Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

Comparison of Weighted Product Method and Simple Additive Weighting in Scholarship Recipient Selection

Oktaviani[1] , Agung Triayudi[2] , Ira Diana Solihati[3]

[123]Sistem Informasi,
Fakultas Teknologi Komunikasi dan Informatika, Universitas Nasional

Email: oktavianidirdja@gmail.com[1], agung.triayudi@civitasunas.ac.id[2], Iradiana2803@gmail.com[3]

ARTICLE INFO

Article history:
Received: 27/01/2020
Revised: 31/ 01/2020
Accepted: 01/02/2020

***Keywords**:*

scholarships, addative simple weighting, decision support systems, weighted product.

ABSTRACT

SMA Dharma Karya as educational institutions annually held the scholarships are given to students based on criteria set by the school. However, in selecting the scholarship still use manual feared scholarships target. So the decision support system built in selecting scholarship learners using weighted product. In this study, using the method of weighted product and simple additive weighting as a comparison. From the results of research on the best methods of weighted product that is on the alternative perengkingan 14 with a total value of 0.0067401308233662 and the best perengkingan SAW method is also on the alternative 14 with a total value of 0.82. The results of a comparison test on the data obtained 263 product value weighted accuracy of 83.03% and a simple additive weighting of 60.45%. Results have the system usability percentage of 85.6% and has been tested BlackBox Addressing that the system can perform properly selecting scholarship recipients.

1. Introduction

Scholarship is financial aid that comes from educational establishments are given to students in supporting the needs in terms of education [1]. SMA Dharma Karya as educational institutions annually held the scholarships. Granting scholarships are awarded to students eligible based on the criteria determined by the school. Scholarships are awarded must absolutely be selected in order to provide scholarships targeted. Sehubung the importance of selecting the scholarship is needed decision support system to help the school in selecting scholarship recipients learners. Moreover, the process of selecting scholarship still use manual feared scholarships target.Decision-making system is an information system that could facilitate and provide solutions to problems in decision-making criteria and alternatives [1].

This research is the development of some previous studies that have similar research methods and objects. In this study, using the method of weighted product as in research on decision support systems Sariati recipients. The data sample consists of 25 students, the best falls on the student perengkingan 3 [1]. Then comparison methods have relevance as research Eko on comparison using simple additive weighting and weighted product in electionschess ukm best athletes. Mechanical comparison by performing calculations on each method. Then calculate the level of accuracy by means of matching rank with the number of original data is then divided by the total of test data. The results showed that the weighted method better product with a percentage of 83.33% and a simple additive weighting method amounted to 62.4975% [2].

Then use other research journals and reference the following description of the research. Decision-making system needs student achievement. The method used weighted product and k-nearest neighour. Using a comparison technique calculation accuracy by means of matching rank with the original data amount is then divided by the total test data. Results of user and system data comparisons k-nearest neighbor method amounted to 56.67% and 76.67%, while the weighted product method of 11.1% and 100% [3].Subsequent research decision support system needs education scholarship recipients Misi, the method used simple additive weighting. The results show the system can perform well perengkingan [4].

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

Future studies are needed the system to select the best wedding organizer, the method used*simple additive weighting*and the weighted product. Comparison technique using a Hamming distance, the measurement results show 78% in method *simple additive weighting*and 80% in the weighted product method [5]. Future studies are needed candidate selection decision support system for new employees. The method used is the weighted product and simple additive weighting. Mechanical comparison by performing calculations on each method to determine the method relavan. Then, compare the time ekseskusi system. Showed that the simple additive weighting system is shorter because the calculation is more sederhanya compared to the weighted product method[6]. Subsequent research needed support systembusiness credit decisions in the process of the people. The method used is the weighted product and simple additive weighting. Mechanical comparison by performing calculations on each method to determine which method is more relavan. Research shows that the weighted product method can provide value and benefits more clearly than the simple additive weighting method [7]. Subsequent research is needed to predict the electoral system best teachers used the weighted product method, the results show the system can help management in decision-making best teacher [8]. The next studydecision support systems needed selecting scholarship recipients, the method used AHP and TOPSIS, research shows the highest value on perengkingan 0980 [9]. Subsequent research decision support system needs to determine the best employees, the method used weighted product, the results perengkingan best employees have the lowest value to the value perengkingan 0.250 0.133 [10].

Based on the explanation above, then by this author preparing to meet Final study entitled "Comparison of Methods of Weighted Product and Simple Additive weighting" In Selection of Fellows ". Systemwhich was built based on web. Purpose built of this system will help the school in selecting scholarship recipients learners recommendation based on the value of the highest perengkingan. Moreover, it can help speed up the selection process without having to use manual calculation. Because the manual calculation ineffective and takes a long time and then worry about the scholarships target.

2. Research methods

In this chapter discusses the methods used and the stages of the research workflow that begins with a study litelatur by searching for references such as research journals and related books. Further identification of the problem, then survey and data collection is by direct observation and interviews to relevant parties. Perform data analysis, design the user interface system, stage writing program code, system testing, conclusions and stages of completion.

Decision support systems have some kind of problem-solving one of which is multi-attribute decision making (MADM) which is a method in searching the optimal alternative is based on a number of alternatives on certain criteria [11]. There are several methods of MADM. In this study, I use the method of weighted product and simple additive weighting. Where in selecting scholarship system design using the weighted product and manual calculations using simple additive weighting method for comparison. Here are the stages of product weighted method

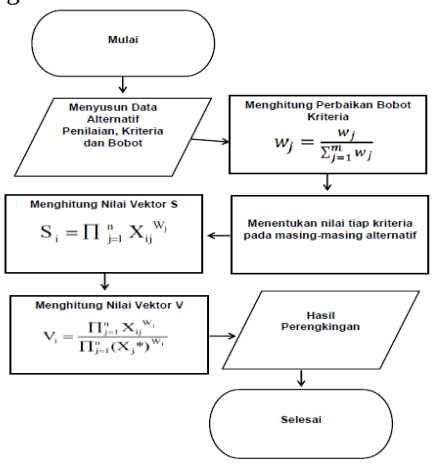

Figure 1. Flowchart weighted product

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

The image above is the flow of product weighted calculation method. In this method of calculation by multiplying the rating on each attribute. Where the rating of each attribute is raised to repair the weights. The process is the same as the normalization. Then proceed with the process of calculating the value of the vector V which is then followed by a phase perengkingan. Tertinggilah preference value to be received in the scholarship selection process. Here's a picture using simple additive weighting stage.

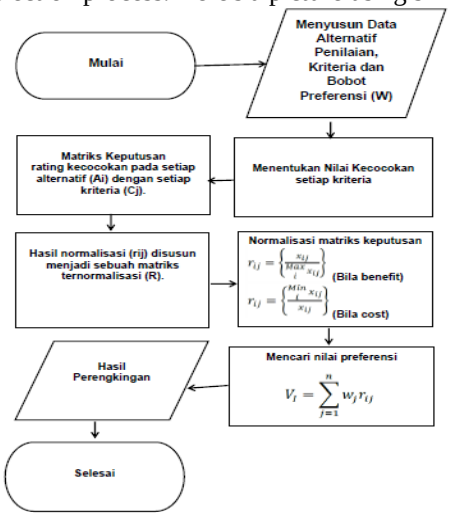

Figure 2. Flowchart method *simple additive weighting*

Based on Figure 2 above is a stage in the calculation of simple additive weighting. Where simple additive weighting is a weighted summation method. This method has the concept of looking for a weighted summation of all alternatives on all attributes. Using simple additive weighting requires the normalization process matrix based on attributes of the benefit / cost. Then final preference value is obtained by performing a summation of the multiplication of each element normalized matris row (R) with corresponding weights improvement with elements of the matrix column.

3. Results and Discussion

A. sample Data

*sample*Data in this study is the student data that is used as an alternative in selecting scholarship. Where the data used were 263 data based on the number of students in grade 10 s / d 12 in SMA Dharma Karya.

Table 1.
sample student data

Alt	C1	C2	C3	C4	C5	C6	C7
A1	-	2000000-4999000	81.11	2	-	General employees	1 KM
A2	-	2000000-4999000	83.32	2	-	entrepreneur	5 KM
A3	-	1000000-1999000	82.07	1	-	labor	4 KM
A4	1	2000000-4999000	82.07	1	-	labor	4 KM
A5	-	2000000-4999000	78.74	3	-	General employees	6 KM
A6	1	5000000-20000000	79.61	5	-	PNS / TNI / PORLI	2 KM
A7	2	2000000-4999000	85.11	2	-	General employees	3 KM
A8	-	1000000-1999000	81.33	2	-	labor	2 KM
A9	-	2000000-4999000	82.90	3	-	General employees	2 KM
A10	1	2000000-4999000	84.57	2	-	General employees	8 KM
...	...	...	...	...	...	...	...
A263	-	2000000-4999000	82.04	3	V	General employees	2 KM

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

B. Determining Criteria and Weights

Table 2.
Table of criteria

Code	Criteria	Weight	sub Criteria	Score
C1	arrears SPP	25%	> 3 months	100
			3 months	80
			2 months	60
			1 month	40
			not arrears	20
C2	Income Parents	20%	<500,000	100
			500000-999000	80
			1.000.000- 1.999 million	60
			2000000-4999000	40
			5000000-20000000	20
C3	Average rapot	20%	90.01-100	100
			80.01 to 90.00	80
			70.01 to 80.00	60
			60.01 to 70.00	40
			60.00	20
C4	The number of dependents	10%	> 4	100
			4	80
			3	60
			2	40
			1	20
C5	Non Academic Achievement	10%	Achievers	100
			not Achievement	50
C6	Parents' job	10%	Workers, Farmers	100
			Small traders	80
			Private Employees, Wirawasta	60
			PNS / TNI / PORLI	40
			Large Employers	20
C7	distance to school	5%	> 12km	100
			10-12 KM	80
			7-9 KM	60
			4-6 KM	40
			1-3 KM	20

Based on Table 2 above is a table of criteria in determining the scholarship selection criteria which uses 7. C1 arrears SPP has the highest weight of 25%, C2 income parents have a weighting of 20, C3 average rapot has a weighting of 20%, C4 number of dependents has a weight of 10%, C5 non-academic achievements has a weight of 10%, the C6 work of parents have weighted 10% and C7 distance to school house has a weight of 5%. Then, from each of the weights has a sub-criteria. The sub-criteria has a score that describes the interests of each sub from very low to very high.

C. Repair Criteria Weight

The next stage was to make weight in the assessment criteria in accordance with the formula in equation (1) is as follows:

$$Wj = \frac{wj}{\sum wj} \quad \text{..... (1)}$$

Information:
W: Rated weight
Wj: weighting value to j

$$W1 = \frac{25}{25+20+20+10+10+10+5} = \frac{25}{100} = 0.25$$
$$W2 = \frac{20}{25+20+20+10+10+10+5} = \frac{20}{100} = 0.2$$
$$W3 = \frac{20}{25+20+20+10+10+10+5} = \frac{20}{100} = 0.2$$
$$W4 = \frac{10}{25+20+20+10+10+10+5} = \frac{10}{100} = 0.1$$
$$W5 = \frac{10}{25+20+20+10+10+10+5} = \frac{10}{100} = 0.1$$

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

W6 = 10 / 25 + 20 + 20 + 10 + 10 + 10 + 5 = 10 / 100 = 0.1

W7 = 5 / 25 + 20 + 20 + 10 + 10 + 10 + 5 = 5 / 100 = 0.05

D. Calculation Method of Weighted Product

Table 3.
Rating Result Match Any Alternatives

Alternative	Criteria						
	C1	C2	C3	C4	C5	C6	C7
A1	20	40	80	40	50	60	20
A2	20	40	80	60	50	60	40
A3	20	40	80	60	50	60	20
A4	40	60	80	20	50	100	40
A5	20	40	60	60	50	60	40
A6	40	20	60	100	50	40	20
A7	60	40	80	40	50	60	20
A8	20	60	80	40	50	100	20
A9	20	40	80	60	50	60	20
A10	40	40	80	40	50	60	60
....	...	...	...	...	...	...	...
A263	20	40	80	60	100	60	20

The above table is the result of a match rating of each alternative on each criterion. Where each value has a level of importance from highest to lowest.

Then the next stage determine a score for each alternative by multiplying the ratings data compatibility with weights improvement. Manual calculations presented in equation (2):

$S_i = Wj \prod_{j=1}^{n} X_{ij}$ ..... (2)

= W1 w2 × × × w5 w4 w3 × × × w6 w7$x_{11}x_{12}$ $x_{13}x_{14}x_{15}x_{16}x_{17}$

= 200.25 × 400.2 × 800.2 × 400.1 × 500.1 × 600.1 × 200.05 = 39.742677170365

Then do the same process to obtain the value of vector S on each of the alternatives presented in Table 4.

Table 4.
Results vectors S

S	vector S
S1	39.742677170365
S2	42.846736102487
S3	41.387218977248
S4	52.103421693947
S5	40.451068454106
S6	40.879516107079
S7	52.304304629078
S8	45.358663105321
S9	41.387218977248
S10	49.931047894954
...	...
S263	44.357722987993

After getting the value of vector S, the next stage doing the calculations to find the value of the preference V by the formula presented in equation (3):

$Vi = Si$ .....(3)

$\sum_i^n Si$

$S1$

$S1 + S2 + \cdots + S263$

= 39.742677170365

=39.742677170365 + 42.846736102487 +...+44.357722987993

= 0.003481796560084

Then do the same process to obtain a preference value V of each alternative are presented Table 5.

Table 5.
Results preference V

V	Preference value V
V1	0.003481796560084
V2	0.0037537385247843

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

V	Preference value V
V3	0.0036258724103739
V4	0.0045647029173431
V5	0.0035438576619154
V6	0.0035813933205703
V7	0.0045823019711139
V8	0.0039738046959725
V9	0.0036258724103739
V10	0.0043743844949548
…	…
V263	0.0038861138279812

Then the last stage of the calculation is to determine the weighted product perengkingan grantee by sorting preference value largest to the smallest V are presented in Table 6.

Table 6.
Results perengkingan weighted product method

Alternative	Score
A14	0.0067401308233562
A77	0.0062723984951992
A113	0.0059216930851825
A202	0.0057501909840839
A117	0.0054219438897163
A135	0.0051717953540152
A44	0.0051487332524104
A56	0.0051144134203814
A29	0.0049823432241788
A53	0.0049240039166947
…	…
A200	0.0027478974402283

Based on Table 6 above alternatives that have the best preference value that is at 14 with a value alternative0.0067401308233562.

E. Weighting Addative Simple Calculation Method

Below is the result of the normalization of the table 3. The process of calculation for each of the data have the benefit criteria then divide the matrix elements with the max value of the row. Make the process of forming a matrix perhitunggan normalized (R

$$\begin{bmatrix}
20/100 & 40/80 & 80/100 & 40/100 & 50/100 & 60/100 & 20/100 \\
20/100 & 40/80 & 80/100 & 60/100 & 50/100 & 60/100 & 40/100 \\
20/100 & 40/80 & 80/100 & 60/100 & 50/100 & 60/100 & 20/100 \\
40/100 & 60/80 & 80/100 & 20/100 & 50/100 & 100/100 & 40/100 \\
20/100 & 40/80 & 60/100 & 60/100 & 50/100 & 60/100 & 40/100 \\
40/100 & 20/80 & 60/100 & 100/100 & 50/100 & 40/100 & 20/100 \\
60/100 & 40/80 & 80/100 & 40/100 & 50/100 & 60/100 & 20/100 \\
20/100 & 60/80 & 80/100 & 40/100 & 50/100 & 100/100 & 20/100 \\
20/100 & 40/80 & 80/100 & 60/100 & 50/100 & 60/100 & 20/100 \\
40/100 & 40/80 & 80/100 & 40/100 & 50/100 & 60/100 & 60/100 \\
\dots & \dots & \dots & \dots & \dots & \dots & \dots \\
20/100 & 40/80 & 80/100 & 60/100 & 100/100 & 60/100 & 20/100
\end{bmatrix}$$

$$\begin{bmatrix}
0,2 & 0,5 & 0,8 & 0,4 & 0,5 & 0,6 & 0,2 \\
0,2 & 0,5 & 0,8 & 0,6 & 0,5 & 0,6 & 0,4 \\
0,2 & 0,5 & 0,8 & 0,6 & 0,5 & 0,6 & 0,2 \\
0,4 & 0,75 & 0,8 & 0,2 & 0,5 & 1 & 0,4 \\
0,2 & 0,5 & 0,6 & 0,6 & 0,5 & 0,6 & 0,4 \\
0,4 & 0,25 & 0,6 & 1 & 0,5 & 0,4 & 0,2 \\
0,6 & 0,5 & 0,8 & 0,4 & 0,5 & 0,6 & 0,2 \\
0,2 & 0,75 & 0,8 & 0,4 & 0,5 & 1 & 0,2 \\
0,2 & 0,5 & 0,8 & 0,6 & 0,5 & 0,6 & 0,2 \\
0,4 & 0,5 & 0,8 & 0,4 & 0,5 & 0,6 & 0,6 \\
\dots & \dots & \dots & \dots & \dots & \dots & \dots \\
0,2 & 0,5 & 0,8 & 0,6 & 1 & 0,6 & 0,2
\end{bmatrix}$$

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

After finding the value of the normalization process matrix next stage is to find the value of the preference to the formula presented in equation (4) below:

$$VI = \sum_{j=1}^{n} WjRij \quad \text{.....(4)}$$

V1 = (0.25) (0.2) + (0.2) (0.5) + (0.2) (0.8) + (0.1) (0.4) + (0.1) (0.5) + (0.1) (0.6) + (0.05) (0.2) = 0.47

Preference value obtained from each alternative (Vi) by adding the result of multiplication of the normalized matrix (R) to the value of improvements the weight of each criterion. Make a calculation process on the entire sample data presented in Table 7 below:

Table 7.
Results Preferences Vi

Alternative	Criteria							Total value
	C1	C2	C3	C4	C5	C6	C7	
A1	0.05	0.1	0.16	0.04	0.05	0.06	0.01	0.47
A2	0.05	0.1	0.16	0.06	0.05	0.06	0.02	0.5
A3	0.05	0.1	0.16	0.06	0.05	0.06	0.01	0.49
A4	0.1	0.15	0.16	0.02	0.05	0.1	0.02	0.6
A5	0.05	0.1	0.12	0.06	0.05	0.06	0.02	0.46
A6	0.1	0.05	0.12	0.1	0.05	0.04	0.01	0.47
A7	0.15	0.1	0.16	0.04	0.05	0.06	0.01	0.57
A8	0.05	0.15	0.16	0.04	0.05	0.1	0.01	0.56
A9	0.05	0.1	0.16	0.06	0.05	0.06	0.01	0.49
A10	0.1	0.1	0.16	0.04	0.05	0.06	0.03	0.54
…	…	…	…	…	…	…	…	…
A263	0.05	0.1	0.16	0.06	0.1	0.06	0.01	0.54

Having in mind the preference value of each alternative is the next step perengkingan stage to the sort of the highest value to the lowest preference are presented in Table 8. The higher the value of the preference, the greater the opportunity to receive scholarships

Table 8.
Results perengkingan simple additive weighting method

Alternative	Total value
A14	0.82
A77	0.78
A113	0.74
A202	0.71
A117	0.69
A199	0.67
A25	0.66
A44	0.66
A56	0.64
A48	0.64
...	...
A200	0.36

According to the table above is the result perengkingan 8 recipients using the best alternative saw fall to the alternative 14 with a value of 0.82.

F. Product Comparison Weighted Method and Simple Additive weighting

Table 9.
Comparison Test Methods

No.	Rank Real	Ket	Rank WP	Ket	Rank SAW
1	A14	S	A14	S	14
2	A77	S	A77	S	77
3	A113	S	A113	S	113
4	A202	S	A202	S	202
5	A117	S	A117	S	117
6	A135	S	A135	TS	199
7	A44	S	A44	TS	25
8	A29	S	A56	TS	44
9	A56	S	A29	TS	56
10	A53	S	A53	TS	48
...	...	...	...	...	...
263	A200	S	A200	S	A200

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

After the calculation process of selecting scholarship using two methods: WP and SAW method. Then testing accuracy by comparing the similarity of perengkingan both methods with the original data and then do the calculation using equation (5).

$$\text{Accuracy} = \frac{\text{Number of correct data}}{\text{The total number of test data}} \times 100\% \quad \text{.....(5)}$$

Based on the results of comparative testing both methods by using the data obtained 263 value weighted product method accuracy of 84.03% and 60.46% SAW method. Results obtained from the value matches perengkingan the WP method as much as 221 data and methods SAW 159 and then divided by the total test data is 263 data. From the above conclusions the authors suggest to use the weighted product method in selecting the scholarship because the calculation more accurately, an alternative calculation based on the multiplication value performance rating, then raised to the value of the weights. So the result will be more specific than the simple additive weighting the calculations simpler. Can be demonstrated in Table 6 vector value on simple additive weighting method many have in common, while the weighted product methods are shown in Table 8 vector value is more specific, the best method perengkingan WP fell to 14 with a value alternative .0067401308233662 while the simple additive weighting calculation Best perengkingan also fell to an alternative 14 but with a different vector value is 0.82.

G. testing Systems

a) Blackbox testing

In the system testing stage using methods blackbox. Blackbox is a software testing to ensure that the system tested had results as expected.

Table 10
Blackbox testing

No.	Page	Test scenario	Expected results	Test results
1	Main page	Shown main page	Displays the main menu	Corresponding
2	User pages Students page Selection page Weather Ratings	Displaying data	Successful Data displayed	Corresponding
		Click the plus button	Data Successfully Increases in system and database	Corresponding
		Click the Edit button	User data is successfully carried out changes to the system and database	Corresponding
		Click the Delete button	Successfully deleted user data on the system and database	Corresponding
3	calculation WP	Prosses perform calculations	Showing the calculation process WP	Corresponding
4	Rating result	Displays the results of the assessment	Displays the results of the assessment	Corresponding

b) Ratings User Acceptance Test (UAT)

Table 11
Rate user acceptance test (UAT)

No.	Data	SS	S	KS	TS	STS	Score	%
1	Does the system of selecting scholarship information easy to understand?	2	3	0	0	0	22	88%
2	Is the selection of scholarship information system is easy to operate?	1	4	0	0	0	21	84%
3	If the system can assist in the selection process for a scholarship?	1	4	0	0	0	21	84%
4	Does the design look attractive system?	2	3	0	0	0	22	88%
5	Whether the system is sound and in accordance with the required performance?	1	4	0	0	0	21	84%
Average							**21.4**	**85.6 %**

Based on the test application to the school, then the respondents fill kuesional sheet containing questions about the usability of the system. Through the results of these assessments have an average percentage of 85.6%. It can be concluded that the screening decision support system performance scholarship is good enough for the school.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

H. System implementation

Figure 3. The data page selection on the system

The image above is a selection of data pages that contained the data name scholarship period and weighting of each criterion as well as the screening quota of scholarships. On this page of the system can perform multiple actions is to see, edit and delete data input selection. Here is an assessment of data pages on the system.

Figure 4. Data on the system ratings

The image above is the page where there are ratings systems students alternative data with the data of criteria for each alternative. Button the process will continue in the process of calculating the weighted product method.

Here's a suitability rating page image of each alternative.

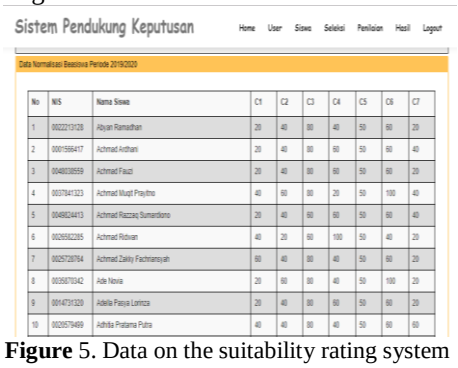

Figure 5. Data on the suitability rating system

The following image is a page that contains data compatibility rating for each alternative on each sub criterion. The score value addressing the level of importance of each criterion from very high to very low.

Here's a repair yard weights.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

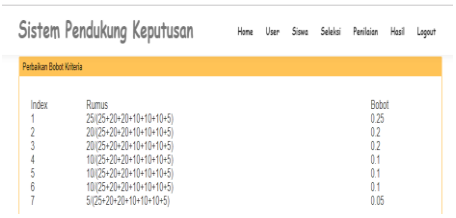

Figure 6. Home improvement weighting system

The following figure is an improvement process stage weight by dividing the weight of each criterion keselurhan dibadi total weight.
Here is an alternative score value data pages on the system.

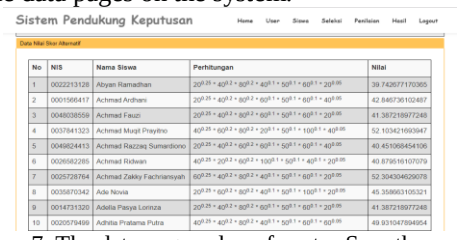

Figure 7. The data page value of vector S on the system

Based on Figure 7 above is a weighted calculation stage product is the data vector S of each alternative. Calculation is calculated by multiplying the suitability ratings data every alternative to weight improvement.
Here is an image vector calculation V.

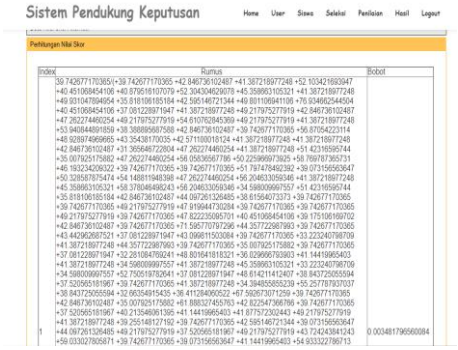

Figure 8. The page calculation of score

Based on the figure 8 above is a vector value calculation page V. This calculation is to determine the value of the preference V on each alternative.
Here's a page image sorting results.

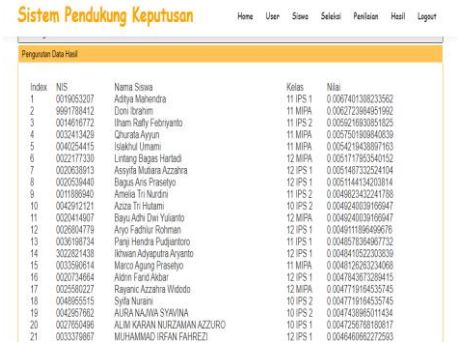

Figure 9. page sorting result

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 337-347 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

Based on the picture above is a page perengkingan 9 in which the order data based on the value of V the higher the preference will be accepted in the selection of scholarship. Based on these results the best alternative to the alternative fall 14 with the value of 0.0067401308233662.

4. Conclusion

Application decision support system implemented using weighted product, and the manual calculation using simple additive weighting as a comparison, this application generates output reports awardees based on calculations using seven criteria: arrears spp, income parents, the average rapot, number of dependents, the achievements of non academic, work of parents and the distance from the house to school. Based on testing the accuracy of the weighted values obtained product by 84.03% and the value of simple additive weighting method accuracy of 60.45%. From the research results showed that the method is more valid is the weighted product method for the calculation is more precise than the SAW simpler method so that the value of the resulting vector WP more specific method, unlike the SAW method wherein a vector value much experience in common. In the method that is best perengkingan alternative WP 14 with a value of 0.0067401308233662 whereas the SAW method best perengkingan also fell to alternative 14, but with a total value of different vectors is 0.82. Based on the test results and the results of usability black box system with an average value of 85.6%. It can be concluded the system can aid in the selection process with good scholarship and performance as expected by the school. Based on the test results and the results of usability black box system with an average value of 85.6%. It can be concluded the system can aid in the selection process with good scholarship and performance as expected by the school. Based on the test results and the results of usability black box system with an average value of 85.6%. It can be concluded the system can aid in the selection process with good scholarship and performance as expected by the school.

5. Reference

[1] Sariati, W. Aprianti, dan Fathurrahmani, "Sistem pendukung keputusan penerimaan beasiswa peningkatan prestasi akademik (PPA) berbasis *web"*, *Jurnal Sains dan Informatika*, vol. 5, no. 1, hal 1-10, Juni 2019.

[2] M. E. Jumaddin, F. Agus, A. H. Kridalaksana, "Perbandingan metode *simple additive weighting* dan *weighted product* untuk pemilihan atlet terbaik pada UKM mulawarman University chess club", *Jurnal Prosiding SAKTI (Seminar Ilmu Komputer dan Teknologi Informasi*, vol. 3, no.2, hlm 50-58, Desember 2018

[3] J. I. Kartika1, E. Santoso, Sutrisno**, "**Penentuan siswa berprestasi menggunakan metode *k-nearest neighbour* dan *weighted product* (studi kasus: SMP negeri 3 Mejayan)*"*, *Jurnal Pengembangan Teknologi Komunikasi dan Ilmu Komputer*, vol. 1, no. 5, hal 352-360, Mei 2017.

[4] R. Fauzan, Y. Indrasary, N. Muthia, "Sistem Pendukung Keputusan Penerimaan Beasiswa Bidik Misi di POLIBAN Dengan Metode SAW Berbasis Web", *JOIN (Jurnal Online Informatika)*, vol. 2, no. 2, hal 79-83, Desember 2017.

[5] P. M. Kusumantara, M. Kustyani, T. Ayu, "Analisa perbandingan metode SAW dan WP pada sistem pendukung keputusan pemilihan *wedding organizer* di Surabaya", *Teknika: Engineering and Sains Journal*, vol, 3, no. 1, hal 19-24, Juni 2019.

[6] A. Setyawan, F. Y. Arini, and I. Akhlis, "Comparative analysis of simple adaptive weighting method and weighted product method to new employee recruitment decision support system", *Scientific Journal of Informatics*, vol. 4, no. 1, pp 34-42, May 2017.

[7] D. W. T Putra, A. A. Punggara, "Comparison analysis of simple additive weighting (SAW) and weighted product (WP) in decision support system", The 2nd international conference on technology, innovation, society and science-to-business(ICTIS), vol. 215, no. 5, pp 1-5, October 2018.

[8] Solikhun, A. P. Windarto, and Amri, "Decision support system in predicting the Best teacher with multi atribute decesion making weighted product (MADMWP) method", *International Journal of Artificial Intelligence Research*, vol. 1, no. 1, pp. 6-10, June 2017.

[9] Triono, W. Usino, S. Lesmana, M. Iqbal, E. A. Setiawan,"Selection of academic achievements scholarship support assistance decision support system", *International Journal of Computer Techniques*, vol. 5, no. 3, June 2018.

[10] N. Aminudin, E. Sundari, Shankar, P. Deeplakshmi, Fauzi, R. Irvani, A. Maselano, "Weighted product and its application to measure employee performance", International Journal Of Engineering & Technology, pp 102-108 , vol. 7, issue 2.26, May 2018.

[11] Program Studi Sistem Informasi Fakultas Sains dan Teknologi Universitas Ma Chung. 2018. Studi Kasus Sistem Pendukung Keputusan membahas metode SAW dan Topsis. Malang: CV Seribu Bint