



Method Implementation Multifactor Evaluation Process (MFEP) in Recommending the Best Types of Cattle for Beef Cattle Farming

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ABSTRACT

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This study aims to implement a decision support system in recommending the best type of cow. The research data comes from interviews and field observations. Based on these observations and interviews, 5 alternatives were obtained Lemosin (A1), Simental (A2), Bali (A3), Dairy (A4), Brahma (A5), as the selected type of cow and 5 criteria for selecting cattle, namely Origin (A), Price (B), Age (C), Weight (D), and Size (E). This research uses the MFEP (Multi Factor Evaluation Process) method. From the results of research and calculations using the MFEP method, it is found that Lemosin (A1) is the best type of cow with a total weight value of 0.6875.

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1. Introduction

Beef cattle are cows that are raised with the main objective of producing meat, so they are often referred to as beef cattle [1]. The rate of increase in beef cattle population is relatively slow, this condition causes the low contribution of beef cattle to national meat production resulting in a widening gap between demand and offers. Lots of beef cattle breeders fail in their business because they cannot choose the best type of cattle that is suitable for breeding.

To achieve high business efficiency, it requires integrated business processing from upstream to downstream and agribusiness-oriented with a partnership pattern, so that it can provide sustainable benefits. The beef cattle business is growing rapidly at this time, causing very sharp competition in fulfilling beef supply.

The beef cattle business is growing rapidly at this time, causing very sharp competition in fulfilling beef supply. In Indonesia there are many types of cattle with various types that are widespread. This causes breeders to be really careful in choosing the type of cattle to raise. This study aims to make it easier for farm owners to choose the best type of cow for their business based on predetermined criteria. In providing recommendations for the best types of cattle, cattle breeders must be able to find out which types of cattle have superior quality to produce the best quality cows. . So that breeders get a bigger profit.

Previous research related to the MFEP method is about Cafe Selection [2], Company Performance Measurement [3], Recommending UKK Participants for TKJ Majors [4], Determining Majors in High School Students [5] and Car Selection [6]. can provide recommendations in the form of information to cattle breeders

2. Research methods

2.1. Research Framework

The research framework consists of several stages that will be carried out in achieving the research objectives [5]. Figure 1 below are the phases undertaken to support the implementation of the Multi Factor Evaluation Process (MFEP) method which will be shown below:



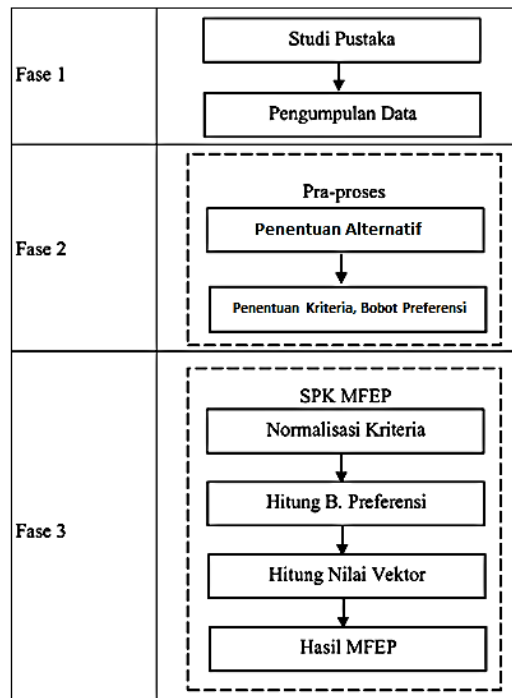


Fig 1. Phases in the Research Framework

2.2. Method of collecting data

The methods used in data collection are as follows:

- a. Library Study
This activity includes collecting documents in the form of journals, books and articles related to this research, which are expected to be able to assist in completing this research.
- b. Observation
This activity includes data collection in the field related to research needs including the type of cow, as well as the characteristics or conditions needed to recommend the best type of cow for beef cattle farming.
- c. Interview
This activity includes questions and answers with cow owners about the criteria that have become benchmarks in recommending the best type of cow.

2.3. Definition of Decision Support System (DSS).

A decision support system (DSS) is an interactive information system that provides information, modeling, and data manipulation. [6].

2.4. Multi Factor Evaluation Process (MFEP) method.

The MFEP method is defined as a method with a weighting system approach. In a multi-criteria decision-making problem, a manager can assess and weigh all the criteria with a quantitative intuitive approach in assessing what criteria are most important in an alternative assessment.[7].

Decision making is carried out subjectively and intuitively by considering various factors that have an important influence on their alternative choices. For decisions that affect strategically, it is advisable to use a quantitative approach such as MFEP. In MFEP, first of all, all criteria that are important factors in considering are given appropriate weighting[8].

So that the MFEP method is appropriate to use in a decision making that has large elements that are quantitative in nature [9]

2.5. The steps of the Multi Factor Evaluation Process (MFEP) method.

Multifactor Evaluation Process (MFEP) is a decision-making model that uses a collective approach to its decision-making process [10]. The steps in the calculation process using the MFEP method are as follows:

- a. Determine the factor and factor weights where the total weighting must be equal to one.
- b. Fill in the value for each factor that affects the decision-making of the data to be processed, the value that is included in the decision-making process of the data to be processed, the value that is included in the decision-making process is an objective value.



- c. The process of calculating weight evaluation, which is the process of calculating the weight between the weight evaluation factors to obtain the total evaluation results.

The formula for the Total Evaluation Results is shown by equation 1 as follows:

$$W = W_1 + W_2 + W_3 + \dots + W_n \dots\dots\dots (1)$$

Information :

W = Total Weight Criteria

W_n = Weight Criteria

The Criteria Weight formula is shown by equation 2 as follows:

$$W_e = W * e \dots\dots\dots (2)$$

Information :

W_e = Weight Evaluation

W = Weight Criteria

E = Evaluation Criteria

3. Results and Discussion

3.1. Data Description

From the results of interviews and field observations, it is known that there are 5 best types of cattle which can be seen in table 1 below:

Table 1.
Cow type or alternative

No.	Cow's Name	Initials / Variables
1	Lemosin	A1
2	Simental	A2
3	Bali	A3
4	Milking	A4
5	Brahma	A5

3.2. Discussion

a. Determination of Factors and Their Weighting.

The factors determined by AMIK Tunas Bangsa Pematangsiantar and then making the value of the factor weight which the total weighting must be 1 or 100%, can be seen in table 2 below:

Table 2.
Factors and weight values

No.	Factor Name	Initials	Weight Value
1	Origin	A	0.1
2	Price	B	0.1
3	Age	C	0.2
4	Weight	D	0.5
5	Size	E	0.1
amount			1

b. Fill in the Value of Each Factor.

- 1) Filling in the value of the sub-factor of responsibility

Table 3.
Sub Factors From The Origin Factor

No.	Sub-Factor Name	Weight Value
1	Local	0.6
2	Western	0.4
amount		1



2) Filling the old sub factor value worked

Table 4.
Sub Factor of Price Factor

No.	Sub-Factor Name	Weight Value
1	> 40 - 55 million	40
2	16 - 17 million	17
3	14 - 15 million	15
4	<10 million	10
5	17-18 million	18
	amount	1

3) Filling in the value of the personality sub-factor

Table 5.
Sub Factors of Age Factors

No.	Sub-Factor Name	Weight Value
1	10 - 20 years	0.2
2	20-30 years	0.7
3	31 - 40 years	0.1
	amount	1

4) Filling in the value of health sub-factors

Table 6.
Sub factor of weight factor

No.	Sub-Factor Name	Weight Value
1	Fat	0.75
2	Thin	0.25
	amount	1

5) Filling in the age sub factor value

Table 7.
Sub factor of size factor

No.	Sub-Factor Name	Weight Value
1	Body Length	0.62
2	Shoulder Height	0.15
3	Chest size	0.2
	amount	1

After knowing the weight value of each sub factor. Next Filling in the alternative values for each factor needed in the decision-making process, the value entered is the subjective value, namely the evaluation factor with a value of 0-1.

Table 8.
The value of each alternative is based on factors

No.	Alternative	A	B	C	D	E
1	A1	0.75	0.25	0.75	0.75	0.65
2	A2	0.75	0.25	0.75	0.75	0.2
3	A3	0.75	0.25	0.75	0.75	0.2
4	A4	0.75	0.15	0.75	0.75	0.2
5	A5	0.75	0.15	0.75	0.75	0.2
	Weight	0.35	0.1	0.25	0.2	0.1

c. Weight Evaluation Calculation Process.

The process of calculating the weight evaluation, which is the process of calculating the weight between the factor weight and factore evaluation with the sum of all the results of the weight evaluations to obtain the total evaluation results. By using formula (2), it is obtained:

- 1) *Weight Origin (A)*
 A1: $0.75 * 0.35 = 0.26$
 A2: $0.75 * 0.35 = 0.26$
 A3: $0.75 * 0.35 = 0.26$



- A4: $0.75 * 0.35 = 0.26$
 A5: $0.75 * 0.35 = 0.26$
- 2) *Weight Price (B)*
 A1: $0.25 * 0.10 = 0.025$
 A2: $0.25 * 0.10 = 0.025$
 A3: $0.25 * 0.10 = 0.025$
 A4: $0.15 * 0.10 = 0.025$
 A5: $0.15 * 0.10 = 0.025$
- 3) *Weight Age (C)*
 A1: $0.75 * 0.25 = 0.1875$
 A2: $0.75 * 0.25 = 0.1875$
 A3: $0.75 * 0.25 = 0.1875$
 A4: $0.75 * 0.25 = 0.1875$
 A5: $0.75 * 0.25 = 0.1875$
- 4) *Weight Weight (D)*
 A1: $0.75 * 0.20 = 0.15$
 A2: $0.75 * 0.20 = 0.15$
 A3: $0.75 * 0.20 = 0.15$
 A4: $0.75 * 0.20 = 0.15$
 A5: $0.75 * 0.20 = 0.15$
- 5) *Weight Size (E)*
 A1: $0.65 * 0.1 = 0.065$
 A2: $0.2 * 0.1 = 0.02$
 A3: $0.2 * 0.1 = 0.02$
 A4: $0.2 * 0.1 = 0.02$
 A5: $0.2 * 0.1 = 0.02$

From these calculations, the following data were obtained:

Table 9.

Evaluate the value of each alternative based on factors

No.	Alternative	A	B	C	D	E
1	A1	0.26	0.025	0.1875	0.15	0.065
2	A2	0.26	0.025	0.1875	0.15	0.02
3	A3	0.26	0.025	0.1875	0.15	0.02
4	A4	0.26	0.15	0.1875	0.15	0.02
5	A5	0.26	0.15	0.1875	0.15	0.02
	Weight	0.35	0.1	0.25	0.2	0.1

Next is the calculation of the value of each alternative with the evaluation weight, so that the following values are obtained:

Table 10

Evaluate the value of each alternative based on factors

No	Alternative	A	B	C	D	E	Evaluation result
1	A1	0.26	0.025	0.1875	0.15	0.065	0.6875
2	A2	0.26	0.025	0.1875	0.15	0.02	0.6425
3	A3	0.26	0.025	0.1875	0.15	0.02	0.6425
4	A4	0.26	0.15	0.1875	0.15	0.02	0.6325
5	A5	0.26	0.15	0.1875	0.15	0.02	0.6325

d. Comparison of Total Weight Evaluation.

Comparing the total value of the criterion weight between alternatives then sort by the highest value.

Table 11
Ranking results

No	Alternative	Evaluation result
1	A1	0.6875
2	A2	0.6425
3	A3	0.6425
4	A4	0.6325
5	A5	0.6325

4. Conclusion

From the results of the research that has been conducted by the author, several conclusions can be drawn, including:

- Based on the results of research using the Multifactor Evaluation Process (MFEP) method with 5 assessment criteria, namely A = Origin, B = Price, C = Age, D = Weight, E = Size, and 3 attributes / alternatives: A1 = Lemosin Beef, A2 = Simental Cow, A3 = Bali Cows, A4 = Dairy Cows, A5 = Brahma Cows, The results obtained from the recommendation of the best type of cow based on the highest weight value are Lemosin Cows (A1) with a weight value of 0.6875.
- The Multifactor Evaluation Process (MFEP) method can be used to assist in the calculation of selecting the best type of beef cattle based on predetermined criteria.

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