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IMPLEMENTATION OF TOPSIS METHOD AS A DECISION-MAKING MODEL IN CHOOSING A DEPARTMENT AT AL KHAIRIYAH CITANGKIL INTEGRATED ISLAMIC VOCATIONAL SCHOOL

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Abstract
In today's technological era, information technology is developing rapidly. One of them is in the field of education, currently many learning media have used technology as a means to facilitate it. With fundamental changes in the field of information and communication technology, information has now become a very valuable commodity and determines success. The problem raised this time is how to determine the majors of new students at Al Khairiyah Citangkil Integrated Islamic Vocational School. In solving this problem, the method that will be used to help select majors at Al Khairiyah Citangkil Integrated Islamic Vocational School is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. This TOPSIS method is based on the concept where the best selected alternative not only has the shortest distance from the positive ideal solution, but also has the longest distance from the negative ideal solution. The TOPSIS method also has a simple and relatively easy-to-understand concept, efficient computation, and has the ability to measure the relative performance of each decision alternative in a simple mathematical form. The application of major selection using the TOPSIS method is very helpful in selecting majors to be more accurate, save time and get faster results. The decision support system for choosing a major at Al Khairiyah Citangkil Integrated Islamic Vocational School can be developed by creating a website-based system with variables of Psychometric Test Score, Al-Quran Test Score, Verbal Test Score, Basic Computer Test Score, Mathematics National Examination Score, Science National Examination Score, English National Examination Score, Indonesian National Examination Score, Parental Income where each test result is directly connected to the decision support database to produce accurate data.

I. INTRODUCTION

In the present time Technology Information develop with moment fast. One of them in field education, which can We Look in field education For moment This There are many learning media that have been use Technology as means For make it easier [1]. Al Khairiyah Citangkil Integrated Islamic Vocational School is School Intermediate Vocational that exists his under shelter. At Al Khairiyah Citangkil Integrated Islamic Vocational School Multimedia, Software Engineering (RPL), Industrial Chemical Engineering, Industrial Electronic Engineering, Metal Casting Engineering (Metallurgy) [2].

The decision support system at SMA Negeri Anggana focuses on providing recommendations for universities that are in accordance with student abilities, therefore this SPK has criteria that can be changed according to needs [3]. In research at SMK Kertha Denpasar Tourism uses fuzzy method , Application built on research This capable produce majors based on criteria as well as weight in relatively sufficient time short short [4]**.** Selection majors at SMK Putra Nusantara Jakarta which uses AHP method which results from study show that factor affecting candidate student in choose major own four criteria that is between There is criteria talent, interest, quality majors and opportunities career [5]

With existence fundamental changes in the field technology information and communication has cause changes in some aspects, even moment This information has become a very valuable and decisive commodity for reach a success. Currently Al Khairiyah Citangkil Integrated Islamic Vocational School there is problem related determination major what fits with ability student new. Because in activity determine majors available at Al Khairiyah Citangkil Integrated Islamic Vocational School. The parties School Not yet apply system computerization optimally because majority determination major Still use manual system. There fore in study This will focus for create a system where you can optimize opportunity success student new in to go through education in the departments available at Al Khairiyah Citangkil Integrated Islamic Vocational School based on calculation test capabilities and supporting factors from student That Alone.

In the making research at Al Khairiyah Citangkil Integrated Islamic Vocational School This use Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. This TOPSIS method based on the concept Where alternative chosen the best No only own distance shortest from positive ideal solution , but also has distance longest from negative ideal solution [6] . In the TOPSIS method there is also simple and relative concept easy understood, the computation efficient, and has ability for measure performance relatively from every alternative decision in form mathematical that

II. RESEARCH METHODS

2.1. Method of collecting data

Data in study This is data in the form of a results file test academic or it can also be in the form of written data results interview with party *Al Khairiyah Citangkil Integrated Islamic* Vocational School, the data brought candidate participant education and important data others of a nature can used as trigger in understand issues that arise moment election or determination major candidate participant educate.

1) Field Survey
   In activities This We do review direct to object which research is here is *Al Khairiyah Citangkil Integrated Islamic* Vocational School, as well as request permission to party School For do study mentioned.
2) Identification problem
   Which is at what stage this is what is done is observe and determine problems that will be raised, then search for related literature, determine objective from problems that can be encountered.
3) Data collection
   At the stage This there is a number of methods in data collection includes:
   1. Archives
      This method of data collection in the form of evidence, records that have been arranged in file document from results test academic student.
   2. Observation
      This method of data collection done with method do observation directly in the field, to data management that will be stored in files and ways determine major for students are determined with consider existing criteria in evaluation academic like test psychological tests, verbal tests, Al-Qur'an tests, and tests understanding computer.
   3. Interview
      Data collection with method do interview this is intended to *Al Khairiyah Citangkil Integrated Islamic* Vocational School, which is the interview This used for find and determine problems with the election majors at *Al Khairiyah Citangkil Integrated Islamic* Vocational School and convince that the data obtained truly accurate in accordance with need research. Interview This done with source person named Mr. Tiara Pragaswara as a teacher at the *Al Khairiyah Citangkil Integrated Islamic* Vocational School, to ask moredeep about election majors at *Al Khairiyah Citangkil Integrated Islamic* Vocational School during This.
   4. Literature review
      Here We study and take notes things important thing that exists in books and journals scientific that has connection to ongoing problem discussed and also have connection with object Which research will be used as base in study.
4) Data processing
   At the stage This The data processing process will be carried out consisting of from start grouping and sorting the data obtained of the upcoming data collection process will be used in the process of discussion and implementation selected method in finish problem.
5) Analysis and discussion
   As discussed before his here We will start apply selected method in finish the problem taken based on the data obtained. In the research This

settlement problem in use that is System Supporters decision use TOPSIS method for finish problem election majors at *Al Khairiyah Citangkil Integrated Islamic* Vocational School.

2.2. Fuzzy Multi Attribute Decision Making (FMADM)

Fuzzy Multi Attribute Decision Making or commonly abbreviated as FMADM is the method used for looking for alternatives with criteria optimally. Fuzzy Multi Attribute Decision Making (FMADM) is method Where We determine mark weight from every existing attributes, then processed with method which ranking will be to select existing alternatives [7] [8] [9]

Basically In FMADM there are three approaches that can used for look for mark weight attribute, which is the first with use approach subjective, the second with approach objective and the last with approach integrity Where approach integrity That Alone be in between approach subjective and approach objective. From each approach the own strengths and weaknesses. Where in the approach subjective, determination mark weight based on subjectivity taking decision, while for approach objective, value weight can counted in a way mathematical so that can ignore subjectivity from taking decision. There is a number of methods that can used in settlement Fuzzy Multi Attribute Decision Making (FMADM) problems, including as following:

1. Electre Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)
2. Analytic Hierarchy Process (AHP)
3. Simple Additive Weighting (SAW)
4. Weighted Product (WP) [10] [6], [11], [12]

TOPSIS method

to Ideal Solution (TOPSIS) One method taking decision multicriteria which was first introduced by Yoon and Hwang (1981). TOPSIS uses principle that selected alternative must have distance closest from the most positive and farthest ideal solution from negative ideal solution from corner view geometric with use distance Euclidean For determine proximity relatively from an alternative with optimal solution. Positive ideal solution defined as amount from all over mark the best that can be achieved For every attributes, while solution negative-ideal consists of from all over mark worst achieved For every attributes [6], [12], [13] .

TOPSIS consider both of them distance to positive ideal solution and distance to negative ideal solution with take proximity relatively to positive ideal solution. Based on comparison to distance relative , arrangement priority alternative Can achieved [14] t stages in TOPSIS Method

1. Determine criteria and characteristics
   The criteria that will be made into reference in taking decision, namely Ci and nature from each criteria.
2. Determining the suitability rating
   Compatibility rating every alternative on each criteria.
3. Make matrix normalized decision
   TOPSIS requires performance rating every Ai alternative on every criteria Normalized Cj, namely:

$$\mathbf{r_{ij}} = \frac{\mathbf{X_{ij}}}{\sqrt{\sum_{i=1}^{m} \mathbf{X_{ij}^2}}}$$

4. Multiplication between weight with mark every attribute
   Multiplication This For to form Y matrix can determined based on weight ranking normalized (yij) as following:

$$\mathbf{Y_{ij}} = \mathbf{W_i r_{ij}}$$

   with i= 1,2,… ,m and j=1,2,…,n
5. Determine matrix positive ideal solutions and matrices negative ideal solution
6. Determine distance between mark every alternative with matrix positive and negative ideal solutions
   The distance between Ai alternative with positive ideal solution formulated as :

$$D_i^+ = \sqrt{\sum_{j=1}^{n} \left(y_i^+ - y_{ij}\right)^2}$$

   The distance between alternative Ai and the negative ideal solution is formulated as

$$D_i^- = \sqrt{\sum_{j=1}^{n} \left(y_{ij} - y_i^-\right)^2}$$

7. Determine mark preference for every alternative
   Preference value For every alternative (Vi) is given as :

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

   Higher Vi values big show that Ai alternative more selected . [14]

III. DISCUSSION

3.1. Registration process

this process done every year teachings new. Student registration new done manually or you can also visit the official website *Al Khairiyah Citangkil Integrated Islamic* Vocational School. After finished do registration and already do payment cost registration, candidate student new will get form reception student new for filled.

3.2. Academic Test

After finished do filling form, candidate student new will through a series test between his test psychological test, Al-Quran test, verbal test and test understanding computer. In recording evaluation test

this, the committee Still do recording evaluation manually. So that recording evaluation This own risk error sufficient writing and calculation the magnitude of which results in data accuracy being reduce.

3.3. Calculation results test and selection major

After a series of test processes done by the candidate student new, committee reception will do calculation from results test the for determine accepted or No as well as determine major For candidate student new based on results tests that have been done. In the calculation test This done with use microsoft excel so can more easy in calculation Because there is functions supporters in it.

3.4. TOPSIS Calculation Method and Results

From this process there is a number of obstacles in the recording process mark test and calculation value. Recording the value that is still manually have risk tall error recording value. The solutions offered writer in study This as the expected alternative can solve problem. Author in study This build system with use method system Supporter decision or SPK which method is chosen is the Technique for Others Reference by Similarity to Ideal Solution (TOPSIS) which is a method This is summation weight from a number of criteria. In supporting the decision-making process decision for election majors at *Al Khairiyah Citangkil Integrated Islamic* Vocational School. Alternative the between can seen in the table following :

Table 2. Alternatives Major

	Alternative
A 1	Alternative 1
A 2	Alternative 2
A 3	Alternative 3
A 4	Alternative 4
A 5	Alternative 5
A 6	Alternative 6
A 7	Alternative 7
A 8	Alternative 8
A 9	Alternative 9
A 10	Alternative 10

From the above alternatives there is limits /range of results processing criteria existing criteria for determine major or the most suitable alternative for student new who have passed the test enter *Al Khairiyah Citangkil Integrated Islamic* Vocational School.

Table 3. Major Value Limits

Major	**Value Limits**	**convert**
Multimedia (MM)	>85.00	>0.75
Engineering Software (RPL)	>80.00-85.00	>0.50-0.75
Industrial Chemical Engineering (TKI)	>75.00-80.00	>0.25-0.50
Casting Techniques Metal (Metallurgy) (TPL)	>70.00-75.00	>0.01-0.25

The criteria used as base reference in taking decision there are 9 criteria. Which are the criteria the taken from calculation results test students and grades National exam on Junior High School Certificate of Candidates student new those. Criteria the among others:

Table 4. Criteria Major

Symbol	**Criteria**
C 1	Psychometric Test Score
C 2	Quran Test Score
C 3	Verbal Test Score
C 4	Computer Basic Test Score
C 5	Mathematics National Exam Score
C 6	Science National Exam Score
C 7	English National Exam Score
C 8	Indonesian Language National Exam Score
C 9	Parental Income

From the above criteria furthermore create sub criteria from criteria existing criteria For determine mark weight from results existing criteria, sub criteria in question like following :

C 1 Psychometric Test Score

Mark	**Category**
60 – 65	Very bad
66 – 71	Bad
72 – 77	Enough
78 – 83	Good
≥ 84	Very good

C 2 Al-Qur'an Test Score

Mark	**Category**
65 – 70	Very bad
71 – 76	Bad
77 – 82	Enough
83 – 88	Good
≥ 89	Very good

C 3 Verbal Test Score

Mark	**Category**
60 – 65	Very bad
66 – 71	Bad
72 – 77	Enough
78 – 83	Good
≥ 84	Very good

C 4 Computer Basic Test Score

Mark	**Category**
62 – 67	Very bad
68 – 73	Bad
74 – 79	Enough
80 – 85	Good
≥ 86	Very good

C 5 Mathematics National Exam Score

Mark	**Category**
60 – 65	Very bad
66 – 71	Bad
72 – 77	Enough
78 – 83	Good

≥ 84	Very good

C 6 Science National Exam Score

Mark	Category
58 – 63	Very bad
64 – 69	Bad
70 – 75	Enough
76 – 81	Good
≥ 82	Very good

C 7 English National Exam Score

Mark	Category
61 – 66	Very bad
67 – 72	Bad
73 – 78	Enough
79 – 84	Good
≥ 85	Very good

C 8 Indonesian Language National Exam Score

Mark	Category
61 – 66	Very bad
67 – 72	Bad
73 – 78	Enough
79 – 84	Good
≥ 85	Very good

C 9 Parental Income

Income	Weight	Category
≥ 4,000,001	90	Very good
≥2,000,001 to 4,000,000	85	Good
≥ 1,000,001 to 2,000,000	80	Enough
≥ 500,000 to 1,000,000	70	Bad
≤ 500,000	65	Very bad

In research This There are 10 student applicants at the *Al Khairiyah Citangkil Integrated Islamic* Vocational School which is a sample. Among them as following:

	A 1	
Alternative 1	Test Score Psychotest	75
	Quran Test Score	90
	Verbal Test Score	70
	Computer Basic Test Score	75
	Mathematics National Exam Score	65
	Science National Exam Score	80
	English National Exam Score	75
	Indonesian Language National Exam Score	85
	Parent's Income Rp. 2,000,000	80
	A 2	
Alternative 2	Test Score Psychotest	78
	Quran Test Score	94
	Verbal Test Score	68
	Computer Basic Test Score	79
	Mathematics National Exam Score	70
	Science National Exam Score	67
	English National Exam Score	72
	Indonesian Language National Exam Score	80
	Parent's Income Rp. 2,800,000	85

After all value data from each alternative 1, 2, 3,… ..10 is obtained Then determine the suitability rating from every alternative to every criteria , suitability rating can seen in the table following :

W	**5**	**4**	**5**	**3**	**4**	**3**	**5**	**3**	**4**
AL	Criteria								
	C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8	C 9
A 1	75	90	70	75	65	80	75	85	80
A 2	78	94	68	79	70	67	72	80	85
A 3	80	77	75	68	82	79	83	73	90
A 4	82	81	85	79	68	82	76	85	90
A 5	77	80	82	85	80	73	65	78	80
A 6	81	84	85	82	86	85	83	85	70
A 7	70	75	73	81	75	80	77	76	90
A 8	85	80	70	82	84	76	85	78	85
A 9	90	83	69	78	80	75	83	80	80
A 10	85	90	76	75	87	90	85	88	80

From the criteria data from each of the alternatives above Then enter to stage normalization which at stage This done with method use calculation as following :

$$\mathbf{r_{ij}} = \frac{\mathbf{X_{ij}}}{\sqrt{\sum_{i=1}^{m} \mathbf{X_{ij}^2}}}$$

$x_1 = \sqrt{75^2+78^2+80^2+82^2+77^2+81^2+70^2+85^2+90^2+85^2}$

$= \sqrt{5625+6084+6400+6728+5929+6561+4900+}$

$= \sqrt{7225+8100+7225}$

$= \sqrt{64773}=254,51$

$r_{11} = \frac{75}{254,50} = 0,29$ $r_{61} = \frac{81}{254,50} = 0,32$

$r_{21} = \frac{78}{254,50} = 0,31$ $r_{71} = \frac{70}{254,50} = 0,28$

$r_{31} = \frac{80}{254,50} = 0,31$ $r_{81} = \frac{85}{254,50} = 0,33$

$r_{41} = \frac{82}{254,50} = 0,32$ $r_{91} = \frac{90}{254,50} = 0,35$

$r_{51} = \frac{77}{254,50} = 0,30$ $r_{101} = \frac{85}{254,50} = 0,33$

$x_2 = \sqrt{90^2+94^2+77^2+81^2+80^2+84^2+75^2+80^2+83^2+90^2}$

$= \sqrt{8100+8836+5929+6561+6400+7056+5625+}$

$= \sqrt{6400+6889+8100}$

$= \sqrt{69,896}=264,38$

$r_{12} = \frac{90}{264,37} = 0,34$ $r_{62} = \frac{84}{264,37} = 0,32$

$r_{22} = \frac{94}{264,37} = 0,36$ $r_{72} = \frac{75}{264,37} = 0,28$

$r_{32} = \frac{77}{264,37} = 0,29$ $r_{82} = \frac{80}{264,37} = 0,30$

$r_{42} = \frac{81}{264,37} = 0,31$ $r_{92} = \frac{83}{264,37} = 0,31$

$r_{52} = \frac{80}{264,37} = 0,30$ $r_{102} = \frac{90}{264,37} = 0,34$

The above calculations are done For all matrix normalization from X_{11} ,… …..,X_{109} . After finished so will get matrix normalization (R) such as following:

0.29	0.34	0.29	0.30	0.26	0.32	0.30	0.33	0.30
0.31	0.36	0.28	0.32	0.28	0.27	0.29	0.31	0.32
0.31	0.29	0.31	0.27	0.33	0.32	0.33	0.29	0.34
0.32	0.31	0.36	0.32	0.28	0.33	0.31	0.33	0.34
0.30	0.30	0.34	0.34	0.32	0.29	0.26	0.30	0.30
0.32	0.32	0.36	0.33	0.35	0.34	0.33	0.33	0.27
0.28	0.28	0.31	0.33	0.30	0.32	0.31	0.30	0.34
0.33	0.30	0.29	0.33	0.34	0.30	0.34	0.30	0.32
0.35	0.31	0.29	0.31	0.32	0.30	0.33	0.31	0.30
0.33	0.34	0.32	0.30	0.35	0.36	0.34	0.34	0.30

If the matrix normalization Already formed so step furthermore that is weighting with method use calculation below This in accordance weight criteria that have been set at the beginning (W = 5, 4, 5, 3, 4, 3, 5, 3, 4).

$\mathbf{Y_{ij} = W_i r_{ij}}$

$Y_{11} = w_1 r_{11} = (5)\ (0.29) = 1.47$
$Y_{12} = w_2 r_{12} = (4)\ (0.34) = 1.36$
$Y_{13} = w_3 r_{13} = (5)\ (0.29) = 1.46$
$Y_{14} = w_4 r_{14} = (3)\ (0.30) = 0.91$
$Y_{15} = w_5 r_{15} = (4)(0.26) = 1.05$
$Y_{16} = w_6 r_{16} = (3)\ (0.32) = 0.96$
$Y_{17} = w_7 r_{17} = (5)\ (0.30) = 1.51$
$Y_{18} = w_8 r_{18} = (3)(0.33) = 1.00$
$Y_{19} = w_9 r_{19} = (4)(0.30) = 1.22$

$Y_{21} = w_1 r_{21} = (5)\ (0.30) = 1.53$
$Y_{22} = w_2 r_{22} = (4)\ (0.35) = 1.42$
$Y_{23} = w_3 r_{23} = (5)\ (0.28) = 1.42$
$Y_{24} = w_4 r_{24} = (3)\ (0.31) = 0.95$
$Y_{25} = w_5 r_{25} = (4)\ (0.28) = 1.13$
$Y_{26} = w_6 r_{26} = (3)\ (0.26) = 0.81$
$Y_{27} = w_7 r_{27} = (5)\ (0.28) = 1.45$
$Y_{28} = w_8 r_{28} = (3)\ (0.31) = 0.94$
$Y_{29} = w_9 r_{29} = (4)\ (0.32) = 1.29$

Do the above calculation until with finished Y_{109} so formed table normalization that has been weighted Y as below This :

1.4	1.3	1.4	0.9	1.0	0.9	1.5	1.0	1.2
7	6	6	1	5	6	1	0	2
1.5	1.4	1.4	0.9	1.1	0.8	1.4	0.9	1.2
3	2	2	5	3	1	5	4	9
1.5	1.1	1.5	0.8	1.3	0.9	1.6	0.8	1.3
7	6	7	2	3	5	7	6	7
1.6	1.2	1.7	0.9	1.1	0.9	1.5	1.0	1.3
1	3	8	5	0	9	3	0	7
1.5	1.2	1.7	1.0	1.3	0.8	1.3	0.9	1.2
1	1	2	3	0	8	1	1	2
1.5	1.2	1.7	0.9	1.3	1.0	1.6	1.0	1.0
9	7	8	9	9	2	7	0	6
1.3	1.1	1.5	0.9	1.2	0.9	1.5	0.8	1.3
8	3	3	8	2	6	5	9	7
1.6	1.2	1.4	0.9	1.3	0.9	1.7	0.9	1.2
7	1	6	9	6	1	1	1	9
1.7	1.2	1.4	0.9	1.3	0.9	1.6	0.9	1.2
7	6	4	4	0	0	7	4	2
1.6	1.3	1.5	0.9	1.4	1.0	1.7	1.0	1.2
7	6	9	1	1	8	1	3	2

Determine Positive ideal value A^+ and Negative ideal value A^- with provisions on the ideal Positive A^+ If he Benefit then what is being sought mark maximum, if the cost is sought minimum/ smallest value and vice versa his for Negative ideal A^- If he Benefits then what is sought its minimum value if Cost is sought mark maximum, as following :

Ideal solution Positive A^+ :

Y_1^+ Max {1,47;1,53;1,57;1,61;1,51;1,59;1,38; 1,67;1,77;1,67}= 1.77

Y_2^+ Max {1,36;1,42;1,16;1,23;1,21;1,27;1,13; 1.21;1.26;1.36} = 1.42

Do calculation as above until Y_9^+.

Negative ideal solution A^-

Y_1^- Max {1,47;1,53;1,57;1,61;1,51;1,59;1,38; 1,67;1,77;1,67}= 1.38

Y_2^- Max {1,36;1,42;1,16;1,23;1,21;1,27;1,13; 1.21;1.26;1.36} = 1.13

Do calculation as above until Y_9^-.

If the steps above has finished Then so the results obtained as below This :

A+

1.7	1.4	1.7	1.0	1.4	1.0	1.7	1.0	1.3
7	2	8	3	1	8	1	3	7

A-

1.3	1.1	1.4	0.8	1.0	0.8	1.3	0.8	1.0
8	3	2	2	5	1	1	6	6

Furthermore that is do calculation For measure alternative distance with Positive ideal solution and Negative ideal solution.

a) Calculation distance between an alternative with Positive ideal solution.

$D_1^+ = \sqrt{(1,77-1,47)^2+(1,42-1,36)^2+(1,78-1,46)^2+}$
$= \sqrt{(1,03-0,91)^2+(1,41-1,05)^2+(1,08-0,96)^2+}$
$= \sqrt{(1,71-1,51)^2+(1,03-1,00)^2+(1,37-1,22)^2}$
$= \sqrt{(0,3)^2+(0,06)^2+(0,32)^2+(0,12)^2+(0,36)^2+}$
$= \sqrt{(0,12)^2 + (0,2)^2+(0,03)^2+(0,15)^2}$
$= \sqrt{0,09+0,0036+0,1024+0,0144+0,1296+0,0144+}$
$= \sqrt{0,04+0,0009+0,0225}$
$= \sqrt{0,4178} = 0,64$

$D_2^+ = \sqrt{(1,77-1,53)^2+(1,42-1,42)^2+(1,78-1,42)^2+}$
$= \sqrt{(1,03-0,95)^2 + (1,41-1,13)^2+(1,08-0,81)^2+}$
$= \sqrt{(1,71-1,45)^2 + (1,03-0,94)^2+(1,37-1,29)^2}$
$= \sqrt{(0,24)^2+(0)^2+(0,36)^2+(0,08)^2+(0,28)^2+}$
$= \sqrt{(0,27)^2 + (0,26)^2+(0,09)^2+(0,08)^2}$
$= \sqrt{0,0576+0+0,1296+0,0064+0,0784+0,0729+}$
$= \sqrt{0,0676+0,0081+0,0064}$
$= \sqrt{0,427} = 0,65$

Do calculation as above until D_{10}^+.

b) Calculation distance between an alternative with Negative ideal solution.

$D_1^- = \sqrt{(1,47-1,38)^2+(1,36-1,13)^2+(1,46-1,42)^2+}$
$= \sqrt{(0,91-0,82)^2+(1,05-1,05)^2+(0,96-0,81)^2+}$
$= \sqrt{(1,51-1,31)^2+(1,00-0,86)^2+(1,22-1,06)^2}$

$=\sqrt{(0,09)^2+(0,23)^2+(0,04)^2+(0,09)^2+(0)^2+}$
$=\sqrt{(0,15)^2+(0,2)^2+(0,14)^2+(0,16)^2}$
$=\sqrt{0,0081+0,0529+0,0016+0,0081+0+0,0225+}$
$=\sqrt{0,04+0,0196+0,0256}$
$=\sqrt{0,1784}=0,42$

$D_2^-=\sqrt{(1,53-1,38)^2+(1,42-1,13)^2+(1,42-1,42)^2+}$
$=\sqrt{(0,95-0,82)^2+(1,13-1,05)^2+(0,81-0,81)^2+}$
$=\sqrt{(1,45-1,31)^2+(0,94-0,86)^2+(1,29-1,06)^2}$
$=\sqrt{(0,15)^2+(0,29)^2+(0)^2+(0,13)^2+(0,08)^2+(0)^2}$
$=\sqrt{+(0,14)^2+(0,08)^2+(0,23)^2}$
$=\sqrt{0,0225+0,0841+0+0,0169+0,0064+0+}$
$=\sqrt{0,0196+0,0064+0,0529}$
$=\sqrt{0,2088}=0,46$

final step that is counting relative proximity of the alternative to ideal solution or look for mark preference For every alternative.

$$v_1 = \frac{D_1^-}{D_1^- + D_1^+} = \frac{0,42}{0,42+0,64} = \frac{0,42}{1,09} = 0,40$$

$$v_2 = \frac{D_2^-}{D_2^- + D_2^+} = \frac{0,46}{0,46+0,65} = \frac{0,46}{1,11} = 0,41$$

From the results preference above can We conclude or We determine best alternative ranking based on specified criteria, which is ranked calculation the will become reference in election major For candidate student *Al Khairiyah Citangkil Integrated Islamic* Vocational School.

No	Alternative	Preference value	Ranking	Major
1	Alternative 1	0.40	10	MM
2	Alternative 2	0.41	9	MM
3	Alternative 3	0.55	6	RPL
4	Alternative 4	0.58	4	RPL
5	Alternative 5	0.45	7	MM
6	Alternative 6	0.65	2	RPL
7	Alternative 7	0.44	8	MM
8	Alternative 8	0.60	3	RPL
9	Alternative 9	0.57	5	RPL
10	Alternative 10	0.72	1	RPL

From the table rank above can be concluded that from 10 samples candidate students above There are 4 students selected for enter to in Multimedia major and 6 selected students enter to in major Engineering Software (RPL) based on from a series-calculations that have been carried out based on established criteria before him, so that party school can direct decide election major to student the.

V. CONCLUSION

In the election major use System Decision Support Systems (DSS) can be very helpful make it easier and make desired result more accurate, here TOPSIS method was selected Because method This Still Enough relevants If in taking decision only use One Method. Variables used Psychometric Test Score, Al-Qur'an Test Score, Verbal Test Score, Basic Computer Test Score, Mathematics National Examination Score, Science National Examination Score, English National Examination Score, Indonesian National Examination Score, Parental Income. From the results of the alternative test on each candidate candidates in each major with test 10 samples candidate student There are 4 students selected for enter to in Multimedia Department (MM) and 6 selected students enter to in major Engineering Software (RPL).

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