Business model analysis of coconut shell processor in North Sulawesi

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Abstract. This research aim about coconut shell industry model in North Sulawesi. Respondent of this research is owner, manager, and employee which play role in this venture. Canvas approach use for mapping business model and qualitative analysis and SWOT use for development planning model. Crucial factors for created competitive advantage for coconut shell business is the availability of raw material, market target, and adequate of human resources. Limited channels, tools, and traditional techniques are several factors that make the business unprofitable. Then the opportunities obtained include high market demand, availability of new technology, and business partners. An external factor that poses a threat is the presence of new arrivals. The products have not fully met the standards due to the simple technology used. The development of a more innovative and competitive business model enhances the essential elements of the coconut shell model canvas. Strategies are needed to improve aspects of production technology, information networks, a culture of innovation, strong partnerships and relationships, a high entrepreneurial spirit and mentality as well as good quality products and services. Increasing economic value in a more integrated group of coconut industry processors requires strong partnerships between coconut farmers, processors and consumers.

1. Introduction
Agricultural industrialization through the development of the agro-industry sector is seen as the most appropriate transition in bridging the process of economic transformation in Indonesia. In relation to the potential of Indonesia as an agrarian country, agro-industry is an effort to modernize agriculture by utilizing the strong links between the agricultural sector and the industrial sector [1]. Agro-industry is defined as part of manufacturing, which is a sector that processes raw materials and intermediate products from agriculture, fisheries, and forestry. Agro-industry is part of a broader concept of agribusiness because it includes suppliers of inputs to the agriculture, fisheries, and forestry sectors and distributors of food and non-food output from agro-industries [2]. Saragih and Krishnamurti (1992) stated that agro-industry has strong upstream to downstream links, its activities are resource-based industries and generally use renewable inputs and the demand for agro-industrial products is elastic to income [3]. Agro-industry of agricultural products is able to make a very real contribution to development in most developing countries because agro-industry as a doorway for the agricultural sector, the basis of the manufacturing sector, processing of agricultural products produces important export commodities and processing of agricultural products produces important export commodities [4–6].
Indonesian coconut production per year ranks second in the world at 12,915 billion (24.4%) of world production. However, the problem of these commodities is not the area of land, and the amount of output, but the products produced are still limited to the form of raw products as well as the marketing of coconuts in Indonesia are still in raw form. This causes the low economic value of the coconut shell.

The production and coconut area of North Sulawesi Province is currently the second-largest in Indonesia, which is an area of 281,564 hectares with a production of 260,702 tons (Direktorat Jenderal Perkebunan, 2018) [7]. Coconut from community plantations is more than 95 percent. Therefore, the pros and cons of the coconut market will have a direct impact on the people's economy in North Sulawesi. In general, agricultural commodity businesses, including coconut products, are prone to quality and marketing conditions. The coconut commodity business does not only involve selling low prices. It also related to the vulnerability of the economic resilience of the people of North Sulawesi.

The Ministry of Industry has established two approaches to build synergic and integrated industrial competitiveness between the center and the regions or a top-down approach with the development of 35 priority industry clusters and through a bottom-up approach with the determination of the core competencies of the regional industries, where central government helped there so that the region has competitiveness. The development of core competencies at the provincial level is referred to as Provincial Leading Industries, and at the district/city level, it is called Regency / City Core Industrial Competencies. Determination of industrial development through the resolution of priority and core industrial competencies is needed to provide certainty and get support from all sectors in the economy, including banking.

There is a 35 Roadmap for Development of Priority Industrial Clusters, including the coconut processing industry. North Sulawesi has compiled a leading industry roadmap and a map of leading industry development guidelines established through Permen No. 136 / M-IND / PER / 12/2010 concerning the Roadmap for Leading Industry Development in North Sulawesi Province.

The alternative to replacing the economy of farmers in coconut-producing regions with other commodities is not significant yet. The coconut commodity business in North Sulawesi still has opportunities to improve from cultivation to post-harvest and product development, primarily through developing more innovative and more competitive business models. This study aims to map the business model of coconut shell processing business and analyze the performance of the business model and build a more innovative and competitive coconut shell business model in the palm oil industry in North Sulawesi Province.

2. Research method

2.1. Research location
This research was conducted at a coconut shell processing business or coconut shell agroindustry in Bitung City, North Sulawesi Province.

2.2. Materials and research tools
Tools and materials used in the form of questionnaires and writing instruments, computers, and field survey equipment such as vehicles, assignments, cameras, recording devices, etc.

2.3. Research variable
The variables analyzed in this study are:
- Value proposition
- Customer segment
- Customer relations
- Channels
- Main activities
- Main resources
2.4. Collecting and analysis data
Data was collected from business units that use coconut shell raw materials in the city of Bitung. The type of coconut shell processing business studied is classified as a small and medium business. The data analysis method uses a canvas model of business analysis. The data analysis method uses a canvas model business analysis with nine blocks (Osterwalder, A. and Yves Pigneur, 2010)[8], as shown in Figure 1 and Figure 2 (Svanebjerg, 2011), and followed by a SWOT analysis [9].

The SWOT analysis begins by identifying internal and external factors that influence the sustainability of the coconut shell industry. These factors include the strengths, weaknesses of business also the opportunities and threats to the sustainability of the coconut shell industry. SWOT
analysis is used to develop more innovative and competitive business models. The business model is generated from the formulation of development and improvement strategies in each of the existing coconut shell agro-industry business models. The alternative prototype of the new business model is expected to be more innovative and competitive for the company in the future.

3. Research and discussion

3.1. Mapping models

3.1.1. Value proposition. Process coconut shell/coconut shell into charcoal activated carbon and shisha briquettes with 15% moisture content and 3% ash content.

3.1.2. Customer segment. Domestic: restaurants and satay traders. Overseas: Indian countries, Sri Lanka, and Turkey.

3.1.3. Customer Relations. Business cooperation relationships with domestic and foreign buyers, and fulfill orders according to the requirements requested by the buyer.

3.1.4. Channel. The most widely used business media are telephone, ocean freight expeditions, and social media WA and Facebook. Other business media: email and WEB.

3.1.5. Main activities.

- Procurement. Raw materials obtained from farmers who were collecting coconut shells with a 1-hour radius from the shell processing plant. Coconut shell processing locations scattered in several areas, including Bitung, Halmahera, Sanger, Temple, Boroko, and Likupang.

- Processing. For making coconut shell charcoal done in 2 ways, namely by using holes and drums. This business has three holes and 40 drums. Each hole can produce 400 kg of charcoal with 1600 kilograms of coconut shells, while for one drum, it can produce 30-35kg of charcoal from 120-140kg of the shell. Making activated charcoal from coconut shells by cleaning the coconut shell from impurities such as soil, gravel, then drying it in the sun, then the shell is put into the hole/drum, the fuel used is the shell. Shell burned for two nights one day or the equivalent of 36 hours for hole fuel media and 24 hours for drums. After completing the drum, the lid is covered with banana fronds and sacks of moistened sand to cover the smoke coming out.

The stages of shell charcoal briquette production described as follows:

- Sifting. Charcoal sifting is intended to make the charcoal we will turn into briquettes free from dust and other non-charcoal materials. Sifter tools used can be traditional sieves in the form of ram wire that stretched on a wooden frame and operated by swinging. Also, with more modern tools such as a swivel. The equipment depends on the needs and existing budget.

- Siege. After sifting, the next process is flouring. We make charcoal powder by using specialized tools (disk and hammer mill). The goal is that the charcoal has smooth enough to make it the dough before printing into briquettes.

- Mixing is the process of compound powdered charcoal with an adhesive. The goal is the charcoal powder can glue to each other and form into briquettes. This is similar to if we make clay dough to be made into bricks or sand and cement mixture to be used as a brick. Here we can use a mixer, and the mixing process takes about 5-10 minutes until the mixture is evenly mixed.

The mixture we use is a charcoal powder (charcoal flour), water and adhesive. The adhesive used is tapioca flour, with a maximum percentage of 3%. The water used must be clean and clear water. The water dose must be just right, about 20% only and adjusted to the condition
of the charcoal powder. The amount of water we use also follows the character of the printing press that we use.

- Maturing of the dough is a process carried out to make our briquette mixture "fluffier". This process is carried out using the same screw press as used for the printing process. Actually, without the ripening process, we can still print the dough into briquettes. But the printing process will be easier, and the resulting briquettes will be even better if previously done the dough ripening process first.

- Printing. The fluffier dough is printed using the first printing press. The shape of the mold adjusted to the desired shape of the briquette. Briquettes that have been made and are still wet are accommodated on a tray, to make it easier in the drying process. Printouts are selected to separate the good and defective briquettes. Good briquettes will be sent to the drying process, while rejected briquettes will be returned and mixed with the dough ready to be reprinted.

- Oven. Drying briquettes can be done naturally with sunlight or using an oven. The advantage of drying with the sun is that it does not require special equipment and additional costs for heating. The disadvantage is that it requires longer drying time, a large drying area, and greatly influenced by local weather conditions. Therefore drying in this way does not provide optimal results.

Drying with an oven does require additional investment in making the oven and adding operational costs for the heater. But with the oven, we can save time drying, can be done at any time, as well as with more optimal results.

- Packing. Shell charcoal that has been packed in sacks.

- Shipping/Sales. Delivery is carried out by using trucks to the port after that using sea transportation in the form of ships. Traditional sales of trucks delivered to buyers (customers) who buy directly to the company.

3.1.6. Main Resources. Coconut shell raw material is the primary resource in the process of making charcoal and shisha briquettes. HR is also the central resource of this business, where the selected HR has particular expertise in every field that is carried out both in terms of procurement of raw materials to delivery/sales.

3.1.7. Main Partnership. Main partners: (1) procurement of raw materials, namely coconut shell collecting farmers; (2) marketing companies that are overseas marketing partners

3.1.8. Production cost. The cost of procuring raw materials for coconut shell that is ready to be processed is Rp. 1,000 per kg. The total raw material requirements for this calculation (1 month) are 100,000 kg, with a total cost of Rp. 100,000,000.

3.1.9. Revenue

- Selling price from charcoal Rp. 5,500 / Kg

1 Month Acceptance:

\[
\text{Total Production} \times \text{Price} = \text{Revenue} \\
100,000 \text{ kg (100 tons)} \times 5,500 = \text{Rp 550,000,000,-}
\]

- \( R / C \) and Benefit Cost Ratio

\[
R / C = \frac{\text{Revenue}}{\text{Production Costs}} \\
= \frac{\text{Rp 550,000,000}}{\text{Rp 100,000,000}} \\
= \text{Rp. 5.5}
\]

That is, every one rupiah costs incurred for production generates revenues of 5.5 rupiah

- Benefit-Cost Ratio = Profit: Production Costs

\[
= \frac{\text{Rp 450,000,000}}{\text{Rp 100,000,000}} \\
= \text{Rp 4.5}
\]

That is, every one rupiah costs incurred for production produces a profit of 4.5 rupiah
4 kg of shell = 1 kg of charcoal

- Break event point (BEP)
  BEP price = Total production cost: production
  \[ \text{BEP price} = \frac{\text{Rp 100,000,000}}{100,000 \text{ Kg}} \]
  \[ \text{BEP price} = \text{Rp. 1,000} \]

  This means that the "Charcoal" business will break even when in the production of 100,000 kg sold at a price of Rp 1,000

  Production BEP = Total production cost: selling price
  \[ \text{Production BEP} = \frac{\text{Rp 100,000,000}}{\text{Rp 5,500}} \]
  \[ \text{Production BEP} = 18,182 \text{ Kg} \]

  This means that the "Charcoal" business will break even at a price of Rp 5,500 / Kg when the production of 18,182 Kg is sold.

3.2. Analysis of Business Model Development Strategies using SWOT analysis:

3.2.1. Strength (Strength)
- Coconut shell raw materials are available
- The target market is clear
- Having human resources
- Production networks in several locations

3.2.2. Weakness
- The number of distribution channels is small
- Simple/traditional tools and technology

3.2.3. Opportunity
- Good market growth
- High demand

3.2.4. Ancaman (Threats)
- Newcomers producing charcoal
The charcoal produced is overcooked due to the techniques and technology used which are still simple. Overall, shell charcoal marketing is still minimal, because the export market dominates demand, and entrepreneurs also prefer to export because the number of requests continues to increase from year to year. Whereas local people use shell charcoal to meet their daily needs, and the demand is relatively small.

3.3. Identification and analysis of strengths and weaknesses in the IFAS and EFAS matrix

### Table 1. IFAS matrix analysis.

| Internal Factors                                    | Weight | Rating | Value |
|-----------------------------------------------------|--------|--------|-------|
| Strengths                                           |        |        |       |
| Coconut shell raw materials are available           | 0.20   | 5      | 1.00  |
| The target market is clear                          | 0.20   | 5      | 1.00  |
| Having human resources                              | 0.15   | 4      | 0.60  |
| Production network in several locations             | 0.15   | 4      | 0.60  |
| Weakness                                            |        |        |       |
| The number of distribution channels is small        | 0.10   | 3      | 0.30  |
| Simple / traditional tools and technology           | 0.20   | 3      | 0.60  |
| Total                                               | 1.00   |        | 4.10  |

From the IFAS matrix table above, the company's condition in the company's internal environment is in good condition (4.10).

### Table 2. EFAS matrix analysis.

| External Factors                                    | Weight | Rating | Value |
|-----------------------------------------------------|--------|--------|-------|
| Opportunity                                         |        |        |       |
| Good market growth                                  | 0.30   | 5      | 1.50  |
| High demand                                         | 0.20   | 4      | 0.80  |
| Threats                                             |        |        |       |
| Newcomers producing charcoal                        | 0.20   | 3      | 0.60  |
| The charcoal produced is overcooked due to the     | 0.30   | 5      | 1.50  |
| techniques and technology used which are still     |        |        |       |
| simple                                             |        |        |       |
| Total                                               | 1.00   |        | 4.40  |

From the EFAS matrix table above, the company's condition in the company's internal environment is in good condition (4.40).

3.4. SWOT analysis of charcoal shells production

3.4.1. Alternative Strategies with a 9 cell SWOT matrix
3.4.2. Canvas business model for coconut shell agro-industry business development

| Main Partnership: | Main Activities: Production Technology & Network Marketing | Value Proposition: Charcoal (Volunteer Meter = 18), activated carbon, Shisha | Customer Relationship: Business cooperation | Customer Segment: Domestic: restaurants & satay sellers Overseas: Sri Lanka, India, Turkey, Japan & the Middle East |
|-------------------|------------------------------------------------------|-------------------------------------------------|--------------------------------------|-----------------------------------------------------|
| Farmers, shell collectors, marketers | | | | |

| Main Resources: | | | |
|-----------------|-------------------------------------------------|--------------------------------------|-------------------------------------------------|
| Shell, HR | | | |

| Cost Structure: | Receipt Flow: |
|-----------------|----------------|
| Cost of procuring raw materials Rp. 1,000 per kg | Revenue Per Month |

| Total Production x Price = Revenue |
|-----------------------------------|
| 150,000kg (150 tons) x 5,500 = Rp. 825,000,000 |

3.4.2. Canvas development of coconut shell agro-industry business model

4. Conclusion
The development of the coconut shell industry model influenced by internal factors, namely strengths and weaknesses and external factors, namely opportunities and threats. The availability of raw
materials, target markets, and adequate human resources and production networks that scattered in several locations are essential competitive advantages for coconut shell agroindustry. Characteristics that make coconut shell agroindustry not profitable are the limited number of distribution channels, traditional production equipment, and technology. The existence of newcomers of coconut agroindustry and low quality of products from using simple techniques and technology can cause problems for this business. The development of more innovative and competitive business models improves essential elements on the canvas of the existing coconut agroindustry business model. The improvement strategy is mainly related to aspects of production technology, information networks, innovation culture, strong partnership relations, high entrepreneurial spirit and mentality, and right quality products and services. Increasing economic value in the coconut processing industry cluster includes coir, shell, fruit flesh, and coconut water, which is more integrated requires a strong partnership between coconut farmers, processors (industry), and consumers.

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