



Decision Support System Direct Cash Village Fund Using TOPSIS Method

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ABSTRACT

The COVID-19 pandemic became a world problem in early 2020. One of the impacts is the decline in the Indonesian economy. One of the efforts made by the Indonesian government to overcome this is by refocusing the budget from various existing budget posts. The Village Fund is one of the refocused budget items. The village fund which was originally intended for village development and development was transferred to a cash transfer fund called the Village Fund Direct Assistance (BLT DD). However, in practice, the execution of the Village Fund Direct Assistance faced many problems. Quoted from National Kompas.com, survey results from the Indonesian Political Opinion (IPO) survey agency showed as many as 51.3 percent of respondents assessed that the direct cash assistance (BLT) program was not right on target. One of the causes of this BLT DD distribution error is the absence of a system that can assist in data processing to determine BLT DD recipients accurately and efficiently. This study resulted in a Decision Support System that assists village government agencies in determining BLT DD recipients. The decision support system using the TOPSIS method can provide recommendations on which citizen assessment results need to be prioritized to get BLT DD, so that it can be used as information in the form of very valuable recommendations in determining residents who receive Village Cash Direct Assistance (BLT DD) for the community.

Keywords: covid-19, web-based, dss, topsis.

1. INTRODUCTION

COVID-19 is spreading all over the world, it has become a pandemic and is declared by the World Health Organization [1][2]. After the virus-infected and caused death in China, then the virus spread to Italy and other European countries [3][4]. COVID-19 became a global problem in early 2020. Governments around the world are still trying to stop COVID-19 from spreading and are incessantly coping with the effects of COVID-19, even though they are overwhelmed. The Indonesian economy has declined due to the COVID-19 pandemic. One of the efforts and steps of the Indonesian government in overcoming this is to refocus the budget from various existing budget posts for handling COVID-19. And one of the budget items that was also refocused was the Village Fund. Village funds, which were intended for village

development and development, were transferred to cash assistance funds called the Village Fund Direct Assistance (BLT DD) [5].

Kaliputih Village is one of the villages in Alian District, Kebumen Regency whose people have been affected by the COVID-19 pandemic, most of the people in this village have jobs as farmers and laborers, so many have lost their jobs due to the COVID-19 pandemic. So that the Village Fund Direct Cash Assistance (BLT DD) helps the economy of the residents during this pandemic. Then the Kaliputih village government said that this Village Fund Direct Cash Assistance (BLT DD) could continue to help villagers who were considered poor or economically incapable. However, in practice, the execution of the Village Fund Direct Assistance (BLT DD) faces many problems. Quoted from National Kompas.com, survey results from the Indonesian Political Opinion (IPO) survey agency showed as many as

51.3 percent of respondents assessed that the direct cash assistance (BLT) program was not right on target[6]. The village government's weak supervision and observation of BLT DD made some residents who were entitled to receive assistance not even receive BLT DD assistance. Meanwhile, some residents who were not entitled to receive assistance even received BLT DD.

The current obstacle is that there is still no system that can help analyze data and process data handling quickly and efficiently to determine residents who are eligible for this Village Fund Direct Assistance (BLT DD). So we need a system intending to solve and provide solutions more quickly and efficiently to an existing problem. Based on some of the problems above, one option to provide a solution regarding the inaccuracy of the distribution of BLT DD, which can be applied by using a computer-based system is a website-based decision support system. With a decision support system for determining residents who are eligible to receive BLT DD, it is hoped that it can help and facilitate the village government in making decisions on the list of BLT DD recipients more quickly so that it can directly impact the community and village government in anticipating errors in the distribution of Village Fund Direct Cash Assistance. BLT DD) this.

2. MATERIAL AND METHOD

The stages in this research are described in a flowchart. The flowchart is a diagram that is considered capable of describing a stage in the system. Flowcharts help understand how a process works [7]. The stages in this research are illustrated in Figure 1 below.

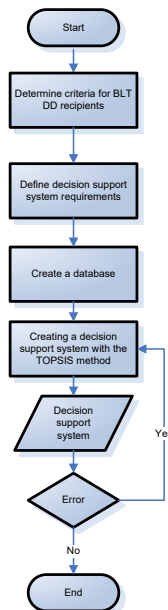


FIGURE 1. Steps of research on making a decision support system from start to finish

The research begins with finding and determining the criteria for BLT DD beneficiaries. Search and determination of criteria are done by conducting interviews and observations. After the criteria are determined, the next step is to determine the need for a decision support system to be built. At this stage the menu, features, and methods used for the decision support system are determined. The method used and selected is the TOPSIS method. After the system requirements have been created, the next step is to create a database to accommodate data on criteria, weights, and alternative solutions that exist in the decision support system. Furthermore, a decision support system is made using a website-based programming language. The programming language code combined with the database will produce a decision support system that suits the needs of decision-makers. When a decision support system has been created, the system will be tested. If the system has not worked following the analysis and requirements that have been determined, the system will be reviewed by improving the program code. If the system has worked following the analysis and needs, the decision support system can already be used by decision-makers.

2.1. The Technique for Order of Preference by Similarity to Ideal Solution

For individuals and organizations, decision-making is an important part of everyday life [8]. The algorithm that can be used to design alternatives in a decision support system is The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) [9]. Various multi-attribute decision-making problems can be solved with the help of TOPSIS [10] [11].

- a. Create a normalized decision matrix. TOPSIS requires a performance rating of each alternative A_i on each normalized C_j criterion. The formula that can be used for the normalization process can be seen in the equation:

$$r_{ij} = \frac{X_{ij}}{\sum_i^m X_{ij}^2} \tag{1}$$

- b. Create a weighted normalized decision matrix. The positive ideal solution A^+ and the negative ideal solution A^- can be determined based on the normalized weight rating (y_{ij}). The formula that can be used for this process can be seen in the equation:

$$y_{ij} = w_i r_{ij} \tag{2}$$

- c. Determine the positive ideal solution matrix and negative ideal solution matrix. Determine the

Positive Ideal Solution (A^+) and the Negative Ideal Matrix (A^-) can be seen in the equation:

$$A^+ = (y_1^+, y_2^+, \dots, y_n^+) \tag{3}$$

$$A^- = (y_1^-, y_2^-, \dots, y_n^-) \tag{4}$$

- d. Determine the distance between the value of each alternative with a positive ideal solution matrix and a negative ideal solution matrix. The distance between alternative A_i with a positive ideal solution and a negative ideal solution is formulated as an equation:

$$D_i^+ = \sqrt{\sum_{j=1}^n (y_{ij}^+ - y_{ij})^2} \tag{5}$$

$$D_i^- = \sqrt{\sum_{j=1}^n (y_{ij} - y_{ij}^-)^2} \tag{6}$$

- e. Determine the preference value for each alternative. Determine the preference value for each alternative. A larger V_i value indicates that the alternative A_i is preferred, the formula can be seen in the equation:

$$V_i = \frac{D_i^-}{D_i^- + D_i^+} \tag{7}$$

3. RESULTS AND DISCUSSIONS

After getting a clear picture of the system to be made, the next step is to design it. The design stage is carried out to provide a clear general picture to users and a complete design of the system to be developed for the parties involved in the development of this system. Constraints and contexts to be modeled in the system are defined using context diagrams [12]. To map the context can use context diagrams [13]. The Context Diagram is surrounded by the elements that interact with it [14]. The process of developing a system will run smoothly if the context diagram to the lower-level data flow diagram does not

change [15]. Context diagrams are used to provide an overview of the external entities involved, the inputs processed and the information generated. In this Context Diagram, there are two entities, namely admin and user. The context diagram in this study can be seen in Figure 2.

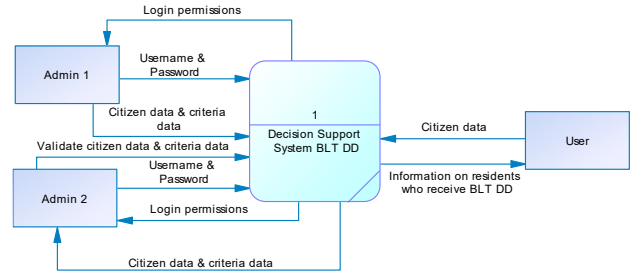


FIGURE 2. Context diagram that describes in general a decision support system

Figure 2 above illustrates that the system interacts with three entities, namely admin 1, admin 2, and user. Admin 1 logs in to get access rights and can then input citizen data and input criteria data. Admin 2 logs in to validate the data and upload the calculation results to the user page. Users do not need to log in to access the system. Users can see who is recommended as BLT DD recipients transparently or open to the public.

The system starts with weight management criteria, the system is made according to the system design that has been made. Admin can change or add weights that will be used for the process of determining residents who need to be prioritized in the priority recipients of Village Fund Direct Cash Assistance (BLT DD). The design of a decision support system database to determine the recipients of the Village Fund Direct Cash Assistance (BLT DD) using the TOPSIS method requires 5 tables including the admin table, criteria table, alternative table, matrix value table, and preference value table. The database table on the decision support system can be seen in Figure 3 below.

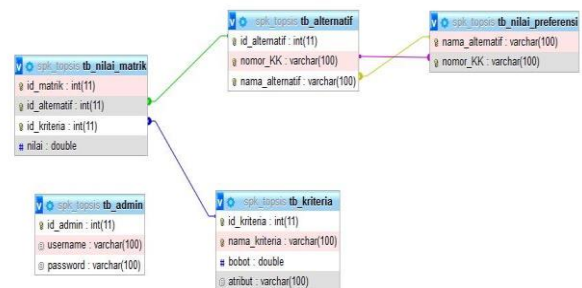


FIGURE 3. The decision support system database consists of five interrelated tables

The `tb_admin` is used to store admin data, `tb_kriteria` is used to store criteria data, `tb_alternatif` is used to store citizen data, `tb_nilai_matrik` is used to store valuable data based on the data in the alternative table, and `tb_nilai_preferensi` is used to store the calculated data.

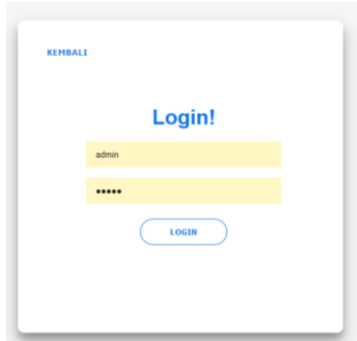


FIGURE 4. The login page display is the page used by the admin to carry out the login process

Several types of login systems can be used, such as punch cards, user id, or passwords [16]. The login form is intended for protection and protection from unauthorized persons entering the system. System security is so important to maintaining data in an information system [17][18]. This form serves to enter a username and password, then the system will check whether the entered username and password match or not with the data in the database. The implementation of the login page display can be seen in Figure 4.

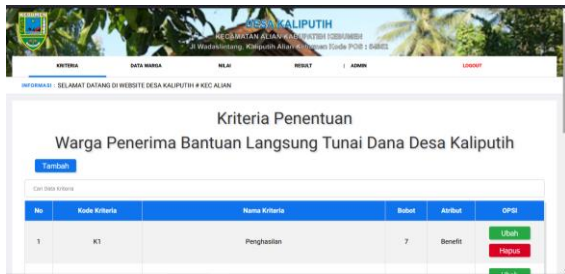


FIGURE 5. The criteria page view is used by admins to add, delete, or update data from existing criteria

In Figure 5 there are 3 buttons, the first is the “Tambah” button which functions to add criteria data if there are new data/criteria, then there is “Ubah” which functions to change or update the data if there are errors or mistakes when adding data, then the last there is a button “Hapus” which serves to delete the existing criteria data.

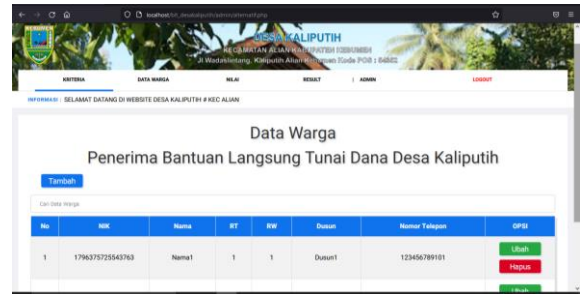


FIGURE 6. The alternative page view is used by the admin to input alternative data

Figure 6 is used to add data for new residents as a requirement in the process of determining the list of residents who receive direct cash assistance from village funds using the TOPSIS method.

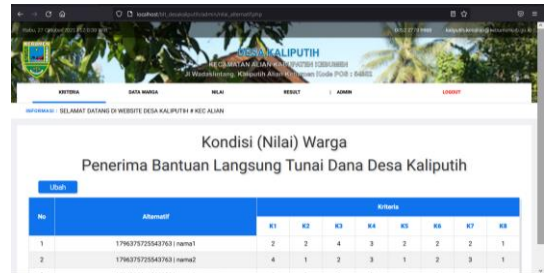


FIGURE 7. Alternative weight value page view

Figure 7 is a display of the system used by the admin for assigning weights to each alternative which functions to process TOPSIS calculation data to get the weight value of each alternative. This weight value is obtained from the weight value of the criteria that have been determined.

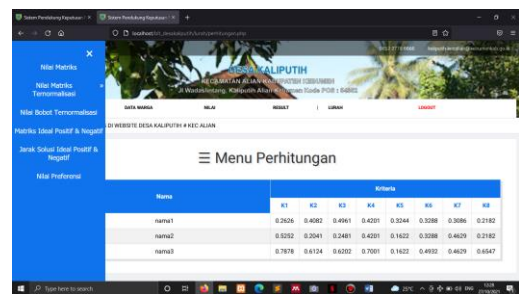
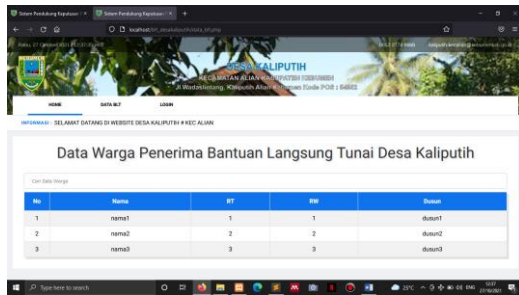


FIGURE 8. On the display of this calculation page, there is TOPSIS calculation data processing for determining residents who receive direct cash assistance from village funds

Figure 8 is a system display that displays several calculation processes made in several tabs - menus in the form of matrix values, normalized matrix values, normalized weight values, positive & negative ideal matrices, positive & negative ideal solution distances, and preference values.



No	Nama	IP	Email
1	nama1	1	email1
2	nama2	2	email2
3	nama3	3	email3

FIGURE 9. Data page for residents who receive direct cash assistance from village funds

The data that was previously searched for, calculated by the admin, and uploaded by the validator will then appear as shown in Figure 9 with the intention that information can reach the community. Based on the results of trials conducted by the Village Head on the system, the system can run well and the functional system has been able to produce the expected output. The decision support system using the TOPSIS method can provide recommendations on which citizen assessment results need to be prioritized to get BLT DD, so that it can be used as information in the form of very valuable recommendations in determining residents who receive Village Cash Direct Assistance (BLT DD) for the community. The results of calculations using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method are used as recommendations for determining the recipients of Village Fund Direct Cash Assistance (BLT DD) for village government agencies located in the Kaliputih Village area, Kebumen, Central Java, Indonesia.

CONCLUSION

This research has produced a decision support system for determining the recipients of the Village Fund Direct Cash Assistance using the website-based TOPSIS method for village government agencies in Kaliputih Village, Kebumen, Jawa Tengah, Indonesia. The system can determine residents who need to be prioritized in the priority of BLT DD recipients more quickly, precisely, effectively, and efficiently so that it can be used as very valuable information in decision making. In addition, testing the decision support system for determining the recipients of the Village Fund Direct Cash Assistance using the TOPSIS method shows the system can run well.

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