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Measuring The Performance of Posyandu Cadres Using The Topsis Method

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Abstract-Dijen Binakesmas posyandu Depkes RI (2009) found out that the performance of posyandu cadres decreased, it was known because the coverage of toddlers who came to posyandu fell from 60 % to 43% resulting in many children who do not receive posyandu services and can result in malnutrition. POSYANDU (Posyandu Service Post) is one form of community-based effort. The success of a posyandu is influenced by the active activities of a cadre. The TOPSIS method is one of the multicretic methods of decision making. To simplify the assessment of cadre performance using the Technique for Oorder Preference method by Similiary to Ideal Solution. The purpose of this study was to obtain a model of decision making on the posyandu cadre performance appraisal with the topsis method. The criteria that are determined include: age, education, occupation, years of service, achievements. The results of this study obtained that the alternative V6 with a value of 0.8242 was the performance of the best posyandu cadre.

Keywords: Performance, Posyandu Cadre, Decision Support System, TOPSIS Method**.**

I. INTRODUCTION

Of the Health Service Post (POSYANDU) is a form of community-based effort (UKBM) that is managed based on, by, and for the community in addressing nutrition problems in children under five. One real example of community empowerment is the Posyandu, which is very important for the health of the community or toddlers. Whether or not a posyandu program is running is based on the performance of the cadre itself, if the posyandu cadre is active, the posyandu will run well according to what is desired. According to the Dijen Binakesmas posyandu, MOH (2009), it is known that the performance of posyandu cadres has decreased, it is known that the coverage of under-five children coming from posyandu decreased from 60% to 43%, resulting in many children who did not receive posyandu services and could result in malnutrition [1].

According to the Minister of Home Affairs Regulation number 19 of 2011 article 1 paragraph 1 and 2 which reads: The management of posyandu is an element of the community, community institutions, community organizations, non-governmental organizations, and the business world that are selected, willing, able, to care for social services diposyandu, therefore Posyandu cadres are also called trained cadres, namely posyandu cadres who have attended training related to posyandu services[2]. Rikesda (2013) said that the activeness of posyandu cadres nationwide until 2010 had only reached 78% from 80% in 2011 reaching a wide range of program or community participation, ranging from a low of 10% to 80% [3].

Based on the research used the FMADM method in order to help and facilitate the system in assessing the performance of lecturers in higher education based on predetermined criteria. In the research [4] conducted research for cadres in empowering the community to reduce infant and under-five mortality in Indonesia. While the research that will be conducted is to measure the performance of posyandu cadres using the TOPSIS method. This research is expected to help cadre assessment to meet the criteria and weight that has been determined in order to get rewards or benefits from the village in the form of salary bonuses.

Based on the above background, the formulation of the problem obtained how to implement a decision-making system to measure the performance of posyandu cadres using the topsis method and how to determine the performance criteria for posyandu cadres.

To help improve the quality of the performance of posyandu cadres in each program. Implement assessment criteria for the performance of posyandu cadres. Select posyandu cadres to determine awards.

II. THEORETICAL

2.1. The concept of decision support

Systems Decision Support Systems according to Efrain Turban (2005: 19) is an interactive computer-based system that helps users of models and data to solve unstructured problems using a combination of models, analysis techniques and information retrieval systems can help develop and evaluate suitable alternatives[5].

Decision support systems can provide informative analysis to improve the efficiency of decision making within the organization[6]. From the above definition we can conclude that the decision support system is a computer-based decision support system to solve an unstructured problem.

The stages that must be passed in the decision-making process are as follows[4]:

1. Stage of Understanding (Intelligence Phase)
   This stage is a search process and approach of the scope of the problem and the process of identifying problems. Input data is obtained, processed, and tested in order to identify problems.

2. Design Phase
   This stage is a development process and the search for alternative actions or solutions that can be taken is a representation of a simplified real event, so that a validation and verification process is needed to determine the accuracy of the model in examining existing problems.

3. Choise Phase (Choise Phase)
   At this stage the selection of various alternative solutions raised during the planning stage is determined or by taking into account the criteria based on the objectives to be achieved.

4. Stage of Implementation (Implementation Phase)
   At this stage the implementation of the system design that has been made at the design stage and the implementation of the alternative actions that have been selected during the selection phase are carried out.

2.2 Definition of Performance

Performance is an assessment of employees or workers systematically from a combination of ability, effort and opportunity that can be assessed from the results of the evaluation of the work done by comparing the predetermined criteria[7].

2.3 Definition of Posyandu Cadre Posyandu

Cadres are a form of community participation to become cadres in the health sector who are of course trained and get health education. The role of cadres is very important as a motivator and motivator for the community, because if the cadre is not active then the posyandu process will not run smoothly[8]. The task of a cadre is to serve the community especially for children and mothers, family planning, overcoming infectious diseases, improving malnutrition, weighing toddlers, administering vitamins, and reducing mortality[9].

2.4 Fuzzy Multi Attribute Decision Making (Fuzzy MADM)

Fuzzy multiple attribute decision making (FMADM) [10] [4] is a method used to find alternatives from a number of alternatives with the specified criteria. The core of the FMADM method determines the weight value for each attribute, then the ranking process is carried out which will select the specified alternatives. Basically, there are 3 approaches to finding attribute weight values, namely subjective approaches, subjective approaches and integration approaches between subjective and objective. Each approach has its advantages and disadvantages.

There are several methods that can be used to solve the FMADM problem, namely:

1. *Simple Additive Weighting Method* (SAW).
2. *Weighted Product* (WP).
3. ELECTRE *(Elimination Et Choix Traduisat la Realite)*
4. TOPSIS (*Technique For Order Preference By Similaryty To Ideal Solution*).
5. *Analitycal Hhierarchy Process* (AHP)[11]–[13].

III. RESEARCH METHODS

3.1. Data Collection

The methods that the authors do are as follows:

1. Observation
   Method This method is that the writer observes objects directly at the implementation of Posyandu at the head of Cipadang Village.
2. Literature study The
   Author utilizes theories concerning the discussion of information systems and information technology sciences, especially journals *decision support system.*
3. Interview
   This method the author conducted an interview with the Village Midwife regarding the Performance of Cadres in Cipadang Village.

3.2. Topsis Method

TOPSIS(*Technique For Order Preference By Similaryty To Ideal Solution*) is one method of multicriteria decision making. Topsis was first introduced by Yoon and Hwang in 1981 used as a method in solving multicriteria problems[14], [15]. Topsis method is used to help complete decision making practically, so that it can be easily understood, the computation is efficient, and has the ability to measure the relative performance of alternative decision-making.

The steps taken in solving problems using the TOPSIS method[4]:

1. Topsis begins by building a decision matrix. The decision matrix X refers to the alternative that will be evaluated based on criteria.

$$X = \begin{Bmatrix} A_1 X_{11} X_{12} X_{13} \dots X_{1n} \\ A_2 X_{21} X_{22} X_{23} \dots X_{2n} \\ A_3 X_{31} X_{32} X_{33} \dots X_{3n} \\ A_m X_{m1} X_{m2} X_{m3} \dots X_{mn} \end{Bmatrix}$$

Where A_i (i = 1,2,3, ... m) is an alternative that may be X_j (j = 1,2,3, ... n) is an attribute where alternative performance is measured, X_{ij} is performance A_i with reference to attribute X_j.

2. Make a normalized decision matrix.

$$rij = \frac{xij}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}$$

With i = 1,2, .. m
j = 1,2, .. n
Where:
R_{ij} = normalized matrix [i] [j]
X_{ij} = decision matrix [i] [j]

3. Making the normalized decision matrix weighted.

$$V_{ij} = w_{ij} r_{ij};$$

with i = 1,2, ..., m; and j = 1,2, ..., n.
Where:
V_{ij}= Element of normalized decision matrix weighted V
w_{ij}= Weight of j-criterion
r_{ij}= Matrix element normalized R

4. A positive A^+ ideal solution and ideal negative solution A^- can be determined based on normalized weight rating (y_{ij}) as:

$A^+ = (y_1^+, y_2^+ \dots y_{?}^+)$;
$A^- = (y_1^-, y_2^- \dots y_3^-)$;

Where:
V_{ij}^+= max V_{ij} if j is the attribute of profit
Min Y_{ij} if j is the cost attribute
V_j^-= min Y_{ij} if j is the attribute of theprofit
max Y_{ij} = if j is the attribute cost The

5. distance between the alternative ?? and the positive idel solution:

$$D_i^+ = \sqrt{\sum_{i=1}^{n} (Y_i^+ - Y_{ij})^2}$$

Where:
D_i^+ = Alternative distance A_i with positive ideal solution
Y_j^+ = positive ideal solution [i]
Y_{ij} = Normalization matrix [i] [j]

6. Distance between alternatives with negative ideal solution

$$D_i^- \sqrt{\sum_{i-1}^{n} (Y_{ij} - Y_j^-)^2}$$

i = 1,2, .. m

Where:
D_i^- = Alternative distance A_i with negative ideal solution
Y_j^- = Negative ideal solution [i]
Y_{ij} = Normalization matrix [i] [j]

7. The preference value for each alternative (V_i) given as:

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

i = 1,2, .. m
V_i = proximity of each alternative to the ideal solution
D_i^+ = A_i with positive ideal solution
D_i^- = A_i with the negative ideal solution
value V_i greater indicates that alternative A_i preferred.

Table 1. Alternative values for each

Criteria	Criterion Criteria	Value

C1	Age	20%
C2	Education	25%
C3	Job	20%
C4	Work period	15%
C5	Achievement	20%
Total		100%

Source: [6] [13]

Table 2. Weight Value of

Weight	**Value**
Very Low	0
Low	0.25
Enough	0.5
Good	0.75
Very Good	1

Table 3. Age weight score (C1)

Age	Value	Weight
<30	1	Very Good
35-40	0.75	Good
45-50	0.5	Enough
> 46	0.25	Low

Table 4. Value of Education Weight (C2)

Education	Value	Weight
SD	0	Very Low Middle
School	0.25	Low
SMA	0.5	Enough
D-III	0.75	Good
S1 / S2	1	Very Good

Table 5. Value Weight of work period (C3)

Working period	Value	Weight
<1 year	0.25	Low
2-3 years	0.75	Good
> 5 years	1	Very Good

Table 6. Job Weight Value (C4)

Job	Value	Weight
Unemployment (Mother RT)	1	Very Good
Self Employed	0 , 75	Good
PNS	0.25	Low

Table 7. Achievement Weight Value (C5)

Achievement	Value	Weighing
District	0.5	Enough
Province	0.75	Good
National	1	Very Good

3.3. Research Framework

Thought Concept Thought Concept is a diagram that outline the logic flow in a study. The framework of thought is based on research questions from several concepts that have been made. In this study, the development of decision support for the assessment of the performance of posyandu cadres using the framework framework is as follows:

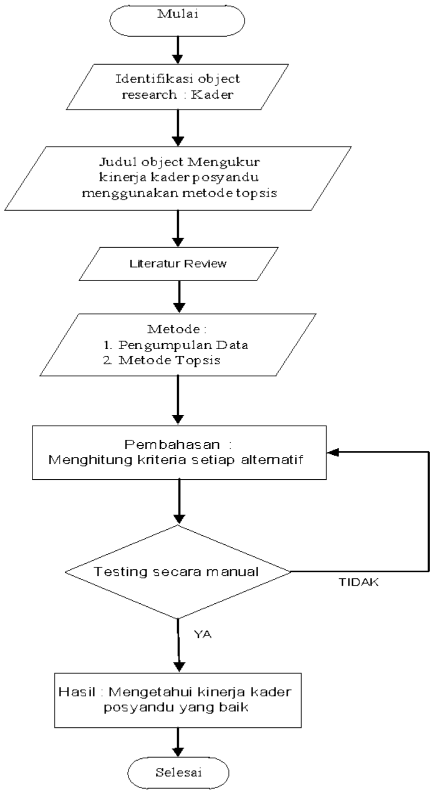

Figure 1 Research framework

IV. DISCUSSION

In this analysis, all data will be implemented in the form of the implementation of the TOPSIS method used.

a. The table below is a table of data on posyandu cadres that are alternative.

Table. 8 Decision Matrix

	C1	C2	C3	C4	C5
A1	0.5	0.25	1	1	0.5
A2	0.5	0	1	1	0.5
A3	0.25	0	1	1	0.5
A4	0.75	0.25	1	1	0 , 5
A5	0.75	0	1	1	0.5
A6	0.75	1	0.75	0.25	1
A7	0.75	0.5	0.75	1	0.75
A8	0.75	0.5	0.75	0, 75	0.75
A9	0.5	0.5	0.75	1	0.75
A10	0.75	0.5	0.75	1	0.5
A11	0.5	0.25	1	1	0.75
A12	0.5	0, 25	1	0.75	0.5
A13	0.75	0.5	1	1	1
A14	0.25	0.25	1	1	0.5
A15	0.75	0.5	1	1	1

b. After making the decision matrix the next is to make a normalized matrix on the following solution:

$|X_1|=$
$\sqrt{0.5^2+0.5^2+0.25^2+0.75^2+0.75^2+0.75^2}$
$\sqrt{0.75^2+0.75^2+0.5^2+0.75^2+0,5^2+0.5^2}$
$\sqrt{0,75^2+0,25^2+0,75^2}$
= 2,42384

$r_{11}=\frac{x_{11}}{|X_1|}=\frac{0,5}{2,42384}=0{,}02062842432$

$r_{21}=\frac{x_{21}}{|X_1|}=\frac{0,5}{2,42384}=0{,}2062842432$

$r_{31}=\frac{x_{31}}{|X_1|}=\frac{0,25}{2,42384}=0{,}1031421216$

$r_{41}=\frac{x_{41}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$r_{51}=\frac{x_{51}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$r_{61}=\frac{x_{61}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$r_{71}=\frac{x_{71}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$r_{81}=\frac{x_{81}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$r_{91}=\frac{x_{91}}{|X_1|}=\frac{0.5}{2,43284}=0{,}2062842432$

$r_{101}=\frac{x_{10}}{|X_1|}=\frac{0.75}{2.42384}=0{,}3094263648$

$r_{111}=\frac{x_{11}}{|X_1|}=\frac{0,5}{2,42384}=0{,}2062842432$

$r_{121}=\frac{x_{12}}{|X_1|}=\frac{0,5}{2,42384}=0{,}2062842432$

$r_{131}=\frac{x_{13}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$r_{141}=\frac{x_{14}}{|X_1|}=\frac{0,25}{2,42384}=0{,}1031421216$

$r_{151}=\frac{x_{15}}{|X_1|}=\frac{0,75}{2,42384}=0{,}3094263648$

$|X_2|=$
$\sqrt{0,25^2+0^2+0^2+0,25^2+0^2+1^2+0,5^2}$
$\sqrt{0.5^2+0.5^2+0.5^2+0.25^2+0.25^2+0.5^2}$
$\sqrt{0.25^2+0.5^2}$
= 1.677051

$r_{12}=\frac{x_{12}}{|X_2|}=\frac{0.25}{1.677051}=0{,}149071197$

$r_{22}=\frac{x_{22}}{|X_2|}=\frac{0}{1.677051}=0$

$r_{32}=\frac{x_{32}}{|X_2|}=\frac{0}{1.677051}=0$

$r_{42}=\frac{x_{42}}{|X_2|}=\frac{0.25}{1.677051}=0.149071197$

$r_{52}=\frac{x_{52}}{|X_2|}=\frac{0}{1.677051}=0$

$r_{62}=\frac{x_{62}}{|X_2|}=\frac{1}{1.677051}=0.596284788$

$r_{72}=\frac{x_{72}}{|X_2|}=\frac{0.5}{1.677051}=0.298142394$

$r_{82}=\frac{x_{82}}{|X_2|}=\frac{0.5}{1.677051}=0{,}298142394$

$r_{92}=\frac{x_{92}}{|X_2|}=\frac{0,5}{1,677051}=0{,}298142394$

$r_{102}=\frac{x_{102}}{|X_2|}=\frac{0.5}{1.677051}=0.298142394$

$r_{112}=\frac{x_{112}}{|X_2|}=\frac{0,25}{1,677051}=0{,}149071197$

$r_{122}=\frac{x_{122}}{|X_2|}=\frac{0,25}{1,677051}=0{,}149071197$

$r_{132}=\frac{x_{132}}{|X_2|}=\frac{0.5}{1.677051}=0.298142394$
$r_{142}=\frac{x_{142}}{|X_2|}=\frac{0,25}{1,677051}=0{,}14907119$

$r_{152}=\frac{x_{152}}{|X_2|}=\frac{0,5}{1,677051}=0{,}298142394$

$|X_3|=$
$\sqrt{1^2+1^2+1^2+1^2+1^2+0,75^2+0,75^2}$
$\sqrt{0,75^2+0,75^2+0,75^2+1^2+1^2+1^2}$
$\sqrt{1^2+1^2}$
= 3,579455

$r_{13}=\frac{x_{13}}{x_3}=\frac{1}{3,579455}=0{,}2793721391$

$r_{23}=\frac{x_{23}}{|x_3|}=\frac{1}{3,579455}=0{,}2793721391$

$r_{33}=\frac{x_{33}}{|X_3|}=\frac{1}{3,579455}=0{,}2793721391$

$r_{43}=\frac{x_{43}}{|X_3|}=\frac{1}{3,579455}=0{,}2793721391$

$r_{53}=\frac{x_{53}}{|X_3|}=\frac{1}{3,579455}=0{,}2793721391$

$r_{63} = \frac{X_{63}}{|X_3|} = \frac{0,75}{3,579455} = 0,2095291043$

$r_{73} = \frac{X_{73}}{|X_3|} = \frac{0,75}{3,579455} = 0,2095291043$

$r_{83} = \frac{X_{83}}{|X_3|} = \frac{0,75}{3,579455} = 0,2095291043$

$r_{93} = \frac{X_{93}}{|X_3|} = \frac{0,75}{3,579455} = 0,2095291043$

$r_{103} = \frac{X_{103}}{|X_3|} = \frac{0,75}{3,579455} = 0,2095291043$

$r_{113} = \frac{X_{113}}{|X_3|} = \frac{1}{3,579455} = 0,2793721391$

$r_{123} = \frac{X_{123}}{|X_3|} = \frac{1}{3,579455} = 0,2793721391$

$r_{133} = \frac{X_{133}}{|X_3|} = \frac{1}{3,579455} = 0,2793721391$

$r_{143} = \frac{X_{143}}{|X_3|} = \frac{1}{3,579455} = 0,2793721391$

$r_{153} = \frac{X_{153}}{|X_3|} = \frac{1}{3,579455} = 0,2793721391$

$|X_4| = \sqrt{1^2 + 1^2 + 1^2 + 1^2 + 1^2 + 0,25^2 + 1^2 + 0,75^2} \sqrt{1^2 + 1^2 + 1^2 + 0,75^2 + 1^2 + 1^2 + 1^2}$
$= 3.63146$

$r_{14} = \frac{X_{14}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{24} = \frac{X_{24}}{|X_4|} = \frac{1}{3,63146} = 0.2753713382$

$r_{34} = \frac{X_{34}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{44} = \frac{X_{44}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{54} = \frac{X_{54}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{64} = \frac{X_{64}}{|X_4|} = \frac{0.25}{3.63146} = 0.0688428346$

$r_{74} = \frac{X_{74}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{84} = \frac{X_{84}}{|X_4|} = \frac{0,75}{3,63146} = 0,2065285037$

$r_{94} = \frac{X_{94}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{104} = \frac{X_{104}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{114} = \frac{X_{114}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{124} = \frac{X_{124}}{|X_4|} = \frac{0,75}{3,63146} = 0,2065285037$

$r_{134} = \frac{X_{134}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{144} = \frac{X_{144}}{|X_4|} = \frac{1}{3,63146} = 0,2753713382$

$r_{154} = \frac{X_{154}}{|X_4|} = \frac{1}{3,63146} = 0.2753713382$

$|X_5| = \sqrt{0.5^2 + 0.5^2 + 0.5^2 + 0.5^2 + 0.5^2 + 1^2 +} \sqrt{0.75^2 + 0.75^2 + 0.75^2 + 0.5^2 + 0.75^2 +} \sqrt{0.5^2 + 1^2 + 0.5^2 + 1^2}$
$= 2.692582$

$r_{15} = \frac{X_{15}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{25} = \frac{X_{25}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{35} = \frac{X_{35}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{45} = \frac{X_{45}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{55} = \frac{X_{55}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{65} = \frac{X_{65}}{|X_5|} = \frac{1}{2,692582} = 0,371390732$

$r_{75} = \frac{X_{75}}{|X_5|} = \frac{0,75}{2,692582} = 0,278543049$

$r_{85} = \frac{X_{85}}{|X_5|} = \frac{0.75}{2.692582} = 0.278543049$

$r_{95} = \frac{X_{95}}{|X_5|} = \frac{0,75}{2,692582} = 0,278543049$

$r_{105} = \frac{X_{105}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{115} = \frac{X_{115}}{|X_5|} = \frac{0.75}{2.692582} = 0.278543049$

$r_{125} = \frac{X_{125}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{135} = \frac{X_{135}}{|X_5|} = \frac{1}{2,692582} = 0,371390732$

$r_{145} = \frac{X_{145}}{|X_5|} = \frac{0,5}{2,692582} = 0,185695366$

$r_{155} = \frac{X_{155}}{|X_5|} = \frac{1}{2,692582}$ = 0,371390732

From the results of the aboveobtained normalized matrix (R):

$$R = \begin{bmatrix} 0,2062 & 0,1490 & 0,2793 & 0,2753 & 0,1856 \\ 0,2062 & 0 & 0,2793 & 0,2753 & 0,1856 \\ 0,1031 & 0 & 0,2793 & 0,2753 & 0,1856 \\ 0,3094 & 0,1490 & 0,2793 & 0,2753 & 0,1856 \\ 0,3094 & 0 & 0,2793 & 0,2753 & 0,1856 \\ 0,3094 & 0,5962 & 0,2095 & 0,0688 & 0,3713 \\ 0,3094 & 0,2981 & 0,2095 & 0,2753 & 0,2785 \\ 0,3094 & 0,2981 & 0,2095 & 0,2065 & 0,2785 \\ 0,2062 & 0,2981 & 0,2095 & 0,2753 & 0,2785 \\ 0,3094 & 0,2981 & 0,2095 & 0,2753 & 0,1856 \\ 0,2062 & 0,1490 & 0,2793 & 0,2753 & 0,2785 \\ 0,2062 & 0,1490 & 0,2793 & 0,2065 & 0,1856 \\ 0,3094 & 0,2981 & 0,2793 & 0,2753 & 0,3713 \\ 0,1031 & 0,1490 & 0,2793 & 0,2753 & 0,1856 \\ 0,3094 & 0,2981 & 0,2793 & 0,2753 & 0,3713 \end{bmatrix}$$

After obtaining normalized matrix (R), then look for matrix V based on the equation:

$$V_{ij} = W_j X_{ij}$$

$V_{11} = W_1 r_{11}$ = (0,2) (0,2062)
= 0.0412

$V_{12} = W_2 r_{12}$ = (0,25) (0,1490)
= 0,0372

$V_{13} = W_3 r_{13}$ = (0,20) (0,2793)
= 0.0558

$V_{14} = W_4 r_{14}$ = (0,15) (0,2753)
= 0,0412

$V_{15} = W_5 r_{15}$ = (0,20) (0,1856)
= 0,0371

$V_{21} = W_1 r_{21}$ = (0,20) (0,2062)
= 0,0412

$V_{22} = W_2 r_{22}$ = (0,25) (0)
= 0

$V_{23} = W_3 r_{23}$ = (0,20) (0,2793)
= 0,0558

$V_{24} = W_4 r_{24}$ = (0,15) (0,2753)
= 0,0412

$V_{25} = W_5 r_{25}$ = (0,20) (0,1856)
= 0,0371

$V_{31} = W_1 r_{31}$ = (0,20) (0,1031)
= 0,0206

$V_{32} = W_2 r_{32}$ = (0,25) (0)
= 0

$V_{33} = W_3 r_{33}$ = (0,20) (0,2793)
= 0,0558

$V_{34} = W_4 r_{34}$ = (0,15) (0,2753)
= 0,0412

$V_{35} = W_5 r_{35}$ = (0,20) (0,1856)
= 0,0371

$V_{41} = W_1 r_{41}$ = (0,20) (0,3094)
= 0,0618

$V_{42} = W_2 r_{42}$ = (0,25) (0,1490)
= 0,0372

$V_{43} = W_3 r_{43}$ = (0,20) (0,2793)
= 0,0558

$V_{44} = W_4 r_{44}$ = (0.15) (0.2753)
= 0.0412

$V_{45} = W_5 r_{45}$ = (0,20) (0,1856)
= 0,0371

$V_{51} = W_1 r_{51}$ = (0,20) (0,3094)
= 0,0618

$V_{52} = W_2 r_{52}$ = (0,25) (0)
= 0

$V_{53} = W_3 r_{53}$ = (0,20) (0,2793)
= 0,0558

$V_{54} = W_4 r_{54}$ = (0,15) (0,2753)
= 0,0412

$V_{55} = W_5 r_{55}$ = (0,20) (0,1856)
= 0,0371

$V_{61} = W_1 r_{61}$ = (0,20) (0,3094)
= 0,0618

$V_{62} = W_2 r_{62}$ = (0,25) (0,5963)
= 0,1490

$V_{63} = W_3 r_{63}$ = (0,20) (0,2095)
= 0,0419

$V_{64} = W_4 r_{64}$ = (0.15) (0.0688)
= 0.0103

$V_{65} = W_5 r_{65}$ = (0,20) (0,3714)
= 0,0742

$V_{71} = W_1 r_{71}$ = (0,20) (0,3094)

= 0,06188

$V_{72} = W_2 r_{72}$ = (0,25) (0.2981)
= 0.0745

$V_{73} = W_3 r_{73}$ = (0.20) (0.2095)
= 0.0419

$V_{74} = W_4 r_{74}$ = (0.15) (0.2753)
= 0.0412

$V_{75} = W_5 r_{75}$ = (0.20) (0.2785)
= 0.0557

$V_{81} = W_1 r_{81}$ = (0.20) (0.3094)
= 0.0618

$V_{82} = W_2 r_{82}$ = (0.25) (0.2981)
= 0.0745

$V_{83} = W_3 r_{83}$ = (0.20) (0.2095)
= 0.0419

$V_{84} = W_4 r_{84}$ = (0.15) (0.2065)
= 0.0309

$V_{85} = W_5 r_{85}$ = (0.20) (0.2785)
= 0.0557

$V_{91} = W_1 r_{91}$ = (0.20) (0.2062)
= 0.0412

$V_{92} = W_2 r_{92}$ = (0.25) (0.2981)
= 0.0745

$V_{93} = W_3 r_{93}$ = (0.20) (0.2095)
= 0.0419

$V_{94} = W_4 r_{94}$ = (0.15) (0.2753)
= 0.0412

$V_{95} = W_5 r_{95}$ = (0,20) (0,2785)
= 0,0557

$V_{101} = W_1 r_{101}$ = (0,20) (0,3094)
=0,0618

$V_{102} = W_2 r_{102}$ = (0,25) (0,2981)
= 0,0745

$V_{103} = W_3 r_{103}$ = (0.20) (0.2095)
= 0.0419

$V_{104} = W_4 r_{104}$ = (0.15) (0.2753)
= 0.0412

$V_{105} = W_5 r_{105}$ = (0.20) (0.1857)
= 0.0371

$V_{111} = W_1 r_{111}$ = (0.20) (0.2062)
= 0.0412

$V_{112} = W_2 r_{112}$ = (0,25) (0,1490)
= 0,0372

$V_{113} = W_3 r_{113}$ = (0.20) (0.2793)
= 0.0558

$V_{114} = W_4 r_{114}$ = (0.15) (0.2753)
= 0.0412

$V_{115} = W_5 r_{115}$ = (0.20) (0.2785)
= 0.0557

$V_{121} = W_1 r_{121}$ = (0.20) (0.2062)
= 0.0412

$V_{122} = W_2 r_{122}$ = (0,25) (0,1490)
= 0,0372

$V_{123} = W_3 r_{123}$ = (0.20) (0.2793)
= 0.0558

$V_{124} = W_4 r_{124}$ = (0.15) (0.2065)
= 0.0309

$V_{125} = W_5 r_{125}$ = (0,20) (0,1856)
= 0,0371

$V_{131} = W_1 r_{131}$ = (0.20) (0.3094)
= 0.0618

$V_{132} = W_2 r_{132}$ = (0.25) (0.2981)
= 0.0745

$V_{133} = W_3 r_{133}$ = (0.20) (0.2793)
= 0.0558

$V_{134} = W_4 r_{134}$ = (0.15) (0.2753)
= 0,0412

$V_{135} = W_5 r_{135}$ = (0,20) (0,3713)
= 0,0742

$V_{141} = W_1 r_{141}$ = (0.20) (0.1031)
= 0.0206

$V_{142} = W_2 r_{142}$ = (0,25) (0,1490)
= 0,0372

$V_{143} = W_3 r_{143}$ = (0.20) (0.2793)
= 0.0558

$V_{144} = W_4 r_{144}$ = (0.15) (0.2753)
= 0.0412

$V_{145} = W_5 r_{145}$ = (0,20) (0,1856)

= 0,0371

$V_{151} = W_1 r_{151}$ = (0.20) (0.3094)
= 0.0618

$V_{152} = W_2 r_{152}$ = (0.25) (0.2981)
= 0.0745

$V_{153} = W_3 r_{153}$ = (0.20) (0.2793)
= 0.0558

$V_{154} = W_4 r_{154}$ = (0.15) (0.2753)
= 0.0412

$V_{155} = W_5 r_{155}$ = (0,20) (0,3713)
= 0,0742

From the above calculation, the matrix Y

$$Y=\begin{bmatrix} 0,0412 & 0,0372 & 0,0558 & 0,0412 & 0,0371 \\ 0,0412 & 0 & 0,0558 & 0,0412 & 0,0371 \\ 0,0206 & 0 & 0,0558 & 0,0412 & 0,0371 \\ 0,0618 & 0,0372 & 0,0558 & 0,0412 & 0,0371 \\ 0,0618 & 0 & 0,0558 & 0,0103 & 0,0371 \\ 0,0618 & 0,1490 & 0,0419 & 0,0412 & 0,0742 \\ 0,0618 & 0,0745 & 0,0419 & 0,0309 & 0,0557 \\ 0,0618 & 0,0745 & 0,0419 & 0,0412 & 0,0557 \\ 0.0412 & 0,0745 & 0,0419 & 0,0412 & 0,0557 \\ 0,0618 & 0,0745 & 0,0419 & 0,0412 & 0,0371 \\ 0,0412 & 0,0372 & 0,0558 & 0,0412 & 0,0558 \\ 0,0412 & 0,0372 & 0,0558 & 0,0309 & 0,0371 \\ 0,0618 & 0,0745 & 0,0558 & 0,0412 & 0,0742 \\ 0,0206 & 0,0372 & 0,0558 & 0,0412 & 0,0371 \\ 0,0618 & 0,0745 & 0,0558 & 0,0412 & 0,0742 \end{bmatrix}$$

Positive ideal solutions are calculated based on the equation:

$$A^+ = (y_1^+, y_2^+ \dots y_n^+)$$

y_1^+= max {0.0412; 0.0412; 0.0206; 0.0618; 0.0618; 0.0618; 0.0618; 0.0618; 0.0412; 0.0618; 0.0412; 0.0412; 0.0618; 0.0206; 0.0618}
= 0.0618

y_2^+= max {0.0372; 0; 0; 0.0372; 0; 0.1490; 0.0745; 0.0745; 0.0745; 0.0745; 0.0372 0.0372; 0.0745; 0.0372; 0,0745}
= 0,1490

y_3^+= max {0,0558; 0,0558; 0,0558; 0,0558; 0,0558; 0.0419; 0.0419; 0.0419; 0.0419; 0.0419; 0,0558; 0,0558; 0,0558; 0,0558; 0.0558}
= 0,0558

y_4^+= max {0.0412; 0.0412; 0.0412; 0.0412; 0.0412; 0.0103; 0.0412; 0.0309; 0.0412; 0.0412; 0.0412; 0.0309; 0.0412; 0.0412; 0.0412}
= 0.0413

y_5^+ = max {0.0371; 0.0371; 0.0371; 0.0371; 0.0371; 0.0742; 0,0557; 0,0557; 0,0557; 0.0371; 0,0557; 0.0371; 0.0742; 0.0371; 0,0742}
= 0,0742

A^+= {0,0618; 0.1490; 0,0558; 0.0412; 0,0742}

The negative ideal solution is calculated based on the equation:

$$y^- = (y_1^-, y_2^- \dots y_n^-)$$

y_1^-= min {0,0412; 0.0412; 0.0206; 0.0618; 0.0618; 0.0618; 0.0618; 0.0618; 0.0412; 0.0618; 0.0412; 0.0412; 0.0618; 0.0206; 0.0618}
= 0.0206

y_2^-= min {0.0372; 0; 0; 0.0372; 0; 0.1490; 0.0745; 0.0745; 0.0745; 0.0745; 0.0372; 0.0372; 0.0745; 0.0372; 0,0745}
= 0

y_3^-= min {0,0558; 0,0558; 0.0558; 0,0558; 0,0558; 0.0419; 0.0419; 0.0419; 0.0419; 0.0419; 0,0558; 0,0558; 0,0558; 0,0558; 0.0558}
= 0.0419

y_4^-= min {0.0412; 0.0412; 0.0412; 0.0412; 0.0412; 0.0103; 0.0412; 0.0309; 0.0412; 0.0412; 0.0412; 0.0309; 0.0412; 0.0412; 0.0412}
= 0.0103

y_5^- = min {0.0371; 0.0371; 0.0371; 0.0371; 0.0371; 0.0742; 0,0557; 0,0557; 0,0557; 0.0371; 0,0557; 0.0371; 0.0742; 0.0371; 0,0742}
= 0,0371

A^-= {0,0206; 0; 0.0419; 0.0103; 0.0371}

The distance between the weighted value of each alternative to the positive ideal solution is calculated based on the equation:

$$D_i^+ = \sqrt{\sum_{i=1}^{n} (Y_i^+ - Y_{ij})^2}$$

D_1^+=
$$\sqrt{(0.0412-0.0618)^2 + (0,0372-0.1490)^2 + (0.0558-0.0558)^2 + (0.0412-0.0412)^2 + (0.0371-0.0742)^2}$$
= $\sqrt{0.014305}$ = 0.1196

D_2^+=
$$\sqrt{(0,0412-0.0618)^2 + (0-0.1490)^2 +$$

$(0{,}0558 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 + (0{,}0371 - 0{,}0742)^2$
$= \sqrt{0.0204027} = 0.1550$

$D_3^+ =$
$\sqrt{(0{,}0206 - 0{,}0618)^2 + (0 - 0{,}1490)^2 + (0{,}0558 - 0{,}0558)^2 + (0{,}0413 - 0{,}0413)^2 + (0{,}0371 - 0{,}0742\,)^2}$
$= \sqrt{0.025304} = 0.1590$

$D_4^+ =$
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0{,}0372 - 0{,}1490)^2 + (0{,}0558 - 0{,}0558)^2 + (0{,}0413 - 0{,}0413)^2 + (0{,}0371 - 0\,{,}0742)^2}$
$= \sqrt{0.013879} = 0.1178$

$D_5^+ =$
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0 - 0{,}1490)^2 + (0{,}0558 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 + (0{,}0371 - 0{,}0742\,)^2}$
$= \sqrt{0.023602} = 0.1536$

$D_6^+ =$
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0{,}1490 - 0{,}1490)^2 + (0{,}0419 - 0{,}0558)^2 + (0{,}0103 - 0{,}0412)^2 + (0{,}0742 - 0\,{,}0742)^2}$
$= \sqrt{0.001155} = 0.0339$

$D_7^+ =$ =
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0{,}0745 - 0{,}1490)^2 + (0.0419 - 0.0558)^2 + (0.0412 - 0.0412)^2 + (0.0557 - 0.0742)^2}$
$= \sqrt{0.006096} = 0.0780$

$D_8^+ =$
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0{,}0745 - 0{,}1490)^2 + (0{,}0419 - 0{,}0558)^2 + (0{,}0309 - 0{,}0412)^2 + (0{,}0557 - 0\,{,}0742)^2}$
$= \sqrt{0.066202} = 0.0787$

$D_9^+ =$
$\sqrt{(0{,}0412 - 0{,}0618)^2 + (0{,}0745 - 1490)^2 +}$
$\sqrt{(0{,}0419 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 +}$
$\sqrt{(0{,}0557 - 0{,}0745\,)^2}$
$= \sqrt{0.006521} = 0.0807$

$D_{10}^+ =$
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0{,}0745 - 0{,}1490)^2 +}$ $(0{,}0419 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 + (0{,}0371 - 0\,{,}0742)^2$
$= \sqrt{0.00713} = 0.0844$

$D_{11}^+ =$
$\sqrt{(0{,}0412 - 0{,}0618)^2 + (0{,}0372 - 0{,}1490)^2 +}$
$(0{,}0558 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 + (0{,}0557 - 0{,}0742)^2$
$= \sqrt{0{,}01327} = 0{,}1151$

$D_{12}^+ =$
$\sqrt{(0{,}0412 - 0{,}0618)^2 + (0{,}0372 - 0{,}1490)^2 + (0{,}0558 - 0{,}0558)^2 + (0{,}0309 - 0{,}0412)^2 + (0{,}0371 - 0\,{,}0742)^2}$
$= \sqrt{0.014411} = 0.1200$

$D_{13}^+ =$
$\sqrt{(0{,}0618 - 0{,}0618)^2 + (0{,}0745 - 0{,}1490)^2 + (0{,}0558 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 (0{,}0742 - 0{,}0742)^2}$
$= \sqrt{0.005556} = 0.0745$

$D_{14}^+ =$
$\sqrt{(0{,}0206 - 0{,}0618)^2 + (0{,}0372 - 0{,}1490)^2 + (0{,}0558 - 0{,}0558)^2 + (0{,}0412 - 0{,}0412)^2 + (0{,}0371 - 0\,{,}0742)^2}$
$= \sqrt{0.015381} = 0.1248$

$D_{15}^+ =$
$\sqrt{(0.0618 - 0.0618)^2 + (0.0745 - 0.1490)^2 + (0.0558 - 0.0558)^2 + (0.0412 - 0.0412)^2 (0.0742 - 0.0742)^2}$
$= \sqrt{0{,}\,005556} = 0.0745$ The

distance between the values weighted for each alternative to the alternative to the negative ideal solution calculated based on the equation:

$$D_i^- = \sqrt{\sum_{i=1}^{n} (Y_i^+ - Y_{ij})^2}$$

$D_1^- =$
$\sqrt{(0{,}0412 - 0{,}0206)^2 + (0{,}0372 - 0)^2 + (0{,}0558 - 0{,}0419)^2 + (0{,}0412 - 0{,}0103)^2 + (0{,}0371 - 0{,}0371\,)^2}$
$= \sqrt{0.002969} = 0.0544$

$D_2^- =$
$\sqrt{(0{,}0412 - 0{,}0206)^2 + (0 - 0)^2 + (0{,}0558 - 0{,}0419)^2 + (0{,}0412 - 0{,}0103)^2 + (0{,}0371 - 0{,}0371)^2}$
$= \sqrt{0\,{,}\,00158} = 0.0397$

$D_3^- =$
$\sqrt{(0{,}0206 - 0{,}0206)^2 + (0 - 0)^2 + (0{,}0558 - 0{,}0419)^2 + (0{,}0412 - 0{,}0103)^2 + (0{,}0371 - 0{,}0371)^2}$
$= \sqrt{0\,{,}\,001155} = 0.0339$

$D_4^- = \sqrt{(0{,}0206-0{,}0206)^2+(0{,}0372-0)^2+(0{,}0558-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0371-0{,}0371)^2}$
$= \sqrt{0.004246} = 0.0651$

$D_5^- = \sqrt{(0{,}0618-0{,}0206)^2+(0-0)^2+(0{,}0558-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0371-0{,}0371)^2}$
$= \sqrt{0{,}002857} = 0.0534$

$D_6^- = \sqrt{(0{,}0618-0{,}0206)^2+(0{,}1490-0)^2+(0{,}0419-0{,}0419)^2+(0{,}0103-0{,}0103)^2+(0{,}0742-0{,}0371)^2}$
$= \sqrt{0.025304} = 0.1590$

$D_7^- = \sqrt{(0{,}0618-0{,}0206)^2+(0{,}0745-0)^2+(0{,}0419-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0557-0{,}0371)^2}$
$\sqrt{0{,}008562} = 0{,}0925$

$D_8^- = \sqrt{(0{,}0618-0{,}0206)^2+(0{,}0745-0)^2+(0{,}0419-0{,}0419)^2+(0{,}0309-0{,}0103)^2+(0{,}0557-0{,}0371)^2}$
$= \sqrt{0.008029} = 0.0896$

$D_9^- = \sqrt{(0{,}0412-0{,}0206)^2+(0{,}0745-0)^2+(0{,}0419-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0557-0{,}0371)^2}$
$= \sqrt{0.007286} = 0.0853$

$D_{10}^- = \sqrt{(0{,}0618-0{,}0206)^2+(0{,}0745-0)^2+(0{,}0419-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0371-0{,}0371)^2}$
$= \sqrt{0.008217} = 0.0906$

$D_{11}^- = \sqrt{(0{,}0412-0{,}0206)^2+(0{,}0372-0)^2+(0{,}0558-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0557-0{,}0371)^2}$
$= \sqrt{0.003314} = 0.0575$

$D_{12}^- = \sqrt{(0{,}0412-0{,}0206)^2+(0{,}0372-0)^2+(0{,}0558-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0371-0{,}0371)^2}$
$= \sqrt{0.002436} = 0.0493$

$D_{13}^- = \sqrt{(0.0618-0.0206)^2+(0.0745-0)^2+(0.0558-0.0149)^2+(0.0412-0.0103)^2+(0.0742-0.0371)^2}$
$= \sqrt{0.009792} = 0.0989$

$D_{14}^- = \sqrt{(0{,}0206-0{,}0206)^2+(0{,}0372-0)^2+(0{,}0558-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0371-0{,}0371)^2}$
$= \sqrt{0.002544} = 0.0504$

$D_{15}^- = \sqrt{(0{,}0618-0{,}0206)^2+(0{,}0745-0)^2+(0{,}0558-0{,}0419)^2+(0{,}0412-0{,}0103)^2+(0{,}0742-0{,}0371)^2}$
$= \sqrt{0.009792} = 0.0989$

The proximity of each alternative to the ideal solution is calculated based on the equation:

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

$V_1 = \frac{0.0544}{0.1196 + 0.0544} = \frac{0.0544}{0.174} = 0.3126$

$V_2 = \frac{0.0397}{0.1550 + 0.0397} = \frac{0.0397}{0.1947} = 0.2039$

$V_3 = \frac{0.0339}{0.1590 + 0.0339} = \frac{0.0339}{0.1929} = 0,1757$

$V_4 = \frac{0.0651}{0.1178 + 0.0651} = \frac{0.0651}{0.1829} = 0.3592$

$V_5 = \frac{0.0534}{0.1532 + 0.0534} = \frac{0.0651}{0.2066} = 0.2584$

$V_6 = \frac{0.1590}{0.0339 + 0.1590} = \frac{0{,}1590}{0{,}1929} = 0{,}8242$

$V_7 = \frac{0{,}0925}{0{,}0780+0{,}0925} = \frac{0{,}0925}{0{,}1705} = 0{,}5423$

$V_8 = \frac{0.0896}{0.0787 + 0.0896} = \frac{0.0896}{0.1683} = 0.5323$

$V_9 = \frac{0.0853}{0.0807 + 0.0853} = \frac{0.0853}{0.166} = 0.5138$

$V_{10} = \frac{0{,}0906}{0{,}0890+0{,}0906} = \frac{0{,}0906}{0{,}1796} = 0{,}5044$

$V_{11} = \frac{0{,}0575}{0{,}1154+0{,}0575} = \frac{0{,}0575}{0{,}1729} = 0{,}3325$

$V_{12} = \frac{0.0493}{0.1200 + 0{,}0493} = \frac{0{,}0493}{0{,}1693} = 0{,}2911$

$V_{13} = \frac{0{,}0989}{0{,}0745 + 0{,}0989} = \frac{0{,}0989}{0{,}1734} = 0{,}5703$

$$V_{14} = \frac{0,0504}{0,1248 + 0,0504} = \frac{0.0504}{0.1752} = 0.2876$$

$$V_{15} = \frac{0.0989}{0.0745 + 0.0989} = \frac{0.0989}{0.1734} = 0.5\ 703$$

From the results of the V value obtained the value of V3 = 0.1757 has the smallest value and V6 = 0.8242 has the greatest value as the best performance of the posyandu cadre. Results of testing the calculation of posyandu cadre performance with the topsis method applied using results in a ranking of criteria weight to obtain the alternative value that is selected as the best performance of posyandu cadres with an alternatve value of 0.8242.

V. CONCLUSION

Decision support system using the Technique For Order Preference By Similaryty To Ideal Solution (TOPSIS) method in the making of an assessment model measures the performance of posyandu cadres in order to help and simplify the performance assessment of posyandu cadres based on the criteria that have been determined, Age, Education, Employment, Service Period and Achievement. Of the 5 criteria and 15 alternatives tested then the 6th alternative with a value of 0.8242 which states the performance of the best posyandu cadre while the third alternative with a value of 0.1757 states the lowest Posyandu cadre performance appraisal.

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