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# Implementation WASPAS For Recommendations On Salary Increases For Employees case study TOKO NASIONAL UTAMA

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**Abstract.** This implementation aims to decide which employees to get salary increases. waspas is one of multi criteria decision making method that using multiple criteria to find the highest value from all data criteria. This implementation number of criteria, criteria weight and level of importance can be changed as needed, in this case data of employees is using from toko nasional utama and criteria, value of criteria, and level of importance was given from toko nasional utama owner. Based the testing result is choose 3 employees with highest value using 5 data of employees and 10 criteria from the owner, the result Nico is 0.8116, Eko is 0.6902, Djajantono is 0.6347. The gap between Nico and Eko or Eko and Djajantono because assessment from owner to employees is different based on their performance and that effected on the result. Based on the result that obtained it can be concluded that waspas can be used for make a recommendations with multiple criteria.

## 1. Introduction

In this era of globalization to face increasingly fierce competition in the free era, a store and company are required to have strong management in order to survive and thrive in running its business

Toko Nasional Utama is a store that located in South Tangerang and established in 1997, Toko Nasional Utama is sells electrical appliances and household equipment that have 3 store around South Tangerang, people around Tangerang can come, contact, and request to send the equipment they needed and the employees will serve. an employee is one that is needed in running a store or even a company, good employees performance can make a store and company survive and compete with each other. one of aspect that make employee performance thrive is how management to manage employee salary Increases.[1] some companies and store still determine to raise employee salaries manually with data and aspects that only that provide employee performance evaluation is not maximal. Toko Nasional Utama Mangement have a problem in evaluating the performance of employees when they want to raise their employees salary

Shomat, abd muslim used promethee method to decide for employees salary increases in Janwas company [2]. The decide employees whos get salary increases is using criteria that given from management whos assess the employees performance.

In this implementation we build system that is used by management to get whos employees that get recommended salary increases by using the criteria and weights given by



management. The result of this application is will show employees value of their criteria and performance that can be used by management to decide salary increases.

## 2. Methodology

### 2.1 Salary

Based on big dictionary of bahasa Indonesia salary is a wages for work paid in a fixed time or payback received by workers in the form of money based on a certain time. [3] The conclude is salaries are payments for services performed by employees in lieu of his his work in the company to fulfil his life needs

### 2.2 Multiple criteria decision making

Multiple Criteria Decision Making (MCDM) Is a method of decision making to determine the best alternative from a number of alternatives based on certain criteria. Criteria can be in the form of measurements and rules used in decision making, based on the purpose of MCDM, which is to provide the best results from several alternatives with more than 1 criteria. MCDM problems do not always provide specific solutions, different types can provide different solutions. Ideal solutions, criteria or attributes can be divided into two categories namely criteria whose value will be maximized (Benefit) and criteria whose value will be minimized (Cost), the ideal solution will maximize all profit criteria (Benefit) and minimize (Cost) all cost criteria. [4] [5]

### 2.3 Weighted aggregated sum product assessment (WASPAS)

Weighted Sum Model (WSM) is a basic concept of the Simple Additive Weighting Method (SAW) method which seeks to weighted the sum of the performance ratings for each alternative on all WSM attributes requiring a decision matrix normalization process to a scale that can be compared with all existing alternative ratings. Weighted Product Model (WPM) is a method developed to overcome the weaknesses of the Weighting Sum Model (WSM). The main difference between WPM and WSM is that WPM uses the multiplication method while WSM uses the sum method, WPM is a method that uses multiplication to connect the attribute ratings where competing each attribute must be raised first with the weight of the attribute in question. Weighted Aggregated Sum Product Assessment (WASPAS) is a decision support model that can reduce errors or optimize the assessment for the selection of the highest and lowest values. This method is a unique combination of the MCDM approach namely the weighted sum model (WSM) and the weighted product model (WPM), WASPAS is often used to help make decisions by weighting so that it can produce several alternatives to the results chosen. The steps in the calculation process apply the WASPAS method: [6]

- 1) Determine matrix normalization

$$X = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1n} \\ r_{21} & r_{22} & \dots & r_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ r_{m1} & r_{m2} & \dots & r_{mn} \end{bmatrix} \quad (1)$$

If the maximum and minimum values have been determined then the equation  
For benefit criteria

$$r_{ij} = \frac{r_{ij}}{\max_i r_{ij}} ; i = 1, \dots, m ; j = 1, \dots, n \quad (2)$$

For cost criteria

$$r_{ij} = \frac{\min_i r_{ij}}{r_{ij}} ; i = 1, \dots, m ; j = 1, \dots, n \quad (3)$$

- 2) Calculate the normalization value of matrices and WASPAS weights in decision making

$$Q_i = \frac{1}{2} \cdot (\sum_{j=1}^n r_{ij}^* \cdot w_j + \prod_{j=1}^n (r_{ij}^*)^{w_j}) ; i = 1, \dots, m \quad (4)$$

where  $Q_i$  is feature Q to i,  $r_{ij}w$  is Multiplication value  $r_{ij}$  with w value,  $\frac{1}{2}$  is determination,  $W_j$  is Attribute weights, i is alternative, j is criteria

### 3. Result

This Implementation WASPAS For Recommendations On Salary Increases For Employees case study Toko Nasional Utama using PHP and HTML programming languages. The goal of this implementation is give management name of employees that get highest value from determined criteria. The program have

At figure 1, we can see dashboard interface of recommendations, at dashboard we can see who employees that get salary increases

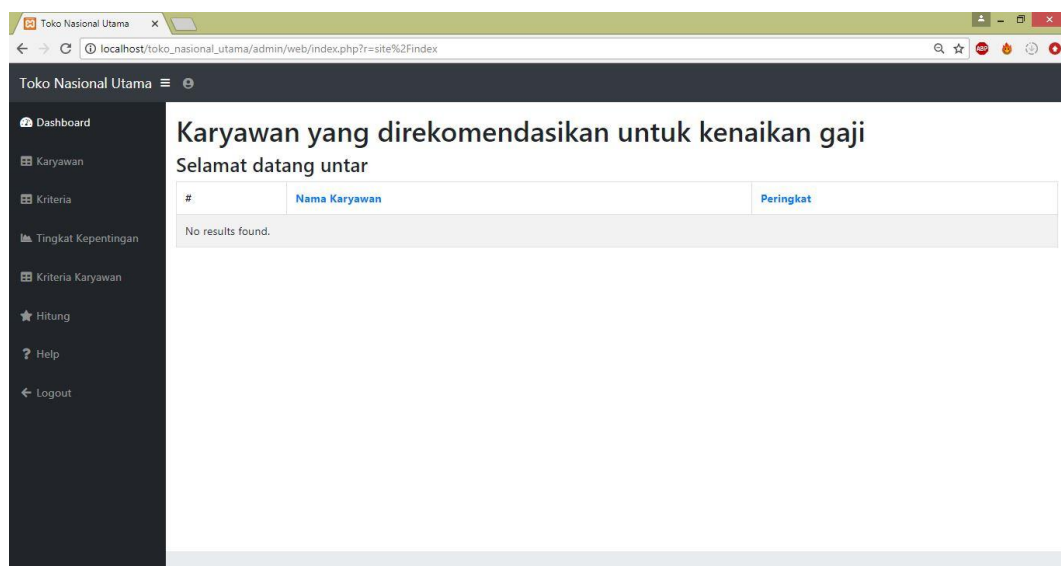


Figure 1. Dashboard interface

At figure 2, we can add, edit, delete, and add criteria, weight and type of criteria that we needed for the recommendations. for the sum of all weight of criteria must be 100 and not less than that. And at table 1 list of criteria that we use for this implementation

**Kriteria**  
Tambah Kriteria

Showing 1-10 of 10 items.



















#	Nama Kriteria	Bobot	Jenis	
1	Jarak rumah dengan toko(KM)	7.5	Cost	 
2	Tingkat pendidikan	10	Benefit	 
3	Usia	7.5	Cost	 
4	Jumlah Kehadiran	10	Benefit	 
5	kinerja	15	Benefit	 
6	masa kerja	10	Benefit	 
7	Keahlian kerja	12.5	Benefit	 
8	status	12.5	Benefit	 
9	Gaji	7.5	Cost	 

Figure 2. Criteria interface

Table 1. table of criteria

Criteria name	Weight	Type of criteria
Distance between home to store in KM	7.5%	Cost
Level of education	10%	Benefit
Age	7.5%	Cost
Number of attendance	10%	Benefit
Perfomance	15%	Benefit
Years of services	10%	Benefit
Skill	12.5%	Benefit
Status	12.5%	Benefit
Salary Currently	7.5%	Cost
Dependents	7.5%	Cost

At figure 3, level importance we can add, delete and add name of importance, level and information level importance. Level importance is to help give information from criteria

**Tingkat Kepentingan**  
Tambah Tingkat Kepentingan

Showing 1-12 of 12 items.





















#	Nama Kepentingan	Tingkat Kepentingan	Keterangan	
1	Tingkat pendidikan	1	Tidak Sekolah	 
2	Tingkat pendidikan	2	SD	 
3	Tingkat pendidikan	3	SMP	 
4	Tingkat pendidikan	4	SMA	 
5	Tingkat pendidikan	5	D3/S1	 
6	kinerja	1	Buruk:	 
7	kinerja	3	Cukup	 
8	kinerja	5	Baik	 
9	Keahlian kerja	1	Staff	 
10	Keahlian kerja	2	Kasir	 

Figure 3. level importance

Table 2. list of level importance

Level of importance name	Value
Education	1= Have no Education 2= Primary School 3= Junior High School 4= Senior High School 5= Bachelor/Magister
Peformance	1= Bad 2= Enogh 5= Good
Skill	1= Staff 2= Cashier
Status	1=Married 2=Single

In figure 4. Criteria of employees we can add, delete and add employee name, name of criteria and they value

### Kriteria Karyawan

Tambah Kriteria Karyawan

Showing 1-20 of 59 items.

#	Nama Karyawan	Nama Kriteria	Nilai	
	<input type="text"/>	<input type="text"/>	<input type="text"/>	
1	Daniel	Tingkat pendidikan	4	 
2	Daniel	Usia	42	 
3	Daniel	Jumlah Kehadiran	82	 
4	Daniel	kinerja	3	 
5	Daniel	masa kerja	5	 
6	Daniel	Keahlian kerja	2	 
7	Daniel	status	1	 
8	Daniel	Gaji	80	 
9	Djajantono	Jarak rumah dengan toko(KM)	2	 

Figure 4. Criteria of employees

At figure 5, we can see all data of employees, criteria, decision matrix, and preference value of the employees including they rank from highest to lowest.

Data		Kriteria								
No	Jarak rumah dengan toko(KM)	Tingkat pendidikan	Usia	Jumlah Kehadiran	kinerja	masa kerja	Keahlian kerja	status	Gaji	Tanggungan
Daniel	5	4	42	82	3	5	2	1	80	3
Eko	3.5	3	22	88	3	2	1	2	50	1
Nico	6.8	5	25	90	5	4	2	2	100	1
Djajantono	2	4	34	88	3	7	1	1	80	4
Rohman	7.8	3	47	90	3	10	1	1	80	3
<b>Matriks Keputusan</b>										
0.4	0.8	0.52381	0.91111	0.6	0.5	1	0.5	0.625	0.33333	
0.57143	0.6	1	0.97778	0.6	0.2	0.5	1	1	1	
0.29412	1	0.88	1	1	0.4	1	1	0.5	1	
1	0.8	0.64706	0.97778	0.6	0.7	0.5	0.5	0.625	0.25	
0.25641	0.6	0.46809	1	0.6	1	0.5	0.5	0.625	0.33333	
<b>Nilai Preferensi</b>										
0.81164			Nico						1	
0.69025			Eko						2	
0.63474			Djajantono						3	

Figure 5. Calculation interface

**Table 1.** ranking result

Alternative	Result	Ranking
A <sub>3</sub> or Nico	0.8115	1
A <sub>2</sub> or Eko	0.6901	2
A <sub>4</sub> or Djajantono	0.6344	3
A <sub>1</sub> or Daniel	0.6231	4
A <sub>5</sub> or Rohman	0.581	5

The ranking result is employees A<sub>3</sub> or Nico get the highest result with 0.8115 as an employees to get salary increases

#### 4. Conclusion

In this implementation with Waspa method has been built to obtain recommendations for salary increases. This application can used to get value of employees from criteria and weight that given and sort from highest to the lowest value

This application has been used by management of Toko Nasional Utama to see which employees to get highest value for get a salary increses, and the result of it is Nico with 0.8115 and get ranking number 1 and that is highest from all employees.

For the further implementation we will try to make another recommendations application such as travel destinations, scholarship and etc with waspas method and combined with another method from MCDM for get best result value.

## References

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