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Selection Of Employee Recruitment Based On Priority Sequence Level Assessment Using ROC Method

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ABSTRACT

The organization runs a recruitment procedure to maintain the caliber of its workforce. The success or failure of a company's operations is largely determined by the success of its recruitment efforts or the acceptance of a big offer. In practice, the recruiting process frequently does not employ a selection system with predetermined evaluation criteria and an objective evaluation of each applicant. Therefore, this study applies decision-making approaches to the recruitment selection process by calculating the final alternative value using the Rank Order Centroid(ROC) method. The ROC technique can score and ascribe factors depending on the order of importance, resulting in more objective decision outcomes. The three best alternative employees that passed the selection were derived from the final computation of the alternative ranking based on five assessment factors.

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1. INTRODUCTION

Acceptance of new employees or recruiting is the most crucial aspect for firms to acquire new prospective employees in accordance with their qualifications and quality. Article 1 paragraph 3 of Rhode Island Law No. 13 of 2003 regulating Manpower defines a worker/laborer as any person who works for pay or other kinds of recompense (Indonesia, 2003). Consequently, it is evident that all businesses require human resources in order to operate effectively. Human Resources is one of the most important parts of a business. The way a company handles its human resources has a big impact on many parts of how well it does its job. If HR is well-run, the company should be able to run all of its business processes better (Tangkuman et al., 2015)(Rinaldi, 2021). In order for the company to get human resources that match their skills, it must go through the process of hiring new people or recruitment (Abdullah, 2014).

For instance, the employee recruitment process at Kids Café Company is carried out in stages over the course of a certain period of time. This is done because the employee recruitment process is important for screening the level of quality of the human resources that will be brought into the Company (Anwar, 2019). The hiring procedure is the single most critical thing for businesses (Ramli & Yudhistira, 2018) to focus on when trying to fill open positions with new staff members. It is believed that the Human Resource Manager

is not yet performing at an optimal level when it comes to managing the process of recruiting new personnel (Fahrudin, 2020). Therefore, it is common for us to encounter individuals who have recently started working for a firm but who leave after only a short amount of time, as well as employees who do not have the necessary knowledge and abilities for the position they are in. Errors in recruitment are the root source of the issue, and the reason for this is that the assessment parameters used during the recruitment stage have a tendency to fluctuate, they are unpredictable, and they do not objectively apply the selection process.

Therefore, the purpose of this study is to apply the selection of new employee acceptance decisions by focusing the results of decisions based on the priority level of assessment of alternative prospective employees, with the intention of making it simpler for Human Resource Managers to carry out the selection process. This research was carried out in order to apply the selection of new employee acceptance decisions.

Numerous research have applied decision support system techniques to multi-criteria problems(Kharisma, 2021)(Yazdani et al., 2016) since the recruiting selection process takes into account a number of possibilities from a number of criteria (Santika & Handika, 2019)(Evita et al., 2017). Research employing the Rank Order Centroid (ROC)(Kunsch & Ishizaka, 2019) method for MCDM problems has been used to apply decision-making techniques based on the priority level of criteria or assessment qualities (Ahn, 2017)(I Gede Iwan Sudipa, 2018). It is simpler to construct the final ranking value by taking into account the priority level of each criterion(Sudipa & Puspitayani, 2019) or attribute and score into the value.

2. RESEARCH METHOD

2.1 Decision Support System

An information system is referred to as a decision support system (DSS) or decision support system (DSS) if it is designed to help middle-level managers with semi-structured decision-making processes (Yeh & Willis, 2001)become more efficient through the utilization of analytical models and data that is readily available. The decision-making process has a significant impact on managerial decisions, making it an extremely efficient tool for addressing issues pertaining to corporate management (Meiryani et al., 2020).

2.2 Rank Order Centroid (ROC)

ROC is a development of the SMARTS (Simple Multi Attribute Rating Technique Using Swings) method that was added to SMARTER by adding the ROC calculation to determine the elimination weights for criteria (Danielson & Ekenberg, 2017)(Sudipa et al., 2022). SMARTER originally used the SMARTS method to assign swing weights by decision makers using a scale of 0 to 100 or 0 to 1(Barron & Barrett, 1996)(Kunsch & Ishizaka, 2019). ROC is a calculation that determines the elimination weights for criteria.

$C_1 \geq C_2 \geq C_3 \geq \ldots \geq C_n$

Calculate the weight value. The following rules determine it:

$W_1 \geq W_2 \geq W_3 \geq \ldots \geq W_n \geq 0; \sum_{j=1}^{n} \overline{W}_j = 1$

Where W1 is the weight for all C1 criteria, the values W1 to Wj are shown in equation (1).

$$W1 = (1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{k})/K \quad (1)$$
$$W2 = (0 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{k})/K$$
$$Wj = (0 + \ldots + 0 + \frac{1}{k})/K$$

if K is the number of criteria, then the weight value of the jth criteria is formulated by multiplying 1/K by the total number of 1/i, where i = 1,2,3..,j, as follows:

$$W_j = \frac{1}{K}\sum_{i=j}^{K}\left(\frac{1}{i}\right) \quad (2)$$

Information:
Wj = Weighting value for the k-th attribute
K = the quantity of qualities
I = value of the attribute priority order

2.3. Flowchart of ROC Methods

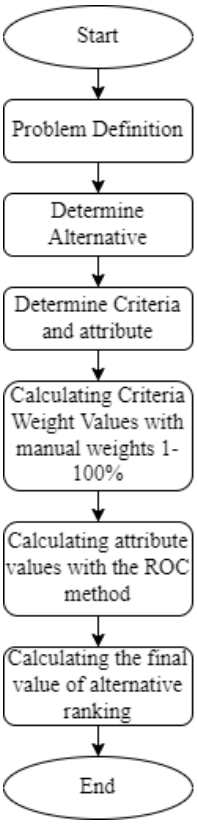

Figure 1. Flowchart Rank Order Centroid

In Figure 1 are depicted the processes beginning with the definition of the problem, namely employee recruitment selection, followed by the determination of alternative employee applicants. Then, proceed with determining the decision-maker assessment criteria and attribute criteria. The value of the weight of the criteria is chosen by decision makers who manually assign weights ranging from 1 to 10%. The ROC approach is utilized to determine the value of the attribute rating scale based on the priority attribute criterion ordering. In the final step, the ranking's final value is calculated by multiplying each criterion's alternative value by its weight value.

3. RESULTS AND DISCUSSIONS

3.1. Criteria and Alternative Analysis

Based on interviews with the Human Resource Management department of the company, there are 5 alternative employee candidates who will go through a selection

process to find the 3 best alternatives. Education (C1), Ability Test (C2), Interview Test (C3), Attitude Assessment (C4), and Previous Work Experience (C5) are some of the things that are looked at during the hiring process (C5). The person making the choice decides how much each of the criteria is worth. Table 1 shows the specifics of the criteria.

Table 1. Detail Criteria

Criteria (C)	Criteria Information	Criteria Weight Value
C1	Education	20%
C2	Ability Test	25%
C3	Interview Test	25%
C4	Attitude Assessment	20%
C5	Previous Work Experience	10%

3.2. Determining Attribute Criteria

Each criterion includes characteristics that make scoring easier. Using the ROC calculation technique, attribute assessment aims to understand the specifics of each criterion connected to the scoring process. The level of priority attribute order criterion C1, C4, and C5 are the foundation for the ROC value. Since the value of the criteria is already expressed in numerical form, scoring is not necessary for C2 and C3.

Table 2. ROC Values for Attribute Criteria C1

Criteria	Attribute	Priority Level	ROC value
Education	S2	1	$W_1 = \frac{1}{4} \text{ x } (\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}) = 0{,}52$
	D4 and S1	2	$W_2 = \frac{1}{4} \text{ x } (\frac{1}{2}+\frac{1}{3}+\frac{1}{4}) = 0{,}27$
	D1 to D3	3	$W_3 = \frac{1}{4} \text{ x } (\frac{1}{3}+\frac{1}{4}) = 0{,}15$
	SMA/SMK Equivalent	4	$W_4 = \frac{1}{4} \text{ x } (+\frac{1}{4}) = 0{,}06$

Table 3. ROC Values for Attribute Criteria C4

Criteria	Attribute	Priority Level	ROC value
Attitude Assessment	Very Good	1	$W_1 = \frac{1}{4} \text{ x } (\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}) = 0{,}52$
	Good	2	$W_2 = \frac{1}{4} \text{ x } (\frac{1}{2}+\frac{1}{3}+\frac{1}{4}) = 0{,}27$
	Enough	3	$W_3 = \frac{1}{4} \text{ x } (\frac{1}{3}+\frac{1}{4}) = 0{,}15$
	Bad	4	$W_4 = \frac{1}{4} \text{ x } (+\frac{1}{4}) = 0{,}06$

Table 4. ROC Values for Attribute Criteria C5

Criteria	Attribute	Priority Level	ROC value
Previous Work Experience	>4 years	1	$W_1 = \frac{1}{4} \text{ x } (\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}) = 0{,}46$
	3 – 4 years	2	$W_2 = \frac{1}{4} \text{ x } (\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}) = 0{,}26$
	2 to 3 years	3	$W_3 = \frac{1}{4} \text{ x } (\frac{1}{3}+\frac{1}{4}+\frac{1}{5}) = 0{,}16$
	< 2 years	4	$W_4 = \frac{1}{4} \text{ x } (\frac{1}{4}+\frac{1}{5}) = 0{,}09$
	No work experience	5	$W_5 = \frac{1}{4} \text{ x } (\frac{1}{5}) = 0{,}04$

3.3. Alternative Values

The ROC method's calculation begins with the determination of the alternative value for each criterion. There are five candidates employee applicants. Alternate information is shown in Table 5.

Table 5. Alternative Values

Alternative	Criteria Values				
	C1	C2	C3	C4	C5
A1	S1	88	91	Good	< 2 years
A2	D4	75	90	Very Good	3 – 4 years
A3	SMA	77	94	Good	< 2 years
A4	S1	85	93	Good	< 2 years
A5	D3	81	92	Good	< 2 years

The alternative values for each criterion C1, C4, and C5 are then assigned ROC values according to tables 2, 3, and 4. Using Equations (1) and (2) . While the alternative values for criteria C2 and C3 are not transformed because they are already in the form of integers, the alternative values for criteria C1 are. The scoring results are displayed in Table 6:

Table 6. Alternative Values Scoring Result

Alternative	Criteria Values				
	K1	K2	K3	K4	K5
A1	0,27	88	91	0,27	0,09
A2	0,27	75	90	0,52	0,26
A3	0,06	77	94	0,27	0,09
A4	0,27	85	93	0,27	0,09
A5	0,15	81	92	0,27	0,09

3.4. Calculation Final Score and Ranking

In order to calculate the final alternative value, each scored alternative value is multiplied by the weight of the corresponding criterion from Table 1.

Table 7. Alternative Values on Each Criteria

Alternative	Criteria WeightValues				
	C1 (20%)	C2 (25%)	C3 (25%)	C4 (20%)	C5 (10%)
A1	0,27	88	91	0,27	0,09
A2	0,27	75	90	0,52	0,26
A3	0,06	77	94	0,27	0,09
A4	0,27	85	93	0,27	0,09
A5	0,15	81	92	0,27	0,09

To determine the final alternative value, the alternative value on the criteria is multiplied by the criterion weight value. Then, add the total result. The final value of each option can be seen in the following calculation:

V_1 = (0,27*0,20)+(88*0,25)+(91*0,25)+(0,27*0,20)+(0,09*0,01) = **44,867**
V_2 = (0,27*0,20)+(75*0,25)+(90*0,25)+(0,52*0,20)+(0,26*0,01) = **41,434**
V_3 = (0,06*0,20)+(77*0,25)+(94*0,25)+(0,27*0,20)+(0,09*0,01) = **42,825**
V_4 = (0,27*0,20)+(85*0,25)+(93*0,25)+(0,27*0,20)+(0,09*0,01) = **44,617**
V_5 = (0,15*0,20)+(81*0,25)+(92*0,25)+(0,27*0,20)+(0,09*0,01) = **43,343**

After determining the final alternative value, the alternative values are ranked from greatest to smallest. Table 8 below displays the final alternate ranking results.

Table 8. Alternative Value Rank

Alternative	Value	Rank
A1	**44,867**	**1**
A4	**44,617**	**2**
A5	**43,343**	**3**
A3	42,825	4
A2	41,434	5

The final value of each alternative was found in Table 8. Then, the three best alternatives were chosen. Alternative A1, with a value of 44,867, came in first. Then alternative A4, which has a value of 44,617, is in second place. Alternative A5, which has a value of 43,343, is in third place. From the final ranking results, it can be seen that the criteria C2 and C3 determine the final value because they have the most weight. The C1 criteria also affect the final result. If you look at table 1's detailed criteria, you can see that there is a value competition between the alternatives that dominates the criteria C1,C2, and C3.

4. CONCLUSION

The best alternative can be found by using the Rank Order Centroid (ROC) method to make a decision. In this case, the best 3 alternatives out of 5 employee candidates were chosen. It has been shown that using an attribute scoring method with a priority order level can lead to different final scores, taking into account how different values on each criterion compete with each other. Education criteria (C1), Ability test (C2), and Interview Test (C3) are the most important ones. This should make it easier for decision makers to figure out the parameters of the assessment criteria based on the order of importance of criteria and criteria attributes.

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