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Analysis of Rice Supply Chain Performance Using the Supply Chain Operation Reference (SCOR) Model and Analytical Hierarchy Process (AHP) Method (Case Study: CV. Meutuah Baro Kuta Baro Aceh Besar District)

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Abstract

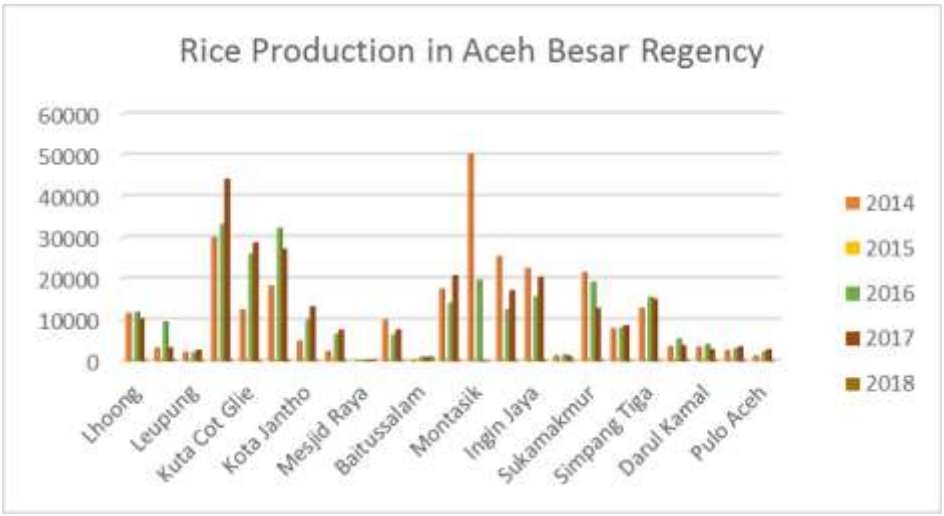
Rice is the main food crop in Indonesia because most of Indonesia's population consumes rice as a source of carbohydrates. The supply chain (supply chain) of rice from producing regions to large markets is controlled by experts. This study discusses how the rice supply chain system in CV. Meutuah Baro and see how the rice supply on the CV. Meutuah Baro if analyzed with the SCOR model and AHP method. This research was carried out in the CV. Meutuah Baro in Kuta Baro District, Aceh Besar District, Aceh Province. This research method uses descriptive analysis and supply chain performance analysis is carried out with the SCOR model and AHP method.

The results of this study indicate the activity of members of the rice supply chain structure in the CV. Meutuah Baro consists of farmers, CV. Meutuah Baro, a large rice trader, a retailer of end-consumer retailers, and rice retailers as a direct distributor to end consumers. While in the supply chain performance analysis CV. Meutuah Baro consists of three attributes, namely reliability is the value of the attribute with the best weight (0.99), the agility attribute produces sufficient results with a weight value (0.55), and the responsiveness attribute is the lowest profit value attribute (0.27). Based on the classification of performance standard values, the results of a comprehensive assessment of the rice supply chain CV. Meutuah Baro shows a sufficient value, which is 64%.

Keywords: *Rice; Supply Chain; Farmer; CV Meutuah Baro; Wholesaler; Trader; Consumer*

Introduction

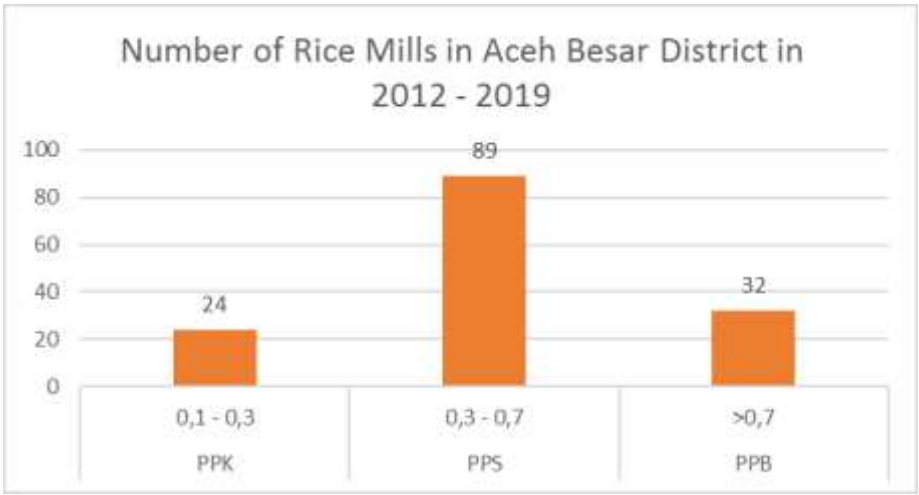
Rice is the main food crop in Indonesia because most of Indonesia's population consumes rice as a source of carbohydrates. The staple food needs of rice so far have not been able to be fulfilled, so there is a policy for rice import, the main cause of the unfulfilled rice because Indonesian rice production is still low and coupled with post-harvest rice which is still weak. As a result, crop loss is still quite high and the quality of the crop is still low. These conditions need to be corrected immediately with proper postharvest management.



Source: Aceh Besar District Agriculture Office, 2012 – 2019
Figure 1. Rice Production in Aceh Besar Regency

Based on the figure 1 rice production in Aceh Besar District is fluctuating. The highest rice production occurred in 2015 amounted to 310,477 tons and in 2018 amounted to 300,666 tons. The lowest production occurred in 2016 amounted to 258,969 tons. In Kuta Baroe sub-district, the production that occurred in the sub-district of the Meutuah Baroe rice refinery also fluctuated with the lowest production of 14041 tons and the highest of 29,162 tons in 2016.

Rice Milling Unit (Rice Milling Unit) is a meeting center between the production, post-harvest, processing and marketing of grain / rice so that it is an important chain in the national rice supply that is demanded to be able to contribute in the supply of rice, both in terms of quantity and quality to support food security national. Rice milling has a very important role in the rice agribusiness system in Indonesia. This role is reflected in the large number of rice mills and their distribution which is almost evenly distributed throughout the central regions of rice production in Indonesia.



*** PPK : The real production capacity is 0.3 tons of rice per hour**
**** PPS : Real Production Capacity is 0.3 - 0.7 tons of rice per hour**
***** PPB: Real production capacity is greater than 0.7 tons of rice per hour**
Source: Aceh Besar District Agriculture Office, 2012 – 2019
Figure 2. Number of Rice Mills in Aceh Besar District in 2012 - 2019

Based on Figure 2 the number of rice refineries in Aceh Besar in 2012 - 2019 which are still active as many as 145 rice refineries. With different capacities. At a production capacity of 0.3 tons of rice per hour as many as 24 rice refineries, at a capacity of 0.3 - 0.7 tons of rice per hour as many as 89 rice refineries and rice production capacity above 0.7 tons of rice per hour as much as 32 rice refineries. Meutuah Baroe Rice Refinery with a production capacity of rice above 0.7 tons per hour. This refinery was established in 1961 which was founded by Haji Muhammad Saleh.

This research was conducted to identify rice supply chain activities. This identification concept explains the resources in the supply chain, the supply chain members involved and the role of members in the supply chain which are measured with performance based on the SCOR model and the AHP method.

Methodology

2.1 Supply Chain Identification

This research was carried out in the CV. Meutuah Baro in Kuta Baro District, Aceh Besar District, Aceh Province with consideration of CV. Meutuah Baro Identification of the rice supply chain is done using descriptive and qualitative methods through field observations and literature studies as a support.

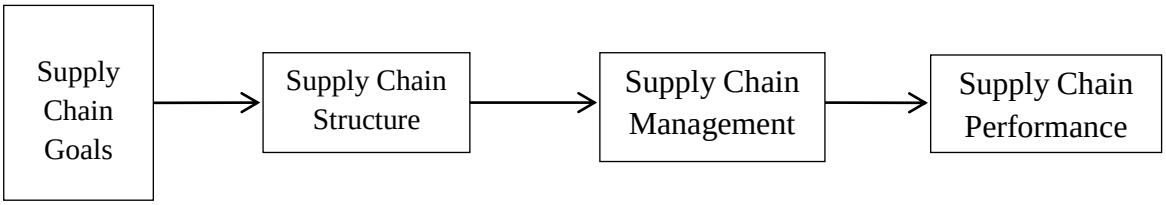


Figure 3. Conceptual Supply Chain Analysis Framework

Development of rice supply chain performance hierarchy structure based on the SCOR model from a study by Afifah, 2018; Thaha, 2016; Lathifah, 2017; and Irfan, 2019. The SCOR hierarchy structure of this research model was modified because of limitations in the study with its suitability to the problem of the rice supply chain in CV. Meutuah Baro.

Determination of the performance matrix is done by comparing the realization of performance with performance targets (targets) in units of percentage. The percentage of the performance matrix illustrates that the higher the realization, the better the level of achievement. Calculation of the percentage of performance achievement can be seen as follows:

a. If the higher the realization to achieve the performance target, showing the percentage of performance that is getting better, then the formula is used:

$$\text{Achievement Level Plan} = \frac{\text{performance percentage}}{\text{plan}} \times 100\%$$

b. If the results of the performance realization have exceeded the achievement target, it shows the lower percentage of performance, then the formula is used:

$$\text{Performance Achievement} = \frac{\text{plan} - (\text{realization} - \text{plan})}{\text{plan}} \times 100\%$$

2.2 *Analytical Hierarchy Process* (AHP)

AHP weighting is done based on the arrangement of criteria and sub-criteria of the SCOR hierarchy structure of the research model. The level of AHP research was determined by several expert respondents through the AHP questionnaire. AHP weighting data results obtained will be calculated on average geometric with the following formula:

$$GM = \sqrt[n]{(X_1)(X_2)\dots(X_n)}$$

Di mana :
GM : Geometrik mean
X_1 : Rating of first responders
X_2 : Second respondent assessment
n : Number of votes

Weighting test results are carried out with logical consistency that is determining the consistency ratio (CR) based on the division between results and consistency index (CI) and random index (IR). If the result of CR ≤ 0,1, the result of AHP weighting is valid. List of IR (Random Index) can be seen in the following Table 4.

Table 1. Index Random (IR)

N	1	2	3	4	5	6	7	8	9	10
RI	0,00	0,00	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49

Source: Syarif dalam Irfan, 2019

2.3 Analysis of Rice Supply Chain Performance in CV. Meutuah Baro

Calculation of the final value of supply chain performance in this study combines the results of the performance matrix analysis and AHP weighting by multiplying the attribute weights and performance indicators will be multiplied by the weighting of the criteria and sub-criteria of the ahp based on expert judgment.

Result and Discussion

3.1 Rice Supply Chain Network Structure

Rice supply chain structure that is in the CV. Meutuah Baro is the same as the rice supply chain in Aceh in general, starting from farmers, rice mills (rice mills), large traders, small traders and consumers.

3.1.1 Farmer

The activities that are carried out by rice farmers are basically land management, planting seeds, maintaining plants, and harvesting rice. Rice harvest in one year can occur two to three times the harvest period, which is separated based on the season of rice planting carried out, namely the rendeng rice planting season (November, December, January, February, and March), gadu rice planting season (April, May , June, and July), and the dry rice season (August, September and October). Furthermore, processed

grain products will be sold by farmers to the nearest rice mill / refinery, or to rice refineries that are far from the farmers' settlement through middlemen. Grain sale and purchase agreements between farmers and rice mills erected by letika grain purchasing power pegged by rice refineries is more profitable than the business that has been issued by farmers. In addition to a competitive purchase price, usually an agreement also occurs because there is already a good relationship between the farmer and the rice refinery.

3.1.2 Rice Milling (CV. Meutuah Baro)

CV. Meutuah Baro as a rice refinery becomes a place for the process of drying, grinding rice, and packaging rice that is ready to be marketed. Grain purchase transactions from rice farmers and traders are carried out at the location of CV. Meutuah Baro himself. CV. Meutuah Baro already has farmers and subscription traders who would normally sell their rice. CV. Meutuah Baro will provide different prices depending on the quality of grain sold and the prices prevailing in the market. Grade A quality dry grain harvest (GKP) is freshly harvested grain on the same day as the sales day to the rice mill, has physical appearance characteristics of a golden yellow with a uniform level of maturity, and consists of only a few or almost no hollow grains. Grade B quality dry grain is a grain that has been stored for a long time before it is sold to the rice mill, usually a storage time of 7 to 12 days, has the physical characteristics of black-grain grain, there are sprouted granules. Rice which is processed from this quality is usually slightly dull white. Meanwhile, Grade C quality GKP is grain that has a storage time before it is sold, namely for more than 15 days, has the physical characteristics of blackened granules and will produce yellow rice. Similarly, sales made by the CV. Meutuah Baro to wholesalers and retailers adjusted to the quality of rice produced

3.1.3 Wholesaler

wholesaler are members of the rice supply chain that act as marketing institutions. Large traders have a role in distributing rice purchased from rice mills that previously had a partner partnership. In large traders, there are generally activities to add value through grading and packaging (packaging with certain trademarks). Large traders then market rice to retailers. Unlike retailers, large traders buy rice in large quantities which they get from direct milling. Large traders also have rice storage warehouses to store rice supplies that will be distributed to retailers.

3.1.4 Trader

The retailer is the next marketing institution that has a role in distributing rice from large traders and rice milling companies. This institution deals directly with end consumers to sell rice. Retailers are spread in many places, from traditional markets to stalls in villages and housing locations. The role of marketing stakeholders, retailers usually get a greater share of profits because they sell rice in a small capacity.

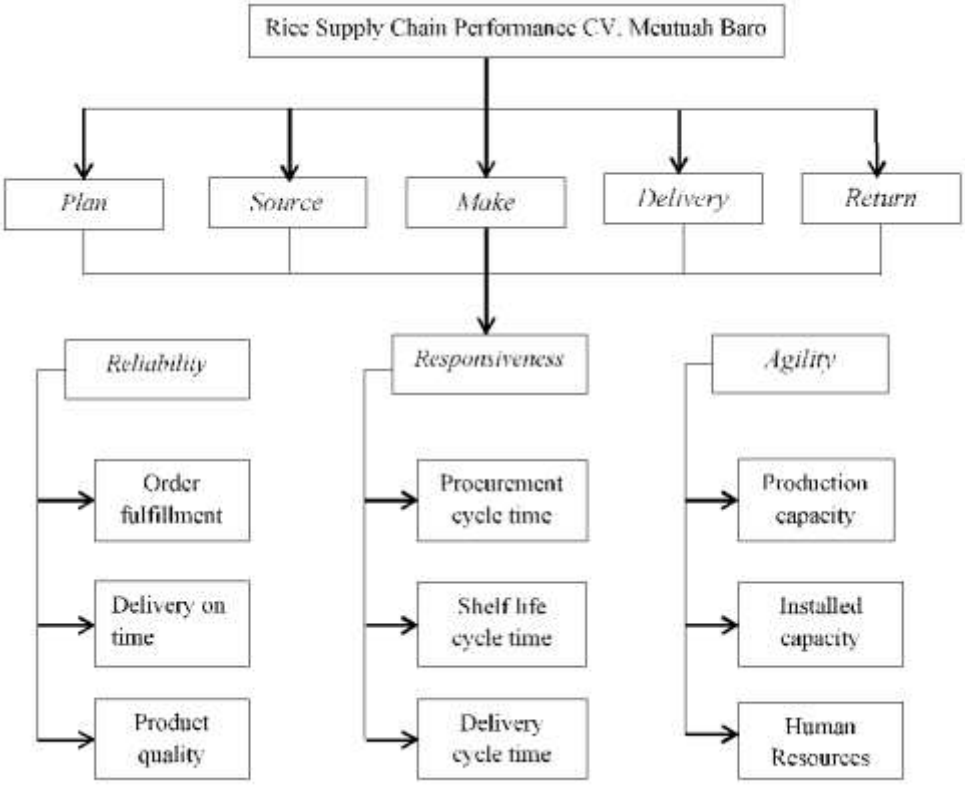
3.1.5 Consumer

The consumer is the last member of the rice supply chain and is the final destination of the supply chain. A consumer is someone who buys rice from a retailer directly. The final consumer buys rice originating from existing farmers in Aceh Besar District through previous supply chain members, pays for the rice purchased, and is entitled to receive and provide information related to the rice product purchased. In addition, consumers are also entitled to receive services provided by previous supply chain members.

Rice originating from Aceh Besar District is known by end consumers to have quality that is not inferior when compared to rice originating from other rice production centers. The final consumers who buy rice to retailers are generally household consumers and restaurant owner consumers in the area of Aceh Besar Regency, Banda Aceh City, Aceh Jaya Regency and Aceh Singkil.

3.2 Performance Analysis

The structure of the rice supply chain hierarchy in this study includes: level 1 as a business process, namely plan, source, make, deliver, and return; level 2 as a performance attribute that is reliability, responsiveness, and agility; level 3 as a performance matrix, namely the fulfillment of orders, on-time delivery, product quality, procurement cycle, shelf life cycle, and delivery cycle, production capacity, installed capacity, and HR capacity. The structure of the SCOR model and AHP mapping hierarchy in this study can be seen in the following figure.



Each process type, attribute, and performance indicator based on Figure 4. has a different function. The definition of the SCOR model of rice supply chain performance hierarchy structure and the AHP research method can be seen in Table 2.

The results of the performance matrix data collection in this study were obtained based on observations from rice supply chain activities and interviews with CV employees. Meutuah Baro. Calculation of performance analysis can be seen in the Appendix. Following are the results of data collection from the performance matrix analysis in CV. Meutuah Baro:

Table 2. Recapitulation of Performance Matrix Data

Attribute	Performance Indicator	Data Collected (per week)	Data Result	Persentase	Weight Value
Reliability	Total shipping	Amount of rice produced (tons)	500	93,33%	0,93
		Total demand for rice (tons)	450		
	Delivery on time	Amounts delivered on time (tons)	420	100%	1,00
		Amount of rice shipped (tons)	420		
	Product quality	Amounts delivered without damage (tons)	420	100%	1,00
		Amount of rice shipped (tons)	420		
Responsiveness	Procurement time cycle	Time of procurement of material (grain) (days)	3	42,85%	0,43
Agility	The shelf life time cycle	Rice storage time (days)	7	100%	1,00
	Delivery time cycle	Target delivery time for rice (days)	1	14,28%	0,14
	Production capacity	Amount of rice requests received (tons)	450	90%	0,90
		Amount of rice produced (tons)	500		
	Installed capacity	Amount of rice procurement (tons)	500	33,33%	0,33
		Rice procurement target amount per week (tons)	1500		
		Employee working hours (hours)	42		
	Human Resources Capacity	Working hours according to law	40	95%	0,95
		Employment (hours)			

Source: Primary Data (Processed), 2020

3.3 AHP weighting

The determination of the level of importance of the AHP method is based on the hierarchical structure in this study. The AHP questionnaire assessment of the respondents was further analyzed with several stages, namely calculating the geometric mean, synthesis of priorities and, logical consistency. The following is the result of AHP weighting:

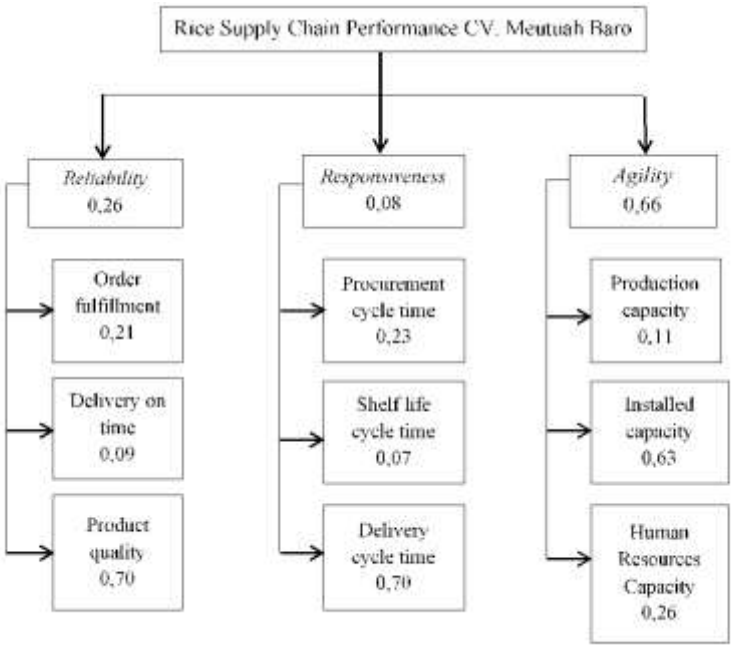


Figure 5. AHP Weighting Results

3.4 Analysis of Rice Supply Chain Performance CV. Meutuah Baro

Analysis of the performance of the rice supply chain CV. Meutuah Baro is based on data on performance weights and AHP weights. Combining data from these two methods is done by multiplying the value of the performance matrix weights with the AHP value. The results of the multiplication of the two weights are followed by a descriptive explanation. Here are the results of the multiplication of the weighting of performance and AHP.

Reliability = (bobot x order fulfillment) + (bobot x timely fulfillment) + (bobot x product quality)
= (0,21 x 0,93) + (0,09 x 1,00) + (0,70 x 1,00)
= 0,20 + 0,09 + 0,70
= 0,99

Responsivenes = (bobot x the rice procurement cycle) + (bobot x maximum cycle of storage rice) + (bobot x siklus pendistribusian beras)
= (0,23 x 0,43) + (0,07 x 1,00) + (0,70 x 0,14)
= 0,10 + 0,07 + 0,07
= 0,27

Agility = (bobot x discuss production capacity) + (bobot x Capacity installed availability) + (bobot x the availability of Human Resources capacity)
= (0,11 x 0,90) + (0,63 x 0,33) + (0,26 x 0,95)
= 0,10 + 0,21 + 0,25
= 0,55

a. Reliability

The reliability attribute performance weights are the highest performance weights (0.99) compared to other performance attribute weights, this shows the CV. Meutuah Baro has met the needs of its consumers precisely and quickly with the right conditions. The distribution of rice carried out by CV. Meutuah Baro so far has no problems, due to the availability of sufficient rice to be distributed to each region that becomes the distribution channel. In terms of rice quality, in 2020 there were no complaints received by the CV. Meutuah Baro, this is due to the fulfillment of the agreements agreed upon by CV. Meutuah Baro and the traders who partnered with them and the rice storage techniques applied by CV. Meutuah Baro is in accordance with quality standards so that the rice owned has maintained quality until it is time for distribution.*Responsiveness.*

The performance weights of responsiveness attributes are the lowest weight values (0.27) among other performance attributes. The indicators that become performance indicators on the responsiveness attribute include three things, namely the procurement cycle, the shelf life cycle, and the delivery cycle. When procurement of rice supplies in the CV. Meutuah Baro is usually actively carried out at the time of the rice harvest, which occurs in one year there can be two harvest cycles. This is due to the fact that when the harvest takes place the rice yields become abundant, so many farmers deliver their grain to the mill. In the shelf life cycle, rice obtained from the harvest can be stored up to four months before the distribution period arrives. Warehouse owned by CV. Meutuah Baro is equipped with a driyer so that the stored rice and rice can last longer and are always in good condition. The delivery time cycle carried out by CV. Meutuah Baro is done almost every day of the week. This delivery was carried out at the request of several regions that became the distribution channels of CV. Meutuah Baro, starting from Aceh Besar Regency, Banda Aceh City, turns to the west side reaching Aceh Jaya Regency to Aceh Singkil.*Agility.*

Agility attribute performance weights which have the second highest weight (0.55) among other attributes performance weights, shown by CV. Meutuah Baro with their ability to respond to unplanned orders in numbers greater than expected or make deliveries faster than is usually done well, this is because it has become a matter that is often experienced by CV. Meutuah Baro. The ability of CV. Meutuah Baro to fulfill unplanned orders even in large quantities is facilitated by their warehouse which can store rice and grain in larger quantities and longer term. As one of the largest mills and has modernized its tools, CV. Meutuah Baro has a lot of regular customers who always deliver their grain to the mill of CV every time they harvest. Meutuah Baro. Supported by adequate and skilled human resources in completing each of their tasks, CV. Meutuah Baro can always complete every order received well.Hasil capaian atribut kinerja.

The final result calculation is based on performance achievements and AHP from the supply chain CV. Meutuah Baro, which started from the procurement of raw material (grain) stock to the distribution of rice to traders. The results of the merger of performance assessment and AHP which were previously in the form of weights, are then converted into a percentage form following the need for performance standard classification which can be seen as follows:

Table 3. Results of Rice Supply Chain Performance Calculations CV. Meutuah Baro

Attribute		Bobot	Total attribute
Attribute	Performance Rating		
Reliability	0,99	0,26	0,26
Responsiveness	0,27	0,08	0,02
Agility	0,55	0,66	0,36
Total Rice Supply Chain Performance			**0,64**
Percentage of Rice Supply Chain Performance CV. Meutuah Baro			**0,64 x 100% = 64%**

Source: Primary Data (Processed), 2020

Conclusions and Recommendations

Structural activities of members of the rice supply chain at CV. Meutuah Baro consists of farmers who produce rice (producers) and process it into grain, CV. Meutuah Baro as a rice refinery steaming grain and processing it into rice, rice wholesalers as providers of regional rice stock as well as rice distribution to retailers and end consumers, and rice retailers as direct distributors to end consumers.

Supply chain performance analysis CV. Meutuah Baro consists of three attributes, namely reliability is the attribute value with the best weight (0.99), the agility attribute shows sufficient results with the weight value (0.55), and the responsiveness attribute is the lowest performance value attribute (0.27).Based on the classification of performance standard values, the results of the overall percentage of the performance of the rice supply chain CV. Meutuah Baro shows a sufficient value, which is 64%.

References

Afifah, F. 2018. Pengukuran Kinerja Rantai Pasok Beras Hitam Organik Menggunakan Metode SCOR dan AHP (Studi Kasus Kelompok Rukun Tani Padasan, Pakern, Sleman, Yogyakarta). Skripsi. Universitas Islam Indonesia, Yogyakarta.

Furqon, C. 2014. Analisis Manajemen dan Kinerja Rantai Pasokan Agribisnis Buah Stroberi di Kabupaten Bandung. *IMAGE, 3*(2), 109-126.

Hammer, *et al*,. (2004). The Agenda: Apa yang Harus Dilakukan Setiap Bisnis untuk Menguasai Masa Depan. Penerbit Erlangga, Jakarta.

Irfan, T. M. 2019. Analisis Kinerja Rantai Pasok Beras dengan Menggunakan *Suppy Chain Operation Reference* (SCOR) Model dan Metode *Analythical Hierarchy Process* (AHP). Studi Kasus : Perusahaan Umum Badan Urusan Logistik (Perum Bulog) Divisi Regional Aceh. Skripsi. Universitas Syiah Kuala. Banda Aceh.

Lathifah, N. 2017. Analisis Kinerja, Nilai Tambah dan Risiko Rantai Pasok Kakao. Thesis. Institut Pertanian Bogor. Bogor.

Pangestuti, M. D. *et al*. 2019. Analisis Rantai Pasok Pemasaran dan Nilai Tambah Gabah di Kecamatan Undaan Kabupaten Kudus. *Jurnal Ekonomi Pertanian dan Agribisnis (JEPA), 3*(4), 671-680.

Sepang, G. Y. M., *et al,*. 2017. Manajemen Rantai Pasok Beras di Kecamatan Kotamobagu Selatan, Kota Kotamobagu. *Jurnal Agri-SosioEkonomi Unsrat, 13*(1A), 225-238.

Soka, T. D., *et al,*. 2017. Kinerja Rantai Pasok Sayuran Komersial di Pasar Tradisional. *Jurnal AgribiSains, 3*(2), 23-31.

Subroto, A. M., *et al*, 2015. Evaluasi Kinerja *Supply Chain Manajemen* pada Produksi Beras di

Suoth, O., *et al*, 2017. Analisis Desain Jaringan Supply Chain Komoditas Beras di Desa Karondoran Kecamatan Langowan Timur Kabupaten Minahasa. *Jurnal EMBA, 5*(2), 511-519.

Supply Chain Council. 2006. SCOR. http://www.supply-chain.org/index.ww].

Syarif *dalam* Irfan, T. M. 2019. Analisis Kinerja Rantai Pasok Beras dengan Menggunakan *Suppy Chain Operation Reference* (SCOR) Model dan Metode *Analythical Hierarchy Process* (AHP). Studi Kasus : Perusahaan Umum Badan Urusan Logistik (Perum Bulog) Divisi Regional Aceh. Skripsi. Universitas Syiah Kuala. Banda Aceh.

Thata, P. 2016. Pengembangan Model Pengukuran Kinerja Rantai Pasok Pada Industri Konstruksi Perumahan. Thesis. Universitas Andalas. Padang.