Supplier Performance Evaluation and Selection on Apple Agro-Industry

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ABSTRACT

Understanding supplier performance is very vital to ensuring a well-functioning of apple agro-industry supply chain network. It will help the process of potential suppliers evaluation and selection, it is also improving both the performance of firms and its suppliers. The purposes of this research are to evaluate the performance and select the potential of apple supplier. The results of this study are as follows: categories (drivers) priority for the evaluation of apple supplier performance are price (0.406), quality (0.335), delivery (0.130) and services (0.070). Based on that categories, the selection of potential of apple supplier sequentially areSupplier A (0.429), Supplier C (0,316), Supplier D (0.129) and Supplier B (0.125). Hopefully, the apple agro-industry can determine the best of suppliers in fulfilling their raw material.

Keywords: Supply Chain, Supplier Performance Evaluation, Supplier Selection, Apple Agroindustry.

INTRODUCTION

Indonesia, the apple is a strategic commodity in supporting national food security and the potential to be developed. One of the efforts to achieve business diversification, among others, product development through the role of the processing industry to increase the added value of food products which named as agro-industry.Currently there are agro-industries that are widely distributed in Batu City, nearly 99.7% from the total agro-industry business unit is a small to medium scale businesses and large-scale of 0.3% (Batu, 2008). The number of agro-industry apple chips scattered in Batu City lead to competition in the supply of raw material apple becomes more intense. So, we need supply chain management effectively and efficiently to the sustainability of the production process for the agroindustry that is one of which has a cooperation agreement with suppliers of apple as raw materials.

Apple agroindustry is agroindustry which engaged in the processing of apple chips. The agroindustry puts the quality in the products of apple chips, thus requiring the supply of raw materials with certain varieties (granola). Currently the performance of suppliers of apples raw materials of granola varieties to apple agroindustry has not stabilized, it can be seen from the supply of raw materials not meeting the agroindustry's request, the delay in the delivery process and the quality of raw materials delivered sometimes not in accordance with the desire of the agroindustry. Therefore, this research conducted to evaluateand select the performance ofapple asraw materials suppliersto the agro-industry to meet market demand and to achieve optimal supply chain management. Successful supply chain management requires an integrated system between supply chain members (Awad & Nassar, 2010). Agro-industry supply chain on apple agroindustry

consist of supplier, manufacturer, retailer, and consumer. To create a well supply chain performance management required a measurement system capable of analysing the performance of the supply chain as a integrated network. Supply Chain Management system facilitates inter-enterprise cooperation and also collaboration with suppliers, customers, and other business partners.

METHODOLOGY

The method of determining the location and respondents of the research done purposively, with consideration that apple chips agroindustry is one manufacturer of apple chips with good quality that from the original raw material apple or without the flour mixture. So the demand of apple chips is increasing every year. With the increased demand for apple chips, the agroindustry must cooperate with suppliers to meet the supply of raw materials in order to create continuity of production companies. Respondents in this study used two groups of samples, namely agro-industry apple chips and raw material suppliers.

Assessment supplier performance analysis used AHP (Analytical Hierarchy Process). AHP method is a method that used for decision making with multiple categories, so that it can take a logical decision. AHP (Analytical Hierarchy Process) which is one form of decision-making model with multiple categories. This method is used in making a decision, namely by weighting the questionnaire and processed using Expert Choice software 11

to determine the performance of suppliers of apple as raw material. By using AHP, a problem concerning the performance evaluation can be simplified in the form of hierarchy. By using the categories and sub-categories that have been set by the agroindustry in determining category priority and sub-category and the best supplier in order to keep going on the continuity of apple agroindustry production.

The performance categories (drivers) which used in this study based on some previous researches and adapted to the conditions of the agroindustry. Performance categories that have been adapted to the state of the agroindustry in evaluating the performance of suppliers of raw materials among other categories of price, quality, service, and deliver. From the categories proficiency level is divided into several sub-categories. Having known priority performance evaluation categories then be determined priority best performance of suppliers with the sub-categories evaluation.

RESULT AND DISCUSSION

Performance analysis of apple suppliers of using the weights of categories and sub-categories that have been set by the agroindustry. Giving the weights are used to determine the priority categories for the analysis of supplier performance. The following are the priority weighting of categories and sub-categories analysis of supplier performance as well as the best supplier priority weight.

Table 1
Categories (Drivers) and Sub-Categories of Suppliers Performance

No.	Categories (Drivers)	Sub-Categories
1	Price (P)	Prices of Apple(P1); Terms of Payment (P2)
2	Quality (Q)	Grade of Apple (Q1);Maturity Level ofApple (Q2)
3	Service (S)	Suppliers Response (S1); Speed of Suppliers in Fulfilling Sudden Apple Orders (S2); Replacement Guarantee of Damaged Apple (S3)
4	Delivery (D)	Timeliness of Apple Delivery (D1); AccuracyQuantity of AppleOrders (D2)

Source: Author's Construct, 2019

Table 2
Performance Evaluation Categories of Apple Suppliers

No	Categories	Weight	Priority
1	Price	0.465	1
2	Quality	0.335	2
3	Service	0.070	4
4	Delivery	0.130	3
Total Weight		1	

Source: Author's Analyze, 2019

Table 3
Suppliers Performance Analysis : Sub-Category P1

No.	Prices of Apple(P1)	Weight	Priority
1	Supplier A	0.376	2
2	Supplier B	0.169	3
3	Supplier C	0.402	1
4	Supplier D	0.053	4
Total Weight		1	

Source: Author's Analyze, 2019

The Categories (Drivers) Analysis of Suppliers Performance
The categories and sub-categories performance analysis of raw materials apple chips suppliers used to determine the weight and priority in the analysis of the best raw material supplier. The following are the weight and priority categories in apple supplier performance analysis.

Based on calculations using AHP, the price is the first priority used in evaluating the performance of apples suppliers by weight (0.465). Pricing categories affects the continuity of production, quantity and quality of apple chips. The agroindustry will consider the price offered by the supplier to the suitability of quality raw materials provided, include the priority of quality (0.335), delivery (0.130) and services (0.070).

Suppliers Performance Evaluation
The supplier performance of raw materials can be determined by the weighting of sub-categories in the analysis of the supplier performance evaluation of apple as raw materials.The following are performance suppliers of several sub-categories in the analysis of performance established by the agroindustry.

Price Category
Price sub categories used by the agroindustry in the performance analysis of raw material suppliers include apple prices and payment provisions.

Sub-Category 1: Price of Apple as Raw Material (P1)
In sub-categories suitability of raw material prices of apples, the main suppliers are prioritized by the agroindustry is a supplier C with weight (0.402) because the supplier to price according to the standard price of the agroindustry is IDR 7,000. A supplier came second with weights (0.376) although it also provides an appropriate price the agroindustry's standards but not often as the supplier C. Supplier B becomes the third priority with weight (0.169) because sometimes give a price well above its specified and supplier D into a fourth priority with weight (0.053) due to price above frequently provide the agroindustry's standards.

Table 4
Suppliers Performance Analysis : Sub-Category P2

No.	Terms of Payment (P2)	Weight	Priority
1	Supplier A	0.434	1
2	Supplier B	0.066	4
3	Supplier C	0.370	2
4	Supplier D	0.130	3
Total Weight		1	

Source: Author's Analyze, 2019

Table 5
Suppliers Performance Analysis: Sub-Categories Q1

No.	Grade of Apple (Q1)	Weight	Priority
1	Supplier A	0.549	1
2	Supplier B	0.074	4
3	Supplier C	0.129	3
4	Supplier D	0.248	2
Total Weight		1	

Source: Author's Analyze, 2019

Sub-Category 2: Terms of Payment (P2)
In sub categories terms of payment, the main supplier of prioritized by the agroindustry is a supplier A with a weight (0.434), because the supplier can provide the terms of payment to the agroindustry by mutual agreement that the direct payment system a day after the purchase. Supplier C came second with weights (0.370) as the supplier can provide the same payment conditions with any supplier A. Supplier D into third priority with weight (0.130) and supplier B into a fourth priority with weights (0.066) often due to violation provisions of payment, so that the agroindustry feel burdened because payments are made indirectly.

Quality Category
Quality sub-categories used by the agroindustry in analysing the performance of suppliers of raw materials include grade ofapple as raw materials and the maturity level of raw materials.

Sub-Category 1: Grade of Apple as Raw Materials (Q1)
The main supplier prioritized by the agroindustry is a supplier A with a weight (0.549) because suppliers often provide quality raw materials applees accordance with agroindustry standards. Supplier D came second with weights (0.248), Supplier C be the third priority with weight (0.129) and supplier B into a fourth priority with weights (0,074) due to the often sent raw materials that are not in accordance with agroindustry standards.

Sub-Category 2: Maturity Level of Apple as Raw Materials (Q2)
The main supplier prioritized by the agroindustry is a supplier A with a weight (0.525) because the supplier can send secure raw material that used wooden crates to minimize their impact or defective condition of the raw material. Supplier C came second with weights (0.279), supplier D becomes the third priority with weights (0,139) and supplier B into a fourth priority with weight (0.057) because often sent raw materials with packaging without the usual sack protective layer so many defective raw material or texture slightly damaged.

Table 6
Suppliers Performance Analysis : Sub-Categories Q2

No.	Maturity Level ofApple (Q2)	Weight	Priority
1	Supplier A	0.525	1
2	Supplier B	0.057	4
3	Supplier C	0.279	2
4	Supplier D	0.139	3
Total Weight		1	

Source: Author's Analyze, 2019

Table 7
Suppliers Performance Analysis : Sub-Category S1

No.	Suppliers Response (S1)	Weight	Priority
1	Supplier A	0.549	1
2	Supplier B	0.074	4
3	Supplier C	0.129	3
4	Supplier D	0.248	2
Total Weight		1	

Source: Author's Analyze, 2019

Service Category

Service in the sub-categories analysis of supplier performance include the suppliers response, the speed of ordering suppliers in responding to sudden and replacement guarantee raw material defects.

Sub-Category 1: The Suppliers Response (S1)

The main supplier prioritized by the agroindustry is a supplier A with a weight (0.549) because suppliers often easily accessible and rapidly respond to the request of the agroindustry. Supplier D came second with weights (0.248) as suppliers easily accessible and rapidly respond to the request of the agroindustry. Supplier C be the third priority by weight (0.129) because the supplier easily to be informed, but less rapidly respond to the agroindustry and supplier B into a fourth priority with weights (0,074) due to the supplier's hard to be informed and less quick in responding the agroindustry.

Sub-Category 2: Speed of Suppliers in Fulfilling Sudden Apple Orders(S2)

The main supplier prioritized by the agroindustry is a supplier D by weight (0.560) because the supplier is able to meet the sudden demand for raw materials quickly with a range of delivery time 1-2 days after reordering. A supplier came second with weights (0.294), supplier B becomes the third priority by weight (0.077) because suppliers are not able to meet the sudden demand for raw materials quickly, because it can send the range within 3 days after reservations as well as supplier C fourth priority by weight (0.069).

Sub-Category 3: Replacement Guarantee of Apple as Raw Materials (S3)

The main supplier prioritized by the agroindustry is a supplier A with a weight (0.411) because the supplier is able to provide a replacement guarantee half of the raw materials were damaged. Supplier C came second with weights (0.411) because just like with the supplier A is able to provide a replacement guarantee half of the raw materials were damaged. Supplier B becomes the third priority with weights (0,113) because the supplier is able to provide a replacement guarantee raw materials damaged but no actions. Supplier D into a fourth priority by weight (0.064) because suppliers are not able to guarantee the raw material replacement of damaged.

Table 8
Suppliers Performance Analysis : Sub-Categories S2

No.	Speed of Suppliers in Fulfilling Sudden Apple Orders (S2)	Weight	Priority
1	Supplier A	0.294	2
2	Supplier B	0.077	3
3	Supplier C	0.069	4
4	Supplier D	0.560	1
Total Weight		1	

Source: Author's Analyze, 2019

Table 9
Suppliers Performance Analysis : Sub-Category S3

No.	Replacement Guarantee of Damaged Apple (S3)	Weight	Priority
1	Supplier A	0.411	1
2	Supplier B	0.113	3
3	Supplier C	0.411	2
4	Supplier D	0.064	4
Total Weight		1	

Source: Author's Analyze, 2019

Table 10
Suppliers Performance Analysis :Sub-Category D1

No.	Timeliness of Apple Delivery (D1)	Weight	Priority
1	Supplier A	0.124	3
2	Supplier B	0.571	1
3	Supplier C	0.069	4
4	Supplier D	0.241	2
Total Weight		1	

Source: Author's Analyze, 2019

Delivery Category
Sub categories deliveries in the analysis of supplier performance include the timely delivery and accuracy of deliveries.

Sub-Category 1: Timeliness of Apple Delivery (D1)
The main supplier prioritized by the agroindustry is a supplier B by weight (0.571) because it was always on time in order to send raw materials but within a year once experienced delays in delivery, supplier D came second with weights (0.241), supplier A be the third priority by weight (0.124), supplier C be the fourth priority by weight (0.069) because it is often not timely in the delivery of raw materials orders for already 4 times the delayed delivery.

Sub-Category 2: Accuracy Quantity of AppleOrders(D2)
The main supplier prioritized by the agroindustry is a supplier C by weight (0.465) because the supplier of raw materials always send orders to the amount on demand and shipment volumes more than any other supplier. A supplier came second with weights (0.399), supplier B becomes the third priority by weight (0.091), supplier D into a fourth priority by weight (0.045) because the supplier had sent raw material does not match the amount requested 3 times with large volumes.

Table 11
Suppliers Performance Analysis : Sub-Categories D2

No.	Accuracy Quantity of Apple Orders (D2)	Weight	Priority
1	Supplier A	0.399	2
2	Supplier B	0.091	3
3	Supplier C	0.465	1
4	Supplier D	0.045	4
Total Weight		1	

Source: Author's Analyze, 2019

Table 12
Priority AppleSuppliers Based on the Results of
Supplier Performance Evaluation

No.	Suppliers	Weight	Priority
1	Supplier A	0.429	1
2	Supplier B	0.125	4
3	Supplier C	0.316	2
4	Supplier D	0.129	3
Total Weight		1	

Source: Author's Analyze, 2019

The Best Supplier Selection
Best supplier obtained from the weighting of the categories and sub-categories in the analysis of the performance of suppliers of raw materials adapted to agroindustry standards

Based on the results of the fourth performance evaluation of raw material supplier's apple chips, it is known that the agroindustry should prioritize Supplier A, Suppliers C, Suppliers D and Suppliers B. With the best known supplier performance priorities, the agroindustry is expected to further enhance cooperation with the supplier to meet the procurement of raw materials to keep occur continuity apple production to meet consumer demand. With good cooperation established between companies with suppliers, it will create an effective supply chain system and efficient.

CONCLUSION
The findings from this research shows that, priority categories (drivers) considered by the apple agro industries in evaluating the performance of suppliers sequentially are price of apple (0.406), quality of apple (0.335), deliver (0.130), and suppliers service (0.070). The research also revealed that, priority suppliers who have the best performance in fulfilling the apple as raw material to the agroindustry are the Supplier A (0.429), Supplier C (0.316), Supplier D (0.129) and the Supplier B (0,125).

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