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APPLICATION OF MULTI-OBJECTTIVE OPTIMAZATION ON THE BASIS OF RATIO ANALYSIS IN DETERMINING MONTHLY STUDY AGENDA ONMASJID AL-MUHAJIRIN RUMAH PONDOK MANSION

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Pondok Mansion House (RPM) which is located in the Namorambe sub-district, Deli Serdang Regency is one of the government subsidized housing held by PT Rapy Ray. The construction of the mosque which has been completed provides good news for the Muslim residents of the housing because they can carry out routine prayers and various other Islamic holiday activities. On Saturday, June 19, 2021, a mosque committee was formed before the establishment of the Mosque Prosperity Agency. Then after the mosque committee was formed. The mosque committee held a meeting to find the name of the mosque and to complete the management of the mosque which was held on July 7, 2021. To make the mosque agenda, it was discussed again by inviting members of the management which coincided on August 3, 2021. Then the results of the meeting were agreed upon by the mosque management and the problem that occurs is the emergence of disagreements or disagreements on one of the mosque's agenda schedules resulting in small talks in the housing complex area which can result in disorganization between mosque administrators and individuals who do not agree with the agenda. It is necessary to make a policy in preparing a schedule with a scientific system based on mathematical calculations so that the results can provide explanations and can be accepted with grace. Of course the well-known system in this case is the Decision Support System (DSS) in which this system provides suggestions, input, as well as contributions to organizational actors, associations whose nature is to choose the best among several available options. Then the results will provide solutions in the form of approaches with alternative systems, ratings and several components related to DSS. The value of the approach or result that will be given later reaches 80% to 95%.

Keywords : *dss, moora, spk,matrix,decision-making system*

I. INTRODUCTION

Al-Muhajirin Mosque is located in the Pondok Mansion (RPM) complex located in Namorambe district of Deli Serdang Regency is one of the government subsidy housing held by PT Rapy Ray. The construction of the mosque that has been completed provides good news for the residential Muslim residents because it can carry out the routine of prayer and various other Islamic holiday activities. On Saturday, June 19, 2021, the mosque was formed before the establishment of the Mosque Prosperity Agency. Then after the establishment of the mosque committee. Panita Masjid conducted deliberations for the search for the name of the mosque and to complete the management of the mosque which was held on July 7, 2021. To create a mosque agenda, it was re-offered by inviting members of the board which coincided on August 3, 2021. Then the results of the meeting were agreed upon by the mosque administrator and the problem that occurred was the emergence of impropriety or disapproval on one of the mosque agenda schedules as a result of small talk in the residential complex area that could result in a non-compact between the mosque manager and people who did not approve of the agenda. It is necessary to make a policy in arranging a schedule with a scientific system based on mathematical

calculations so that the results can provide explanations and can be accepted with airy chest. Of course, the famous system in this case is called the Decision Support System (SPK) where this system provides a suggestion, input, and contribution to the perpetrators of the organization, the association whose nature is to choose the best among several options available. Then the results will provide a solution in the form of an approach with an alternative system, rating and several components related to SPK. The value of the approach or results that will be given later reaches 80% to 95%.

In previous research on the topic of Decision Support System Selection of ORMAWA FKI UMS Activity Schedule with Web-based Weighted Product Method concluded that the decision support system can help the process of monitoring the schedule of activities of ORMAWA FKI so that the process to compile the schedule of activities is more visible, effective and efficient.

In previous research on the topic of Designing The Application of The Application of The Decision Support System scheduling subjects in Smk Ciledug Al-Mussadadiyah concluded that the Support System of The Decision Scheduling Of Subjects is made by modeling that takes into account various factors used as criteria for assessment and weighting including assessment of teacher status, age, position, education level and assessment of subjects [2].

In previous research on the topic of Driver Scheduling Decision Support System Using Round Robin Algorithm (Case Study: Zena Travel) concluded that the scheduling system can help operators to maximize their performance including in the creation of driver schedules as well as to support business processes in addition to driver scheduling as well as customer and reservation docking[3].

2. METHODS

Elfrain Turban, Jay E. Aronson and Peng Lian, argued that "The *Decision Support System (DSS)*was created to improve theprocess and quality of decision-making results, where *DSS* can combine data and knowledge to increase effectiveness and efficiency in the decision-making process". Meanwhile, according to Irfan Surbakti, the *Decision Support System (DSS)* empowers intellectual individual *resources*with the ability of computers to improve the quality of decisions and relate to decision-making management and relate to semi-structured issues. The main basics of decision making according to Geoge R Terry in his research there are 5 important things to attract an accurate and efficient decision including the following [6].

1. Instuisi (Feeling)
   Decision-making based on instuitions or feelings has a subjective nature so that it is easily affected. Decision making based on instuition contains some good and weakness. The good thing is, among others, the time used to make decisions is relatively short, for problems whose limited influence of making will give decisions in general, the ability to take decisions from decision makers is very instrumental and needs to be utilized properly. While the weaknesses include, the resulting decision is relatively unfavorable, it is difficult to find a comparison tool so that it is difficult to measure the truth of its validity, other fundamentals in decision making are often ignored.
1. Experience
   Decision making based on experience has benefits for practical knowledge because based on experience one can estimate something and can take into account the profit and loss and good bad decisions that will be produced. Because of experience, one can guess the problem even if only by looking at the heart has found a way to solve it.
1. Fact
   Fact-based decision making can provide a healthy, solid and good decision. With the fact, the level of trust in decision makers can be higher so that people can accept the decisions made willingly and airy chest.
2. Authority
   Decision makers based on authority are usually carried out by the leader against his subordinates or people who are lower in position. Decision making based on authority also has advantages and disadvantages. The advantages include, most recipients are subordinates regardless of the recipient voluntarily or forcibly, the need can last for a long period of time, have authentic (authentic) authenticity. Weaknesses, among others, can give rise to routine nature, associate with dictatorial practices, often passing problems that should be solved so as to cause blurring.

3. Rational
   In rational decision making, the resulting decision is objective, logical, more transparent, consistent to maximize results or values within certain constraints so that it can be said to be close to the truth or in accordance with what is desired. In rational decision making there are several things as follows.

1. Clarity of the problem, no doubt and blur of the problem
2. Orientation of goals and unity of understanding of the goals to be achieved
3. Science, alternatives, all alternatives are known for their types and consequences.
4. Clear preferences, alternatives can be sorted according to criteria
5. The maximum result, the selection of the best alternative is based on the maximum economic results of rational decision making in full force under ideal circumstances.

MOORA (Multi-Objective Optimization on The Basis of Ratio Analysis) This method of multi-purpose optimization (or programming), also known as multi-criterion optimization or multiple attributes, is the process of simultaneously optimizing two or more conflicting attributes (goals) subject to certain limitations. The MOORA method, first introduced by Brauers (2004) is a multiobjective optimization technique applied to solve differenttypes of complex decision-makingproblems. Problem solving measures using the MOORA method include:

1. Matrix formation

$$Xij = \begin{matrix} x_{11} & x_{12} & x_{1n} \\ x_{21} & x_{22} & x_{2n} \\ x_{m1} & x_{m2} & x_{mn} \end{matrix} \quad \text{.....(1)}$$

x is the criterion value of each criterion represented as a matrix

2. Determining The Matrix of Normalization

$$Xij = \frac{Xij}{\sqrt{\sum_{j=1}^{m} x^{2ij}}} \quad \text{.....(2)}$$

The Xij ratio shows the size to i of the alternative in the criterion to j, m shows the number of alternatives and n indicates the number of criteria. Brauers et al. (2008) concluded that for the denominator, the best choice of square roots of the squared sum of each alternative perkriteria.

3. Determine the weighted normalization matrix

$$Y_i = \sum_{j=1}^{g} w_j x_{ij}^{*} - \sum_{j=g+1}^{n} w_j x_{ij} \quad \text{.....(3)}$$

In some cases, it is often observed that some criteria are more important than others. To signify that a criterion is more important, it can be multiplied by the appropriate weight. Where Wj is the weight of the criteria to - j.

4. Determine the Pretension Value

$$Y_i = \sum_{j=1}^{n} w_j x_{ij}^{*} \quad (j = 1,2,...n) \quad \text{.....(4)}$$

Thus, the best alternative has the highest yi value, while the worst alternative has the highest yj value.

3 RESULT AND DISCUSSION

Table 1. Anilysis Data

No	Day	Citizen Alignment		Information
		Agree	Disagree	
1	Friday night	Setuju	-	Wirit Night
2	Saturday night		-	Sport
3	Sunday night	-	Disagree	Rest
4	Monday night	-	Disagree	Overtime Work
5	Tuesday night	-	Disagree	Overtime Work
6	Wednesday night	-	Disagree	Overtime Work
7	Thursday night	-	Disagree	Overtime Work

Table 2. Alternative Data

No	Alternatif	Information
1	Friday night	Wirit Night
2	Saturday night	Sport
3	Sunday night	Rest
4	Monday night	Overtime Work
5	Tuesday night	Overtime Work
6	Wednesday night	Overtime Work
7	Thursday night	Overtime Work

Table 3. Creating Criteria gives weight

No	Criteria	Day	Information	Weight Value & Weight %
1	C1	Friday night	The best day on which the sun rises on that day is Friday, on that day Adam was created, and on that day Adam was put into heaven, and sent down from heaven, on that day the end will come, on that day there will be a time when no believer prays before Allah expecting good unless Allah will grant his request." (HR. Muslim)	7 – 30%
2	C2	Saturday night	One of the names of the days in the Qur'an Saturday tells the story of the children of Israel. Saturday means to rest.	5 – 20 %
3	C3	Sunday night	Sunday is the first day before the second day, Monday.	3- 15 %

Table 4. Normalization of Criterion Values Against Alternatives

No	Alternatif	Kriteria		
		C1	C2	C3
1	A1	7	5	3
2	A2	5	3	1
3	A3	3	3	3
4	A4	5	1	5
5	A5	5	3	1
6	A6	3	5	3
7	A7	3	3	1

Here's the decision matrix value

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$$Xij = \begin{bmatrix} 7 & 5 & 3 \\ 7 & 3 & 1 \\ 7 & 3 & 3 \\ 7 & 1 & 5 \\ 7 & 3 & 1 \\ 7 & 5 & 3 \\ 7 & 3 & 1 \end{bmatrix}$$

Normalized Performance Matrix

Criterion 1 (C1)

$$C_1 = \sqrt{7^2+7^2+7^2+7^2+7^2+7^2+7^2} = \sqrt{343} = 18,5$$

$$A_{11} = \frac{7}{18,5} = 0,37$$
$$A_{21} = \frac{7}{18,5} = 0,37$$
$$A_{31} = \frac{7}{18,5} = 0,37$$
$$A_{41} = \frac{7}{18,5} = 0,37$$
$$A_{51} = \frac{7}{18,5} = 0,37$$
$$A_{61} = \frac{7}{18,5} = 0,37$$
$$A_{71} = \frac{7}{18,5} = 0,37$$

Criterion 2 (C2)

$$C_2 = \sqrt{5^2+3^2+3^2+1^2+3^2+5^2+3^2} = \sqrt{87} = 9,3$$

$$A_{12} = \frac{5}{9,3} = 0,53$$
$$A_{22} = \frac{3}{9,3} = 0,32$$
$$A_{32} = \frac{3}{9,3} = 0,32$$
$$A_{42} = \frac{1}{9,3} = 0,10$$
$$A_{52} = \frac{3}{9,3} = 0,32$$
$$A_{62} = \frac{5}{9,3} = 0,53$$
$$A_{72} = \frac{3}{9,3} = 0,32$$

Criterion 3 (C3)

$$C_3 = \sqrt{3^2+1^2+3^2+5^2+1^2+3^2+1^2} = \sqrt{55} = 7,4$$

$$A_{13} = \frac{3}{7,4} = 0,40$$
$$A_{23} = \frac{1}{7,4} = 0,13$$
$$A_{33} = \frac{3}{7,4} = 0,40$$
$$A_{43} = \frac{5}{7,4} = 0,67$$
$$A_{53} = \frac{1}{7,4} = 0,13$$
$$A_{63} = \frac{3}{7,4} = 0,40$$
$$A_{73} = \frac{1}{7,4} = 0,13$$

Based on the calculations above, the following is the matrix of normalized performance, namely as follows:

$$Xij = \begin{bmatrix} 0,37 & 0,53 & 0,40 \\ 0,37 & 0,32 & 0,13 \\ 0,37 & 0,32 & 0,40 \\ 0,37 & 0,10 & 0,67 \\ 0,37 & 0,32 & 0,13 \\ 0,37 & 0,53 & 0,40 \\ 0,37 & 0,32 & 0,13 \end{bmatrix}$$

Next calculate the weighted normalized matrix, here are the steps.

$A_{11} = 30\% \times 0,37 = 0,11$ $A_{21} = 20\% \times 0,53 = 0,10$ $A_{31} = 20\% \times 0,40 = 0,06$

$A_{12} = 30\% \times 0,37 = 0,11$ $A_{22} = 20\% \times 0,32 = 0,06$ $A_{32} = 20\% \times 0,13 = 0,01$

$A_{13} = 30\% \times 0,37 = 0,11$ $A_{23} = 20\% \times 0,32 = 0,06$ $A_{33} = 20\% \times 0,40 = 0,06$

$A_{14} = 30\% \times 0,37 = 0,11$ $A_{24} = 20\% \times 0,10 = 0,02$ $A_{34} = 20\% \times 0,67 = 0,10$

$A_{15} = 30\% \times 0,37 = 0,11$ $A_{25} = 20\% \times 0,32 = 0,06$ $A_{35} = 20\% \times 0,13 = 0,01$

$A_{16} = 30\% \times 0,37 = 0,11$ $A_{26} = 20\% \times 0,53 = 0,10$ $A_{36} = 20\% \times 0,40 = 0,06$

$A_{17} = 30\% \times 0,37 = 0,11$ $A_{27} = 20\% \times 0,32 = 0,06$ $A_{37} = 20\% \times 0,13 = 0,01$

The end result is as follows.

0,11	0,10	0,06
0,11	0,06	0,01
0,11	0,06	0,06
0,11	0,02	0,10
0,11	0,06	0,01
0,11	0,10	0,06
0,11	0,06	0,01

So it can be concluded the results of calculationschance on that night because also the night is a using the MOORA method get the highest matrixwirit yasin activity. The agenda of monthly study value is 0.11 with the first choice of criteria,activities held at Al-Muhajirin Masjid Rumah namely Friday night means that the MuslimPondok Mansion adjusts the ADRT of the Please community housing a mansion cottage has aHelp Union (STM).

4. CONCLUSION

Based on scientific calculations using the MOORA method can contribute in determining the monthly study agenda at Masjid Al-Muhajirin Rumah Pondok Mansion and at the same time provide understanding to those who disapprove on Friday night.

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