

# Original Research Article

## Development Prospects Of Smoked Fish Business In Sinjai District, South Sulawesi Province, Indonesia

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### ABSTRACT

**Aims:** This research analyses the characteristics of smoked fish business and determines the appropriate development strategy for the business in the coastal areas of Sinjai District, Indonesia.

**Study design:** This research is qualitative and descriptive in nature where qualitative research aims to obtain a complete picture of a matter according to the human views studied.

**Place and Duration of Study:** Sampling was conducted in North Sinjai and East Sinjai Districts of Sinjai Regency.

**Methodology:** Data analysis techniques use qualitative data analysis and SWOT analysis, where qualitative analysis uses data collection while SWOT analysis is used to systematically identify various factors and formulate a company's strategy.

**Result:** The results showed that the characteristics of smoked fish businesses are dominant using parrotfish and ray raw materials, fish in whole and fillet form, using wood as fuel, simple equipment, local marketing, varying fish prices and not yet having business legality and a workforce aged 33-70 years, the position of smoked fish processing business development in Sinjai Regency is in quadrant I. The strategy carried out is the development of smoked fish processing MSMEs with training and extension programs, establishing partnership cooperation between MSME players and promoting products, implementing processing technology innovations and updating infrastructure and participating in training. The strategy carried out is the development of smoked fish processing MSMEs with training and counseling programs from related agencies, establishing partnership cooperation between MSME players in promoting products, implementing processing technology innovations and updating infrastructure and attending training.

*Keywords: SWOT Analysis, Smoked Fish, Development Strategy, MSME.*

### 1. INTRODUCTION

Sinjai Regency is one of the districts in South Sulawesi province with a fairly large coastal and marine area and is in the position of 5° 19' 30" to 5° 36' 47 " South latitude and 119° 48' 30" to 120° 0' 0" East longitude. The area covers ±819.96 Km<sup>2</sup> or 1.29% of the land area of South Sulawesi. Geographically, Sinjai Regency consists of coastal areas, lowlands and highlands which have a coastline of ± 31 km consisting of a 17 km mainland coastal area and the Sembilan Island area with a coastline length of ± 14 km. with an estimated potential utilization of 38,000 tons / year.

The smoked fish processing business has become one of the industries that is quite interesting to study. Smoked fish is a processed product that has high economic value and stable demand in the local market [4,5]. The process of smoking fish not only extends the shelf life of fish products, but also provides a distinctive flavor that is in demand by consumers. The unique taste and texture of smoked fish make it a favorite choice in a variety of cuisines and dishes, both in restaurants and households [6,7,10]. The problems encountered in the field are that they use a direct smoking system that requires more wood as a source of smoke, the utilization of smoke is not effective (it takes a relatively long time) because the smoke does not go directly to the center of the fish, but more is wasted due to the influence of wind direction, the smoke released causes air pollution and causes discomfort for workers and the environment, simple equipment, limited production with local marketing, limited capital and manual processing that sometimes ignores sanitation resulting in low quality [8,9].

## 2. METHODS

This research will be conducted in Sinjai Regency. The research implementation time is from July to August 2024.



Fig 1 Map showing study Location

### 2.1. Data Collection Techniques

Data collection techniques in this study include:

#### 2.1.1. Analysis of Smoked Fish Characteristics

Collecting smoked fish samples from various producers in Sinjai Regency. Samples were taken randomly to ensure representativeness. Developed a questionnaire that included questions about perceived quality, flavor, texture, and consumer satisfaction of smoked fish products. Distribute questionnaires to consumers. Distribution can be done through direct interviews. Interviews with smoked fish businesses to understand the smoking methods used, the raw materials selected, and the production process.

Literature study by collecting and reviewing books, journals, reports and other documents relevant to the smoked fish processing industry in Indonesia and globally. Conducting interviews with smoked fish businesses to gain insight into the current state of the industry,

market opportunities, and challenges faced. Interviews with local government officials and related agencies to understand policy support and existing development programs.

Collecting market data from the Fisheries Agency, the Office of Cooperatives, SMEs and Manpower and the Office of Trade, Industry and Energy and Mineral Resources of Sinjai Regency on smoked fish production, consumption and market trends. Collecting economic data from the Central Bureau of Statistics (BPS) to understand the contribution of the fisheries sector to the local economy.

### **2.1.2. Analysis of Appropriate Strategies for Smoked Fish Business Development in Sinjai District**

Selecting several smoked fish businesses in Sinjai Regency as case study subjects. Direct observation of the production process, business management and marketing strategies applied by the businesses used as case studies. Conducting interviews with business owners to obtain information on development strategies, innovations applied and challenges faced and with consumers to obtain direct feedback on products.

Collecting and analyzing financial reports, production data, and sales data from the smoked fish business that became the case study to understand business performance and determinants of success. Conduct a SWOT Analysis with the following description:

1. Strengths and Weaknesses: Identified the internal strengths and weaknesses of the smoked fish business through interviews and observations.
2. Opportunities and Threats: Identifying external opportunities and threats through literature review and stakeholder interviews.

## **2.2. Data Analysis**

### **2.2.1. Smoked Fish Characteristics**

Calculating the frequency and percentage of consumer responses related to flavor quality, texture, and satisfaction with smoked fish products. Calculated the average score for each question using a Likert scale to assess consumer perceptions of the product. Data were categorized based on topics such as smoking method, raw material selection, and product quality.

### **2.2.2. Appropriate Strategy for Smoked Fish Development**

1. Identify the internal strengths and weaknesses of the smoked fish business and the external opportunities and threats facing the industry. Data from interviews, case studies, and observations were used for this analysis.
2. Create a SWOT matrix to link internal and external factors and develop strategies based on a combination of strengths, weaknesses, opportunities and threats.
3. Comparing the strategies used by successful smoked fish businesses with other businesses to identify best practices and success factors.
4. Analyzing operational data from the case studies to identify production process efficiency, resource management, and effective marketing strategies.
5. Marketing Strategy Analysis: using STP (Segmenting, Targeting, Positioning) Analysis to identify appropriate market segments, define target markets, and formulate positioning of smoked fish products in the market.
6. Analyze the elements of 4P (Product, Price, Place, Promotion) in marketing strategy to determine the products offered, pricing, distribution, and effective promotion.

## **3. Result and Discussions**

### **3.1. Result**

Table1. Data on Fisheries Micro, Small and Medium Enterprises (MSMEs) in 2023

| No | Name of Business Unit/Group | Chairman           | Address            | Number of Members | Product Type                          |
|----|-----------------------------|--------------------|--------------------|-------------------|---------------------------------------|
| 1  | Tenggiri                    | Risda              | Lappa              | 19 People         | Fish Meatballs, Shredded, And etc.    |
| 2  | Sumber Mitra                | Junaedi            | Lappa              | 18 People         | Smoked fish, ShreddedAnd etc.         |
| 3  | Putra Mandiri               | Abd. Salam         | Lappa              | 13 People         | Wet Fish                              |
| 4  | Komila                      | Sulaiman           | Lappa              | 13 People         | Dried Fish                            |
| 5  | Carmin                      | Nurliah            | Lappa              | 10 People         | Wet Fish                              |
| 6  | Baronang                    | Nurcahaya          | Lappa              | 10 People         | Wet Fish                              |
| 7  | Laskar Sehati               | Mariam             | Lappa              | 10 People         | Wet Fish                              |
| 8  | Bintang Kejora              | Ritawati           | Lappa              | 10 People         | Wet Fish                              |
| 9  | Teri Lappa                  | Lisnayanti         | Lappa              | 20 People         | Dried Fish                            |
| 10 | Damai Sejahtera Bersama     | Srianti            | Lappa              | 19 People         | Wet Fish                              |
| 11 | Sipakatu                    | Mindawati          | Tongke - tongke    | 14 People         | Wet Fish                              |
| 12 | Samataring Jaya             | Hj.Lina            | Tongke - tongke    | 15 People         | Wet Fish                              |
| 13 | Khas Mangrove               | Sulfirayana        | Tongke - tongke    | 11 People         | Seaweed Crackers                      |
| 14 | Tulu Mario                  | Hj.Mare            | Tongke - tongke    | 10 People         | Smoked fish                           |
| 15 | Mutiara Laut                | Trisnawati         | Tongke - tongke    | 20 People         | Fish Crackers                         |
| 16 | Tiram Laut                  | Armawati           | Samataring         | 13 People         | Oyster Satay                          |
| 17 | Karya Sejati                | Rohani             | Samataring         | 15 People         | Smoked fish                           |
| 18 | Sinar Bangko                | Fatmawati          | Panaikang          | 16 People         | Fish Meatballs/Fish Crackers Tuna     |
| 19 | Sipakalebbi                 | Hasni              | Panaikang          | 16 People         | Fish Crackers                         |
| 20 | Massahakue                  | Nurjannah          | Pasimarannu        | 17 People         | Dried Fish                            |
| 21 | Permata                     | Hasniah            | Pasimarannu        | 13 People         | Fish Crackers                         |
| 22 | Mallimpoe                   | Irsa               | Pasimarannu        | 13 People         | Fish Crackers                         |
| 23 | Rayhana Reski Food          | Ade Setia Anugerah | Sinjai Tengah      | 20 People         | Fish Meatballs, Otak - otak, And etc. |
| 24 | Mutiara                     | Nahira             | Pulau Buhung Pitue | 19 People         | Dried Fish                            |
| 25 | Daun Bambu                  | Hasyim/Ro syidiana | Pulau Buhung Pitue | 15 People         | Dried Fish                            |
| 26 | Samaturu                    | Rosmani            | Pulau Kanalo 1     | 15 People         | Dried Fish                            |
| 27 | Bunga Mawar                 | Safina             | Pulau              | 14 People         | Dried Fish                            |

| No | Name of Business Unit/Group | Chairman      | Address              | Number of Members | Product Type                  |
|----|-----------------------------|---------------|----------------------|-------------------|-------------------------------|
|    |                             |               | Persatuan            |                   |                               |
| 28 | Sabar Menanti               | Dulmi         | Pulau Burungloe      | 15 People         | Dried Fish                    |
| 29 | Buhung Pitue II             | Hj. Hariani   | Pulau Burungloe      | 15 People         | Dried Fish                    |
| 30 | Usaha baru                  | Sarina        | Sanjai               | 13 People         | Fish Crackers                 |
| 31 | Mawar Merah                 | Nurfaidal     | Sanjai               | 10 People         | Fish Crackers                 |
| 32 | Usaha Maju                  | Mawarna       | Sanjai               | 14 People         | Wet Fish                      |
| 33 | Bina Putri                  | Nismawati     | Sanjai               | 11 People         | Shredded ikan, Fish Meatballs |
| 34 | Burung Camar                | Nukmawati     | Sanjai               | 13 People         | Shredded ikan, Fish Meatballs |
| 35 | Harapan Baru                | Nurlinda      | Sanjai               | 15 People         | Fish Crackers                 |
| 36 | Wanita Citra Sejati         | Buati         | Sanjai               | 13 People         | Fish Meatballs                |
| 37 | Teratai                     | Nirwati       | Sanjai               | 13 People         | Wet Fish                      |
| 38 | Wanita Sejati               | St. Aminah    | Sanjai               | 10 People         | Dried Fish                    |
| 39 | Tassiwata                   | Magfirah      | Amanagappa St        | 10 People         | Meatballs                     |
| 40 | Bawal                       | Sitti Sudarmi | Desa Tongke - tongke | 11 People         | Crackers                      |
| 41 | Bintang Laut                | Farida        | Yos Sudarso St       | 12 People         | Dried Fish                    |

Source: Fisheries Statistics, 2023.

Table 2. Production and Production Value of Marine Fisheries in Sinjai Regency in 2019-2023.

Source: Sinjai Fisheries Statistics, 2023

| Years | Product (Tons) | Production Value (Rp.1.000,-) |
|-------|----------------|-------------------------------|
| 2019  | 35.935,50      | 484.255.673,-                 |
| 2020  | 36.632,12      | 659.378.160,-                 |
| 2021  | 37.760,20      | 546.494.975,-                 |
| 2022  | 38.873,40      | 819.016.910,-                 |
| 2023  | 40.047         | 926.380.174,-                 |

Table 3. Production Volume of Processed Fish Raw Materials of Marine Fisheries Businesses by Treatment Method in 2019-2023

Source: Sinjai Fisheries Statistics, 2023.

| Main Commodities                                  | Years (Tons) |          |          |          |          | Average Increase (%) |
|---|--------------|----------|----------|----------|----------|----------------------|
|   | 2019         | 2020     | 2021     | 2022     | 2023     |                      |
| Drying/Salting                                    | 3.814,25     | 4.916,56 | 3.302,45 | 897,23   | 1.244,5  | (9,5)                |
| Scavenging  | 25,87        | 28       | 66,00    | 44,46    | 48,30    | 29,9                 |
| Processing of Fish Crackers, Fish Chips and Peyek | -            | -        | -        | 28,47    | 29,14    | 2,0                  |
| Fumigation  | 228,5        | 231,23   | 120,62   | 217,96   | 130,50   | (1,5)                |
| Freezing  | 250,3        | 252,1    | 998,00   | 280,5    | 600,00   | 84,5                 |
| Other Processing (Fish Floss)                     | 3,45         | 3,74     | 20,26    | 16,48    | 14,75    | (7,0)                |
| Surimi & Fish Jelly Processing                    | 1,78         | 1,83     | 19,30    | 36,9     | 33,74    | (17,2)               |
| Others (processed king crab)                      | 1,2          | 1,24     | -        | -        | -        | -                    |
| Fresh Product Handling (Fillet)                   | 20,45        | 21,60    | 24,98    | 4,28     | 4,21     | (50,5)               |
| Total   | 4.345,80     | 5.456,30 | 4.551,61 | 1.526,27 | 2.104,98 | (4,8)                |

### 3.2. Discussions

#### 3.2.1. Profile of Fish Processing Businesses in Sinjai District

There are 41 fisheries processing and marketing groups in Sinjai Regency, consisting of 576 fish processors (Sinjai Fisheries Statistics, 2023). There are 5 (five) smoked fish processing groups, with fish species such as parrotfish, stingray, barracuda and others. This smoked fish is one of the most popular products in the community. This is supported by the potential of fish catches in Sinjai Regency which is also quite large. Catch production in 2022 reached 38,873.40 tons and increased in 2023 by 40,047 tons (Anonymous, 2023). Part of this catch is the raw material for smoked fish.

#### 3.2.2. Characteristics of Smoked Fish Processing Business

Fish smoking is one of the potential fishery product processing businesses in Sinjai Regency. Smoked fish began to be produced in the 80s. The fish smoking business is one type of household-based community business, the house is not for just home life, but is a place for production. Household industries generally start from family businesses that are generally hereditary and can automatically benefit the livelihoods of the surrounding villagers.

Fish processed into smoked fish are stingray, barracuda, tuna, cendro, skipjack, mackerel and cockatoo. Fish are smoked using firewood, belts and coconut shells with the aim of preserving and giving flavor to the fish. According to Hadi et al. (2022), smoking uses smoke

produced from burning wood or other organic materials to preserve and flavor the fish. The availability of raw materials is quite abundant at relatively low prices, the processing process is quite easy and the market absorption is quite high, making the fish smoking business one of the promising business opportunities.

The smoked fish processors in Sinjai District carry out the production process simply. Smoked fish production has not been marketed outside the district because current production only meets local needs. Traditional markets are the marketing place for smoked fish such as Bikeru market, Lancibung Market, Mannanti Market and Lappae Market. People who buy smoked fish are more due to the different aroma and taste of smoked fish compared to raw fish that is grilled by themselves.

### 3.2.3. Characteristics of Smoked Fish Processors

Table 4. Characteristics of smoked fish processors in Sinjai District.

Source: primary data processed, 2024

| No. | Name        | Age (years) | Education            | Business Experience (Years) | Number of Family (People) |
|-----|-------------|-------------|----------------------|-----------------------------|---------------------------|
| 1.  | Sauna       | 48          | Junior High School   | 26                          | 5                         |
| 2.  | Hasniar     | 40          | Elemntary School     | 15                          | 4                         |
| 3.  | Asmaniar    | 42          | Elemntary School     | 17                          | 5                         |
| 4.  | Hasmiati    | 45          | Elemntary School     | 16                          | 4                         |
| 5.  | Hj. Mare    | 70          | -                    | 47                          | 2                         |
| 6.  | Hj. Herlina | 58          | High School          | 35                          | 3                         |
| 7.  | St. Aminah  | 54          | Elemntary School     | 12                          | 4                         |
| 8.  | Mawati      | 33          | Elemntary School     | 14                          | 3                         |
| 9.  | Nirwati     | 46          | Junior High School   | 3                           | 2                         |
| 10. | Marwah      | 53          | Vocation High School | 3                           | 4                         |

### 3.2.4. Consumer Characteristics

Table 5. Consumer characteristics based on age, gender, education and occupation.

Source: primary data processed, 2024

| No. | Age | Gender | Education   | Jobs           |
|-----|-----|--------|-------------|----------------|
| 1   | 20  | P      | D3          | Self-employed  |
| 2   | 22  | P      | High School | Student        |
| 3   | 23  | P      | High School | Mahasiswa      |
| 4   | 24  | P      | D3          | Self-employed  |
| 5   | 26  | P      | D4          | Self-employed  |
| 6   | 27  | P      | D3          | Self-employed  |
| 7   | 27  | L      | S1          | Self-employed  |
| 8   | 53  | L      | S1          | Civil servants |
| 9   | 56  | P      | SMEA        | Self-employed  |
| 10  | 59  | L      | S2          | None           |

### 3.2.5. SWOT Analysis

#### 1. Identification of Strengths and Weaknesses

Table .6 Internal Factors of SWOT Analysis

Source: primary data processed, 2024

| Internal Factors (Strength & Weakness) |     |   |        |        |       |
|--|-----|---|--------|--------|-------|
|  | No. | Strategic Factors                           | Weight | Rating | Score |
| S                                      | 1.  | Long business experience                    | 0.104  | 4.00   | 0.415 |
|  | 2.  | Competitive Price                           | 0.090  | 3.80   | 0.357 |
|  | 3.  | Fish resources available                    | 0.076  | 3.80   | 0.294 |
|  | 4.  | The product has appeal                      | 0.123  | 3.00   | 0.369 |
|  | 5.  | Production tools available                  | 0.136  | 3.00   | 0.407 |
|  |     |   |        |        | 1.843 |
| W                                      | 1.  | Limited business capital                    | 0.097  | 1.80   | 0.174 |
|  | 2.  | The production process is still traditional | 0.131  | 1.60   | 0.210 |
|  | 3.  | Short product economic life                 | 0.130  | 1.60   | 0.208 |
|  | 4.  | Less promotion                              | 0.108  | 1.40   | 0.151 |
|  |     |   |        |        | 0.744 |
| Total                                  |     |   | 1.000  |        | 2.586 |

#### 2. Identify Opportunities and Threats

Table 7 External Factors SWOT Analysis

| External Factors (Oppoertunity & Threats) |    |  |       |       |       |
|---|----|--|-------|-------|-------|
| O   | 1. | Continuity of existing raw materials               | 0.121 | 4.00  | 0.486 |
|   | 2. | Smoked fish products are favored by the public     | 0.105 | 4.00  | 0.419 |
|   | 3. | Government support in fisheries sector development | 0.107 | 2.00  | 0.214 |
|   | 4. | Joining a fisheries business group                 | 0.179 | 3.00  | 0.536 |
|   |    |  |       |       | 1.655 |
| T   | 1. | Erratic weather                                    | 0.186 | 2.20  | 0.409 |
|   | 2. | Competition in the processed fish industry         | 0.136 | 3.00  | 0.407 |
|   | 3. | Changes in government policy                       | 0.167 | 2.40  | 0.400 |
|   |    |  |       |       | 1.216 |
| Total                                     |    |  |       | 1.000 | 2.870 |

### 3.2.6. Prospects for Smoked Fish Business Development in Sinjai Regency

In determining the prospects for smoked fish development, the focus is on the SO (Strength and Opportunities) strategy, namely optimizing the strengths and opportunities possessed. The strategies obtained based on the SWOT matrix include: the development of SMEs in smoked fish processing with training and counseling programs from related agencies. Establishing partnership cooperation between MSME players in promoting products. Application of processing technology innovations by updating infrastructure and attending training.

The resulting strategy based on SWOT Analysis is presented through the SWOT Matrix in Table 7. Figure 2 shows several alternative strategies that can be applied in the development of smoked fish processing businesses in Sinjai Regency. Quadrant 1 is a very favorable situation, where the company has opportunities (Oppoertunities) and strengths (Strenghts) so that it can take advantage of existing opportunities. The strategy that must be applied in this condition is to support an aggressive growth policy (growth oriented strategy).

This strategy is in line with the criteria contained in the SWOT Cartesian Diagram in Figure 3. Smoked fish processors have opportunities in the medium category that can be utilized in running their business by maximizing their average strengths. The SWOT diagram shows that the smoked fish processing business is in quadrant 1, where the strategy has strengths and opportunities so that it can take advantage of existing opportunities. The strategy applied in these conditions supports aggressive policies, where the type of formulation applied is SO (Strength Opportunities), which is a strategy that focuses on using strengths to take advantage of opportunities.

#### **4. CONCLUSION**

Based on the description and description of the results of the discussion, the conclusion of this research is that the characteristics of smoked fish businesses in Sinjai Regency are products that have a distinctive taste, smoked fish in whole and fillet form, using wood as fuel, simple equipment, local marketing, varying fish prices, not yet having business legality and a workforce aged 33-70 years.

The SO (Strengths Opportunities) strategy is the right strategy used in the prospect of developing smoked fish processing businesses in Sinjai Regency, including: developing smoked fish MSMEs with training and counseling programs from related agencies, establishing partnership cooperation between MSME players in promoting products and implementing processing technology innovations by renewing infrastructure and participating in training.

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#### **References**

1. Adawyah, R. (2007). Fish Processing and Preservation. In Bumi Aksara. Bumi Aksara.
2. Hadi, A., Khazanah, W., Andriani, A., & Husna, H. (2022). The effect of various smoking sources on protein, microbiological and organoleptic content of smoked tilapia (*Oreochromis niloticus*). *AcTion: Aceh Nutrition Journal*, 7(2), 179–186.
3. Rangkuti, F. (2016). Techniques for dissecting business cases SWOT Analysis. Jakarta: Gramedia.
4. Sinjai, D. P. K. (2023). Fisheries Statistics of Sinjai Regency. Fisheries Service of Sinjai Regency.

5. Kusmindari CD, Faizal M. Feasibility study of canned smoked fish as the micro enterprises in south Sumatra province, Indonesia. *Jurnal Optimasi Sistem Industri*. 2022 May 31;21(1):10-9.
6. Anam BK, Setiadi A, Santoso SI. Feasibility analysis of sustainability and development strategy of fish smoke centers in Demak Regency. *InIOP Conference Series: Earth and Environmental Science 2023 Sep 1* (Vol. 1246, No. 1, p. 012031). IOP Publishing.
7. Adeyeye SA, Oyewole OB. An overview of traditional fish smoking in Africa. *Journal of culinary science & technology*. 2016 Jul 2;14(3):198-215.
8. Patekkai M, Arief AA, Fachry ME. The analysis of smoked fish katsuwonus pelamis feasibility in Bone Regency. *Int. J. Sci. Res. Publ.* 2019;9(3):755-9.
9. FALODUN OM. Analysis of Marketing Channels and Efficiency of marketing system for smoked fish market in Ogun state, Nigeria. Undergraduate Research Project. Department of Aquaculture and Fisheries Management, College of Environmental Resources Management, University of Agriculture Abeokuta. 2011 Jun.
10. Haqiqiansyah G, Sugiharto E. Coastal women empowerment in improving enterprise of fish product processing in Sanga-Sanga districts. *InIOP Conference Series: Earth and Environmental Science 2018 Apr 1* (Vol. 144, No. 1, p. 012054). IOP Publishing.



**Fig 2. Alternative strategies that can be applied in the development of smoked fish processing**



Fig 3. SWOT Cartesian Diagram

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