Implementation of Weight Sum Model(WSM) in the Selection of Football Athletes

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Abstract – Every soccer team has a standard that is used by coaches in determining athletes that fit the criteria owned by athletes. In this study, researchers used a decision support system (SPK) with the Weight Sum Model (WSM) method, which assesses the results of the criteria needed in the selection of soccer athletes. Decisions made in applying the WSM method will produce recommendations according to the standards used by the trainer. The purpose of this research is to apply the WSM method in selecting soccer athletes based on the desired category. The existence of this system is expected to make selection more objective for trainers in making decisions.

Keywords– Decision Support System, WSM, Football Athletes.

1. INTRODUCTION

In the sport of soccer, the selection of athletes is important for the preparation of strategy in the match. Sport is one of the most popular aspects, especially exercising can make the body healthy. Football is also often a place to compete, even to date, there are countless soccer competitions held in Indonesia. Starting from the level of the school, university, to province. The game of football has become a dream or a favorite for all levels of society from children and adults.

The development of existing technology to date, provides convenience to the world of football, especially in the process of selecting players and choosing the placement of positions to fit the expected character and criteria is still not optimal, because it does not yet have a comprehensive computerized system that is able to provide options for the trainers as supporting facilities in making a decision. In the selection process, the best soccer athlete selection is done manually namely by character assessment and player criteria only.

During this time, the coaches determine the position of players based on observation and intuition, without recording very significant data that can support the decision, it is often difficult for coaches to determine the best athletes. Therefore, a decision support system is needed that can help coaches to choose athletes that fit the existing criteria[1]–[3].

Decision support systems are interactive information systems that provide information, modeling, and data manipulation. Decision systems are used as a tool for decision-makers, but not to replace the judgment of decision-makers[4], [5]. Until now a lot of research related to decision support systems, including the selection of the best lecturers by applying the ELECTRE method[6], the application of SPK in making decisions effective using TOPSIS [7], awarding scholarships by applying MOORA[8]. Besides these methods, many other methods are used including WSM, PROMETHEE II, EXPROM II, COPRAS[9]–[11].

Based on this, the researchers are interested in making a decision support system for the selection of the best soccer athletes using the WSM method. With this system can make it easier for coaches to determine the best soccer athletes. In addition, the coach can also record player developments. So that its performance can be compared and in the end, the coach can choose the best soccer athlete precisely, according to the characteristics and abilities of the players.

2. THEORY

2.1 Decission Support System

Decision Support System (DSS) is a system that can provide problem-solving and communication skills for problems with semi-structured and unstructured conditions. This system aims to provide information, guide, provide predictions and direct information users to be able to make better decisions[4], [5], [12].

2.2 Weighted Sum Model (WSM)

WSM is a very simple method for decision making. In general this method is as simple as the SAW, WP and the like[10], [13]–[15]. Ai Ai$^{\text{WSM-Score}}$, defined from:

$$Ai^{WSM-score} = \sum_{j=1}^{n} WjAij \quad for\ i = 1,2,3\dots,m \quad (1)$$

3. RESULT AND DISCUSSION

At the analysis stage, criteria, weight and alternatives are needed to obtain the factors that influence the determination of the best soccer athlete. Based on the results of the document analysis, it can be seen that the determinants of the best soccer athletes refer to the assessment guidelines. The determinants of the best athletes used as criteria in this study are personality, age, marriage / status, ability, experience, so this study will discuss a support system that can help to determine the best athlete using the Weighted Sum Model (WSM) method.

Tables 1 and 2 are the criteria and alternative data used in the selection of soccer athletes.

Table 1. The criteria and weighted

Criteria	Description	Weighted
C_1	Personality	0,3
C_2	Age	0,1
C_3	Marriage/Status	0,2
C_4	Ability	0,2
C_5	Experience	0,2

Table 2. Alternative football athlete candidates

Alternative	Name	C_1	C_2	C_3	C_3	C_4
A_1	M. Soleh Anwar	Very Good	21	Yes	Very Good	3 Year
A_2	Muhammad	Good	25	Yes	Very Good	4 Year
A_3	M. Rifqy	Very Good	23	No	Good	2 Year
A_4	Saadin Jaga	Very Good	22	No	Very Good	2 Year
A_5	Khairuddin	Pretty Good	23	Yes	Good	3 Year

The following table is a weighting for Personality criteria.

Table 3. Weighting of personality criteria (C_1)

Description	Weighted
Very Good	4
Good	3
Pretty Good	2
Not Good	1

Table 4. Weighting of Marriage (C_3)

Description	Weighted
Yes	1
No	2

From the above table, the matching rating is shown in Table 8.

Table 5. Alternative Match Ratings

Alternative	C_1	C_2	C_3	C_4	C_5
A_1	4	21	1	4	3
A_2	3	25	1	4	4
A_3	4	23	2	3	2
A_4	4	22	2	4	2
A_5	2	23	2	3	3

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After the match rating data is obtained, the first step is to prepare a decision matrix.

$$A_{ij} \begin{vmatrix} 4 & 21 & 1 & 4 & 3 \\ 3 & 25 & 1 & 4 & 4 \\ 4 & 23 & 2 & 3 & 2 \\ 4 & 22 & 2 & 4 & 2 \\ 2 & 23 & 2 & 3 & 3 \end{vmatrix}$$

By using equation 1, we get the $A_i^{WSM\text{-}Score}$ value:

$A_1 = (0.3x4) + (0.1x21) + (0.2x1) + (0.2x4) + (0.2x3) = 1.7$

$A_2 = (0.3x3) + (0.1x25) + (0.2x1) + (0.2x4) + (0.2x4) = 2.5$

$A_3 = (0.3x4) + (0.1x23) + (0.2x2) + (0.2x3) + (0.2x2) = 2$

$A_4 = (0.3x4) + (0.1x22) + (0.2x2) + (0.2x4) + (0.2x2) = 1.8$

$A_5 = (0.3x2) + (0.1x23) + (0.2x2) + (0.2x3) + (0.2x3) = 1.8$

The results of the above calculations are ranked as listed in table 6.

Table 6. Results of WSM Process

Alternative	Results	Rank
A_1	4.90	3
A_2	5.20	1
A_3	4.90	3
A_4	5.00	2
A_5	4.50	4

After the WSM value has been obtained, it is seen that A_2 is 5.2 and is the highest value compared to other alternatives, so it can be decided that A2 can be recommended to be chosen as a soccer athlete

4. CONCLUSION

From the discussion, it can be concluded that the more specific weights used, the better the results obtained. The application of WSM provides convenience for decision making because the process is simple. From the calculation process, it can be seen that the profit or unfavorable criteria do not affect the calculation results.

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