DEVELOPMENT TOURISM NATURAL NEW USING ELECTRE METHOD WITH THE APPROACH OF GEOGRAPHIC INFORMATION SYSTEM IN THE DEPARTMENT OF CULTURE AND TOURISM DISTRICT INDRAMAYU

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ABSTRACT

Indramayu district has potential for tourism that include natural attractions, historical tours, cultural tours and special interest tours. Tourists who often visit the place, namely nature tourist areas such as the beach, forest, lake and lake. Demi happen DISBUDPAR should be able to handle PERDA number 1 in 2018 about District Tourism Development Master Plan (RIPPARKAB). Currently in determining the tourism potential for the development of new nature DISBUDPAR reviewing and preparing the Feasibility Study, Master Plan and Detailed Engineering Design in order to become a leading tourist area of Indramayu district. Based on the existing problems that the government-run tourism potential for the development of new unrealized nature causes run tourist potential for the development of new nature does not correspond to its geographical situation. Results of tests performed on the geographic information system that is built it can be concluded that the system could help the Head of Tourism in determining the tourism potential will be recommended to the new nature in Indramayu.
Keywords : Development new nature, ELECTRE methods, geographic information systems, tourism, Indramayu.

1. PRELIMINARY

Department of Culture and Tourism (DISBUDPAR) Indramayu district is one of the local government agency that has the task to preserve the cultural and tourist development in Indramayu. Indramayu district has potential for tourism that include natural attractions, historical tours, cultural tours and special interest tours. Tourists who often visit the place, namely nature tourist areas such as the beach, forest, lake and lake. In addition, the area has the potential of nature tourism in the district of Indramayu is still quite large, but so far have not managed and put to good use in the development of a new nature. Demi happen DISBUDPAR should be able to handle PERDA number 1 in 2018 about District Tourism Development Master Plan (RIPPARKAB).

The interview with the Head of Tourism Mrs. Hj. Sari Nurlaela Ela, SE. MSI, in DISBUDPAR Indramayu, stated that the agency had planned tourist development that is based RIPPARKAB, this time in determining the tourism potential for the development of a new nature tour DISBUDPAR reviewing and preparing the Feasibility Study, Master Plan and Detailed Engineering Design (DED) in order to be Tourism Regions seed (KWU) in Indramayu district. DISBUDPAR in planning the development of new nature require a land area of potential information about travel, to determine the areas that have the potential of a new nature would require a zoning district information on the new nature. Zoning district used to determine the nature of nature tourism development of new policies, but the availability of an update for the zoning district tourist attraction needs to be done so that governments can use as a reference in decision making, especially in the development of a new nature. These problems certainly lead to the potential tourist area of managed land for new nature tourism development has not been realized or the other side of the tourism industry activity will be reduced. Distribution of the tourist area of land that exists today is not equitable because the potential of land that has not been in accordance with the geographical circumstances. One of the attractions Indramayu classified as urban forest nature, at its inception in 2018 until the end of the urban forest is never empty of visitors. However, because of problems that result in the management of the condition is neglected, even the grass is allowed to grow and condition of the building is not maintained in the end closed. According to data from DISBUDPAR tourist visits declined, judging from the number of tourists coming to nature in 2018 a total of 1,535,681 visitors, tourist arrivals decreased from the previous year as many as 1,788,215 visitors, this happens because of the lack of good supervision , DISBUDPAR trying to increase return through the development of new nature, there are four locations that have tourism potential which Bulak village, Fir, Weak blooms and Eretan wetan in Annex D-4 in order to optimize the potential of the tourist areas and increase the return of tourist interest. According to

data from DISBUDPAR tourist visits declined, judging from the number of tourists coming to nature in 2018 a total of 1,535,681 visitors, tourist arrivals decreased from the previous year as many as 1,788,215 visitors, this happens because of the lack of good supervision , DISBUDPAR trying to increase return through the development of new nature, there are four locations that have tourism potential which Bulak village, Fir, Weak blooms and Eretan wetan in Annex D-4 in order to optimize the potential of the tourist areas and increase the return of tourist interest. According to data from DISBUDPAR tourist visits declined, judging from the number of tourists coming to nature in 2018 a total of 1,535,681 visitors, tourist arrivals decreased from the previous year as many as 1,788,215 visitors, this happens because of the lack of good supervision , DISBUDPAR trying to increase return through the development of new nature, there are four locations that have tourism potential which Bulak village, Fir, Weak blooms and Eretan wetan in Annex D-4 in order to optimize the potential of the tourist areas and increase the return of tourist interest. this is the case because there are no good supervision. DISBUDPAR trying to increase return through the development of new nature, there are four locations that have tourism potential which Bulak village, Fir, Weak blooms and Eretan wetan in Annex D-4 in order to optimize the potential of the tourist areas and increase the return of tourist interest. this is the case because there are no good supervision. DISBUDPAR trying to increase return through the development of new nature, there are four locations that have tourism potential which Bulak village, Fir, Weak blooms and Eretan wetan in Annex D-4 in order to optimize the potential of the tourist areas and increase the return of tourist interest.

The problems that have been described previously, DISBUDPAR require a geographic information system that can help in planning the development of a new nature, a system of geographic information may facilitate tourism department heads in determining the tourism potential will be recommended to the new nature in Indramayu.

2. ISI RESEARCH

2.1 Software Development Methods

The paradigm used in the manufacture of software using waterfall model can be seen in Figure 1. [8]
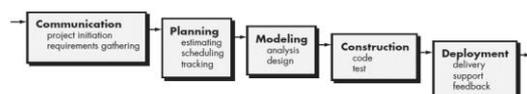
Picture 1. Waterfall Model

2.2 Geographic Information Systems

Geographic information system is a system that is useful for mapping and analyzing the various events taking place in all the earth. Geographical Information System designed to collect, store and analyze location. [1]

GIS can integrate spatial data, attribute and other important properties that distinguish the ability of geographic information system with other information systems, create a geographic information system is superior in the notice of an information approaching real conditions. [10]

GIS has the ability to combine a variety of data at a specific point on the earth's surface. [7]

2.1.1. Spatial Data

Spatial data is a system where there are on earth, including waters, the sea surface of the earth, under the earth's surface and lower atmosphere. [1]

2.1.2. Non-Spatial Data

Non-spatial data is a data that represent aspects of the phenomenon being modeled for the covers property and items so that the information submitted more diverse a non-spatial data also stores attributes of the earth's surface such as the soil has more depth and texture attributes, stored in the form of lines and columns. [1]

2.1.3. layer

Layer SIG meruapakan presentation of geographic data relationships on a digital map or maps are conceptualized as a specific slice on geographic reality in certain areas more or less the same kind of criteria as well as a similar example of the road network, boundary areas and streams. Each pixel has a value in forming a spatial data layer as such, spatial database may contain more than one layer. Storage layer in the database can use a different architecture. In principle, an alternative architecture is intended to keep the layer with the pixel values of successive field of digital image processing, both architectures are used to present to the sensor. [1]

2.3 Regions Nature

Natural tourism area is a place that has a tourist attraction that exploit tourism potential area for recreation. Natural tourism area used as a counterweight after exhausting activities so as to conduct tourist activity the mind becomes calm and able to do the routine over the maximum because of the travel allows obtaining physical and spiritual pleasure. Stage to preserve nature tourism should be taken to keep it clean travel, gives many of the benefits are economically profitable and maintain the typical characteristics of local culture suapaya become leading tourist village that has a tourism potential which is equipped with supporting facilities such as transport and accommodation. [2]

Tourism is a planned holiday who do secarakelompok and individuals from one place to another in order to get pleasure. [9]

2.4 Elimination method Et Choix Traduisant La réalité (ELECTRE)

ELECTRE is a decision making method in a multi-criteria for a concept of out-ranking by using comparative couples an alternative for each criterion there is a match, if one of the alternatives is said to dominate another alternative the criteria more than the other criteria the same as the criteria that still remaining. [3]

a. Excellence methods ELECTRE

The advantages of the method ELECTRE is needed in obscurity and uncertainty for the case. Also in decision support systems are often implemented as a solution to overcome the problem.

b. The weakness of the method ELECTRE

The weakness of the method ELECTRE is a difficult process from the results described in general terms.

c. Use of the method ELECTRE

Step use of methods adopted to solve the problem using ELECTRE methods include: [4]

1. Normalization of the decision matrix of each attribute is converted into comparable value.

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x^2{}_{ij}}}, untuk\ i=1,2,3,...,m\ dan\ j=1,2,3,...,n$$

(1)

2. The weighting matrix that has been normalized, after normalized then each column of the matrix is multiplied by weights.

$$V = R\ x\ W$$

(2)

3. Determining the set of concordance and discordance in the index for each pair of alternatives.

$$C_{kl} = \{\ j, y_{kj} \geq y_{lj}\ \},\ untuk\ j = 1,2,3,...,n$$

(3)

4. Calculating the concordance and discordance matrices.

$$d_{kl} = \frac{\{\max(v_{mn} - v_{mn-\ln})\}; m,n\ \varepsilon\ D_{kl}}{\{\max(v_{mn} - v_{mn-\ln})\}; m,n = 1,2,3,...}$$

(4)

5. Calculating the dominant matrix and disordance concordance.

a. dominant matrix concordance

$$c = \frac{\sum_{k=1}^{n} \sum_{l=1}^{n} ckl}{m(m-1)}$$

(5)

b. dominant matrix discordance

$$c = \frac{\sum_{k=1}^{n} \sum_{l=1}^{n} dkl}{m(m-1)}$$

(6)

6. Determine the dominant matrix of aggregate.

$$ekl = fkl\ x\ gkl$$

(7)

7. The elimination of the less favorable alternative,

2.5 analysis System

Analysis of the system in identifying google maps API conducted for google maps for third party software are prohibited from doing directly access to resources that are owned by google. Analysis of the results obtained in the form of a script system used to access google maps along with the restrictions that apply to google maps. [5]

2.6 Business rules

Business rules are needed in the geographical information system in the development of a new nature tourism attraction in Indramayu as follows:

1. The data shown are tourist area nature tourism land located in the district of Indramayu.
2. Determination of nature tourism development which will be a candidate for a new nature tourism potential and attractions.
3. Location survey of the development of new nature conducted by the staff of Tourism Destinations.

2.7 Analysis of Geographic Information Systems

Geographic information systems analysis is the stage where knowing the geographic information system as if that would be made. Here is a geographic information system model can be seen in Figure 2.
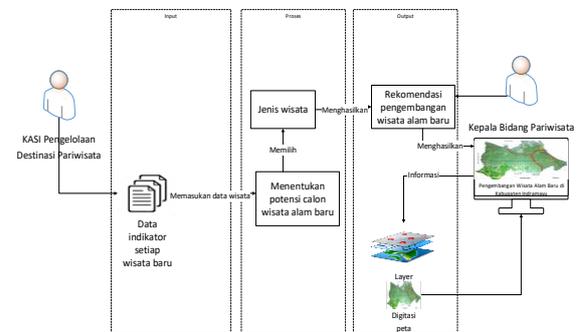
Figure 2. Geographic Information System Model

2.8 Analysis of Spatial Data

Spatial data is used to provide information about the area, the potential and location. The following specifications will be built spatial data information that can be seen in Table 1.

Table 1. Analysis of Spatial Data

No.	Indikator	Description	Spatial Data	Example
1.	territory	Green color region explained that dominated fields and forest	*Polygon*	

No.	Indikator	Description	Spatial Data	Example
		density than the houses.		
2.	tourism potential	If the number of tourist 0	*Polygon*	
		If the travel number 1	*Polygon*	
		If the amount of travel 2	*Polygon*	
		If the travel number 3	*Polygon*	
		If the number of travel 4	*Polygon*	
		If the amount of travel of> 5	*Polygon*	
3.	Tourist sites	Obtained from the tourist locations of latitude and longitude	*Point*	

2.9 Non-Spatial Data Analysis

Analysis of non-spatial data used to build geographic information system development of new nature can be seen in Table 2.

Table 2. Non-Spatial Data Analysis

No.	Name	Description	Attribute
1.	determination travel	Contains information on potential sites where it is located.	Travel assessment code, name of the tour, the rankings
2.	Village	Contains information on the village.	Code village, sub-district code, village name, area village
3.	Attraction type	Contains information on travel	Travel code, country code, area wide, environmental conditions, attractiveness, accessibility, tourist

			infrastructure, tourist facilities

2.10 New Nature Tourism Development Analysis

This analysis was conducted to get an idea of whether the researchers used the method to solve the problem determining the tourism potential for the development of a new nature. The criteria used in the construction of a new nature as follows:

1. Extent of area;
2. Tourist attraction;
3. Attraction type;
4. Accessibility (all types of facilities and transportation infrastructure);
5. Infrastructure (bus terminals, railway stations, public transport);
6. Facilities (convenience, comfort, safety);

In this study used four sample data tourism potential in the development of new nature tourism as an alternative to perform calculations using ELECTRE methods are:

1. A location in the village of Bulak
2. Site B in the village of Pine
3. Weak rural location C in bloom
4. Location D in the village Eretan wetan

Determine the suitability rating of each alternative is the criteria to be assessed using the weights are:

1 = Less well
2 = Enough
3 = Good

Of the tourism potential of the above in determining the development of the new nature can give a weight value of each location. Here is a weighting performed each respective criterion broad criteria table region can be seen in Table 3.

Table 3. Criteria Land Area

Criteria	Information	Weight
The area	<5 Ha	1
	5-10 Ha	2
	> 11	3

The following is a table of criteria with weights tourist attraction value can be seen in Table 4.

Table 4. Criteria Travel Attractions

Criteria	Information	Weight
Tourist attraction	Not good	1
	Enough	2
	Well	3

The following is a table of criteria with weighting travel types can be seen in Table 5.

Table 5. The criteria Type Tourism

Criteria	Information
Attraction type	Lake / river
	Forest / park
	Beach

The following is a table of accessibility criteria to weigh the value can be seen in Table 6.

Table 6. accessibility criteria

Criteria	Information	Weight
accessibility (All types of facilities and transportation infrastructure)	Not good	1
	Enough	2
	Well	3

Below is a table with the infrastructure criteria weighting values can be seen in Table 7.

Table 7. criteria for Infrastructure

Criteria	Information	Weight
tourism infrastructure (Bus terminals, railway stations, public transport)	Not good	1
	Enough	2
	Well	3

Below is a table with the facility criteria weighting values can be seen in Table 8.

Table 8. criteria Facility

Criteria	Information	Weight
Amenities (Convenience, comfort, safety)	Not good	1
	Enough	2
	Well	3

Next will be the incorporation of all the value criteria already conducted a comparison based on the values and value criteria tourism potential new travel criteria can be seen in Table 9.

Table 9. Weight of Nature New Development

Criteria	alternative Tourism			
	location A	location B	location C	location D
The area	<5 Ha	5-10 Ha	<5 Ha	5-10 Ha
Tourist attraction	Well	Well	Well	Well
Attraction type	Forest / park	Beach	Forest / park	Beach
accessibility	Well	Not good	Well	Enough
Infrastructure	Not good	Not good	Not good	Not good
Amenities	Enough	Not good	Well	Enough

Decision makers give preference weights are given in Table 10.

Table 10. Weight Value Criteria

Criteria	Attribute Value
The area	20%
Tourist attraction	20%
accessibility	20%
Infrastructure	20%
Amenities	20%

Decision matrix normalization calculation based on Table 9. Based on the formula (1) normalizing the decision matrix calculation results are presented in Table 11.

Table 11. Normalization Decision Matrix

Criteria	alternative Tourism			
	A	B	C	D
The area	0.32	0.63	0.32	0.63
Tourist attraction	0.95	0.95	0.95	0.95
Attraction type	0.63	0.95	0.63	0.95
accessibility	0.95	0.32	0.95	0.63
Infrastructure	0.32	0.32	0.32	0.32
Amenities	0.63	0.32	0.95	0.63

The weight of this preference further multiplied by a matrix that has been normalized. Based on the formula (2), the results of the calculations are presented in Table 12.

Table 12. Matrix normalized

Criteria	alternative Tourism			
	A	B	C	D
The area	0.63	1.16	0.69	1.37
Tourist attraction	1.90	1.74	2.06	2.06
Attraction type	1.26	1.74	1.37	2.06
accessibility	1.90	0.58	2.06	1.37
Infrastructure	0.63	0.58	0.69	0.69
Amenities	1.26	0.58	2.06	1.37

After getting the value of each criterion and then calculate each alternative of tourism potential. Based on the formula (4), the results of the calculations are presented in Table 13.

Table 13. Results of Preference Index

	alternative Tourism			
	A	B	C	D
A	-	0,067	0,000	0,033
B	0,033	-	0,000	0,000
C	0,033	0,067	-	0,067
D	0,100	0,067	0,067	-

Calculating the concordance dominant matrix, based on the formula (5) the results of the calculation as follows.

C = (0.067 + 0.000 + 0.033) / 6 (6-1) = 0.00333
C = (0.033 + 0.000 + 0.000) / 6 (6-1) = 0.00111
C = (0.033 + 0.067 + 0.067) / 6 (6-1) = 0.00556

C = (0.100 + 0.067 + 0.067) / 6 (6-1) = 0.00778

Calculating the discordance dominant matrix based on the formula (6) the results of the calculation as follows.

D = (0.033 + 0.033 + 0.100) / 6 (6-1) = 0.00556
D = (0.067 + 0.067 + 0.067) / 6 (6-1) = 0.00667
D = (0.000 + 0.000 + 0.067) / 6 (6-1) = 0.00222
D = (0.033 + 0.000 + 0.067) / 6 (6-1) = 0.00333

Determine the dominant matrix of aggregate. Based on the formula (7) the results of the calculations are presented in Table 14.

Table 14. Results on Ranking

Alternative	*Concordance*	*Discordance*	*aggregate*	Ranking
location A	0.00333	0.00556	0.00011	1
location B	0.00111	0.00667	0.00002	2
location C	0.00556	0.00222	0.00002	2
location D	0.00778	0.00333	0.00001	3

From Table 14, it can be concluded that in the development of the new nature is the A site in the village of Bulak because it has the highest aggregate value of the aggregate value of 0.00003 compared to other locations.

2.11 Analysis Database

ERD geographic information system development Indramayu new nature can be seen in Figure 3.
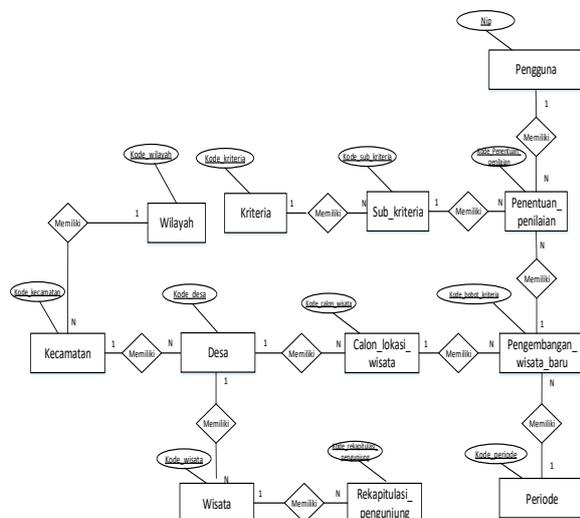
Figure 3. Entity Relationship Diagram

2.12 diagram Context

Diagram context of development of nature tourism New approaches built Geographic Information System is shown in Figure 4.
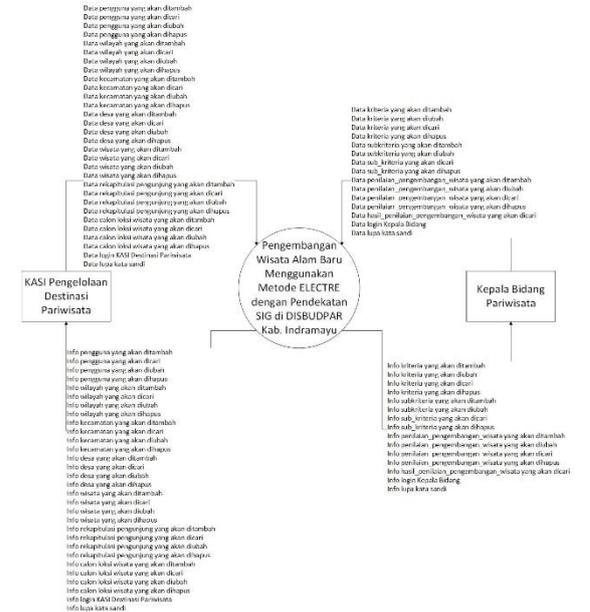
Figure 4. diagram Context

2.13 Data Flow Diagram Level 1

DFD level 1 Geographic Information Systems Development of new Nature Indramayu district consists of six processes can be seen in Figure 5.
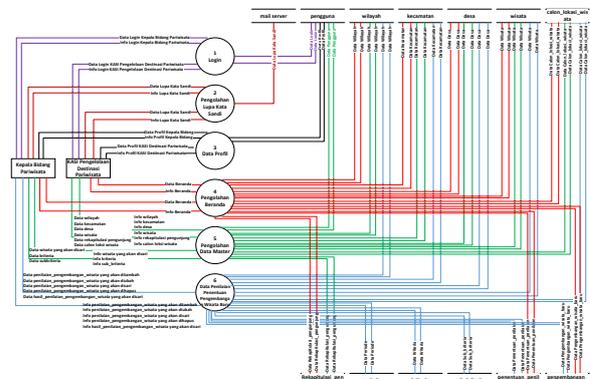
Figure 5. DFD Level 1 Development of New Nature

2.14 System planning

Discusses the system design process from system analysis to be made, the system in accordance with the requirements described in the above analysis.

2.13.1. Relation scheme

Relationship is a relationship diagram for each table in the database of geographic information system development of new nature Indramayu. Diagram relations between tables designed can be seen in Figure 6.

Figure 6. Relationship diagram

2.13.2. Menu Structure Design

The menu structure for KASI Tourism Destination Management of geographic information system development of new nature can be seen in Figure 7.

Figure 7. Design Menu KASI Tourism Destination Management

The menu structure for the Head of Tourism of the geographic information system development of new nature can be seen in Figure 8.

Figure 8. Menu Design Head of Tourism

2.13.3. designing Interfaces

Login interface design KASI Head of Tourism and Tourism Destination Management can be seen in Figure 9.

Figure 9. Login Interface Design

Homepage interface design can be seen in Figure 10.

Figure 10. Interface Design Home

Determination of the interface design assessment of new nature tourism development can be seen in Figure 11.

Figure 11. Determination of Rate Interface Design Development New Nature

2.15 Functional Testing Scenarios

Tests performed can be defined as a set of conditions fill in a test on the functional specification of geographic information systems. [6]

Functional test scenario describes the test scenarios in the development of new nature using ELECTRE methods with geographic information system approach in the Department of Culture and Tourism of Indramayu district. Scenario testing was conducted on the test page KASI Tourism Destination Management and Head of Tourism.

2.16 Beta Testing Scenarios

Users will conduct an assessment of the system using interviews addressed to Mrs. Hj. Sari Nurlaela Ela, SE. M.Si which will serve as a user of software development using the new nature ELECTRE method with the approach of geographic information systems in the Department of Culture and Tourism Indramayu

3. COVER

4.1 Conclusion

Based on the results obtained in the preparation of this paper it is concluded that the geographic information system built to help the Head of Tourism in determining the tourism potential will be recommended for the development of new nature Indramayu.

4.2 Suggestion

Based on the results achieved in the development of new nature using ELECTRE methods with geographic information system approach in the Department of Culture and Tourism of Indramayu district still has shortcomings, therefore it is advisable to add things that can complement the future, namely:

1. Tourism used in determining the potential regional travel is not just nature, but can be added with other tours such as cultural tourism, special interest travel and artificial.
2. Data development of new nature, any criteria that more information can be included photo development stage starting from the beginning till the final stages of development of the development is completed.
3. The geographic information system in the future to determine the location of potential need for tourism development notification feature of each period.

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