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Eligibility Decision Support System Event Organizer In Running Event IBC In Foundation Giving Indonesia Worth use Method Multi Objective Approach Based on Ratio Analysis

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ABSTRACT

The development of an increasingly advanced era like now has made the needs of the community increase as well. Moreover, it is driven by the very fast technological advances. The influence of technological developments has touched various fields, for example, in the field of Professional *Event Organizer* (EO) Service Providers . Technology has been included in it as a tool for doing a job or identifying such as the feasibility of an EO to run an event. Therefore, in determining EO, it is necessary to design a decision support system using the *Multi Objective Optimization* method *On The Basis Of Ratio Analysis* or what is called MOORA. This system is expected to help solve problems and it is hoped that this system will help service users who want to use EO services, so they do not get disappointed when the event takes place.

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1. INTRODUCTION

The development of an increasingly advanced era like now makes people's needs increase as well. Moreover, it is driven by the very fast technological advances. The influence of technological developments has touched various fields, for example, in the field of Professional *Event Organizer* (EO) Service Providers .Technology has been included in it as a tool for doing a job or identifying such as the feasibility of an EO to run an event. EO is a term for a professional event organizing service provider that is legally appointed by his client. Basically, the task of the EO is to help the *client* to be able to carry out the desired program[1]. In determining EO, there are several conditions that must be considered, namely how to speak, be on time, experience and be creative.

Often times we encounter EOs who do not meet the requirements so that they disappoint service users, for example, such as inappropriate speech, no documentation about events that have been conducted, lack of knowledge, and not on time[2]. So that it makes service users often disappointed. Based on this, in determining EO, it is necessary to design a decision support system using the *Multi Objective Optimization* method *On The Basis Of Ratio Analysis* or what is called MOORA .

2. RESEARCH METHOD

2.1 Decision Support System

Decision support systems are interactive information systems that provide information, modeling and manipulating data. The system is used to assist decision making in semi-structured and unstructured situations where no one knows exactly how decisions should be made[3].

Decision support systems are usually built to support a solution to a problem or to evaluate an opportunity. Such a decision support system is called a decision support system application. Decision support system applications are used in decision making[4]. The application uses a flexible, interactive, and adaptable CBIS (Computer Based Information System) developed to support unstructured solutions to specific management problems[5]. Decision support system applications use data, provide an easy user interface, and can incorporate decision-making thinking. Decision support systems are more intended to support management in carrying out analytical work in situations that are less structured and with less clear criteria. Decision support systems are not intended to automate decision making, but provide interactive tools that allow decision-making to perform various analyzes using available models.

2.2 Multi-Objective Optimization On the Basis of Ratio Analysis (MOORA)

Multi-Objective Optimization on the basis of Ratio Analysis (MOORA) is a multi-objective system optimizing two or more conflicting attributes simultaneously. This method is applied to solve problems with complex mathematical calculations[6]. The MOORA method has a degree of flexibility and ease of understanding in separating the subjective part of an evaluation process into decision weight criteria with several decision-making attributes.

Here are the steps for the MOORA method[7] :

1. The first step :
   Inputting Criteria Values. Inputting the criteria value of an alternative where the value will be processed and the result will be a decision.
2. Second Step:
   Change the criteria value into a decision matrix. The decision matrix serves as a performance measurement of the alternative I th on the J th attribute, M is the alternative and n is the number of attributes and then a ratio system is developed where each performance of an alternative on an attribute is compared with the denominator which is the representative for all the alternatives and attributes. here is the change in the criteria value into a decision matrix.

$$X = \begin{matrix} x11 & x12 & x1n \\ x21 & x22 & x2n \\ xm1 & xm2 & xmn \end{matrix}$$

Figure 1. Decision Matrix

3. Third step:
   Normalization on the Moora method. Normalization aims to unify each matrix element so that the matrix elements have uniform values. Normalization at Moora can be calculated using the following:

$$X_{ij}^{*} = \frac{Xij}{\sqrt{\sum_{i=1}^{m} X_{ij}^{2}}}$$

Figure 2. Normalization

4. Fourth Step:

Subtract the maximax and minimax values to indicate that a more important attribute can be multiplied by the corresponding weight of the appropriate weight (significant coefficient). When the weight attribute is considered, the calculation uses the following equation:

$$yi = \sum_{j=1}^{g} W_j X_{ij} - \sum_{j=g+1}^{n} W_j W_{ij}$$

Figure 3. The Final Result

Determine the rank of the MOORA calculation results.

2.3 Event Organizer (EO)

According to management expert Rhenald Kasali, event organizer is a business that applies the concept of management continuously and consistently in exploring the world of entertainment as deeply as possible[1]. EO is a term for professional event organizing service providers that are legally appointed by its clients to organize a whole series of events starting from planning, preparation, execution to evaluation in order to help realize the goals expected by clients in creating events. EO is a service that aims to make it easier for people to organize an event so that it is well organized and smooth, while its benefits can add a vehicle for knowledge, especially on how to see the ability of an EO. Benefits of an EO that event will be run in accordance with the desired faster rescue.

3. RESULTS AND DISCUSSION

Analysis of system problems is a stage that greatly influences the next process. For to determine the EO's eligibility to run the IBC event at Yaysan Giving Indonesia, criteria are needed as a condition for EO to be eligible to run the IBC event . To help determine the EO worthy of running an IBC event that meets these criteria, an analysis of this system is carried out with the aim that decision making for EOs is feasible to run an IBC event can be carried out effectively and efficiently.

Based on the above problems, the Multi-Objective Optimization method on the basis of Ratio Analysis (MOORA) is considered appropriate to assist in building a decision support system. In this case the data taken comes from the Giving Indonesia Foundation. The decision making process is choosing an alternative to make a decision.

The MOORA method in the process requires criteria that will be used as calculation material in the ranking process. The criteria to be considered by the chairman of the foundation, of course, must have a weight that will be used as a reference for assessment based on the level of importance.

1. Speaking Criteria

   Based on the requirements needed in supporting the decision to determine the eligibility of an EO to run an IBC event at the Giving Indonesia Foundation, it is a way of speaking.

Table 1. Criteria for Speaking

No.	Sub-criteria name	Weight Value
1	Polite	5
2	Impolite	1

2. Timely Criteria

   Based on the requirements, punctuality is an important consideration in determining the eligibility of an EO to run an IBC event on Yayasn Giving Indonesia.

Table 2. Criteria on Time

No.	Sub-criteria name	Weight Value
1	On time	5
2	Not on time	1

3. Experience Criteria

   Based on the requirements of experience, it is very important to determine the EO's ability to run the IBC event .

Table 3. Experience Criteria

No.	Sub-criteria name	Weight Value
1	> 6 years	5
2	5 years	4
3	4 years	3
4	3 years	2
5	1-2 years	1

4. Creative Criteria

Based on creative requirements, it is also very influential in determining the eligibility of an EO to run an IBC event at the Giving Indonesia Foundation.

Table 4. Creative Criteria

No.	Sub-criteria name	Weight Value
1	Creative	5
2	Not Creative	1

Table 4. EO Data

No.	Name EO	How to Speak	On time	Experience	Communicative
1	EO Sima	Polite	On time	2 years	Not Creative
2	EO Pangu	Polite	Not On time	4 years	Not Creative
3	EO Sibo	Polite	On time	4 years	Creative
4	EO sir	Polite	On time	5 years	Creative
5	EO Tutu	Polite	Not on time	3 years	Not Creative
6	EO Med	Polite	Not on time	6 years	Creative
7	EO Lin	Polite	Not on time	3 years	Creative
8	EO Parli	Polite	Not on time	2 years	Not Creative

3.1 Calculation Using the MOORA Method

The following is to complete the case calculation determining the EO's eligibility to run the IBC event at the Giving Indonesia Foundation:

Table 5. Weights of the MOORA Method Assessment Criteria

No.	Name Criteria	Weight Value
1	How to speak (C1)	0.35
2	On time (C2)	0.25
3	Experience (C3)	0.20
4	Creative (C4)	0.20

Alternative Assessment Data based on criteria can be seen in the following table:

Table 6 Assignment of Alternatives

No.	Alternative	Assessment			
		C1	C2	C3	C4
1	EO Sima	Polite	On time	2 years	Not Creative
2	EO Pangu	Polite	Not On time	4 years	Not Creative
3	EO Sibo	Polite	On time	4 years	Creative
4	EO sir	Polite	On time	5 years	Creative
5	EO Tutu	Polite	Not on time	3 years	Not Creative
6	EO Med	S opan	Not on time	6 years	Creative

7	EO Lin	Polite	Not on time	3 years	Creative
8	EO Parli	Polite	Not on time	2 years	Not Creative

The alternative changes are obtained as follows:

Table 7. Changes in the Value of Each Alternative

No.	Alternative	Assessment			
		C1	C2	C3	C4
1	EO Sima	5	5	1	1
2	EO Pangu	5	1	3	1
3	EO Sibo	5	5	3	5
4	EO sir	5	5	4	5
5	EO Tutu	5	1	2	1
6	EO Med	5	1	5	5
7	EO Lin	5	1	2	5
8	EO Parli	5	1	1	1

a. Decision Matrix

Based on the data above, a decision matrix can be obtained in the following table:

$$X_{ij} = \begin{matrix} 5 & 5 & 1 & 1 \\ 5 & 1 & 3 & 1 \\ 5 & 5 & 3 & 5 \\ 5 & 5 & 4 & 5 \\ 5 & 1 & 2 & 1 \\ 5 & 1 & 5 & 5 \\ 5 & 1 & 2 & 5 \\ 5 & 1 & 1 & 1 \end{matrix}$$

b. Normalized Performance Matrix

Criterion 1 (C1)

$C1 = \sqrt{5^2 + 5^2 + 5^2 + 5^2 + 5^2 + 5^2 + 5^2 + 5^2}$

$C1 = 14.14$

$A_{11} = 5/14.14 = 0.35$

$A_{12} = 5/14.14 = 0.35$

$A_{13} = 5/14.14 = 0.35$

$A_{14} = 5/14.14 = 0.35$

$A_{15} = 5/14.14 = 0.35$

$A_{16} = 5/14.14 = 0.35$

$A_{17} = 5/14.14 = 0.35$

$A_{18} = 5/14.14 = 0.35$

Criterion 2 (C2)

$C2 = \sqrt{5^2 + 1^2 + 5^2 + 5^2 + 1^2 + 1^2 + 1^2 + 1^2}$

$C2 = 8.9$

$A_{21} = 5/8.9 = 0.56$

$A_{22} = 1/8.9 = 0.11$

$A_{23} = 5/8.9 = 0.56$

$A_{24} = 5/8.9 = 0.56$

$A_{25} = 1/8.9 = 0.11$

$A_{26} = 1/8.9 = 0.11$

$A_{27} = 1/8.9 = 0.11$

$A_{28} = 1/8.9 = 0.11$

Criterion 3 (C3)

$C3 = \sqrt{1^2 + 3^2 + 3^2 + 4^2 + 2^2 + 5^2 + 2^2 + 1^2}$

$C3 = 8.30$

$A_{31} = 1/8.30 = 0.12$

$A_{32} = 3/8.30 = 0.36$

$A_{33} = 3/8.30 = 0.36$

$A_{34} = 4/8.30 = 0.48$

$A_{35} = 2/8.30 = 0.24$

$A_{36} = 5/8.30 = 0.60$

$A_{37} = 2/8.30 = 0.24$

$A_{38} = 1/8.30 = 0.12$

Criterion 4 (C4)

$C4 = \sqrt{1^2 + 1^2 + 5^2 + 5^2 + 1^2 + 5^2 + 5^2 + 1^2}$

$C4 = 10.2$

$A_{41} = 1/10.2 = 0.1$

$A_{42} = 1/10.2 = 0.1$

$A_{43} = 5/10.2 = 0.5$

$A_{44} = 5/10.2 = 0.5$

$A_{45} = 1/10.2 = 0.1$

$A_{46} = 5/10.2 = 0.5$

$A_{47} = 5/10.2 = 0.5$

$A_{48} = 1/10.2 = 0.1$

Then it can be seen that the following normalized matrix , namely:

Table 8. Normalized Matrix

0.35	0.56	0.12	0.1
0.35	0.11	0.36	0.1
0.35	0.56	0.36	0.5
0.35	0.56	0.48	0.5
0.35	0.11	0.24	0.1
0.35	0.11	0.60	0.5
0.35	0.11	0.24	0.5
0.35	0.11	0.12	0.1

Next calculate the weighted normalized ma tricks:

C1= A_{11}: 0.35 x 0.35 = 0.123

A_{12} : 0.35 x 0.35 = 0.123

A_{13} : 0.35 x 0.35 = 0.123

A_{14} : 0.35 x 0.35 = 0.123

A_{15} : 0.35 x 0.35 = 0.123

A_{16} : 0.35 x 0.35 = 0.123

A_{17} : 0.35 x 0.35 = 0.123

A_{18} : 0.35 x 0.35 = 0.123

C2= A_{21}: 0.25 x 0.56 = 0.14

A_{22} : 0.25 x 0.11 = 0.028

A_{23} : 0.25 x 0.56 = 0.14

A_{24} : 0.25 x 0.56 = 0.14

A_{25} : 0.25 x 0.11 = 0.028

A_{26} : 0.25 x 0.11 = 0.028

A_{27} : 0.25 x 0.11 = 0.028

A_{28} : 0.25 x 0.11 = 0.028

C3= A_{31}: 0.20 x 0.12 = 0.024

A_{32} : 0.20 x 0.36 = 0.072

A_{33} : 0.20 x 0.36 = 0.072

A_{34} : 0.20 x 0.48 = 0.096

A_{35}: 0.20 x 0.24 = 0.048

A_{36} : 0.20 x 0.60 = 0.12

A_{37} : 0.20 x 0.24 = 0.048

A_{38} : 0.20 x 0.12 = 0.024

C4= A_{41}: 0.20 x 0.1 = 0.02

A_{42} : 0.20 x 0.1 = 0.02

A_{43} : 0.20 x 0.5 = 0.098

A_{44} : 0.20 x 0.5 = 0.098

A_{45}: 0.20 x 0.1 = 0.02

A_{46} : 0.20 x 0.5 = 0.098

A_{47} : 0.20 x 0.5 = 0.098

A_{48} : 0.20 x 0.1 = 0.02

Table 9. Weighted Normalized Matrix Results

0.12 3	0.14	0.02 4	0.02
0.12 3	0.028	0.072	0.02
0.12 3	0.14	0.072	0.098
0.12 3	0.14	0.096	0.098
0.12 3	0.028	0.048	0.02
0.12 3	0.028	0.12	0.098
0.12 3	0.028	0.048	0.098
0.12 3	0.028	0.02 4	0.02

Next look for the Yi value as follows:

Table 10. Finding Yi Value

Alternative	Max (C1 + C2 + C3 + C4 + C5)	Min (0)	Yi = Max - Min
Chapter Simalungun	(0.12 3 + 0.14 + 0.02 4 + 0.02)	0	0.30 7
Pangururan Chapter	(0.12 3 + 0.028 + 0.072 + 0.02)	0	0.243
Chapter Sibolga	(0.12 3 + 0.14 + 0.072 + 0.098)	0	0.433
West Pakpak chapter	(0.12 3 + 0.14 + 0.096 + 0.098)	0	0.457
Chapter Tarutung	(0.12 3 + 0.028 + 0.048 + 0.02)	0	0.219
Medan Chapter	(0.12 3 + 0.028 + 0.12 + 0.098)	0	0.369
Chapter Lintong	(0.12 3 + 0.028 + 0.048 + 0.098)	0	0.297
Parlilitan Chapter	(0.12 3 + 0.028 + 0.02 4 + 0.02)	0	0.19 5

Table 11. Ranking Table

Alternative	**Yi**	**Ranking**	**Information**
Chapter Simalungun	0.30 7	4	Well worth it
Pangururan Chapter	0.243	6	Not feasible
Chapter Sibolga	0. 433	2	Well worth it
West Pakpak chapter	0.457	1	Well worth it
Chapter Tarutung	0.219	7	Not feasible
Medan Chapter	0.369	3	Well worth it
Chapter Lintong	0.297	5	Not worth it
Parlilitan Chapter	0.195	8	Not feasible

Based on the data above, the alternative value is the highest and meets the requirements, where the value> = 0.3 is declared eligible. So the EOs who deserve to run *the* IBC *event* are the Pakpak Barat chaper, the Sibolga chapter, the Medan chapter, and the Simalungun chapter.

3.2 Implementation

1. Login Form Display

   After the program is run by the user, the user must log in first by entering the username and password according to the existing system in the database, if correct, the user will enter the main

menu page and if the entered username and password does not match, the user must repeat to input the username and password correctly. The following is a login form display:

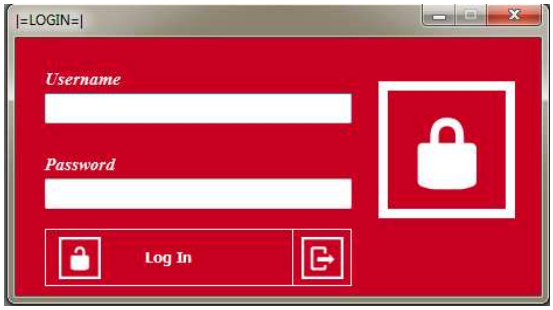

Figure 4. Display Login Form

2. Main Form Display
   The main menu page is a system start page display for processing data in a decision support system using the MOORA method. The following is a display of the main menu page:

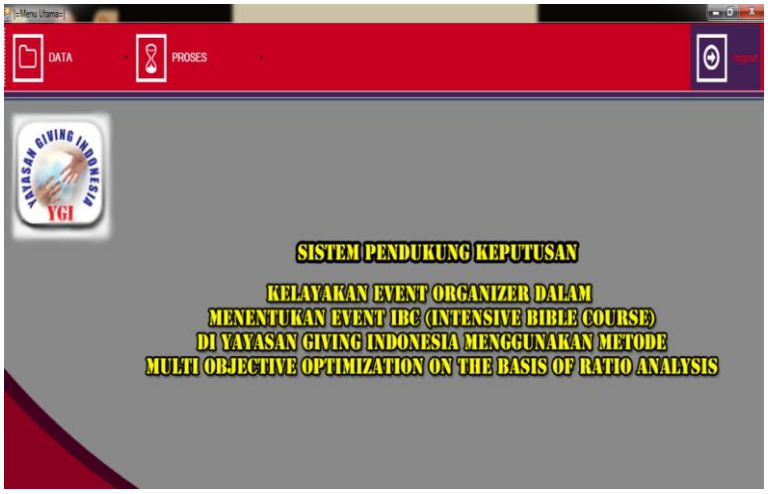

Figure 5. Display Main Menu Form

3. Display Criteria Data Form
   The criteria data *form* can be displayed by selecting the data menu and selecting the criteria data *form* . The following is a display of the criteria data menu:

Figure 6. Display Criteria Data Menu

4. Display Sub Criteria Form
   The sub-criteria data form can be displayed by selecting the data menu and selecting the sub-criteria data form . The following is a display of the sub-criteria data menu:

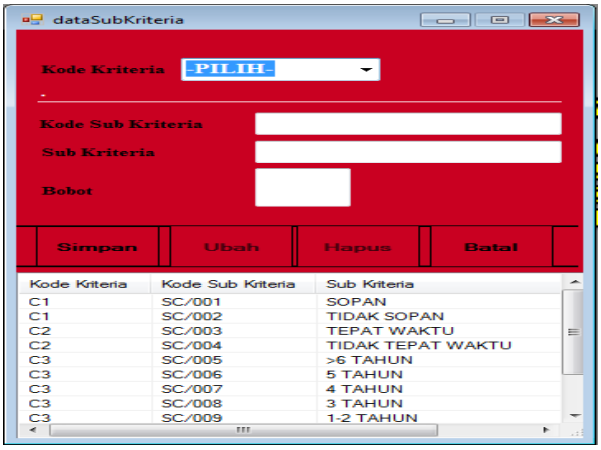

Figure 7. Sub-criteria Data Menu Display

5. Display Decision Process Form

The MOORA *form* can be displayed by selecting the process menu and selecting the MOORA *form* . The following is a display of the MOORA *form* :

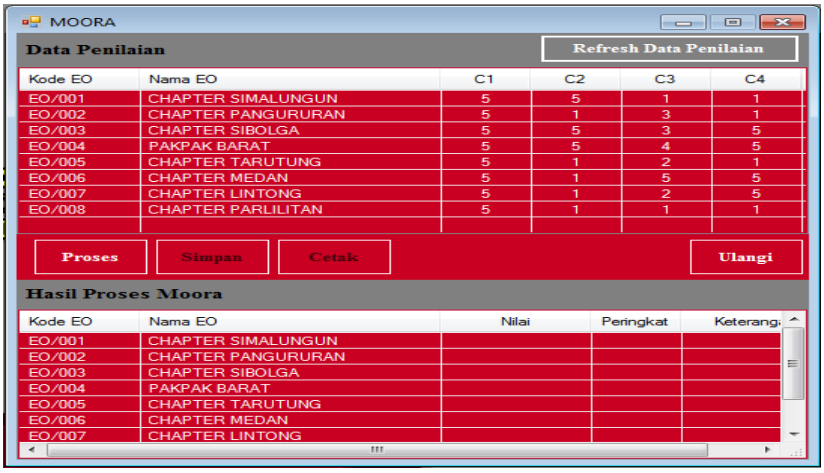

Figure 8. Display of the MOORA Form

6. Report View

The Report Form is a form used to accommodate the EO eligibility decision data report. The following is a display of the report:

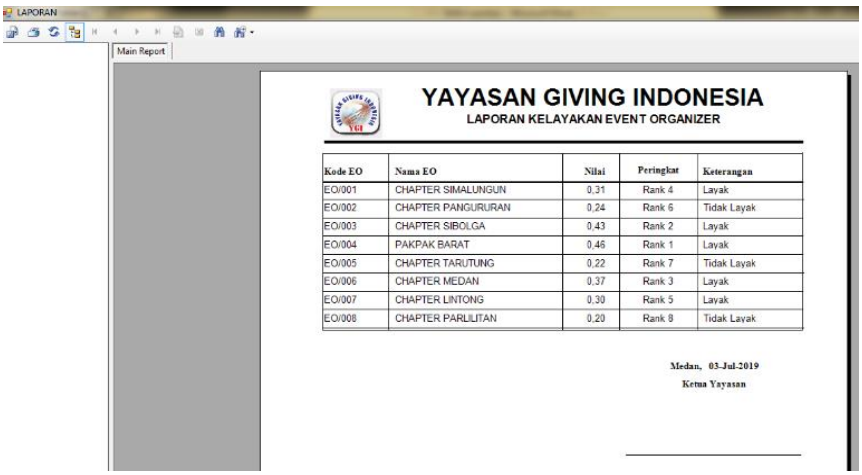

Figure 9. Report Display

4. CONCLUSION

Determining the eligibility of the EO to run the IBC event is done by utilizing a Decision Support System and is examined based on the criteria data from each EO. Applying the MOORA method in the implementation of a decision support system to determine the EO's eligibility to run the IBC event is done by following the calculation steps in accordance with the method. To build an application using the MOORA method is done by selecting Visual Basic 2008 and entering the MOORA method formulation into the application, so the application to determine the eligibility of EO to run the IBC event can be used effectively.

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