

# Digitalizing Pindang Industry with Business Model Canvas for Sustainable Blue Economy

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## Article Info

### Article history:

Submission December 18, 2024

Revised February 12, 2025

Accepted April 13, 2025

Published April 19, 2025

### Keywords:

Babat Village

Blue Economy

Business Model Canvas

Pindang

Information Technology



## ABSTRACT

**This study aims** to design a tailored Business Model Canvas (BMC) for the pindang business in Babat Village, Tangerang, to support the blue economy framework. A qualitative approach was employed, including field surveys, in-depth interviews with stakeholders, and SWOT analysis. **The findings highlight** strengths such as a loyal local customer base and traditional expertise, as well as opportunities to expand into modern retail and export markets. However, weaknesses like limited product diversification and threats such as fluctuating fish supplies were also identified. The study provides strategic recommendations, including sustainable product innovation, digital technology adoption, and strategic partnership development, to enhance the competitiveness of pindang products while promoting environmental sustainability. Additionally, the integration of information technology is emphasized to optimize supply chain management, improve digital marketing strategies, and enhance customer engagement through e-commerce platforms. **This research contributes to** the academic discourse on blue economy implementation, business model innovation in traditional industries, and the role of information technology in modernizing small-scale fisheries. It distinguishes itself from other BMC applications in traditional industries by specifically addressing the unique challenges and opportunities in pindang production, particularly within the context of sustainability and digital transformation.

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DOI: <https://doi.org/10.34306/att.v7i2.581>

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## 1. INTRODUCTION

The blue economy is increasingly recognized as a transformative approach to achieving sustainable development in coastal regions [1–4]. As an archipelagic country, Indonesia has vast marine resources, contributing significantly to the economy. However, these resources are often underutilized or exploited unsustainably, limiting their potential to support community welfare and environmental balance. Babat Village, located near Jakarta, exemplifies this dual challenge of unoptimized resource use and socio-economic stagnation.

**Journal homepage:** <https://att.apptisi.or.id/index.php/att>

While previous studies have applied the BMC to various traditional industries, this research differentiates itself by focusing on pindang production as a strategic component of the blue economy. Unlike other traditional industries, pindang production involves unique environmental and economic considerations, making it a suitable case for exploring sustainable innovation and digital integration. This study strengthens the discussion on why pindang production was chosen, beyond general economic considerations, by highlighting its cultural significance, market potential, and alignment with sustainable development goals.

The concept of the blue economy emphasizes integrating economic growth with environmental sustainability and community participation [5–7]. This approach aligns with the Sustainable Development Goals (SDGs), particularly goals related to life below water (SDG 14) and decent work and economic growth (SDG 8) (Figure 1). Babat Village has the potential to adopt this framework through innovative pindang production, which is a traditional fish preservation method offering opportunities for value addition and economic diversification.



Figure 1. Emphasizing SDGs 8 and 14 for Sustainability

Pindang, a staple product in Indonesian cuisine, is both culturally significant and economically viable. By leveraging innovative techniques in production and marketing, pindang can penetrate broader markets, enhancing its competitiveness while promoting sustainable practices [8–12]. Moreover, using a structured approach like the BMC can help outline the strategic elements needed to transform pindang production into a key driver of the local blue economy.

The integration of Information Technology (IT) further enhances the potential of pindang businesses by improving operational efficiency, expanding market reach, and strengthening customer engagement. IT applications such as e-commerce, digital marketing, data analytics, and supply chain management systems can help traditional businesses modernize and compete in broader markets [13, 14]. For Babat Village, leveraging IT can facilitate the adoption of smart fisheries technologies, optimize resource use, and create more efficient business models that align with sustainability principles.

The problem in this research is the limited optimization and development of pindang production in Babat Village, which faces challenges such as traditional processing methods, limited market reach, inadequate diversification of products, and minimal integration of sustainable practices. These issues hinder the potential of pindang as a key driver for the blue economy, impacting the economic growth and environmental sustainability of the local community [15].

This study aims to design a BMC tailored to the specific needs and potential of pindang production in Babat Village. The BMC framework integrates various critical components, including customer segmentation, value proposition, and key partnerships, to develop a sustainable and competitive business strategy [16–21].

## 2. LITERATURE REVIEW

### 2.1. Blue Economy Theory

The blue economy focuses on using ocean resources sustainably while promoting economic growth and improving livelihoods [1–3]. This theory aligns with the principles of sustainable development and emphasizes innovation in traditional industries to reduce environmental impact.

### 2.2. Business Model Innovation

Osterwalder and Pigneur define a business model as a framework for creating, delivering, and capturing value [22, 23]. This research applies the BMC to systematically explore strategies for innovating pindang production in Babat Village.

### 2.3. Sustainability Theory

Sustainable business practices integrate environmental, social, and economic considerations [16, 24–34]. This theory supports the adoption of eco-friendly production methods and community engagement to enhance the long-term viability of pindang production.

### 2.4. Information Technology in Business

The integration of IT into business processes enhances efficiency, market reach, and innovation [13]. The application of IT in the pindang industry can improve supply chain management, digital marketing, and customer engagement.

### 2.5. Value Chain Analysis

Value chain framework identifies key activities that add value to products [35–40]. This research uses value chain analysis to optimize pindang production processes and distribution channels, enhancing competitiveness.

Although the theoretical framework discusses business model innovation and sustainability, it is now further elaborated to link these concepts with empirical findings. This study integrates business model innovation with environmental sustainability by demonstrating how pindang production can serve as a case study for implementing resource-efficient and eco-friendly practices [41–43]. Moreover, insights from the blue economy theory reinforce the need for industry adaptation through digital and technological advancements.

## 3. METHODOLOGY

This study employs a qualitative approach [44] using the following methods:

- Field Surveys: Identifying market potential and consumer needs for pindang products.
- In-Depth Interviews: Conducted with pindang business actors, village leaders, and other stakeholders.
- Sampling Approach: The study adopted a purposive sampling method, selecting informants based on their expertise and direct involvement in pindang production. The criteria for participant selection included business owners, industry regulators, and supply chain partners to ensure a comprehensive perspective.
- Data Validation: Triangulation was employed by cross-verifying information from multiple sources to enhance reliability and credibility.
- Qualitative Data Analysis: The data were analyzed across the nine aspects of the BMC in terms of its Strengths, Weaknesses, Opportunities, and Threats (SWOT).

SWOT analysis is particularly useful in assessing small-scale businesses where competitive forces are not as clearly defined as in large-scale industries [3].

Table 1. Comparison of Traditional and Modernized Pindang Production

Aspect	Traditional Pindang Production	Modernized Pindang Production
Processing Method	Manual, labor-intensive	Automated, energy-efficient
Production Time	8-12 hours	4-6 hours
Product Shelf Life	3-5 days	7-10 days with better packaging
Market Reach	Local markets	National and export markets
Technology Use	Minimal	Advanced processing and digital marketing
Environmental Impact	High waste generation	Sustainable waste management practices

#### 4. RESULT AND DISCUSSION

Tables and figures are includes comparative data on traditional vs modernized pindang production to highlight the impact of technological integration on efficiency and profitability. This comparison highlights how modernization can enhance efficiency, sustainability, and profitability in pindang production.

The SWOT analysis provides strategic recommendations; however, additional empirical evidence and case studies have been incorporated to substantiate these recommendations [15]. For instance, digital marketing strategies were observed to improve sales in similar fisheries-based enterprises, as demonstrated in a case study from coastal regions in Java. This reinforces the proposal to enhance pindang market reach through online platforms.

To improve readability and avoid redundancy, repetitive mentions of digital marketing have been consolidated into a single section under strategic recommendations.

Table 2. Customer Segments

Analysis	Details
Strengths	Loyal local consumer base with cultural affinity for pindang
Weaknesses	Limited awareness in broader markets
Opportunities	Expanding to modern retail and export markets
Threats	Competition from alternative fish products
Strategic Actions	Conduct market education campaigns to increase awareness; build partnerships with retailers.

The key factors impacting the customer base of the business (From table 2). The strength of the business lies in its loyal local consumer base, which is strongly connected to the cultural affinity for pindang. However, the business faces a weakness due to limited awareness in broader markets, preventing it from reaching potential customers outside of the local community [45]. An opportunity exists in expanding to modern retail and export markets, which could significantly increase the reach and visibility of the product. On the other hand, there is a threat from competition with alternative fish products, which may attract potential customers. To address these challenges, the business should conduct market education campaigns to increase awareness of pindang and build partnerships with retailers, ensuring the product availability in wider markets.

Table 3. Value Propositions

Analysis	Details
Strengths	Unique flavor profile and eco-friendly packaging
Weaknesses	Limited variations in product offerings
Opportunities	Development of premium and ready-to-eat pindang variants
Threats	Rising consumer demand for healthier, non-preserved food options
Strategic Actions	Innovate product lines by introducing healthier options and value-added packaging.

The table 3 highlighting key aspects that shape its competitive edge in the market. One of the primary strengths of pindang is its unique flavor profile paired with eco-friendly packaging, which appeals to consumers who are both food enthusiasts and environmentally conscious. This distinctive combination helps differentiate pindang from other fish products, attracting a loyal customer base that values both taste and sustainability. However, a significant weakness lies in the limited variation in product offerings, which may hinder the brand ability to reach a wider audience. Expanding the variety of pindang products would cater to a broader range of consumer preferences, boosting its market presence.

There are also substantial opportunities for growth, such as the development of premium and ready-to-eat pindang variants. With the increasing demand for convenient and high-quality food options, introducing premium variants could appeal to health-conscious consumers looking for ready-to-eat meals [46]. On the other hand, the brand faces threats from the growing consumer demand for healthier, non-preserved food choices, which could impact the appeal of preserved products like pindang [47–49]. To address these challenges, strategic actions should focus on innovating product lines by offering healthier, preservative-free alternatives and enhancing packaging to add greater value. These efforts would not only align with evolving consumer preferences but also strengthen the brand position in the competitive food market [50].

Table 4. Distribution Channels

Analysis	Details
Strengths	Established presence in local markets
Weaknesses	Inadequate e-commerce adoption
Opportunities	Leveraging digital platforms for wider market access
Threats	Dependence on traditional distribution methods
Strategic Actions	Invest in e-commerce platforms; train local distributors in digital logistics systems.

Table 4 current strengths, weaknesses, opportunities, threats, and strategic actions for a business. The main strength lies in its established presence in local markets, which provides a solid foundation for further expansion. However, a significant weakness is the inadequate adoption of e-commerce, limiting the business ability to tap into the growing online market. To overcome this, there are opportunities to leverage digital platforms for broader market access, allowing the business to expand beyond its local base. On the other hand, the reliance on traditional distribution methods poses a threat, as digital distribution methods are increasingly becoming more efficient and cost-effective [51, 52].

To address these challenges, strategic actions are recommended, such as investing in e-commerce platforms and training local distributors in digital logistics systems. By adopting these strategies, the business can modernize its distribution approach, improve efficiency, and gain access to new markets, ensuring long-term growth and competitiveness in an increasingly digital world.

Table 5. Customer Relationships

Analysis	Details
Strengths	Strong community engagement through local events
Weaknesses	Limited loyalty programs or direct consumer feedback mechanisms
Opportunities	Building digital customer engagement through social media
Threats	Consumer shift to competitors with superior customer interaction
Strategic Actions	Develop loyalty programs and use feedback to refine customer interactions.

From table 5 focusing on key factors that influence customer engagement and brand loyalty. The strength of the business lies in its strong community engagement through local events, which helps build trust and connection with consumers. However, the business faces a weakness due to the lack of loyalty programs and direct consumer feedback mechanisms, which are crucial for fostering long-term relationships and improving customer satisfaction.

There is an opportunity to enhance digital customer engagement through social media, allowing the business to connect with a broader audience and strengthen relationships with existing customers. On the other hand, there is a threat from consumers shifting to competitors who offer superior customer interaction,

potentially leading to lost market share. To address these challenges, the business should develop loyalty programs and utilize customer feedback to refine its interactions, ensuring more personalized and effective engagement with customers. This will help build stronger customer loyalty and improve overall customer satisfaction.

Table 6. Revenue Streams

Analysis	Details
Strengths	Steady income from traditional markets
Weaknesses	Dependence on single product revenue
Opportunities	Diversification through innovative product lines
Threats	Fluctuating fish supply affecting production costs
Strategic Actions	Diversify product offerings; establish alternative supply sources to mitigate risks.

Table 6 addressing the key factors that impact its income generation. The main strength is the steady income from traditional markets, providing a reliable revenue base. However, the business faces a weakness in its dependence on a single product revenue, which can make the company vulnerable to fluctuations in demand or market conditions for that product.

There is an opportunity to diversify revenue streams by introducing innovative product lines, which could attract new customers and expand the market. A potential threat is the fluctuating fish supply, which can lead to increased production costs, affecting profitability. To mitigate these risks, the business should diversify product offerings and establish alternative supply sources, ensuring a more resilient and sustainable revenue model. This approach would help reduce reliance on a single source and enhance long-term financial stability.

Table 7. Key Resources

Analysis	Details
Strengths	Access to abundant marine resources and skilled workforce
Weaknesses	Limited investment in modern processing facilities
Opportunities	Partnerships for resource optimization and facility upgrades
Threats	Overfishing and environmental degradation
Strategic Actions	Build capacity through partnerships; implement sustainable resource practices.

The table 7 presents analyzing essential factors that contribute to its success. The strength lies in having access to abundant marine resources and a skilled workforce, which provides a solid foundation for sustainable production. However, the weakness is the limited investment in modern processing facilities, which may hinder the company ability to scale operations or increase efficiency.

There are opportunities to form partnerships that focus on resource optimization and facility upgrades, which could enhance productivity and reduce operational costs. However, the company faces significant threats from overfishing and environmental degradation, which could deplete natural resources and disrupt business operations. To address these challenges, the business should build capacity through partnerships and implement sustainable resource practices, ensuring long-term viability and minimizing environmental impact. This will help maintain resource availability while promoting environmentally responsible practices.

Table 8. Key Activities

Analysis	Details
Strengths	Expertise in traditional pindang production techniques
Weaknesses	Lack of formal R&D initiatives
Opportunities	Introducing sustainable production technologies
Threats	Resistance to change from traditional methods
Strategic Actions	Establish R&D units focused on sustainable production and innovation.

The table 8 focusing on the strengths, weaknesses, opportunities, threats, and strategic actions. The strength of the business lies in its expertise in traditional pindang production techniques, which provides a strong foundation in crafting the product with established methods. However, a weakness is the lack of formal

R&D initiatives, limiting the company ability to innovate or optimize its production processes. There is an opportunity to introduce sustainable production technologies, which would not only modernize the business but also appeal to environmentally-conscious consumers. A potential threat is resistance to change from traditional methods, which can hinder progress and innovation. To address these challenges, the company should establish R&D units focused on sustainable production and innovation, enabling the business to adapt to modern technologies while maintaining its traditional strengths. This will help the company stay competitive and aligned with evolving industry standards.

Table 9. Key Partners

Analysis	Details
Strengths	Support from local government and NGOs
Weaknesses	Limited collaboration with private sector players
Opportunities	Building partnerships with modern retailers and digital platforms
Threats	Dependency on government support, which can be unpredictable
Strategic Actions	Diversify partnerships to include private and international stakeholders.

Table 9 present the strength of the business lies in its support from local government and NGOs, which provides a reliable foundation for growth and operational stability. However, a weakness is the limited collaboration with private sector players, which may hinder the company ability to scale or diversify its partnerships. An opportunity lies in building partnerships with modern retailers and digital platforms, opening avenues for wider distribution and market expansion. However, there is a threat from dependency on government support, which can be unstable and unpredictable. To mitigate this risk, the business should diversify partnerships to include private and international stakeholders, ensuring greater stability and fostering broader, more resilient networks. This will help the business expand its influence and reduce its reliance on any single source of support.

Table 10. Cost Structure

Analysis	Details
Strengths	Cost efficiency from traditional methods
Weaknesses	High energy and labor costs
Opportunities	Adopting energy-efficient and automated technologies
Threats	Increasing costs of raw materials and production inputs
Strategic Actions	Invest in cost-saving technologies and optimize operational workflows.

Based on the SWOT analysis (Table 10), it is recommended to implement aggressive strategies focusing on leveraging the existing strengths to capitalize on identified opportunities (SO strategies) and addressing weaknesses to seize these opportunities (WO strategies). For instance, utilizing the loyal local customer base can help expand into modern retail and export markets, while introducing innovative product lines, such as ready-to-eat pindang, can diversify offerings without compromising the traditional flavor. Additionally, overcoming the limited adoption of e-commerce by investing in digital platforms and training can facilitate market expansion, while launching healthier and premium variants of pindang will address the current product diversification gap.

Integration of Information Technology in Business Strategy to enhance the business model for pindang production, this study incorporates IT-based solutions, such as:

- E-commerce platforms to expand market reach.
- Digital marketing strategies to improve brand awareness.
- Supply chain management software to optimize distribution efficiency.
- Data analytics to enhance customer relationship management.

These technological innovations strengthen business operations, improve competitiveness, and ensure sustainability in the long term.

## 5. MANAGERIAL IMPLICATIONS

Managers can apply the findings of this study by focusing on several key strategies to enhance the pindang business. Expanding market reach through modern retail channels and e-commerce platforms will help access a broader customer base, both nationally and internationally. Product diversification, including the introduction of premium and ready-to-eat variants, will meet changing consumer demands and increase product appeal.

Additionally, adopting sustainable technologies in production processes will help reduce costs and minimize the environmental impact, aligning with growing consumer interest in eco-friendly products. Strengthening partnerships with private stakeholders, modern retailers, and digital platforms will further enhance competitiveness and market access. Finally, implementing targeted digital marketing strategies will boost brand awareness and engagement, allowing pindang producers to better connect with consumers and grow their market presence. These actions will enable managers to improve both the sustainability and profitability of the pindang industry.

## 6. CONCLUSION

The findings of this study offer several practical recommendations for managers in the pindang industry in Babat Village. Managers should focus on expanding their market reach by adopting modern retail channels and e-commerce platforms, enabling access to both national and international markets. Product innovation, such as developing healthier and premium pindang variants, will help cater to evolving consumer preferences. Additionally, leveraging digital marketing strategies will enhance brand visibility and engagement with a broader consumer base, boosting competitiveness in the market.


Furthermore, integrating sustainable production practices, such as eco-friendly packaging and efficient resource management, will help meet the growing demand for environmentally responsible products. Managers should also strengthen strategic partnerships with modern retailers, digital platforms, and other key stakeholders to foster growth and innovation. Investing in training programs to improve digital literacy and business management skills will equip local producers with the necessary tools to navigate the digital economy and align with global industry standards. These recommendations provide actionable insights to enhance both the sustainability and competitiveness of the pindang industry.

## 7. DECLARATIONS

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Conceptualization: HS and AH; Methodology: HS and AH; Software: AH and EJ; Validation: HS and AH; Formal Analysis: HS.; Investigation: HS, AH, EJ, NV and SW; Resources: NV and SW; Data Curation: NV; Writing Original Draft Preparation: HS; Writing Review and Editing: HS; Visualization: HS and NV; All authors, HS, AH, EJ, NV and SW have read and agreed to the published version of the manuscript.

### 7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

### 7.4. Funding

Research funding is obtained from the Directorate of Research, Technology and Community Service, for the "Beginner Lecturer Research (PDP)" Scheme.



### 7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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