COVID-19 SOCIAL AID ADMISSION SELECTION USING SIMPLE ADDITIVE WEIGHTING METHOD AS DECISION SUPPORT

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Abstract

The process of receiving Covid-19 social assistance to residents who are recorded as social aid recipients in the RT.07 RW.10 Kp. Sukapura Jaya area is still uneven. The second problem is that there is no particular mathematical calculation to determine the value of the weight of the criteria, especially for residents who are recorded as receiving Covid-19 social aid in the RT.007 RW.10 Kp. Sukapura Jaya area. The gradual decline in social aid programs so that the number that falls does not match the data of social aid recipients. This caused a polemic for RT administrators in distributing social aid programs. The decline in social aid programs does not match the number of citizens recorded. It overcomes citizens who cause social jealousy—analyzing the problems experienced by the RT management in the distribution of Covid-19 social assistance, especially the RT.07 RW.10 Kp. Sukapura Jaya area to residents who are recorded as recipients. Selecting Covid-19 social assistance recipients, especially in the RT.07 RW.10 Kp. Sukapura Jaya area. So the application of methods as decision support is needed, and it is needed to help determine the weight of particular criteria for citizens who are recorded as more in need. This study proposes a decision support method using the Simple Additive Weighting (SAW) method, which is expected to help decision-making in solving problems for selecting Covid-19 social aid recipients in the RT.07 RW.10 Kp. Sukapura Jaya community. The purpose of the study is to select residents who are recorded to receive social aid who are more in need first will get Covid-19 social aid.

Keywords: Simple Additive Weighting Method; Covid-19; Social Assistance

Abstrak

Proses penerimaan bantuan sosial Covid-19 kepada khususnya warga yang terdata penerima bansos di wilayah RT.07 RW.10 Kp. Sukapura Jaya masih tidak merata. Masalah kedua belum adanya perhitungan matematika khusus untuk menentukan nilai bobot kriteria khususnya warga yang terdata penerimaan bansos Covid-19 yang ada di wilayah RT.007 RW.10 Kp. Sukapura Jaya. Turunnya bansos secara bertahap sehingga jumlah yang turun tidak sesuai dengan data penerima bansos. Sehingga menimbulkan polemik buat pengurus RT dalam mendistribusikan bansos. Turunnya bansos tidak sesuai dengan jumlah warga yang terdata dan mengatasi terjadi nya warga yang menimbulkan kecemburuan sosial. Menganalisis permasalahan yang dialami pihak pengurus RT dalam pembagian bansos Covid-19 khususnya wilayah RT.07 RW.10 Kp. Sukapura Jaya terhadap warga yang terdata penerima. Dengan adanya masalah terhadap penyeleksian penerima bantuan sosial Covid-19 khususnya di wilayah RT.07 RW.10 Kp. Sukapura Jaya. Maka dibutuhkannya penerapan metode sebagai pendukung keputusan dan diperlukannya untuk bisa membantu dalam menentukan bobot kriteria khusus nya para warga yang terdata lebih menbutuhkan. Pada penelitian ini mengusulkan metode pendukung keputusan menggunakan metode Simple Additive Weighting (SAW), yang diharapkan membantu pengambilan keputusan dalam memecahkan masalah untuk seleksi penerima bansos Covid-19 pada masyarakat RT.07 RW.10 Kp. Sukapura Jaya. Tujuan penelitian untuk menyeleksian terhadap warga yang terdata menerima bansos yang lebih membutuhkan dahulu akan mendapatkan bansos Covid-19.

Kata Kunci: Metode Simple Additive Weighting; Covid-19; Bantuan Sosial
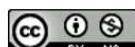
INTRODUCTION

In Indonesia, precisely in the capital city of DKI Jakarta, many companies laid off workers or worked at home while also being laid off due to the company experiencing a decline, not just workers in the company, but small traders, farmers, online motorcycle taxis and so on also experienced an economic crisis due to lack of income generation. Many complain that necessities for daily life are getting more expensive (Maleha et al., 2021) than the necessities of life caused by the Covid-19 pandemic. For this reason, the DKI Jakarta provincial government helps its people who are struggling in their economy, so the DKI Jakarta provincial government distributes Covid-19 Social Assistance consisting of various necessities. This is stated in Law No. 1 of 2020, explaining the policy system and economic handling during the Covid-19 pandemic (Einstein et al., 2020). Target bantuan sosial ini, kepada masyarakat yang berekonomi rendah hingga menengah yang mayoritas tinggal diperkampungan contohnya di wilayah RT.07 RW.10 Kp. Sukapura Jaya Jakarta Utara.

In the RT.07 RW.10 Kp. Area, Sukapura Jaya is an area consisting of the majority of people with low and medium economies. Currently, the process of receiving Covid-19 social assistance to especially residents who are recorded as social aid recipients in the RT.07 RW.10 Kp. Sukapura Jaya area is still uneven. So that the receipt of Covid-19 social assistance in the region caused a polemic of social jealousy because it was not correctly on target (Santoso & Suparmadi, 2019). The second problem is that there is no mathematical calculation to determine the weight value, especially for residents who are recorded as receiving Covid-19 social aid in the RT.007 RW.10 Kp. Sukapura Jaya area to assess who is more entitled to the assistance first. It is necessary to apply decision support methods to analyze criteria, especially citizens listed as recipients, to assess who is more entitled to the assistance. The goal is to help facilitate the RT management in their duties, select residents who are recorded as needing to get Covid-19 social assistance, overcome the occurrence of residents who cause social jealousy, and help research accuracy in selection (Jurnal et al., 2018). Moreover, the third problem is the gradual decline in social aid programs so that the number that falls does not match the data of social aid recipients (Aprilia et al., 2022). So that caused a polemic among RT managers. The Simple Additive Weighting (SAW) method determines the weight value of particular criteria and continues the ranking process that will

select particular social aid recipients (Astika et al., 2018). It is hoped that applying decision support methods with the SAW method can help problems or solve problems in selecting social aid recipients so that there is no wrong target, overcome social jealousy (Jayawardani & Maryam, 2022; Rizaldy, 2022), and selecting social aid recipients who need it first in the RT.07 RW.10 Kp. Sukapura Jaya area.

The previous research conducted by Falentino Sembiring et al. (Fauzan et al., 2018), discussing the Covid-19 social aid system, is still used manually in Sundawenang Village. This is in the provision of Covid-19 social aid is still mistargeted at Covid-19 social aid recipients. For this reason, the right solution is to develop a decision support system with the SAW method that refers to relevant criteria. Similarly, according to Joni Riadi et al. (Rohmatin et al., 2020). Discusses the system. The recipients of "Raskin" in the Alalak sub-district still use subjective assessments or estimates and assumptions. It is feared that this will cause inaccuracy in judging so that Raskin does not reach people who need it. Therefore, applying decision support using the SAW method to solve personal assessment problems with the condition that the criteria for recipients of Social Assistance (Bansos) are determined is the right solution. The SAW method can also determine the weight value of specific criteria and continue the ranking process, which will select specific social assistance recipients. This will help overcome the problem of the uneven distribution of Covid-19 social assistance in the RT.07 RW.10 Kp area. Sukapura Jaya. This decision support system is expected to help determine Raskin beneficiaries so that distribution is not on target.

The aims of this research are as follows 1) To help facilitate the task of the RT manager in selecting residents who need Covid-19 social assistance and to get the social assistance first. 2) To overcome the emergence of citizen social dissatisfaction caused by the uneven distribution of Covid-19 social assistance in the area of RT.07 RW.10 Kp. Sukapura Jaya. 3) To help improve accuracy in selecting recipients of Covid-19 social assistance, especially in determining the priority of receiving social assistance for needy residents.

MATERIALS AND METHODS

Stages of Research

The preparation of this research required process steps to achieve the goals that have been set. These steps are depicted in Figure 1.
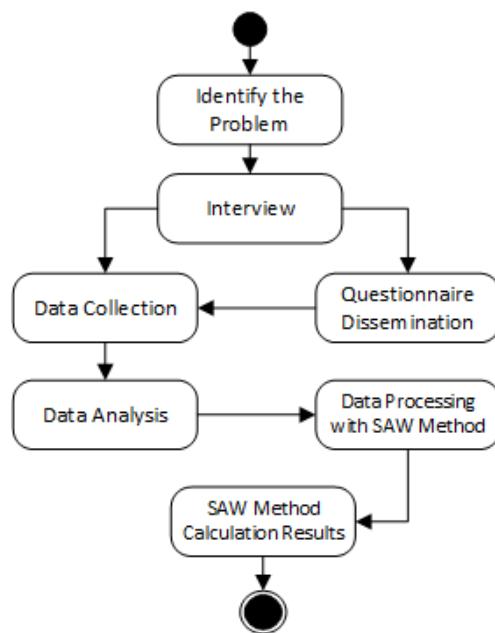
Figure 1. Research Steps Diagram

The following is an explanation of the research steps in Figure 1.

a. Problem Identification

Identifying a persistent problem is the initial stage of the research process. This stage builds on several underlying issues on the background of the problem.

b. Interview

The second step is an interview. The interview stage is carried out face-to-face directly with the parties involved and has a role in providing the information needed.

c. Questionnaire Dissemination

The third step is the distribution of questionnaires. The distribution of questionnaires is carried out so that the process of the problem under study provides reciprocity in the form of data filled in by social aid recipients to be examined by the author.

d. Data Collection

The fourth step is data collection. In this process, data collection is carried out by filling out questionnaires from parties who receive and filling out questionnaires for data preparation at the next stage.

e. Data Analysis

The fifth step is data analysis, and this stage is the process of analyzing data for the needs of the following process in the data processing.

f. Data processing with the SAW method

The sixth step is processing, and with the Simple Additive Weighting method, the data processing process is to apply calculations to the SAW method to produce calculation data output to determine the ranking under study with the expected results.

g. Calculation Results of the SAW Method

The seventh step is a result of calculating data obtained from the research process that has been carried out.

Population and Research Sample

The population of residents receiving Covid-19 social aid in RT.07 RW.10 Kp. Sukapura Jaya has filled out a selection criteria questionnaire for 150 Heads of Families who are recorded as recipients and select who gets social aid first. In determining the sample size of the population, the author used the Slovin formula with a critical value of 5% and obtained a sample of 110 Heads of Families (KK) residents receiving social assistance.

Simple Additive Weighting (SAW)

SAW is a weighted addition method (Much Ibnu Subroto & Kurniadi, 2022; Putera et al., 2020). The basis of the concept of this method is to find the sum of the weights of the performance branch on each alternative in all attributes (Habibur Rahman Arjuni & Arif Senja Fitrani, 2022; Hutahaean et al., 2022). This method also requires normalizing the decision matrix (X) (Marpaung, 2018; Pratama & Yunita, 2022) to a scale that can be compared with all alternative ratings on each criterion.

This method requires the decision maker to determine the weight of each tribute or criterion. The alternative management stages used (in this case, determine the selection of social aid recipients who first Covid-19 in RT.07 RW.10 Kp. Sukapura Jaya residents), namely:

a. Setting an alternative is A_i.

b. Determine the criteria used as a reference in decision-making, namely C_j.

c. Determine each criterion's preference weight or level of importance (W).

d. Determine the value of the matching branch for each alternative on each criterion.

e. Make a decision matrix (X) from the table of match branches of each alternative on each criterion. The X value of each alternative (A_i) on each criterion (C_j) has been determined.

f. Carry out the process of normalizing the decision matrix (X) to a scale that can be compared with all existing alternative branches on each criterion.

g. The result of matrix normalization (R_{ij}) forms a normalized matrix (R).

h. The final result of the preference value (V_i) is obtained from the sum of the multiplication of the normalized matrix row elements (R) with

the preference weight (W) corresponding to the matrix column elements (R).

i. The ranking process is obtained based on the alternative with the largest to lowest total value to determine the selection of beneficiaries who first received the Covid-19 social assistance at RT.07 RW.10 Kp.Sukapura Jaya.

Because the SAW method is one of the methods of the FMADM model, the determination of weights and variable values on each criterion must use fuzzy numbers. The criteria that have been determined are as Table 1.

Table 1. Criteria

Criterion (C)	Description
C_1	Age
C_2	Home Ownership Status
C_3	Number of Family Members
C_4	Status/Type of Work
C_5	For
C_6	Deposit Savings
C_7	Expenditure

These criteria then determine the importance of the value criteria based on the weight values applied to the fuzzy numbers. Table 2 below is the suitability rating for each alternative for each criterion.

Table 2 Fuzzy Numbers

Fuzzy Numbers	Value
Low	1
Currently	2
Tall	3

Table 2 displays the criteria based on the suitability of each alternative for each predetermined criterion, then the weight of each criterion has been converted to a fuzzy number.

Age

Table 3 shows the age criteria are the requirements needed for decision making, based on age. The description of the age value has been converted to fuzzy numbers.

Table 3 Age Value

Age	Fuzzy Numbers	Value
25 – 30 Years	Low	1
30 – 40 Years	Currently	2
40>	Tall	3

Home Ownership Status

Table 4 shows the criteria for Home Ownership Status, which are the requirements for decision-making based on Home Ownership Status. The description of the value of house ownership status has been converted to fuzzy numbers.

Table 4 Assess Home Ownership Status

Home Ownership Status	Fuzzy Numbers	Value
Private House	Low	1
Contracted	Currently	2

Number of Family Members

Table 6 displays the criteria for the Number of Family Members, which are the requirements for decision-making based on the type of work. The description of the value of the Number of Family Members has been converted to fuzzy numbers.

Table 6. Assess the number of family members

Number of Family Members	Fuzzy Numbers	Grade
2-3 Person	Low	1
3-5 People	Currently	2
Five>	Tall	3

Job Status/Type

Table 7 displays the criteria for status/type of work is a requirement needed for decision making, based on the type of work. The description of the job type value has been converted to fuzzy numbers.

Table 7 Job Type Values

Type of work	Fuzzy Numbers	Value
Unemployed/laid off	Tall	3
Farmer/Odd Worker/Trader/Driver/Security	Currently	2
Private sector employee	Low	1

Income

Table 8 shows the income criteria are the requirements for decision-making based on income. The description of earnings has been converted to fuzzy numbers.

Table 8 Income Value

Income	Fuzzy Numbers	Value
Do not settle	Low	1
Rp. 1.000.000 - Rp. 2.000.000	Currently	2
Rp. 2.000.000 - Rp. 3.000.000	Tall	3

Deposit Savings

Table 9 displays the criteria for savings deposits which are the requirements for decision-making based on savings. The description of savings accounts has been converted to fuzzy numbers.

Table 9. Value of Deposit Savings

Income	Fuzzy Numbers	Value
< Rp. 1.000.000	Low	1
Rp. 1.000.000 - Rp. 2.000.000	Currently	2
Rp. 3.000.000 - Rp. 4.500.000	Tall	3

Expenditure

Table 10 displays the criteria for expenditure requirements needed for decision-making by expenditure. The expenditure description has been converted to fuzzy numbers.

Table 10 Expenditure Value

Income	Fuzzy Numbers	Value
Rp. 500.000 – Rp. 1.000.000	Low	1
Rp. 1.000.000 - Rp. 1.500.000	Currently	2
> Rp. 2.000.000	Tall	3

Table 11 shows some of the criteria above, so the decision maker gives a weight value based on the level of importance of the required criteria. The weight value of each criterion is as follows:

Table 11. Criteria Importance Level

Criteria (C)	Information
C_1	3
C_2	2
C_3	3
C_4	3
C_5	3
C_6	3
C_7	2

RESULTS AND DISCUSSION

Result

Compatibility Rating Value of Each Alternative on Each Criterion

Table 12 determines the suitability rating of each alternative on each predetermined criterion.

Table 12. Alternative Compatibility Ratings

Name	Age	Possession	Number of Family	Types of Jobs	Income	Savings	Expenses
A1	3	1	2	2	2	2	2
A2	3	1	2	2	2	2	2
A3	3	1	2	2	2	2	2
A4	3	1	1	2	2	2	2
A5	3	2	2	2	2	2	2
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
A106	3	1	1	1	3	3	1
A107	2	1	2	2	1	1	2
A108	2	1	2	2	2	2	3
A109	3	2	2	2	3	2	2
A110	3	1	2	2	3	2	3

Decision Matrix Normalization (X)

Table 13 presents the results of the decision matrix normalization process (X) to a scale that can be compared with all alternative ratings in each criterion.

$$R_{ij} = \frac{X_{ij}}{Max\ X_{ij}} = \text{If J is the profit attribute}$$

x_{ij} = Ai and Cj match twig values

$Max\ x_i$ = Largest of all rating values Largest of all matching twig scores on each criterion.

Table 13. Decision Matrix Normalization Value

Name	Age	Possession	Number of Family Members	Types of Jobs	Income	Savings	Expenditure Needs
A1	1	0,5	0,666666667	0,666666667	0,666666667	0,666666667	0,666666667
A2	1	0,5	0,666666667	0,666666667	0,666666667	0,666666667	0,666666667
A3	1	0,5	0,666666667	0,666666667	0,666666667	0,666666667	0,666666667
A4	1	0,5	0,333333333	0,666666667	0,666666667	0,666666667	0,666666667
A5	1	1	0,666666667	0,666666667	0,666666667	0,666666667	0,666666667
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
A106	1	0,5	0,333333333	1	1	1	0,333333333
A107	0,666666667	0,5	0,666666667	0,333333333	0,333333333	0,333333333	0,666666667
A108	0,666666667	0,5	0,666666667	0,666666667	0,666666667	0,666666667	1
A109	1	1	0,666666667	1	1	0,666666667	0,666666667
A110	1	0,5	0,666666667	1	1	0,666666667	1

Preference Value (V_i)

Table 14 shows the final results of the preference values obtained from the sum of the multiplication of the normalized matrix row elements (R) with the preference weights (W) corresponding to the matrix column elements (R).

Preference Weight: 3, 2, 3, 3, 3, 3, 2.

(C1 x 3) + (C2 x 2) + (C3 x 3) + (C4 x 3) + (C4 x 3) + (C5 x 3) + (C5 x 2)

Table 14. Test result

Name	Age	Ownership	Number of Family Members	Type of work	Income	Deposit Savings	Expenditure Needs	Total
A1	3	1	2	2	2	2	1,333333	13,33333
A2	3	1	2	2	2	2	1,333333	13,33333
A3	3	1	2	2	2	2	1,333333	13,33333
A4	3	1	1	2	2	2	1,333333	12,33333
A5	3	2	2	2	2	2	1,333333	14,33333
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
108	A108	2	1	2	2	2	2	2
109	A109	3	2	2	3	3	2	1,333333
110	A110	3	1	2	3	3	2	2

Based on the calculation results in Table 14, we get the ranking results. Here is Table 15, showing 20 Covid-19 Social Assistance receipts.

Table 15. Data Ranking Results of Recipients of Covid-19 Social Assistance

Rank	No.	Total
1	46	18
2	47	18
3	79	18
4	84	18
5	8	17,333
6	28	17,33333
7	36	17
8	56	17
9	101	16,33333
10	109	16,33333
11	21	16
12	38	16
13	45	16
14	48	16
15	110	16
16	102	15,33333
17	104	15,33333
18	15	15
19	20	15
20	30	15
...	...	...
...	...	...
106	44	9
107	73	9
108	97	9
109	86	8
110	92	8

Table 15 displays ranking calculation results where each sequence has the same score. Even though it has the same score using the SAW method, the committee gets priority results for Covid-19 social assistance recipients.

Discussion

By highlighting the strengths and advantages of the SAW method and carefully evaluating its accuracy, reliability, and validity, the conclusions can show the effectiveness of the SAW method as a reliable tool for selecting recipients of Covid-19 social assistance in RT.07 RW.10 Kp. Sukapura Jaya. In this respect, the discussion of the effectiveness of the SAW method provides a more detailed understanding of the performance and reliability of the method and provides strong support for the research conclusions.

CONCLUSION

Berdasarkan uraian pembahasan penelitian yang telah dilakukan, maka kesimpulan yang dapat ditarik antara lain dengan metode Simple Additive Weighting (SAW) dapat melengkapi keputusan dalam penentuan khususnya bagi warga RT.07 RW.10 Kp. Sukapura Jaya, yang tercatat menerima kebutuhan lebih dulu. Proses pemilihan penerima bansos Covid-19 dilakukan dengan metode ini, dimulai dengan penilaian kriteria kuesioner, pembobotan, pencocokan rating, normalisasi, dan ranking untuk menghasilkan skor dari setiap kriteria bagi warga RT.07 RW.10 Kp—Sukapura Jaya, yang tercatat lebih dulu. Hasil perhitungan penerapan metode tersebut adalah peringkat tertinggi hingga terendah yang merupakan hasil akhir pertimbangan pihak tertentu untuk memilih penerima bansos Covid-19 yang membutuhkan terlebih dahulu. Beberapa saran terkait penerapan metode SAW ini dapat dikembangkan seiring dengan perkembangan teknologi yang merinci kebutuhan yang sangat dibutuhkan. Pengembangan
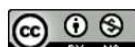
lanjutan mungkin melibatkan penjelajahan teknik dan algoritme yang lebih canggih. Misalnya, pendekatan hybrid yang menggabungkan SAW dengan metode lain seperti Analytical Hierarchy Process (AHP) atau Technique for Order of Preference by Similarity to the Ideal Solution (TOPSIS) dapat meningkatkan akurasi dan reliabilitas hasil pengambilan keputusan. Dengan menerapkan kombinasi yang tepat dari teknik-teknik tersebut, diharapkan hasil seleksi penerima bansos Covid-19 akan lebih optimal.

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