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Competitiveness of Livestock Sub-Sector in West Sumatera, Indonesia

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Abstract: The purpose of this study is to analyze the factors that influence and determine the competitiveness of animal husbandry business in West Sumatera and identify the relative comparison of the level of competitiveness of animal husbandry business in several regencies/cities in West Sumatera. To analyze the competitiveness status of livestock business in West Sumatera the study used Analytical Hierarchy Process (AHP) method while the competitiveness variable was determined by using the Diamond Porter variable. The results of the study showed that natural and human resources, infrastructure and technology play a significant role in increasing the competitiveness of farming in West Sumatera with a weight of 0.304 followed by a demand factor for livestock commodities with a weight of 0.26, which in turn is followed by the presence factor of the role of government and opportunity with a weight of 0.25, followed by industry competition factor with a weight of 0.239 and most recently, an industry cluster with a weight of 0.203. Regions that have better competitiveness in West Sumatera are Padang Pariaman Regency and Pariaman City with a weight of 0.27.

Keywords: Competitiveness, Livestock Subsector, Diamond Porter

Introduction

Livestock sub-sector is a strategic sector in supporting regional and national economies. Facing the era of global competition, animal husbandry development must be able to realize advanced, efficient and industrial-scale farming. Sadly, the contribution of the livestock sub-sector to the West Sumatera Gross Regional Domestic Products (GRDP) is still very low compared to other sub-sectors (West Sumatera Statistics Agency Report, 2019). This shows that there are not many animal husbandry businesses that are attempted on an industrial scale. Regional development to achieve community welfare must be done with sustainable development to achieve present and future human needs (Brundtland, 1987). The purpose of this study is to analyze the factors that influence and determine the competitiveness of animal husbandry business in West Sumatera and identify the relative comparison of the level of competitiveness of animal husbandry business in several regencies/cities in West Sumatera. Numerous studies on the development of livestock subsector to meet the high demand in meat and dairy products in

Indonesia in general and in West Sumatera in particular. However, not many of these studies have focused on the factors influencing the competitiveness of this lively commodity. In other words, the idea of how to make livestock subsector more competitive not only to abundantly supply market with meat and dairy products but also to improve the economic condition of everyone involved in livestock business. The concept of sustainable development has now become a goal in the development and development of cities and regencies in Indonesia. In creating sustainable cities and districts, five basic principles are needed, namely environment (ecology), economy (employment), equity, engagement and energy (Budihardjo and Sujarto, 1999).

The level of competitiveness is one of the parameters in the concept of sustainable development. The higher the level of competitiveness of an area, the higher the level of welfare of its people. One indicator of increasing regional competitiveness is industrial growth (Khairad *et al.*, 2018). This industrial growth contributes to economic development in the region, but it must also be able to make a meaningful contribution to socio-political and cultural development. In industrial development it is

aimed more at overcoming problems such as high unemployment and poverty, low economic growth, slowing export development, weak infrastructure sector and lack of technological mastery. As one of the main components in national economic development, the industrial sector is not only able to contribute a large output to the economy, but also in employment.

One of the great potentials possessed by West Sumatra is the livestock sub-sector. The level of regional competitiveness for the livestock sub-sector in this province is certainly shaped by the competitiveness of each district and city and their different economies, infrastructure and natural and human resource characteristics. Several approaches have been taken to measure regional competitiveness (Khairad *et al.*, 2018). Some of the obstacles that reduce the competitiveness of the livestock industry include inefficient government bureaucracy, inadequate infrastructure, unstable political conditions and very limited banking access. These things must be improved by the government so that the livestock industry can grow rapidly. Another challenge is marketing livestock products, which are mostly in the form of commodities. "As much as 80% of livestock products is sold in the form of commodities while only 20% is marketed in processed form (Daryanto, 2009).

The low ability of regions to create industries is due to several factors including conditions such as natural resources, human resources, demand factors, industrial cluster factors and the role of government. The livestock industry referred to here is the ability of the livestock business in the regions in developing their business from cultivation to processing of products. If the region has better competitiveness in the livestock industry with qualified human resources, then the livestock sector as an important pillar in the foodstuff industry can help sustain national food security, able to meet the needs of the animal protein of the community, namely meat, eggs and milk.

The competitiveness of animal husbandry in West Sumatra is increasing every year to ensure the high economic growth of the region. Livestock competitiveness certainly already exists, which is shown by several simple indicators such as the contribution in Gross Regional Domestic Product, Gross Regional Domestic Product per capita and Gross Regional Domestic Product growth rate as well as infrastructure, natural resources, human resources (Rouf *et al.*, 2014), capital and the availability of science and technology. However, the contribution of the livestock sub-sector to Gross Regional Domestic Revenue based on current prices in West Sumatra is still low at 1.70 as of 2018. Measuring the status of this competitiveness needs to be done to spur the development of farms in the region.

Some methods of measuring the level of competitiveness of livestock business are mostly done at the micro level instead of the opposite. Measuring the status of livestock competition done at the micro level includes Relative Trade Advantage (RTA), Agribusiness Confidence Index (ACI), Policy Analysis Matrix (PAM) and so on. The measurement of the status of competitiveness often uses the Diamond Porter model by looking at aspects of conditions, demand, supporting and related industries (clusters) and competition. These four factors affect the environment in which domestic companies can compete to create a competitive advantage (Saptana, 2010). Besides the four factors above, Porter (1998) also included two variables outside the model, namely the role of government and opportunity. Where the role of government is an important factor in increasing competitive advantage.

Most of the previous research has focused more on regional competitiveness. Abdullah (2002) ranks regional competitiveness in 26 provinces in Indonesia through mapping. However, in this study, we measured the status of the competitiveness of the livestock industry in the districts and cities in West Sumatra by using the diamond porter model approach because the most important thing from the Diamond Model Porter is the existence of a self-reinforcing competitiveness creation model, in which regional competitiveness can be created with the growth of the industry, especially livestock industry and simultaneously forming advanced consumerism that always requires improvement and innovation. Furthermore, the Diamond Model Porter also promotes industrial clusters. However, research that has led to the identification of livestock competitiveness using this model in each district and city has not been done much. This is very necessary to intervene in regional development policies to increase the contribution of the livestock sub-sector to the Gross Regional Domestic Revenue in West Sumatra and ultimately to improve the competitiveness of livestock.

Methods

The assessment of the competitiveness of livestock industry between regions in West Sumatra is a qualitative descriptive study consisting of the following stages.

Data Collection

Data collection was carried out by survey to find out the opinions of experts or individuals who are competent in the field of animal science. Respondents are scholars from the Department of Animal Science and other related fields. The number of respondents or experts for each variable is five persons.

Data Analysis

- a. Identifying the priority weights or the relative importance of the indicators in one variable, for each variable. The method used in this identification is the Analytical Hierarchy Process, where the method is used up to the determination of the criteria hierarchy or comparing the relative importance of the criteria. The criteria are referred to in this study as indicators. Before the data for each indicator is processed with AHP, it is first "standardized" to obtain a normal distribution of data and can be compared between one another. Some indicators that have the opposite meaning, meaning that the greater the value of the indicator, the worse the condition of the indicator (inflation indicator, dependency rate, unemployment), the inverse calculation is done prior to the standardization of the data to avoid the production of a wrong priority weight
- b. Measuring the level of competitiveness of farms between districts/cities based on the value of the variable Diamond Porter (Conditions, Demand, Industrial Clusters, Industrial Competition, the role of government and the role of opportunities) by making a multiplication of the values of standardized indicators
- c. In this study using the qualitative method of Porter's Diamond Model to analyze the factors that influence the competitive advantage of livestock business descriptively or using each component in the Porter's Diamond Model

Variables and Indicators of Livestock Industry Competitiveness.

To measure the competitiveness status of each variable is as follows:

1. Condition Factor:
 - a. Natural resources
 - b. Human Resource
 - c. Capital
 - d. Science and technology
 - e. Infrastructure

2. Demand Factor:
 - a. Number of purchases and growth rate
 - b. Market growth
 - c. Market access
 - d. Market Segment
3. Industrial Cluster Factor
 - a. Processing Industry
 - b. Upstream Industries and Suppliers
 - c. Supporting Industry
 - d. Related Industries
 - e. Marketing institute
4. Industrial Competition Factor
 - a. Strategy
 - b. Innovation
 - c. The level of competition in the processing industry
 - d. Market Structure
5. Role of the Government
 - a. Intermediate User
 - b. Policies and regulations
 - c. Master Plan
 - d. Assistance and Coaching
6. The Role of Opportunity
 - a. Research and Invention
 - b. Fuel
 - c. Political Condition
 - d. Business environment

Results and Discussion

The West Sumatra Central Statistics Agency 2019 Report showed that the distribution of the percentage of Gross Regional Domestic Product in the livestock sub-sector was the lowest compared to other sub-sectors, which was 1.70 in 2018 although the Gross Domestic Product growth rate of livestock sub-sector kept increasing every year (West Sumatra Statistics Agency Report, 2019). The percentage distribution of Gross Regional Domestic Product of Agriculture sub-sector based on Applicable Prices by Business Field 2014-2018 can be seen in Table 1.

Table 1: Distribution of gross regional domestic products in the agriculture sector in West Sumatra based on applicable prices by business field (percent) 2014-2018

Business field	2014	2015	2016	2017	2018
Forestry/Agriculture	24,99	24,69	24,06	23,61	23,16
Food crops	7,48	7,28	6,74	6,54	6,69
Horticultural Crops	3,41	3,44	3,41	3,33	2,94
Plantation Crops	6,98	6,66	6,67	6,64	6,11
Livestock	1,72	1,71	1,66	1,64	1,70

Source: West Sumatra Central Statistics Agency 2019

This shows that the condition of livestock business is less developed compared to other sub-sectors. The Gross Regional Domestic Products' growth rate of the Agriculture sector in West Sumatra based on Applicable Prices by Business Field 2014-2018 can be seen in Table 2.

Research on the competitiveness of livestock sub-sectors in several regions can be defined as the ability of these regions to compete with one another in several ways to grow and develop in economic terms. From the stylized fact that some of the areas of her husbandry business are more developed than others. Differences in competitive styles depend on what economic specialization has achieved (Boschma, 2004).

Based on primary data using a questionnaire distributed to experts and resource persons, it can be seen the determinants of farm competitiveness in West Sumatra by using the Diamond Porter variable. The results obtained in the form of priority weights of each determinant variable of competitiveness can be seen in Table 3.

Farm competitiveness is measured using an index formed based on the dimensions of the Diamond Porter, namely: Actor condition dimensions, demand condition, industrial cluster and industry competition dimensions. The value of the livestock industry competitiveness

index in each region is determined by the weight of each element in each dimension. The results of the study showed that the dimensions of demand conditions were ranked highest with a weighting of 42%. This means that demand conditions have the most important role in determining the competitiveness index compared to other dimensions. This has bright prospects in the future of livestock product market due to the increasing population in West Sumatra. While the industry competition dimension ranks second because the products produced have regional characteristics and competitive prices. The analysis can be seen in each district in West Sumatra, as shown in Table 4.

The table above shows that both Padang Pariaman and Pariaman have 27% livestock competitiveness. This figure shows that the competitiveness of livestock in these two regions is higher than in other regions in West Sumatra. Then the next higher competitiveness value is Lima Puluh District and Payakumbuh. This indicates that the city and regency have made the city as a production center city, an industrial city, as a raw material processing center and a district that has a function as a production center or supplier, in the form of raw materials, semi-finished goods and finished goods.

Table 2: Gross regional domestic products' growth rate of the agriculture sector in West Sumatra province based on applicable prices by business field (percent) 2014-2018

Business field	2014	2015	2016	2017	2018
Forestry./Agriculture	13,70	7,76	6,19	7,04	5,74
Food Crops	16,67	6,19	0,97	5,81	10,21
Horticultural Crops	10,88	10,00	7,98	6,55	-4,75
Plantation Crops	11,82	4,11	9,17	8,55	-0,87
Livestock	8,33	8,70	5,88	7,45	11,85

Source: West Sumatra Central Statistics Agency 2019

Table 3: Weight values for each livestock competitiveness variable in West Sumatra

Variables	Weight	Rank
Condition	0,304	1
Demand	0,260	2
Industrial Cluster	0,203	6
Industrial Competitiveness	0,239	5
Role of Government	0,25	3
Role of Opportunity	0,25	4

Table 4: Priority weight of indicators in several regions in West Sumatra

Regency/City	Condition	Demand	Industrial cluster	Industrial competitiveness	Role of government	Role of opportunity	Weighted value
Solok	0,20	0,25	0,21	0,25	0,25	0,25	0,24
Payakumbuh	0,29	0,29	0,23	0,25	0,25	0,25	0,26
Pariaman	0,44	0,25	0,20	0,25	0,30	0,25	0,27
Agam Regency	0,20	0,25	0,18	0,25	0,25	0,25	0,23
Tanah Datar	0,20	0,25	0,20	0,17	0,25	0,25	0,22
Limapuluh Kota	0,36	0,27	0,20	0,25	0,25	0,25	0,26
Padang Pariaman	0,44	0,25	0,20	0,25	0,25	0,25	0,27

Table 5: Priority weight factor condition in several areas in West Sumatra

Districts/Cities	Condition					
	Natural resources	Human resource	Modal	Science and Tech.	Infrastructure	Average
Solok	0,25	0,37	0,16	0,13	0,09	0,20
Payakumbuh	0,26	0,20	0,11	0,50	0,38	0,29
Pariaman	1,34	0,29	0,26	0,18	0,14	0,44
Agam	0,13	0,20	0,28	0,31	0,08	0,20
Tanah Datar	0,12	0,23	0,30	0,22	0,12	0,20
Limapuluh Kota	0,17	0,20	0,25	0,88	0,30	0,36
Padang Pariaman	1,34	0,29	0,26	0,18	0,14	0,44

Condition Factor

The results of the study showed that when it comes to the competitiveness of livestock based on conditions, Pariaman and Padang Pariaman have better production factors compared to other regions. This shows that the increase in livestock competitiveness must refer to the inputs used as factors of production, such as labor, natural resources, capital and infrastructure, as pointed out by (Khairad *et al.*, 2018). This shows that the main key factor of production is "created" not inherited. Furthermore, the scarcity of resources often helps livestock to be competitive. The order of competitiveness of farms in each district/city for regional condition factors can be seen in Table 5.

West Sumatra has sufficient natural resources to improve the community's economy, especially in the agriculture, tourism, mining and energy sectors. Within the Agricultural sector, livestock alone accounts for approximately 48% of the livelihood in West Sumatra, while the rest is shared between trade, hotel/restaurant and industrial sectors. When viewed from the availability of land, Livestock can accommodate around 3,250,000 heads, while the current large livestock population is 902,144 head of cattle (cattle and buffalo). This illustrates that there is still sufficient land available for large livestock development. The fact that West Sumatra has sufficient rainfall throughout the year has made it's land fertile for growing forage fodder and agricultural waste such as corn leaves, straw and others. The location of beef cattle breeding business in West Sumatra which has become a business area, there are 10 Regencies/Cities, namely 50 Kota Regencies (Mungo regency, Nagari regency), Agam regency (Agoto regency, Koto Ilalang regency, Baso regency), Sawahlunto-Sijunjung Regency (Sitiungagency, Kotobaru Kenagarian), Tanah Datar District (KenagarianTanjung Emas, Salimpaung Kenagarian), Payakumbuh City (Northern Payakumbuh District), Solok Regency (Kenagarian Talang, Kenagarian Lembah Gumanti), Padang Pariaman Regency (Kenagarian Lubuk Alung, Kenagarian Padang Sago), Pesisir Selatan District (Kenagarian Sutra, Kenagarian Shadow), Pasaman Regency (Kenagarian Kinali), Padang City (Pauh District, Kuranji District, Koto Tengah District). However, if we look at the human resources in all the regions above, it shows that Solok City has a better weight than that of Kota

Pariaman, so to improve the competitiveness of Kota Pariaman it is necessary to have a program to increase their knowledge through higher formal education or to take various courses and the training. Increased competitiveness can also be done through the promotion of entrepreneurship by utilizing local potential and business development services (Wiyadi, 2009).

Demand Factor

Referring to the availability of a domestic market that is ready to play an important element in generating competitiveness. Such markets are characterized by the ability to sell superior livestock products, this is driven by the demand for quality goods and services and the close relationship between companies and customers (Porter, 1998). The same thing is also explained by (Sheldon, 2017) who argues that the competitiveness of agricultural products is largely determined by the processing and level of buyer power. From the following, it is found that the areas with the highest demand, in terms of the weight of livestock competition are Payakumbuh and Solok. Consequently, the program has increased market access and carried out various programs, such as: Developing new products, adding new uses, entering new segments and market expansion in these two areas (Table 6).

Industrial Cluster

From the results of the study indicate that Payakumbuh has a strong relationship between the supporting industries of livestock with livestock companies, this relationship and support is positive and has resulted in an increase in the competitiveness of livestock companies. This is justified by (Tambunan, 2003), industrial development must be carried out in an integrated and interrelated manner between small, medium and large scale industries. Because the sectoral development policies by the government should not be distinguished by the industrial scale. So that in the long run the direction of industrial development is intended to create new market opportunities, added value, increase employment opportunities and industrial competitiveness.

Porter develops a model of this type of condition factor with industrial clusters or agglomeration, which benefits the potential technology knowledge spillover, closeness to consumers to further increase market power.

Each company is inherently part of an industrial cluster because the competitive advantage is not only determined by one company alone. Increasing efficiency at the company level of livestock processed products in Payakumbuh is essential, but in global competition that is not enough. Empirical evidence shows that the success of developing strong and dynamic industrial clusters will give birth to sustainable competitive advantages (Tatang, 2016). The priority weights of Industrial Cluster Factor in several regions in West Sumatra Province can be seen in Table 7.

Industrial Competition Factor

All districts have and refer to the strategies and structures that exist in most companies and the intensity of competition in the livestock industry. The intensity of competition in the livestock industry in several city districts has the same value to encourage innovation (Table 8).

Porter also added another factor: The role of government and opportunity, which are said to have an important role in creating competitiveness. The intended

role of the government is not as a player in the industry, but through its authority to provide facilitation, catalyst and challenge to the industry. The government encourages and encourages industries to reach a certain level of competitiveness. These things can be done by the government through incentive policies in the form of subsidies, taxation, education, focus on creating and strengthening the industrial cluster factor as well as enforcing industry standards for all regions in West Sumatra. intermediate user regulation and assistance and guidance. It is proven that all regions have the same weight value. However, even though the value of the role of government is the same in every region, there are still regions that have a low competitiveness status than other regions. This of course needs a program to accelerate animal husbandry development towards industrialization. From the results of the study, that the determinant factor of low competitiveness in West Sumatra is the lack of planning and implementation programs for the development of livestock industry clusters in all districts and cities (Table 9 and 10).

Table 6: Priority weight of demand factor in several regions in West Sumatra.

Districts/Cities	Purchases and growth rate	Market growth	Market access	Market segment	Weighted value
Solok	0,381	0,291	0,196	0,29	0,289
Payakumbuh	0,143	0,317	0,422	0,29	0,293
Pariaman city	0,127	0,263	0,227	0,21	0,206
Agam	0,187	0,387	0,156	0,24	0,242
Tanah Datar	0,217	0,15	0,172	0,18	0,179
Limapuluh Kota	0,262	0,181	0,115	0,19	0,189
Padang.Pariaman	0,127	0,263	0,222	0,20	0,203

Table 7: Priority weight of industrial cluster factor in several regions in West Sumatra

Districts/Cities	Industrial cluster					Average
	Processing industries	Upstream industries and suppliers	Supporting industries and services	Related industries	Supporting institutions	
Solok	0,14	0,10	0,28	0,17	0,37	0,21
Payakumbuh	0,42	0,28	0,16	0,18	0,11	0,23
Pariaman	0,37	0,11	0,19	0,15	0,18	0,20
Agam	0,15	0,12	0,18	0,21	0,25	0,18
Tanah Datar	0,17	0,26	0,22	0,13	0,22	0,20
Limapuluh kota	0,21	0,35	0,19	0,12	0,14	0,20
Padang Pariaman	0,37	0,11	0,19	0,15	0,18	0,20

Table 8: Priority weight of industrial competition factor in several regions in West Sumatra

Districts/Cities	Industrial Competition				Average
	Strategy	Innovation	Competition level in processing industries	Market Structure	
Solok	0,34	0,35	0,17	0,14	0,25
Payakumbuh	0,11	0,27	0,58	0,05	0,25
Pariaman	0,39	0,15	0,34	0,12	0,25
Agam	0,17	0,18	0,23	0,42	0,25
Tanah Datar	0,28	0,43	0,13	0,17	0,25
Limapuluh Kota	0,19	0,39	0,30	0,13	0,25
Padang Pariaman	0,39	0,15	0,34	0,12	0,25

Table 9: Priority weight factor of the role of government in several regions in West Sumatra

Districts/Cities	Role of Government				Average
	Intermediate users	Policies and regulations	Master plan	Assistance and coaching	
Solok	0,33	0,13	0,24	0,30	0,25
Payakumbuh	0,09	0,53	0,14	0,24	0,25
Pariaman	0,32	0,30	0,27	0,10	0,25
Agam	0,15	0,25	0,45	0,15	0,25
Tanah Datar	0,18	0,28	0,27	0,28	0,25
Limapuluh kota	0,18	0,41	0,25	0,17	0,25
Padang Pariaman	0,32	0,30	0,27	0,10	0,25

Table 10: Priority weight factor of the role of opportunity in several regions in West Sumatra

Districts/Cities	Role of opportunity				Average
	Research and invention	Price of Fuel	Political condition	Business environment	
Solok	0,37	0,26	0,20	0,17	0,25
Payakumbuh	0,29	0,20	0,09	0,43	0,25
Pariaman	0,17	0,13	0,41	0,29	0,25
Agam	0,23	0,37	0,18	0,22	0,25
Tanah Datar	0,19	0,27	0,24	0,31	0,25
Limapuluh kota	0,28	0,13	0,17	0,42	0,25
Padang Pariaman	0,17	0,13	0,41	0,29	0,25

The role of opportunity is the role of control outside the producers, suppliers and the government. Existing opportunities can come from within the country or abroad. Often with advances in technology and time, there is no denying the existence of free trade from abroad entering the domestic market. This makes competition increase because competitors do not only appear from domestic but from outside. Therefore, by utilizing existing technology, domestic producers should be able to use the technology to produce livestock commodities with a quality that is not inferior to the quality of imports so that local products can remain competitive. The opportunity factor and the role of the government can be in the form of regulations, issued to regulate the running of livestock businesses run by farmers in districts/cities in West Sumatra. The research on livestock business has not been carried out efficiently. There is still a low level of competitiveness, export activities and investment attractiveness in West Sumatra.

Conclusion

The results of the analysis using Diamond Porter showed that the determinants of livestock competitiveness in West Sumatra are determined by conditions such as natural resources, human resources, capital, infrastructure and technology with a weight of 30%. But the level of industrial clusters and industrial competition factors remains low. This shows that livestock business is hardly built with the technology

and innovation needed to increase high productivity. What is important from the results of this study is that the competitiveness of sub-sectors in the regions must be able to increase sustainable industrial growth. While the level of competitiveness of livestock business in Padang Pariaman and Pariaman districts has a better status compared to the other five regions in West Sumatra with a weight of 27%.

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Author's Contributions

All authors equally contributed in the work.

Ethics

This research has been approved by the Committee of Ethics of the Faculty of Animal Science Andalas University Padang, Indonesia and therefore, no ethical issues may arise after its publication.

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