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Application of Electre Method in Election of Regional Head Candidates

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ABSTRACT

The Regional Head is a government in the region that is related to the authority they have in managing and regulating regional autonomy. Regional Heads are community protectors who head an area for the advancement of the region. The progress of an area depends on a regional leader. One of the requirements to become a regional head is that he must be registered with a party. A party is a political organization that follows a certain ideology that is formed with a general-purpose. In the NasDem party, Deli Serdang Regency, there was a problem where the process of selecting regional head candidates was still carried out manually without any system assistance. The ELECTRE method is a multi-criteria decision-making method based on the ranking concept using paired comparisons of alternatives based on each appropriate criterion. The ELECTRE method is used in conditions where alternatives that do not meet the criteria are eliminated, and suitable alternatives can be generated. Selection of candidates for the regional head is carried out using various criteria, but some criteria are very effective in selecting candidates for the regional head, namely KTP, Education, Organizational History, Work Experience, Vision & Mission. The percentage of accuracy is obtained from 10 times the electre calculation experiments and 1x error is found because the alternatives for each candidate are similar or the same as the other candidates causing the results do not to appear. Because from 10 experiments and 1 failure or 9 out of 10 from the Electre calculation experiments, a result is obtained, it can be concluded that the level of accuracy is (9/10) * 100% = 90%Application of Electre Method in Election of Regional Head Candidates

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1. INTRODUCTION

The Regional Head is a government in the region that is related to the authority they have in managing and regulating in accordance with regional autonomy. Regional Heads are community protectors who head an area for the advancement of the region. The progress of an area depends on a regional leader. Many residents want to devote themselves to protecting the community by becoming candidates for the regional head. One of the requirements to become a regional head is that he must be registered with a party. A party is a political organization that follows a certain ideology that is formed according to a general goal. There are several parties registered in Indonesia in the 2019 election, namely 14 parties (PKB, Garuda, PDI, Golkar, NasDem, Gerindra, Berkarya,

PKS, Perindo, PPP, PSI, PAN, Hanura, Democrat). One of the parties that are nominated for regional head elections that are appointed in this study is the NasDem party.

The NasDem Party is the only new party that passed as a participant in the 2014 General Election. Even the NasDem Party made the history of getting serial number 1 as a participant in the 2014 General Election, the NasDem Party is also a new party that has many enthusiasts due to its long political experience. also have extensive access to networks and senior political figures. The large number of Regional Head candidates who propose to the party to be promoted by the party to become the Regional Head candidate at the Deli Serdang Regency level makes parties confused in choosing the Regional Head candidate. Of the many candidates for the regional head, of course, it is very difficult for us manually to choose who is a suitable candidate, therefore we use technology, namely the Decision Support System to elect the candidate for the regional head. In the NasDem party, Deli Serdang Regency, there was a problem where the process of selecting regional head candidates was still carried out manually without any system assistance. Selection of regional head candidates is carried out with various criteria, but some criteria are very effective in selecting regional head candidates, namely KTP, Education, Organizational History, Work Experience, Vision & Mission, which in these criteria greatly affect the selectivity of regional head candidates. With the existence of a decision support system, it will make it easier to select candidates for the head of the region.

Technology is one of the human needs that must be met today, both in the business, social and political world. Especially information technology is used not only as a support but also as a primary requirement that can be used to provide information quickly. Applications and instructions related to computer programming can do things that help alleviate human work. One of them is in the Decision Support System for the Election of Candidates for Regional Head of Deli Serdang Regency.

Decision Support System (DSS) or commonly referred to as Decision Support System (DSS) is a system with the ability to solve problems, or also the ability to communicate for semi-structured and unstructured conditions[1]. The Decision Support System has several methods including the Simple Additive Weighting (SAW) method, the Weighted Product Method (WP), the Topsis Method, Electre, and Analytical Hierarchy Processes (AHP) Methods[2], [3]. The advantage of a Decision Support System is that it saves the time it takes to solve problems, such as various complex and unstructured problems[4]. Produce a solution faster and the results are reliable. Decision Support System for the election of Regional Head candidates using the Electre method which is used as decision support for decision making in the NasDem Party, Deli Serdang Regency.

ELECTRE is a multi-criteria decision-making method based on the Outranking concept that uses pairwise comparisons of alternatives based on appropriate criteria. The development of this method is unfortunately good for increasing the ability to make decisions in the election of regional head candidates for the NasDem party.

2. RESEARCH METHOD

According to Mahmudi (2019: 863), the ELECTRE method is a multicriteria decision-making method based on the ranking concept that uses paired comparisons with alternatives based on each appropriate criterion[5][6], [7]. The ELECTRE method is used in conditions where alternatives that do not meet the criteria are eliminated, and suitable alternatives are generated[8], [9]. ELECTRE is used for cases where many alternatives but few criteria are involved. A biased alternative is said to dominate the other alternatives if one and/or more of its criteria exceeds (compared to the criteria of the other alternatives) and is the same as the remaining criteria[10], [11].

According to Setiawan (2015: 84), the Electre method is one of the methods used to rank and determine the best alternative. It is intended that Electre is used for cases with many alternatives but few criteria involved. The basic concept of the Electre method is to deal with out-ranking relationships using pairwise comparisons between the alternatives under each criterion separately. Ai outranking relationship. Aj explains that even when the 1st alternative does not dominate the j-alternative in a quantitative way, then the decision-maker can still risk Ai about being almost certainly better than Aj. Alternatives are said to be dominated if there are other alternatives that outperform them in one or more attributes and are the same in the remaining attributes. Outranking

here is to take the final result of all paired comparisons of each alternative on each criterion, where the ranking with the most results is the best[12].

3. RESULTS AND DISCUSSION

The Electre method is used in conditions where unsuitable alternatives, as well as criteria, are eliminated and suitable alternatives are generated. Electre is used for cases where many alternatives but few criteria are involved,

The steps taken for problem-solving using the Electre method are as follows:

The employee performance appraisal form and interviews follow the standard values set by the company with value criteria, namely:

Table 1. Assessment criteria

BOBOT	NILAI	KETERANGAN
5	81 – 100	sangat baik
4	61 – 80	Baik
3	41 – 60	Cukup
2	21– 40	Buruk
1	<20	sangat buruk

1. Identity card

Table 2. Identity card criteria

NO	KRITERIA	SKOR NILAI
1	Memiliki KTP	100
2	Tidak Memiliki KTP	10

2. Last Education

Table 3. Last education criteria

NO	KRITERIA	SKOR NILAI
1	SMA	20
2	Diploma	40
3	S1	60
4	S2	80
5	S3	100

3. Organizational History

Table 4. Organization History Criteria

NO	KRITERIA	SKOR NILAI
1	1 Riwayat	20
2	2 Riwayat	40
3	3 Riwayat	60
4	4 Riwayat	80
5	5 Riwayat	100

4. Work Experience

Table 5. Work Experience Criteria

NO	KRITERIA	SKOR NILAI
1	0-1 pengalaman	25
2	2-3 pengalaman	50
3	4-5 pengalaman	75
4	+5 pengalaman	100

5. Vision and Mission

Table 6. Vison and Mission Criteria

NO	KRITERIA	SKOR NILAI
1	1-3 point	25
2	1-5 point	50
3	1-7 point	75
4	1-10 point	100

So that the following table is obtained:

Table 7. Match Rating

KTP	PD	RO	PK	VM	NILAI	RATING
Memiliki KTP	SMA	1 Riwayat	0-1 pengalaman	1-3 point	1	sangat baik
	Diploma	2 Riwayat	2-3 pengalaman	1-5 point	2	baik
	S1	3 Riwayat	4-5 pengalaman	1-7 point	3	cukup
	S2	4 Riwayat	+5 pengalaman	1-10 point	4	buruk
Tidak Memiliki KTP	S3	5 Riwayat			5	sangat buruk

Information :
KTP = identity card
PD = Last education
RO = Organization History
PK = Work Experience
VM = Vision and Mision

The steps taken in solving problems using the ELECTRE method are as follows:
There are three alternatives, namely the names of people running for regional head candidates, namely:

a. Erwan = A1
b. Zulhamdani Npitupulu = A2
c. Legimmune = A3

There are five criteria used, namely:

a. KTP = C1
b. Last Education = C2
c. Organization History = C3
d. Work experience = C4
e. Vision & Mission = C5

The rating of the suitability of each alternative on each criterion is rated 1 to 5 with the following conditions:

1 = Very bad,
2 = Bad,
3 = Enough,
4 = OK,
5 = Very good.

Meanwhile, the level of importance which will be used as preference weight for each criterion is also assessed by 1 to 5, provided that:

1 = Very low,
2 = Low,
3 = Enough,
4 = Height,
5 = Very high.

Table 8. Alternatives to Each Criterion

Alternatif	Kriteria				
	C1	C2	C3	C4	C5
A1	1	5	5	2	4
A2	1	2	1	4	4
A3	1	3	3	2	1

The Alternative table shows the suitability rating of each alternative on each criterion. Because each value assigned to each alternative in each criterion is the value of suitability where the greatest value is the best, all the criteria given are assumed to be the profit criteria.
The decision-maker gives preference weights as:
W = (5, 3, 4, 4, 2)
The decision matrix formed from the suitability table is as follows:

$$X = \begin{matrix} 15524 \\ [12344] \\ 13121 \end{matrix}$$

Matrix E provides the order of choice for each alternative, that is if the alternative Ak is a better alternative than Al. Thus, the rows in matrix E that have the least number of them can be eliminated. Thus, the first and second rows can be eliminated, and the remaining row three. The value of e32 = 1 indicates that the third alternative is better than the second alternative.

Table 9. Electre Calculation Results

Nama	Matrik1	Matrik2	Matrik3	Hasil
Erwan	-	0	0	Gagal
Zulhamdani Npitupulu	0	-	0	Gagal
Legimun	0	1	-	Berhasil

The percentage of accuracy is obtained from 10 times the electre calculation experiments and one error is found because the alternatives of each candidate are similar or the same as the other candidates causing the results do not to appear. Because from 10 experiments and 1 failure or 9 out of 10 from the electre calculation experiments, a result is obtained, it can be concluded that the level of accuracy is (9/10) * 100% = 90% Accuracy Level.

The implementation of the decision support system for choosing a laptop using the analytical hierarchy process method can be seen in the screenshot (print screen) as follows.

1. Login Form Display
   Login is the main step in being able to enter the system, login is a start menu display of the program where the admin will fill in the username and password to enter the menu. The login display image can be seen in the image below:

Figure 1. Login Page

2. Alternative Form View
   The alternative form display here only displays data in the form of regional head candidates. An alternative form image can be seen in the following image:

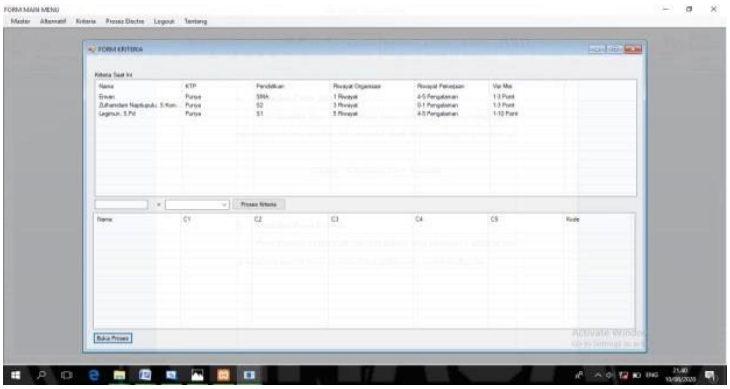

Figure 2. Alternative Page

3. Result Display
   In this view is the final result of the calculation of the criteria for regional head candidates, the results obtained are as follows:

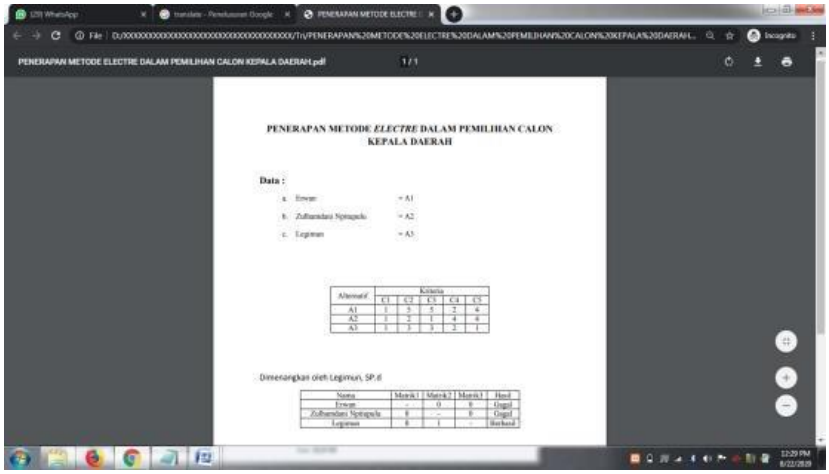

Figure 3. Result Display

4. CONCLUSION

The application of Electre to the decision support system for the election of regional head candidates is very efficient because, with this application, the percentage of possible candidates can be found quite easily calculated from the existing criteria. The design of the application of the electre method in the election of regional head candidates is built using the Visual Basic 2010 application or desktop-based which functions as a media to support decisions, especially in the election of regional head candidates in the NasDem party. The electre method in determining the selection of candidates for the regional head has high accuracy, which is 90% obtained through 10 trials using different data and 1 result does not display results due to the same criteria, then 9 out of 10 get accurate results according to the criteria each candidate.

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