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Decision Support System for Covid-19 Social Assistance Recipients Applying the Weighted Aggregated Sum Product Assessment Method

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Abstract-The government's efforts to provide social assistance to fulfil all economic needs for people affected by Covid-19 are not optimal. So that many people feel that the social assistance provided is not right on target. Manual data entry in Medan Estate Village is claimed to be at risk of not being on target, multiple recipients and individuals who take advantage of the situation. The WASPAS method is expected to determine the criteria for people who are entitled to receive Covid-19 social assistance, because the WASPAS method will carry out a ranking process based on attributes with different weights so that the results are more optimal. This research is to find the weight value for each attribute, then a ranking process is carried out which will determine the optimal alternative in receiving social assistance. The 5 alternatives that are the results of determining the recipients of Covid-19 Social Assistance are alternative A2 with a result of 0.7553, A1 with a result of 0.7198, A6 with a result of 0.6159, A11 with a result of 0.6086 and A8 with a result of 0.5999.

Keywords: Covid-19 Social Assistance Recipients; WASPAS Method; DSS

1. INTRODUCTION

The Covid-19 virus outbreak in Indonesia has affected a number of aspects of life. There is instability in various fields, especially in the economic aspect. The increasing number of unemployment due to layoffs or temporary layoffs due to this pandemic has forced some people to lose their jobs, including MSMEs and small traders who are also experiencing economic difficulties. To prevent an economic crisis, the government provides assistance to affected communities in the form of cash and non-cash social assistance to ease the costs of daily life.

However, the implementation of the programme did not meet the expectations of the community, because the social assistance was considered misdirected or not on target. This can be proven by complaints from people who should be eligible for assistance but were not selected as recipients of the assistance. For this reason, a system is needed that can assist in selecting recipients of Covid-19 social assistance. One of the systems that can help solve this problem is the Decision Support System.

Decision support systems, also known as DSS, are systems that enable decision-making and communication in unstructured and semi-structured situations. This system is useful in unusual and complex situations, where careful calculations are very important in making decisions. There are so many methods provided in making a decision where research can use these methods according to the problem being studied. This research uses the WASPAS method in making a decision[1]–[5]. The Weighted Aggregated Sum Product Assessment (WASPAS) method is a method that can reduce errors or optimise the assessment for sorting the highest and lowest values. The main advantage of this method lies in its nature as a compensation method, where deficiencies in one attribute can be compensated for by advantages in other attributes. In addition, the assumption of independence between attributes and its ability to convert qualitative attributes into quantitative ones further expands its scope of application[6]–[10].

Beberapa penelitian sebelumnya yang telah di baca sehingga dijadikan sebagai referensi dalam penyeelsaian penelitian ini, seperti penelitian yang dilakukan oleh Irfan Zain Fauzi dan Redi Darmawan, mereka melakukan penelitian pada tahun 2024. Pada penelitian tersebut terdapat beberapa permasalahan dalam penyaluran Bantuan Sosial (Bansos) di Indonesia. Salah satu fenomena yang sering terjadi adalah penyaluran Bansos yang tidak tepat sasaran. Hal ini dibuktikan dengan adanya warga yang secara finansial mampu, namun tetap menerima Bansos. Di sisi lain, terdapat warga yang benar-benar membutuhkan Bansos, namun tidak mendapatkannya. Dari permasalahan tersebut mereka menerapkan metode WP dalam menyelesaikan permasalahan tersebut. Dari hasil perhitungan dengan metode Weight Product (WP), Angga Dwi (alternatif V4) keluar sebagai kandidat paling layak untuk menerima Bantuan Sosial. Nilai WP yang diperoleh Angga Dwi adalah 0,2395, mengalahkan 9 kandidat lain (V1 hingga V10)[11].

Previous research that has been conducted by Ömer Faruk Görçün, and his two research colleagues in 2024. the research conducted can help decision makers choose the ideal light railway and improve the efficiency of urban transport systems with a hybrid procedure that combines BWM and WASPAS'PH. Factors that affect the final result are acquisition cost, economic life, number of seats, and energy consumption. The final result obtained is A14 Brand CR as the best choice for urban light rail fleet with a final score of 0.7819[12]. Vicky Rahmawan and Heri Haerudin conducted a study in 2024. The research they conducted discussed the determination of people who are entitled to receive a long-standing government programme, namely Social Assistance aimed at underprivileged or deserving

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people. They used the AHP method in the process of selecting prospective recipients of this assistance so as to obtain satisfactory final results and also be more efficient[13].

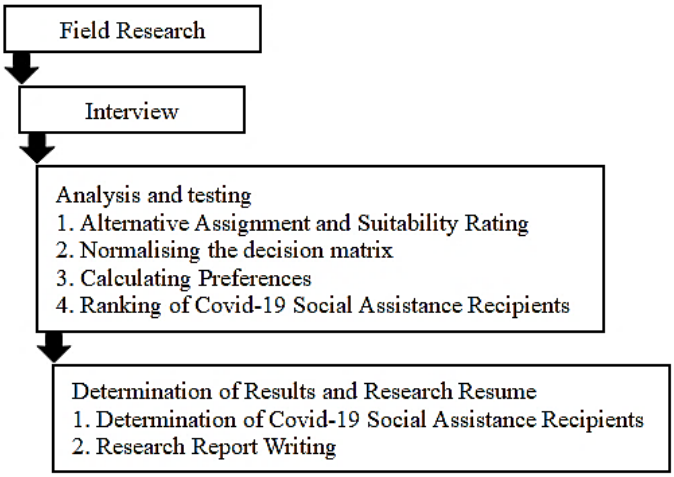
Adinda Afriliya Santoso and Raissa Amanda Putri conducted the research in 2024. They conducted research on the Faculty Student Senate (SEMAF), the highest student governing body, which oversees campus affairs and represents the student population. Due to the large number of students applying to SEMAF, the manual selection process raises concerns of bias or nepotism. So this research uses WASPAS for evaluation and weighting the importance of each criterion using ROC. The resulting system will rank applicants based on scores (highest score: 0.9850 for A23, lowest score: 0.4641 for A30), ensuring a fair and transparent selection process[14].

2. RESEARCH METHODOLOGY

2.1 Research Stages

In conducting research on Medan Estate Village, the author conducted several stages that were carried out in the completion of a study including, namely:

1. Field Research, at this stage the author sees and directly observes the processing of existing data.
2. Interviews, namely collecting data by asking questions to related parties in order to obtain the necessary information.
3. Literature study, namely reading books or looking for references from the internet that are directly or indirectly related to theoretically knowing the problems at hand.
4. Analysis and Testing, namely selecting several data samples. The author takes as many as 15 (Fifteen) data samples about data on social assistance recipients in Medan Estate Village including attributes that are used as criteria for receiving social assistance. The author also tests applying the Weighted Aggregated Sum Product Assessment (WASPAS) method to the alternatives and criteria used. At this stage the author also ranks the recipient alternatives, so that the final result is a recipient who is eligible to receive social assistance.
5. Determination of Results and Research Resume, in this last stage, the author determines the results of 5 (Five) families who are eligible to receive Covid-19 social assistance.



Fugure 1. Methodology of practical work implementation

2.2 Decision Support System

Decision Support System (DSS) is a system designed by utilising computers in the decision-making process. According to Moore and Chang, DSS can be described as a system capable of supporting data analysis, and decision modelling, decision-oriented, future planning orientation, and used at unusual times. DSS has many methods that can be used in making a decision ranging from the simplest method, namely the SAW method, WP method to more complex methods such as the OCRA method, ARAS method, MAUT method, EDAS method and there are many other methods that can be used[15]–[21].

2.3 Weighted Aggregated Sum Product Assessment (WASPAS) Method

WASPAS comes as a solution to minimise errors and optimise the determination of the highest and lowest values in the decision-making process. This method combines two models, namely the Weighted Sum Model (WSM) and the Weighted Product Model (WPM), thus enabling a more accurate determination of the relative weight of each attribute and the priority of alternatives. The use of the WASPAS method has proven effective in various fields, such as individual selection, machining process analysis, and material selection. The main advantage of this method lies in its nature as a compensation method, where deficiencies in one attribute can be compensated for by advantages in other attributes. In addition, the assumption of independence between attributes and its ability to convert qualitative

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attributes into quantitative ones further expands its scope of application. Thus, the WASPAS method offers a reliable and flexible solution to a wide range of problems that involve multi-criteria and require precise judgement[22]–[26]. The steps in problem solving using the Weighted Aggregated Sum Product Assessment (WASPAS) method are as follows[27]–[30]:

1. Creating a Decision Matrix

$$X_{ij} = \begin{bmatrix} X11 & X12 \cdots & X1n \\ X21 & X22 \ldots & X2n \\ Xm1 & Xm2 \cdots & Xmn \end{bmatrix} \quad (1)$$

Where m is the number of candidate alternatives, n is the number of evaluation criteria and X_{ij} is the alternative performance with respect to criterion j.

2. Normalise the matrix X_{ij}
   a. For benefit criteria

$$X_{ij} = \frac{Xij}{max\ Xij} \quad (2)$$

   b. For cost criteria

$$X_{ij} = \frac{min\ Xij}{Xij} \quad (3)$$

   The description of the formula used in normalising the matrix includes X_{ij} is the Alternative Matrix j on criterion i, Max Xij is the Maximum Value of X_{ij} and Min X_{ij} is the Minimum Value of Xij.
3. Calculating matrix normalisation values and WASPAS weights in decision making.

$$Q = 0{,}5 \sum_{j=1}^{n} Xij\ w + 0{,}5 \prod wj \quad (4)$$

   The explanation of the formula used in Calculating matrix normalisation values and WASPAS weights in decision making includes Q which is the Alternative Matrix j on criterion i, W is the weight that has been determined and j is the weight of j.
4. Finding the highest rank
   The best alternative is the alternative that has Qi with the highest value.

3. RESULTS AND DISCUSSION

The experience that arose at the time of the selection of social assistance receipts at the medan estate village office which was carried out in the previous period provided useful lessons to improve the situation of the implementation of the next social assistance receipt with even better service. Criticism and suggestions received by human resource management from the selection process for receiving social assistance can be used as material for analysing problems to be used as reference material for solving problems that occur. Problems that arise can be categorised into problems of supporting facilities and human error.

The problem of supporting facilities is a top priority in improving the quality of the selection process for receiving social assistance in the next period. The problem encountered is in the selection process that the selection team only relies on certain things as reference material in selecting the receipt of social assistance. The human error factor occurs in relation to the supporting facilities provided. Human error occurs due to several factors, including:

1. The lack of accuracy of the selection team in the selection process for receiving social assistance which has an impact on the inaccurate employees who receive it.
2. The workload faced by human resource management due to the large number of HR (Human Resources) that must be selected and must concentrate on other work that is a daily routine..

3.1 Determination of Criteria, Weights and Alternatives

The initial stage that must be done is to determine the criteria in determining the recipients of Covid-19 social assistance. The research data used is secondary data taken from the Medan Estate Village Office. The research criteria used are 4 criteria as shown in table 1. In table 1, the weight value is generated from the Rank Order Centroid (ROC) method. After completing the weighting, table 1 will be obtained:

Table 1. Criteria

Criteria	Description	Type	Weight
C1	Total Income	Cost	0.521
C2	Marital Status	Benefit	0.271
C3	Number of Dependents	Benefit	0.146
C4	Age	Benefit	0.063

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Based on table 1, which contains four criteria used in this study as well as the type of criteria where three criteria are of the benefit type and one criterion is of the cost type and also the importance weight of each criterion is different, the criteria that are used as the first priority are C1 criteria with an importance weight of 0.521, then the second priority criteria are C2 and the criteria with the lowest priority level are C1 only 0.063. After determining the level of importance of the criteria, the following table 2, the sample data that will be selected.

Table 2. Data Sample

Alternative Codes	Full Name	Total Income	Marital Status	Number of Dependents	Age (Year)
A1	Sunarmi	1.700.000	Life Divorce	5	45
A2	Junita Sari	800.000	Life Divorce	3	35
A3	Nurhaida Panjaitan	700.000	Death Divorce	0	74
A4	Nauli Matondang	1.500.000	Life Divorce	3	43
A5	Agus Pangaribuan	1.500.000	Married	4	52
A6	Amson Sinaga	1.000.000	Married	3	56
A7	Rizky Abdillah	1.500.000	Married	3	43
A8	Dedy Sariaman Simbolon	1.000.000	Married	3	37
A9	Eferoni Hia	1.000.000	Married	4	32
A10	Surianto	1.800.000	Married	6	56
A11	Nursiah Lubis	1.500.000	Death Divorce	3	47
A12	Martua Tampubolon	1.500.000	Married	5	53
A13	Dorian Nababan	1.250.000	Married	3	49
A14	Pirlian Zalukhu	1.500.000	Married	4	34
A15	Jafar	1.000.000	Married	1	27

Based on the sample data in table 2 above, there are 15 data that will be selected based on the data of each criterion owned, the data sample data still has criteria that have not been numeric or numeric so it is necessary to improve the weights, the linguistic criteria are the Marital Status criteria. Therefore, the following weight improvement table for the Marital Status criteria can be seen in table 3 below.

Table 3. Marital Status Criteria Weighting Improvement

Description	Weight
Death Divorce	4
Life Divorce	3
Married	2
Not Married	1

Based on table 3, it contains the improvement of the weight of the Marital Status criteria which is made from the highest to the lowest value. The value is adjusted based on the type of criteria previously determined in table 1. The following table shows the results of weight improvement on sample data that has been adjusted to table 3 which is referred to as a match rating which can be seen in table 4.

Table 4. Suitability Rating

Alternatives	C1	C2	C3	C4
A1	1.700.000	3	5	45
A2	800.000	3	3	35
A3	700.000	4	0	74
A4	1.500.000	3	3	43
A5	1.500.000	2	4	52
A6	1.000.000	2	3	56
A7	1.500.000	2	3	43
A8	1.000.000	2	3	37
A9	1.000.000	2	4	32
A10	1.800.000	2	6	56
A11	1.500.000	4	3	47
A12	1.500.000	2	5	53
A13	1.250.000	2	3	49
A14	1.500.000	2	4	34
A15	1.000.000	2	1	27

After forming the match rating table, all criteria in the data have numerical values so that they can be processed in the selection using the WASPAS method.

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3.2 Implementation of the WASPAS Method

The following is the process carried out in determining social assistance recipients by applying one of the methods in making a decision, namely the WASPAS method. The steps taken start from determining the decision matrix to ranking, for more details can be seen in the following steps.

1. The first step is to create a Decision Matrix

$$X_{ij} = \begin{vmatrix} 1.700.000 & 3 & 5 & 45 \\ 800.000 & 3 & 3 & 35 \\ 700.000 & 4 & 0 & 74 \\ 1.500.000 & 3 & 3 & 43 \\ 1.500.000 & 2 & 4 & 52 \\ 1.000.000 & 2 & 3 & 56 \\ 1.500.000 & 2 & 3 & 43 \\ 1.000.000 & 2 & 3 & 37 \\ 1.000.000 & 2 & 4 & 32 \\ 1.800.000 & 2 & 6 & 56 \\ 1.500.000 & 4 & 3 & 47 \\ 1.500.000 & 2 & 5 & 53 \\ 1.250.000 & 2 & 3 & 49 \\ 1.500.000 & 2 & 4 & 34 \\ 1.000.000 & 2 & 1 & 27 \end{vmatrix}$$

2. The second step is to Normalise the Rij Matrix, Before calculating the normalisation of the matrix that has been determined, the following are the maximum (max) and minimum (min) values of each criterion:
   Criteria C1

$$Max = Max\{1.700.000; 800.000; 700.000; 1.500.000; 1.500.000; 1.000.000; 1.500.000; 1.000.000; 1.000.000; 1.800.000; 1.500.000; 1.500.000; 1.250.000; 1.500.000; 1.000.000\} = 1.800.000$$

$$Min = Min\{1.700.000; 800.000; 700.000; 1.500.000; 1.500.000; 1.000.000; 1.500.000; 1.000.000; 1.000.000; 1.800.000; 1.500.000; 1.500.000; 1.250.000; 1.500.000; 1.000.000\} = 700.000$$

   Criteria C2

$$Max = Max\{3; 3; 4; 3; 2; 2; 2; 2; 2; 2; 4; 2; 2; 2; 2\} = 4$$

$$Min = Min\{3; 3; 4; 3; 2; 2; 2; 2; 2; 2; 4; 2; 2; 2; 2\} = 2$$

   Criteria C3

$$Max = Max\{5; 3; 0; 3; 4; 3; 3; 3; 4; 6; 3; 5; 3; 4; 1\} = 6$$

$$Min = Min\{5; 3; 0; 3; 4; 3; 3; 3; 4; 6; 3; 5; 3; 4; 1\} = 0$$

   Criteria C4

$$Max = Max\{45; 35; 74; 43; 52; 56; 43; 37; 32; 56; 47; 53; 49; 34; 27\} = 74$$

$$Min = Min\{45; 35; 74; 43; 52; 56; 43; 37; 32; 56; 47; 53; 49; 34; 27\} = 27$$

   After obtaining the maximum and minimum values of each criterion, the next process is to calculate the normalisation value of each criterion using equation 2 for benefit criteria and equation 3 for cost criteria.

   a. Normalisation of criterion C1 (Total Income = Cost) because the smaller the value, the better.

$$X_{ij} = \frac{min\ Xij}{Xij}$$

$$R_{(1,1)} = \frac{700000}{1700000} = 0{,}4117$$

$$R_{(1,2)} = \frac{700000}{800000} = 0{,}875$$

$$R_{(1,3)} = \frac{700000}{700000} = 1$$

$$R_{(1,4)} = \frac{700000}{1500000} = 0{,}4666$$

$$R_{(1,5)} = \frac{700000}{1500000} = 0{,}4666$$

$$R_{(1,6)} = \frac{700000}{1000000} = 0{,}7$$

$$R_{(1,7)} = \frac{700000}{1500000} = 0.4666$$

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$R_{(1,8)} = \frac{700000}{1000000} = 0,7$

$R_{(1,9)} = \frac{700000}{1000000} = 0,7$

$R_{(1,10)} = \frac{700000}{1800000} = 0,3888$

$R_{(1,11)} = \frac{700000}{1500000} = 0,4666$

$R_{(1,12)} = \frac{700000}{1500000} = 0,4666$

$R_{(1,13)} = \frac{700000}{1250000} = 0,56$

$R_{(1,14)} = \frac{700000}{1500000} = 0,4666$

$R_{(1,15)} = \frac{700000}{1000000} = 0,7$

b. Normalisation of C2 criteria (Marital Status = Benefit) because the greater the value, the better.

$X_{ij} = \frac{Xij}{max\ Xij}$

$R_{(2,1)} = \frac{3}{4} = 0,75$

$R_{(2,2)} = \frac{3}{4} = 0,75$

$R_{(2,3)} = \frac{4}{4} = 1$

$R_{(2,4)} = \frac{3}{4} = 0,75$

$R_{(2,5)} = \frac{2}{4} = 0,5$

$R_{(2,6)} = \frac{2}{4} = 0,5$

$R_{(2,7)} = \frac{2}{4} = 0,5$

$R_{(2,8)} = \frac{2}{4} = 0,5$

$R_{(2,9)} = \frac{2}{4} = 0,5$

$R_{(2,10)} = \frac{4}{4} = 1$

$R_{(2,11)} = \frac{2}{4} = 0,5$

$R_{(2,12)} = \frac{2}{4} = 0,5$

$R_{(2,13)} = \frac{2}{4} = 0,5$

$R_{(2,14)} = \frac{2}{4} = 0,5$

$R_{(2,15)} = \frac{2}{4} = 0,5$

c. Normalisation of criterion C3 (Number of Dependents = Benefit) because the greater the value, the better.X_{ij}

$X_{ij} = \frac{Xij}{max\ Xij}$

$R_{(3,1)} = \frac{5}{6} = 0,8333$

$R_{(3,2)} = \frac{3}{6} = 0,5$

$R_{(3,3)} = \frac{0}{6} = 0$

$R_{(3,4)} = \frac{3}{6} = 0,5$

$R_{(3,5)} = \frac{4}{6} = 0,4666$

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$R_{(3,6)} = \frac{3}{6} = 0{,}5$

$R_{(3,7)} = \frac{3}{6} = 0{,}5$

$R_{(3,8)} = \frac{3}{6} = 0{,}5$

$R_{(3,9)} = \frac{4}{6} = 0{,}4666$

$R_{(3,10)} = \frac{6}{6} = 1$

$R_{(3,11)} = \frac{2}{3} = 0{,}5$

$R_{(3,12)} = \frac{5}{6} = 0{,}8333$

$R_{(3,13)} = \frac{3}{6} = 0{,}5$

$R_{(3,14)} = \frac{4}{6} = 0{,}4666$

$R_{(3,15)} = \frac{1}{6} = 0{,}1666$

d. Normalise criterion C4 (Age = Benefit) because the greater the value, the better.

$X_{ij} = \frac{Xij}{max\ Xij}$

$R_{(4,1)} = \frac{45}{74} = 0{,}6081$

$R_{(4,2)} = \frac{35}{74} = 0{,}4729$

$R_{(4,3)} = \frac{74}{74} = 1$

$R_{(4,4)} = \frac{43}{74} = 0{,}5810$

$R_{(4,5)} = \frac{52}{74} = 0{,}7027$

$R_{(4,6)} = \frac{56}{74} = 0{,}7567$

$R_{(4,7)} = \frac{43}{74} = 0{,}5810$

$R_{(4,8)} = \frac{37}{74} = 0{,}5$

$R_{(4,9)} = \frac{32}{74} = 0{,}4324$

$R_{(4,10)} = \frac{56}{74} = 0{,}7567$

$R_{(4,11)} = \frac{47}{74} = 0{,}6351$

$R_{(4,12)} = \frac{53}{74} = 0{,}7162$

$R_{(4,13)} = \frac{49}{74} = 0{,}6621$

$R_{(4,14)} = \frac{34}{74} = 0{,}4594$

$R_{(4,15)} = \frac{27}{74} = 0{,}364$

The following normalised matrix is obtained from the normalisation results of the normalised C1 criteria to the normalised C2 criteria.

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$$Rij = \begin{vmatrix} 0,4117 & 0,75 & 0,8333 & 0,6081 \\ 0,875 & 0,75 & 0,5 & 0,4729 \\ 1 & 1 & 0 & 1 \\ 0,4666 & 0,75 & 0,5 & 0,581 \\ 0,4666 & 0,5 & 0,4666 & 0,7027 \\ 0,7 & 0,5 & 0,5 & 0,7567 \\ 0,4666 & 0,5 & 0,5 & 0,581 \\ 0,7 & 0,5 & 0,5 & 0,5 \\ 0,7 & 0,5 & 0,4666 & 0,4324 \\ 0,3888 & 0,5 & 1 & 0,7567 \\ 0,4666 & 1 & 0,5 & 0,6351 \\ 0,4666 & 0,5 & 0,8333 & 0,7162 \\ 0,56 & 0,5 & 0,5 & 0,6621 \\ 0,4666 & 0,5 & 0,4666 & 0,4594 \\ 0,7 & 0,5 & 0,1666 & 0,3648 \end{vmatrix}$$

3. Step 3 is to find the Preference Value (Qi)

Q1 $=0,5\sum(0,4117*0,521)+(0,75*0,271)+(0,8333*0,146)+(0,60810,063)+0,5\prod(0,4117)^{0,521}*(0,75)^{0,271}*(0,8333)^{0,146}*(0,6081)^{0,063}=0,5\sum(0,2144+0,2032+0,4341+0,0383)+0,5\prod(0,6297*0,925*0,9737*0,9691)=0,445+0,2748=0,7198$

Q2 $=0,5\sum(0,875*0,521)+(0,75*0,271)+(0,5*0,146)+(0,4729*0,063)+0,5\prod(0,875)^{0,521}*(0,75)^{0,271}*(0,5)^{0,146}*(0,4729)^{0,063}=0,5(0,4558+0,2032+0,073+0,0297)+0,5\prod(0,9327*0,925*0,9037*0,9539)=0,3835+0,3718=0,7553$

Q3 $=0,5\sum(1*0,521)+(1*0,271)+(0*0,146)+(1*0,063)+0,5\prod(1)^{0,521}*(1)^{0,271}*(0)^{0,146}*(1)^{0,063}=0,5\sum(0,521+0,271+0+0,063)+0,5\prod(1*1*0*1)=0,4275+0=0,4275$

Q4 $=0,5\sum(0,4666*0,521)+(0,75*0,271)+(0,5*0,146)+(0,5810*0,063)+0,5\prod(0,4666)^{0,521}*(0,75)^{0,271}*(0,5)^{0,146}*(0,5810)^{0,063}=0,5\sum(0,243+0,2032+0,073+0,0366)+0,5\prod(0,6722*0,925*0,9037*0,9663)=0,2779+0,2714=0,5493$

Q5 $=0,5\sum(0,4666*0,521)+(0,5*0,271)+(0,4666*0,146)+(0,7027*0,063)+0,5\prod(0,4666)^{0,521}*(0,5)^{0,271}*(0,4666)^{0,146}*(0,7027)^{0,063}=0,5\sum(0,2430+0,1355+0,0681+0,0442)+0,5\prod(0,6722*0,925*0,8946*0,978)=0,2454+0,272=0,5174$

Q6 $=0,5\sum(0,7*0,521)+(0,5*0,271)+(0,5*0,146)+(0,7567*0,063)+0,5\prod(0,7)^{0,521}*(0,5)^{0,271}*(0,5)^{0,146}*(0,7567)^{0,063}=0,5\sum(0,3647+0,1355+0,073+0,0476)+0,5\prod(0,8304*0,8287*0,9037*0,9825)=0,3104+0,3055=0,6159$

Q7 $=0,5\sum(0,4666*0,521)+(0,5*0,271)+(0,5*0,146)+(0,5810*0,063)+0,5\prod(0,4666)^{0,521}*(0,5)^{0,271}*(0,5)^{0,146}*(0,5810)^{0,063}=0,5\sum(0,243+0,1355+0,073+0,0366)+0,5\prod(0,6722*0,8287*0,9037*0,9663)=0,2440+0,2432=0,4872$

Q8 $=0,5\sum(0,7*0,521)+(0,5*0,271)+(0,5*0,146)+(0,5*0,063)+0,5\prod(0,7)^{0,521}*(0,5)^{0,271}*(0,5)^{0,146}*(0,5)^{0,063}=0,5\sum(0,3647+0,1355+0,073+0,0315)+0,5\prod(0,8304*0,8287*0,9037*0,9572)=0,3023+0,2976=0,5999$

Q9 $=0,5\sum(0,7*0,521)+(0,5*0,271)+(0,4666*0,146)+(0,4324*0,063)+0,5\prod(0,7)^{0,521}*(0,5)^{0,271}*(0,4666)^{0,146}*(0,4324)^{0,063}=0,5\sum(0,3647+0,1355+0,0681+0,0272)+0,5\prod(0,8304*0,8287*0,8946*0,9485)=0,2977+0,2919=0,5896$

Q10 $=0,5\sum(0,3888*0,521)+(0,5*0,271)+(1*0,146)+(0,7567*0,063)+0,5\prod(0,3888)^{0,521}*(0,5)^{0,271}*(1)^{0,146}*(0,7567)^{0,063}=0,5\sum(0,2025+0,1355+0,146+0,0476)+0,5\prod(0,6112*0,8287*1*0,9825)=0,2658+0,2488=0,5146$

Q11 $=0,5\sum(0,4666*0,521)+(1*0,271)+(0,5*0,146)+(0,6351*0,063)+0,5\prod(0,4666)^{0,521}*(1)^{0,271}*(0,5)^{0,146}*(0,6351)^{0,063}=0,5\sum(0,243+0,271+0,073+0,04)+0,5\prod(0,6722*1*0,9037*0,9718)=0,3135+0,2951=0,6086$

Q12 $=0,5\sum(0,4666*0,521)+(0,5*0,271)+(0,8333*0,146)+(0,7162*0,063)+0,5\prod(0,4666)^{0,521}*(0,5)^{0,271}*(0,8333)^{0,146}*(0,7162)^{0,063}=0,5\sum(0,243+0,1355+0,1216+0,0451)+0,5\prod(0,6722*0,8287*0,9737*0,9791)=0,2726+0,2655=0,5381$

Q13 $=0,5\sum(0,56*0,521)+(0,5*0,271)+(0,5*0,146)+(0,6621*0,063)+0,5\prod(0,56)^{0,521}*(0,5)^{0,271}*(0,5)^{0,146}*(0,6621)^{0,063}=0,5\sum(0,2917+0,1355+0,073+0,0417)+0,5\prod(0,7392*0,8287*0,9037*0,9743)=0,2709+0,2696=0,5405$

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$Q14 = 0{,}5 \sum(0{,}4666 * 0{,}521) + (0{,}5 * 0{,}271) + (0{,}4666 * 0{,}146) + (0{,}4594 * 0{,}063) + 0{,}5 \prod(0{,}4666)^{0{,}521} * (0{,}5)^{0{,}271} * (0{,}4666)^{0{,}146} * (0{,}4594)^{0{,}063} = 0{,}5\sum(0{,}243 + 0{,}1355 + 0{,}0681 + 0{,}0289) + 0{,}5\prod(0{,}6722 * 0{,}8287 * 0{,}8946 * 0{,}9521) = 0,\ 0{,}2377+0{,}2372 = 0{,}4749$

$Q15 = 0{,}5 \sum(0{,}7 * 0{,}521) + (0{,}5 * 0{,}271) + (0{,}1666 * 0{,}146) + (0{,}3648 * 0{,}063) + 0{,}5 \prod(0{,}7)^{0{,}521} * (0{,}5)^{0{,}271} * (0{,}1666)^{0{,}146} * (0{,}3648)^{0{,}063} = 0{,}5\sum(0{,}3647 + 0{,}1355 + 0{,}0243 + 0{,}0229) + 0{,}5\prod(0{,}8304 * 0{,}8287 * 0{,}7697 * 0{,}9384) = 0{,}2737+0{,}2485 = 0{,}5222$

4. Step 4 is to rank based on the preference values that have been calculated in step three so that the highest to lowest values are obtained which can be seen in table 5 below..

Table 5. Ranking results

Alternatives	Name	Qi Values	Rank
A2	Junita Sari	0,7553	1
A1	Sunarmi	0,7198	2
A6	Amson Sinaga	0,6159	3
A11	Nursiah Lubis	0,6086	4
A8	Dedy Sariaman Simbolon	0,5999	5
A9	Eferoni Hia	0,5896	6
A4	Nauli Matondang	0,5493	7
A13	Dorian Nababan	0,5405	8
A12	Martua Tampubolon	0,5381	9
A15	Jafar	0,522	10
A5	Agus Pangaribuan	0,5174	11
A10	Surianto	0,5146	12
A7	Rizky Abdillah	0,4872	13
A14	Pirlian Zalukhu	0,4749	14
A3	Nurhaida Panjaitan	0,4275	15

It can be seen in table 5, that A2 with a result of 0.7553, A1 with a result of 0.7198, A6 with a result of 0.6159, A11 with a result of 0.6086 and A8 with a result of 0.5999 are 5 alternatives that are eligible to receive Covid-19 social assistance.

3. CONCLUSION

From the research results, it is concluded that this system can assist employees in finding recipients of covid-19 social assistance in 2021 until this system is still needed. The calculation process in this system can be done efficiently, so that the process does not take a long time and minimises the possibility of errors in finding prospective recipients of social assistance. A total of 15 data on salons receiving assistance that have been selected based on four criteria which are used as sub-assessments. In this assessment, of course, it produces a decision where prospective recipients are entitled to receive social assistance. The final result after applying the WASPAS method in the selection was decided that on behalf of Junita Sari obtained the highest final value of 0.7553 so that she became the first recommendation entitled to receive social assistance.

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