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Evaluation of Poultry Supply Chain Performance in XYZ Slaughtering House Yogyakarta using SCOR and AHP Method

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Abstract

Poultry is the highest consumed meat nowadays. There are some problems in poultry supply chain in XYZ slaughtering house. In addition to supply chain problem, people always need to consume poultry, not only from quality but also from halal status on it. SCOR is a method of assessing supply chain performance created by Supply Chain Council from two perspectives those are internal business process and customer facing. The using of AHP and Cause-Effect-Diagram is to find problem of performance and give alternative recommendation from the 3 worst measured performances. Framework has been made includes 9 performances to measure. The 3 worst score of performances will be processed by AHP to decide the rank of problem based on XYZ perspective. Finally it is gained weight-score product cycle time (0.255), supply order fulfillment (0.35) and supplier lead time (0.391). The alternative recommendation is given to XYZ by using *Cause and effect Diagram* such as the on-time order by consumer, on-time cycle time and standardized chicken from supplier.

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1. Introduction

Poultry is one of the most interested food commodity in our society (Harsana and Widayati, 2009). Even in some regions, poultry is chosen as the main dish. Poultry demand and consumption has been increasing by year. That is why we need to get more attention to this supply chain and its problem to understand. The main aim is to keep fulfilling consumer's need in accordance to quality and quantity.

Besides, halal is also main issue for poultry product. Halal is mentioned because Indonesia has biggest moeslem population in the world. Nowadays halal issue needs more attention to give guarantee for consumer while consuming products, in this case is poultry. Indonesia has MUI as committee to measure and release halal certificate for each company in Indonesia (LPPOM, 2008). This is going to check, whether the company has halal certificate and also the process from ordering, slaughtering until delivering to end consumer.

Poultry supply chain generally starts from breeder – distributor – chicken slaughtering house – end consumer (Processed data, 2014). Figure 1 shows the real condition of poultry supply chain.



Fig.1 Chicken Supply Chain Scheme

Poultry supply chain has some performance need to carry out from the beginning to the end. These performances of each step impact the next step. Then we need to measure and give recommendation for possibility problem to appear. The method seems fit to this performance measurement is Supply Chain Operations Reference (SCOR) 10.0 level 2.

One of chicken slaughtering house is XYZ. It is going to be research center, because of method used to this research. SCOR will be undertaken here because it fit to use in one company. After that, AHP will help to decide which problem needs to give recommendation by ranging the 3 worst performances. These methods with SCOR and AHP had been undertaken by Hanugrani et al (2012) in tobacco product. Using Cause and effect Diagram will give alternative recommendation to the XYZ about improvement of supply chain process.

2. Material and Method

This research takes data from XYZ. The data is performance of poultry supply chain and continued to measure with SCOR, Snorm DeBoer, AHP and Cause Effect diagram.

Paul (2014) stated SCOR is method created by supply chain council in order to provide self-assessment and activities comparison of supply chain performances. There are 5 elements namely plan, source, make, deliver and return. There are also customer facing metrics and internal metrics. Customer metrics comprise of responsibility, responsiveness and flexibility. Meanwhile internal metrics comprise of cost and asset

Vanany (2006) stated Snorm DeBoer to compare each KPI (Key Performance Index) measurement. Normalization process used which each KPI has a range between 0 - 100. The following equations are below

1. For smaller equation. It means that the smaller score the better result

$$Snorm = \frac{(\text{Si-S min})}{S\max-S\min} \times 100 \tag{1}$$

$$Snorm = \frac{(S \max - Si)}{S \max - S \min} \times 100$$
(2)

After gaining score then using AHP. Triantaphyllou (2000) stated AHP is capable of analyze complex problem into hierarchy system. AHP defines relative performance of every alternative based on actual data It has scale ranging from 1-9 on AHP assessment. AHP uses perception of decision maker which is possible to get inconsistency in spite of limit to compare every criteria. Inconsistency could be achieved by this formula

$$CI = (\lambda \max - n)/(n-1)$$
(3)

$$CR = (CI/RI)$$
(4)

3. Result and Discussion

Supply chain in XYZ starts from plan, source, make, deliver and return. Besides supply chain, there are also halal and thayyib which need to reviewed. Halal means that something are permitted or prohibited to consume (Salman, 2011). Thayyib is quality which makes product to be consumed well or not. Halal is inserted in source, make and deliver.

- a. Source contains chicken and how do chicken is treated before sent to Slaughtering House. The vaccine and feed are halal.
- b. Make contains every single process from slaughtering to delivering. There 3 main items namely process, tool and place. Process has to do based on Islam's requirement. Tool has to be clean before and after use. Place has to be clean.
- c. Deliver contains temperature while delivering poulty. Standard temperature is 5°C.

Data are collected from XYZ and arranged to be performances framework. There are from SCOR metrics which are reliability, responsiveness, flexibility and cost. Metric reliability contains forecast accuracy, perfect order fulfilment, make item flexibility and customer complaint. Metric responsiveness contains source lead time and delivery order fulfilment. Metric flexibility contains product cycle time and delivery cycle time. Metric cost contains transportation cost. Figure 2 below shows the performances framework has been arranged in accordance to real condition.



Fig. 2 Performances in XYZ

After collecting data then data should be validated to XYZ, whether data is enough or not. SCOR will be combined with Snorm DeBoer to calculate accurately the result. Performance are calculated by using equations (1) and (2). Equation (1) is for negative perspective which means the smaller score the better result. And equation (2) is for positive perspective which means the bigger score the better result. Forecast accuracy, supply order fulfilment, item flexibility, delivery order fulfilment, product cycle time and delivery cycle time use equation (2). Whereas customer complaint, source lead time and transportation cost use equation (1).

Performance are showed in table 1.

Performance	Score	Performance	Score	Performance	Score
Forecast accuracy	71	Customer complaint	0	Product cycle time	68,5
Supply order fulfilment	58,5	Source lead time	68,5	Delivery cycle time	74
Item flexibility	87,03	Delivery order fulfilment	94,4	Transportation cost	34,4

There are 3 worst score in table will go to processed by AHP. AHP will lead to decide performances which need to give recommendation. AHP will be undertaken in XYZ to all workers and managers. Figure 3 shows the AHP framework and should be processed with Microsoft Excel. Result of AHP is showed in table 2



Fig. 3 AHP Framework

Tabel 2 AHP Resul	t					
Weight	Plan	Source	Make	Deliver	Return	Total
Supply order						
fulfilment	0,10883047	0,044885	0,108396	0,110108	0,019292	0,391
Source lead time	0,05870523	0,050742	0,112936	0,10965	0,020606	0,352
Product cycle						
time	0,03990979	0,025178	0,099325	0,073376	0,018061	0,255

The 3 worst scores are supply order fulfilment, supplier lead time and product cycle time. Measuring by AHP will have to make questionnaire for each person in XYZ. And the recommendation will be given by creating Cause and effect diagram like in Figure 4.



Fig. 4 Cause and Effect Diagram

Finally, product cycle time is the worst performance when checked with AHP and using Cause and Effect diagram will give recommendation. The main causes are man, environment, method and material. Interview with XYZ will lead to the recommendation from the problem.

4. Conclusion

Poultry process has fulfilled halal procedure especially in source, make and deliver processes. AHP measurement based on 3 worst performance, these are *supply order fulfilment, supplier lead time* and *product cycle time. Final score of these 3 performances are supply order fulfilment* to 0.391511; *supplier lead time* to 0.352639 and *product cycle time* to 0.25585. Recommendation is given to repair the performance by using Cause and effect diagram such as applying working hours on-time, chicken order to supplier and also chicken order by consumer.

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