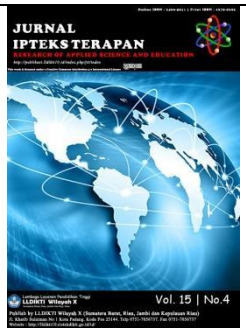

Vol.16 No.4 | Des, 2022

DSS: RECOMMENDATIONS FOR ZAKAT RECIPIENTS FOR MUSTAHIQ AT THE NATIONAL ZAKAT AMIL BODY WITH TOPSIS

Riski Arianto*[1)], Nuriadi Manurung[2)], Akmal[3)]
[123]Sekolah Tinggi Manajemen Informatika Dan Komputer Royal
Corresponden Email: riskyarianto2704@gmail.com

Submit:
17/08/2022

Accept:
25/12/2022

Publish:
31/12/2022

Abstract

Backgound: The National Amil Zakat Agency of Asahan Regency is a religious and social institution located on Jl. Turi, Mekar Baru, Kec. West Kisaran City, Asahan Regency. The problem that is often encountered in the National Amil Zakat Agency of Asahan Regency is the selection of mustahiq which still uses the manual method, so that it still causes problems such as the length of the selection process and the occurrence of miscalculations, resulting in less accurate mustahiq selection results. In addition, the unavailability of access to information to see mustahiq who have been included in the list of zakat recipients, resulting in mustahiq who have received zakat can receive assistance more than once a year. **Method:** The method used in the decision support system in the Recommendation for Zakat Recipients for Mustahiq is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). There are several criteria in the selection and determination of mustahiq at the National Amil Zakat Agency of Asahan Regency, namely by taking into account the status of residence, income, employment status, number of dependents, and family vehicles. **Result:** The alternative results obtained from the calculation, based on the calculation steps using the TOPSIS method, a decision can be made that A28 is entitled and can be recommended, namely those who have the highest value who receive recommendations for zakat recipients. **Conclusion:** The application of the Topsis Algorithm for the Decision Support System for Recipients of Surgical Assistance at the National Amil Zakat Agency of Asahan Regency which runs based on the description described in the previous discussion and the completed program designed and built in the form of a Decision Support System for Recipients of Surgical Assistance at the National Amil Zakat Agency of Asahan Regency can well executed.

Keywords: Recommendation of Zakat Recipients for Mustahiq, Topsis Method

doi: https://doi.org/10.22216/jit.v15i4.1489 575-582
1979-9292 / 2460-5611 ©2021 © 2022 Lembaga Layanan Pendidikan Tinggi Wilayah X

JIT is Sinta 3 Journal (https://sinta3.kemdikbud.go.id/journals/profile/2143) accredited by Ministry of Research & Technology, Republic Indonesia

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

INTRODUCTION

In addition to cleaning from wealth, zakat also eases the burden of mustahiq. Zakat is divided into 2, namely Zakat Fitrah and Zakat Mal, Zakat Fitrah is a zakat that is required for every Muslim man and woman carried out in the month of Ramadan until the Eid prayer. While Zakat Mal is zakat imposed on all types of property. In Indonesia, which is mostly Muslim, the issue of zakat is an important thing to maximize its management which will later be useful for overcoming the problem of poverty. [1].

The National Amil Zakat Agency of Asahan Regency is a religious and social institution located on Jl. Turi, Mekar Baru, Kec. West Kisaran City, Asahan Regency. The problem that is often encountered in the National Amil Zakat Agency of Asahan Regency is the selection of mustahiq which still uses the manual method, so that it still causes problems such as the length of the selection process and the occurrence of miscalculations, resulting in less accurate mustahiq selection results. In addition, the unavailability of access to information to see mustahiq who have been included in the list of zakat recipients, resulting in mustahiq who have received zakat can receive assistance more than once a year.

The method used in the decision support system in the Recommendation for Zakat Recipients for Mustahiq is the Technique For Order Preference by Similarity to Ideal Solution (TOPSIS). The method was chosen because the TOPSIS method is a form of decision support method based on the concept that the best alternative not only has the shortest distance from the positive ideal solution but also has the longest distance from the negative ideal solution which in this case is as expected.

There are several references taken by the author as consideration or material to assist researchers in the process of compiling this research which was previously carried out by other researchers who discussed almost the same problems, including: research conducted by Darmawan F, et al (2021) with the title "Application of the Topsis Method in Decision Support Systems for Cities that Implement Large-Scale Social Restrictions Caused by the Corona Outbreak" [2], then there is a study by Nalatissifa H (2020) with the title "Decision Support System Using Topsis Method to Determine Eligibility of Uninhabitable House Assistance (RTLH)" [3], then research conducted by Ardhiansyah M and Husain T (2020) with the title "Decision Support System for Selection of Superior Class Students Using the AHP Method and TOPSIS Decision Support System for Student Selection of Prime Class Using AHP and TOPSIS Methods" [4]. Research by Mahendra G, et al in 2020 with the title "The Ahp-Topsis Method in a Decision Support System for Determining the Placement of Automated Teller Machines" [5], and the last is a study conducted by Sari W, et al in 2021 entitled "Comparison of SAW and Topsis Methods in Decision Support System for Selection of Scholarship Recipients" [6].

These studies prove that the use of TOPSIS as a method for decision making is quite effective and appropriate if it is implemented into the system or the problems encountered. The difference between these studies and the research that the researchers did is that this research resulted in the application of a decision

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

support system for the Recommendation of Zakat Recipients for Mustahiq at the National Amil Zakat Agency of Asahan Regency, applying the TOPSIS method to the decision support system for the Recommendation of Zakat Recipients for Mustahiq at the Regency National Amil Zakat Agency. Asahan and help solve the problem of Recommendation for Zakat Recipients for Mustahiq at the National Amil Zakat Agency of Asahan Regency based on existing criteria.

RESEARCH METHODS

In this study, researchers used quantitative methods. Quantitative method is a systematic scientific study of the parts and phenomena and the quality of their relationships. Quantitative methods used in determining which can be grouped. DSS is part of a computer-based decision support system, including a knowledge-based system (knowledge management) that is used to support decision making in an organization or a company. Whereas the DSS method is carried out by making decisions from problems that are structured, semi-structured, or unstructured [7].

Technique Order Performance by Similarity to Ideal Solution (TOPSIS) is based on the concept that the bestchosen alternative not only has the shortest distance from the positive ideal solution, but also has the longest distance from the negative ideal solution (Fan and Cheng 2009:4) [8]. Here are the steps of the TOPSIS method:

1. TOPSIS begins by building a decision matrix. The decision matrix X refers to m alternatives that will be evaluated based on n criteria. The decision matrix X can be seen in the following equation 1:

$$X = \begin{matrix} a_1 \\ . \\ . \\ . \\ . \\ a_m \end{matrix} \begin{bmatrix} X_{11} & . & .. & . & X_{1n} \\ . & . & .. & . & . \\ . & . & .. & . & . \\ . & . & .. & . & . \\ . & . & .. & . & . \\ X_{m1} & . & .. & . & X_{mn} \end{bmatrix} \quad (1)$$

Where a_i $(\mathrm{i} = 1, 2, 3, \ldots, \mathrm{m})$ are possible alternatives, x_j $(\mathrm{j} = 1, 2, 3, \ldots, \mathrm{n})$ is the attribute by which the performance of the alternative is measured, x_{ij} is alternative performance a_i with attribute reference x_j.

2. Create a normalized decision matrix.

The equation used to transform each element of xij is:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} {x_{ij}}^2}} \quad (2)$$

Where i = 1, 2, 3, . . . , m; and j = 1, 2, 3, . . . , n ; where r_{ij} is an element of the normalized decision matrix R, x_{ij} is an element of the decision matrix X.

3. Create a weighted normalized decision matrix.

With weight $w_i = (w_1, w_2, w_3, \cdot \ \cdot \ \cdot, w_n)$, where w_j is the weight of the j-th criteria and $\sum_{j=1}^{n} w_j$ and = 1 then the normalized weight matrix V is:

$$v_{ij} = w_j r_{ij} \quad (3)$$

Where with i = 1, 2, 3, . . . , m; and j = 1, 2, 3, . . . , n. Where v_{ij} is an element of the weighted normalized decision matrix V. w_{ij} is the weight of the j-th criterion. r_{ij} is an element of the normalized decision matrix R.

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

4. Determine the positive ideal solution matrix and the negative ideal solution.

The positive ideal solution is denoted A^+, while the negative ideal solution is denoted A^-. The following is the equation of A^+ and A^-:

$A^+ = \{(\max v_{ij} \mid j \in J), (\min v_{ij} \mid j \in J'), i = 1, 2, 3, \ldots, m\} = \{v_1^-, v_2^-, v_3^-, \cdot \cdot \cdot, v_n^-\}$ (4)

$A^- = \{(\min v_{ij} \mid j \in J), (\max v_{ij} \mid j \in J'), i = 1, 2, 3, \ldots, m\} = \{v_1^-, v_2^-, v_3^-, \cdot \cdot \cdot, v_n^-\}$ (5)

J = { j = 1, 2, 3, . . . , n and J is a set of (*benefit criteria*)}. J' = { j = 1, 2, 3, . . . , n and J is the set of (*cost criteria*)}. Where v_{ij} are elements of the weighted normalized decision matrix V, v_j^+ = (j = 1, 2, 3, . . . , n) is the element of the positive ideal solution matrix, v_j^- = (j = 1, 2, 3, . . . , n) are elements of the negative ideal solution matrix.

5. Calculating separation

S^+ is the alternative distance from the positive ideal solution defined as:

$S_i^+ = \sqrt{\sum_{j=i}^{n} \left(v_{ij} - v_j^+\right)^2}$, With i = 1, 2, 3, . . ., m (6)

S^- is the alternative distance from the negative ideal solution defined as:

$S_i^- = \sqrt{\sum_{j=i}^{n} \left(v_{ij} - v_j^-\right)^2}$, With i = 1, 2, 3, . . ., m (7)

Where S_i^+ is the i-th alternative distance from the positive ideal solution, S_i^- is the i-th alternative distance from the negative ideal solution, v_{ij} is an element of the weighted normalized decision matrix V, v_j^+ is the element of the positive ideal solution matrix, v_j^- are elements of the negative ideal solution matrix.

6. Calculates the proximity to the positive ideal solution.

The relative closeness of each alternative to the positive ideal solution can be calculated by the following equation:

$$c_i^+ = \frac{s_i^-}{(s_i^- + s_i^+)}, 0 \leq c_i^+ \leq 1 \quad (8)$$

With i = 1, 2, 3, . . . , m, where c_i^+ is the relative closeness of the i-th alternative to the positive ideal solution, s_i^+ is the i-th alternative distance from the positive ideal solution, s_i^- is the i-th alternative distance from the negative ideal solution.

7. Ranking alternatives

The alternatives are sorted by value C^+ largest to smallest value. Alternative with value C^+ largest is the best solution.

RESULTS AND DISCUSSION

System analysis is an explanation of one complete system into its component parts with a view to identifying and evaluating problems, obstacles that occur and expected needs so that improvements can be proposed to make a good application. The proposed system design can be done after analyzing the current system. The proposed system that is designed is a change from the system that has been implemented so far, assisted by Microsoft Visual Studio 2010 and MySQL applications. The following is the flow of the new system proposed in this study:

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

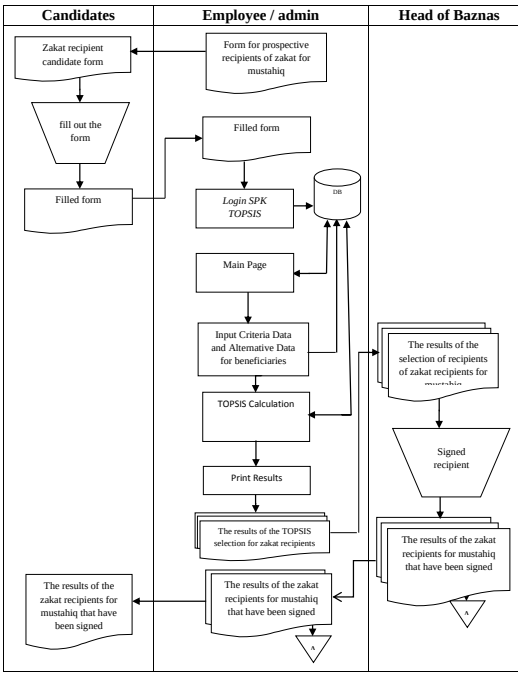

Figure 1. Proposed System Flow

In starting the calculation of the Topsis method, criteria and sub-criteria are needed so that calculations can be carried out on the weights of the criteria and sub-criteria that have been determined in the determination of zakat recipients for mustahiq at the National Amil Zakat Agency of Asahan Regency. The following table of criteria and sub-criteria data is as follows:

Code	Criteria	Value
C01	Job status	5
C02	number of dependents	4
C03	Children's Education	4
C04	Family Vehicle	3
C05	Income	3
C06	Status of residence	3

Table 1. Criteria

Each of the criteria above each has a sub-criteria that has a weight of 1 - 4. Except for the criteria for residence status which only has 2 sub-criteria.

Alt	C1	C2	C3	C4	C5	C6
A1	3	4	4	3	2	2
A2	4	4	3	3	3	2
A3	3	3	2	4	4	2
…	…	…	…	…	…	…
A29	3	3	5	2	3	2
A30	4	2	2	3	4	2

Table 2. Data Value of Prospective Zakat Recipients for Mustahiq

What we need to do next is find the value of the normalized decision matrix where the formula is to divide each candidate weight matrix with the X value of each criterion. And the results of the normalized decision matrix are obtained as shown in the following table:

/	17,46	19,44	19,90	17,32	17,32	10,95
A/K	C1	C2	C3	C4	C5	C6
A1	0,17	0,21	0,20	0,17	0,12	0,18
A2	0,23	0,21	0,15	0,17	0,17	0,18
…	…	…	…	…	…	…
A3	0,17	0,15	0,25	0,12	0,17	0,18
A4	0,23	0,10	0,10	0,17	0,23	0,18

Table 3. Normalized Decision Matrix

Next, what needs to be done is to find the normalized weight value, by multiplying each normalized decision matrix by the weight value of each criterion.

A/C	C1	C2	C3	C4	C5	C6
A1	0,859	0,823	0,804	0,520	0,346	0,548
A2	1,145	0,823	0,603	0,520	0,520	0,548
A3	0,859	0,617	0,402	0,693	0,693	0,548
…	…	…	…	…	…	…
A29	0,859	0,617	1,005	0,346	0,520	0,548
A30	1,145	0,411	0,402	0,520	0,693	0,548
MAX	1,145	1,029	1,005	0,693	0,693	0,548
MIN	0,573	0,411	0,402	0,346	0,346	0,548

Tabel 4. Data Normalisasi Berbobot

To find the negative ideal solution also has the same formula as the positive ideal solution, only it is subtracted by the lowest normalized weights for each criterion.

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

Code	Name	Positive	Negative
A01	Darmono	0,561	0,666
A02	Iwan Gunawan	0,514	0,773
A03	Sayuti	0,784	0,604
…	…	…	…
A29	Hartini	0,633	0,720
A30	Jarno	0,880	0,691

Table 5. Results of Finding D+ & D⁻ in Each Alternative

After getting the positive and negative ideal values, the next step is the final step to get the ranking values. Then the calculation is carried out until all candidates have a ranking value, so that the ranking results for each candidate will be obtained as shown in the following table:

Code	Name	Pref	Rank
A01	Darmono	0,543	11
A02	Iwan Gunawan	0,601	6
…	…	…	…
A28	**Tari**	**0,713**	**1**
A29	Hartini	0,532	15
A30	Jarno	0,440	23

Table 6. Results of Finding Preferences for Each Alternative

Alternative results obtained from calculations, based on Calculation Steps. By using the TOPSIS method, a decision can be made that A28 is entitled and can be recommended, namely those with the highest scores who receive recommendations for zakat recipients.

Implementation of the system is the final stage of the application system development process after going through the design stage. In order for the implementation process and software to work perfectly, the software must first be tested to find out the weaknesses and deficiencies that exist, which will then be evaluated. The following are the results of the implementation of the system in this study:

Figure 2. Display Login Form

Figure 3. Main Page Display

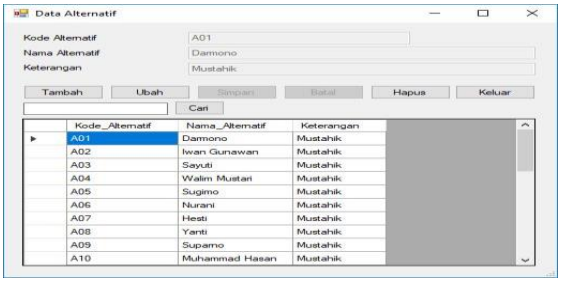

Figure 4. Alternative Form Display

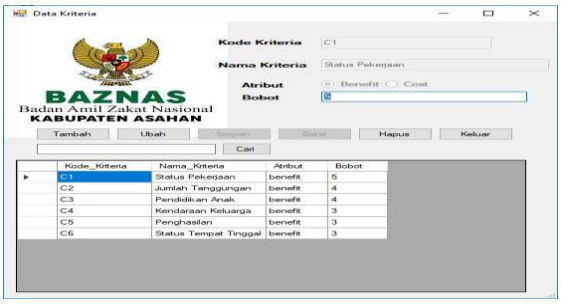

Figure 5. Criteria Form Display

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

Figure 6. Display of the Weight Value Form

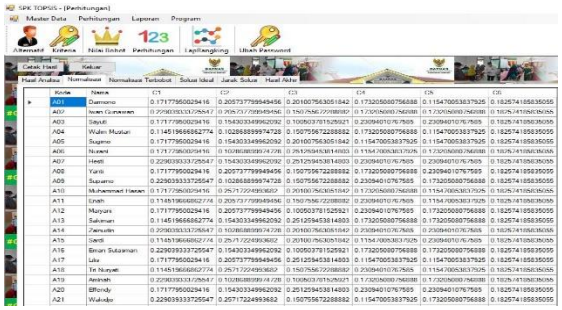

Figure 7. Normalization Calculation Form

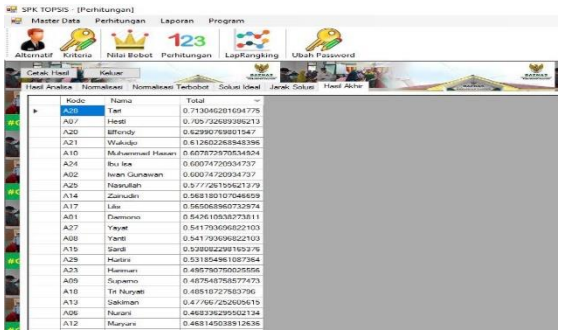

Figure 8. Calculation of Ranking Results Form

Based on the results of testing the Topsis method calculation system with manual calculations carried out by the National Amil Zakat Agency of Asahan Regency using the Microsoft Excel application, the final results are close to the same. Decision Support System (SPK) Determining Determining recipients of zakat recipients for mustahiq using the Technique For Order Preference by Similarity to Ideal Solution (TOPSIS) method which gives results, namely as a calculation of criteria and as ranking.

From the implementation results it is explained that the decision support system determines Determining recipients of zakat recipients for mustahiq is a system that provides convenience in solving problems. in accordance with the results expected by the National Amil Zakat Agency of Asahan Regency.

CONCLUSION

The Decision Support System for recipients of zakat recipients for mustahiq at the National Amil Zakat Agency of Asahan Regency uses the TOPSIS method, so that the results of the assessment have been carried out through many calculation processes, starting from value weighting, normalization, weighted normalization, max and min values of all criteria and determine the value of positive and negative ideal solutions to get prospective recipients at the National Amil Zakat Agency of Asahan Regency. The application of the Topsis Algorithm for the Decision Support System for Recipients of Surgical Assistance at the National Amil Zakat Agency of Asahan Regency which runs based on the description described in the previous discussion and the completed program designed and built in the form of a Decision Support System for Recipients of Surgical Assistance at the National Amil Zakat Agency of Asahan Regency can well executed.

ISSN : 1979-9292

JURNAL IPTEKS TERAPAN
Research of Applied Science and Education V16.i4 (575-582)

BIBLIOGRAPHY

[1] A. Ardianis, "PERAN ZAKAT DALAM ISLAM," *Al-Intaj: Jurnal Ekonomi dan Perbankan Syariah*, vol. 4, no. 1, 2018.

[2] F. R. Darmawan, E. L. Amalia, and U. D. Rosiani, "Penerapan Metode Topsis pada Sistem Pendukung Keputusan untuk Kota yang Menerapkan Pembatasan Sosial Berskala Besar yang di Sebabkan Wabah Corona," *Jurnal Sistem dan Teknologi Informasi (Justin)*, vol. 9, no. 2, p. 250, Apr. 2021, doi: 10.26418/justin.v9i2.43896.

[3] H. Nalatissifa and Y. Ramdhani, "Sistem Penunjang Keputusan Menggunakan Metode Topsis Untuk Menentukan Kelayakan Bantuan Rumah Tidak Layak Huni (RTLH)," *MATRIK : Jurnal Manajemen, Teknik Informatika dan Rekayasa Komputer*, vol. 19, no. 2, pp. 246–256, May 2020, doi: 10.30812/matrik.v19i2.638.

[4] M. Ardhiansyah and T. Husain, "Sistem Pendukung Keputusan Pemilihan Siswa/i Kelas Unggulan Menggunakan Metode AHP dan TOPSIS Decision Support System for Student Selection of Prime Class Using AHP and TOPSIS Methods," 2020.

[5] G. S. Mahendra, I. Putu, and Y. Indrawan, "METODE AHP-TOPSIS PADA SISTEM PENDUKUNG KEPUTUSAN PENENTUAN PENEMPATAN AUTOMATED TELLER MACHINE," 2020.

[6] W. E. Sari, M. B, and S. Rani, "Perbandingan Metode SAW dan Topsis pada Sistem Pendukung Keputusan Seleksi Penerima Beasiswa," *Jurnal Sisfokom (Sistem Informasi dan Komputer)*, vol. 10, no. 1, pp. 52–58, Feb. 2021, doi: 10.32736/sisfokom.v10i1.1027.

[7] W. A. P. Cahya, "Penerapan Metode Kuantitatif Terhadap Jumlah Permintaan Tenaga Kerja Perhotelan Di Denpasar," *Jurnal Bisnis Darmajaya*, vol. 3, no. 1, pp. 65–73, 2017.

[8] M. Handayani, "Sistem Pendukung Keputusan Penentuan Penerimaan Raskin Di Menggunakan Metode Topsis," *Jurnal Teknologi Informasi*, vol. 1, no. 1, p. 54, 2017, doi: 10.36294/jurti.v1i1.43.