Proceeding
International Conference
on Social, Sciences and Information Technology
Kisaran, August 19th, 2020, hlm. 19 - 26
DOI: https://doi.org/10.33330/icossit.v1i1.822
Available online at https://jurnal.stmikroyal.ac.id/index.php/ICdoSSIT

ISSN 2723-4509 (Online)

THE MFEP AND MAUT METHODS IN SELECTING THE BEST EMPLOYEES

Dewi Maharani [1] , Maulana Dwi Sena[1]
[1]Information Management, Sekolah Tinggi Manajemen Informatika dan Komputer Royal, Indonesia

Corresponding author:
dewimaharani15@gmail.com

Keywords:
maut
mfep
the best employee

ABSTRACT

Many companies conduct assessments to improve employee performance, including Ibu Kartini Hospital. Components of performance appraisal, the number of employees, and assessment results become the main data of researchers. To avoid subjective and inaccurate judgments because of the large number of elements being assessed and the number of employees to be assessed, the researcher assists the Hospital in finding the best employees by using Decision Support System Technology. Through a comparison of 2 methods, the Multi Factor Evaluation Process (MFEP) and the Multi Attribute Utility Theory (MAUT), the researcher will conduct a comparative analysis to produce an accurate value. The MFEP method is a method that considers several factors that influence alternatives. While the MAUT method is a method that has a final evaluation scheme with weights and values that are relevant to the alternative. As a result, the MFEP method produces 2 of the best employees, namely KRS52 and KRS59. While the MAUT method produces 1 of the best employees, namely KRS52.

INTRODUCTION

The best employees become an important asset that must be maintained and developed by every company [1]. Ibu Kartini Hospital is a private company engaged in health with 68 employees (KRS).

Choosing the best employees can improve employee performance, as well as the selection of employees who are not objective or misdirected, which can cause catastrophe for all employees so that it relates to the company's image [2], [3]. Data of all employees then selecting all employees to produce the best employees must be done objectively, so researchers use two methods in determining the best employees, the MFEP method which is a model of decision making through a collective approach to the decision-making process, while the MAUT Method can help change some interests into numerical values on a scale of zero to one, to produce definitive decisions [4].

Methods Multi Factor Evaluation Process (MFEP)

The MFEP method is a quantitative method that uses a weighting system. The MFEP method is multi-factor, decision-makers subjectively weighing various factors that influence the importance of their choices. In MFEP all important criteria, factors in

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making consideration are carried out following their weights. For alternatives that will be selected will do an assessment. Then an evaluation process is carried out related to the factor criteria. The MFEP method stipulates that the alternative with the highest value is the best solution based on the criteria chosen [5].

The following are the steps in the calculation process using the MFEP method, namely:

1. Determine the factors and factor weights where the total weighting must be equal to 1 (Σ weighting = 1), i.e. factor weight.
2. Filling in the value for each factor that influences the decision making of the data to be processed, the value entered in the decision-making process is objective, that is certainly a factor evaluation whose value is between 0-1.
3. The process of calculating weight evaluation which is the process of calculating the weight between factor weight and factor evaluation by adding all the results of weight evaluations to obtain the total evaluation results [6], [7].

The total formula of the evaluation results is shown by the equation, below: [8].

$$W = w\_1 + w\_2 + w\_3 + \cdots .. + n \quad (1)$$

Explanation:
W = Total Criteria Weight
w = Criteria Weight

Method Multi Attribute Utility Theory (MAUT)

Multi-attribute utility theory is one of the well-known MCDM methods and is used to solve problems related to many important issues. The MAUT method is the final result of the evaluation scheme, v (x) of the object (x) which is interpreted as a weighted sum with the relevant value. The result is a sequence or ranking of alternatives that we have included that illustrate the decision-makers' choices [9]. The overall evaluation value can be defined, as follows [10].

$$V(X) = \sum_{i=1}^{n} W_j X_{ij} \quad (2)$$

V (X) is the evaluation value of an object. The value of i and w is a weight that determines the value in order to know how important element i is for other elements. n is the number of elements with a total weight of 1 [11]. Whereas for matrix normalization, as follows

$$U_{(x)} = \frac{x_i - x_j^-}{x_i^+ - x_j^-} \quad (3)$$

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U (x) is normalization of alternative weight x. The value of x is an alternative weight. Xi value $^{-}$ is the worst weight (minumum) of criteria for all x and xi $^{+}$ is the weight of the best (maximum) of criteria to - x [12].

METHOD

This study uses the MFEP and MAUT methods. The first step the researcher takes is to establish criteria or measures on which to base the assessment and weight according to each criterion (Weight Factor). The second step inputting the value of factors and alternatives from the results of employee performance appraisal [13]. The third step determines the Weigh Evaluation from the results of the assessment. The final step is to make a total Weigh Evaluation then sort it. After the steps of the MFEP method are completed, which results in the best ranking of employees the researcher follows the steps in the MAUT method such as determining the weight of each criterion with a total of one, inputting factor values and alternatives to the employee performance appraisal results, calculating the utility value matrix normalization for each criterion then the results will be multiplied by weights [14]. Criteria and weight weights for the MFEP and MAUT methods can be seen as in table 1, the following:
The framework of this research is as follows [15]:

Table 1. Factor Weight

Criteria	Information	Weight
C1	Work attitude	0,4
C2	Responsible	0,3
C3	Competence	0,3
		1

Furthermore, the steps of the MFEP and MAUT methods are analyzed to look the best alternative between the methods and will produce a ranking that is useful for producing accurate, and subjective data. The framework in this study includes Literature Studies, Instrument Arrangement, Collecting Data and Analyzing Data [16].

RESULT AND DISCUSSION

Based on the research methods outlined, the next thing to apply is to enter data into a comparison of the MFEP and MAUT methods. The following are the steps in completing the MFEP method to get the best employees.

1. Determine factors and factor weights
   Factors and factor weights must have a total weight of 1. Factors and factor weights, as in table 1.
2. Criteria and Alternative Values of All Employees at Ibu Kartini Hospital

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Table 2. Value Factors and Alternatives

Nilai Faktor dan Alternatif			
	C1	C2	C3
KRS1	85	90	90
KRS2	90	75	85
KRS3	75	90	85
KRS4	90	85	90
KRS5	90	70	85
KRS6	90	90	85
KRS7	90	85	90
KRS8	85	90	95
KRS9	90	85	90
KRS10	85	85	90
KRS11	90	90	85
KRS12	85	90	85
KRS13	85	75	85
KRS14	90	85	85
KRS15	85	90	85
KRS16	90	85	90
KRS17	90	90	85
KRS18	90	80	85
KRS19	85	90	85
KRS20	90	90	85
KRS21	85	85	90
KRS22	90	90	85
KRS23	85	85	90
KRS24	85	90	85
KRS25	85	85	85
KRS26	90	75	85
KRS27	85	90	85
KRS28	90	90	85
KRS29	90	85	90
KRS30	85	90	90
KRS31	85	90	90
KRS32	85	90	85
KRS33	85	85	90
KRS34	90	90	85
KRS35	90	85	90
KRS36	85	90	90
KRS37	85	90	85
KRS38	85	90	75
KRS39	85	90	85
KRS40	75	85	90
KRS41	85	95	85
KRS42	85	90	85
KRS43	85	90	90
KRS44	90	85	90
KRS45	90	90	85
KRS46	85	90	85
KRS47	90	95	85
KRS48	85	90	85
KRS49	85	95	90
KRS50	90	90	85
KRS51	85	90	85
KRS52	90	90	95
KRS53	85	90	85
KRS54	85	95	85
KRS55	90	90	90
KRS56	85	90	90
KRS57	90	85	85
KRS58	85	90	85
KRS59	90	95	90
KRS60	90	95	85
KRS61	85	90	85
KRS62	90	85	85
KRS63	85	90	85
KRS64	85	90	90
KRS65	85	85	85
KRS66	90	90	85
KRS67	85	90	90
KRS68	85	90	90

The process of calculating weighted evaluations (x)

Weight Evaluation (x) is generated from the Weight Factor (WF) multiplied by the alternative value. The following calculation of weight and factor evaluation.

KRS1 = 0.4 * 85 = 34,
KRS2 = 0.3 * 90 = 27,
KRS3 = 0.3 * 90 = 27

Based on the calculation of Weight Evaluation (x), the next final step is to add up all alternatives based on the criteria, so that the total Weight Evaluation (x) and ranking results can be obtained.

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XKRS1 = 34 + 27 + 27 = 88,
XKRS2 = 36 + 22.5 + 25.5 = 84,
XKRS3 = 30 + 27 + 25.5 = 82.5

The results of the overall calculation are as follows,

Table 3. Total Weighted Evaluation (x)

	TOTAL	RANG KING
KRS1	88	25
KRS2	84	62
KRS3	82,5	65
KRS4	88,5	8
KRS5	82,5	65
KRS6	88,5	8
KRS7	88,5	8
KRS8	89,5	6
KRS9	88,5	8
KRS10	86,5	39
KRS11	88,5	8
KRS12	86,5	39
KRS13	82	68
KRS14	87	36
KRS15	86,5	39
KRS16	88,5	8
KRS17	88,5	8
KRS18	85,5	59
KRS19	86,5	39
KRS20	88,5	8
KRS21	86,5	39
KRS22	88,5	8
KRS23	86,5	39
KRS24	86,5	39
KRS25	85	60
KRS26	84	62
KRS27	86,5	39
KRS28	88,5	8
KRS29	88,5	8
KRS30	88	25
KRS31	88	25
KRS32	86,5	39
KRS33	86,5	39
KRS34	88,5	8
KRS35	88,5	8
KRS36	88	25
KRS37	86,5	39
KRS38	83,5	64
KRS39	86,5	39
KRS40	82,5	65
KRS41	88	25
KRS42	86,5	39
KRS43	88	25
KRS44	88,5	8
KRS45	88,5	8
KRS46	86,5	39
KRS47	90	3
KRS48	86,5	39
KRS49	89,5	6
KRS50	88,5	8
KRS51	86,5	39
KRS52	91,5	1
KRS53	86,5	39
KRS54	88	25
KRS55	90	3
KRS56	88	25
KRS57	87	36
KRS58	86,5	39
KRS59	91,5	1
KRS60	90	3
KRS61	86,5	39
KRS62	87	36
KRS63	86,5	39
KRS64	88	25
KRS65	85	60
KRS66	88,5	8
KRS67	88	25
KRS68	88	25

The steps of the MFEP method have been completed. The next stage is the application of the MAUT method, while the completion steps are as follows:

1. The researcher uses the same weight as the MFEP method, the weight is by table 1.
2. Researchers use alternative value data and the same criteria, according to table 2.
3. Researchers perform the normalization matrix calculation, as follows

- C1 = (85-75) / (90-75) = 0.667

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- C2 = (90-70) / (95-70) = 0.8
- C3 = (90-75) / (95-75) = 0.75

4. The researcher calculates the total from the normalization matrix multiplication with weights, as follows:
   - KRS1 = (0.4 * 0.667) + (0.3 * 0.8) + (0.3 * 0.75) = 0.731667
   - KRS2 = (0.4 * 1,000) + (0.3 * 0.2) + (0.3 * 0.5) = 0.61
   - KRS3 = (0.4 * 0,000) + (0.3 * 0.8) + (0.3 * 0.5) = 0.39

This is the final stage of the Normalization Matrix process. The results of the total normalization matrix which will then be ranked according to the amount obtained.

The search formula for ranking used is as follows, RANK.EQ (Number; Reference; [order]). The results of the overall calculation are as follows,

Tabel 4. Hasil Total Matriks Normalisasi & Perankingan

	Total	Rang King
KRS1	0,731667	25
KRS2	0,61	60
KRS3	0,39	68
KRS4	0,805	8
KRS5	0,55	64
KRS6	0,79	15
KRS7	0,805	8
KRS8	0,806667	7
KRS9	0,805	8
KRS10	0,671667	39
KRS11	0,79	15
KRS12	0,656667	44
KRS13	0,476667	66
KRS14	0,73	34
KRS15	0,656667	44
KRS16	0,805	8
KRS17	0,79	15
KRS18	0,67	43
KRS19	0,656667	44
KRS20	0,79	15
KRS21	0,671667	39
KRS22	0,79	15
KRS23	0,671667	39
KRS24	0,656667	44
KRS25	0,596667	62
KRS26	0,61	60
KRS27	0,656667	44
KRS28	0,79	15
KRS29	0,805	8
KRS30	0,731667	25
KRS31	0,731667	25
KRS32	0,656667	44
KRS33	0,671667	39
KRS34	0,79	15
KRS35	0,805	8
KRS36	0,731667	25
KRS37	0,656667	44
KRS38	0,506667	65
KRS39	0,656667	44
KRS40	0,405	67
KRS41	0,716667	37
KRS42	0,656667	44
KRS43	0,731667	25
KRS44	0,805	8
KRS45	0,79	15
KRS46	0,656667	44
KRS47	0,85	5
KRS48	0,656667	44
KRS49	0,925	2
KRS50	0,79	15
KRS51	0,656667	44
KRS52	0,94	1
KRS53	0,656667	44
KRS54	0,716667	37
KRS55	0,865	4
KRS56	0,731667	25
KRS57	0,73	34
KRS58	0,656667	44
KRS59	0,925	2
KRS60	0,85	5
KRS61	0,656667	44
KRS62	0,73	34
KRS63	0,656667	44
KRS64	0,731667	25
KRS65	0,596667	62
KRS66	0,79	15
KRS67	0,731667	25
KRS68	0,731667	25

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CONCLUSION

Comparison of MFEP and MAUT methods in the case of the best employee selection produces criteria that can be applied, namely the first criterion (C1) of work attitude with elements, prioritizing service, loyalty to the company, enthusiasm for work, acceptance of supervision, ability to work under pressure, absenteeism, cooperation, communication; the second criterion (C2) responsibility with elements of timely attendance, timeliness of completing work, initiative, acceptance of additional tasks; and the third criterion (C3) is competency with the ability to work, knowledge of work, the accuracy of decision making.

The number of alternatives or the number of employees makes the MFEP method ineffective because it produces 2 of the best employees with the same total value. Whereas the comparison of the MFEP and MAUT methods helped produce 1 best employee namely KRS52, with details that the MFEP method produced the best employees namely KRS52 (total 91.5) and KRS59 (Total 91.5) while the MAUT method produced its best employees namely KRS52 (Total 0.94).

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