



DECISION-MAKING MODEL IN SELECTING STRATEGY FOR FOOD SUPPLY IN LIVESTOCK BUSINESS USING ANALYTICAL HIERARCHY PROCESS (AHP) (A Case Study of WD Putra Farm)

Ayu Agustine Hernowo^{1,*}, Yuliani Dwi Lestari²

¹⁾ ayu-agustinehernowo@sbm-itb.ac.id

^{1,2)} SBM-ITB, Bandung, Indonesia

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ABSTRAK

Dalam usaha peternakan sapi potong diketahui bahwa pakan merupakan salah satu faktor keberhasilan dan menyumbang 50,20% dari total biaya. Penelitian ini dilakukan dengan menggunakan metode AHP (Analytical Hierarchy Process) dengan analisis BOCR (Benefit, Opportunity, Cost, Risk) untuk mengetahui pertimbangan dalam pemilihan proses penyediaan pakan, bobot masing-masing kriteria pada strategi dalam proses penyediaan pakan, dan urutan prioritas strategi. BOCR digunakan sebagai kriteria dalam perbandingan berpasangan. Setiap kriteria (B, O, C, R) terdiri dari 13 sub kriteria atau disebut faktor yang dikembangkan dari literatur dan pertimbangan internal perusahaan. Kriteria manfaat terdiri dari 4 subkriteria yang meliputi peningkatan pembelajaran organisasi, fokus pada kompetensi inti, peningkatan gerakan organisasi, dan peningkatan pemanfaatan aset.

ABSTRACT

In the beef cattle business, it is known that the feed is one of the success factor and it is contributed 50.20% of the total cost. This research was conducted using the AHP (Analytical Hierarchy Process) method with BOCR analysis (Benefit, Opportunity, Cost, Risk) to determine the consideration in the selection of feed supply process, the weight of each criterion at strategy in the feed supply process, and the order of priority for the strategy. BOCR was used as a criterion in pairwise comparisons. Each criterion (B, O, C, R) consists of 13 sub-criteria or called factors that developed from the literature and internal company considerations. Benefit criteria is consist of 4 sub-criteria which include enhancing organizational learning, focus on core competencies, increase organizational movement, and improve asset utilization.

* Corresponding author at:

ayu-agustinehernowo@sbm-itb.ac.id

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1. Introduction

Mentioned by the Director-General of Animal Husbandry and Animal Health (Dirjen PKH), Ministry of Agriculture, I Ketut Diarmita through the official website of the Directorate General of Agriculture and Animal Health that it was recorded that between 2015 and the first semester of 2019, there was a significant increase in performance. This significant increase in livestock performance is proven that in 2018 the GDP of the livestock sub-sector reached 231.71 trillion or contributed 16.35% to the total GDP of the agricultural sector, which amounted to Rp. 1,417.07 trillion (Warta Ekonomi, 2020). Besides, the deteriorating condition of the Indonesian economy caused by Covid-19 outbreak has resulted in a surge in the supply of cattle feed from abroad (Pradana et al., 2020). This has an impact on the livestock business which uses concentrate as the main food ingredient. With the existence of Covid-19, the price of concentrates has increased and the supply is limited. This is because all prices of imported materials, especially soybeans, have increased and their distribution to Indonesia is stagnant. As mentioned on wartaekonomi.com on April 12, 2020 there has been an increase in the price of raw materials, one of which is soybeans. It is known that the price of imported soybeans jumped from IDR 6,700 to IDR 8,500.

2. Literature Review

The definition of outsourcing in general is one of the work systems in which a company assigns tasks and responsibilities to outside parties. Outsourcing goes beyond the more common purchasing and consulting contracts because not only are the activities transferred but also resources that make the activities occur including people, activities, equipment, technology and other assets are transferred. The responsibilities for making the decision over certain elements of the activities are transferred as well. Conversely, insourcing can be defined as internal sourcing of business activities. So, insourcing can be viewed as an allocation or reallocation of resources internally within the same organization, even if the allocation is in different geographic locations. The internal supply chain provides products to customers through several chain activities within the company (Augustrianto et al., 2019). This series of activities goes through several processes including sales, production and finally the distribution process to consumers. By going through these processes the company can improve its performance.

Analytical Hierarchy Process (AHP) was developed by Thomas L. Saaty in the 1970's. This method is one model multi-criteria decision making that can help the human frame of mind in which the factors of logic, experience, knowledge, emotions, and feelings are optimized into a systematic process. AHP is a decision-making method developed to give priority to several alternatives when several criteria must be considered, as well as to allow decision makers to organize complex problems into a hierarchical form or a series of integrated levels (Winarno et al., 2019).

Based on research made by Saaty and Ozdemir in 2003 regarding the BOCR model, there are four ways to rank the several alternatives offered, including additives, probabilistic, subtractive and multiplication in BOCR. To combine the priorities of B, O, C, R can be done by synthesizing using two formulas, namely multiplicative and additive subtractive [6]. In this study, BOCR was used as a criterion in pairwise comparisons. Each criterion (B, O, C, R) consists of several sub-criteria or called as factors before to developed from the literature as well as internal company considerations.

Benefit criteria, strategies that can provide benefits or advantages for the company both in terms of operations and business development. In business criteria, there are 4 sub criteria developed from the literature and also internal company considerations, which include enhancing organizational learning, focus on core competencies, increase organizational movement and improve asset utilization. Cost and financial criteria, is the company's expenses with regard to the implementation of the feed supply strategy in supporting the whole part of operational process and the calculation is held to review the company ability to make a deal with certain strategy based on its financial status. The cost criteria consist of 3 sub criteria, including capital expenditure, operational expenditure and cash flow. Capital Expenditure. In the insourcing strategy, the company should invest as much as IDR 1,286,800,000 in the beginning. In the other hand, when the company running the outsourcing strategy there is no investment needed because the company just purchase the feed daily and the delivery process is supported by renting the accommodation.

Operating Expenditure. It is known that in total the number of operation cost in 2021 for insourcing as much as IDR 2,105,086,086 and in the 2025 as much as IDR 3,272,169,401. In the other hand, the number of operating cost for outsourcing is mentioned that in 2021 the total operating cost is IDR 2,598,167,303 and IDR 4,849,397,398 in the 2025. Free cash flow of insourcing is mentioned that in the 2021 there is an investment as much as IDR 1,286,800,000 from equity with interest rate 10% and the total cash flow in the first year is IDR 1,358,659,985. In the 2025 the

number of cash flow is IDR 4,658,585,039. It is compared with the cash flow of outsourcing with the number of cash flow in the first year as much as IDR 2,286,078 and there is no investment or purchase for assets. The number of cash flow for outsourcing in the 2025 is IDR 3,510,357,041. Beside, this condition also compared based on its NPV (Net Present Value). The NPV result for insourcing is IDR 10,914,157,351 and for outsourcing 10,631,168,327. It is described that based on the calculation, the most profitable strategy is insourcing. Opportunity criteria, profit opportunities from the aspect of business development and opportunities in the future by implementing outsourcing and insourcing strategies. For the opportunity criteria consists of 2 sub criteria, namely easiness to control and create alternative revenue. Risk criteria, the risk of loss that must be borne by the company from internal and external aspects of the company when implementing an outsourcing or insourcing strategy. There are 4 sub-criteria in the risk criteria, including customer complaint issue, government issue, employee issue and operational risk (Saragih et al., 2018).

3. Methodology

As described in Figure 2, it is explained that this research begins by analysing the problem with internal company observations and collecting related phenomena occurring at this time. Next is to conduct a literature study to collect theories that supports the discussion that will be raised in the research. In this process, data collection is carried out to find related factors and theories that will be used in the research. The next step is internal and external analysis to create the root cause of the research. In this part, there is a problem break down to analyses the problem in detail. The next process is to conduct a Focus Group Discussion (FGD) with the expertise to consider the factors that will be discussed in the AHP chart and do the scoring in pairwise comparisons. After the AHP method with BOCR analysis has been carried out, the final step is to determine the chosen solution and submit an implementation plan.

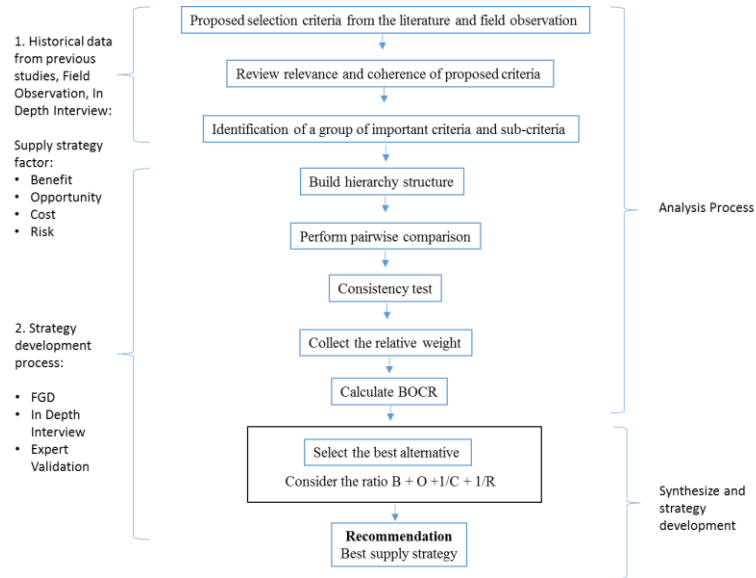


Figure 2 AHP Analysis Path

This study is conducted by combining BOCR and AHP to evaluate the synthetic utility value of the criteria and sub-criteria weights and then rank the optimal collection strategy against both outsourcing and insourcing strategies. For the AHP based decision making method was used to provide decision makers with a valuable reference for measuring the optimal strategy of the feed supply in the cattle fattening process at WD Putra Farm. BOCR was used as a criterion in pairwise comparisons. Each criterion (B, O, C, R) consists of several sub-criteria or called as factors before to developed from the literature as well as internal company considerations as describe in the Figure 2. In short, it can be explained that the AHP method with BOCR analysis is a step that will be carried out in this study using Super Decision software to analyze the data obtained more simply. Super Decision software will build a decision model with pairwise comparisons and analysis of computational results using super metrics from the Analytical Hierarchy Process (AHP) [8]. The pairwise comparison was discussed in the Focus Group Discussion (FGD) that was conducted by involving a Supervisor from WD Putra Farm and an expert from outside the company who understands the process of providing feed ingredients in the cattle fattening business and has an educational background according to this research.

4. Result and Discussion

In the benefit criteria, the highest score is on the Improve Asset Utilization sub-criteria (0.551). This illustrates that the company hopes that each strategy implemented can be useful, especially in using assets wisely so that it can maximize productivity through an effective and efficient system. The second is Enhancing Organizational Learning (0.274), which illustrates that the strategy the company will take is one that can increase the company's value through learning by the process. The third is the Increase Organization Movement (0.131), and the last one is the Focus on Core Competencies (0.044). Factor analysis for alternatives to the sub-criteria under benefits includes Enhancing Organizational Learning with the highest weight is Insourcing (0.875) and then Outsourcing (0.125). Then for Focus on Core Competencies, Outsourcing has the highest weight, namely (0.875) then Insourcing (0.125). Then for the Increase Organizational Learning sub-criteria with the highest weight on Insourcing (0.875) and followed by Outsourcing (0.125). The last sub-criteria is to Improve Assets Utilization with the highest number in Insourcing (0.875) and Outsourcing (0.125), as seen in Figure 3.

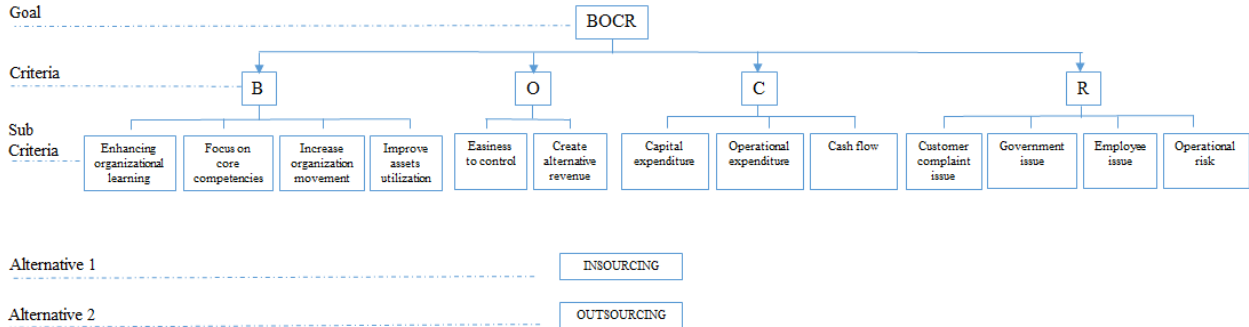


Figure 3 Conceptual Framework

The highest value in the opportunity criteria is Easiness to Control (0.833); this illustrates that the company wants a supply strategy that provides easy access for them to control all related processes both in terms of price and quantity. The second is Create Alternative Revenue (0.167), with a long-distance of weight to illustrate that alternative revenue is not the company's priority at this time. Factor analysis for alternatives to the Opportunity sub-criteria consists of Easiness to Control and Create Alternative Revenue. For Easiness to Control, the highest priority is Insourcing

(0.750), and below is Outsourcing (0.250). Next is Create Alternative Revenue with the highest value is Insourcing (0.875) then Outsourcing (0.125).

Cash Flow is the sub-criterion with the highest weight (0.637). This illustrates that the smooth flow of cash within the company is the most crucial factor that a company will consider when implementing a strategy because the cash flow will know the company's financial condition whether it is feasible to be implemented or not. Next is Capital Expenditure (0.258) because this fee is quite high and must be paid simultaneously at the beginning of strategy implementation. The third is Operational Expenditure (0.105), which is the company's final consideration in implementing a supply strategy. Factor analysis for sub-cost criteria consists of cash flow, capital expenditure, and operational expenditure. For cash flow, the highest weight is Insourcing (0.875), then underneath is Outsourcing (0.125). Then for capital expenditure, the higher is Outsourcing (0.834) then followed by Insourcing (0.1667). The last one is operational cost with a balanced weight between Insourcing (0.750) and Outsourcing (0.250). The supporting data for the comparison process is mentioned below.

In the insourcing strategy, the company should invest as much as IDR 1,286,800,000 in the beginning. In the other hand, when the company running the outsourcing strategy there is no investment needed because the company just purchase the feed daily and the delivery process is supported by renting the accommodation. It is known that in total the number of operation cost in 2021 for insourcing as much as IDR 2,105,086,086 and in the 2025 as much as IDR 3,272,169,401. In the other hand, the number of operating cost for outsourcing is mentioned that in 2021 the total operating cost is IDR 2,598,167,303 and IDR 4,849,397,398 in the 2025.

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In Risk sub-criteria, the Employee Issue has the highest weight (0.556). This indicates that the company will prioritize risks related to employees and workers. All risks associated with employees

will be a major concern for the company, including job security and employee motivation. The second is Operational Risk (0.259), which means that problems related to operational activities, including errors in the system, and workers will be the second priority in the company. The last two are Government Issue (0.136), and the last is Customer Complaint Issue (0.049). The first alternative factor analysis on the Risk sub-criteria is the Customer Complaint Issue with the highest priority on Insourcing (0.833) followed by Outsourcing (0.167). The second sub-criterion is Government Issue with a balanced weight between Insourcing (0.500) and Outsourcing (0.500). The third is the Employee Issue with the highest risk for Outsourcing (0.875) and then Insourcing (0.125). The last one is Operational Risk with the highest value in Outsourcing (0.750) and followed by Insourcing (0.250).

Global weight priorities show that the highest priority is Cost and Financial (0.57407), and the second is Benefit (0.28208). Risk priority is in the third priority (0.09152), and the last one is Opportunity priority (0.05233). While in terms of alternative, the second priority is Outsourcing (0.26321), and finally, the first priority is Insourcing, which gets the highest weight (0.73679).

5. Kesimpulan

This research contributes to the company both theoretically and practically. First, this study proposes a Super Decision Software for running the AHP analysis model with BOCR. The consideration in the selection of supply strategy process is arranged using BOCR analysis. Benefit criteria consist of 4 sub-criteria developed from the literature and also internal company considerations, which include enhancing organizational learning, focus on core competencies, increase organizational movement, and improve asset utilization. Cost criteria consist of 3 sub-criteria, including capital expenditure, operational expenditure, and cash flow. Opportunity criteria consist of 2 sub-criteria, namely easiness to control and create alternative revenue. Risk criteria consist of 4 sub-criteria, including customer complaint issue, government issue, employee issue, and operational risk. The alternatives consist of insourcing and outsourcing. Based on the research and analysis the alternative selected is insourcing which generated the highest weight as much as 0.73679. In order to apply the insourcing supply strategy, the company should arrange the implementation plan and prepare for investment.

The used of AHP Method in this research was assumed to be independent without any inter-correlation between each criteria. For the future research, we suggest to conduct Analytic Network

Process (ANP) method in order to accommodate interdependent among cluster, criteria and sub-criteria of model. After the problem solving, which already held by using AHP model analysis with BOCR, insourcing is founded as the best solution. However, it is known that in terms of costs at the beginning of the year, it is higher than outsourcing, but insourcing provides more advantages to be applied to the company. To solve the existing problems, the implementation of the supply insourcing strategy needs to be applied formally and systematically.

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