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OPTIMIZATION OF INCENTIVE GIVING THROUGH MULTI-CRITERIA DECISION ANALYSIS APPROACH

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Abstract: This research aims to optimize the provision of incentives to employees (sales team) in a company using a multi-criteria approach. Many companies face challenges in determining criteria and mechanisms for providing incentives that are effective and fair to improve work performance and motivation. The multi-criteria approach used is Multi-Attribute Utility Theory (MAUT) which can assess various aspects of employee performance comprehensively and objectively. Factors considered include productivity, quality of work, attendance, innovation and overall turnover. The research results show that the multi-criteria approach provides a more comprehensive and accurate assessment, so that companies can develop a more transparent and effective incentive system. Implementation of this approach is expected to increase employee motivation and productivity, help companies achieve their business goals more efficiently, and provide long-term benefits in the form of increased employee loyalty and competitiveness in the field.

Keywords: optimization; incentives; multi criteria; maut method

Abstrak: Penelitian ini bertujuan untuk mengoptimalkan pemberian insentif kepada karyawan (tim sales) di sebuah perusahaan dengan menggunakan pendekatan multikriteria. Banyak perusahaan menghadapi tantangan dalam menentukan kriteria dan mekanisme pemberian insentif yang efektif dan adil untuk meningkatkan kinerja dan motivasi kerja. Pendekatan multikriteria yang digunakan adalah Multi-Attribute Utility Theory (MAUT) dapat mengevaluasi berbagai aspek kinerja karyawan secara menyeluruh dan objektif. Faktor-faktor yang dipertimbangkan meliputi produktivitas, kualitas kerja, kehadiran, inovasi dan omset keseluruhan. Hasil penelitian menunjukkan bahwa pendekatan multikriteria memberikan penilaian yang lebih komprehensif dan akurat, sehingga perusahaan dapat mengembangkan sistem insentif yang lebih transparan dan efektif. Implementasi pendekatan ini diharapkan dapat meningkatkan motivasi dan produktivitas karyawan, membantu perusahaan mencapai tujuan bisnisnya dengan lebih efisien, serta memberikan manfaat jangka panjang berupa peningkatan loyalitas karyawan dan daya saing di lapangan.

Kata kunci: optimalisasi; insentif; multi kriteria; metode maut

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INTRODUCTION

Along with the development of technology, the incentive system can be improved through the use of Artificial Intelligence (AI), Big Data Analytics, and Decision Support Systems (DSS) [1] . This technology allows companies to analyze employee performance data more accurately and objectively, so that the incentive system can be adjusted based on various multi-criteria factors.

Decision Support Systems (DSS) – Multi-Criteria Decision Analysis (MCDA) based DSS technology can be used to assist decision making regarding incentive provision [2] . DSS is able to integrate various assessment factors, such as productivity, work quality, attendance, innovation and overall turnover obtained for each employee.

Human resources (HR) are a key element in the success of an organization. Employee productivity and performance are greatly influenced by various factors, one of which is the incentive system implemented by the company [3] . Well-designed incentives can increase work motivation, employee satisfaction, and loyalty to the company [4] . Various studies have shown that an effective incentive system contributes to increased performance and achievement of company targets [5] .

However, the implementation of incentive systems in various companies still faces a number of challenges. Many organizations use conventional approaches in determining incentives, such as based on seniority or individual achievements, without considering other factors that influence the success of the organization [6] . Incentive systems that are not based on quantitative methods or data-based approaches can lead to dissatisfaction among employees [7] . To find out the decision support system process using the MAUT method in providing incentives for employees and to make it easier to implement the MAUT method in making decisions about providing incentives with existing criteria. In addition, several studies have proposed technology-based approaches such as AI and Big Data in employee management, but their application in incentive systems is still limited [8] . This can lead to unfairness in the distribution of incentives and cause dissatisfaction among employees. Therefore, a more comprehensive approach is needed in providing incentives to ensure a more objective, fair, and effective system.

By utilizing this technology, the incentive system can be optimized to be more objective, transparent, and fair, and can increase employee motivation and satisfaction.

METHOD

The multicriteria approach to decision making is a method used to evaluate several alternatives based on various relevant factors or criteria. In the context of employee incentives, this approach allows companies to consider various aspects of the assessment, such as individual performance, job difficulty, team involvement, innovation, and attendance.

One method that is often used in multi-criteria decision making is the Multi-Attribute Utility Theory (MAUT) . This method is based on the concept of utility function, where each criterion is given a weight according to its level of importance, then aggregated to determine the best alternative.

In a decision support system (DSS),

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MAUT can be used to optimize incentive provision by:

Determining Assessment Criteria – Identify factors that influence the provision of incentives, such as productivity, discipline, and contribution to the company.

Setting Criteria Weights – Each criterion is given a weight based on its level of influence on the success of the organization.

Calculating Utility Function – Each alternative (employee) is evaluated based on a predetermined assessment scale, then the total utility value is calculated.

Determining Optimal Decisions – The alternative with the highest utility value is selected as the recipient of the most optimal incentive.

By implementing MAUT in the application of DSS in the decision-making process for providing incentives has the potential to be more transparent, fair, and data-based, which can help reduce subjectivity and increase company effectiveness.

DSS, incentive systems can be more transparent, fair, and data-based. This helps companies reduce subjectivity and increase effectiveness in rewarding employee performance.

Multi-Attribute Utility Theory (MAUT) method is a quantitative comparison method that usually combines measurements of different risk costs and benefits. Each existing criterion has several alternatives that can provide solutions, to find alternatives that are close to the user's wishes, then to identify them, multiplication is carried out on the predetermined priority scale.

Where Vi(x) is the evaluation value of an object i and wi is the weight that determines the value of how important element i is to other elements. While n is the number of elements. The total weight is 1. In summary, the steps in the MAUT method are as follows [9] :

First, determine alternatives and standard values from existing criteria
Second,classify all alternatives separately for each criteria
Third, Determine the relative weight of each criterion,
Four, Combining the alternative weights for each criterion with the score results for each criterion from all options to obtain an overall score value.
The last, Conduct an analysis of the overall assessment results of all alternatives and make a ranking.

To calculate the overall evaluation value, it can be defined using several equations, formulated as follows [10] :

$$v_{(x)=} \sum_{i-1}^{n} WiVi(x) \qquad (1)$$

Description:

vi(x) is the evaluation value of an object i and wi is the weight that determines the value of how important element i is to other elements. While n is the number of elements. The total weight is 1.

$$\sum_{i=1}^{n} Wi = 1 \qquad (2)$$

For each dimension, the *evaluation value* vi(x) is defined as the sum of the relevant attributes.

$$vi_{(X)} = \sum_{e=Ai} Wai.Vai\left(I(a)\right) \quad (3)$$

Description:

$V_{(x)}$	:	Evaluation value
n	:	Number of elements/criteria
i	:	Total weight is 1
A_i	:	The set of all relevant attributes
$V_{ai(1(a)}$	:	Evaluation of the actual level
Wai	:	The weight that determines

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the impact of the attribute evaluation on the dimension
Vi : The overall value of the alternative choices for a criterion
A : Criteria

In summary, the steps in the MAUT method for calculating the normalized *Utility value* of the matrix for each alternative according to its attributes.

$$U_{(X)} \frac{(X-Xi)}{Xi^{+} - Xi^{-}} \quad (4)$$

Description:
U(x) : Alternative weight normalization
Xi^{-} : Minimum criteria value (worst weight)
Xi^{+} : Maximum criteria value (best weight)
X : Alternative weights

RESULTS AND DISCUSSION

In solving with the MAUT method , we need to determine the criteria needed to determine who will be selected as an alternative that has appropriate and good criteria. in providing incentives. The criteria are as follows:

Table 1. Criteria and Weight Data

Code	Criteria	Weight
C1	Productivity	40
C2	Quality of Work	20
C3	Presence	10
C4	Innovation	5
C5	Total Turnover	25

Table 2. Productivity Sub-Criteria Weights

Sub Criteria	Mark
Productivity	10
No Productivity	5

Table 3. Weight of Sub-Criteria for Work Quality

Sub Criteria	Mark
Very good	10
Good	9
Pretty good	8
Not good	7

Table 4. Weight of Sub-Criteria of Attendance

Sub Criteria	Mark
Very good	100
Good	97-99
Enough	94-96
Low	90-93

Table 5. Weighting of Sub-Criteria for Ability to Work in a Team

Sub Criteria	Mark
Very good	10
Good	9
Pretty good	8

Table 6. Weight of Sub Criteria Number of Outlets

Sub Criteria	Mark
Very high	>106
Tall	92-105
Currently	78-91
Low	66-77
Very Low	50-65

Meanwhile, there are 10 (ten) alternatives, namely: Nadia, Dea, Novi, Jefry, Kiki, Ahmad, Doni, Dedi, Yudi, Andre.

The manual calculation process of the multi-attribute utility theory method in providing incentives is to determine the alternatives first. The alternatives for assessing the provision of incentives that have been normalized are as follows:

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Table 8 Alternative Value Normalization Data

Name	C01	C02	C03	C04	C05
Nadia	10	164	92	10	97
Dea	10	141	100	10	65
New	10	132	96	10	67
Jeffrey	10	185	100	10	67
Kiki	10	203	100	8	116
Ahmad	10	172	96	10	56
Donny	5	212	100	9	77
Deddy	5	147	100	10	77
Yudi	5	102	100	9	77
Andrew	10	184	100	10	91
Max	**10**	**212**	**100**	**10**	**116**
Min	**5**	**102**	**92**	**8**	**56**

The second stage is to carry out normal weight correction using the following formula calculation:

$$Wj = \frac{Wj}{\sum Wj}$$

Description:
Wj : Weight of each criteria
∑Wj : The total weight of all criteria

With the calculation of the formula above, the weight of improvement for criterion (C1) is as follows:

Table 9 Improvement Weight

Code	Criteria	Repair
C1	Productivity	0.4
C2	Quality of Work	0.2
C3	Presence	0.1
C4	Innovation	0.05
C5	Total Turnover	0.25

The next stage is the calculation of the Utility Value (U), by dividing the criteria value minus the minimum value by the maximum value minus the minimum, following are the values and their normalization results.

Table 10 Results of MAUT Matrix Normalization

Code	C01	C02	C03	C04	C05
A01	1	0.56	0	1	0.68
A02	1	0.35	1	1	0.15
A03	1	0.27	0.5	1	0.18
A04	1	0.75	1	1	0.18
A05	1	0.92	1	0	1
A06	1	0.64	0.5	1	0
A07	0	1	1	0.5	0.35
A08	0	0.41	1	1	0.35
A09	0	0	1	0.5	0.35
A10	1	0.75	1	1	0.58

The next stage is to multiply the normalization matrix by the preference weights from the multiplication of the normalization matrix with the preference weights, the resulting values are obtained as in the following table:

Table 11 Result Values

Code	C01	C02	C03	C04	C05
weight	0.4	0.2	0.1	0.05	0.25
A01	0.4	0.1	0	0.05	0.17
A02	0.4	0.1	0.1	0.05	0.04
A03	0.4	0.1	0.05	0.05	0.05
A04	0.4	0.2	0.1	0.05	0.05
A05	0.4	0.2	0.1	0	0.25
A06	0.4	0.1	0.05	0.05	0
A07	0	0.2	0.1	0.03	0.09
A08	0	0.08	0.1	0.05	0.09
A09	0	0	0.1	0.03	0.09
A10	0.4	0.15	0.1	0.05	0.15

Next is the ranking stage. This ranking is obtained from the Total multiplication of the normalization matrix with the preference weight. Furthermore, the ranking results are as follows:

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Table 12 Ranking

Rank	Code	Name	Total
1	A05	Kiki	0.93
2	A10	Andrew	0.84
3	A04	Jeffrey	0.75
4	A01	Nadia	0.73
5	A02	Dea	0.66
6	A06	Ahmad	0.63
7	A03	New	0.60
8	A07	Donny	0.41
9	A08	Deddy	0.32
10	A09	Yudi	0.21

Table 13. Comparison Result Table

aspect	before optimization	after optimization
method determination incentive	subjective, based on evaluation individual	quantitative, based MAUT method
criteria evaluation	limited, only a number of aspects to consider	more area, considering 5 criteria main
transparency	not enough transparent	more transparent, all employee know factors assessed
motivation employee	varies, some employee feel no fair	more high, system fair and based on performance

CONCLUSION

The results of the research show that the implementation of this multi-criteria approach provides several main benefits, namely by considering various criteria in providing incentives, employees are more motivated to improve their overall performance, rather than just focusing on one particular aspect. Then the multi-criteria approach helps create a fairer and more transparent incentive system.

BIBLIOGRAPHY

[1] R. A. Aras, "solver-oriented decision support system (DSS)," J. Tech. Mechanical, Electrical and Comput. Sci. , vol. 2, no. 1, pp. 58–63, 2022.

[2] IGI Sudipa et al. , application of decision support system (dss) in various fields (industrial revolution 4.0 towards society 5.0 Era). PT. Sonpedia Publishing Indonesia, 2023.

[3] M. Gumanti, M. Muslihudin, and S. Mukodimah, Information Systems Project Management . Adab Publisher, 2024.

[4] S. Selvia and O. Karneli, "the effect of compensation on employee loyalty through job satisfaction," J. Stud. Manaj. and Business , vol. 10, no. 2, pp. 103–113, 2023.

[5] H. Risnawati and S. Retnoningsih, "The Effect Of Incentives, Job Training And Internal Control On Employee Performance Effectiveness," Permana J. Taxation, Management, vol. 12, no. 2,

[6] SE Syihabudhin, SH Dita Rachmawati, NA Wibowo, SE Lilik Ismawati, and HS Hasani, *Performance Management* . Media Nusa Creative

[7] MR Rahmawati, "Performance Analysis Of Kemalo Abung Health Center Using The Balanced Scorecard Method." Faculty of Economics, Pakuan University, 2022.

[8] M. FAQIH, Building a Strong Team: Modern Human Resource Management Strategy . PT Indonesia Delapan Kreasi Nusa, 2024.

[9] S. Kayati, H. Yenni, and H. Asnal, "Application Of Multi Attribute Utility Theory (Maut) Method In Determining Superior Class At SMKN 1 Mandau," *Technol. J. Ilm. Sist. Inf.* , vol. 12, no. 2,

[10] RS Hayati, SL Rahayu, and A. Sanjaya, "Selection Of Formula Milk Using The Multi Attribute Utility Theory Method," *Infosys (Information Syst. J., Vol. 6, No. 1, P. 42, 2021,*