Performance Assessment of Wheat Flour Suppliers Based on Balanced Scorecard (BSC)

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ABSTRACT

Company X is one of the companies in Indonesia that produces seasoned flour. This seasoned flour product uses the main raw material in the form of wheat flour. Company X has 3 suppliers of wheat flour raw materials used. In the process, there are problems with these suppliers in supplying wheat flour, including delays in the fulfillment of raw materials, the amount of raw materials sent does not match the demand, causing disruption to the production process, so Company Xneeds to evaluate suppliers of wheat flour to choose suppliers who the best that can be used so as not to interfere with the production process. In evaluating the performance of this supplier, the method used is the Balanced Scorecard in determining the criteria for supplier measurement indicators based on a financial perspective, a customer perspective, an internal business process perspective and a learning and growth perspective. This study aims to obtain the best supplier of wheat flour raw materials. Based on the results of the study, it shows that the best wheat flour supplier performance is the UPS supplier with a value of 148.09 meaning the company is satisfied with the UPS supplier performance because it is in the 80-160 value range so that it can be used as the main supplier in supplying wheat flour, then the ACL supplier. which gets a value of 151.37 which means that the company is also satisfied with the performance of the ACL supplier so that it can be used as a backup supplier.

Key Words: Balanced Scorecard, Supplier, Supplier Evaluation.

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1. INTRODUCTION

The market for flour products continues to develop dynamically in line with the development of various types of processed fried products. The increasing demand for crispy fried chicken, crispy mushrooms, and various other products has resulted in a greater need for the flour. The growing market for the flour has led to an increasing number of companies producing seasoned flour so that competition for this product category is getting tougher [1-13]. Company X is a company that was founded in 2014. This company is engaged in the food industry, specifically the manufacture of seasoning flour and instant seasonings. It implements supply chain management in both upstream and downstream. For upstream parts,it involvesthe suppliers directly or indirectly such as the flow of materials/raw materials, internal parts or those related to every process within the organization such as managing production processes to distribution. Meanwhile for downstream parts,it involves the customers whuch handle the customer's problem such as complaint on its products and services.

Suppliers play an important role in a company or individual to provide products or raw materials that meet the needs of companies or individuals for resale. Raw materials are supporting elements of the manufacturing process which have a direct

impact on the resulting product. In addition, there is the role of suppliers that affect company performance [14-22]. In the process there are several problems that often occur at Company X, especially in the performance of the supply of raw materials, which include: delays in fulfilling raw materials, discrepancy in the amount of raw material sent by the supplier with the request and discrepancies in daily production schedules. Consequently, it led to disruption production process as well as failure to achieve production targets. In addition, there is a discrepancy between the number of raw materials received and the number of raw materials ordered. One of these discrepancies can occur because there is a discrepancy in the specifications for wheat flour received, thus it must be returned to the supplier, or there are defects in the packaging such as the packaging has holes which can cause contamination of the raw material which should be returned. The process of returning wheat flour to getting replacement takes time so that it can also disrupt the production process if the amount of flour received does not match what was ordered.

Based on these problems, Company X needs to evaluate suppliers or suppliers of wheat flour raw materials so that the supplier's performance goes well so that it does not interfere with other processes because the processes from upstream to downstream at Company X are interconnected and influence each other. The supplier evaluation is used to determine which supplier can be determined as the main supplier or backup supplier. This supplier evaluation was carried out on wheat flour suppliers because wheat flour is the main raw material that is widely used for the production of products from Company X.

To evaluate suppliers by categorizing supplier evaluation criteria, the author use the Balanced Scorecard (BSC). By using the BSC it can be integrated into a performance management system that is integrated in designing a process-based supply chain performance measurement system, it is hoped that the company will be able to evaluate supplier performance holistically for monitoring and control, communicating company goals to supply chain functions and knowing where position of a company against competitors and determine the direction of improvement to create competitive advantage [23-27]. BSC has advantages over other methods to measure in more comprehensive way. It means that the BSC can measure several aspects which include financial and non-financial, short term and long term, internal and external [28-30].

Therefore, in this study, supplier evaluation will be carried out based on the results of measuring supplier performance using the BSC method based on a financial perspective, a customer perspective, an internal business process perspective and a growth and learning perspective to get the best suppliers. Through evaluating the performance of these suppliers will produce alternative solutions to problem solving so that Company X can solve the same problem in the future.

2. RESEARCH METHOD

This study willprocess the data using BSC and dynamic system simulation. The BSC method is a systematic and balanced measurement. The BSC translates and classifies the company's strategic goals and indicators formulated based on strategic goals into four perspectives, includes a financial perspective, a customer perspective, an internal business process perspective, and a growth and learning perspective [31-32]. The steps taken are as follows:

1. Collecting company data based on interviews with related parties as well as supplier list data, raw material ordering data, raw material arrival data, and raw material receiving data.

2. Formulate measurement criteria and indicators based on the four BSC perspectives listed/

3. Validation of indicator criteria by validating the indicators used as research with indicators in other studies.

4. Determine the score of each supplier from the four BSC perspectives. This score is obtained from the interview results and then converted into quantitative data based on the Likert scale. The Likert scale is an assessment of someone's statement of something with five levels of answers. Then the results of this score are used as a reference for evaluating suppliers.
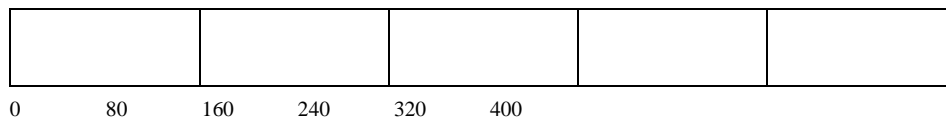
Likert 5 Scale:

Strongly Agree   : 5

Agree   : 4

Neutral   : 3

Disagree   : 2

Strongly Disagree :1

Then the attitude scale can be seen as follows:

(Attitude - 1) x 100 = X, and the result is (5 - 1) x 100 = 400

0   80   160   240   320   400

Figure 1 Comparison Graph of Total Inventory Cost

Information :

0 – 80 : Very Good

80 – 160 : Fine

160 – 240 : Neutral

240 – 320 : Not Good

320 – 420 : Very Not Good

The results of the attitude scale calculation can be interpreted that the smaller the scale or the more the scale to the left, the better the supplier's performance, and vice versa.

Table 1 Formulation of Measurement Indicators Based on Four BSC Perspectives

Perspective	Criteria	Indicator/Measurement Attribute
Finance	Economical aspect (ECN)	Price stability
Customer	Repair, services and follow-up (RSF)	Service satisfaction
		Problem solving
Internal Business Process	Delivery (DLV)	On time delivery
	Production facility and capacity (PFC)	Response on customer requests
	Quality (QLT)	Quality conformity
Learning and development	Information technology and communication system (ITC)	Ease of communication and information

3. RESULT

3.1. Determination of Indicators

The indicators used to evaluate suppliers are viewed from four BSC perspectives, namely a financial perspective, a customer perspective, an internal business process perspective, and a growth and learning perspective. These four perspectives are used to evaluate suppliers as a whole from several aspects includes financial and non-financial aspects that are tailored to the needs of the company Company X.The indicators that have been determined are then validated by means of criterion validation, namely comparing the indicators used with indicators in other studies. Criteria validity focuses on comparing the instrument that has been developed with other instruments that are considered comparable to what will be assessed by the instrument that has been

developed. These other instruments are referred to as criteria (Yusup, 2018). Which means, the validity of the criteria can be determined by comparing the scores or performance indicators with another measure.

3.2. Questionnaire

Questionnaire forms were given to employees of Company Xwho were related to this research, such as the QC Incoming, Purchasing, PPIC and Warehouse sections consisting of seven people. This questionnaire form is used as a reference in evaluating wheat flour suppliers by converting qualitative data into quantitative data based on a Likert scale.

3.3. Assessment Process

Assessment of wheat flour suppliers at Company Xis carried out by collecting the results of the questionnaires that have been made then recapitulating the data from the questionnaire results, weighting each perspective based on the level of importance of each indicator for each perspective, then analyzing the data using formula 1. The following is recapitulation of the results of data processing:

3.3.1 Financial perspective

Based on the calculations, the results show that the company's attitude towards the performance of UPS, LIE and ACL suppliers based on a financial perspective is very good because it lies in the value range 0-80. UPS suppliers get a score of 13.16, LIE suppliers get a score of 24.78, and ACL suppliers get a score of 16.8. Thus it is found that the supplier that is best assessed from a financial perspective is the UPS supplier because it gets the lowest score than the LIE and ACL suppliers. The following is a table and graph of the value scale from the recapitulation of the value/score calculation results from each supplier:

Table 2 Recapitulation of all supplier calculation results from a financial perspective

No.	Supplier	Belief Value (Average)	Ideal Value (Average)	Score	Rating
1	UPS	3,06	4,00	13,16	**1**
2	LIE	2,23	4,00	24,78	3
3	ACL	2,80	4,00	16,8	2
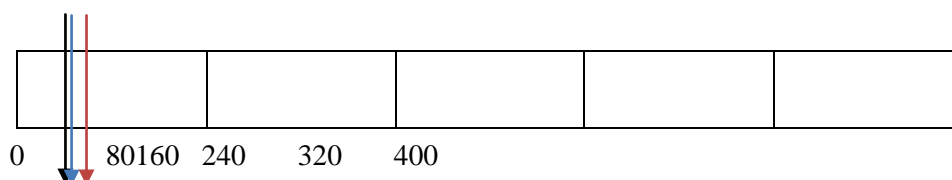
Figure 2Comparison of value scales of all suppliers from a financial perspective

Information:

Black Arrow   : UPS supplier

Blue Arrow   : ACL supplier

Orange Arrow   : LIE supplier

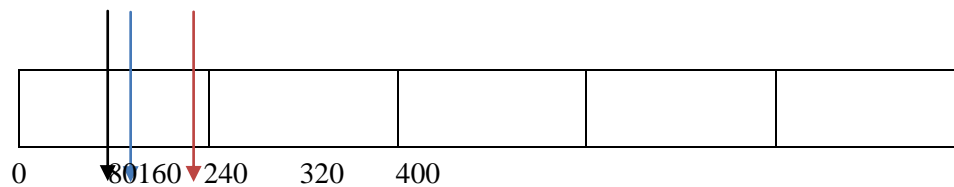### 3.3.2 Customer Perspective

Based on the calculations, the results show that the company's attitude towards the performance of UPS, LIE and ACL suppliers based on the customer perspective is very good because it lies in the value range 0-80. UPS suppliers get a score of 39.25, LIE suppliers get a score of 62.75, and ACL suppliers get a score of 45. So it is found that the supplier that is best assessed from a

customer perspective is a UPS supplier because it gets the lowest score than LIE and ACL suppliers. The following is a table and graph of the value scale from the recapitulation of the value/score calculation results from each supplier:

Table 3Recapitulation of all suppliers' calculation results from the customer's perspective

No.	*Supplier*	Belief Value (Average)	Ideal Value (Average)	Score	Rating
1	UPS	3,14	4,71	39,25	**1**
2	LIE	2,20	4,71	62,75	3
3	ACL	2,91	4,71	45	2

Figure 3Comparison of all supplier's value scales from the customer's perspective
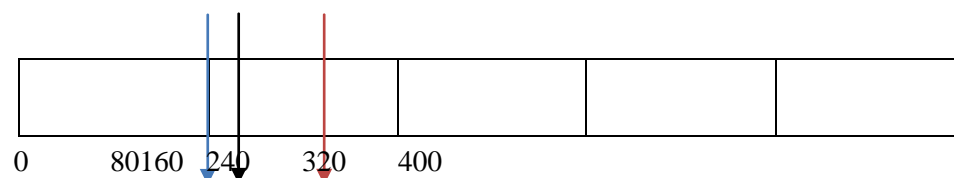
Information:

Black Arrow   : UPS supplier

Blue Arrow   : ACL supplier

Orange Arrow   : LIE supplier

3.3.3 Business Process Perspective

Based on the calculations, it was found that the company's attitude towards the performance of ACL suppliers based on the perspective of internal business processes was very good because it was in the range of 0-80, while UPS and LIE suppliers were good because they were in the range of 80-160. UPS suppliers get a score of 86, LIE suppliers get a score of 120, and ACL suppliers get a score of 74.5. So it is found that the supplier that is best assessed from the perspective of internal business processes is the ACL supplier because it gets the lowest score than UPS and LIE suppliers. The following is a table and graph of the value scale from the recapitulation of the value/score calculation results from each supplier:

Table 4Recapitulation of the calculation results of all suppliers from the perspective of internal business processes

No.	*Supplier*	Belief Value (Average)	Ideal Value (Average)	Score	Rating
1	UPS	3,11	4,83	86	2
2	LIE	2,43	4,83	120	3
3	ACL	3,34	4,83	74,5	**1**

Figure 4Comparison of value scales of all suppliers from the perspective of internal business processes

Information:

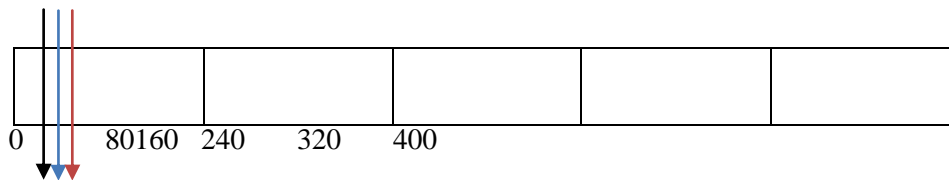Black Arrow   : UPS supplier

Blue Arrow   : ACL supplier

Orange Arrow   : LIE supplier

3.3.4 Learning and DevelopmentPerspective

Based on the calculations, the results show that the company's attitude towards the performance of UPS, LIE and ACL suppliers based on a learning and growth perspective is very good because it lies in the value range 0-80. UPS suppliers get a score of 9.68, LIE suppliers get a score of 21.67, and ACL suppliers get a score of 15.07. So it is found that the supplier that is best assessed from a learning and growth perspective is a UPS supplier because it gets the lowest score than LIE and ACL suppliers. The following is a table and graph of the value scale from the recapitulation of the value/score calculation results from each supplier:

Table 4Recapitulation of all supplier calculation results from learning and development

No.	*Supplier*	Belief Value (Average)	Ideal Value (Average)	Score	Rating
1	UPS	3,43	4,31	9,68	**1**
2	LIE	2,34	4,31	21,67	3
3	ACL	2,94	4,31	15,07	2

Figure 5Comparison of the value scales of all suppliers from a learning and development perspective
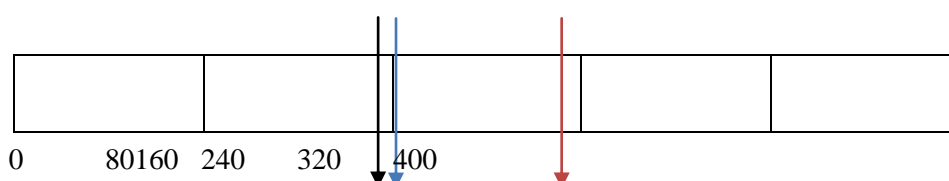
Information:

Black Arrow   : UPS supplier

Blue Arrow   : ACL supplier

Orange Arrow   : LIE supplier

3.4. Determination of the best supplier based on four BSC perspectives

Based on the calculation results, the overall value/score for UPS suppliers is 148.09, ACL suppliers are 151.37, which means that the company assesses both the performance of UPS and ACL suppliers because they are in the range of 80-160. The LIE supplier gets a score of 229.2, which means that the company considers it neutral/mediocre towards the LIE supplier's performance because it lies in the range of 160-240. The following is a table and graph of the value scale from the recapitulation of the value/score calculation results from each supplier:

Table 5 Recapitulation of the final score of each supplier

No.	*Supplier*	Final score value	Rating
1	UPS	148,09	**1**
2	LIE	229,2	3
3	ACL	151,37	2

Figure 6 Final comparison of the value scales of all suppliers

Information:

Black Arrow   : UPS supplier

Blue Arrow   : ACL supplier

Orange Arrow   : LIE supplier

It can be concluded that from the results of the assessment of the four BSC perspectives for each supplier, the best wheat flour supplier is the UPS supplier because it has the lowest score when compared to ACL and LIE suppliers.Meanwhilefrom a perspective of financial and non-financial, the supplier with the worst performance is a LIE supplier, because it has the highest value than UPS and ACL suppliers. Therefore, UPS supplier become the main supplier for wheat flour, while ACL supplier as a backup supplier. Whereas LIE suppliers need to evaluate their performance so that the company can replace LIE suppliers with UPS or ACL suppliers.

4. CONCLUSION

After collecting data and processing data, the following conclusions can be drawn:

1. In evaluating the performance of the best wheat flour supplier at Company X based on four BSC perspectives with the indicators used adapted to the company's conditions, as follows:

    • Price stability

    • Service satisfaction

    •Problem solving

    • On time delivery

    • Response to customer requests

    • Quality conformity

    • Ease of communication and information

2. Based on data calculations, it is found that the best wheat flour supplier from financial and non-financial aspects based on four BSC perspectives is the UPS supplier which reach the lowest score between LIE and ACL suppliers, it is included in the score range of 80-160 which is categorized as a good score. Other than that, the company is satisfied with the performance of the supplier. Therefore, the company can categorize UPS supplier as the main supplier. In addition, can use the ACL supplier as a backup supplier in supplying wheat flour raw materials. Finally, LIE suppliers can be categorized as a neutral supplier which the performance neither good nor bad for the company.

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