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Competitiveness of mandar coconut oil industry

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Abstract. This study aims to determine the competitiveness of the Mandar coconut oil industry in Polewali Mandar Regency. Research methods with descriptive qualitative and quantitative approaches. Industry competitiveness analyzes by the LQ method, Klassen Typology, and Shift Share Analysis (SSA), also the Porter Five Force Model. While the determinants of competitiveness are analyzed with the Porter Diamond Model. The results showed the Mandar coconut oil industry in Polewali Mandar had competitive power based on competition among rival companies, supplier bargaining power, and consumer bargaining power. Also, the comparative advantage of the processing industry is a leading base sector in the area, which is potential and can still develop and be competitive. Factors that determine the competitiveness of the Mandar coconut oil industry are human resources, natural resources and the environment, technology, number of buyers, and the growth rate of demand, and suppliers. Need efforts to improve competitiveness include training and mentoring for Mandar oil entrepreneurs related to increased use of production technology, packaging and promotion to increase competitiveness.

1. Introduction

Coconut is one of main farm commodities in Indonesia, even Indonesia become one of the countries with the largest coconut producer in the world. However, Indonesia's strength as the largest coconut producing country in the world has not yet been maximized. Industries in this commodity have not been developed so much [1].

In Indonesia, around 96 percent coconut farm (*Cocos nucifera L*) is society plantation which is managed by monoculture or mixed garden with the involvement of around 20 million families of farmers or farm labors [2]. One of the coconut producing regions in Indonesia is Polewali Mandar Regency, West Sulawesi Province, and ranks second largest in Eastern Indonesian Region. Coconut farm in West Sulawesi Province covers an area of 43.194 Ha with a production of 37.369 ton per year [3].

Mandar ethnic society is hereditary well-known experts in making coconut oil that has a distinctive aroma. Mandar coconut oil is a regional wealth that still exists even though many other coconut oils are also circulating in the market. This is because it is managed based on the local wisdom of the community and becomes a product of the pride of the ethnic Mandar society.

By looking at the potential of the West Sulawesi Province, this certainly can have a good impact on the development of the coconut oil industry in Polewali Mandar Regency because Polewali Mandar has a strategic location on a pivot road that connects South Sulawesi and Central Sulawesi so that it is directly connected with regional market access. With the development of the coconut oil processing



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industry can provide added value to the coconut commodity (in) on the market. Requirement to penetrate the competitive market, mandar coconut oil products must be competitive. Therefore, this study aims to determine the competitiveness of the mandar coconut oil industry and the factors that determine the competitiveness of the mandar coconut oil industry in Polewali Mandar regency.

2. Research methods

The method used by researchers is a descriptive research method with qualitative and quantitative approaches. The location of this research is in Polewali Mandar Regency, West Sulawesi Province, Indonesia. The population in this study were all mandar coconut oil companies in Polewali Mandar District, which total of 438 units, so that the percentage of leeway used was 30%. By using the Slovin technique, according to Sugiyono [4], the number of samples of this study was determined to be 10. This study uses primary data and secondary data. Analysis of competitive advantage is carried out using the Porter's Five Forces Model approach and analysis of the factors that determine the competitiveness of the mandar coconut oil processing industry is analyzed using the Porter's Diamond Model [5] (Porter, 2006). Whereas the comparative advantage analysis of mandar coconut oil and the analysis of the leading sector in Polewali Mandar Regency using the methodology using Klassen Typology, Location Quotient (LQ), and Shift Share Analysis (SSA) analysis [6].

Location Quotient (LQ)

LQ is widely used in the analysis of base sectors in a region, with the rationale based on the economic capability of a sector in an area can be calculated from the following ratio:

$$LQ = \frac{Si/Ni}{S/N}$$

Which are :

- Si = Production value of the mandar coconut oil industry in Polewali Mandar Regency
- Ini = Production value of the mandar coconut oil industry in West Sulawesi Province
- S = Production value of the processing industry in Polewali Mandar Regency
- N = Production value of the processing industry in West Sulawesi Province

Based on the LQ results can be analyzed and concluded as follows:

- a. If $LQ > 1$, it means that the growth rate of the palm oil sector in this region is greater than the growth rate of the same sector in regional growth.
- b. If $LQ = 1$, it means that the growth rate of the palm oil sector in this region is the same as the growth rate of the same sector in regional growth.
- c. If $LQ < 1$, it means that the palm oil sector is not a leading sector in the region and has no potential to be developed in supporting regional economic.

Typology Klassen

Typology Klassen used to find out the position of regional progress based on regional economic growth variables and regional per capita income.

PDRB per capita Growth Rate	$y_1 > y$	$y_1 < y$
$r_1 > r$	ADVANCED FORCES AND GROW FAST High income High growth	AREA GROWING Low income and high growth
$r_1 < r$	ADVANCED FORCES BUT PRESSURED High income and low growth	RELATIVE AREA LEFT BEHIND Low income and low growth

Figure 1. Typology Klassen Model Shift Share Analisis (SSA).

Stages of the Shift Share Analysis (SSA) analysis are:

1. Prepare data for activity indicators / i-sector of the j-th region and data of activity indicators / i-sector in a wider area of 2 year points
2. Calculate the components of national growth (PN), the formula:

$$PN_{ij} = \left[\frac{X_{..}(t_1)}{X_{..}(t_0)} - 1 \right] x X_{ij}(t_0)$$

$PN_{ij} < 0$ = Indicates that sector i in region j plays a less role in regional dynamics

$PN_{ij} > 0$ = Indicates that sector i in j region plays a role in regional dynamics.

3. Calculate the proportional shift (PS) component with the equation:

$$PS_{ij} = \left[\frac{X_{ij}(t_1)}{X_{ij}(t_0)} - \frac{X_{..}(t_1)}{X_{..}(t_0)} \right] x X_{ij}(t_0)$$

$PS_{ij} < 0$ = Indicates sector i in region j has slow growth.

$PS_{ij} > 0$ = Indicates sector i in region j has fast growth.

Calculate the differential shift component (DS) with the equation:

$$DS_{ij} = \left[\frac{X_{ij}(t_1)}{X_{ij}(t_0)} - \frac{X_{..}(t_1)}{X_{..}(t_0)} \right] x X_{ij}(t_0)$$

$DS_{ij} < 0$ = Indicates sector i in region j has no competitiveness compared to sector i in other regions.

$DS_{ij} > 0$ = Indicates sector i in region j has good competitiveness

Calculate the net shift (PB) with the equation :

$$PB_{ij} = PS_{ij} + DS_{ij}$$

$PB_{ij} > 0$ = Sector i growth in region j is progressive

$PS_{ij} < 0$ = Indicates that sector i in region j is slow.

Porter Five Force Model

Porter (2006) [6] states the five forces that will determine the survival of the company (competitive forces) can be seen through the following picture:

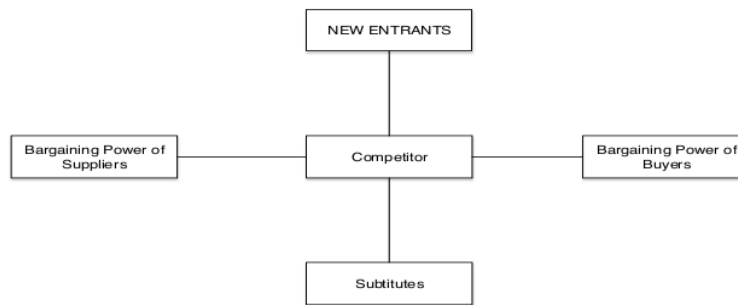


Figure 2. Porter five force model.

Porter Diamond Model

Porter identified four main factors and two supporting factors that affect competitiveness. The Diamond Porter model can be seen in the following image:

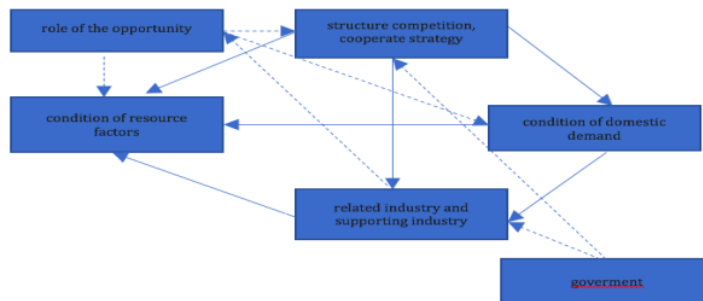


Figure 3. Porter diamond model.

3. Results and conclusions

3.1. Geographical conditions and coconut potential

Based on geographical location and administrative area, Polewali Mandar Regency is a regency located in West Sulawesi with an area of 2,022.30 km² which is administratively divided into 16 subdistricts and consists of 167 villages.

Based on the coconut potential in Polewali Mandar District, coconut production (in) in Polewali Mandar Regency during the last 5 years has been around 17,000 tons per year. Coconut production is used by various industries to produce a product that has the quality and added value. The mandar coconut oil industry is an industry that uses the most coconut fruit (in) as a raw material in the production process.

Coconut production (in) in 2016 was 16,391.47 tons greater than the type of hybrid coconut whose production was only 2,397.02 tons. This shows that there are still guaranteed raw materials for the industry of coconut users (in) in Polewali Mandar Regency.

Overview of Mandar Coconut Oil.

Mandar coconut oil is coconut oil that is produced from processed coconut fruit (inside) which is traditionally processed by the mandar ethnic community. Most indigenous people of the mandar tribe only want to cook if using mandar coconut oil as cooking oil or as a complement to the special cooking spices of mandar. The advantages of this product have a distinctive taste and aroma. In addition, mandar coconut oil also has a long enough durability ± 3 months, some even have the

endurance for up to 1 year without using preservatives. The raw material for making pure from coconut (in).

The Process of Making Mandar's Coconut Oil.

Coconut oil can be made in several methods. The method used in making mandar coconut oil uses a traditional method called the wet method [7]. The equipment used is very simple, namely kitchen equipment that is commonly used for cooking such as pans, shredder machines, machetes, filter cloths, basins, and tongs. The wet method of making coconut oil is done by extracting coconut milk from coconut meat then cooked until the oil is separated.

3.2. Processing industry economy

In 2016, the contribution of the manufacturing sector to the Gross Domestic Product figures for the 2010 Constant Prices and the Applicable Prices was 6.60 percent and 6.12 percent, which occupies the 5th largest position. Compared to 2014, there was an increase of 9.21 percent and 9.24 percent, respectively. The number of small industrial businesses in Polewali Mandar Regency in 2016 reached 6,144 company units from 41 types of industries. The workforce involved in small industries reached 14,016 people. The mandar coconut oil industry is the second largest industry that helps absorb labor after the silk fabric weaving industry, which is around 7.84 percent of the total workforce in small industries.

3.3. Industrial processing performance

Processing Industry is an industry that is defined as a unit of production that involves economic activity, the production of goods or services, which is housed in a certain building or location. The performance of the processing industry in Polewali Mandar Regency can be seen from the results of leading sector analysis using Klassen Typology, Location Quotient (LQ) and Shift Share Analysis (SSA) analysis described as follows:

4. Typology klassen

Based on the results of Klassen's typology analysis, the number of sectors by category in Polewali Mandar Regency is: 1) There are 6 sectors included in the categories of advanced and rapid growth, namely mining and quarrying, electricity and gas procurement, information and communication, financial and insurance services, services education, as well as health services and social activities. 2) there are 2 sectors that fall into the category of advanced but depressed, namely accommodation and food and other services, 3) there are 5 economic subsectors that fall into the category of potential or still developing, namely the processing industry; water, garbage, waste, and recycling; construction; real estate; government, defense, and social security, 4) there are 4 economic subsectors which are lagging behind namely Agriculture, Forestry and Fisheries; Trade and Repair; Transportation and Warehousing; and Company Services.

Location Quotient (LQ)

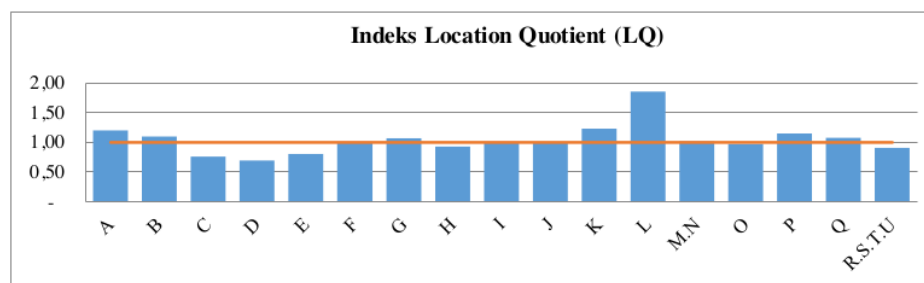


Figure 4. Location quotient index of industrial sectors of Polewali Mandar regency and West Sulawesi Province in 2012-2016.

Figure information:

Sector A ; Agricultural, Forestry, Fishery
Sector B ; Mining and Excavation
Sector C ; Processing Industry
Sector D ; Electricity and Gas Procurement
Sector E : Water, Waste and Recycling
Sector F ; Construction
Sector G; Trade and Reparation
Sector H; Transportation and Warehousing

Sector I; Accommodations and Eating&Drinking
Sector J; Information and Communication
Sector K; Financial and Insurance Services
Sector L; Real Estate
Sector M,N ; Company Services
Sector O; Government, Defense&Social Security
Sector P ; Education Services
Sector Q ; Health Services & Social Activities
Sector R,S,T,U; Other Services

Based on the picture above, of the 17 economic sectors of Polewali Mandar Regency, there are 7 sectors that have an LQ value <1. This shows that the 7 sectors are not a Basis sector and have less potential to be developed as an economic driver of Polewali Mandar Regency. On the other hand, there are ten economic sectors that are the Basis sector to be developed as the economic drivers of Polewali Mandar Regency, including the processing industry.

Shift Share Analysis (SSA)

Table 1. Shift share analysis based on industry type in Polewali Mandar Regency.

Code	Type of Industry	Share Component	Shift Component		Local Sector Total Shift	Clean Shift
		Komp Pert Wil Acuan (PN)	Komp. Pert Proforsional (PS)	Komp. Pert. Diferentia 1 (DS)		
A	Agricultural, Forestry, Fishery	875.40	-353.75	-227.32	294.34	-581.07
B	Mining & Excavation	47.14	4.75	6.15	58.05	10.90
C	Processing Industry	138.60	64.70	6.34	209.64	71.04
D	Electricity & Gas Procurement	1.39	597.05	0.51	598.94	597.55
E	Water, Waste, and Recycling	3.75	0.40	-1.00	3.15	-0.60
F	Construction	161.24	-161.24	6.85	6.85	-154.39
G	Trade & Reparation	356.24	-100.53	-98.67	157.04	199.20
H	Transportation & Warehousing	33.09	-8.36	-11.45	13.28	-19.81
I	Acommodations and Eating & Drinking	6.22	-1.38	-1.34	3.50	-2.72
J	Information and Communication	110.14	17.21	13.55	140.90	30.77
K	Financial & Insurance Services	52.18	-6.98	6.99	52.19	0.01
L	Real Estate	84.78	-40.77	-28.57	15.44	-69.34
M.N	Company Services	2.54	-0.92	-0.36	1.25	-1.29
O	Government, Defense&Social Security	159.33	42.04	13.16	214.53	55.20

P	Education Services	110.75	-14.60	-8.26	87.89	-22.86
Q	Health Services & Social Activities	56.69	-6.92	-5.62	44.15	-12.54
R.S.T.U	Other Services	51.30	-5.25	-9.49	36.55	-14.75

Source: Statistic Bureau West Sulawesi Province, 2017 [8]

Based on proportional shift values per economic sector, it is known that there are six sectors that have positive proportional shift values, namely (1) Mining and Quarrying, (2) Processing Industry, (3) Electricity and Gas Procurement, (4) Water, Waste, and Recycling, (5) Information and Communication and (6) Government, Defense and Social Security. This condition shows that the six sectors experienced faster growth compared to the overall economic growth of West Sulawesi Province. On the other hand, there are eleven sectors that have a negative proportional shift value, namely (1) Agriculture, Forestry and Fisheries, (2) Construction, (3) Trade and Repair, (4) Transportation and Warehousing, (5) Food and Drink Accommodation, (6) Financial Services and Insurance, (7) Real Estate, (8) Corporate Services, (9) Educational Services, (10) Health Services and Social Activities and (11) Other Services. These conditions indicate that the 11 sectors experienced slower growth compared to the overall economic growth of West Sulawesi Province.

Differential Shift in Polewali Mandar Regency economic sectors during 2012-2016 when viewed per economic sector, it is known that there are ten sectors that have negative differential shifts, namely (1) Forestry Agriculture and Fisheries, (2) Water, Waste, and Recycling, (3) Trade and Repair, (4) Transportation and Warehousing, (5) Accommodation and Food and Beverage, (6) Real Estate, (7) Company Services, (8) Educational Services, (9) Health Services and (10) Other Services. This is because the six sectors experienced slower growth compared to the growth of the same sector at the level of West Sulawesi Province. On the other hand, there are seven sectors that have positive differential shifts, namely (1) Mining and Quarrying, (2) Processing Industry, (3) Electricity and Gas Procurement, (4) Construction, (5) Information and Communication, (6) Services Finance and Insurance and (7) Government, Defense and Social Security. This happens because the seven sectors have the ability to grow faster compared to the growth of the same sector at the level of West Sulawesi Province. Overall performance of the processing industry can be seen in the following table:

Table 2. Klassen's typology, location quotient, and Shift Share based on industrial types in Polewali Mandar Regency.

	Business Field	Klassen's typology	Location Quotient	Differential Shift
A	Agriculture, Forestry, and Fisheries	Relatively left-out	Based	Incompetitive
B	Mining and Excavation	Further and rapidly growing	Based	Competitive
C	Processing Industry	Potential and remain growing	Non-based	Incompetitive
D	Electric and Gas	Further and rapidly growing	Non-based	Competitive
E	Water, Waste bins, and Recycled water	Potential and remain growing	Non-based	Incompetitive
F	Constructions	Potential and remain growing	Based	Competitive
G	Trade and reparation	Relatively left-out	Based	Incompetitive
H	Transportation and warehousing	Relatively left-out	Non-based	Incompetitive
I	Accommodation of food and beverage	Further, but experiencing pressure	Based	Incompetitive

J	Information and communication	Further and rapidly growing	Non-based	Competitive
K	Financial and assurance service	Further and rapidly growing	Based	Competitive
L	Real Estate	Potential and remain growing	Based	Incompetitive
M.N	Corporate service	Relatively left-out	Based	Incompetitive
O	Government, Defense, and Social Guarantee	Potential and remain growing	Non-based	Competitive
P	Education service	Further and rapidly growing	Based	Incompetitive
Q	Social Activity and Healthcare	Further and rapidly growing	Based	Incompetitive
R.S.T. U	Other services	Further, but experiencing pressure	Non-based	Incompetitive

Based on those criteria, to determine a qualified sector is referred to a further and rapidly growing, based, and competitive sector. Those are mining and excavation and financial and assurance service sector. The processing industry is potential and still able to develop and compete.

3.5. Mandar Palm Oil Industrial Performance

The Mandar palm oil industry is one of the industries that have an important role in the manufacturing sector. The performance of the mandar coconut oil industry to the processing industry in Polewali Mandar Regency can be seen in the following table:

Table 3. Growth and contribution of Mandar Palm Oil Industry toward Industrial Processing, 2015-2016

Palm oil industry in Mandar	Contribution value			Percentage (%)
	2015	2016	Growth (%)	
Company (unit)	454.00	468.00	0.62	0.6
Labour (people)	988.00	1.100.00	2.41	7.85
Production value (Rp.000)	8,390,000.00	8.681.900.00	0.72	3.81
Investments value (Rp.000)	790,000.00	880.000.00	2.20	2.23
Productivity	-	7.893.00	-	0.36
Efficiency value	-	9.87	-	1.30

Source: Statistic Bureau Polewali Mandar District, 2017 [9]

Referring to the table above, it proves that the competitiveness of the mandar oil industry in Polewali Mandar Regency is quite good and allows it to be continuously improved. This can be seen from the positive growth rate and the substantial contribution to the processing industry.

6. Competitiveness of the Mandar Palm Oil Industry

The competitiveness of the mandar coconut oil industry based on comparative advantage and competitive advantage, is explained as follows:

1. Comparative Advantages of Mandar Palm Oil

Comparative advantage is analyzed by using Location Quotient (LQ) analysis with the following calculation:

$$LQ = \frac{8.681.900/227.053.618}{12.052.405/323.418.079} = 1.02$$

LQ analysis results show the value of $LQ > 1$, meaning that the growth rate of the palm oil sector in the region is greater than the rate of growth of the same sector in the regional economy. It can be

concluded that the mandar coconut oil sector is a base sector or a leading sector in the Polewali Mandar area.

2. *Competitive Advantage of Mandar Coconut Oil*

The results of the analysis of competitive advantage in the mandar coconut oil industry are described as follows:

A. *Competition between rival companies (New Entrants)*

1. Competitors. Competitors in the mandar oil business come from large companies with certain brands that also produce cooking oil using either raw coconut (in) or palm oil. Given that mandar coconut oil has existed long before the existence of coconut oil with certain brands and is a product of the mandar's ethnic ancestral heritage, so it is not difficult to compete with existing competitors. In addition, mandar coconut oil has a distinctive aroma and taste that consumers like but is not found in similar coconut oil.
2. Competitive Advantage. Competitors' advantages include a) product durability that can reach 1 year or even more than 1 year, while mandar coconut oil generally only lasts around 1 to 3 months. Only a small portion of the mandar oil business can produce oil with a durability of up to 1 year. b) promotions carried out by branded coconut oil companies are superior to the mandar oil business. c) Product packaging used by competitors is more modern, practical, available in various sizes, and equipped with information on nutritional content, expiration period, and others.

B. *Bargaining Power of Suppliers*

1. Supplier Strength. Suppliers come from within the Polewali Mandar area, so the supply chain of raw materials is quite short, ranging from coconut producers to the mandar coconut oil industry as a user of coconut commodities. Short supply chains make the price of raw materials at the consumer level cheaper because they do not incur much of the costs of intermediary traders. Most suppliers come from their own families or from neighbors who are still related.
2. Influence of Suppliers on the Mandar Coconut Oil Business. Suppliers are the spearhead of the mandar coconut oil business. If the supply of raw materials is hampered, it will stop the production of mandar coconut oil. Therefore, in order to ensure its sustainable supply of raw materials, the majority of mandar coconut oil businesses use coconut raw materials that come from their own or family-owned plantations.
3. Selection of Suppliers of Mandar Coconut Oil. The selection of suppliers is based on consideration of the quality of coconut raw materials (size and fruit maturity), price, and ease of obtaining coconut raw materials from suppliers.

C. *Bargaining Power of Buyer*

The sustainability of a business is closely related to consumer demand for the products offered by the business. One determinant of consumer demand for a product is the price of the product. In terms of price, mandar coconut oil is more expensive than other coconut oil, which is IDR 36,000/liter, while other coconut oil is only around IDR 20,000 / liter - IDR 25,000 / liter. However, the demand for mandar coconut oil in 2016 increased by 0.72%, seen from the value of the production of mandar coconut oil (Badan Pusat Statistik Polman Regency, 2017) [9]. This shows that consumers' bargaining power towards mandar coconut oil is quite large.

D. *New competitors to get in*

1. The Emergence of New Competitors. Currently, palm oil products have been circulating that are produced from outside the Polewali Mandar Regency. This oil is known to the public as 'oil drum' and is sold at much cheaper prices with longer product durability. The coconut oil industry is classified as a perfectly competitive market so that similar companies are free to enter or exit the industry [10].

2. Impacts Given by New Competitors. The entry of new players in the coconut oil industry poses a threat to the mandar palm oil business. This is because consumers have additional choices of coconut oil products that can be consumed. Rational consumers will make choices on quality products at lower prices. In the current unstable economic conditions, it is possible that consumers of mandarine palm oil switch to buy other products due to price considerations.

E. Substitute products

1. The emergence of substitution products. The emergence of substituted coconut oil products such as palm oil sold in the form of bulk oil or branded coconut oil is a threat to the business of mandar coconut oil.
2. Effect of Substitution Products. The substitute product offered has high competitiveness because the price offered for coconut oil sold in bulk oil is cheaper than mandar coconut oil. In addition, coconut oil products that have certain brands generally have good quality, so that not a few consumers who switch to consuming branded coconut oil.

3.7. Determinants of Competitiveness of the Mandar Coconut Oil Industry

To analyze the factors that determine the competitiveness of the mandar coconut oil industry, Porter Diamond Model analysis is used, which includes an analysis of condition factors, demand condition factors, related industry and supporting industry factors, industry competition factors, government role factors and opportunity role factors. The data analyzed came from information from five expert respondents related to 6 determinants of competitiveness, which were graded 1-4 based on their level of influence on the competitiveness of mandar coconut oil. Value 4 (very decisive), value 3 (determine), value 2 (slightly determine), value 1 (not determine). To find out in more detail, the average value of the determinants of the competitiveness of mandar coconut oil can be seen in Table 4.

Based on the analysis of the Porter Diamond Model in Table 4, it is known that the attributes that have the highest value are human resources, natural and environmental resources, technology, number of buyers and the level of demand growth, and suppliers. While the attribute that has the lowest value is retailing mandar coconut oil. This shows the most influential factor in the competitiveness of the mandar coconut oil industry is human resources, natural and environmental resources, technology, number of buyers, and the level of demand growth, and suppliers.

Table 4. Competitiveness determinant factors on mandar palm oil based on Porter diamond model analysis.

Attribute	Average Score
Conditional factors	
Human resources	4.0
Capital resources	3.8
Natural and environmental resources	4.0
Technology	4.0
Infrastructure	3.6
Demand Condition Factors	
Buyers and growth rate	4.0
Consumers' preference	3.6
Related and supporting industry factors	
Suppliers	4.0
Palm oil retailers in Mandar	2.6
Industrial competition factors	
Competition rate for mandar palm oil retailers	3.0
Competitor's strategy	3.0
Government's Role Factors	
Regulation	3.4

Opportunity Role Factors	
Business's climate	3.8

4 Conclusion and Suggestions

Competitiveness of the mandar coconut oil industry in Polewali Mandar Regency in terms of competitive advantage has the competitive power of competition between rival companies, supplier bargaining power, and consumer bargaining power. Meanwhile, in terms of the comparative advantage of the processing industry in Polewali Mandar Regency, it is a basic sector or leading sector in the area, which is potential and can still be developed and competitive. The determinants of the competitiveness of the mandar coconut oil industry are human resources, natural and environmental resources, technology, number of buyers, and the level of demand growth, and suppliers.

Training and assistance for mandar oil business operators are needed, especially in the use of production and packaging technology in order to increase competitiveness and excel in the five forces that determine the survival of the company (competitive forces), namely competition between rival companies, supplier bargaining power, power bargaining consumers, the potential entry of new competitors and the potential development of substitute products. It is necessary to increase promotion so that the mandar coconut oil is more widely known by people outside the mandar ethnic group.

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