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Processing Performance and Economic Feasibility Profile of Jambal Roti Salted Fish in Pangandaran, West Java

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ABSTRACT

Pangandaran's abundant fishery resources require proper processing to prevent rapid spoilage, making preservation through jambal roti salted fish production crucial for both food security and local livelihoods. Jambal roti salted fish production has become a crucial economic activity for coastal communities in Pangandaran. This study aims to analyze the processing performance and economic feasibility of jambal roti salted fish production in Pangandaran, West Java. The study employed Good Manufacturing Practices (GMP), Sanitation Standard Operating Procedures (SSOP), and Hazard Analysis and Critical Control Point (HACCP) for processing performance analysis, while Cost-Benefit Analysis (CBA) was used for economic feasibility assessment. The results showed that the enterprise is economically viable, with a monthly profit of IDR 4.940.278 and a profitability rate of 15.44%. Additional economic indicators include a BCR of 1.18, payback period of 0.23 years, BEP (Q) of 54.19 kg/month, BEP (IDR) of IDR 4.142.927/month, and a production cost per unit of IDR 67.649/kg. However, the technical performance evaluation indicated only 47% compliance with GMP, SSOP, and HACCP standards, suggesting substantial room for improvement in food safety practices. In conclusion, while jambal roti production in Pangandaran is economically feasible, improvements in processing performance are necessary to ensure better food safety compliance and sustainability.

INTRODUCTION

Pangandaran, a coastal area known for its abundant marine resources (Akbarsyah *et al.*, 2022), was listed as one of West Java's top 10 regions in marine capture fisheries production in 2023 (KKP, 2025d). According to the DKPKP (2025), the region's marine fisheries production reached 1.143.890 kg in 2024. Fish represent one of Indonesia's most abundant aquatic resources, offering significant potential for utilization (Hayati & Hafiludin, 2023). High animal protein content, accessibility, and affordability make fish a staple in local diets (Putri et al., 2022). However, high moisture levels in fish contribute to rapid spoilage, as fish tissue serves as an ideal medium for enzymatic activity and microbial decomposition (Sulistiani & Hafiludin, 2022). Among its processed fishery goods, jambal roti salted fish has become a highly popular local specialty, largely due to Pangandaran's coastal location (Andhikawati & Permana, 2023). In West Java, fresh fish dominate the market (65%), while processed fish products account for only 35% (KKP, 2025e, 2025c, 2025b), indicating the importance of fish processing activities to extend shelf life (Sa'adah, 2021).

Fish processing involves transforming raw fish into value-added and consumable products (Permen-KP No. 05, 2021). Jambal roti, a traditional salt-fermented product from manyung fish (*Arius sp.*), involves gutting, curing, and drying to create its flaky texture and umami flavor (BSN, 2017). In Pangandaran Regency, jambal roti salted fish exemplifies a regional specialty with notable economic potential (Mutaqin & Natari, 2021). Salted fish production, including jambal roti, generally involves salting and drying processes to extend shelf life (Pumpente *et al.*, 2023; Salim *et al.*, 2021). The salting, fermentation, and drying processes extend shelf life while enhancing flavor (Yulianti *et al.*, 2020). To ensure high-quality preservation, processors must adhere to strict standards, including raw material quality control, equipment sanitation and hygiene protocols, and quality assurance of additives (Herliani et al., 2023). Adherence to GMP and SSOP provides the necessary groundwork for managing fundamental production hazards (Zubir et al., 2022). As a preserved seafood product, jambal roti salted fish maintains substantial local popularity while attracting tourist interest (Kamsiah & Ponirah, 2021). In 2023, West Java's processed fishery production was dominated by salted and dried fish (52.11%), followed by pindang (18.53%), surimi-based products (16.39%), and other methods (12.98%) (KKP, 2025a). Pangandaran's jambal roti production relies on two main raw materials, kedukang fish (*Hexanematichthys sagor*) and manyung fish (*Arius sp.),* which undergo traditional salt-fermentation (Junianto *et al.*, 2024). The salt-fermentation process extends shelf life by reducing water activity while simultaneously enhancing economic value through traditional preservation techniques (Junaidi *et al.*, 2024).

Good Manufacturing Practices (GMP) and Standard Sanitation Operational Procedures (SSOP) are the primary prerequisite programs in a food safety system, aimed at preventing physical, chemical, and biological hazards during food processing (Zubir *et al.*, 2022). Effective food safety in fish processing is built on a tiered system of controls. At the base level, Good Manufacturing Practices (GMP) establish the essential ground rules for production, ensuring consistent product quality and basic safety. Operationalizing these rules, Sanitation Standard Operating Procedures (SSOP) translate GMP principles into actionable daily hygiene protocols, directly targeting the food safety hazards inherent to the processing environment (Lapene *et al.*, 2021). Elevating this foundation to a preventive science, the Hazard Analysis and Critical Control Points (HACCP) system introduces a proactive framework. Rather than relying on end-product inspection, HACCP focuses on preempting hazards. It systematically identifies, evaluates, and controls risks at every stage of production from raw material to consumer through real-time monitoring and immediate corrective actions at defined Critical Control Points (CCPs) (Mortimore & Wallace, 2015; Wallace et al., 2018). The implementation of a HACCP system yields significant benefits. It not only ensures the highest level of food safety and facilitates regulatory compliance but also promotes cost efficiency by reducing waste and the need for extensive end-product testing. Furthermore, it protects the company's reputation, allows for more effective resource allocation, and drives overall product quality improvement (Wallace *et al.*, 2018). To complement these prerequisite programs, the Hazard Analysis and Critical Control Point (HACCP) system provides a preventive approach to ensure food safety through continuous monitoring of critical points (Mortimore & Wallace, 2015; Wallace *et al.*, 2018).

The fish processing and marketing group was established through Ministerial Regulation as a collective of fisheries processors and marketers working together under organized group structures (Permen-KP No. 02, 2013). Indonesia's Ministry of Marine Affairs and Fisheries established fish processing and marketing group as a community empowerment program to develop productive fishery processing and marketing enterprises (Kusumawardhani *et al.*, 2022).

For home-based industries, true performance extends beyond simple profit; it is measured by their ability to foster efficient economic growth, generate sustainable livelihoods, and create valuable employment opportunities within their communities (Purnamasari *et al.*, 2023). Cost-Benefit Analysis (CBA) is conducted to assess business feasibility (Asti *et al.*, 2016). A Cost-Benefit Analysis (CBA) serves as a crucial tool for evaluating production efficiency, extending beyond mere financial metrics to encompass non-economic factors such as environmental and social impacts, thereby supporting more holistic strategic decision-making (Plakias, 2021).

The existing literature on small-scale jambal roti production paints a picture of strong economic potential tempered by technical challenges. Economically, the sector shows clear promise, with studies reporting favourable R/C ratios of 1.6 at MSMEs H. Udin Wijaya (Junianto *et al.*, 2024), and 1.9 at MSMEs Mamah Jambal (Kamsiah & Ponirah, 2021). Technically, however, the pursuit of consistent quality and safety remains a work in progress. While foundational food safety practices (GMP and SSOP) have been partially adopted, research by Munief *et al.*, (2022) concurrently identified persistent failures to control fundamental product characteristics.

Despite previous studies highlighting the economic potential of jambal roti salted fish production, limited research has integrated technical processing performance, such as GMP, SSOP, and HACCP, with economic feasibility analysis, particularly in Pangandaran, West Java. Therefore, this study aims to fill this gap by combining these two analytical perspectives. The processing activity successfully extends the product's shelf life and enhances its market value, thereby justifying its implementation. Although analyses of Processing Performance and Economic Feasibility in fish salting have been widely studied, specific research focusing on jambal roti in the Pangandaran region, particularly that produced by the Fish Processing and Marketing Group (Poklahsar) of Pangandaran Village, remains highly limited. Therefore, further research is necessary to analyze the value-added of the jambal roti product generated by the Poklahsar in Pangandaran Village.

METHOD

The fieldwork for this research was carried out in Pangandaran, West Java, during May and June 2025. The study centered on three community-based enterprises, the Istri Binangkit, Jambal, and Srikandi fish processing and marketing groups, with a specific focus on their production of jambal roti using kedukang fish (*Hexanematichthys sagor*). Data were collected through documentation, interviews, observations, and questionnaires to evaluate processing performance and economic feasibility. This study employed a non-probability sampling technique using purposive sampling, where respondents were selected based on specific criteria according to Sugiyono (2013). The criteria included individuals who have in-depth knowledge and direct involvement in fish processing and marketing activities. A total of 10 respondents were selected, consisting of the head and members of the fish processing and marketing group (Poklahsar). This sample size was considered sufficient as the study focused on key informants who possess comprehensive information on both technical processing and economic aspects, rather than on statistical generalization.

Data Analysis Methods

This research employs quantitative descriptive analysis, covering two aspects:

1. **Processing Performance Analysis**

Technical production performance was evaluated using primary data collected through interviews and on-site observations, with analysis conducted through an integrated assessment framework that combines two key components. The framework incorporates both Good Manufacturing Practices and Sanitation Standard Operating Procedures standards derived from Indonesia Marine Affairs and Fisheries Ministry Regulation No. 17 of 2019 (Permen-KP No. 17, 2019), along with Hazard Analysis and Critical Control Point protocols based on Indonesia Marine Affairs and Fisheries Ministry Regulation No. 51 of 2018 (Permen-KP No. 51, 2018).

2. **Economic Feasibility Analysis**

Economic feasibility data gathered through interviews were evaluated using cost-benefit analysis (CBA). The assessment framework focused on key financial indicators, including:

a. Profit

Profit is the difference between total revenue and total cost, as expressed in the following formula (Riyadi & Wijayanto, 2012):

$$\pi = TR - TC$$

Information:
π = Profit
TR = Total revenue
TC = Total cost

b. Profitability

Profitability is used to measure a company's ability to generate profit, calculated using the following formula (Riyadi & Wijayanto, 2012):

$$Profitability = \frac{\pi}{TR} \times 100\%$$

Information:
π = Profit
TR = Total revenue

c. Benefit-Cost Ratio (BCR)

Benefit-Cost Ratio (BCR) is a comparative ratio between benefits (reflected in total revenue) and costs, calculated using the following formula (Riyadi & Wijayanto, 2012):

$$BCR = \frac{TR}{TC}$$

Information:
TR = Total revenue
TC = Total cost

d. Payback Period

Payback Period represents the time required to recover the initial cash investment, calculated using the following formula (Riyadi & Wijayanto, 2012):

$$Payback\ Period = \frac{I}{\pi} \times 1\ year$$

Information:
I = Investment
π = Profit

e. Break-Even Point (BEP)

Break-Even Point (BEP) is achieved when total revenue equals total costs, which comprise both variable and fixed costs. It can be calculated either in production units (Q) or monetary value (IDR), using the following formulas (Riyadi & Wijayanto, 2012):
In Production Units:

$$BEP\ (Q) = \frac{TFC}{P - AVC}$$

In Monetary Value:

$$BEP\ (IDR) = \frac{TFC}{1 - \frac{AVC}{P}}$$

Information:
TFC = Total fixed cost
AVC = Average variable cost
Q = Quantity of units produced
P = Price per unit

f. Production Cost

Production Cost per Unit is the manufacturing cost allocated to each product unit, calculated by dividing total production cost by quantity produced (Mulyadi, 2016 *cited in* Sahla, 2020):

$$Production\ Cost = \frac{TC}{Q}$$

Information:
TC = Total cost
Q = Quantity of units produced

RESULT AND DISCUSSION

1. Processing Performance Analysis

Based on the evaluation data, the overall compliance level with GMP, SSOP, and HACCP remains low, with 47% compliance and 53% non-compliance. The compliance percentage was calculated based on the number of fulfilled criteria compared to the total assessment indicators using a checklist approach. The following explains the results of the production technical performance analysis based on aspects with 100% compliance, partial compliance, and 0% compliance, as shown in the following table.

Table 1. Compliance Assessment Format for GMP, SSOP, and HACCP Implementation

No.	Parameter Aspect	No. of Items	C	Non-C	C (%)	Non-C (%)
1	Location and Building Facilities	19	9	10	47	53
2	Water and Ice Safety	5	5	0	100	0
3	Condition and Hygiene of Food-Contact Surfaces	2	1	1	50	50
4	Cross-Contamination Prevention	3	0	3	0	100
5	Handwashing, Sanitation, and Toilet Facilities	2	2	0	100	0
6	Protection from Contaminants	4	4	0	100	0
7	Labelling, Storage, and Use of Hazardous Chemicals	2	2	0	100	0
8	Employee Health and Hygiene Monitoring	6	5	1	83	17
9	Pest Control Management	3	0	3	0	100
10	HACCP Implementation	13	0	13	0	100
	TOTAL	59	28	31	47%	53%

Source: Processed Data (2025)
Notes: C = Compliant, Non-C = Non-Compliant, C (%) = Compliance Rate (%), Non-C (%) = Non-Compliance Rate (%)

a. Aspects with 100% Compliance

The water and ice safety aspect fully met all parameters, including odorless, colorless, and tasteless water from safe sources, avoidance of seawater, and proper handling and storage of ice made from potable water. This result indicates that the processing unit has implemented adequate sanitation practices, which play an important role in minimizing the risk of contamination and maintaining product quality. This finding is in line with FAO and WHO (2020), which emphasize that regular monitoring of water quality is essential to prevent contamination and control pathogen growth.

Handwashing, sanitation, and toilet facilities aspect completely satisfied requirements, with adequate numbers of properly functioning units, running water, sanitary facilities, and separation from processing areas. These compliant facilities maintain personnel hygiene and product safety according to standards (FAO and WHO, 2020).

Protection from contaminants aspect demonstrated full compliance through proper use of approved chemicals/cleaners, correct labelling, and dedicated storage separate from processed products. This safeguards against chemical contamination through safe materials, segregated storage, proper sanitation procedures, clear labelling, and staff training (FAO and WHO, 2020).

Labelling, Storage, and Use of Hazardous Chemicals met all standards, with clear labelling, secure separate storage, and proper usage methods. Chemical management requires clear labelling, locked ventilated storage, and strict protocols to prevent cross-contamination (FAO and WHO, 2020).

b. Aspects with Partial Compliance

Regarding location and building facilities (47% compliant), ten of nineteen parameters were unmet, primarily due to unsanitary conditions from animal intrusions in the open-air production area lacking proper walls, ventilation, and with cracked flooring. While ceilings, lighting and waste facilities met standards, Blanchfield (2005) highlights that dry food processing requires enclosed systems to control explosive dust and cross-contamination risks, with Knutson (2020) noting poor maintenance attracts pests.

Condition and hygiene of food-contact surfaces (50% compliant), unmarked equipment across work zones risked cross-contamination, though materials were rust-resistant and cleanable. FAO and WHO (2020) emphasize the need for distinct zoning and sanitation-friendly designs, while Sinlapapanya *et al.* (2025) stress that food-contact surfaces require non-toxic materials and rigorous cleaning to prevent bacterial transfer.

Employee health and hygiene monitoring showed 83% compliance, with gaps in protective gear usage despite meeting requirements for health checks, no eating in production areas, and adequate facilities. FAO and WHO (2020) mandate strict personal hygiene protocols, supported by Hasnan *et al.* (2022) findings that contamination often stems from inadequate protective measures and poor hand hygiene practices. These partial compliance areas highlight critical needs for structural improvements, equipment zoning, and enhanced worker safety protocols to meet full production standards.

c. Aspects with 0% Compliance

Cross-contamination prevention failed all parameters due to inadequate facility design, poor process layout, and insufficient processing rooms, enabling contaminant and pest entry (Knutson, 2020). Proper seafood processing facilities require unidirectional product flow to ensure food safety, process efficiency, and continuous cold chain maintenance (FAO and WHO, 2020).

Pest control management showed zero compliance, lacking effective insect/animal control facilities and documented procedures. This absence of documented pest management and cleaning programs under GMP leads to microbial contamination, necessitating SOPs, training, and regular verification (Hasnan *et al.*, 2022). Effective pest control begins with rigorous sanitation to eliminate pest-attracting conditions (FAO and WHO, 2020).

HACCP implementation was entirely absent, missing 12 essential components including company profile, HACCP team, process flow diagrams, verification systems, and recall procedures. Full HACCP implementation requires prior GMP/SSOP compliance and staff training to ensure safe, efficient processing (FAO and WHO, 2020). These systemic deficiencies highlight urgent needs for facility redesign, pest management programs, and comprehensive food safety system implementation.

Economic Feasibility Analysis

a. Investment Cost

Investment cost refers to all expenditures used to acquire and prepare production equipment, including machinery, factory tools, and supporting facilities. This cost does not directly reduce the company's profit. However, the depreciation of these assets will be recorded as an operational expense throughout their useful life. The depreciation value is obtained by dividing the total cost by the technical lifespan. The investment cost is presented in the following table:

Table 2. Investment Cost Calculation

No	Equipment	Qty	Unit Price (IDR)	Lifespan (Years)	Total Cost (IDR)	Annual Deprec. (IDR)	Monthly Deprec. (IDR)
1	Knife	5	100.000	1	500.000	500.000	41.667
2	Hatchet	5	100.000	1	500.000	500.000	41.667
3	Cutting board	5	150.000	1	750.000	750.000	62.500
4	Knife sharpener	4	15.000	1	60.000	60.000	5.000
5	Bucket	10	70.000	1	700.000	700.000	58.333
6	Storage Box	3	1.000.000	1	3.000.000	3.000.000	250.000
7	Small Freezer	1	2.700.000	5	2.700.000	540.000	45.000
8	Large Freezer	1	3.500.000	3	3.500.000	1.166.667	97.222
9	Drying rack	8	150.000	1	1.200.000	1.200.000	100.000
10	Net (meter)	15	3.000	1,5	45.000	30.000	2.500
11	Bamboo tray	5	30.000	3	150.000	50.000	4.167
12	Scales	1	300.000	3	300.000	100.000	8.333
	Total Investment Cost (IDR)				13.405.000	8.596.667	716.389

Source: Processed Data (2025)

The total cost of all equipment used in the production of jambal roti salted fish was calculated to be IDR 13.405.000. Each item has a different technical lifespan, which affects its depreciation value. The total annual depreciation cost for all necessary equipment amounts to IDR 8.596.667 per year, or approximately IDR 716.389 per month. The investment cost includes equipment used in the production of salted fish processing. These tools are designed for long-term technical lifespans to minimize production costs over time.

b. Total Cost

Total cost represents the aggregate expenditure required to operate the business, comprising both fixed and variable costs. The total cost calculation is presented in the following table:

Table 3. Total Cost Calculation

No	Total Cost	Per Batch (IDR)	Monthly Cost (IDR)	Annual Cost (IDR)
	Fixed Cost			
1	Land and Building Tax	2.083	8.333	100.000
2	Depreciation Expenses	179.097	716.389	8.596.667
3	Interest Expenses	2.500	10.000	120.000
	Variable Cost			
1	Kedukang Fish (raw material)	6.000.000	24.000.000	288.000.000

No	Total Cost	Per Batch (IDR)	Monthly Cost (IDR)	Annual Cost (IDR)
2	Coarse Salt	150.000	600.000	7.200.000
3	Packaging Materials	52.500	100.000	2.520.000
4	Employee Labour	300.000	1.200.000	14.400.000
5	Transportation	50.000	200.000	2.400.000
6	Electricity	50.000	200.000	2.400.000
7	Plastic PE	3.125	12.500	150.000
8	Brush	3.125	12.500	150.000
	Total	6.764.931	27.059.722	324.716.667

Source: Processed Data (2025)

The total cost incurred per production cycle is calculated at IDR 6.764.931. Consequently, the total monthly cost amounts to IDR 27.059.722, and the annual cost reaches IDR 324.716.667. The primary factor influencing the total cost is production fluctuation due to dependence on fishing seasons, which affects the volatility of raw material prices (Tomek & Kaiser 2014). Efforts to manage the total cost include optimizing fixed costs and controlling variable costs through production efficiency and price negotiations (Marouli & Maroulis 2005).

c. Total Revenue

The total revenue received by jambal roti salted fish producers is calculated by multiplying the production output quantity by the selling price. Each production batch yields 100 kg of jambal roti salted fish, sold at IDR 80.000 per kg. The revenue per batch reaches IDR 8.000.000. Operating four batches monthly yields IDR 32.000.000 in monthly revenue, accumulating to IDR 384.000.000 annually.

High prices and strong consumer demand can increase revenue. However, fluctuations in demand, seasonality, and price adjustments also affect sales volume and total receipts (Chattopadhyay & Mitra, 2019). Strategies to enhance total revenue include optimizing the supply chain (Diaz-Sanchez *et al.*, 2025), and implementing price management that considers market demand and competitive conditions (Bujalance-López *et al.*, 2025).

d. Cost-Benefit Analysis

Cost-Benefit Analysis (CBA) is conducted to assess business feasibility (Asti *et al.*, 2016). The Cost-Benefit Analysis calculations are presented in the following table:

Table 4. Cost-Benefit Analysis (CBA) Calculation

No	Metric	Unit	Result per Batch	Monthly Result	Annual Result
1	Profit	IDR	1.235.069	4.940.278	59.283.333
2	Profitability	%	15.44	15.44	15.44
3	Benefit Cost Ratio (BCR)	Ratio	1.18	1.18	1.18
4	Payback Period	Years	0.23	0.23	0.23
5 a.	Break Even Point (Q)	kg	12.95	51.79	621.44
5 b.	Break Even Point (IDR)	IDR	1.035.732	4.142.927	49.715.125
6	Production Cost	IDR/kg	67.649	67.649	67.649

Source: Processed Data (2025)

The financial assessment affirms the profitability of the jambal roti enterprise, with each production cycle generating a net profit of IDR 1.235.069. Scaled over time, this amounts to IDR 4.940.270 per month and IDR 59.283.333 annually, reflecting a solid profitability rate of 15.44%. Despite these encouraging figures, the business faces ongoing operational challenges. Its profitability remains susceptible to fluctuations in the cost and supply of raw materials, as well as difficulties in controlling essential operational expenses such as labor and fuel (Chattopadhyay & Mitra, 2019). This indicates that the business performance is sensitive to changes in key input variables, which can affect overall profitability under different cost scenarios. To address these vulnerabilities and strengthen financial outcomes, a strategic and forward-looking approach is essential. Key measures include streamlining the supply chain to enhance cost efficiency (Cupertino *et al.*, 2021), adopting agile marketing tactics to drive revenue growth, and investing in product innovation and diversification. These steps not only reinforce the company's competitive stance but also build resilience for sustained success in a dynamic market environment (O'Sullivan *et al.*, 2019).

The jambal roti business demonstrates solid financial promise, as shown by a Benefit-Cost Ratio (BCR) of 1.18. This indicates that for every IDR 1 invested,the business gains IDR 1.18 in return, clearly surpassing the break-even point and confirming its fundamental economic viability. However, this positive indicator is dynamic, not guaranteed. The BCR is highly sensitive to the delicate balance between income and expenses. It improves when revenue grows faster than costs but declines if costs begin to outpace earnings (Yang *et al.*, 2004). To safeguard and strengthen this viability, a proactive approach to cost management is key by introducing selective mechanization to control production expenses and optimizing input use through careful management of materials and processes, the business can lower costs without compromising the quality that customers value (Zugarramurdi & Parin, 1995).

The processing and marketing groups' venture into jambal roti salted fish production demonstrates a highly efficient capital recovery, with a calculated payback period of 0,23 years, or approximately two months and three weeks. The payback period, defined as the duration required to recoup an initial investment from generated profits, is a key indicator of investment liquidity and risk. A shorter period, as in this case, typically signifies a quicker return on investment and reduced exposure to long-term uncertainties (Wu & Buyya, 2015). Several interconnected factors influence this metric. Primarily, the scale of the initial capital outlay and the subsequent volume and predictability of cash inflows are critical determinants. Furthermore, the calculation is contextualized by the project's anticipated lifespan and its terminal value, while also being susceptible to broader economic principles like the time value of money and external market volatilities, including shifts in commodity prices and regulatory frameworks (Wu & Buyya, 2015). Strategically, the pace of investment recovery can be accelerated by manipulating key operational and financial levers. This entails enhancing operational efficiency to bolster net cash flow, driving revenue growth through strategic pricing or market expansion, and minimizing the initial capital burden through meticulous planning or a phased investment approach (Bozos *et al.*, 2025).

The break-even analysis for the jambal roti salted fish venture indicates a production threshold of 12.95 kg per cycle, equating to 51.79 kg monthly and 621.44 kg annually. In monetary terms, the business must achieve a minimum revenue of IDR 1.035.732 per cycle (IDR 4.142.927 monthly or IDR 49.715.125 annually) to cover all costs and reach a point of zero profit or loss. This financial threshold is dynamic, shaped primarily by the interplay of the venture's cost structure a its pricing strategy. The key determinants are the magnitude of fixed costs, the variable cost per unit, and the established selling price (Kiran, 2019). Consequently, strategies to improve the business's resilience by lowering its break-even point focus on these key levers. Therefore, strategic management to enhance business resilience and lower the break-even point must focus on these specific levers. This involves pursuing one or more of the following: optimizing operational efficiency to reduce fixed overhead, leveraging strategic sourcing and process improvements to minimize variable costs, or enhancing product value to justify a premium selling price (Kiran, 2019).

The jambal roti business demonstrates robust unit economics, with a production cost of IDR 67.649 per kg against a selling price of IDR 80.000, securing a positive margin on each unit sold. However, that this unit cost is dynamic. It fluctuates with production volume, the methodology for overhead allocation, and the overall efficiency of operations, all of which collectively determine the final cost structure (Johansson *et al.*, 2020). To protect and enhance this profitability, a proactive and multi-faceted approach to cost management is essential. Key strategies include optimizing the supply chain through improved coordination and strategic supplier partnerships to reduce material costs. Internally, integrated production planning can streamline workflows and reduce waste. Furthermore, pursuing economies of scale by increasing output is a particularly powerful lever, as it dilutes fixed costs per unit and can concurrently strengthen the organization's market position and bargaining power (Hu *et al.*, 2019).

CONCLUSION

The research concludes that, from a processing performance perspective, the jambal roti (salted fish) business has not yet complied with food safety standards such as GMP, SSOP, and HACCP, as indicated by a conformity level of 47% and a higher non-conformity level of 53%. However, from an economic feasibility standpoint, the business is considered viable to operate. This is supported by a profit of IDR 1,235,069 per production cycle and a profitability rate of 15.44%. Additionally, the Benefit-Cost Ratio of 1.18 indicates that the business generates more benefits than costs, while the relatively short payback period of 0.23 years (approximately 2 months, 3 weeks, and 3 days) reflects a quick return on investment. The Break-Even Point is reached at 12.95 kg per production cycle or IDR 1,035,732, with a unit production cost (HPP) of IDR 67,649 per kg, further supporting the business's financial feasibility despite its current shortcomings in food safety compliance.

REFERENCES

Akbarsyah, N., Masrina, D., Permana, R., Putra, P. K. D. N. Y., Andhikawati, A., & Thirafi, L. (2022). Penyuluhan dan Aksi Coastal Clean Up dalam Rangka World Ocean Day 2022 di Pantai Timur Pangandaran. *Farmers: Journal of Community Services*, *3*(2), 49–52.

Andhikawati, A., & Permana, R. (2023). Diseminasi Pemetaan Sumber Potensi Limbah Pengolahan Perikanan di Kecamatan Parigi, Kabupaten Pangandaran. *Farmers: Journal of Community Services*, *4*(2), 46–49.

Asti, A., Priyarsono, D. S., & Sahara, S. (2016). Analisis Biaya Manfaat Program Pembangunan Food Estate dalam Perspektif Perencanaan Wilayah: Studi Kasus Provinsi Kalimantan Barat. *Jurnal Agribisnis Indonesia*, *4*(2), 79–90.

Blanchfield, J. R. (2005). Good manufacturing practice (GMP) in the food industry. In *Handbook of Hygiene Control in the Food Industry* (pp. 324–347). Woodhead Publishing Limited. https://doi.org/10.1533/9781845690533.3.324

Bozos, K., Filatotchev, I., & Goergen, M. (2025). Corporate governance, finance, and global strategy. *International Business Review*. https://doi.org/10.1016/j.ibusrev.2025.102499

BSN. (2017). *SNI 8376:2017 tentang Ikan Asin Jambal Roti* (pp. 1–5).

Bujalance-López, L., González-Serrano, L., Sancho, M. P. L., & Talon-Ballestero, P. (2025). Restaurant revenue management: a systematic literature review and future challenges. *British Food Journal*, *127*(6), 2169–2196.

Chattopadhyay, M., & Mitra, S. K. (2019). Determinants of revenue per available room: Influential roles of average daily rate, demand, seasonality and yearly trend. *International Journal of Hospitality Management*, *77*, 573–582. https://doi.org/10.1016/j.ijhm.2018.09.001

Cupertino, S., Vitale, G., & Riccaboni, A. (2021). Sustainability and short-term profitability in the agri-food sector, a cross-sectional time-series investigation on global corporations. *British Food Journal*, *123*(13), 317–336.

Diaz-Sanchez, L., Retamozo-Shapiama, J., Ruiz-Garcia, N., Salas-Chaparin, A., Sinarahua-Cardenas, G., Ninaquispe-Soto, M., Riega-Virú, Y., Quezada-Hidalgo, E., & Salas-Riega, J. (2025). Optimization of net revenue in fruit wholesale distribution through a linear programming model. *Procedia Computer Science*, *257*, 1172–1177. https://doi.org/10.1016/j.procs.2025.03.156

DKPKP. (2025). *Produksi Perikanan Tangkap Per PP Kabupaten Pangandaran Tahun 2024*.

FAO and WHO. (2020). Code of Practice for Fish and Fishery Products. In *Code of Practice for Fish and Fishery Products*. https://doi.org/10.4060/cb0658en

Hasnan, N. Z. N., Basha, R. K., Amin, N. A. M., Ramli, S. H. M., Tang, J. Y. H., & Aziz, N. A. (2022). Analysis of the most frequent nonconformance aspects related to Good Manufacturing Practices (GMP) among small and medium enterprises (SMEs) in the food industry and their main factors. *Food Control*, *141*, 1–12. https://doi.org/10.1016/j.foodcont.2022.109205

Hayati, C. N., & Hafiludin, H. (2023). Karakteristik Kimia (Kadar Air, TVB-N, dan Protein) pada Produk Perikanan di BPMHP Semarang. *Juvenil: Jurnal Ilmiah Kelautan Dan Perikanan*, *4*(1), 13–20.

Herliani, D. O., Listyaningrum, N. P., Wahyu, Y. I., Masirah, M., & Lailatussifa, R. R. (2023). *Pengolahan Hasil Perikanan* (pp. 1–78).

Hu, J., Hu, Q., & Xia, Y. (2019). Who should invest in cost reduction in supply chains? *International Journal of Production Economics*, *207*(September 2018), 1–18. https://doi.org/10.1016/j.ijpe.2018.10.002

Johansson, A., Gustavsson, L., & Pejryd, L. (2020). Sustainable operations management through development of unit cost performance measurement. *Procedia Manufacturing*, *43*, 344–351. https://doi.org/10.1016/j.promfg.2020.02.171

Junaidi, Y., Indahsari, S. R., Suhendra, A. A., & Andelia, S. R. (2024). Pemberdayaan Perempuan dalam Meningkatkan Nilai Tambah Hasil Laut melalui Program Bahari Sembilang Mandiri di Kabupaten Banyuasin. *Matriks: Jurnal Sosial Dan Sains*, *6*(1), 45–57.

Junianto, J., Veronica, V., Musthopa, A. A., & Zain, A. N. (2024). *Feasibility Analysis, Planning, and Marketing of MSMEs Jambal Roti Asli "H. Udin Wijaya" in Pangandaran Regency, West Java*. *193*(2), 190–200.

Kamsiah, K., & Ponirah, P. (2021). Kajian Kelayakan Usaha Pengolahan Tradisional Jambal Roti di UKM Mamah Jambal. *Jurnal Penyuluhan Perikanan Dan Kelautan*, *15*(3), 319–331.

Kiran, D. R. (2019). Break-even and make or buy analyses. In *Production Planning and Control* (pp. 195–206). https://doi.org/10.1016/b978-0-12-818364-9.00014-7

KKP. (2025a). *Data Statistik Produk Olahan di Jawa Barat*.

KKP. (2025b). *Produk Olahan Perikanan Jawa Barat 2023*.

KKP. (2025c). *Produksi Perikanan Budi Daya Pembesaran di Jawa Barat 2023*.

KKP. (2025d). *Produksi Perikanan Tangkap Jawa Barat 2023*.

KKP. (2025e). *Produksi Perikanan Tangkap Laut dan Perairan Darat Jawa Barat 2023*.

Knutson, K. (2020). *Good manufacturing practice compliance is not optional* (pp. 47–68). https://doi.org/10.1016/B978-0-12-819512-3.00004-3

Kusumawardhani, L. B., Widowati, I., & Suprihanti, A. (2022). Analisis Strategi Pemasaran Abon Lele Berdasarkan Siklus Hidup Produk di Poklahsar Sari Mina Sempu Pakembinangun Pakem Sleman. *Jurnal Dinamika Sosial Ekonomi*, *23*(1), 42–56.

Lapene, A. A. I., Sipahutar, Y. H., & Ma'roef, A. F. (2021). Penerapan GMP dan SSOP pada Pengalengan Ikan Lemuru (Sardinella longiceps) dalam Minyak Nabati. *Aurelia Journal: Authentic Research of Global Fisheries Application Journal*, *3*(1), 11–24. https://doi.org/10.15578/aj.v3i1.10281

Marouli, A. Z., & Maroulis, Z. B. (2005). Cost data analysis for the food industry. *Journal of Food Engineering*, *67*, 289–299. https://doi.org/10.1016/j.jfoodeng.2004.04.031

Mortimore, S. E., & Wallace, C. A. (2015). HACCP: A Food Industry Briefing. In *Sustainability (Switzerland)* (2nd ed., Vol. 11, Issue 1). John Wiley & Sons.

Munief, F. R., Pratama, R. I., Nurhayati, A., & Junianto, . (2022). Application of Good Manufacturing Practices and Sanitation Standard Operating Procedures on Jambal Roti Salted Fish Processing at MSME Mamah Jambal Pangandaran. *Asian Journal of Fisheries and Aquatic Research*, *19*(4), 32–40.

Mutaqin, B., & Natari, S. U. (2021). Analisis Potensi Ekspor Produk Ikan Asin Jambal Roti di Kabupaten Pangandaran. *SULUH: Jurnal Abdimas*, *2*(2), 97–104.

O'Sullivan, C. A., Bonnett, G. D., McIntyre, C. L., Hochman, Z., & Wasson, A. P. (2019). Strategies to improve the productivity, product diversity and profitability of urban agriculture. *Agricultural Systems*, *174*, 133–144. https://doi.org/10.1016/j.agsy.2019.05.007

Permen-KP No. 02. (2013). *Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 2 Tahun 2013 tentang Pedoman Pelaksanaan Program Nasional Peberdayaan Masyarakat Mandiri Kelautan dan Perikanan* (pp. 1–34).

Permen-KP No. 05. (2021). *Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 05 Tahun 2021 tentang Usaha Pengolahan Ikan* (Vol. 44, Issue 8, pp. 1–23).

Permen-KP No. 17. (2019). *Peraturan Menteri Kelautan dan Perikanan Nomor 17 Tahun 2019 tentang Persyaratan dan Tata Cara Penerbitan Sertifikat Kelayakan Pengolahan* (pp. 1–101).

Permen-KP No. 51. (2018). *Peraturan Menteri Kelautan dan Perikanan Republik Indonesia Nomor 51/PERMEN-KP/2018 tentang Persyaratan dan Tata Cara Penerbitan Sertifikat Penerapan Program Manajemen Mutu Terpadu/Hazard Analysis and Critical Control Point* (pp. 1–21).

Plakias, Z. T. (2021). Cost-Benefit Analysis as a Tool for Measuring Economic Impacts of Local Food Systems: Case Study of an Institutional Sourcing Change. *Journal of Agriculture, Food Systems, and Community Development*, *10*(3), 161–185.

Pumpente, O. I., Ansar, N. M. S., & Tanod, W. A. (2023). Efek Penggaraman Kering terhadap Karakteristik Sensori dan Kadar Air Ikan Kuwe Asin (Caranx sp.). *INSOLOGI: Jurnal Sains Dan Teknologi*, *2*(2), 340–348.

Purnamasari, W. O. D., Zarliani, W. O. Al, & Wabula, F. H. (2023). Analisis Keragaan Usaha Tahu di Industri Rumah Tangga Dwi Berkah Kabupaten Buton. *Sang Pencerah: Jurnal Ilmiah Universitas Muhammadiyah Buton*, *9*(3), 646–652. https://doi.org/10.35326/pencerah.v9i3.3983

Putri, E. M. M., Burhan, R. Y. P., Zetra, Y., Mujahid, M. N., Gunawan, T., & Nugraheni, Z. V. (2022). Peningkatan Potensi Ekonomi Masyarakat Desa Pliwetan, Kecamatan Palang, Kabupaten Tuban melalui Pembuatan dan Pemasaran Olahan Nugget Ikan serta Pemanfaatan Limbah Olahan Ikan sebagai Alternatif Pupuk Organik Cair. *Sewagati*, *6*(1), 1–9.

Riyadi, P. H., & Wijayanto, D. (2012). Manajemen Industri Perikanan. In *Undip Press Semarang*.

Sa'adah, W. (2021). Analisis Nilai Tambah Pengolahan Ikan Mujair Menjadi Ikan Asin di Desa Weduni Kecamatan Deket Kabupaten Lamongan. *Mimbar Agribisnis: Jurnal Pemikiran Masyarakat Ilmiah Berwawasan Agribisnis*, *7*(1), 466–475.

Sahla, W. A. (2020). *Akuntansi Biaya: Panduan Perhitungan Harga Pokok Produk*. Poliban Press.

Salim, S., Sipahutar, Y. H., Handoko, Y. P., Perceka, M. L., Bertiantoro, A., & Yuniarti, T. (2021). Pengetahuan Pengolah Ikan Asin dan Keberadaan Formalin di Sentra Ikan Asin di Desa Kronjo, Kabupaten Tangerang. *Prosiding Simposium Nasional VIII Kelautan Dan Perikanan*, 165–172.

Sinlapapanya, P., Pelyuntha, W., & Vongkamjan, K. (2025). Diversity of sanitizer-resistant bacteria on food contact surface and handling equipment in squid sushi production line. *Food Research International*, *203*, 1–8. https://doi.org/10.1016/j.foodres.2025.115837

Sulistiani, A., & Hafiludin, H. (2022). Karakteristik Mikrobiologi (ALT, E. Coli, dan Salmonella) pada Produk Hasil Perikanan di BPMHP Semarang. *Juvenil: Jurnal Ilmiah Kelautan Dan Perikanan*, *3*(1), 37–43.

Tomek, W. G., & Kaiser, H. M. (2014). Agricultural Product Prices. In *European Review of Agricultural Economics* (5th ed., Vol. 42, Issue 1). Cornell University Press.

Wallace, C. A., Sperber, W. H., & Mortimore, S. E. (2018). Food Safety for the 21st Century: Managing HACCP and Food Safety Throughout the Global Supply Chain. In *Sustainability (Switzerland)* (2nd ed., Vol. 11, Issue 1).

Wu, C., & Buyya, R. (2015). Cost Model Categories. In *Cloud Data Centers and Cost Modeling* (pp. 611–647). https://doi.org/10.1016/b978-0-12-801413-4.00015-5

Yang, K.-L., Chu, P., & Chouhuang, W.-T. (2004). Note on Incremental Benefit/Cost Ratios in Analytic Hierarchy Process. *Mathematical and Computer Modelling*, *39*, 279–286.

Yulianti, Y., Supriyadi, S., & Thohidin, T. (2020). Strategi Pengembangan Usaha Pengolahan Ikan Asin Jambal Roti pada UD. Sumber Berkah. *Agri Wiralodra: Jurnal Agribisnis*, *12*(2), 87–98.