

Triple Layered Business Model Canvas Strategy in Realizing Aquaculture Business Sustainability at the Mina Perkasa Farming Group

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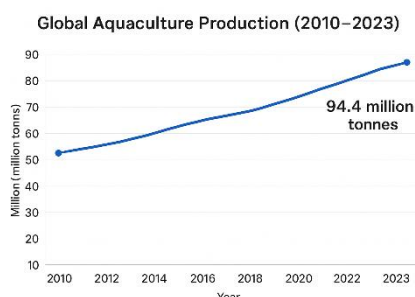
Abstract: *This study aims to identify the sustainable business model and formulate business development strategies for Pokdakan Mina Perkasa using the Triple Layered Business Model Canvas (TLBMC) approach. This research employed a qualitative method with a case study approach. Data were collected through interviews, observations, and documentation involving the head of Pokdakan Mina Perkasa, group members, and stakeholders engaged in aquaculture and fish processing activities. The findings indicate that the business model of Pokdakan Mina Perkasa has incorporated economic, environmental, and social aspects. However, several areas still require improvement. In the economic layer, the proposed strategies focus on expanding customer segments, strengthening digital marketing, improving customer relationships, and developing value-added products. In the social layer, the strategies are directed toward enhancing members' capacities, empowering the local community, and strengthening collaboration with various stakeholders. In the environmental layer, the strategies emphasize waste reduction, by-product utilization, efficient resource management, and environmentally friendly distribution practices. Based on these findings, an integrated business development strategy covering economic, environmental, and social aspects was formulated to support the sustainability of Pokdakan Mina Perkasa. The proposed strategy is expected to improve business competitiveness, strengthen long-term business sustainability, and generate benefits for group members, the local community, and the environment.*

INTRODUCTION

Aquaculture is an important subsector of national economic development because it supports food security and provides animal protein. Global aquaculture production reached 94.4 million tonnes, while more than half of global fish consumption was supplied by aquaculture

products (FAO, 2023). This figure confirms the strategic role of aquaculture in meeting global food demand, including in Indonesia, which has extensive inland and coastal water resources. However, increased production may generate water pollution, unused feed waste, and aquatic ecosystem degradation, potentially threatening long-term business sustainability without responsible production and environmental management (Priyanka et al., 2021).

Figure 1. Global Aquaculture Production
 Source: FAO (2023)



Aquaculture sustainability requires the integration of economic, social, and environmental dimensions. The Triple Bottom Line framework assesses business performance through people, planet, and profit, encouraging businesses to create economic value while protecting community welfare and environmental quality (Elkington, 1997). Joyce and Paquin (2016) extended this principle through the Triple Layered Business Model Canvas, which integrates economic, social, and environmental layers into a comprehensive analysis of business activities, stakeholder relationships, social value, resource use, and environmental impacts.

The Triple Layered Business Model Canvas is relevant to small-scale aquaculture because its operations are directly connected to communities and natural resources. Fish-farming groups conduct production and marketing while facilitating knowledge exchange, strengthening cooperation, supporting local employment, and affecting aquatic ecosystems. Their performance should therefore be evaluated not only through revenue, costs, customers, and market channels, but also through the social and environmental value they generate.

Pokdakan Mina Perkasa is a fish-farming group located in Karang Duren Village, Mrebet District, Purbalingga Regency. It supports local residents in developing gourami aquaculture through fish seed and consumption-sized fish production. The group also contributes to technical learning, member cooperation, and the rural economy (Pokdakan Mina Perkasa, 2025).



Figure 2. Location of Pokdakan Mina Perkasa
 Source: Pokdakan Mina Perkasa (2025)

Despite its business potential, preliminary observations show that sales remain relatively

low, marketing is conducted independently by members, and the group has not fully functioned as an integrated business unit. These conditions constrain production coordination, market expansion, bargaining power, and the development of a collective business identity.

The group has introduced aquaponic systems and utilized fish-processing by-products to produce frozen foods such as nuggets and tempura. These initiatives demonstrate efforts to improve efficiency, reduce waste, create added value, and respond to market needs. However, their effectiveness requires clearer organizational responsibilities, coordinated production, stronger institutional management, appropriate marketing strategies, and continuous evaluation.

Pokdakan Mina Perkasa has 15 active members out of 22 registered members. It functions as a learning platform that strengthens technical competence, cooperation, solidarity, and collective participation. Its sustainability therefore contributes not only to member income but also to community empowerment, local economic resilience, knowledge development, and environmentally responsible aquaculture in Karang Duren Village.

Previous sustainable business model studies have generally focused on large companies or examined economic, social, and environmental dimensions separately. The application of the Triple Layered Business Model Canvas to community-based micro and small aquaculture enterprises in Indonesia remains limited. Existing studies have therefore not fully explained how local fish-farming groups can integrate institutional management, market development, social empowerment, and environmental responsibility into a unified business model.

This study examines Pokdakan Mina Perkasa using the Triple Layered Business Model Canvas. It identifies the existing economic, social, and environmental elements, evaluates their contribution to sustainability, and formulates business development strategies. The analysis focuses on operational, managerial, social, and environmental activities using data collected through interviews, observations, and documentation.

This study aims to determine how the Triple Layered Business Model Canvas can support the sustainability of Pokdakan Mina Perkasa and formulate more effective, competitive, and sustainable strategies. The findings are expected to contribute to sustainable business model and social entrepreneurship literature in small-scale aquaculture. They may also support improvements in organizational governance, collective marketing, product development, stakeholder relationships, environmental management, and overall business sustainability.

LITERATURE REVIEW

Entrepreneurial Strategy

Entrepreneurial strategy combines entrepreneurial orientation with strategic management to support long-term business development. It involves identifying opportunities, managing resources, developing innovation, and responding proactively to market changes (Frederick & Kuratko, 2010). Entrepreneurs are expected to make strategic decisions and design appropriate growth plans despite uncertainty and limited resources (Gundry & Kickul, 2007). In community-based enterprises, entrepreneurial strategy also includes collaboration, network development, social responsibility, and environmental awareness. Therefore, an appropriate entrepreneurial strategy can help small-scale businesses improve competitiveness, create added value, and maintain business continuity.

Strategic Management

Strategic management refers to a series of managerial decisions and actions used to determine an organization's long-term direction and performance. The process consists of environmental analysis, strategy formulation, strategy implementation, and evaluation and control (Wheelen et al., 2018). Environmental analysis helps organizations identify internal

strengths and weaknesses as well as external opportunities and threats. The evaluation stage compares actual performance with predetermined targets and provides a basis for corrective actions. In this study, strategic management supports the assessment of the existing business model and the formulation of development strategies for Pokdakan Mina Perkasa.

Sustainable Business Model

A business model explains how an organization creates, delivers, and captures value through its resources, activities, partnerships, and relationships with customers (Osterwalder & Pigneur, 2010). Business models also function as strategic instruments for evaluating business competitiveness and adaptability to environmental changes (Teece, 2018). However, conventional business models tend to emphasize financial value. Sustainable business models expand this orientation by integrating economic, social, and environmental value into business activities (Bocken et al., 2014).

The concept of a sustainable business model is closely related to the Triple Bottom Line framework, which consists of profit, people, and planet (Elkington, 1997). Profit represents the organization's ability to generate sufficient economic value to maintain its operations. People refers to the welfare of employees, communities, customers, and other stakeholders affected by business activities. Planet focuses on the responsible use of natural resources and the reduction of environmental damage. A sustainable business model should therefore provide economic benefits while creating positive social value and reducing negative environmental impacts.

Fish-Farming Groups

A fish-farming group, commonly referred to as Pokdakan in Indonesia, is a socioeconomic organization formed by fish farmers to collectively manage aquaculture activities. Pokdakan supports production coordination, knowledge sharing, resource access, technology adoption, and marketing development. Collective action enables members to overcome production and business challenges more efficiently than individual operations (Salim, Elfitasari, & Harwanto, 2025).

Pokdakan also contributes to the development of social capital through cooperation, trust, and shared learning among members. Participation in a group can improve farmers' technical and managerial capabilities while strengthening their bargaining position and access to institutional support (Gichuki, Ndiritu, & Emodoi, 2024). Therefore, Pokdakan should not only function as a social association but also as a collective business institution capable of managing production, marketing, partnerships, and sustainable business development.

Triple Layered Business Model Canvas

The Triple Layered Business Model Canvas is a sustainable business model framework developed by Joyce and Paquin (2016). It extends the conventional Business Model Canvas by incorporating three interconnected layers, namely economic, social, and environmental. The framework is based on the Triple Bottom Line principle and allows organizations to assess how their business activities create financial value, influence stakeholders, and affect the natural environment.

The economic layer adopts the nine components of the Business Model Canvas, consisting of customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure (Osterwalder & Pigneur, 2010). This layer examines how an organization creates and maintains financial value through its operational and commercial activities.

The social layer evaluates the relationship between an organization and its stakeholders. Its components include social value, employees, governance, local communities, societal culture,

end users, social impacts, social benefits, and scale of outreach. This layer identifies the organization's contribution to employee welfare, community empowerment, institutional accountability, and broader social development.

The environmental layer evaluates the ecological consequences of business activities throughout the product life cycle. It includes functional value, materials, production, supplies and outsourcing, distribution, use phase, end-of-life, environmental benefits, and environmental impacts. This layer helps organizations identify resource consumption, waste generation, pollution risks, and opportunities to improve environmental efficiency.

In this study, the Triple Layered Business Model Canvas is used to identify the existing business model of Pokdakan Mina Perkasa, evaluate its economic, social, and environmental performance, and formulate an integrated business development strategy. The framework is relevant because aquaculture activities depend on financial viability, community participation, and responsible management of water, feed, production waste, and other natural resources.

METHOD

Research Design

This study employed a descriptive qualitative approach with a case study design to obtain an in-depth understanding of the business model and sustainability practices of Pokdakan Mina Perkasa. A qualitative approach was used to interpret activities, experiences, and social conditions through narrative data, while the case study design allowed the research to examine the actual business conditions within a specific organizational context (Creswell & Creswell, 2018; Waruwu, 2023).

The research focused on applying the Triple Layered Business Model Canvas to identify, evaluate, and formulate the development strategy of Pokdakan Mina Perkasa across economic, social, and environmental dimensions (Joyce & Paquin, 2016).

Research Site and Participants

The study was conducted at Pokdakan Mina Perkasa in Karang Duren Village, Mrebet District, Purbalingga Regency, Central Java, from October 2025 to April 2026. Participants were selected using purposive sampling because the study required informants with relevant knowledge, experience, and direct involvement in the group's aquaculture activities (Moleong, 2019; Sugiyono, 2022).

The participants consisted of the chairperson of Pokdakan Mina Perkasa, active fish-farming members, and representatives of the surrounding community. They provided information regarding business management, production, marketing, organizational governance, social contributions, environmental practices, and business development constraints.

Data Collection

The researcher served as the primary research instrument and was directly involved in collecting and interpreting field data (Fadli, 2021). Primary data were collected through observation, in-depth interviews, and documentation. Observation was conducted systematically to examine fish-farming activities, aquaponic practices, production facilities, marketing processes, member interactions, and environmental management (Abdussamad, 2021). Interviews used open-ended questions to explore the participants' experiences and perspectives regarding operational activities, strategic decisions, business constraints, and sustainability practices (Waruwu, 2023).

Documentation was used to support and verify the interview and observation findings. The documents included photographs, production records, simple financial records, organizational activity records, training records, and other available documents related to Pokdakan Mina

Perkasa (Haryoko et al., 2020). Secondary data were obtained from books, scientific articles, reports, and previous studies concerning sustainable business models, aquaculture, and the Triple Layered Business Model Canvas (Sugiyono, 2022).

Data Analysis

Data were analyzed continuously using the interactive analysis model consisting of data collection, data reduction, data display, and conclusion drawing and verification (Sugiyono, 2023). The collected data were selected, categorized, and interpreted according to the research objectives. Information from interviews, observations, and documentation was then mapped into the three layers of the Triple Layered Business Model Canvas.

The economic layer examined customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure based on the conventional Business Model Canvas (Osterwalder & Pigneur, 2010). The social layer assessed social value, governance, group members, local communities, social impacts, social benefits, and outreach. The environmental layer evaluated materials, production processes, supplies, distribution, resource use, waste management, environmental impacts, and environmental benefits (Joyce & Paquin, 2016).

The analysis was conducted in three stages. First, the existing business model of Pokdakan Mina Perkasa was identified. Second, each economic, social, and environmental element was evaluated to identify strengths, weaknesses, and sustainability contributions. Third, the evaluation results were used to formulate recommendations for improving organizational governance, collective production, marketing, social empowerment, and environmental management. The TLBMC framework was used because it can identify weaknesses in an existing business model and support the formulation of more integrated and sustainable strategies (Wijaya & Teny, 2022).

Data Trustworthiness

The trustworthiness of the findings was established through source, method, and theory triangulation (Sugiyono, 2022). Source triangulation was conducted by comparing information from the group chairperson, active members, and community representatives. Method triangulation compared data obtained through interviews, observation, and documentation.

Theory triangulation interpreted the findings using the Triple Bottom Line and Triple Layered Business Model Canvas frameworks. Conclusions were continuously verified until the information showed consistency and adequately represented the actual conditions of Pokdakan Mina Perkasa.

RESULT AND DISCUSSION

Research Context and Existing Business Strategy

Pokdakan Mina Perkasa is a community-based freshwater aquaculture group established on January 20, 2020, in Karang Duren Village, Mrebet District, Purbalingga Regency. The group focuses on gourami cultivation and fish-processing activities. It has 22 registered members, of whom 15 actively participate in production and business development. Its activities are financed through members' contributions and supported by Universitas Muhammadiyah Purwokerto and the Purbalingga Regency Fisheries and Agriculture Office.

The group conducts fish maintenance, feeding, harvesting, processing, and marketing through a simple organizational structure. Its existing business strategy relies on cooperation among members, product quality, direct communication, and trust-based relationships with customers. The chairperson explained:

"We focus on maintaining good communication with members and buyers. When relationships remain good, buyers will trust the quality of the fish we sell. Members also help one

another so that this aquaculture business can continue to develop” (Subekti, Chairperson of Pokdakan Mina Perkasa, May 2, 2026).

Marketing is primarily conducted through direct sales, collectors, word-of-mouth communication, WhatsApp, and the group’s website. These channels support relationships with local customers but have not significantly expanded the market beyond Karang Duren Village and nearby areas. The group’s original document also shows that its strategy remains centred on communication, cooperation, conventional marketing, and limited digital promotion.

Existing Triple Layered Business Model Canvas

The findings were mapped into the economic, social, and environmental layers of the Triple Layered Business Model Canvas. Table 1 summarizes the existing elements identified through interviews, observations, and documentation.

Table 1. Existing Triple Layered Business Model Canvas of Pokdakan Mina Perkasa

Layer	Element	Main Findings
Economic	Customer Segments	Local households, fish traders, food stalls, and culinary businesses
Economic	Value Propositions	Fresh gourami, fish nuggets, and fish tempura that are nutritious, practical, and affordable
Economic	Channels	Direct sales, collectors, WhatsApp, website, and word-of-mouth communication
Economic	Customer Relationships	Responsive communication, personal service, customer feedback, and product-quality maintenance
Economic	Revenue Streams	Fresh fish sales, processed-product sales, grants, and development assistance
Economic	Key Resources	Ponds, processing equipment, production facilities, operational vehicles, members’ skills, and financial support
Economic	Key Activities	Cultivation, feeding, maintenance, harvesting, processing, packaging, and marketing
Economic	Key Partnerships	Universitas Muhammadiyah Purwokerto, local government agencies, suppliers, and the local community
Economic	Cost Structure	Fish seed, feed, pond maintenance, utilities, processing materials, packaging, transportation, and marketing
Social	Social Value	Additional income, community empowerment, knowledge sharing, and business opportunities
Social	Employees	Member participation in cultivation, processing, and marketing, supported by training and mentoring
Social	Governance	Task allocation, deliberative decision-making, coordination with partners, and open communication
Social	Local Communities	Access to aquaculture and fish-processing knowledge
Social	Societal Culture	Cooperation, mutual assistance, solidarity, and collective responsibility
Social	Scale of Outreach	Members and residents of Karang Duren Village
Social	End Users	Local consumers and community members receiving

		products and knowledge
Social	Social Impacts	Improved skills, participation, economic opportunities, and social relationships
Social	Social Benefits	Training access, institutional assistance, nutritional products, and stronger community knowledge
Environmental	Functional Value	Fish products that provide nutrition and improve harvest utilization
Environmental	Materials	Internally cultivated fish, fish seed, feed, processing ingredients, and packaging
Environmental	Production	Integrated cultivation and fish-processing activities
Environmental	Supplies and Outsourcing	Fish seed, feed, ingredients, and packaging obtained mainly from external and local suppliers
Environmental	Distribution	Direct and short-distance distribution within nearby markets
Environmental	Use Phase	Fresh and processed fish products used as household protein sources
Environmental	End-of-Life	Partial reuse of fish-processing residues
Environmental	Environmental Impacts	Water, feed, energy, packaging, pond residue, and processing waste
Environmental	Environmental Benefits	Better harvest utilization, longer shelf life, waste reduction, and increased environmental awareness

Source: Processed by the Researchers (2026)

The economic findings indicate that Pokdakan Mina Perkasa has established the basic components of a viable aquaculture business. The group serves local households and food businesses by offering fresh fish and processed products. WhatsApp, the website, direct selling, and word-of-mouth communication support product delivery and customer relationships. However, fresh fish remains the primary source of income, digital promotion remains limited, and marketing has not been fully managed collectively.

Layer Ekonomi				
KEY PARTNERS - Mitra Pengembangan dan Pembiayaan : - Universitas Muhammadiyah Perakerto (UMP) : Menyediakan pendanaan dan dukungan inovasi pengembangan serta keberlanjutan usaha Pokdakan Mina Perkasa. - Dinas Perikanan dan Pertanian Pematangsari : memberikan pendampingan dan dukungan usaha untuk meningkatkan kemampuan budidaya kelompok. - Masyarakat Desa : Mendukung kegiatan usaha dan keberlanjutan kelompok melalui kerja sama sosial.	KEY ACTIVITIES - Budidaya ikan dan pengolahan hasil panen menjadi produk bernilai tambah. - Memasarkan via hasil produksi menjadi produk olahan yang memiliki nilai tambah dan mengemas menjadi produk seperti tempura. - Menjualkan produk pertanian berupa ikan segar dan olahan frozen food seperti nugget.	VALUE PROPOSITIONS - Produk : - Ikan segar dan produk olahan berkualitas, bergizi, praktis, serta memiliki nilai tambah bagi konsumen. - Layanan : - Menyediakan produk perikanan berkualitas yang memberikan nilai tambah serta mendukung keberlanjutan usaha budidaya kelompok. - Produk olahan ikan sebagai respon dari permintaan pasar, serta ikan segar dari kolam yang dapat langsung dikonsumsi atau dimasak.	CUSTOMER RELATIONSHIP - Promosi kegiatan produk via WhatsApp dan Website Pokdakan. - Hubungan pelanggan dijaga melalui pelayanan yang ramah dan responsif, komunikasi langsung untuk menerima masukan, komentar, serta menerima keluhan produk secara konsisten guna meningkatkan kepercayaan dan loyalitas pelanggan.	CUSTOMER SEGMENTS - Demografi : - Masyarakat desa yang ingin mendapatkan ikan segar dan produk olahan praktis. - Komunitas rumah tangga yang menyukai frozen food berkualitas. - Pelaku usaha kuliner atau warung makan yang membutuhkan bahan baku ikan. - Usah produk 20-40 tahun sebagai konsumen utama produk perikanan. - Geografi : - Masyarakat dengan tingkat pendapatan menengah yang mencari sumber pangan bergizi dan terjangkau. - Generasi : - Masyarakat di wilayah Desa Karang Duren dijangkau melalui pemasaran online menggunakan WhatsApp dan website Pokdakan Mina Perkasa, serta pemasaran offline melalui promosi dari mulut ke mulut.
COST STRUCTURE - Biaya tetap : - Biaya pemeliharaan kolam dan peralatan budidaya. - Biaya listrik dan air untuk kegiatan operasional. - Biaya fasilitas produksi dan penyimpanan produk. - Biaya Variabel : - Biaya pembelian bibit dan pakan ikan. - Biaya bahan baku pengolahan frozen food. - Biaya pemasaran, transportasi, dan pemasaran produk.	REVENUE STREAMS - Penjualan ikan segar hasil budidaya. - Pendapatan dari pemasaran produk kepada masyarakat desa dan pelaku usaha. - Penjualan produk olahan frozen food seperti nugget dan tempura ikan. - Dukungan bantuan atau hibah untuk pengembangan usaha kelompok.			

Figure 5. Existing Economic Layer of Pokdakan Mina Perkasa

Source: Processed by the Researchers (2026)

The social layer shows that the group functions as both a business organization and a community learning platform. Members obtain additional income, technical knowledge, and processing skills, while local residents gain access to information about aquaculture and fish-processing activities. Cooperation and mutual assistance form the group's main organizational culture. However, only 15 of the 22 registered members are active, indicating uneven

participation and responsibility.

A group member explained:

“Pokdakan Mina Perkasa does not only operate in fish farming. Its activities provide benefits for members and the surrounding community. Members can earn additional income, and we also share knowledge about fish farming and fish processing with community members who want to learn” (Participant 2).

Layer Sosial				
LOCAL COMMUNITIES	GOVERNANCE	SOCIAL VALUE	SOCIETAL CULTURE	END-USERS
- Masyarakat Desa Karang Duren sebagai penerima manfaat kegiatan perikanan. - Peningkatan pengetahuan masyarakat Desa Karang Duren mengenai budidaya ikan. - Peningkatan keterampilan masyarakat Desa Karang Duren dalam pengolahan hasil perikanan.	- Pembagian tugas dan tanggung jawab anggota. - Pengambilan keputusan melalui musyawarah. - Koordinasi dengan mitra terkait seperti ump dan dinas perikanan. - Pengelolaan kelompok yang transparan.	- Keberadaan Pokdakan Mina Perkasa memberikan manfaat ekonomi bagi anggota kelompok dengan membuka peluang usaha melalui kegiatan budidaya, pengolahan, dan pemasaran produk perikanan. - Hubungan sosial antara kelompok dan masyarakat desa le dipertukarkan melalui kegiatan berbagi pengetahuan budidaya dan pelatihan pembuatan olahan ikan, sehingga tercipta kerja sama dan interaksi yang lebih baik. - Mendukung pemberdayaan masyarakat melalui kegiatan perikanan yang berkelanjutan.	- Menumbuhkan budaya kerja sama antar anggota melalui kegiatan budidaya, pengolahan hasil perikanan, serta saling membantu dalam menyelesaikan berbagai kebutuhan kelompok. - Menjaga manfaat hingga tingkat masyarakat desa karang duren. - Dampak sosial dirasakan oleh anggota kelompok dan masyarakat desa Karang Duren. - Penyebarkan pengetahuan budidaya dan pengolahan ikan kepada warga desa karang duren.	Masyarakat desa yang memperoleh manfaat dari kegiatan kelompok.
SOCIAL IMPACTS		SOCIAL BENEFITS		
- Meningkatkan keterampilan dan pengetahuan anggota dalam budidaya serta pengolahan ikan. - Menciptakan peluang usaha dan menambah pendapatan bagi anggota kelompok. - Mendorong partisipasi masyarakat desa dalam kegiatan perikanan. - Memperkuat kerja sama dan hubungan sosial antar anggota serta masyarakat desa.		- Terbukanya kesempatan mengikuti kegiatan pelatihan dan pengembangan usaha. - Mendapatkan dukungan pembinaan dari berbagai pihak seperti UMP dan Penyuluh perikanan. - Kemudahan memperoleh produk perikanan yang berkualitas. - Bertambahnya pengetahuan masyarakat tentang usaha perikanan.		

Figure 4. Existing Social Layer of Pokdakan Mina Perkasa

Source: Processed by the Researchers (2026)

The environmental layer shows that cultivation and processing are connected through the use of harvested fish as fresh and value-added products. Nuggets and tempura extend product shelf life and reduce the risk of unused harvests. The group also reuses part of its fish-processing residues. Nevertheless, water consumption, feed efficiency, energy use, packaging waste, and production residues have not been systematically recorded or evaluated.

Layer Lingkungan				
Supplies and Outsourcing	PRODUCTION	FUNCTIONAL VALUE	END-OF-LIFE	USE PHASE
- Pengadaan bahan ikan dari pemasok lokal. - Pengadaan pakan untuk mendukung kegiatan budidaya. - Pengadaan bahan baku pendukung untuk produk olahan ikan. - Pengadaan kemasan untuk produk frozen food. - Kerja sama dengan mitra dalam memenuhi kebutuhan produksi secara berkelanjutan.	- Budidaya ikan konsumsi. - Pengolahan hasil panen menjadi produk olahan.	- Pemanfaatan hasil panen ikan melalui produksi dan pengolahan menjadi produk bernilai tambah. - Penyediaan produk perikanan yang mendukung ketahanan pangan lokal. - Penggunaan sumber daya budidaya secara lebih efisien.	Sisa hasil pengolahan ikan, seperti tulang ikan, dapat dimanfaatkan kembali sebagai bahan tambahan dalam pembuatan produk olahan perikanan, sehingga membantu mengurangi limbah yang dihasilkan dari proses produksi.	- Produk perikanan dimanfaatkan sebagai sumber pangan bergizi bagi masyarakat. - Produk dapat dikonsumsi oleh berbagai kalangan sebagai alternatif pangan sehat. - Produk memberikan manfaat berkelanjutan karena membantu memenuhi kebutuhan konsumsi sehari-hari masyarakat. - Produk olahan memiliki masa simpan yang lebih lama dibandingkan ikan segar.
ENVIRONMENTAL IMPACTS		ENVIRONMENTAL BENEFITS		
- Berkurangnya limbah hasil produksi melalui pemanfaatan kembali sisa pengolahan ikan menjadi produk olahan. - Pemanfaatan lahan dan air secara efisien melalui budidaya ikan. - Pengurangan potensi pemborosan pangan melalui produk frozen food yang memiliki masa simpan lebih lama.		- Limbah hasil produksi berkurang. - Kesadaran menjaga lingkungan meningkat. - Pengelolaan sumber daya perikanan lebih berkelanjutan.		

Figure 5. Existing Environmental Layer of Pokdakan Mina Perkasa

Source: Processed by the Researchers (2026)

Evaluation of the Existing Business Model

The evaluation identified strengths and development needs within each TLBMC layer.

Table 2. Evaluation of the Existing Business Model

Layer	Existing Strengths	Development Needs
Economic	Established local customers, fresh	Wider markets, collective marketing,

	and processed products, production resources, and institutional partnerships	stronger digital promotion, improved financial records, and reduced dependence on external assistance
Social	Skills development, cooperation, community knowledge sharing, and participatory decision-making	More active member participation, clearer responsibilities, wider outreach, and stronger organizational accountability
Environmental	Fish processing, local distribution, harvest utilization, and partial reuse of residues	Resource monitoring, feed and water efficiency, structured waste management, and more sustainable packaging

Source: Processed by the Researchers (2026)

Economically, the group has sufficient production assets and marketable products, but its market remains geographically limited. Socially, the group creates benefits for members and residents, but participation and outreach require improvement. Environmentally, several resource-efficiency practices have emerged, although they remain informal and have not been supported by measurable standards.

Proposed Sustainable Business Development Strategy

The economic strategy focuses on expanding the customer base to restaurants, food stalls, fish traders, resellers, and consumers outside Karang Duren Village. The group should strengthen processed-product variety, packaging, branding, digital promotion, customer records, collective marketing, and financial documentation. Revenue should increasingly come from fish sales, processed products, and training services rather than temporary assistance.

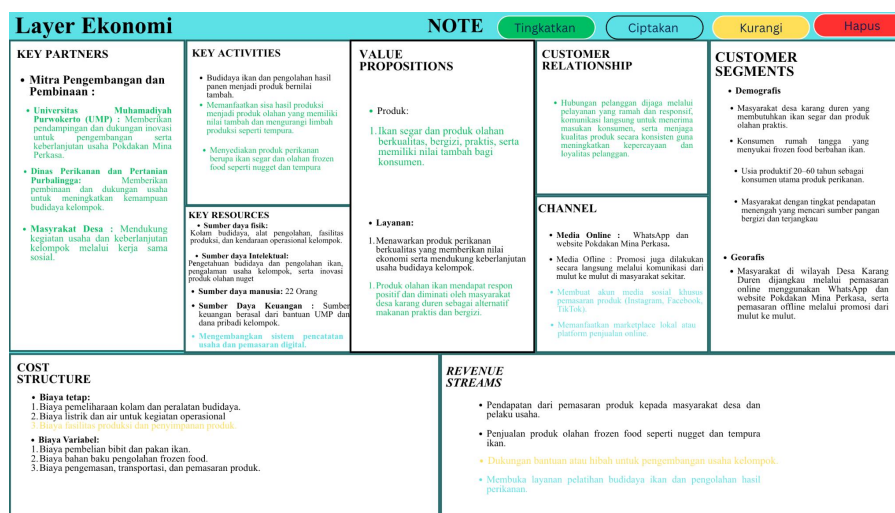


Figure 6. Proposed Economic Layer of Pokdakan Mina Perkasa

Source: Processed by the Researchers (2026)

The social strategy emphasizes regular technical and business training, clearer role distribution, operational procedures, transparent reporting, recognition for active members, and wider cooperation with schools, village institutions, communities, and other fish-farming groups. Consumer education concerning fish nutrition should also be included in the group's community activities.

Layer Sosial		NOTE		Tingkatkan	Ciptakan	Kurangi	Hapus
LOCAL COMMUNITIES	GOVERNANCE • Pembagian tugas dan tanggung jawab anggota. • Pengambilan keputusan melalui musyawarah. • Koordinasi dengan mitra terkait seperti ump dan dinas perikanan. • Pengelolaan kelompok masyarakat Karang Duren dengan mengacu budaya ikan. • Peningkatan pengetahuan masyarakat Desa Karang Duren mengenai budidaya ikan. • Peningkatan keterampilan masyarakat Desa Karang Duren dalam pengolahan hasil perikanan.	SOCIAL VALUE • Keberadaan Pokdakan Mina Perkasia memberikan manfaat ekonomi bagi anggota kelompok dengan membuka peluang usaha melalui kegiatan budidaya, pengolahan, dan pemasaran produk perikanan. • Hubungan sosial antara kelompok dan masyarakat desa karang duren diperkuat melalui kegiatan berbagai pelatihan – budidaya dan pelatihan pembuatan ulaman ikan, sehingga tercipta kerja sama dan interaksi yang lebih baik. • Mendukung pemberdayaan masyarakat desa karang duren melalui kegiatan perikanan yang berkelanjutan.	SOCIETAL CULTURE • Menumbuhkan budaya kerja sama antaranggota melalui kegiatan budidaya, pengolahan hasil perikanan, serta saling membantu dalam menyelesaikan berbagai kebutuhan kelompok. • Budaya berbagi pengalaman antaranggota secara terajwad.	END-USERS • Masyarakat desa yang memperoleh manfaat dari keberadaan dan kegiatan kelompok. • Efikasi manfaat konsumsi ikan dari produk ulaman kepada konsumen.			
	EMPLOYEES • Keterlibatan anggota dalam budidaya dan pengolahan. • Peningkatan keterampilan melalui pelatihan. • Pengembangan kapasitas sumber daya manusia. • Sistem pengalangan hasil anggota yang aktif dan berprestasi.		SCALE OF OUTREACH • Jangkauan manfaat hingga tingkat masyarakat desa karang duren . • Dampak sosial dirasakan oleh anggota kelompok dan masyarakat desa Karang Duren. • Penyebaran pengetahuan budidaya dan pengolahan ikan kepada warga desa karang duren.				
SOCIAL IMPACTS • Meningkatkan keterampilan dan pengetahuan anggota dalam budidaya serta pengolahan ikan. • Menciptakan peluang usaha dan menambah pendapatan bagi anggota kelompok. • Mendongkrak partisipasi masyarakat desa dalam kegiatan perikanan • Memperkuat kerja sama dan hubungan sosial antaranggota serta masyarakat desa		SOCIAL BENEFITS • Terbukanya kesempatan mengikuti kegiatan pelatihan dan pengembangan usaha • Mendapatkan dukungan pembinaan dari berbagai pihak seperti UMP dan Penyuhat perikanan • Kemudian memperoleh produk perikanan yang berkualitas.					

Figure 7. Proposed Social Layer of Pokdakan Mina Perkasia

Figure 7. Proposed Social Layer of Pokdakan Mina Perkasa

Source: Processed by the Researchers (2026)

The environmental strategy focuses on efficient use of fish seed, feed, water, energy, and processing materials. The group should prioritize local suppliers, planned distribution, recyclable or reusable packaging, longer-lasting products, and responsible use of fish-processing residues. Simple records of resource use and waste should be introduced to evaluate environmental performance.

Layer Lingkungan		NOTE		Tingkatkan	Ciptakan	Kurangi	Hapus
Supplies and Outsourcing • Pengadaan bahan ikan dari pemasok lokal • Penyelidikan pakan untuk mendukung kegiatan budidaya. • Pengadaan bahan baku pendukung untuk produk olahan ikan. • Penyelidikan kemasan untuk produk frozen food. • Kerja sama dengan mitra dalam memenuhi kebutuhan produksi secara berkelanjutan.	PRODUCTION • Budaya ikan konsumsi. • Pengolahan hasil panen menjadi produk olahan.	FUNCTIONAL VALUE • Pemaksimalan hasil panen ikan melalui pengolahan dan pengolahan menjadi produk bernilai tambah. • Penyelidikan produk perikanan yang mendukung ketahanan pangan lokal. • Pengemasan sumber daya budidaya secara lebih efisien.	END-OF-LIFE • Sisa hasil pengolahan ikan, seperti tulang ikan, dapat dimanfaatkan kembali sebagai bahan tambahan dalam pembuatan produk olahan perikanan, sehingga membantu mengurangi limbah yang dihasilkan dari proses produksi.	USE PHASE • Produk perikanan dimanfaatkan sebagai sumber pangan bergizi bagi masyarakat. • Produk dapat dikonsumsi oleh berbagai kalangan sebagai alternatif pangan sehat. • Produk memberikan manfaat berkelanjutan karena membantu memenuhi kebutuhan konsumsi sehari-hari masyarakat. • Produk olahan memiliki masa simpan yang lebih lama dibandingkan ikan segar.			
	MATERIALS • Ikan hasil budidaya yang digunakan sebagai bahan baku pembuatan nugget ikan dan produk olahan lainnya. • Bahan ikan untuk kegiatan budidaya. • Kemasan untuk distribusi produk.	DISTRIBUTION • Penyaluran hasil perikanan secara langsung kepada konsumen. • Pemrosesan produk dalam wilayah desa karang duren untuk mengurangi jarak pengiriman. • Pengemasan kemasan yang dapat digunakan kembali atau diluar ulang. • Pengaturan jadwal distribusi yang lebih efisien.					
	ENVIRONMENTAL IMPACTS • Berkurangnya limbah hasil produksi melalui pemanfaatan kembali sisa pengolahan ikan menjadi produk olahan. • pemanfaatan lahan dan air secara efisien melalui budidaya ikan • Pengurangan potensi pemborsoran pangan melalui produk frozen food yang memiliki masa simpan lebih lama. • Program kerja sama dengan pemasok yang menerapkan prinsip ramah lingkungan.		ENVIRONMENTAL BENEFITS • Limbah hasil produksi berkurang. • Kesadaran menjaga lingkungan meningkat. • Pengelolaan sumber daya perikanan lebih berkelanjutan.				

Figure 8. Proposed Environmental Layer of Pokdakan Mina Perkasa

Source: Processed by the Researchers (2026)

Discussion

Economic Sustainability

The economic layer shows that Pokdakan Mina Perkasa has established the basic components of a functioning aquaculture business model. The group creates value through fresh fish and processed products, delivers it through direct and digital channels, and captures it through product sales. Its ponds, processing equipment, members' skills, and institutional

partnerships also provide an operational foundation for business continuity. However, these elements have not yet been managed as a fully integrated collective business. The economic layer of the TLBMC emphasizes the consistency among customers, value propositions, channels, resources, activities, partnerships, revenues, and costs in maintaining long-term business value (Joyce & Paquin, 2016).

The group's market currently consists of local households, food stalls, fish traders, and culinary businesses. This customer base indicates an existing demand for fresh fish and practical processed products. Nevertheless, the market remains concentrated in Karang Duren Village and nearby areas, limiting sales volume and business expansion. Customer segmentation allows a business to understand different consumer needs and develop more focused marketing strategies (Gomes & Meisen, 2023). Therefore, the group should retain its local consumers while expanding toward restaurants, resellers, culinary businesses, and consumers outside the village.

Fresh gourami, nuggets, and fish tempura constitute the group's main value propositions. Fresh fish meets daily household consumption needs, while processed products offer convenience, nutritional value, longer storage, and higher added value. Positive consumer responses indicate that processed products can strengthen product differentiation and reduce dependence on fresh fish sales. However, their development requires consistent quality, appropriate packaging, clear product information, stable production capacity, and a recognizable business identity.

Current marketing combines direct selling, collectors, word-of-mouth promotion, WhatsApp, and the group's website. These channels facilitate communication and maintain customer trust, but their reach remains limited. Channels function as mechanisms through which an organization communicates, delivers, and distributes its value proposition to customers (Osterwalder & Pigneur, 2010). Dedicated social media accounts, digital catalogues, marketplaces, and reseller cooperation are therefore required to complement existing channels rather than replace direct relationships with local customers.

Responsive communication, personal service, acceptance of feedback, and product-quality maintenance are important strengths in customer relationships. These practices support trust and repeat purchases in a market that still relies heavily on personal recommendations. Customer records, regular information on prices and stock, and clearer ordering procedures would make these relationships more systematic while preserving their personal character.

Revenue currently comes from fresh fish, processed-product sales, grants, and business-development assistance. External assistance supports facilities and innovation, but it does not constitute a recurring operational revenue stream. The group should increase the contribution of processed products and consider paid training in aquaculture and fish processing as an additional source of income. Separate records for each revenue source are also necessary to identify which activities provide stable financial returns.

The group has physical, human, intellectual, and financial resources, but its business information remains insufficiently organized. Production volume, input use, sales, inventory, customer data, and costs need to be recorded consistently. These records would allow the group to calculate production costs, determine appropriate selling prices, assess product profitability, and plan production according to market demand.

Cultivation, harvesting, processing, packaging, and marketing form an interconnected set of key activities. Processing part of the harvest into nuggets and tempura increases product value and improves harvest utilization. This finding is consistent with Jovana Sibalija et al. (2021), who position key activities as a central mechanism for creating and delivering value to customers. For Pokdakan Mina Perkasa, the integration of cultivation and processing creates greater value than

selling the entire harvest as unprocessed fish.

Partnerships with Universitas Muhammadiyah Purwokerto, the Purbalingga Regency Fisheries and Agriculture Office, suppliers, and the local community strengthen access to technical knowledge, mentoring, production inputs, and customers. These partnerships should be directed toward specific needs such as product standardization, digital marketing, licensing, market access, and member capacity. Cost management should also distinguish fish seed, feed, pond maintenance, utilities, processing ingredients, packaging, storage, transportation, and marketing expenses. This approach would improve efficiency without reducing product quality.

Social Sustainability

The social layer demonstrates that Pokdakan Mina Perkasa functions as both a business organization and a community learning platform. Its activities generate additional income, develop members' technical capabilities, strengthen cooperation, and share aquaculture knowledge with the surrounding community. These benefits show that the group creates social value alongside economic value. The social layer of the TLBMC evaluates how business activities influence members, governance, end users, local communities, social culture, and the broader distribution of benefits (Joyce & Paquin, 2016).

Members participate in cultivation, harvesting, processing, and marketing while receiving training and mentoring from partner institutions. This involvement provides practical learning and strengthens members' capacity to operate an aquaculture business. However, only 15 of the 22 registered members are actively involved. This difference indicates that participation, motivation, and role implementation remain uneven. Regular training, clearer responsibilities, activity schedules, and recognition for active members are needed to maintain collective involvement.

The group applies deliberative decision-making and open communication in managing activities. These practices support participation and internal trust, but informal task distribution may lead to inconsistent responsibilities. Clear job descriptions and standard operating procedures are needed for cultivation, sanitation, processing, packaging, marketing, and financial recording. Such procedures would strengthen accountability without eliminating the group's participatory governance.

Cooperation, mutual assistance, and solidarity constitute the group's main social culture. Members assist each other during cultivation, harvesting, processing, and marketing activities. This culture supports collective work, particularly when formal labour arrangements are limited. Nevertheless, cooperation should be supported by structured task allocation so that operational responsibilities do not remain concentrated among a small number of active members.

The local community receives benefits through access to fish products and knowledge about cultivation and processing. These activities may support household consumption, skills development, and new economic opportunities. However, the current scale of outreach remains concentrated in Karang Duren Village. Cooperation with village institutions, schools, community organizations, local businesses, and other fish-farming groups could broaden the distribution of knowledge and social benefits.

The group may also provide education on fish nutrition and practical processing methods to consumers and community members. This activity would connect product marketing with public knowledge and food access. The social strategy should therefore focus on strengthening member capacity, governance, knowledge transfer, community partnerships, and measurable outreach.

These findings reflect the people dimension of the Triple Bottom Line, which requires business activities to generate welfare and benefits for the stakeholders involved and affected

(Elkington, 1997). Social sustainability at Pokdakan Mina Perkasa will depend on its ability to maintain active participation, distribute responsibilities fairly, and extend benefits beyond its core members.

Environmental Sustainability

The environmental layer shows that the group has begun to apply resource-efficiency practices through fish processing, local distribution, and partial utilization of production residues. Processing harvested fish into nuggets and tempura extends product usability, creates added value, and reduces the risk of unsold fish becoming waste. Fish processing can extend product shelf life and contribute to food security (Rasyid, 2025). Efficient resource utilization is also an important component of sustainable fishery-business management (Omalia & Mardhiah, 2025), while local fish production supports food availability within surrounding communities (Greenfeld et al., 2024).

Processed products generate both economic and environmental value. Economically, they increase the selling value of the harvest. Environmentally, they improve harvest absorption and reduce potential product loss. Sustainable aquaculture can be strengthened through higher product value, efficient resource utilization, and reduced production waste (Turchini, 2023). Fishery products also contribute to sustainable food systems because they provide accessible and nutritious food (Kennedy et al., 2023). Product diversification is therefore relevant, provided that production volume follows market demand and does not create new unsold inventory.

The group primarily uses fish from its own cultivation activities as the raw material for processed products. This internal supply helps maintain freshness, control quality, and reduce dependence on external fish sources. Sustainable aquaculture depends partly on the efficient management of raw materials and production resources (Troell et al., 2023). However, internal production still requires careful management of fish seed, feed, water, energy, processing ingredients, and packaging. Appropriate management of production inputs is essential for developing sustainable aquaculture systems (FAO, 2024).

The integration of cultivation and processing is one of the strongest features of the group's environmental model. Cultivation supplies the primary product, while processing increases the use and value of the harvest. Integrated management of cultivation and fish-processing activities can support aquaculture sustainability (Boyd et al., 2022). Fish processing also strengthens product competitiveness by transforming primary products into higher-value outputs (Ahmed & Thompson, 2023).

The use of nearby suppliers for fish seed and other inputs can shorten procurement distances and strengthen local economic relationships. Local supply-chain development may improve production efficiency and support local economic development (FAO, 2024). The use of local resources and suppliers can also reduce transportation distance and energy consumption within the production system (Gephart et al., 2023). However, supplier selection should gradually consider product quality, consistency, accessibility, and environmental responsibility.

Distribution is primarily directed toward nearby consumers. Short delivery distances help maintain freshness and limit transportation needs. Nevertheless, environmental efficiency also depends on delivery frequency, route planning, and packaging. Efficient distribution and environmentally responsible packaging can reduce supply-chain impacts (UNEP, 2023). Locally based and shorter food-distribution systems can also improve logistical efficiency and support food-system sustainability (FAO, 2024). The group should therefore introduce planned delivery schedules and gradually adopt reusable or recyclable packaging.

Nuggets and tempura have a longer shelf life than fresh fish, allowing consumers to store

the products for a longer period and reducing the risk of rapid deterioration. Longer-lasting fish products improve harvest utilization and can reduce food loss (Troell et al., 2024). Products with extended storage periods may also support food availability because they remain usable beyond the short marketing period of fresh fish (FAO, 2024).

The partial reuse of processing residues represents an initial end-of-life practice. This activity can reduce discarded materials and improve the utilization of fishery resources. Waste reduction in the fishery sector is an important step toward more sustainable production and resource use (FAO, 2024). However, the group needs clear procedures to ensure that any reused material remains safe and suitable for the intended product.

The main environmental limitation is the absence of systematic monitoring. Feed use, water consumption, energy, packaging, pond residue, and processing waste have not been consistently measured. Waste reduction and resource efficiency can reduce the environmental burden of fisheries and aquaculture (Gephart et al., 2024). Simple records would allow the group to identify inefficiencies and monitor improvement without requiring a complex environmental management system.

Environmental benefits also depend on consistent member awareness. Efficient resource use and waste reduction are important foundations of sustainable fishery businesses (FAO, 2024). They are also essential for developing sustainable production systems more broadly (UNEP, 2024). The group should therefore combine production improvements with regular education on feed efficiency, water management, sanitation, waste separation, and responsible packaging.

Integrated TLBMC Strategy

The three layers show that business development cannot be managed separately. Wider market access requires more consistent production, stronger member skills, and better coordination. Processed-product development can increase revenue and reduce product loss, but it requires quality control, safe processing, appropriate packaging, and responsible waste management. Community empowerment also requires stable business income, transparent governance, and members capable of transferring knowledge.

This relationship reflects the Triple Bottom Line principle, which places profit, people, and planet as interdependent dimensions of sustainability (Elkington, 1997). The TLBMC translates these dimensions into connected economic, social, and environmental business-model elements (Joyce & Paquin, 2016). Therefore, improvement in one layer should strengthen rather than weaken the other layers.

The economic strategy should prioritize market expansion, collective marketing, processed-product development, digital channels, business records, and reduced dependence on grants. The social strategy should strengthen member participation, task clarity, governance, training, and community outreach. The environmental strategy should improve input efficiency, local procurement, distribution planning, packaging, residue utilization, and resource monitoring.

Through this integrated strategy, Pokdakan Mina Perkasa can develop from a fish-farming group with fragmented marketing into a collectively managed community-based aquaculture enterprise. This development can strengthen market access, bargaining power, member welfare, local food availability, and environmental responsibility while preserving the group's cooperative character.

CONCLUSION

Pokdakan Mina Perkasa has developed a community-based aquaculture business model that creates economic, social, and environmental value. Economically, the group produces fresh and processed fish products supported by production facilities, member capabilities, and institutional

partnerships. Socially, its activities improve income, skills, cooperation, and community knowledge. Environmentally, the group has begun to optimize harvest utilization, local distribution, and processing residues.

However, the TLBMC evaluation shows that the business model is not yet fully integrated. Its main limitations include limited market reach, weak digital promotion, fragmented marketing, incomplete financial records, uneven member participation, and the absence of systematic resource and waste monitoring.

The proposed strategy focuses on collective marketing, broader customer segments, stronger digital channels, improved product development, clearer organizational roles, continuous member training, wider community collaboration, efficient resource use, sustainable packaging, and structured waste management. These findings show that the Triple Layered Business Model Canvas can support Pokdakan Mina Perkasa in improving competitiveness, member welfare, community benefits, and environmental sustainability.

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