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AHP-TOPSIS for Selection Step of Land Title Deed Registration Process

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***Abstract*—This study discusses about a decision support system that help the registration process of land deed title ("*Akta/Sertifikat Tanah*" in Indonesian) that is required to obtain legal certainty for land, rights holders and other parties concerned with the land. *AHP (Analytical Hierarchy Process) TOPSIS (Technique Order Preference by similarity to ideal solution)* is a solution that can be used for decision making for land deed official (PPAT or "*Pejabat Pembuat Akta Tanah*" in Indonesian) to select which documents that should be processed based on the priority. The criteria's used in AHP method to determine the priority is data of submitted land tittle deed, land books, registration base maps, registration maps, land lists, letter of measurement, lists of names, and land status. TOPSIS data processing is done after AHP weighting process finished to make a list of document queue based on priority. The result of this research shows that fewer variables could represent all the variables and can assess and rank with the quality of good decisions and provide variables that focused on improvement.**

Keywords—decision support systems; AHP TOPSIS; legal certainty for land rights holders; land deed title registration process

I. INTRODUCTION

Land plays an important role in human life, for example, land can be used as assets or investment for the future. As a developing country, Indonesia, with a sizeable population, demographic problems often affect the people, especially those related to land. Uncertainty land ownership is one of the biggest problem in Indonesia especially here in Kalimantan. The dispute of land ownership rights can be lead to some social problems.

Registration of land title deed is conducted to obtain legal certainty for holders of land rights as well as other parties concerned with the land. By registering and obtaining a certificate (land title deed), the holder of land rights has strong evidence of the land. The problems could occurred in the process. For example, problem with Standard Operating Procedures for Land Regulations and Services (SPOPP); the problem of land borders is the most occurred problem in the Land Affairs Office. For example, by shifting the existing landmarks or borders. This would certainly be a conflict between the landowner and the party who try to take the land right [18].

In addition to the land border issue, what usually happens is the existence of fake certificate or land title deed forgery. The fake certificates are often used in inheritance certificates, seal sales papers or as debt guarantees. This fake certificate could be one of the causes of land conflicts.

Badan Pertanahan Nasional (Indonesian government land agency) is the only agency who can make official land tittle deed. A land deed official (public officials who are authorized to make the deeds on the land) help the agency to check the originality of the deed and make sure the registration of the land title deed is processed without problem [18].

The use of Analytical Hierarchical Process (AHP) is illustrated in a study measuring the most important factors [8]. In today's increasingly competitive environment, an accurate and precise evaluation of financial performance is important for a company that targets to successfully maintain its market position and protect their market share against potential future risks.

Method of TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) is used to determine whether the results of TOPSIS rank and rank results registrant value of land deed certificate overlapped or not [1]. Evaluating the performance of land tittle deed registration processes is an important issue. Not only for those who sign up for the right to right in the land tittle deed, but also for other land deed officials residing in the same sector. The proposed approach of this study use Fuzzy Analytic Hierarchy Process (FAHP) and TOPSIS. FAHP is used in generating the weight of criteria in decision making.

TOPSIS method is also used to evaluate the performance of fifteen Turkish cement companies on the Istanbul Stock Exchange [6]. This method simplify complicated metric distance method, and propose an algorithm to modify the AHP-TOPSIS Chen, also presents a numerical example and build a practical matter of suppliers to verify the proposed method and compare it with other methods [21]. Credit quality has become the center of attention recently. The classical MCDM TOPSIS was introduced to evaluate credit quality at 8 Air Conditioning companies, where the results of the evaluation have proved that the feasibility and effectiveness of TOPSIS that can significantly influence the evaluation results [22].

This study use the method in assessment process, where the assessment process in the previous research is still subjective, whereas in this research is objective by using the assessment

scale. So in the assessment process is not dependent on the personal but can be done by the system automatically.

This study discusses the selection of land tittle deed for land deed official. The criteria used are submitted land tittle deed, land books, registration base maps, registration maps, land lists, letter of measurement, lists of names, and land status. The applicant or customer who will perform the certification process will be assessed objectively. The result of the argument from the judgment, can be used as a benchmark in decision makers.

II. METHODOLOGY

A. Land Deed Official (Notaris PPAT in Bahasa Indonesia)

Notary (deed official) is a public official authorized to make authentic deeds and other powers as intended in law. Notary law is contained in Indonesian act no. 30 of 2004 chapter III on authority, obligations and restrictions. The first part of Article 15, the notary, is authorized to make an authentic deed of all acts, agreements and statutes which shall be by law of the law intended by interested parties to be declared in an authentic deed, guaranteeing the date of making the deed, preserving the deed, granting the copy, Excerpts of deeds, all of which during the making of such deeds are not also assigned or excluded to other officials or other persons established by law.

Government Regulation of the Republic of Indonesia Number 24 of 1997 on Land Registry chapter 1 General Regulations, Land Registration is a series of activities. The continuous, sustained and regular undertakings of the government include collection, sorting, bookkeeping, and presenting and maintaining physical data and juridical data, in the form of maps and lists, on the plots of land and apartment units, including the provision of letters The proof of their right to the existing land rights and the ownership rights of the apartment units and the certain rights that burden them.

B. Decision Support System (DSS)

Decision Support System (DSS) is a system capable of providing problem-solving and communications capabilities for problems with semi-structured and unstructured conditions. This system is used to assist decision making in semi-structured situations and unstructured situations, where nobody knows exactly how decisions should be made [4]. DSS aims to provide information, guide, provide predictions and lead to users of information in order to make better decisions.

DSS is an implementation of decision-making theories that have been introduced by sciences such as operation research and science management. The only difference is that if you first look for problem solving you have to manually calculate iteration (usually to find the minimum, maximum, or Optimum), now PC has offered its ability to solve the same problem in a relatively short time. Sprague and Watson define Decision Support System (DSS) as a system that has five main characteristics [14]:

- Computer-based systems,
- Used to help decision makers,
- To solve complicated problems that are impossible to do with manual calculations,
- Through interactive simulation way,
- Data and model analysis as main components.

Generally Decision Support System is built by three major components of database Management, Model Base and Software System / User Interface.

C. AHP

AHP developed Dr. Thomas L. Saaty of the Wharton School of Business in 1970 for organizing information and *judgment* in having the most preferred alternative [20]. AHP is a method of breaking complex / complex problems in an unstructured situation into component parts. Organize this part or variable into a hierarchical order form, then assign a numerical value to the subjective assessment of the relative importance of each variable and synthesize the assessment for which variable has the highest priority that will affect the settlement of the situation. The AHP combines personal judgment and judgment in a logical and influenced way imagination, experience, and knowledge to construct a hierarchy of problems based on logic, intuition as well as experience to give consideration [20]. The procedure in *AHP* method consists of several stages, namely:

1) Prepare the hierarchy of problems encountered

Preparation of hierarchy is by determining the objectives that are the target system as a whole at the top level. The next level consists of criteria for assessing or considering alternatives and determining those alternatives. Each criterion can have sub criteria below and each criterion can have an intensity value of each.

2) Define the priority of the element

The first step in determining the priority of the elements is to make pairwise comparisons, i.e., comparing the elements in pairs according to the given criteria by using the matrix form. A simple, robust matrix that offers a framework for checking consistency, obtaining additional information by making all possible comparisons and analyzing the overall priority sensitivity to change considerations. The pairwise comparison process starts from the topmost level of the hierarchy to select criteria, such as C, then from the lower levels the elements will be compared, e.g. A1, A2, A3, A4, A5, then the arrangement of elements in a matrix, Table I.

TABLE I. QUANTITATIVE SCALES IN AHP METHOD

C	A1	A2	A3	A4	A5
A1	1				
A2		1			
A3			1		
A4				1	
A5					1

3) Some steps in this process :

Fill in a pairwise matrix by using a number to represent the relative importance of one element to the other element in the form of a scale from 1 to 9. This scale defines and explains

values 1 to 9 for consideration in pairwise pairs of elements at each hierarchical level of a Criteria at a higher level. If an element in the matrix and compared with itself, it is given a value of 1. If *i* than *j* get a certain value, then *j* than *i* was opposite. Here is a quantitative scale of 1 to 9 to assess the importance of an element with other elements.

TABLE II. QUANTITATIVE SCALES IN AHP METHOD

Intensity of Interest	Meaning / Meaning	Explanation
1	Both elements are equally important	Two elements have the same effect on purpose
3	One element is slightly more important than the other elements	Experience and judgment support a little more than any other element
5	One element is more important than other elements	Experience and judgment are very strong in favor of one element over the other
7	One element is clearly more important than the other	One strong element in advocacy and dominance is seen in practice
9	One element is absolutely essential from other elements	Evidence that supports one element against other elements has the highest degree of affirmation that might be corroborating
2, 4, 6, 8	Values between 2 adjacent consideration values	This value is given when there are two compromises between the 2 options
The opposite	If activity i gets one number over activity j, then j has its reverse value compared with i	

4) Synthesis

Considerations for paired comparisons in synthesis to gain overall priority:

- Sums up the values of each column in the matrix.
- Divide each value of the column by the corresponding column total to obtain the normalization of the matrix.
- Sums the value of each matrix and divides it by the number of elements to get the average value.
- Measure consistency.

Consistency is important to get valid results in the real world. *AHP* measure consideration consistency with consistency ratio *(ratio consistency).* Consistency value ratio should be less than 5% for 3x3 matrices, 9% for 4x4 matrices and 10% for larger matrices. If more than the ratio of the limit then the matrix comparison value is done again. Steps to calculate the value of consistency ratio are:

- Multiplying the value in the first column with the relative priority of the first element, the value in the second column with the relative priority of the second element, and so on.
- Sums up each row.
- The result of the sum of the rows is shared with the relevant relative priority element.
- Dividing the above results with many existing elements, the result is called Eigen value (λmax), for matrices see Table II.
- Calculating the consistency index (consistency index) with the formula:

$$CI = (\lambda max\text{-}n)/n. \quad (1)$$

CI = Consistency Index
λmax = Eigen Value
n = Many elements

- Calculated the consistency ratio (CR) by the formula:

$$CR = \frac{CI}{RC} \quad (2)$$

CR = Consistency Ratio
CI = Consistency Index
RC = Random Consistency

Random matrix with a scale of 1 to 9 and their ratings have upside as *random consistency* (RC). Based on calculations using 500 samples *Saaty,* if consideration randomly select from a scale of 1/9, 1/8, … , 1, 2, … , 9 will be obtained average consistency for different matrix can be seen in Table III.

TABLE III. THE AVERAGE VALUE OF CONSISTENCY

Matrix Size	Random Consistency
1	0.00
2	0.00
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49

D. TOPSIS (Technique For Others Reference by Similarity to Ideal Solution)

TOPSIS is one of the multi-criteria decision-making methods first introduced by Yoon and Hwang (1981). TOPSIS uses the principle that the chosen alternative must have the shortest distance from the ideal solution and the longest distance from the ideal solution from a geometric point of view by using the distance between two points to determine the relative proximity of an alternative with the optimal solution.

The positive ideal solution is defined as the sum of all the best attainable values for each attribute, while the ideal negative solution consists of all the worst values achieved for each attribute. TOPSIS considers both, the distance to the ideal solution and the distance to the ideal solution by taking the proximity relative to the positive ideal solution. The algorithm basic steps of TOPSIS as follows.

a. Each alternative rank

TOPSIS requires performance ranking of each alternative A_i on each of the normalized C_j criteria. This can be seen from the formula below:

$$rij = \frac{xij}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (3)$$

with i = 1,2, ... m; and j = 1,2, ... n;
Where:

r_{ij} = value normalized performance rating

x_{ij} = value of each alternative on each criterion

A_i is the alternative of an activity. C_j is a type of criteria.

b. Declined Matrix of Decisions Weighted

$$Y_{ij} = W_i r_{ij} \quad (4)$$

with i = 1,2, ..., m and j = 1,2, ..., n

Where:

W_j = value of the weight of each criterion

r_{ij} = value normalized performance rating

c. Positive and Negative Positive Solutions

The ideal A + positive solution and the ideal A-negative solution can be determined based on the normalized weighted rank (Yij) as follows:

$$A^+ = (y_1^+, y_2^+, ..., y_n^+); \quad A^- = (y_1^-, y_2^-, ..., y_n^-); \quad (5)$$

Where:

y_i^+ : Max y_{ij} if j is an attribute profits

Max y_{ij} if j is an attribute charge

y_i^- : Min y_{ij} if j is an attribute profits

Min y_{ij} if j is an attribute charge

d. Distance With Ideal Solution

Distance is an alternative Ai with a positive ideal solution formulated as follows:

$$D_i^+ = \sqrt{\sum_{j=1}^{m} (y_i^+ - y_{ij}) 2} \quad (6)$$

Distance is an alternative A_i with a negative ideal solution formulated as follows:

$$D_i^- = \sqrt{\sum_{j=1}^{m} (y_{ij} - y_i^-) 2} \quad (7)$$

e. Preference Value For Any Alternative

The preference value for each alternative (Vi) is given as:

$$v_i = \frac{D_i^-}{D_i^- + D_i^+} \quad (8)$$

A larger value of Vi indicates that an alternative Ai is exactly selected

III. METHODOLOGY

A. *Research Procedures*

Basically TOPSIS not have a specific input models in solving a case. Alternatives can be ranked in order. Therefore, the best alternative is one of the shortest distance to the ideal solution and furthest away with the ideal-negative solution. TOPSIS uses adaptation input model from other methods i.e., AHP, UTA, ELECTRE, TAGUCHI, FUZZY and so forth [23].

In solving a multi-criteria case, AHP compares each criterion using a pairwise comparison matrix for each alternative then the result is a decision matrix that shows the score of each alternative on all criteria. The best alternative is the highest-scoring alternative after being multiplied by the weight vector. While on TOPSIS method, the decision matrix resulting from AHP method is initial capital / initial input in the next calculation.

Research carried out has stages to be done, with the aim to obtain maximum results in decision support. Here are the steps described with the flow diagram:

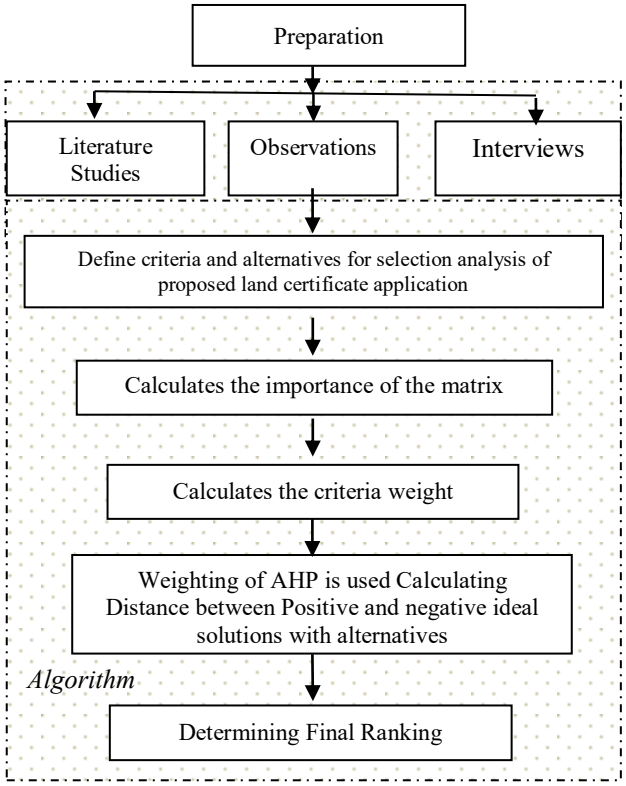

Fig. 1. Research flow diagram

There are several stages of research procedures conducted in this study, namely data collection research, identification and data processing, system design, system implementation, and system testing.

This testing stage is done after the implementation phase is completed. At this stage the system testing whether the system can run as expected or not. Testing is done in the form of two stages, namely testing of the calculation of the data flow used and testing the performance of the system.

B. Use Case Diagram

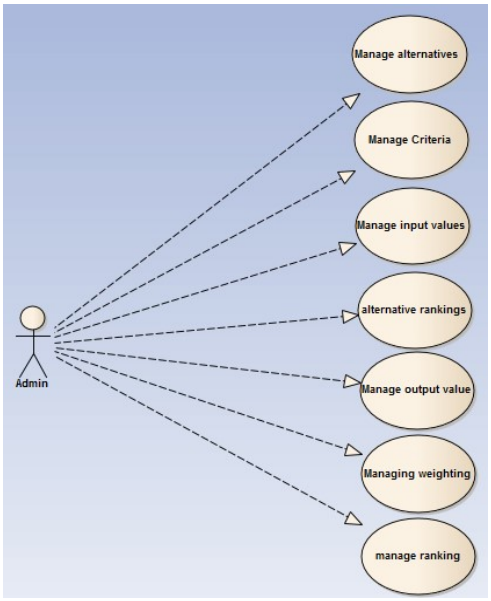

Fig. 2. Use Case Diagram

- Actor: admin and notary
- *Use cases:* managing criteria, manage alternatives, managing input values, ranking alternatives, manage rankings

The input selection input is entered into this input as many as several alternatives. The data inputted into the input based on the application table. After completion of selection of proposal in input, hence making of certificate of land will be assessed objectively by system based on input data selection proposal of making land costumer certificate. The alternatives are assessed by several alternatives, the number of criteria for each alternative is seven criteria. The values of some of these alternatives are calculated by the weight of the criteria, then the criterion weights is calculated using AHP method. The steps of system algorithm:

1. The input selection input is entered into this input as many as several alternatives. The data inputted into the system based on the application table.
2. An alternative assessment with TOPSIS. After filling in the request for proposal selection input, then the certificates, the land will be assessed objectively by the system based on the data from customers who want to register their land tittle deed. The alternatives are assessed by several alternatives, the number of criteria for each alternative is seven criteria. The values of some of these alternatives are calculated by the weight of the criteria, the criterion weight is calculated using the AHP method.

C. AHP calculation

Calculation of AHP, done only once at the beginning, to get the value of weight criteria, then the value of the criteria weight is used continuously for calculation with TOPSIS, AHP assessment is done by Notary (land deed official).

IV. Results and Discussion

A. Research result

Results AHP data processing is the weight of the criteria that TOPSIS will use to perform the TOPSIS process. Stages of Results Data processing using AHP as follows.

Processing AHP data processing to generate criteria weight begins by creating a hierarchical structure, importance level, comparison of importance level, priority vector (pv) or pairwise comparison matrices, and weighted normalization matrices.

1. Level of Interest

The values of the interest level table are filled by Notaries on a scale of 1 to 5. Where value 1 is very unimportant, 2 not important, 3 important enough, 4 important, and 5 is very important. The determination of these values based on the stages of registration of land derived from a notary (land deed official).

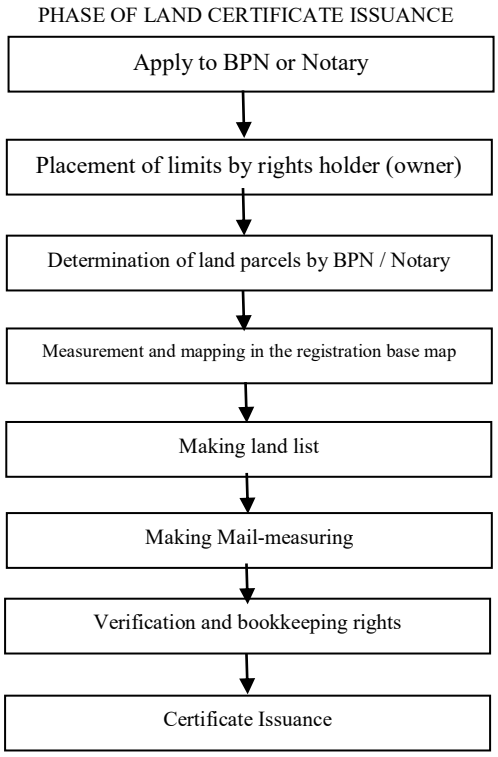

Fig. 3. Circulation Phase of Land Certificate Creation

Explanation of the circulation of soil-making steps:

1. The certificate shall be a certificate of right as referred to in Article 19 paragraph 2 sub-paragraph c of the UUPA (*Undang-Undang Pokok Agraria*) for land rights,

management rights, *wakaf* land, property rights of the apartment units and mortgages, each of which has been recorded in the land books concerned.

2. The land book is a document in the form of a list containing the juridical data and physical data of an entitled registration object.
3. The land registration map is a map that contains technical base points and geographical elements, such as rivers, roads, buildings, and physical boundaries of land.
4. The registration map is a map that describes the plot of land for land-keeping purposes.
5. List of land is a document in the form of a list containing the identity of the plot of land with a numbering system.
6. Measures are documents containing physical data of a plot in the form of maps and descriptions.
7. A list of names is a document in the form of a list containing information on land ownership with rights over the land, or the right management and the ownership of property rights on apartment units by individuals or legal entities.

TABLE IV. LEVEL OF INTERESTS

No	Name of Respondent	Level of importance criteria						
		certificate	Book of land	Base map	Registration map	land list	measure mail	List name
1	Manajer	5	5	4	3	3	4	3
Interest Rate Scale								
1	Very unimportant							
2	Not important							
3	quite important							
4	important							
5	Very important							

The values of the interest level table are filled by notary PPAT (land deed official) on a scale of 1 to 5. The determination of those values is based on the decision of the notary itself. In this table there are seven criteria that must be filled in the value which then will be followed by filling table comparison of interests.

2. *Comparison of Interest*

TABLE V. COMPARISON OF INTEREST

Certificate					
Book of land	***Base map***	***Registration map***	***land list***	***measure mail***	***List name***
1	1/3	1/5	1/3	1/5	1/9
Book of land					
Base map	***Registration map***		***land list***	***measure mail***	***List name***
1	1/3		1	1	1/5
Base map					
Registration map		***land list***	***measure mail***		***List name***
1		1/3	1/3		1/5
Registration Map			**Land List**		**List Name**
List Land	***Measure Mail***	***List name***	***Measure Mail***	***List Name***	***stats***
1/7	1	1/9	1	1/9	1/7

Book of land			
1	***just as important***		
3	greater than 1	1/3	Smaller 1
5	greater than 2	1/5	Smaller 2
7	greater than 3	1/7	Smaller 3
9	greater than 4	1/9	Smaller 4

Completion of comparison table of interest, different from filling table importance level. The difference is on the scale used, the comparison table of interests uses a scale of 1 to 9. Each one criterion is compared with seven other criteria, by comparing many to one. For example, compare the certificate criteria with seven other criteria, namely the certificate, land books, registration base map, a map application, a list of land, measurement certificate, a list of names. Similarly, with other criteria. The result of this comparison of interest can be made table matrix of pairwise comparison.

3. *Pairwise Comparison Matrices*

TABLE VI. PAIRWISE COMPARISON MATRIX

vector priority table								
Criteria	***certificate***	***Book of land***	***Base map***	***Registration map***	***land list***	***measure mail***	***List name***	***Priority Vektor***
Certificate	1	1	1/3	1/5	1/3	1/5	1/9	0.0587
Book of Land	1	1	1	1/3	1	1	1/5	0.1068
Base map	3	1	1	1	1/3	1/3	1/5	0.1068
Registration map	5	3	1	1	1/7	1	1/9	0.0587
Land list	3	1	3	7	1	1	1/9	0.0275
Measure mail	5	1	3	1	1	1	1/7	0.0762
List name	9	5	5	9	9	7	1	0.5340
amount	27.15	13.03	14.39	19.62	12.89	11.53	1.87	0.9688

a. Scale comparison

b.
1 Both elements are equally important
3 One element is slightly more important than the other
5 One element is more important than the other
7 One element is clearly more absolutely essential than other elements
9 One element is absolutely essential than any other element
2,4,6,8 Values between two values of adjacent considerations

In the table of pairwise comparison matrix, the value of which is filled in the upper triangle is yellow and the value can be retrieved from the table comparison of the interests of the above, for the lower triangle is blue will be filled automatically by means 1 divided by eight criteria to the right and the result will be obtained column-row, then followed by calculating CI, CI and priority vector.

4. *Matrix Weighted Normalization*

TABLE VII. MATRIX WEIGHTED NORMALIZATION

Table matrix normalization									
Criteria	certificate	Book of land	Base map	Registration map	land list	measure mail	List name	Number of rows	Weight criteria
Certificate	0.0368	0.0767	0.0229	0.0102	0.0256	0.0173	0.0587	0.2484	0.0355
Book of Land	0.0368	0.0767	0.0695	0.0168	0.0776	0.0867	0.1068	0.4709	0.0673
Base map	0.1116	0.0767	0.0695	0.0510	0.0256	0.0286	0.1068	0.4698	0.0671
Registration map	0.1842	0.2326	0.0695	0.0510	0.0111	0.0867	0.0587	0.6937	0.0991
Land list	0.1116	0.0767	02106	0.356	0.0776	0.0867	0.0587	0.9788	0.1398
Measure mail	0.1842	0.0767	0.2106	0.0510	0.0776	0.0867	0.0762	0.7629	0.1090
List name	0.3348	0.3837	0.3474	0.4633	0.7051	0.6072	0.5340	3.3755	0.4822

Weighted normalized matrix table is a table of final value of weighted criteria to be taken, the results of it's own weight is obtained by the number of rows divided by the number of criteria.

B. Results of Data Processing TOPSIS

TOPSIS data processing is carried out the next stage after the weighting process in the AHP. The process is done on TOPSIS is making Table Decision, Decision Matrix Normalization, Normalized Weighted Decision Matrix, Determining the Ideal Solution Positive and Negative Ideal Solution, Calculating Distance alternative to Ideal Solution Positive and Negative Ideal Solution, and Calculating the Value Preference Each alternative.

TABLE VIII. TABLE DECISION (X_{ij})

Decision Table (Xij)							
Alternative	Criteria						
	certificate	*Book of land*	*Base map*	*Registration map*	*land list*	*measure mail*	*List name*
Ardiansyah	5	4	4	3	4	2	2
Teguh Suwikto	4	5	5	5	3	4	2
Ballo	3	5	4	3	5	2	3
Abdul Rahman	4	5	3	2	4	3	4
Umar Bakri	2	4	2	4	3	4	5
Nasir	2	4	4	3	5	5	4
Andi Arsyad	4	5	2	5	3	4	3
Sutardin	3	4	3	4	2	3	4
M. Yusuf Ambo Rappe	5	4	4	3	4	3	2
Dwi Sapto Harsono	5	4	3	5	5	4	4

[c.] Feasibility scale:
1. very unfeasible
2. not feasible
3. quite decent
4. Feasible
5. Very decent

The values in the table is filled by a Notary PPAT a scale of 1 to 5 the same thing on the charging AHP. Ratings in the content based on the results of the data and observations. In this table there are seven grades of criteria that must fill an alternative who will then proceed with charging the normalization table Decision Matrix

1. Normalization Decision Matrix

Charging value in Table Normalization Decision Matrix can be calculated using the formula equation (2.3)

The following table is a first step that must be done for the process to normalizing the decision matrix, the values in this table are squaring the value of the decision table.

TABLE IX. SQUARING

Stage 1 Rank each alternative							
Squared							
Alternative	Criteria						
	certificate	Book of land	Base map	Registration map	land list	measure mail	List name
Ardiansyah	25	16	16	9	16	4	4
Teguh Suwikto	16	25	25	25	9	16	4
Ballo	9	25	16	9	25	4	9
Abdul Rahman	16	25	9	4	16	9	16
Umar Bakri	4	16	4	16	9	16	25
Nasir	4	16	16	9	25	25	16
Andi Arsyad	16	25	4	25	9	16	9
Sutardin	9	16	9	16	4	9	16
M. Yusuf Ambo Rappe	25	16	16	9	16	9	4
Dwi Sapto Harsono	25	16	9	25	25	16	16
Amount	149	196	124	147	154	124	119
square root	12.21	14.00	11.14	12.12	12.41	11.14	10.91

TABLE X. NORMALIZATION DECISION MATRIX

Normalization of decision matrix (rij)							
Alternative	Criteria						
	certificate	Book of land	Base map	Registration map	land list	measure mail	List name
Ardiansyah	2.0481	1.1429	1.4368	0.7423	1.2893	0.3592	0.3667
Teguh Suwikto	1.3108	1.7857	2.2451	2.0620	0.7252	1.4368	0.3667
Ballo	0.7373	1.7857	1.4368	0.7423	2.0146	0.3592	0.8250
Abdul Rahman	1.3108	1.7857	0.8082	0.3299	1.2893	0.8082	1.4667
Umar Bakri	0.3277	1.1429	0.3592	1.3197	0.7252	1.4368	2.2917
Nasir	0.3277	1.1429	1.4368	0.7423	2.0146	2.2451	1.4667
Andi Arsyad	1.3108	1.7857	0.3592	2.0620	0.7252	1.4368	0.8250
Sutardin	0.7373	1.1429	0.8082	1.3197	0.3223	0.8082	1.4667
M. Yusuf Ambo Rappe	2.0481	1.1429	1.4368	0.7423	1.2893	0.8082	0.3667
Dwi Sapto Harsono	2.0481	1.1429	0.8082	2.0620	2.0146	1.4368	1.4667

2. Normalization Weighted Decision Matrix

TOPSIS next stage, a weighted decision matrix normalization which is calculated on the AHP process, which calculates the weighted normalization matrix, which results in weight criteria. Elements of the normalized weighted matrix is the product of the weight criteria in AHP with elements (*rij*) in the Decision Matrix normalization table. Table weighting criteria obtained from AHP calculation.

TABLE XI. CRITERIA WEIGHTS

Wighted Criteria						
certificate	Book of land	Base map	Registration map	land list	measure mail	List name
2.0481	1.1429	1.4368	0.7423	1.2893	0.3592	0.3667

TABLE XII. NORMALIZED WEIGHTED DECISION MATRIX

Alternative	Criteria						
	certif icate	Book of land	Base map	Registr ation map	land list	meas ure mail	List name
Ardiansyah	0.0727	0.0769	0.0964	0.0736	0.1803	0.0392	0.1768
Teguh Suwikto	0.0465	0.1201	0.1507	0.2043	0.1014	0.1566	0.1768
Ballo	0.0262	0.1201	0.0964	0.0736	0.2817	0.0392	0.3978
Abdul Rahman	0.0465	0.1201	0.0542	0.0327	0.1803	0.0881	0.7073
Umar Bakri	0.0116	0.0769	0.0241	0.1308	0.1014	0.1566	1.1051
Nasir	0.0116	0.0769	0.0964	0.0736	0.2817	0.2447	0.7073
Andi Arsyad	0.0465	0.1201	0.0241	0.2043	0.1014	0.1566	0.3978
Sutardin	0.0262	0.0769	0.0542	0.1308	0.0451	0.0881	0.7073
M. Yusuf Ambo Rappe	0.0727	0.0769	0.0964	0.0736	0.1803	0.0881	0.1768
Dwi Sapto Harsono	0.0727	0.0769	0.0542	0.2043	0.2817	0.1566	0.7073

3. *Determining the Ideal Solution Positive and Negative Ideal Solution*

Stages ideal solution for the positive (+) and negative ideal solution (-) can be based weighted normalization matrix. The elements of the matrix A^+ in the table below is the maximum value of each column in Table Normalization Weighted Decision Matrix, while the elements of the matrix A^- in the table below are the minimum value of each column in Table Normalization Weighted Decision Matrix, Table XIII.

TABLE XIII. DETERMINING THE IDEAL SOLUTION POSITIVE AND NEGATIVE IDEAL SOLUTION

Stage 3: Ideal positive and negative solutions						
Y+	0.0727	0.1507	0.2043	0.2817	0.2447	1.1051
Y-	0.0116	0.0241	0.0327	0.0451	0.0392	0.1768

4. *Calculating Distance alternative to Ideal Solution Positive and Negative Ideal Solution*

At this stage the distance determined is not only the shortest distance, but the farthest distance can be calculated value. So this step is to determine the distance of each alternative against the positive ideal solution and within each alternative against the negative ideal solution. Distance is an alternative Ai with positive ideal solution formulated. Distance is an alternative Ai formulated with negative ideal solution, Table XIV.

TABLE XIV. DISTANCE TO THE IDEAL SOLUTION

Stage 3: Ideal positive and negative solutions						
Y+	0.0727	0.1507	0.2043	0.2817	0.2447	1.1051
Y-	0.0116	0.0241	0.0327	0.0451	0.0392	0.1768

5. *Calculating the Value Preference Every Alternative*

This stage is the final stage determined for ranking TOPSIS or known by calculating the preference value for each alternative. Preference value for each alternative (vi) the relative proximity of each alternative is calculated based on the equation of the formula. V_i larger value indicates that the alternative A_i appropriately selected. As the following Table XV.

TABLE XV. DISTANCE TO THE IDEAL SOLUTION

Alternative	The preference value of each alternative	
Ardiansyah	V1	0.1440
Teguh Suwikto	V2	0.2099
Ballo	V3	0.3081
Abdul Rahman	V4	0.5335
Umar Bakri	V5	0.7862
Nasir	V6	0.5929
Andi Arsyad	V7	0.2939
Sutardin	V8	0.5176
M. Yusuf Ambo Rappe	V9	0.1565
Dwi Sapto Harsono	V10	0.5972

V. CONCLUSION

The result of this research shows that fewer variables could represent all the variables and can assess and rank with the quality of good decisions and provide variables that focused on improvement.

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