Determination of receipt of UPZ assistance using the SAW method

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ABSTRACT

Zakat has a very strategic position in giving the impact of welfare and improving the community's economy if the collection and distribution are managed in trustworthy, transparent and professional. An institution on zakat management is National Zakat Agency (BAZNAS), which an institution manages the zakat management nationally, and non-structural government institution that is independent and responsible to President through the Minister of Religion. BAZNAS is located in the capital city and assisted by zakat collection unit (UPZ). Along this time, they conduct manually in determining the person who will receive the assistance, but it often occurs errors in its implementation. Therefore, a decision support system is needed to assist UPZ in determining the person who will receive the assistance. The decision support system was designed using SAW (Simple Additive Weighting) method, then the administrators obtain an alternative data in the form of lists of students who receive the UPZ assistance. The SAW algorithm is an algorithm for decision making. The SAW algorithm is also known as an algorithm with additive weighting method. The method requires normalization process of decision matrix (x) into a scale and can be compared to the entire available alternative ratings. The study showed that SAW can be applied to determine the acceptance of UPZ assistance by the calculation results of 16. The result of calculation and recommendation of decision support system for person who receive the UPZ acceptance, have the same data on output, namely Astin Dwi Wulan.

1. Introduction

Zakat is the only worship in Islamic Shari'a which explicitly stated that there are officers (QS. Al-Maidah: 60 and 103). This is because zakat has a very strategic position in determining welfare, improving the economy, that can happen if the collection and distribution are managed in a trustful, transparent and professional manner.

Based on the Perpu BAZNAS Number 2 of 2016 concerning the establishment and working procedures of zakat collection units, BAZNAS is an institution that has the authority to carry out the task of managing zakat nationally. To facilitate the management of zakat, each regency or city has a National Zakat Agency called BAZNAS. In its implementation, BAZNAS is assisted by UPZ or 'Unit Pengumpul Zakat'. UPZ is an organization formed by BAZNAS or National Zakat Agency to assist in the collection of zakat. The result of zakat collection by UPZ must be deposited to BAZNAS.

After the zakat is collected, the BAZNAS will utilize the zakat for various purposes including scholarships. The scholarships held are called UPZ scholarships. Each school can send data of students who are entitled to receive UPZ scholarships. Then BAZNAS determines who are eligible to receive

UPZ scholarships. However, the determination of the acceptance of UPZ scholarships is still experiencing difficulties, so a system is needed that can assist BAZNAS in determining the receipt of UPZ scholarships.

References of this research are decision support system using Simple Additive Weighting capable of displaying the result of the weighting and calculation based on the criteria in easy and straightforward and Simple Additive Weighting method can produce the expected result was found in [1]. Other study using Simple Additive Weighting can make a decision more effective, efficient was found in [2] and Simple Additive Weighting can make a decision more accurate was found in[3]. Ciptayani & Dewi [4] using Simple Additive Weighting on decision support system make a decision making more accurate. Afshari et al [5] produce that SAW ignores the fuzziness of executives judgment during the decision-making process. Pratiwi et al [6] using SAW to generate the recommendation majoring result that will be given to students in the recommendation list. Setyawan et al [7] implemented SAW and WP to analyzed the differences in execution time. The research produces that SAW method relatively quick because SAW has a simpler process. Siahaan et al [8] using SAW to solve decision that can not be completed manually. Esclamando et al [9] using SAW to create a function to calculate the ranking score. Geetha & Sekar [10] using SAW to determine the optional combination of operating parameters of an engine. Irvanizahm [11], Sam et al [12], Susilowati et al [13], Ibrohim & Sumiati [14] and Melia [15] using SAW to display a list of data alternative by sorting the best alternative values. SAW method can be used in that case study. Hidayat & Utami [16] using SAW to determine weighting sum of each alternative. Other study [17] SAW method can choose the best alternative from several alternatives by using each criterion. Atmojo et al [18] using SAW to get smartphone recommendation based on a criterion. Ningsih et al [19] using SAW to determine the worthy or not the inpatient in hospitals pringsewu. Other study [20] using SAW to calculate all criteria to determine the best collage in pringsewu.

Based on the research already mentioned it can be concluded that SAW can be applied to alternative recommendation cases by ranking. So as to encourage researchers to apply SAW to the determination of acceptance of UPZ case study assistance conducted at Muhammadiyah Salaman Vocational School. In this study, the criteria used to determine the receipt of UPZ assistance funds were 'pendidikan ayah', 'pekerjaan ayah', 'penghasilan ayah', 'pendidikan ibu', 'pekerjaan ibu', 'penghasilan ibu', and 'jumlah saudara kandung'.

2. Method

2.1. Simple Additive Weighting (SAW)

The research method is a scientific way to get information based on purpose. The research method used is experiment. The experiment was carried out by applying the SAW method to determine the acceptance of UPZ assistance at Muhammadiyah Salaman Vocational School.

The research method that is carried out using the SAW method is as follows:

- Determine the parameters used as a reference in determining the acceptance of assistance.

- Giving value based on parameters used as a reference.

- Normalization of the matrix for comparison with all alternative ratings which is the benefit or cost equation.

- Determine the parameters used as a reference in determining the acceptance of assistance.

- Analysis of receipt of UPZ assistance.

Equations or calculation formula of the method is:

$$V_i = \sum_{j=0}^{n} w_j r_{ij} \tag{1}$$

Information:

V_i = alternative final value

w_j = weight each criteria

r_{ij} = normalization of the matrix

3. Results and Discussion

Determination of acceptance of UPZ assistance is a decision made by the management so that it is expected that the determination of UPZ aid recipients can be done objectively. The criteria used to determine the recipients of UPZ assistance were 'pendidikan ayah', 'pekerjaan ayah', 'penghasilan ayah', 'pendidikan ibu', 'pekerjaan ibu', 'penghasilan ibu', and 'jumlah saudara kandung'. Criteria are calculated using the SAW (Simple Additive Weighting) method so that alternatives are ranked. The following calculation of the SAW method is shown in the following steps:

3.1. SAW Calculation

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

Table 1.   The Weight of Each Criteria

Code	Criteria	Weight	Inf
K1	Pendidikan ayah	2	Ben
K2	Pekerjaan ayah	3	Ben
K3	Penghasilan ayah	4	Ben
K4	Pendidikan ibu	3	Ben
K5	Pekerjaan ibu	4	Ben
K6	Penghasilan ibu	3	Ben
K7	Jumlah saudara kandung	4	Ben

Table 1 shows that the criteria for 'pendidikan ayah' is K1 with the weight of criterion 2, 'pekerjaan ayah' is K2 with the weight of criterion 3, 'penghasilan ayah' is K3 with the weight of criterion 4, 'pendidikan ibu' is K4 with the weight of criterion 3, 'pekerjaan ibu' is K5 with the weight of criterion 4, 'penghasilan ibu' is K6 with the weight of criterion 3 and the 'jumlah saudara kandung' is K7 with the weight of criterion 4. As well as determining each of these criteria benefit or cost.

Table 2.   Value Convertion

No	Data	K1	K2	K3	K4	K5	K6	K7
1	Astin Dwi Wulan	1	3	2	3	4	4	2
2	Rahayuning Pamuji	3	3	2	3	2	2	2
3	Nur Laela	1	3	2	1	3	2	2

Based on table 2 all data that is known is converted to numbers so that the data can be 1 to 5.

Table 3.   Vector Value

No	Data	K1	K2	K3	K4	K5	K6	K7
1	Astin Dwi Wulan	0.25	0.75	0.5	0.75	1	1	0.5
2	Rahayuning Pamuji	0.75	0.75	0.5	0.75	0.5	0.5	0.5
3	Nur Laela	0.25	0.75	0.5	0.25	0.75	0.5	0.5

Table 3 is known as a S vector value table. S vector values are generated from the values of each criterion calculated according to the SAW formula. The formula used adjusts each set of criteria, namely benefit or cost.

Table 4.   Preference Values

No	Data	K1	K2	K3	K4	K5	K6	K7
1	Astin Dwi Wulan	0.5	2.25	2	2.25	4	3	2
2	Rahayuning Pamuji	1.5	2.25	2	2.25	2	1.5	2
3	Nur Laela	0.5	2.25	2	0.75	3	1.5	2

Table 4 shows that the preference value is generated from the multiplication of each vector value against the specified weight. The weights used are 2, 3, 4, 3, 4, 3, 4.

Table 5.   Result

No	Data	Result
1	Astin Dwi Wulan	16
2	Rahayuning Pamuji	13.5
3	Nur Laela	12

3.2. Testing Result

Based on the results of the above test it can be seen that in Figure 2 the test results using the saw method produce that Astin Dwi Wulan is ranked first or the highest value. So that Astin Dwi Wulan can be used as the first recipient of UPZ assistance.

No	Data	Result
1	Astin Dwi Wulan	21.66
2	Rahayuning Pamuji	19.5
3	Nur Laela	17.66

From table 5 the results of the calculation are generated from the sum of all values owned by each alternative data. Based on the results of these calculations indicate that the highest value is found at Astin Dwi Wulan. The results of the calculation of table 5 can be presented in Figure 1.
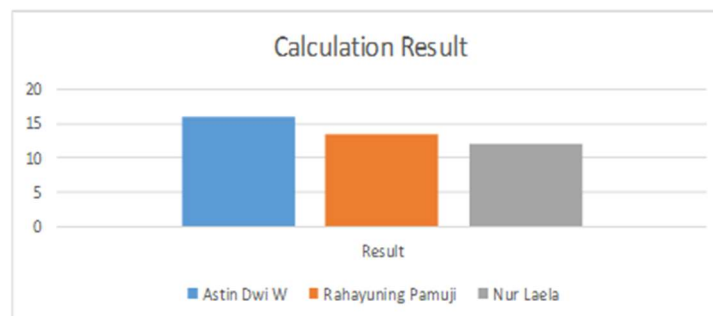
Fig. 1. Calculation result

4. Conclusion

Based on the results of this study, it can be concluded that SAW can be used for ranking the acceptance of UPZ assistance. It was produced that Astin Dwi Wulan became the first recipient of the designed system. The research suggestion is that methods can be combined with classification methods such as k-means, c-means, and knn.

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