JMSCOWA 2 (1) (2021) Pages:. 13-20

Journal homepage: https://pcijournal.org/index.php/jmscowa

Journal of Mathematics and Scientific Computing with Applications

Published: Pena Cendekia Insani

CRITERIA FOR RECEIVING DIRECT CASH TRANSFERS USING THE TOPSIS METHOD

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Article Info

Article history:

Received October 1, 2020
Revised November 2, 2020
Accepted December 2, 2020

Keywords:

Pandemic, Recipients Of Direct Cash Assistence, Topsis.

ABSTRACT

In carrying out the direct cash transfer program during the Covid-19 pandemic, this is one of the efforts of the government to overcome poverty in Indonesia. In this case, it is very important that the assistance provided is right on target, so that it can be used by people in need. The method used in this research is the topsis method, by using the topsis method it is expected that the results given will find an alternative solution that is more precise and accurate because the calculation is based on predetermined criteria and weight values. Therefore, the researcher took the Topsis model for this study in order to provide maximum and accurate results.

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1. INTRODUCTION

In dealing with current problems related to the Covid-19 pandemic, the government is making efforts to help the needs of the community, namely by providing direct cash assistance (BLT) programs. With the direct cash transfer program, it is hoped that it can make the community more prosperous and peaceful.

In carrying out this government program, namely direct cash assistance (BLT), it should be carried out transparently so that the assistance provided is right on target. The process carried out in Serdang Bedagai Regency was carried out by investigating the predetermined criteria for poor families. The selection of criteria for poor families was submitted to the head of the RT of Serdang Bedagai Regency and then selected again in the sub-district.

The principle of the TOPSIS method is to use an alternative that is to be chosen closer to the positive ideal solution and has a far distance from the negative ideal solution from a geometric perspective to determine the approach of an alternative with the optimal solution. The application of the TOPSIS method has also been carried out by several researchers.

The criteria to be used in grouping are the results of monthly income, total monthly expenses, and residence status. As for the criteria that will be used in the ranking, namely, the pattern of life, the number of family dependents, and the number of family members who are of productive age.

2. RESEARCH METHODE

2.1 TOPSIS (Technique For Order Preference by Similarity to Ideal Solution)

(TOPSIS) Technique for Order Preference by Similarity to Ideal Solution is one of the first methods introduced by Yon and Hwang for multicriteria decision making in 1981. This method has the basic idea that the alternative to be chosen has the farthest distance with a negative ideal solution. and the closest to the positive ideal solution. To solve decision problems practically this concept is also used in several MADM (Multiple Attributes Decision Making) models. Due to this, it has an easy and simple concept.

2.2 Steps in Completing The Topsis Method

The steps taken in completing the topsis method are:

1. Determine the normalized decision matrix

To be able to get a normalized matrix R, each element of the C matrix is normalized. The calculation can be done as follows to obtain the normalization of the rij value respectively.

2. Determine the weighted normalized decision matrix

$$r_{ij} = \frac{Xij}{\sqrt{\sum_{i=1}^{m} Xi^2 j}}$$

Given the weight W = (w1, w2, w3, w4, ..., wn), so the weight normalization matrix V is:

$$V = \begin{bmatrix} w1r11 & w2r12 & wnr1n \\ w1r21 & & \\ w1m1 & w2rm2 & wnrmn \end{bmatrix}$$

3. Determine the ideal solution positive and the ideal solution negative

Positive ideal solutions are denoted by A + while negative ideal solutions are denoted by A-:

$$A^+ = (y1^+, y2^+, \dots\ yn^+)$$

$$A^- = (y1^-, y2^-, \dots\ yn^-)$$

Where

Yj + = - max yij, if j is the profit attribute

- min yij, if j is a cost attribute

Yj = - min yij, if j is the profit attribute

- max yij, if j is the cost attribute

Expands A + and A- to represent the most preferable alternative to the ideal, least preferable solution respectively.

4. Calculate the separation measure

$$S_i = \sqrt{\sum_{j=1}^{n} (yi^+ - yij)^2}\ ;\ i = 1,2,...m.....$$

$$S_i = \sqrt{\sum_{j=1}^{n} (yij - yi^-)^2}\ ;\ i = 1,2,....m.....$$

5. Calculate the relative proximity by the ideal solution

$$C_i = \frac{Si^-}{Si^+ + Si^-},\ 0 < Ci\ < 1\ dan\ i = 1,2,3, \dots, m$$

6. Compose options

The alternative that has the shortest distance to the negative ideal solution will be arranged based on Ci so that it gets the best.

Poor Population Criteria Approach:

1. Monthly income
2. Total monthly expenses
3. Residence status
4. Number of family dependents

5. Patterns of life
6. Number of family members of productive age

3. RESULT AND DISCUSSION

Steps

1. The welfare value for residence can be seen in the table

Residence	Welfare value
Rent	5
Hitchhike	3
My own house	1

2. Assess the level of importance of family life patterns

Assess the level of importance	Information
5	Very bad
4	Bad
3	Enough
2	Good
1	Very good

3. Weight criteria

Income	Home	The number of dependents	Lifestyle	Number of family members of productive age
5	5	2	4	5

4. The range to be used for the eligibility level of BLT recipient candidates for the monthly income of parents and children of productive age:

< 1.000.000	Very worthy	5
1.000.000-1.200.000	Well worth it	4
1.200.000-1.500.000	Pretty decent	3
1.500.000-2.000.000	Not worth it	2
> 2.000.000	Not feasible	1

Topsis Analysis Result

No.	Alternative	Criterion 1: Income	Criterion 2: Residence	Criterion 3: Number of family dependents	Criterion 4: Lifestyle	Criterion 5: Number of family members of productive age
1.	Rohani BR Nasution	5	3	-	4	1

2.	Nurjannah	4	3	1	4	1
3.	Surianto	2	1	3	3	3
4.	Waliadi	1	3	2	2	2
5.	Warisno	1	1	3	2	1

a. Each weight value is squared

Alternative	**C 1**	**C2**	**C3**	**C4**	**C5**
Rohani BR Nasution	25	9	0	16	1
Nurjannah	16	9	1	16	1
Surianto	4	1	9	9	9
Waliadi	1	9	4	4	4
Warisno	1	1	9	4	1

b. The resulting squares are then added up:

	C1	**C2**	**C3**	**C4**	**C5**
Sum squared	47	29	23	49	16
Square root	6,856	5,385	4,796	7	4

c. Normalization of the decision matrix

0,729	0,557	0	0,571	0,25
0,583	0,557	0,2085	0,571	0,25
0,292	0,186	0,6255	0,4285	0,75
0,146	0,557	0,417	0,286	0,5
0,146	0,186	0,6255	0,286	0,25

d. Weighted normalized decision matrix

Alternative	**C1**	**C2**	**C3**	**C4**	**C5**
Rohani BR Nasution	3,645	2,785	0	2,284	1,25
Nurjannah	2,915	2,785	0,417	2,284	1,25
Surianto	1,46	0,93	1,251	1,714	3,75

Waliadi	0,73	2,785	0,834	1,144	2,5
Warisno	0,73	0,93	1,251	1,144	1,25

e. The ideal solution is positive and the ideal solution is negative

	C1	C2	C3	C4	C5
A+	0,73	2,785	1,251	2,284	3,75
A-	3,645	0,93	0	1,144	1,25

f. Calculate the separation

Alternative distance	Positive ideal solution matrix
S1+	4,039
S2+	3,423
S3+	2,073
S4+	1,742
S5+	3,315

Calculating the distance between the value of each alternative with the negative ideal solution matrix:

Alternative distance	Positive ideal solution matrix
S1-	2,177
S2-	2,334
S3-	3,594
S4-	3,768
S5-	3,172

g. Calculating relative susceptibility to the ideal solution

C1	Rohani BR Nasution	2,716
C2	Nurjannah	3,016
C3	Surianto	5,328
C4	Waliadi	5,931
C5	Warisno	4,129

h. Sort options

The ranking is taken from the highest alternative results

No.	**Alternative**	**Result**
1.	Waliadi	5,931
2.	Surianto	5,328
3.	Warisno	4,129
4.	Nurjannah	3,016
5.	Rohani BR Nasution	2,716

i. Conclusion

Based on the ranking of values, the best alternative is Waliadi with a result of 5,931.

4. CONCLUSION

From the research that has been done, the following conclusions can be drawn:

The process of selecting the criteria for potential BLT recipients used the TOPSIS method by ranking alternatives that match the criteria. The TOPSIS results will be a reference for choosing the best alternative.

The TOPSIS method is used when the amount of data obtained is more than what is needed, so that ranking is needed in order to find the best alternative.

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