.2 million to Rp1.54 million per month. A total of 23 participants, representing 77 percent of the group, reported continued product sales three months after the training program.

Participant progress was systematically monitored through a three-level evaluation process. Weekly WhatsApp monitoring was conducted to track participant engagement, resulting in an 82 percent completion rate for the financial literacy handbook. Mid-program practical assessments showed that 80% of participants completed the shrimp waste processing competency test. In addition, field verification visits confirmed that 23 of 30 participants could independently produce shrimp waste-based products. These outcomes support the Gender and Development framework proposed by Kabeer (2005), which emphasizes transforming women from passive recipients of assistance into active agents of economic development. In this program, women shifted from being affected by problems with shrimp waste disposal to becoming active economic actors who process approximately 150 kilograms of shrimp waste each month into marketable products. Program sustainability is strengthened through BKM Sejahtera's commitment, formalized through a memorandum of understanding, to manage udangcycle.ID platform and continue the financial literacy training for new members in the future.

#### IV. Results and Discussion

The community service program, entitled "Empowering Women through Shrimp Waste Processing into Local Wisdom-Based Entrepreneurial Products to Strengthen the Family Economy," in Beach of Selumit Village, Tarakan City, has produced tangible results in both community capacity building and measurable program outputs. The activities involved 30 women members of BKM Sejahtera, along with several homemakers who participated as the main participants in the program. The program adopted a participatory, community-based approach, in which the community served as the primary actor at every stage, from planning to implementation to evaluation. Through this approach, participants were not only recipients of the program but also actively contributed to its development and implementation. The entire program was implemented over three months.



**Figure 4. Activity Documentation**

The implementation stages began with program socialization, followed by production training, financial literacy workshops, and digital marketing mentorship. The outcomes achieved included not only improvements in the participants' technical and managerial skills but also the creation of three concrete outputs that have the potential to be developed sustainably. These outputs include the following:

a. Innovation of Processed Shrimp Waste Products

The shrimp waste processing training produced two main products: shrimp broth powder and organic fertilizer. This activity was designed as a response to environmental problems caused by the disposal of shrimp heads and shells directly into the sea. Through a process of drying, grinding, and simple formulation, participants produced natural broth powder without preservatives, with a savory flavor well accepted by consumers. Previous studies have shown that shrimp waste can be developed into alternative value-added products with high economic potential (Fitriani & Abdullah, 2020; Sari, Pertiwi, and Maulidya, 2021; Ulya S, 2016b). The fertilizer produced in this program is a natural powder derived from shrimp waste consisting of heads, shells, and carapaces, which are processed through simple drying and grinding methods without the use of additional additives. The production process begins with sorting and cleaning the raw materials. The materials are then dried to reduce moisture content and prevent unpleasant odors and microbial growth. After drying, the materials are ground and sieved to obtain a uniform particle size, then packaged securely. This fertilizer is applied as a soil conditioner or surface fertilizer by sprinkling it lightly onto the planting medium or mixing it into the top layer of the soil. This method makes the product practical for use in household gardens and small-scale agricultural activities. The additive-free production method highlights the product's natural characteristics, ease of replication, and low production cost. These aspects are consistent with empowering coastal women who rely on locally available resources. In addition to reducing the accumulation of shrimp waste around shrimp collection areas, the product's powdered form facilitates easier storage and distribution, thereby increasing the economic value of marine byproducts. The following figure presents the processed shrimp waste products produced during the program.



**Figure 5. Processed Shrimp Waste Products**

Through training facilitated by the community service team in collaboration with BKM Sejahtera, shrimp waste is used as the primary raw material to produce value-added, environmentally friendly products (Putra et al., 2025). This approach reflects the principles of the circular economy, in which products are produced from byproducts, which are reused as productive resources. From an academic perspective, this innovation demonstrates the successful implementation of community-based development and the empowerment of women through the Gender and Development (GAD) approach. Within this framework, women are not only beneficiaries of the program but also key actors who actively contribute to developing sustainable economic and environmental solutions. Furthermore, the shrimp waste processing initiative is consistent with the principles of the Sustainable Development Goals. In particular, it supports achieving SDG 5 on gender equality, SDG 8 on decent work and economic growth, and SDG 12 on responsible consumption and production.

b. Financial Literacy Handbook

The women's empowerment activities in Beach of Selumit Village also focus on improving financial literacy. Various previous studies have shown that low financial literacy is one of the main factors contributing to low business sustainability and a high risk of financial failure, particularly among women-led MSMEs (Christinawati Putri et al., 2024; Kartini, Kismanti et al., 2025; Nainggolan et al., 2022, 2024). This aspect is important because initial observations indicated that most women partners could not maintain proper business records and tended to combine household finances with the finances of their business activities. Such conditions often lead to unclear cash flow and difficulties in calculating profits or planning capital allocation. Through training and mentoring activities, the community service team introduced a financial literacy handbook in a simple, practical format. This handbook provides step-by-step guidance on recording daily income and expenses, separating business capital from sales revenue, and planning business expenditures and savings. The format is easy to understand and is supported by examples of simple bookkeeping tables that can be manually implemented using a standard notebook. In addition to functioning as an administrative tool, the handbook also serves as a medium for reflection and financial self-control. Many participants reported that by recording each transaction, they became more aware of their cash flow, reduced unproductive spending, and could clearly identify when the business generated profits or experienced losses. This practice directly strengthens women's capacity as responsible and careful managers of household and business finances.



**Figure 6. Financial Literacy Handbook**

From an empowerment perspective, financial literacy is not only the ability to manage money but also the capacity to make informed economic decisions. By understanding the basic concepts of bookkeeping,

capital management, and profit calculation, women are better equipped to determine business development strategies, manage inventory, and decide when to expand their businesses or purchase additional raw materials. In this program, strengthening financial literacy lays a foundation for the long-term sustainability of community-based economic activities. Participants are no longer dependent on external assistance and can manage their resources more effectively and efficiently. In addition, the handbook provides long-term educational value. BKM Sejahtera currently uses the handbook as an internal module for entrepreneurship training for new members. As a result, its benefits extend beyond the initial participants and can be shared with other coastal communities. Financial literacy, therefore, plays a dual role as both a tool for strengthening individual capacity and an instrument for reinforcing community-based institutional development.

c. The "udangcycle.ID" Social Media Account as a Digital Promotion Channel

As an effort to strengthen business sustainability and expand the market reach of processed products from shrimp waste, the women's empowerment activities in Beach of Selumit Village also focus on improving digital literacy and online marketing skills. Initial observations indicated that most participants were not accustomed to using social media for business purposes. Many participants still relied on direct sales within their local communities and did not adopt a structured promotional strategy. To address this challenge, the community service team introduced the concept of community-based digital marketing through the creation of an official social media account named "udangcycle.id."



**Figure 6. Social Media**

The "udangcycle.id" account was developed as a collective platform for women members of BKM Sejahtera to promote their products collectively. These products include shrimp broth powder, natural powdered fertilizer, and other derivative products based on local resources. Through this platform, participants received training on creating simple promotional content, including product photography, writing compelling product descriptions, creating relevant hashtags, and engaging with potential customers. The training was conducted step by step, using a practical learning approach, so participants could gradually become familiar with the digital marketing process. From an analytical perspective, the digital marketing strategy implemented through "udangcycle.id" provides three main benefits. First, it improves promotional efficiency because social media enables participants to market their products without significant advertising or product exhibition costs. Second, it expands market reach, as a broader audience can now access products

previously known only within the local community through digital platforms. Third, it contributes to the development of a collective business identity, since the account functions not only as a promotional channel but also as a branding tool that strengthens the image of coastal women as actors in the creative economy. In addition, this activity encourages a sense of ownership and collaboration among participants. The account management is conducted in shifts by a small team, coordinated by BKM Sejahtera.

Each member is assigned a specific role, including product documentation, post design, and customer message management. This model strengthens BKM Sejahtera's role as a community-based driver of the local economy. With a clear structure of responsibilities, the sustainability of product promotion activities can be maintained even after the university's mentoring activities have been completed. From a conceptual perspective, digital marketing through "udangcycle.id" represents a form of socio-economic transformation based on technology. Through this process, coastal women adapt to the digital era to improve the competitiveness of their businesses. This approach is consistent with the principle of digital empowerment, which emphasizes the development of individual capacity to use technology to achieve economic independence. Previous studies have shown that using social media can increase product production and business performance (Kartini et al., 2024b; Sulistya Rini Pratiwi et al., 2023; Wilianto et al., 2026). In addition to supporting the achievement of the Sustainable Development Goals, particularly SDG 5 on gender equality and SDG 8 on decent work and economic growth, this initiative also opens broader opportunities for women to participate in the regional digital economy ecosystem.

## V. Conclusion

The women's empowerment program implemented in Beach of Selumit Village, Tarakan City, demonstrates that shrimp waste management grounded in local wisdom can be an effective approach to improving the welfare of coastal communities while simultaneously supporting environmental sustainability. Through this program, women participants gained technical skills in processing shrimp waste into value-added products, such as natural powdered fertilizer and shrimp broth powder. In addition, participants improved their financial management abilities through the introduction of a financial literacy handbook and strengthened their digital marketing capacity through the collective promotional account named udangcycle.id. The integration of production skills, financial literacy, and digital marketing capacity has created a sustainable model for community empowerment. The program's outcomes include improvements in household income, increased managerial knowledge, and the development of a stronger entrepreneurial mindset among coastal women. Furthermore, the program strengthens BKM Sejahtera's institutional role as a community-based driver of local economic development. This initiative not only addresses the environmental challenges posed by fisheries waste but also promotes socio-economic transformation through gender empowerment. The program aligns with the objectives of the Sustainable Development Goals, particularly SDG 5 on Gender Equality and SDG 8 on Decent Work and Economic Growth. The empowerment model developed through this activity has the potential to be replicated in other coastal regions by adapting to local resource potential in order to create an inclusive, independent, and sustainable community economy.

For future studies, it is recommended that longitudinal research be conducted to evaluate the long-term impact and sustainability of similar empowerment programs. Expanding the scope of participants and involving broader local stakeholders and policy makers may provide deeper insights into the effectiveness of such initiatives. Future research should also examine strategies to address social and cultural barriers that may limit women's participation in entrepreneurship, as well as develop more context-appropriate digital marketing training programs for coastal communities. The authors would like to express their sincere gratitude to the Directorate of Research and Community Service, Directorate General of Research and Development, Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia, for providing funding support for the implementation of this community service program. The authors also extend their appreciation to Universitas Borneo Tarakan and BKM Sejahtera of Beach of Selumit Village for

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