

# Decision Support System For Home Surgery Assistance Recipient Using Technique For Order Performance By Similarity To Ideal Solutions (TOPSIS) Method (Case Study: Kotapulu Village, Dolo District)

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## ARTICLE INFO

## ABSTRACT

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**Introduction:** This study aims to create a decision support system for home renovation aid recipients that can speed up and simplify the decision-making process in providing home surgery assistance, so that home surgery assistance is more objective in accordance with community priorities or on target using the TOPSIS method. The TOPSIS method uses the principle that the chosen alternative must have the closest distance from the positive ideal solution and the longest (farthest) distance from the negative ideal solution from a geometric point of view by using the Euclidean distance (distance between two points) to determine the relative proximity of an alternative to the optimal solution. The criteria used in the system are land ownership, roof conditions, wall conditions, and floor conditions. The data used by the Author is 210 original data from the Kotapulu village office so that the system created by the Author can make it easier for the Kotapulu village office to determine the recipient of the house renovation assistance only by inputting population data based on the survey results.

## 1. Introduction

The decision support system is a system that is used as a tool for decision-makers but not to replace the judgment of decision-makers. In the decision-making process, data and information processing carried out by DSS is designed to produce various alternatives offered to decision-makers in carrying out their duties [1], [2]. The method used in the decision-making system for home surgery beneficiaries is the Technique For Order Performance By Similarly To Ideal Solutions (TOPSIS) method, where the TOPSIS method is a method that not only calculates the distance from the positive ideal solution but also calculates the distance from the negative ideal solution to provide recommendations for results that are right on target and as expected [4], [5].

House renovation is an annual program held by the government in order to improve the quality of housing for underprivileged people throughout Indonesia. Kotapulu Village is one of the villages that runs a home renovation assistance program from the government, the large number of people who are entitled to receive home renovation assistance makes Kotapulu Village Officials have to be selective in providing house renovation assistance, and the selection of routine and fast home renovation assistance recipients is needed so that they can provide feedback. Prompt feedback and repair in the Kotapulu Village environment [6]. The problem that often arises, namely the inaccurate

distribution of home renovation assistance, causes people who do not deserve to receive home renovation assistance. On the contrary, people who deserve home renovation assistance are not feasible due to the absence of a good standard of assessment, so the assessment made is only an estimate. The criteria that will be used in determining the recipients of house renovation assistance are Land Ownership, Wall Conditions, Floor Conditions, and Roof Conditions.

## 2. Method

### 2.1 Data Collection

The data collection techniques in conducting this research are as follows:

1. Observation
2. Observations were made in this study by visiting the Kotapulu village office to find out the existing problems and solutions to solve them, as well as to find out what data will be needed in this research.
3. Interview  
Interviews conducted in this study were conducted with the village head, village secretary, and Kotapulu village officials. This was done to find out what the criteria were in determining the recipients of house renovation assistance.
4. Literature review  
The literature study carried out in this study was to collect data sourced from various books that were used as references and search using internet media to obtain additional data needed.

### 2.2 Research site

In making a decision support system for surgical aid recipients, the authors conducted research in Kotapulu Village, Sigi Regency.

### 2.3 Software Design

In making the software, the stages carried out are designing a Decision Support System for Home Recipients with the Technique For Order Performance By Similarly To Ideal Solutions (TOPSIS) Web-based method.

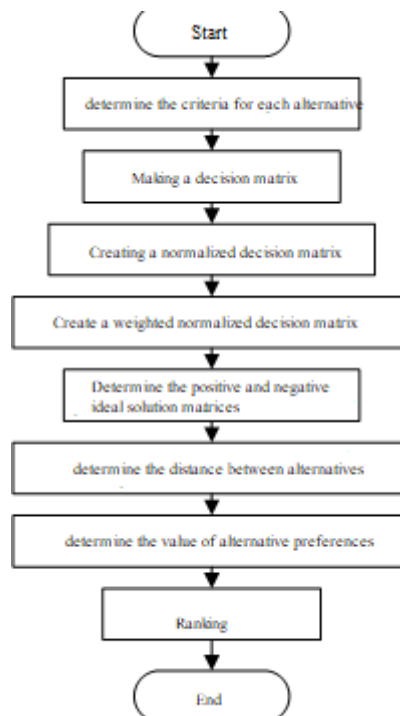


Fig 1 TOPSIS Algorithm Flowchart

### 2.4 Software Development

Making software, in addition to preparing the software to be used, making designs, databases and coding. There are several stages carried out in the decision support system for determining

exemplary teachers using the Web-based TOPSIS method, namely the design of display designs and system databases.

## 2.5 Software Testing

At the software testing stage, all functions of the academic value program that have been created must be thoroughly tested to ensure that there are no bugs or errors in the program so that the program created is as expected [8]. The Author uses Blackbox Testing as a system testing method. At this stage, software testing is carried out, which includes the ability of the system to solve the problem of selecting an exemplary teacher properly [9]. Testing will be carried out using Black-Box, which includes User Login testing, Beneficiary data testing, Criteria Data Testing, Calculation Results Testing, and Ranking Results Testing.

## 3. Discussion and Results

### 3.1 Home surgery beneficiary system

In the decision support system for determining the recipient of home renovation assistance, there are several input forms to enter data, including the following:

No	Nomor KK	Nama KK	Jumlah Tanggungan	Usia	Jenis Kelamin	Status	Alamat	Proses
1	2147483647	Mohammad Gazzali	3	47	Laki-laki	Kepala Keluarga	RT 001 DUSUN 001	<input type="checkbox"/>
2	2147483647	Jumadi Awal	4	40	Laki-laki	Kepala Keluarga	RT 001 DUSUN 001	<input type="checkbox"/>
3	2147483647	Ismail	3	38	Laki-laki	kepala keluarga	RT 001 DUSUN 001	<input type="checkbox"/>

Fig 2 Population menu form

Form assessment is used for the process of assessing the population of prospective home renovation aid recipients. The assessment form can be seen in Fig 3 below:

No	Nomor KK	Nama KK	Proses
1	2147483647	Ismail	<input type="checkbox"/>
2	2147483647	Jumadi Awal	<input type="checkbox"/>
3	2147483647	Mohammad Gazzali	<input type="checkbox"/>

Fig 3 Assessment Menu Form

Form results of the assessment are used to display data on the ranking results of prospective home surgery aid recipients. TOPSIS Process Form can be seen in Fig 4 below:

Ranking	No KK	Nama	Hasil
1	2147483647	Jumadi Awal	1
2	2147483647	Ismail	0.4254
3	2147483647	Mohammad Gazzali	0

Fig 4 TOPSIS Process Menu Form

### 3.2 System Test

System testing is carried out using the Black-Box method, where testing is carried out on user logins, teacher data, criteria data, calculation results, and ranking results. After that, the algorithm is tested again [10], [11]. [12] [13].

### 3.2.1 Black-Box Test Results

Testing the function of the decision support system for home renovation assistance recipients can be seen in Table 1 below:

Table 1 System Function Testing Table

No	Tested function	Result Expectations	Test result
1.	Profile	Can input data admin username and password	Well
2.	Data Entry Population	Can input and save population data	Well
3.	Criteria and sub-Data Input Criteria	Can input and store criteria weight values and sub-criteria	Well
4.	Assessment Data Input	Can input and save assessment data Population	Well
5.	Data entry rating result	Can input and save result data	Well
6.	Print Report	Can print result data Evaluation	Well

The results of system testing can be said to be good because the tested forms are in accordance with their respective functions based on input data and observations. Here are some system test tables based on each process in the system.

Table 2 Admin data test

Data input	Which is expected	Observation	Results testing
Enter admin data such as username and password	When the data is inputted and stored then data it will be saved to <i>database</i> and can used to access the system	Can work well, in accordance with the which is expected	Well
	When not all data entered or data is wrong is inputted, then the system refuse to save the data to the database	Can work well, in accordance with the which is expected	
Change admin data which has saved to in system	When the admin wants change admin data then the data is successful changed and will be saved into the system	Can work well, in accordance with the which is expected	Well

Table 3 Population data test

Input data	Which is expected	Observation	Results testing
<i>Input</i> population data such as recipient id, family number, family name, number of dependents, age, status, and address	When the data is inputted and stored, the data will be saved to the <i>Databases</i>	Can function properly, according to which is expected	Well
	When not all data is entered, or data is entered incorrectly, the system refuses to save the data to database	Works well, as expected	
Changing population data that has been stored in the system	When the admin wants to change population data, the data that has been successfully changed will be saved to the in system	Works well, as expected	Well
Deleting resident data that has been stored in the system	When the admin wants to delete population data, the data that has been successfully changed will be stored in the database System	Works well, as expected	Well

Table 4 criteria and sub-criteria data testing

Input data	Which is expected	Observation	Results testing
<i>Input</i> data	When the data is inputted and	Can work	Well
criteria and	stored then data	well,	Well
Sub-criteria	it will be saved to	in accordance with the	Well
like id	<i>Databases</i>	which is expected	Well
criteria, id	When not all	Can work	Well
sub-criteria,	input data or data	well,	Well
criteria, name	wrong Input then	in accordance with the	Well
sub-criteria and weight	the system refuses to save the data to database	which is expected	Well
Changing population data that has been stored in the system	When the admin wants to change the criteria and sub-criteria data, the data that has been successfully changed will be stored in the database System	Works well, as expected	Well
Deleting	When the admin wants to	Works well, as	

Input data	Which is expected	Observation	Results testing
resident data that has been stored in the system	delete the criteria and sub-criteria data, the data that has been successfully changed will be stored in the database system	expected	Well

Table 5 Population Assessment Data Testing

Input data	Which is expected	Observation	Results testing
<i>Input</i> population assessment data based on population data and input criteria data	When the data is inputted and stored, the data will be saved to the <i>database</i>	Can function properly, according to which is expected	Well
	When not all data is entered, or data is entered incorrectly, the system refuses to save the data to database	Works well, as expected	
Changing population assessment data that has been stored in the system	When the admin wants to change the population assessment data, the data that has been successfully changed will be stored in the database system	Works well, as expected	Well
Deleting population assessment data has been saved into the system	When the admin wants to delete population assessment data, the data successfully changed will be saved into the system	Works well, as expected	Well

### 3.2.2 TOPSIS Algorithm Testing

Table 6 Rank of Alternative

No	Case Study Original Data		System calculation results	
	KK name	Description	KK name	Final score
1	Early Friday	Heavy Damage	Early Friday	0.5774
2	Abdul Rahim	Heavy Damage	Abdul Rahim	0.7819
3	Suriadin	Heavy Damage	Suriadin	0.6572
4	Astien	Heavy Damage	Astien	0.7443
5	Jumadi Liemer	Heavy Damage	Jumadi Liemer	0.7819
6	Sumarlin	Heavy Damage	Sumarlin	0.6572
7	Muhammad Hendro Jaya	Heavy Damage	Muhammad Hendro Jaya	0.6572
8	Hasanuddin	Heavy Damage	Hasanuddin	0.6566
9	ofanita	Heavy Damage	ofanita	0.6566



10	Saharudin	Heavy Damage	Supran	0.6572
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Based on the test results in table 6, there are nine alternatives that have the same final value between the original case study data and the system calculation, so the calculation of the percentage of success of the Topsis Method is as follows:

$$\frac{9}{10} \times 100\% = 90\%$$

So for calculating the percentage of success of the Topsis method on the system is 90%, it can be said that the TOPSIS method can be applied to the decision support system for home surgery recipients.

#### 4. Conclusion

Based on the results of testing and analysis of the decision support system for determining the recipient of home renovation assistance, it can be concluded:

1. The decision support system for home renovation aid recipients using the website-based TOPSIS method can help the Kotapulu Village Office in determining the recipient of home renovation assistance.
2. Based on the results of the calculation of the survey questionnaire on the satisfaction of using the system, the percentage of satisfaction with the use of the system is 80%.
3. From the results of the Blackbox test, it can be seen that the functions applied to the system can run well as expected.
4. From the results of the validation of the algorithm, there are nine alternatives that have the same final value between the original case study data and the system calculation, so for calculating the percentage of success of the Topsis method on the system is 90%, it can be said that the TOPSIS method can be applied to the decision support system for home surgery recipients.

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