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Pharmacist Acceptance Decision Support System Applying AHP and COPRAS Methods

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Abstract-A pharmacist is a profession that is responsible for drugs both synthetic and herbal for the purpose of human health, namely starting from designing drugs, producing them, distributing them, monitoring whether the drugs prescribed by doctors are appropriate and of high quality and safe for patients. Qualified pharmacists will make it easier for companies to select pharmacists during the recruitment process. The pharmacist recruitment process requires a professional and accurate way to produce human resources that can support the quality and success of an organization. Pharmacist recruitment usually takes a long time, because the organization or company must first carefully examine and select the criteria and requirements completed by prospective pharmacists. Seeing this situation, in selecting pharmacist acceptance, a decision support system (SPK) is needed so that pharmacist acceptance can be carried out more accurately, quickly and not subjectively. Decision-making techniques using the Analytic Hierarchy Process (AHP) method developed by Thomas L Saaty are to help solve complex problems by compiling a hierarchy of criteria, subjectively assessed by interested parties and then draw various considerations to develop weights or priorities, while decision-making techniques using the COmplex PRoportional ASsessment (COPRAS) method are used to assist decision-making in making decisions on several alternative decisions to get an accurate and optimal decision. The final results obtained Billy Surkawi, S.Farm, is a pharmacist candidate who has the first highest score with a final score of 100.00, and second place Nurul andini, S.Farm with a final score of 93.66. So that the two pharmacist candidates can be proposed to become pharmacists from the results of the selection carried out.

Keywords: Pharmacist; Analytic Hierarchy Process (AHP); Complex Proportional Assessment (COPRAS)

1. INTRODUCTION

Pharmacist is a profession that is responsible for drugs both synthetic and herbal for the purpose of human health, starting from designing drugs, producing them, distributing them, monitoring whether the drugs prescribed by doctors are appropriate and of high quality and safe for patients. Qualified pharmacists will make it easier for companies to select pharmacists during recruitment. Selection is the process of obtaining and using information about pharmacist applicants to determine who is hired to fill a position for a long or short period of time. It can also be interpreted briefly that selection is a stage to decide whether an applicant is accepted or not. Meanwhile, how to make a selection can be done with several selection methods with test stages.

The selection method consists of interviews, physical ability tests, cognitive ability tests, personality inventories, drug tests and honesty tests. Meanwhile, according to Panggabean, the selection procedure includes preliminary acceptance, examination of application files, acceptance tests, selection interviews, background and reference checks, medical evaluations, interviews with direct supervisors, actual job reviews, and acceptance decisions. The decision taken is expected to be non-subjective so that the quality of human resources obtained can be in accordance with expectations so that no party is harmed. Decision making to determine whether an applicant is accepted or not is based on several criteria set by the company.

Company or organization management must be able to design competency-based recruitment and selection programs, for example in the applicant pooling process, interviews, assessments and evaluations, so that it is hoped that with the accuracy of designing recruitment and selection programs that best suit the needs of the organization, the results obtained will provide benefits to the organization by selecting competent people who are most appropriate for the jobs available.

The pharmacist recruitment process requires a professional and accurate way to produce human resources that can support the quality and success of an organization. Pharmacist recruitment usually takes a long time, because the organization or company must first carefully examine and select the criteria and requirements completed by prospective pharmacists. Seeing this situation, in selecting pharmacist acceptance, a decision support system (SPK) is needed so that pharmacist acceptance can be carried out more accurately, quickly and not subjectively.

A decision support system is part of a computer-based information system (including knowledge-based systems or knowledge management used to support decision making in an organization or company). It can also be said to be a computer system that processes information data to make decisions from specific semi-structured problems [1][2][3][4]. Some of the methods used in SPK are: Fuzzy logic, Profile Matching, ANFIS, AHP, COPRAS, MOORA, SAW, WP, TOPSIS, ELECTRE and many more methods are used [5][6][7]. The decision-making technique using the Analytic Hierarchy Process (AHP) method developed by Thomas L Saaty is to help solve complex problems by compiling a hierarchy of criteria, subjectively assessed by interested parties and then

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drawing various considerations to develop weights or priorities, while decision-making techniques using the COmplex PRoportional ASsessment (COPRAS) method are used to assist decision making in making decisions on several alternative decisions to obtain an accurate and optimal decision [8][9][10][11].

In 2021, Musli Yanto conducted research with the aim of overcoming the problem of determining the most popular products in mini markets. This research uses the Analytical Hierarchy Process (AHP) method to calculate the priority of criteria such as price, taste, product design, aroma, and benefits. The results of this study help mini markets to identify products that are in demand by customers, which in turn can help mini market managers optimize product supply and avoid losses due to product backlogs. The three highly demanded products in this study are Teh Pucuk Harum with the highest priority value, followed by Ichi Ocha and Mirai Ocha [12].

Tessa Yolanda Marisi Sihite conducted research in 2020 at the Marine and Fisheries Service, which aims to select the best fishermen group. This research highlights the problem in the process of selecting the best fishermen group which still takes a lot of time and effort. To overcome this, a Decision Support System (SPK) with the Complex Proportional Assessment (Copras) method is used. Copras focuses on ranking by comparing criteria weights on existing alternatives. The results showed that the Copras method was efficient in the selection process, and the best fishermen group, the Indonesian Fishermen's Union, was selected with the highest score, Ui=100.00. This is a solution that helps improve efficiency in selecting the best fishermen group at the Marine and Fisheries Service [13].

Research by Agung Triayudi, et al. (2022) shows that manual supervisor performance review is ineffective. Therefore, companies need to conduct several other performance evaluations, such as length of service, leadership, communication, discipline, and attendance. A decision support system (DSS) is needed to evaluate supervisor performance comprehensively. In this study, the researchers used the COPRAS method with ROC weighting to evaluate supervisor performance. This method resulted in the best alternative, namely alternative A2 as a replacement for "Budiman Sianipar, ST" with a value of Ui = 100. Alternative A2 is the alternative that has the best performance based on predetermined criteria [14].

2. RESEARCH METHODOLOGY

2.1 Decision Support System

The decision support system was introduced by G. Anthony Gorry and Michael S. Scott Morton. Both are professors from MIT writing articles in the journal "A framework for management Information System". They developed a framework for thinking about the use of computer applications in the decision-making process for management levels. Based on this framework, it can be defined that this decision system is closely related to information systems or analysis models designed to help decision makers get accurate information [15][16][17][18].

2.2 Pharmacists

Pharmacist has a term from the physician Galen (131-201), he termed the place where he examined patients as "latron" and the place where Claudius Galen stored medicine was called "apotcheca", which literally means warehouse. In 1240 in the royal state of Sicilla for the first time a law was passed separating the work of doctors and pharmacists. Pharmacists in Indonesia join a professional organization called the Indonesian Pharmacists Association (IAI). Pharmacists in Indonesia do not only work in pharmacies, but are spread across various sectors, namely the public sector, such as the Ministry of Health, the Food and Drug Monitoring Agency, LIPI, the private sector such as pharmaceutical companies, distribution companies and the World Health Organization (WHO). A pharmacist who has just completed education is also sworn in like a doctor. The oath is intended so that a pharmacist is serious in applying his pharmaceutical knowledge for the good of humanity. A pharmacist is prohibited from using his knowledge to harm others [19][20][21][22].

2.3 AHP Method

The multipurpose hierarchical structure in the AHP method utilizes criteria, sub-criteria and alternatives to detail the aspects that need to be assessed. In this case, it is important to create a set of pairwise comparisons that will help in a more systematic assessment. In addition, graphical visualization of this hierarchical structure makes it easier to understand. AHP itself is a highly structured and comprehensive decision-making tool, which also offers efficient and fast calculations. Using the AHP method allows us to make decisions with more confidence, because the processed data provides the best recommendations for dealing with crucial decisions [23][24][25]. The steps to determine the weight value of each criterion are [26][27]:

1. Determine Element Priority with a pairwise comparison matrix
2. Normalize the data by dividing the value of each element in the pairwise matrix by the total value of each criterion (column).
3. Calculate the eigenvector value and test its consistency.
4. Calculate the eigenvector of each comparison
5. Checking the consistency of the hierarchy:
   Calculate the Consistent Index (Ci) based on the following equation 1

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$C_i = \frac{\alpha_{max}-n}{n-1}$

Calculate the Consistancy Ratio (Cr) based on the following equation 2

$C_r = \frac{C_i}{R_i}$

If it is 0 ≤ ratio ≤ 0.1 then it is called consistent and the calculation is correct

2.4 The (Complex Proportional Assessment) COPRAS method

The COPRAS method assumes a direct and proportional dependence of the significance and utility levels of the alternatives in the presence of conflicting criteria. It takes into account the performance of alternatives with respect to different criteria and also the corresponding criteria weights. The method selects the best decision given the ideal and ideal-worst solutions. The COPRAS method used here for decision-making in a manufacturing environment adopts a multiple-stage ranking procedure and evaluates alternatives in terms of their importance and usefulness. The COPRAS method has the ability to take into account both positive (favorable) and negative (unfavorable) criteria, which can be assessed separately in the evaluation process. The most important feature that makes the COPRAS method superior to other methods is that it can be used to calculate the utility level of alternatives which indicates the extent to which alternatives are taken for comparison[28][29][30]. The steps of the COPRAS method are as follows[14][31][7]:

1. Create a decision matrix.

$$D = \begin{matrix} A_1 \\ A_2 \\ A_3 \\ A_4 \\ A_m \end{matrix} \begin{bmatrix} X_{11} & X_{12} & X_{13} & X_{1n} \\ X_{21} & X_{22} & X_{23} & X_{2n} \\ X_{31} & X_{32} & X_{33} & X_{3n} \\ X_{41} & X_{42} & X_{43} & X_{4n} \\ X_{m1} & X_{m2} & X_{m3} & X_{mn} \end{bmatrix} \quad (1)$$

2. Normalize the decision matrix, using the following formula:

$$X_{ij} = \frac{X_{ij}}{\sum_{1=1}^{m} X_{ij}} \quad (2)$$

3. Determine the normalized weighted decision matrix, using the following equation:

$$D' = d_{ij} = X_{ij} \times W_j \quad (3)$$

4. Calculation of maximizing and minimizing indices for each alternative using the following equation:

$$S_{+i} = \sum_{j=1}^{n} y_{+ij} \quad (4)$$

$$S_{-i} = \sum_{j=1}^{n} y_{-ij} \quad (5)$$

5. Determine the significance of alternatives based on the determination of positive alternatives S_{+i} and negative alternatives S_{-i} calculation of the relative weight of each alternative.
6. Determine the relative significance or relative priority (Q_i) of each alternative is determined using the following formula:

$$Q_i = S_{+i} + \frac{S_{-i} \min \sum_{i=1}^{m} S_{-i}}{S_{-i} \sum_{i=1}^{m} (S_{-\min}/S_{-i})} = S_{+i} + \frac{\sum_{i=1}^{m} S_{-i}}{S_{-i} \sum_{i=1}^{m} (1/S_{-i})} \quad (i=1,2,\ldots,m) \quad (6)$$

7. Calculate the quantitative utility (U_i) for each alternative. The level of alternative utility that leads to a complete ranking of candidate alternatives is determined by comparing the priorities of all the most efficient alternatives and can be expressed as follows:

$$U_i = \left[\frac{Q_i}{Q_{max}}\right] * 100\% \quad (7)$$

3. RESULTS AND DISCUSSION

In the acceptance of pharmacists at Estomihi Medan Hospital, data collection is still done manually, so that the acceptance of new pharmacists takes a long time, so that the acceptance of pharmacists is right and not wrong in accepting it, a decision support system (SPK) is needed in making decisions for pharmacist acceptance. With the application of a decision support system using the Complex Proportional Assessment (COPRAS) method, it is hoped that it can help produce the best appropriate alternative. The Complex Proportional Assessment (COPRAS) method uses stepwise ranking and evaluates alternative procedures in terms of significance and utility levels. The Complex Proportional Assessment (COPRAS) method has the ability to take into account both positive (favorable) and

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negative (unfavorable) criteria, which can be assessed separately in the evaluation process.

3.1 Criteria Data

Criteria data for the acceptance of recommended pharmacists according to the provisions set by Estomihi Hospital are as follows:

Table 1. Criteria for Pharmacist Candidates at Estomihi Hospital

No	Criteria	Description
1.	C_1	Bachelor of Pharmacy
2.	C_2	Pharmacy Certificate
3.	C_3	Work Experience
4.	C_4	Age

3.2 Determining Criteria Prioritization

The steps that must be taken in determining the prioritization of criteria are as follows:

a. Creating a pairwise comparison matrix
At this stage, a comparison assessment is carried out between one criterion and other criteria.

Table 2. Comparison Matrix for Criteria

	C1	C2	C3	C4
C1	1	3	7	9
C2	1/3	1	5	7
C3	1/7	1/5	1	3
C4	1/9	1/7	1/3	1

b. Simplified comparison matrix

Table 3. Simplified comparison matrix for criteria

	C1	C2	C3	C4
C1	1,0000	3,000	7,0000	9,0000
C2	0,3333	1,000	5,0000	7,0000
C3	0,1428	0,2000	1,0000	3,0000
C4	0,1111	0,1428	0,3333	1,0000
∑Column	1,5873	4,3429	13,3333	20,0000

c. Creating a matrix for normalized criteria
Each column is divided by the total number in the column concerned, and the normalized relative weight will be obtained. The following is the calculation of the normalized relative weight:

1,0000 : 1,5873 = 0,6300

0,3333 : 1,5873 = 0,2100

0,1428 : 1,5873 = 0,0900

0,1111 : 1,5873 = 0,0700

3,0000 : 4,3429 = 0,6908

1,0000 : 4,3429 = 0,2303

0,2000 : 4,3429 = 0,0461

0,1428 : 4,3429 = 0,0329

7,0000 : 13,333 = 0,5250

5,0000 : 13,333 = 0,3750

1,0000 : 13,333 = 0,0750

0,3333 : 13,333 = 0,0250

9,0000 : 20,000 = 0,4500

7,0000: 20,000 = 0,3500

3,0000 : 20,000 = 0,1500

1,0000 : 20,000 = 0,0500

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Table 4. Matrix for normalized criteria

	C1	C2	C3	C4
C1	0,6300	0,6908	0,5250	0,4500
C2	0,2100	0,2303	0,3750	0,3500
C3	0,0900	0,0461	0,0750	0,1500
C4	0,0700	0,0329	0,0500	0,0500

d. Finding row values
Add up the values of each row, here are the calculations:

C1 = 0,6300 + 0,6908 + 0,5250 + 0,4500 = 2,2958

e. Finding the Eigen Vector value
The row value is divided by the number of criteria columns, here is the calculation:

C1 = ∑ row/column

= 2,2958/4

= 0,57

Table 5. Comparison matrix for normalized criteria

	C1	C2	C3	C4	∑ Rows	Eigen Vektor
C1	0,6300	0,6908	0,5250	0,4500	2,2958	0,57
C2	0,2100	0,2303	0,3750	0,3500	1,1653	0,29
C3	0,0900	0,0461	0,0750	0,1500	0,3611	0,09
C4	0,0700	0,0329	0,0500	0,0500	0,1779	0,04

f. Find the maximum value
Where ∑ column is multiplied by the weight, the following calculation:

W_i = (1,5873*0,57) + (4,3429*0,29) + (13,3333*0,09) + (20,0000*0,04)

= 0,91103 + 1,26514 + 1,20351 + 0,889474

= 4,26915

$Ci = \frac{4,26915-4}{4-1} = \frac{0,26915}{3} = 0,08972$

Since the n value is 4, the RI value is 0.9, as follows:

$CR = \frac{CI}{RI} = \frac{0,08972}{0,9} = 0,09969$

Then the results of the above calculations obtained the weight value of the criteria as follows:

Table 6. Weight value of criteria

Criteria	Weight	Type
C1	0,57	*Benefit*
C2	0,29	*Benefit*
C3	0,09	*Benefit*
C4	0,04	*Cost*

After determining the weight of the criteria using the AHP method, then the ranking of alternatives is carried out using the COPRAS method.

Table 7. Alternative data

No	Alternative	C1	C2	C3	C4
1	Billy Surkawi, S.Farm	S1 Pharmacy	5 Certificates	2 years	24 years
2	Naila Tsabita, S.Farm	S1 Pharmacy	2 Certificates	1 year	23 years
3	Salwa Nandara, S.Farm	S1 Pharmacy	1 Certificate	None	22 years
4	Radit Arlanda, S.Farm	S1 Pharmacy	2 Certificates	None	21 years
5	Chiko Adrianf, S.Farm	S1 Pharmacy	1 Certificate	2 years	22 years
6	Alif Ayuna Dewi, S.Farm	S1 Pharmacy	None	1 year	22 years
7	Rendi Razalie, S.Farm	S1 Pharmacy	1 Certificate	1 year	22 years
8	Kenzo Tanaka, S.Farm	S1 Pharmacy	3 Certificates	2 years	23 years
9	Kartika Sari, S.Farm	S1 Pharmacy	None	2 years	22 years

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No	Alternative	C1	C2	C3	C4
10	Laura Mahriska, S.Farm	S1 Pharmacy	3 Certificates	3 years	24 years
11	Shahnas Humaira, S.Farm	S1 Pharmacy	1 Certificate	1 year	21 years
12	Ramzy Aditya, S.Farm	S1 Pharmacy	2 Certificates	2 years	23 years
13	Nurul andini, S.Farm	S1 Pharmacy	4 Certificates	3 years	25 years
14	Rahma Hermanto, S.Farm	S1 Pharmacy	None	1 year	23 years
15	Bella Monica Syahruna, S.Farm	S1 Pharmacy	3 Certificates	1 year	23 years

Table 8. Rating of each alternative on each criterion

No	Alternatif	C1	C2	C3	C4
1	Billy Surkawi, S.Farm	1	5	2	24
2	Naila Tsabita, S.Farm	1	2	1	23
3	Salwa Nandara, S.Farm	1	1	0	22
4	Radit Arlanda, S.Farm	1	2	0	21
5	Chiko Adrianf, S.Farm	1	1	2	22
6	Alif Ayuna Dewi, S.Farm	1	0	1	22
7	Rendi Razalie, S.Farm	1	1	1	22
8	Kenzo Tanaka, S.Farm	1	3	2	23
9	Kartika Sari, S.Farm	1	0	2	22
10	Laura Mahriska, S.Farm	1	3	3	24
11	Shahnas Humaira, S.Farm	1	1	1	21
12	Ramzy Aditya, S.Farm	1	2	2	23
13	Nurul andini, S.Farm	1	4	3	25
14	Rahma Hermanto, S.Farm	1	0	1	23
15	Bella Monica Syahruna, S.Farm	1	3	1	23
	Amount	15	28	22	340

Here are the steps to solve the above problem using the COPRAS method:

1. Create a decision matrix

$$X = \begin{bmatrix} 1 & 5 & 2 & 24 \\ 1 & 2 & 1 & 23 \\ 1 & 1 & 0 & 22 \\ 1 & 2 & 0 & 21 \\ 1 & 1 & 2 & 22 \\ 1 & 0 & 1 & 22 \\ 1 & 1 & 1 & 22 \\ 1 & 3 & 2 & 23 \\ 1 & 0 & 2 & 22 \\ 1 & 3 & 3 & 24 \\ 1 & 1 & 1 & 21 \\ 1 & 2 & 2 & 23 \\ 1 & 4 & 3 & 25 \\ 1 & 0 & 1 & 23 \\ 1 & 3 & 1 & 23 \end{bmatrix}$$

2. Normalize Matrix X using equation 2.
   Normalization of the decision matrix, where the value of each column is divided by the number of columns, the following calculation:

$C_1 = (1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1) = 15$

$X_{11} = \frac{1}{15} = 0{,}6667$

$X_{21} = \frac{1}{15} = 0{,}6667$

$X_{31} = \frac{1}{15} = 0{,}6667$

$C_2 = (5 + 2 + 1 + 2 + 1 + 0 + 1 + 3 + 0 + 3 + 1 + 2 + 4 + 0 + 3) = 28$

$X_{12} = \frac{5}{28} = 0{,}17857$

$X_{22} = \frac{2}{28} = 0{,}07143$

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$X_{32} = \frac{1}{28} = 0{,}03571$

$C_3 = (2 + 1 + 0 + 0 + 2 + 1 + 1 + 2 + 2 + 3 + 1 + 2 + 3 + 1 + 1) = 22$

$X_{13} = \frac{2}{22} = 0{,}09091$

$X_{23} = \frac{1}{22} = 0{,}04545$

$X_{33} = \frac{0}{22} = 0$

$C_4 = (24 + 23 + 22 + 21 + 22 + 22 + 22 + 23 + 22 + 24 + 21 + 23 + 25 + 23 + 23) = 340$

$X_{14} = \frac{24}{340} = 0{,}07059$

$X_{24} = \frac{23}{340} = 0{,}06765$

$X_{34} = \frac{22}{340} = 0{,}06471$

$$X_{ij} = \begin{bmatrix} 0{,}06667 & 0{,}017857 & 0{,}09091 & 0{,}07059 \\ 0{,}06667 & 0{,}07143 & 0{,}04545 & 0{,}06765 \\ 0{,}06667 & 0{,}03571 & 0 & 0{,}06471 \\ 0{,}06667 & 0{,}07143 & 0 & 0{,}06176 \\ 0{,}06667 & 0{,}03571 & 0{,}09091 & 0{,}06471 \\ 0{,}06667 & 0 & 0{,}04545 & 0{,}06471 \\ 0{,}06667 & 0{,}03571 & 0{,}04545 & 0{,}06471 \\ 0{,}06667 & 0{,}10714 & 0{,}09091 & 0{,}06765 \\ 0{,}06667 & 0 & 0{,}09091 & 0{,}06471 \\ 0{,}06667 & 0{,}10714 & 0{,}13636 & 0{,}07059 \\ 0{,}06667 & 0{,}03571 & 0{,}04545 & 0{,}061765 \\ 0{,}06667 & 0{,}07143 & 0{,}09091 & 0{,}06765 \\ 0{,}06667 & 0{,}14286 & 0{,}13636 & 0{,}07353 \\ 0{,}06667 & 0 & 0{,}04545 & 0{,}06765 \\ 0{,}06667 & 0{,}10741 & 0{,}04545 & 0{,}06765 \end{bmatrix}$$

3. Determine the normalized weighted decision matrix (using equation 3).

$A_{11} = 0{,}06667 * 0{,}57 = 0{,}03800$

$A_{21} = 0{,}06667 * 0{,}57 = 0{,}03800$

$A_{31} = 0{,}06667 * 0{,}57 = 0{,}03800$

$A_{12} = 0{,}17857 * 0{,}29 = 0{,}05179$

$A_{22} = 0{,}07143 * 0{,}29 = 0{,}02071$

$A_{32} = 0{,}03571 * 0{,}29 = 0{,}01036$

$A_{13} = 0{,}09091 * 0{,}09 = 0{,}00818$

$A_{23} = 0{,}04545 * 0{,}09 = 0{,}004009$

$A_{33} = 0 * 0{,}09 = 0$

$A_{14} = 0{,}07059 * 0{,}04 = 0{,}00282$

$A_{24} = 0{,}06765 * 0{,}04 = 0{,}00271$

$A_{34} = 0{,}06471 * 0{,}04 = 0{,}00259$

From the above calculations, D_{ij} mariks is obtained

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$$D_{ij} = \begin{bmatrix} 0{,}03827 & 0{,}05179 & 0{,}00818 & 0{,}00282 \\ 0{,}03827 & 0{,}02071 & 0{,}00409 & 0{,}00271 \\ 0{,}03827 & 0{,}01036 & 0 & 0{,}00259 \\ 0{,}03827 & 0{,}02071 & 0 & 0{,}00247 \\ 0{,}03827 & 0{,}01036 & 0{,}00818 & 0{,}00259 \\ 0{,}03827 & 0 & 0{,}00409 & 0{,}00259 \\ 0{,}03827 & 0{,}01036 & 0{,}00409 & 0{,}00259 \\ 0{,}03827 & 0{,}03107 & 0{,}00818 & 0{,}00271 \\ 0{,}03827 & 0 & 0{,}00818 & 0{,}00259 \\ 0{,}03827 & 0{,}03107 & 0{,}01227 & 0{,}00282 \\ 0{,}03827 & 0{,}01036 & 0{,}00409 & 0{,}00247 \\ 0{,}03827 & 0{,}02071 & 0{,}00818 & 0{,}00271 \\ 0{,}03827 & 0{,}04143 & 0{,}01227 & 0{,}00294 \\ 0{,}03827 & 0 & 0{,}00409 & 0{,}00271 \\ 0{,}03827 & 0{,}03107 & 0{,}00409 & 0{,}00271 \end{bmatrix}$$

4. Calculation of maximizing and minimizing indices for each alternative.
   Where C1, C2, and C3 are Max (equation 4), while C4 is Min (equation 5).

   $S_{+i} = (C_1 + C_2 + C_3)$

   $A_1 = 0{,}03800 + 0{,}05179 + 0{,}00818 = 0{,}09797$

   $A_2 = 0{,}03800 + 0{,}02071 + 0{,}00409 = 0{,}06281$

   $A_3 = 0{,}03800 + 0{,}01036 + 0 = 0{,}04836$

   Calculation of minimizing S= C4

   $A_1 = 0{,}00282$

   $A_2 = 0{,}00271$

   $A_3 = 0{,}00259$

   Amount S_{-i} (C_4) = 0,0400

   $1/S_{-i}$

   $1/S_{-1} = 1 : 0{,}00282 = 354{,}166$

   $1/S_{-2} = 1 : 0{,}00271 = 369{,}565$

   $1/S_{-3} = 1 : 0{,}00259 = 386{,}363$

   Amount $1/S_{-i}$ = 5637,5014

   $1/S_{-i} * S -$

   $5637{,}5014 * 0{,}00282 = 15{,}9177$

   $5637{,}5014 * 0{,}00271 = 15{,}2544$

   $5637{,}5014 * 0{,}00259 = 14{,}5912$

5. $Q_1 = S + \frac{S-}{S_{-1}}$

   $Q_1 = 0{,}09797 + \frac{0{,}0440}{15{,}9177} = 0{,}10$

   $Q_2 = 0{,}06281 + \frac{0{,}0440}{15{,}2544} = 0{,}07$

   $Q_3 = 0{,}04836 + \frac{0{,}0440}{14{,}5912} = 0{,}05$

   Max Q_i = 0,10

Table 9. Prioritization of alternatives

Alternative	S+	S-	$1/S_{-i}$	Q_i
Billy Surkawi, S.Farm	0,09797	0,00282	354,166	0,10
Naila Tsabita, S.Farm	0,06281	0,00271	369,565	0,07
Salwa Nandara, S.Farm	0,04836	0,00259	386,363	0,05

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Alternative	S+	S-	$1/S_{-i}$	Q_i
Radit Arlanda, S.Farm	0,05871	0,00247	404,761	0,06
Chiko Adrianf, S.Farm	0,05654	0,00259	386,363	0,06
Alif Ayuna Dewi, S.Farm	0,05118	0,00259	386,363	0,05
Rendi Razalie, S.Farm	0,05245	0,00259	386,363	0,06
Kenzo Tanaka, S.Farm	0,08225	0,00271	369,565	0,08
Kartika Sari, S.Farm	0,04618	0,00259	386,363	0,05
Laura Mahriska, S.Farm	0,08134	0,00282	354,166	0,08
Shahnas Humaira, S.Farm	0,05654	0,00247	404,761	0,06
Ramzy Aditya, S.Farm	0,06690	00,071	369,565	0,07
Nurul andini, S.Farm	0,09170	0,00294	340,000	0,09
Rahma Hermanto, S.Farm	0,04209	0,071	369,565	0,04
Bella Monica Syahruna, S.Farm	0,07316	0,0071	369,565	0,08

6. $P_i \frac{[Q_1]}{Q_{max}} * 100$

$P_1 = \left(\frac{0,10}{0,10}\right) * 100 = 100,00$

$P_2 = \left(\frac{0,07}{0,010}\right) * 100 = 65,11$

$P_3 = \left(\frac{0,05}{0,10}\right) * 100 = 50,85$

Table 10. Ranking Results

Alternative	P_i	Priority
Billy Surkawi, S.Farm	100,00	1
Naila Tsabita, S.Farm	65,11	7
Salwa Nandara, S.Farm	50,85	13
Radit Arlanda, S.Farm	61,29	8
Chiko Adrianf, S.Farm	59,00	10
Alif Ayuna Dewi, S.Farm	53,67	12
Rendi Razalie, S.Farm	54,93	11
Kenzo Tanaka, S.Farm	84,47	3
Kartika Sari, S.Farm	48,69	14
Laura Mahriska, S.Farm	83,46	4
Shahnas Humaira, S.Farm	59,13	9
Ramzy Aditya, S.Farm	69,19	6
Nurul andini, S.Farm	93,66	2
Rahma Hermanto, S.Farm	44,50	15
Bella Monica Syahruna, S.Farm	75,42	5

From these results it is known that Billy Surkawi, S.Farm, is the pharmacist candidate who has the highest score, and can be proposed as a pharmacist from the results of the selection carried out.

4. CONCLUSION

Based on the research, it can be concluded that the pharmacist acceptance procedure process uses the required files and the assessment is carried out in accordance with the criteria determined by the Hospital. The application of the COPRAS (COmplex Proportional Assessment) method is considered to be able to solve problems in pharmacist acceptance.

REFERENCES

[1] J. Afriany, K. Tampubolon, and R. Fadillah, "Penerapan Metode TOPSIS Penentuan Pemberian Mikro Faedah Bank Syariah Indonesia (BSI)," *TIN Terap. Inform. Nusant.*, vol. 2, no. 3, pp. 129–137, 2021.
[2] M. Yanto, "Sistem Penunjang Keputusan Dengan Menggunakan Metode Ahp Dalam Seleksi Produk," *J. Teknol. Dan Sist. Inf. Bisnis*, vol. 3, no. 1, pp. 167–174, 2021.
[3] D. O. Wibowo and A. T. Priandika, "Sistem Pendukung Keputusan Pemilihan Gedung Pernikahan Pada Wilayah Bandar Lampung Menggunakan Metode Topsis," *J. Inform. Dan Rekayasa Perangkat Lunak*, vol. 2, no. 1, pp. 73–84, 2021.
[4] R. Safitri and I. Firdaus, "SPK Rekomendasi Pekerjaan Dengan Metode EDAS (Studi Kasus: Lembaga Kursus dan Pelatihan Komputer Widya Informatika Selat Panjang)," *J. Inf. Komput. Log.*, vol. 1, no. 4, 2020.
[5] S. Manurung, R. T. Torong, and I. S. Dumayanti, "Sistem Pendukung Keputusan Kelayakan Nasabah Pinjaman Kredit Dengan Metode Exprom Ii," *J. Ilm. Tek. Inform. METHOTIKA*, vol. 2, no. 1, pp. 1–7, 2022.
[6] H. Dafitri, N. Wulan, and H. Ritonga, "Analisis Perbandingan Sistem Pendukung Keputusan Pemilihan Guru Terbaik

Volume 1, No 1, December 2023, Page: 26−35
ISSN 3026-7315 (media online)
https://journals.adaresearch.or.id/ijids/index
DOI: doi.org/10.64366/ijids.v1i1.15

Menggunakan Metode TOPSIS dan WASPAS," *JURIKOM (Jurnal Ris. Komputer)*, vol. 9, no. 5, pp. 1313–1321, 2022.
[7] S. R. Tanjung, M. Mesran, S. Sarwandi, and M. V Siagian, "Penerapan Metode COPRAS dan ENTROPY dalam Pemilihan Anggota Badan Pengawas Pemilihan Umum (BAWASLU)," *J. Informatics Manag. Inf. Technol.*, vol. 1, no. 2, pp. 48–59, 2021.
[8] M. I. H. Saputra and N. Nugraha, "Sistem Pendukung Keputusan Dengan Metode Analytical Hierarchy Process (Ahp)(Studi Kasus: Penentuan Internet Service Provider Di Lingkungan Jaringan Rumah)," *J. Ilm. Teknol. Dan Rekayasa*, vol. 25, no. 3, pp. 199–212, 2021.
[9] A. Pratama, N. Novriyenni, and N. Nurhayati, "SISTEM PENDUKUNG KEPUTUSAN PEMILIHAN DUSUN TERBAIK DI DESA LAU MULGAP DENGAN MENGGUNAKAN METODE AHP (ANALYTICAL HIERARCHY PROCESS)," *JTIK (Jurnal Tek. Inform. Kaputama)*, vol. 6, no. 1, pp. 284–289, 2022.
[10] G. Ginting, S. Alvita, M. Mesran, A. Karim, M. Syahrizal, and N. K. Daulay, "Penerapan Complex Proportional Assessment (COPRAS) Dalam Penentuan Kepolisian Sektor Terbaik," *J-SAKTI (Jurnal Sains Komput. dan Inform.*, vol. 4, no. 2, pp. 616–631, 2020.
[11] A. Fadilla, A. H. Nasyuha, and V. W. Sari, "Sistem Pendukung Keputusan Pemilihan Juru Masak (Koki) Menggunakan Metode Complex Proportional Assesment (COPRAS)," *JURIKOM (Jurnal Ris. Komputer)*, vol. 9, no. 2, pp. 316–327, 2022.
[12] M. Yanto, "SISTEM PENUNJANG KEPUTUSAN DENGAN MENGGUNAKAN," vol. 3, no. 1, pp. 167–174, 2021.
[13] T. Yolanda and M. Sihite, "Sistem Pendukung Keputusan Penentuan Kelompok Nelayan Terbaik Menerapkan Metode Copras," vol. 7, no. 2, pp. 106–110, 2020.
[14] A. Triayudi, F. Nugroho, A. G. Simorangkir, and M. Mesran, "Sistem Pendukung Keputusan Dalam Penilaian Kinerja Supervisor Menggunakan Metode COPRAS Dengan Pembobotan ROC," *J. Comput. Syst. Informatics*, vol. 3, no. 4, pp. 461–468, 2022.
[15] G. S. Mahendra and K. Y. Ernanda Aryanto, "SPK Penentuan Lokasi ATM Menggunakan Metode AHP dan SAW," *J. Nas. Teknol. dan Sist. Inf.*, vol. 5, no. 1, pp. 49–56, 2019, doi: 10.25077/teknosi.v5i1.2019.49-56.
[16] A. Karim, S. Esabella, K. Kusmanto, M. Mesran, and U. Hasanah, "Analisa Penerapan Metode Operational Competitiveness Rating Analysis (OCRA) dan Metode Multi Attribute Utility Theory (MAUT) Dalam Pemilihan Calon Karyawan Tetap Menerapkan Pembobotan Rank Order Centroid (ROC)," *J. Media Inform. Budidarma*, vol. 5, no. 4, pp. 1674–1687, 2021.
[17] H. Arahman, "Tingkat Akurasi dalam Analisis Perbandingan Metode ORESTE dengan PSI terhadap Penilai Kinerja Dosen," *J. Inf. dan Teknol.*, pp. 7–12, 2023.
[18] D. Aldo, N. Putra, and Z. Munir, "Sistem Pendukung Keputusan Penilaian Kinerja Dosen Dengan Menggunakan Metode Multi Attribute Utility Theory (Maut)," *JURSIMA (Jurnal Sist. Inf. dan Manajemen)*, vol. 7, no. 2, pp. 76–82, 2019.
[19] A. Kusuma and G. Ginting, "Sistem Pendukung Keputusan Pemilihan Apoteker Terbaik Pada PT. Kimia Farma (Persero) Tbk Medan Menerapkan Metode Vikor," *J. Sist. Komput. Dan Inform.*, vol. 1, no. 3, pp. 252–257, 2020.
[20] C. Astutiningsih, N. P. Tjahjani, and L. Listyani, "Pengenalan Profesi Apoteker dan Mengenali Obat Sejak Usia Dini," *J. Abdidas*, vol. 2, no. 3, pp. 713–719, 2021.
[21] Y. Hendrika, V. K. Utama, S. B. Riva, and Y. Febrianita, "Pelatihan Apoteker Cilik (Apocil) Dan Pengenalan Dagusibu di Madrasah Ibtidaiyah Nur Ikhlas Kecamatan Tualang," *J. Pengabdi. Masy. Multidisiplin*, vol. 6, no. 1, pp. 25–29, 2022.
[22] L. M. Alfarizi and B. F. Maharani, "Perlindungan Hukum Bagi Konsumen Terhadap Kelalaian Apoteker Dalam Memberikan Resep Obat Pada Pelayanan Kesehatan," *Med. J. Ilm. Kesehat.*, vol. 2, no. 1, pp. 1–9, 2022.
[23] J. Hutagalung, K. Erwansyah, F. Sonata, and B. Anwar, "Baker Terbaik Combination of Ahp and Moora Methods in Choosing," vol. 7, no. 2, 2022.
[24] H. A. Septilia, P. Parjito, and S. Styawati, "Sistem pendukung keputusan pemberian dana bantuan menggunakan metode ahp," *J. Teknol. Dan Sist. Inf.*, vol. 1, no. 2, pp. 34–41, 2020.
[25] R. Agusli, M. I. Dzulhaq, and F. C. Irawan, "Sistem Pendukung Keputusan Penerimaan Karyawan Menggunakan Metode Ahp-Topsis," *Acad. J. Comput. Sci. Res.*, vol. 2, no. 2, 2020.
[26] C. Pertiwi and A. Diana, "Aplikasi Sistem Pendukung Keputusan Penilaian Karyawan Terbaik Menggunakan Metode AHP Dan SAW," *J. Bit*, vol. 17, no. 1, pp. 23–30, 2020.
[27] A. W. N. Ulfy and P. A. R. Devi, "Penentuan Kenaikan Jabatan Menggunakan Pembobotan Metode AHP dan Didukung Metode Complex Proportional Assessment," *J. Sist. Komput. dan Inform.*, vol. 3, no. 3, pp. 232–240, 2022.