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APPLICATION OF THE WP METHOD AS A DETERMINATION OF THE NEW MEKAR VILLAGE ASSISTANCE

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Abstract

Background : Mekar Baru Village is a village located on Petatal Plantation Street, Datuk Tanah Datar District, Batu Bara Regency, North Sumatra 21254 which has a fairly large population, of which this village has 7 hamlets in one village. The problems that exist in Mekar Baru Village are in determining the acceptance of village assistance which is difficult to determine, because the number of aid proposals that propose more proposals that come in, this is very troublesome for village officials who choose to receive assistance. As the problem develops, a decision support system is needed. **Method :** A decision support system is a system to find support for decisions taken using a system designed based on user needs in helping to make decisions. **Conclusion :** designed based on predetermined criteria and alternatives and has a structured and programmed system in the form of weighting that will be accumulated and normalized and produce a ranking. **Result :** The results of the assessment of the system trial, obtained five alternatives as people who deserve assistance, namely alternative A3 ranks 1, with a value of 0.1345, alternative A6 ranks 2 with a value of 0.1203, alternative A10 ranks 3, with a value 0.1203, alternative A4 ranks 4th, with a value of 0.1156, alternative A2 ranks 5th, with a value of 0.1028.

Keywords: Decision Support System, Village Assistance, Weight Product

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INTRODUCTION

In the progress of a technology, especially computers now produce many changes in aspects of human life [1][7][8]. Mekar Baru Village is a village located on Petatal Plantation Street, Datuk Tanah Datar District, Batu Bara Regency, North Sumatra 21254 which has a fairly large population, which This village has 7 hamlets in one village. The problems that exist in Mekar Baru Village are in determining the acceptance of village assistance which is difficult to determine, because the number of aid proposals that propose more proposals that come in, this is very inconvenient for village officials who choose to receive assistance. The Weighted Product (WP) method is one of the methods used to complete the decision-making system by considering the criteria and weights. This study uses the Weighted Product (WP) method, because in making decisions for selecting the worst employee there are no sub-criteria[7]. To receive KIP, families who receive KIP assistance come from underprivileged/poor families, and children who meet pre-selected criteria [2]. Direct Cash Assistance (BLT) is assistance provided by the government to underprivileged families who are poor, so that they can improve their level of social welfare in order to reduce the economic burden that is increasingly pressing their lives, as a result of rising prices for daily staples and also fuel prices. which can disrupt the economy [3]. The system is a form of network of procedures that are interconnected, from gathering together to carry out an activity or to complete a certain goal [4]. The purpose of a decision support system (DSS) is, among others, to support determining decisions in the process of making a decision using the

results obtained from data processing, which has information and model design[5][10]. The Weight Product method is one of the multi-criteria decision-making analysis by determining the criteria factors as benefits (conflicts between criteria) by looking for the results of the multiplication of the alternative criteria values against the criteria weights[6].

RESEARCH METHODS

The research framework is the steps that will be taken in solving the problem, so that the final target in the Mekar Baru Village Fund Assistance can be implemented.

Data Collection

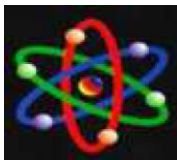
The author conducted a direct interview with the head of the village of Bloom Baru. So that the authors get information along with data that will become the receipt of village assistance at the sub-district level of Datuk Tanah Flat.

Identification is a problem process which is also the most important research process in research among other processes. At this stage, the author determines the research object to be studied and sets the problem to be analyzed in the research object.

The formulation of the problem is the most important part of the core of the research that must be carefully thought out. At this stage, the author determines what the formulation of the problem in this research is.

At this stage, the authors study and understand the theories relevant to the problem to be studied. These theories are





obtained from various sources such as books, journals, internet, and other references.

RESULTS AND DISCUSSION

The method used in determining the Decision of Direct Cash Assistance (BLT) in Mekar Baru Village is the Weighted Product (WP) method. The weighting of the Weighted Product method is calculated based on the level of importance. The importance of the Weighted Product method, namely:

2= Less Important

3= Quite Important

4= Important

5= Very Important

Here is the system analysis and calculation of WP:

1. Determine the Types of Determination of Direct Cash Assistance (BLT) in Mekar Baru.

Code	Name Criteria	Weight	Score
C1	Age	Important	4
C2	Residence	Very important	5
C3	Income	Important	4
C4	The number of dependents	Important	4
C5	Number of Children Still in School	Very important	5

Table 1. Display Criteria Data

Then assign a weighting value to each criterion. Can be seen in the following table:

Criteria	Weight	Score
Age	>70 Years	5
	50-69 Years	4
	40-49 Years	3
	30-39 Years	2
	<29 Years	1

Table 2. Display Weighting of Age Criteria

Criteria	Weight	Score
Residence	Thatch roof house	5
	Bamboo house walls/unplastered	4
	Tin roof/tile house	3
	The house has a cement floor and a floor area of 8m	2
	The stone house has not been plastered	1
	The house has tile floors and the house is big	0

Table 3. Display Weighting of Residence Criteria

Criteria	Weight	Score
Income	Under 200K/Month	5
	200K - 400K/Month	4
	400K - 700K/Month	3
	700 Thousand - 1 Million/Month	2
	Above 1 Million/Month	1

Table 4. Display Weighting Criteria Have Income

Criteria	Weight	Score
The Number of Dependents	> 4 People	5
	4 people	4
	3 people	3
	2 persons	2
	1 person	1

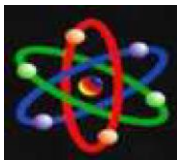
Table 5. Display Weighting Criteria Number of Dependents

Criteria	Weight	Score
Number of Children Still in School	> 4 People	5
	4 people	4
	3 people	3
	2 persons	2
	1 person	1

Table 6. Display Number of Children Still in School

In this case, ten alternative data will be used, namely the data of the community who applied for Direct Cash Assistance (BLT) in Mekar Baru Village in 2021. It can be seen in the following:





Code	Name Alternatif
A1	Ahmad Fauzi
A2	Abdul Manan Sinaga
A3	Darwan
A4	Kijan
A5	Zulkifli
A6	Misdar
A7	Miyem
A8	Imeh
A9	Saker
A10	Samuri
A11	Jubaidah
A12	Warsih
A13	Turiman
A14	Usman
A15	Mulyadi
A16	Mursidi
A17	Hadimin Kasdi
A18	Katinem
A19	Hendri Pradana
A20	Rasiyah Br Sitorus

Table 7. Display Data Alternatif

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A7	Miyem
A8	Imeh
A9	Saker
A10	Samuri
A11	Jubaidah
A12	Warsih
A13	Turiman
A14	Usman
A15	Mulyadi
A16	Mursidi
A17	Hadimin Kasdi
A18	Katinem

A19	Hendri Pradana
A20	Rasiyah Br Sitorus

Table 8. Display Data Alternatif

Furthermore, the weight correction will be carried out first. The initial weight $W = (4,5,4,4,5)$ will be corrected so that the total weight is $W_j = 1$, where W is the weight of each of the criteria entered. The calculation of improvement criteria using equation 4.1:

Formula Description:

W_j = weight of each criterion

$W_j = \text{sigma } j \text{ From } 1 \text{ to } n \text{ times sub criteria}$
 $W_Initj = \text{total weight sharing of alternatives}$

$$W_j = \frac{W_Initj}{\sum_{j=1}^n [W_Initj]} \quad (4.1)$$

$$W_1(C1) = \frac{4}{4 + 5 + 4 + 4 + 5}$$

$$W_1(C1) = 0,1888$$

Preference value	Weight	Preference Weight value
W1(C1) 0.1818		W1(C1) 0.1818
W2(C2) 0.2273		W2(C2) 0.2273
W3(C3) 0.1818		W3(C3) 0.1818
W4(C4) 0.1818		W4(C4) 0.1818
W5(C5) 0.2273		W5(C5) 0.2273
Wj 1		Wj 1

Table 9. Display the results of the weight of the criteria

Then the next step is to calculate the vector S , S is the value of each alternative. This calculation is done by multiplying all attributes (criteria) for an alternative with W (weight) as a positive rank or attribute of benefit (Benefit) and a weight with a negative rank or attribute of cost (Cost). In the case of Determination of Direct Cash Assistance (BLT) in Mekar Baru Village,





the method for calculating the S vector is

$$S_i = \prod_{j=1}^n X_{ij}^{W_j}$$

as follows:

Formula Description:

S = Is the result of normalizing the value of each alternative.

A = Weight of criteria data

S_i = Is the result of normalization of decisions on the i-th alternative,

X_{ij} = Is the alternative rating per attribute,

i = Is alternative

j = Is an attribute

S₁(A1) = 3^(0,1818) x 3^(-0,2273) x 2^(-0,1818) x 4^(0,1818) x 2^(0,2273)

S₁(A1) = 1.2211 x 1.2836 x 0.8816 x 1.2867 x 1.1706

S₁(A1) = 2.0813 (Vector S Value For Alternative A1)

Vektor S	Si
S ₁ (A ₁)	2.0813
S ₂ (A ₂)	2.1659
S ₃ (A ₃)	2.3570
S ₄ (A ₄)	2.4364
S ₅ (A ₅)	2.1087
S ₆ (A ₆)	1.9334
S ₇ (A ₇)	2.0607
S ₈ (A ₈)	1.5674
S ₉ (A ₉)	1.2335
S ₁₀ (A ₁₀)	1.9752
S ₁₁ (A ₁₁)	2.1931
S ₁₂ (A ₁₂)	2.1659
S ₁₃ (A ₁₃)	2.2369
S ₁₄ (A ₁₄)	2.4364
S ₁₅ (A ₁₅)	2.2219
S ₁₆ (A ₁₆)	1.8349
S ₁₇ (A ₁₇)	2.0607
S ₁₈ (A ₁₈)	1.5674
S ₁₉ (A ₁₉)	1.3992
S ₂₀ (A ₂₀)	1.9334
Sum S_i	39.9692

Table 10. Display Looking for S_i . Value Results

After getting the vector value S, then determine the ranking of alternative alternatives by dividing the value V (vector value used for ranking) for each alternative by the total value of all alternative values (vector S). Here is the ranking calculation:

Formula Description:

V_i = Total value of alternative vector

S_i = Calculation of each alternative weight value

n/j = sigma j From 1 to n times sub criteria

$$V_i = \frac{S_i}{\sum_{j=1}^n S_i}$$

$$V1(A1) = \frac{2,0813}{39,9692}$$

V1(A1) = 0,0521 (Value For Alternative Ranking A1).

After calculating the value of the vector V, the largest value is obtained which is the best alternative.

Code	Alternative	Result	Rangking
A3	Darwan	0.0716	1
A13	Turiman	0.0679	2
A4	Kijan	0.0575	3
A14	Usman	0.0575	4
A7	Miyem	0.0564	5
A17	Hadimin Kasdi	0.0564	6
A15	Mulyadi	0.0525	7
A11	Jubaidah	0.0518	8
A2	Abdul Manan Sinaga	0.0511	9
A12	Warsih	0.0511	10
A5	Zulkifli	0.0498	11
A1	Ahmad Fauzi	0.0491	12
A10	Samuri	0.0466	13
A6	Misdar	0.0456	14
A20	Rasiyah Br Sitorus	0.0456	15
A16	Mursidi	0.0433	16
A19	Hendri Pradana	0.0383	17
A8	Imeh	0.0370	18
A18	Katinem	0.0370	19
A9	Saker	0.0337	20

Table 11. Alternative Ranking Results





CONCLUSION

Based on the results of the implementation and testing that has been done while making the Decision Support System for Determining Direct Cash Assistance (BLT) in Mekar Baru Village, the following conclusions can be drawn:

1. The existence of a system by applying the Weight Product (WP) method can help Mekar Baru Village in selecting people who are eligible to receive assistance.
2. The decision-making system for determining Cash Direct Assistance (BLT) is built using the PHP programming language and uses a website-based MySQL database.
3. The results of the assessment of the system trial, obtained five alternatives as people who deserve assistance, namely alternative A3 ranks 1, with a value of 0.1345, alternative A6 ranks 2 with a value of 0.1203, alternative A10 ranks 3, with a value 0.1203, alternative A4 ranks 4th, with a value of 0.1156, alternative A2 ranks 5th, with a value of 0.1028..

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