People and Behavior Analysis, Vol. 3 No. 1 (2025) https://doi.org/10.31098/pba.v3i1.3135

Check for updates

Research Paper

Implementation of TOPSIS Method to Assist the Process of Accepting New Employees in the Company

Astrid Noviana Paradhita[1], Yeni Fajariyanti[2], Muhammad Tafdhil Amanda[3], Agreianti Puspitasari[4], Vivin Sulistyowati[5]

[1,2,3,4,5] Universitas Sebelas Maret, Indonesia

Received: January 12, 2025	Revised: February 12, 2025	Accepted: March 24, 2025	Online: March 31, 2025

Abstract

Human resources play an important role in ensuring that all business processes in a company run smoothly. Human resources in a company must have competencies and skills that match the company's needs. The employee recruitment process is the first gateway that must be carried out comprehensively to obtain reliable human resources. However, the company's recruitment process is still at risk of bias and takes a long time. This study was conducted to identify a strategy for recruiting new employees who are competent according to the qualifications required by the company. This study was developed by applying a preference ordering technique based on similarity to the ideal solution (TOPSIS). The data criteria used in the study were based on a selection process commonly used in one of the state-owned companies in Indonesia, which included the results of a general intelligence test (TIU), a national insight test (TWK), a field ability test (TKB), and an interview test. The weighting used was TIU 30%, TWK 10% TWK, 20% TKB, and 40% for the interview test. The study results showed that the TOPSIS method can help companies find employees with the competencies that best match the qualifications needed. TOPSIS can also increase the efficiency of the recruitment process time by up to 70%. TOPSIS can help companies find the best 20 candidates in just 7 days, whereas, in the recruitment process, without TOPSIS, the company needs 21 to 30 days. Using TOPSIS, companies can streamline the recruitment process, reduce bias, and reduce maintenance costs.

Keywords *Human resources; Employee recruitment strategies; Decision making processes; TOPSIS*

INTRODUCTION

Every company, whether large, medium, or small, requires a set of tools to organize and manage all its business processes. Human resources play an important role in ensuring that all business processes in a company run efficiently. Aslam et al. (2014) stated that human resources are a manifestation of the company's roots, which, in practice, can regulate all activities within a company. Patterson (2023) also strengthened this opinion by stating that every human resource in a company has its own duties and responsibilities, which are integrated with one another to realize the company's goals.

Armstrong and Taylor (2014) argued that human resources in a company must have competencies and skills that suit the company's needs. Markham et al. (2022) also stated that the capabilities and competencies of the company's human resources must be constantly developed. Human resources are one of the main parts a company must have to conduct its business processes and gain profits. Therefore, the employee recruitment process, as an element of human resources in a company, should be conducted comprehensively by considering the applicant's abilities and experience. This is done so that the company's employees have the quality of work needed to achieve its goals and obtain optimal profits effectively and efficiently.

The selection of employees for a company is considered the first step in ensuring the

Copyright Holder:
© Paradhita, Fajariyanti, Amanda, Puspitasari, & Sulistyowati. (2025)
Corresponding author's email: astrid.noviana@staff.uns.ac.id
This Article is Licensed Under:

company's success (Fayad & Easa, 2020). Employees who are actively involved in the company can provide an impression of experience for all parties related to the company, such as producers, consumers, partners, and co-workers (Alam et al., 2024). Goyal et al. (2023) considered employees the spearheads that bring success or failure to a company. If a company can recruit employees who are competent, honest, and have a high work ethic, it can achieve success more easily and quickly; conversely, if the company recruits the wrong employees, it can experience bankruptcy (Pattrick & Mazhar, 2019).

Hietaniemi et al. (2021) stated that skill acquisition is an essential key to recruiting company employees. Apart from having to perform analyses to meet demand, companies must also ensure that job applicants meet the minimum standards of qualifications required by the company (Wardlaw, 2019). International Labor Organization (2023) stated that companies need exceptional capabilities to assess administrative documents, test results, and interview results from job applicants so that new employees can provide the best work performance to support management and operations and improve company achievements.

The complexity of the employee recruitment process in a company is a challenge for companies so that they do not make mistakes in selecting employees (Rozario et al., 2019). In addition to obtaining competent and skilled human resources, the recruitment process must also be free from bias. There are opportunities to optimize employee recruitment. Implementing technology can increase the similarity of preferences between the qualifications required by the company and the qualifications possessed by job applicants (Tripathy, 2023). Ammer et al. (2023) added that by implementing technology companies can quickly determine variables to assess the quality of job applicants. This is supported by Rathore (2023), who believes that proper technology can conduct the process of identifying, recruiting, hiring, and training every talented prospective applicant. One strategy that can be developed to help the employee recruitment process is to implement a decision-making process. One of the decision-making process methods that can be used is The Technique for Order of Preference by Similarity to the Ideal Solution (TOPSIS). The TOPSIS method is essential for weighting based on the similarity of preferences to find the ideal solution among various existing options. Therefore, the TOPSIS method can be used to analyze prospective job applicants' qualifications when recruiting company employees.

The TOPSIS method has advantages, such as its ability to obtain the most appropriate preferences as required. Shakerian et al. (2016) explained the basic concept of TOPSIS to rank the quality of human resource performance based on the company's internal preferences. Saeidi et al. (2022) also demonstrated that TOPSIS can be a strategy to ensure the company's sustainability of human resource performance. Moreover, Kusumawardani and Agintiara (2015) also provided an overview of how TOPSIS can demonstrate a person's level of professionalism when performing a responsibility. Several studies have proven that the TOPSIS method can be used as a strategy for measuring company employee performance. Therefore, this study proves that the TOPSIS method can also be used as a recruitment strategy to obtain the best quality prospective employees.

LITERATURE REVIEW

Today, human resource management has experienced significant changes, especially in the field of technology. The recruitment, selection, placement, and employee performance assessment processes have shifted from conventional to digital. Hietaniemi et al. (2024) stated that companies that apply technology in managing human resources have reached a higher level than companies that still manage human resources conventionally. Bal and Bal (2022) stated that using technology in managing human resources is one of the strategies companies need to increase their competitiveness and help the decision-making process. Jantan et al. (2010) also confirmed that to develop a company from within, starting with providing quality human resources, companies can

implement a decision support model when the company conducts the recruitment process. It can be said that technology without a system to support decision-making is not optimal. Therefore, a decision-support system with an appropriate method is required to optimize the performance of the technology.

A decision support system is a technology whose main function is to help interested parties provide the best solution to problems based on predetermined criteria (An et al., 2023). Stephen et al. (2019) argue that the recruitment, selection, and placement of human resources in companies requires a tool to help increase the effectiveness and efficiency of all processes. Apart from being supported by qualified recruiters and experts in their fields, the assistance of tools in decision support system technology will also be beneficial, especially for assessing the suitability of the required qualifications with the applicant's qualifications (Mandal et al., 2024). In decision-support system technology, several criteria are used as primary data in the reasoning process before providing recommendations for the best solution. The criteria provided are adjusted to user needs. DSS also applies the best method that best suits the user's interests. There are several DSS methods; one that can be used in implementing a decision support system for the hiring process for job applicants is the TOPSIS method.

TOPSIS, The Theory of Order Preferences by Similarity for Ideal Solution, was first introduced by Hwang and Yoon (1981) and was later developed by many other researchers. The TOPSIS method has several advantages, such as representing the human selection process and finding the best and worst solutions, and it is a simple computational process (Pavić & Novoselac, 2013). Other than that, no matter how many criteria attributes are used, it does not affect the stages in TOPSIS and can measure the performance of each criteria attribute to find a solution to the most ideal of the existing problems (Madanchian & Taherdoost, 2023).

Several previous studies have used the TOPSIS method to develop decision support systems. The first research is the use of TOPSIS to develop a decision support system for companies selecting suppliers (Azad, 2019). This research uses 15 criteria attributes, with each criterion given a weight in percentage according to the assessment of experts in the company. From this research, the results of the assessment of the best and worst suppliers for the company were obtained. Second, Sharma et al. (2021) evaluated retailers in India. This research uses six criteria for retailer logistics management in India. The results of this research rank several of the best retail companies in India. Third, Antunes et al. (2023) applied TOPSIS to help healthy employees work and improve their performance. This study used 13 criteria to assess the need for healthcare workers. From the results of this percentage, hospital management can determine how many physicians, specialists, nurses, and other health workers can be assigned to each ward. Bakar et al. (2021) developed a DSS using the TOPSIS method for recruiting manufacturing companies in Indonesia. This research uses four attribute criteria—administrative scores, test scores, field ability scores, and interview scores—with standard scores for each criterion given to assess the abilities of job applicants. Rahi et al. (2021), who applied the TOPSIS method when building a decision support system. However, in this study, TOPSIS was used only to rank job applicant interview results, not at other recruitment stages.

Several previous studies have demonstrated that the TOPSIS decision support system method can help improve company performance in various fields. Therefore, researchers are interested in applying the TOPSIS method to develop decision support systems to help manage human resources in companies, especially when recruiting new employees. DSS, which is built using TOPSIS, uses four main criteria that are always present in the employee recruitment process: general intelligence tests (TIU), national insight tests (TWK), field ability tests (TKB), and interview tests (TW).

RESEARCH METHOD

This research was conducted using quantitative descriptive methods. The research was conducted at one of the state-owned companies in Solo, X. In conducting research methods, researchers perform the systematic steps necessary to achieve the objectives of this research. Before deciding to use TOPSIS, the researcher considered several decision-making methods such as AHP, ANP, and TOPSIS. Table 1 shows the differences between each method.

Table 1. Differences between AHP, ANP, and TOPSIS

Difference	AHP	ANP	TOPSIS
Performance	Fair	Good	Very Good
Accuracy	Poor	Fair	Good
Deduction of Weight	Paired Comparison	Paired Comparison	Definite and Clear
Main Process	Paired Comparison	Paired Comparison	Absolute Measurement
Compability	Poor	Fair	Very Good
Ability to Look for Best and Worst Solution	Cannot	Cannot	Can

Based on Table 1, TOPSIS offers many benefits over other methods. Figure 1 shows the steps and stages of the research.

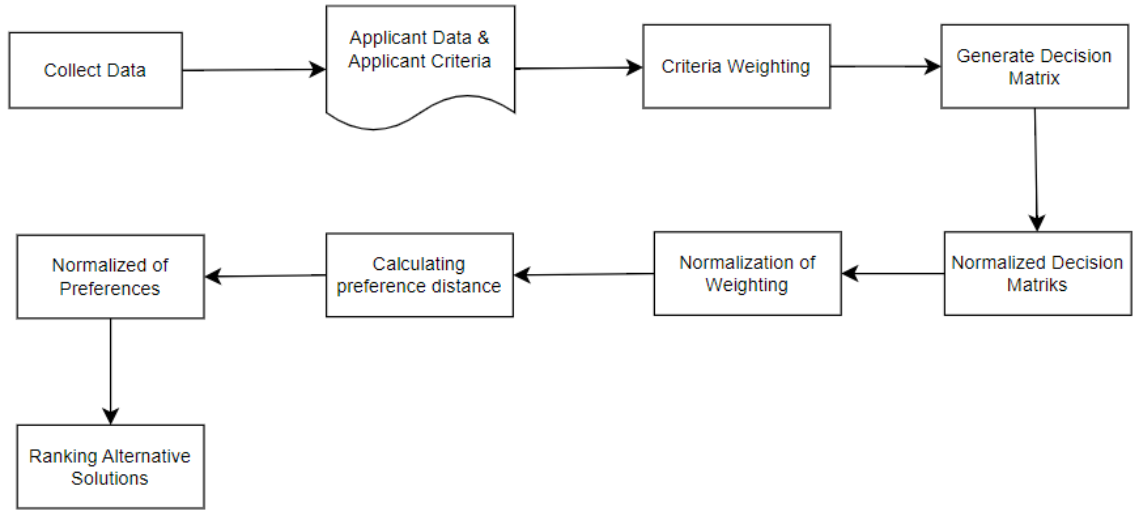

Figure 1. Research Systematic Steps

Collecting data

This research requires sufficient enough test data to be used as simulation data according to actual conditions at the recruitment stage of job applicants in companies. In this case, the researchers obtained test data from Company X. Company X is one of the state-owned company in Solo.

Applicant Data and Applicant Criteria

The next stage involves processing the applicant data to be simulated using the TOPSIS

method. At this stage, researchers assess four criteria based on the job applicant criteria required by the company: TIU, TWK, TKB, and TW.

Criteria Weighting

The third stage in the research is the initial stage in implementing the TOPSIS method. At this stage, weighting is carried out against the four types of criteria that have been determined. The weighting is carried out based on skill requirements and the importance of the preferences desired by company X.

Generate Decision Matrix

A decision matrix is a mapping based on an assessment of each existing alternative solution (Cahigas et al., 2021). A model can be formed from the decision matrix to evaluate alternatives based on the criteria and values for each alternative.

Normalization of Decision Matrix

The next stage is to normalize the decision matrix. Normalization is performed to balance the values of all alternatives. Normalization must be performed because the assessment of each criterion for each alternative will be different, so balancing the values between alternatives is necessary to obtain an appropriate comparison between the decision matrices for each criterion. Equation 1 is used to normalize the decision matrix.

$$\boldsymbol{R_{ij}} = \frac{\boldsymbol{X_{ij}}}{\sqrt{\sum_{i=1}^{m} \boldsymbol{x_{ij}^2}}} \quad \textbf{(1)}$$

Where:
R = normalized decision matrix
X = value in criteria

Normalization of Weighting

After normalizing the decision matrix, the next stage normalizes the decision matrix based on the weights of each criterion. Weight normalization is carried out to determine to what extent the preferences for alternative solutions (applicants) match the preferences required by the decision-maker (company) based on the weights that have been determined. Equation 2 is used to normalize the weights.

$$\boldsymbol{Y_{ij}} = \boldsymbol{W_i r_{ij}} \quad \textbf{(2)}$$

Where:
Y = normalized weight
R = normalized value of the decision matrix for each alternative
W = Weight of each criteria

Calculating Preferences Distance

The preference distance is calculated to find the most ideal preference value required (Shih & Olson, 2022). The preference distance is calculated after normalizing the weights for each criterion have been normalized. This is done so that the distance between the applicant's preferences and those required by the company is balanced and unbiased. There are two types of

preference calculations, namely positive preference distance, or the positive ideal solution matrix, and negative preference distance, or the negative ideal solution matrix. To obtain the positive ideal solution matrix, use the equation 3.

$$\boldsymbol{A^+ = y1^+, y2^+, y3^+, \ldots., yn^+} \quad \textbf{(3)}$$

A positive ideal solution matrix is a matrix that best represents the multi-criteria solution. Therefore, the best alternative is the one that has the closest distance and the slightest difference with the results of the obtained positive ideal solution matrix. Meanwhile, to obtain the negative ideal solution matrix, use equation 4.

$$\boldsymbol{A^- = y1^-, y2^-, y3^-, \ldots., yn^-} \quad \textbf{(4)}$$

The negative ideal solution matrix represents the worst multi-criteria solution. Therefore, the best alternative is the one that has the farthest distance and the most significant difference with respect to the results obtained for the negative ideal solution matrix.

Normalization of Preferences

In the next stage, the preference distance is normalized. Normalization of the preference distance is performed done to determine the difference between the value of the alternative solution and the calculation results with the preference distance from the previous stage. This preference normalization stage helps can help determine the distance between the preference value for each alternative (job applicant) and the values value of the positive and negative ideal solution matrix. To determine the distance between preference values for alternative solutions and positive ideal solution matrix values, researchers use equation 5.

$$\boldsymbol{Dj^+ = \sqrt{\sum_{j=1}^{n} (y_{ij} - y_i{}^+)^2}} \quad \textbf{(5)}$$

To determine the distance between the preference value for each alternative solution and the negative ideal solution matrix value, the researcher used equation 6.

$$\boldsymbol{Dj^- = \sqrt{\sum_{j=1}^{n} (y_{ij} - y_i{}^-)^2}} \quad \textbf{(6)}$$

Next, from the results of the preference distance for each alternative based on the criteria, a calculation is done using the equation (x) to get the applicant's preference distance to the criteria preference distance. So, the calculation results show the preference distance between the positive solution matrix and the negative solution matrix. Equation 7 is used to obtain the preference distance for each alternative.

$$\boldsymbol{Dj = \frac{Di^-}{Di^- + Di^+}} \quad \textbf{(7)}$$

Alternative Solutions Ranking

After all the preference analyses have been conducted, the next stage is to assess the

feasibility of alternative solutions (job applicants) based on the preferences required by the company. If the final value is known, the final stage ranks the final values from most significant to smallest. The most considerable value indicates that the preferences of alternative solutions (job applicants) have the highest level of closeness (competence) to the preferences required by the company. On the other hand, the smallest value indicates that the job applicant lacks competencies that do not match the qualifications required by the company. Equation 8 is used to obtain the final value of each alternative.

$$V = \frac{Dj}{\sum_{j=1}^{n} Dj} \quad (8)$$

FINDINGS AND DISCUSSION

After conducting the research stages, as shown in Figure 1, sufficient research results were obtained for further analysis. From the data collection results, test data were obtained in the form of job applicants' names and scores resulting from the recruitment process carried out by the company for each criterion. Table 2 presents the criteria and criterion weights used, and Table 3 presents the applicant data and the resulting score for each criterion.

Table 2. Weighted Criteria

Criteria	Attribute	Weight
TIU	Benefit	0,30
TWK	Benefit	0,10
TKB	Benefit	0,20
TW	Benefit	0,40

From Table 2, it can be seen that the weighting results for the four criteria used in the new employee recruitment process at Company X are TIU 30%, TWK 10%, TKB 20%, and TW 40%. The percentage weighting value used was adjusted to the needs of preferences and recommendations from the company's human resource management division. This means that the weight value for each criterion is flexible and can be adjusted to the needs of each company.

Table 3. Applicant Score

No	Name	TIU	TWK	TKB	TW
1	AW	110	75	180	300
2	AS	90	90	170	280
3	AN	85	125	166	300
4	AP	95	90	200	270
5	AF	95	85	195	250
6	A	105	90	185	380
7	AI	95	120	200	270
...					
...					
128	YAB	100	65	180	285
129	YS	150	100	166	296
130	ZZ	105	100	180	376

From the obtained data, researchers carried out calculations to obtain a decision matrix. The value in the decision matrix indicates the number of alternatives evaluated, and the obtained score indicates the rating value of each applicant's suitability to the standard criteria required by the company. At the end of the calculation, the decision matrix can show the average value of the suitability between applicants and company qualifications, namely, a TIU value of 1154.91, a TWK value of 1068.2, a TKB value of 2150.67, and a TW value of 3657.429. Table 4 shows the decision matrix obtained after applying the x equation to job applicant data.

Table 4. Decision Matrix

No	Name	TIU²	TWK²	TKB²	TW²
1	AW	12100	5625	32400	90000
2	AS	8100	8100	28900	78400
3	AN	7225	15625	27556	90000
4	AP	9025	8100	40000	72900
5	AF	9025	7225	38025	62500
6	A	11025	8100	34225	144400
7	AI	9025	14400	40000	72900
...					
...					
128	YAB	10000	4225	32400	81225
129	YS	22500	10000	27556	87616
130	ZZ	11025	10000	32400	141376
		1333825	1141050	4625381	13376787
	Decision Matriks	1154,91	1068,2	2150,67	3657,429

If the decision matrix has been defined, the researcher applies equation 2 to normalize the decision matrix. The results of normalizing the decision matrix can show the decision score for each alternative solution obtained. The data processing results demonstrate that each alternative has a decision score ranging from 0 to 1. If percentages are carried out, it can be seen that each alternative from the score on each existing criterion influences the decision of 0% to 100%. Table 5 presents the results of normalizing the decision matrix.

Table 5 shows that the first candidate, Abdul Wahid, has a compatibility value with the company's TIU qualifications of 9%, TWK of 7%, TKB of 8%, and TW of 8%. The exact value also calculated for other applicant candidates to show how compatible the applicant is with the company's qualifications and the comparison. Next, researchers carried out weight normalization. Table 6 shows the results of normalizing the decision matrix against the weights for each criterion. The results of this calculation can determine the impact of the score each applicant has on the preferences desired by the company. For example, the applicant, on behalf of Abdul Wahid, has a normalized weight score of 0.028573571, meaning that the score obtained by the applicant has an impact of 2.857% on the minimum criteria required by the company.

Table 5. Normalized Decision Matrix

No	Name	TIU	TWK	TKB	TW
1	AW	0,095245235	0,070211609	0,083694853	0,082024832
2	AS	0,07792792	0,084253931	0,079045139	0,07655651
3	AN	0,073598591	0,117019348	0,077185253	0,082024832
4	AP	0,082257249	0,084253931	0,092994281	0,073822349
5	AF	0,082257249	0,079573157	0,090669424	0,068354027
6	A	0,090915906	0,084253931	0,08601971	0,10389812
7	AI	0,082257249	0,112338574	0,092994281	0,073822349
...					
...					
128	YAB	0,086586577	0,060850061	0,083694853	0,07792359
129	YS	0,129879866	0,093615479	0,077185253	0,080931167
130	ZZ	0,090915906	0,093615479	0,083694853	0,102804456

Table 6. Normalized Weight

No	Name	TIU	TWK	TKB	TW
1	AW	0,028573571	0,007021161	0,016738971	0,032809933
2	AS	0,023378376	0,008425393	0,015809028	0,030622604
3	AN	0,022079577	0,011701935	0,015437051	0,032809933
4	AP	0,024677175	0,008425393	0,018598856	0,029528939
5	AF	0,024677175	0,007957316	0,018133885	0,027341611
6	A	0,027274772	0,008425393	0,017203942	0,041559248
7	AI	0,024677175	0,011233857	0,018598856	0,029528939
...					
...					
128	YAB	0,025975973	0,006085006	0,016738971	0,031169436
129	YS	0,03896396	0,009361548	0,015437051	0,032372467
130	ZZ	0,027274772	0,009361548	0,016738971	0,041121782

From the alternative values normalized to the criteria weights; by applying the equation x, we obtain the preference distance for each criterion and the existing alternative solutions. Table 7 shows each criterion's positive ideal solution matrix (A+) and negative ideal solution matrix (A-).

Table 7. Ideal Solution Matrix

	TIU	TWK	TKB	TW
A+	0,022079577	0,006085006	0,015437051	0,02460745
A-	0,03896396	0,014042322	0,020923713	0,043199745

Table 7 shows that TIU's required positive preference distance is 2.2%, TWK is 0.06%, TKB is 0.15%, and TW is 0.24%. Meanwhile, TIU's negative preference distance is 0.389%, TWK is 0.14%, TKB is 0.209%, and TW is 0.43%. If the applicant has a TIU preference distance of less than 0.22% and more than 0.38%, TWK less than 0.6% and more than 0.14%, TKB less than 0.15% and

more than 0.20%, and TW less than 0.24% and more than 0.43%, then the applicant is said not to meet the company's qualifications.

From the ideal solution matrix, the difference in the value of each alternative solution can be observed in the ideal preference distance required by the company. Table 8 normalizes the preference distance for each criterion to the ideal solution matrix required by the company. The calculation results indicate that the applicant has the closest preference to the positive ideal solution matrix, with a distance of 0.004030177. In addition, applicants with the furthest preferences from the negative ideal solution matrix have a distance of 0.024107503. The preference value compared to each alternative solution preference (applicant) is 52.41065271.

Table 8. Normalized Preferences

No	Nama	Dj+	Dj-	Dj
1	AW	0,010584142	0,016814195	0,386305999
2	AS	0,006594296	0,021419729	0,23539266
3	AN	0,009941359	0,020702933	0,32441144
4	AP	0,00681491	0,020687146	0,247796389
5	AF	0,005000161	0,022369691	0,182688624
6	A	0,017970889	0,013590987	0,569385951
7	AI	0,008214393	0,020107103	0,290040941
...				
...				
127	YAB	0,007612171	0,020046966	0,275213606
128	YS	0,007741871	0,019855656	0,280527707
129	ZZ	0,018870972	0,013009345	0,591931761
130	YAB	0,017667596	0,013430441	0,568125758
				52,41065271

From the data processing results, before ranking, the V value is calculated, which shows the final score of each preference against the multiple criteria the company has determined when accepting new employees. The V value indicates the final score of each applicant, which indicates the extent of competency possessed by each applicant against the qualification preferences required by the company. Table 9 presents the V score of each applicant.

Based on Table 9, the ranking is based on the V score obtained. The ranking is sorted from the most significant V score to the most miniature V score. From the ranking results, 20 names of applicants with the best V scores were obtained. Table 10 shows the ranking results for all applicants in the company. The more excellent V score of the applicant indicates that the applicant has better competence than other applicants.

Table 10 shows that applying the TOPSIS method helped company X obtain a list of the 20 best applicants. With this list of the 20 best applicants, the recruitment team can focus more on exploring the applicants' character, background, and competencies. This made it easier for the recruitment team to study data from 130 applicants. In addition, implementing the TOPSIS method can increase the recruitment process's efficiency and effectiveness and reduce the stress and fatigue of the recruitment team. Obtaining the best applicant data quickly can also reduce operational costs during recruitment. With TOPSIS, companies can also minimize the subjectivity of the recruitment team's assessment of applicants so that companies can recruit employees that

best suit the required qualifications. Based on the results of this research, with the help of the TOPSIS method, company x can obtain data on the 20 best applicants in just a matter of seconds. Even though the company usually narrows down applicants from 130 to 20 applicants, it takes only 7 days whereas normally it can take 21 to 30 days.

Table 9. Final Score

No	Name	V
1	**AW**	**0,007370753**
2	**AS**	**0,004491313**
3	**AN**	**0,0061898**
4	**AP**	**0,004727978**
5	**AF**	**0,003485715**
6	**A**	**0,010863936**
7	**AI**	**0,005534007**
...		
...		
127	**YAB**	**0,005251101**
128	**YS**	**0,005352494**
129	**ZZ**	**0,011294112**
130	**YAB**	**0,010839891**

Table 10. Ranked Score

No	Name	V	V*1000
1	KA	0,013192	13,19221
2	L	0,012542	12,54172
3	MU	0,01181	11,81048
4	SP	0,011694	11,69373
5	S	0,011411	11,41077
6	FL	0,011403	11,40252
7	YS	0,011294	11,29411
8	FA	0,011118	11,11803
9	PA	0,011028	11,02809
10	M	0,010969	10,96888
11	LI	0,010955	10,9553
12	IR	0,010954	10,95449
13	BF	0,010912	10,9123
14	A	0,010864	10,86394
15	NN	0,010846	10,8458
16	ZZ	0,01084	10,83989
17	KF	0,010776	10,77566
18	MU	0,010658	10,65763
19	RP	0,010642	10,64232

No	Name	V	V*1000
20	NA	0,010548	10,54754
...			
127	AF	0,003486	3,485715
128	AAP	0,003077	3,076867
129	DP	0,002826	2,825783
130	DD	0,002733	2,732853

CONCLUSIONS

From this research, the TOPSIS method can be used to rank the recruitment of new employees in a company. TOPSIS has been proven to be able to carry out analyses of different criteria (multi-criteria) that are needed as a basis for making a decision. TOPSIS has an easy and simple calculation system that minimizes the subjectivity of assessments. The TOPSIS method has the advantage of analyzing the closeness of the ideal solution between alternative preferences (applicant competencies) and required preferences (employee qualifications). The determination of criteria and weights in TOPSIS is flexible so that it can be adjusted to the needs and interests of the decision-maker. In this study, companies increased their efficiency and effectiveness in obtaining the best applicant list by up to 70%, generally taking 21 to 30 days to only 7 days.

LIMITATION & FURTHER RESEARCH

This research has limitations in terms of the data related to the sub-criteria used by company X during the interviews. The type of assessment usually used by companies when conducting interviews is considered a company secret; thus, researchers are not given sufficient information regarding the interview assessment techniques used by the company. In further research, the sub-criteria companies' use for each TIU, TKW, TKB, and TW criteria. In conclusion, TOPSIS can optimize the recruitment process by up to 70%. It can be increased further by combining the TOPSIS method with fuzzy or other methods.

As for the weighting value, this study uses weighting, which is commonly used by companies. The researchers did not conduct further research on each criterion's weighting value to find the ideal weight. Thus, in future research, researchers will conduct deeper tests to obtain the most appropriate weighting value to improve the quality of human resources obtained. In addition, this study was conducted only on model recruitment strategies using the TOPSIS method. In addition, to optimize the recruitment process, company X can apply the computerized TOPSIS method in its recruitment system to recruit new employees.

REFERENCES

Alam, M. J., Ullah, M. S., Islam, M., & Chowdhury, T. A. (2024). Human resource management practices and employee engagement: The moderating effect of supervisory role. *Powerful Business and Management, 11*(1). https://doi.org/10.1080/23311975.2024.2318802

Ammer, M. A., Ahmed, Z. A. T., Alsubari, S. N., Aldhyani, T. H. H., & Almaaytah, S. A. (2023). Application of artificial intelligence for better investment in human capital. *Mathematics, 11*(3). https://doi.org/10.3390/math11030612

An, L., Grimm, V., Bai, Y., Sullivan, A., Turner, B. L., Malleson, N., Heppenstall, A., Vincenot, C., Robinson, D., Ye, X., Liu, J., Lindkvist, E., & Tang, W. (2023). Modeling agent decisions and behaviors in light of data science and artificial intelligence. *Environmental Modeling and Software, 166*. https://doi.org/10.1016/j.envsoft.2023.105713

Antunes, J., Hadi-Vencheh, A., Jamshidi, A., Tan, Y., & Wanke, P. (2023). TEA-IS: A hybrid DEA-TOPSIS approach for assessing performance and synergy in Chinese health care. *Decision Support Systems, 171*. https://doi.org/10.1016/j.dss.2022.113916

Armstrong, M., & Taylor, S. (2014). *Armstrong's handbook of human resource management practice* (13th ed.). Kogan Page.

Aslam, H. D., Aslam, M., Ali, N., & Habib, B. (2014). The importance of human resource management in the 21st century: A theoretical perspective. *International Journal of Human Resource Studies, 3*(3), 87–98. https://doi.org/10.5296/ijhrs.v3i3.6255

Azad, T. (2019). Implementation of the TOPSIS method for multi-criteria decision making of supplier selection. *European Journal of Advances in Engineering and Technology, 6*(11).

Bakar, A., Darmayantie, A., & Sumampouw, L. (2021). Implementation of profile matching and TOPSIS in the decision support system for new employee recruitment at DBC Manufacturing Group in Indonesia. *International Journal of Scientific and Research Publications (IJSRP), 11*(2), 678–684. https://doi.org/10.29322/ijsrp.11.02.2021.p11085

Bal, M., & Bal, Y. (2022). A novel approach to the recruitment process in human resources management: A decision support system based on formal concept analysis. *International Journal of Decision Support System Technology, 14*(1). https://doi.org/10.4018/IJDSST.292447

Cahigas, M. M., Robielos, R. A. C., & Gumasing, M. J. J. (2021). Application of multiple criteria decision-making methods in the human resource recruitment process. *11th Annual International Conference on Industrial Engineering and Operations Management, Singapore.*

Fayad, N. M., & Easa, N. F. (2020). Human resources management practices and employee engagement: Known and unknown aspects in the literature. *BAU Journal - Creative Sustainable Development, 2*(1). https://doi.org/10.54729/2789-8334.1030

Goyal, K., Nigam, A., & Goyal, N. (2023). Human resource management practices and employee engagement. *International Journal of Human Capital in Urban Management, 8*(4), 559–572. https://doi.org/10.22034/IJHCUM.2023.04.09

Hietaniemi, L., Santamaria, S., Kacperczyk, A., & Peltonen, J. (2021). Entrepreneurial hiring strategies in standalone and portfolio ventures. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.3764531

Hietaniemi, L., Santamaria, S., Kacperczyk, A., & Peltonen, J. (2024). Human resource redeployability and entrepreneurial hiring strategy. *Strategic Management Journal, 45*(2), 272–300. https://doi.org/10.1002/smj.3547

Hsu-Shih, S., & Olson, D. L. (2022). *TOPSIS and its extensions: A distance-based MCDM approach* (1st ed., Vol. 1). Springer.

Hwang, C. L. ve Yoon, K.(1981). Multi Attiribute Decision Making Methods and Applications.

International Labour Organization. (2023). *Human resource management: A manual for employer and business membership organizations - Tool 4: Performance management.* Available at www.ilo.org/publns

Jantan, H., Razak, A., & Ali, Z. (2010). Intelligent techniques for decision support systems in human resource management. In *Decision Support Systems Advances.* InTech. https://doi.org/10.5772/39401

Kusumawardani, R. P., & Agintiara, M. (2015). Application of fuzzy AHP-TOPSIS to the human resource manager selection process. *Procedia Computer Science, 72*, 638–646. https://doi.org/10.1016/j.procs.2015.12.173

Madanchian, M., & Taherdoost, H. (2023). A comprehensive guide to the TOPSIS method for multi-criteria decision making. *Sustainable Social Development, 1*(1). https://doi.org/10.54517/ssd.v1i1.2220

Mandal, S., Gazi, K. H., Salahshour, S., Mondal, S. P., Bhattacharya, P., & Saha, A. K. (2024). Application of interval-valued intuitionistic fuzzy uncertain MCDM methodology for Ph.D. supervisor selection problem. *Results in Control and Optimization, 15*. https://doi.org/10.1016/j.rico.2024.100411

Markham, L., Gobind, J., Abdulla, S., Mabaso, C., Rajaram, S., & Uys, M. (2022). *Introduction to human resource management: Fresh perspectives.* Pearson.

Patterson, D. (2023). *Human resources management* (3rd ed.).

Pattrick, P., & Mazhar, S. (2019). Core functions of human resource management and its effectiveness in organizational management: A study. *International Journal of Research in Economics and Social Sciences, 9*(5). Fanshawe.

Pavić, Z., & Novoselac, V. (2013). Notes on TOPSIS method. *International Journal of Research in Engineering and Science (IJRES), 1*(2), 5–12.

Rahi, Ullah, & Alam. (2021). A decision support system (DSS) for interview-based personnel selection using fuzzy TOPSIS method. *Proceedings of International Conference on Fourth Industrial Revolution and Beyond 2021 and Systems, 437.*

Rathore, P. S. S. (2023). Impact of AI on recruitment and selection processes: Analyzing the role of AI in automating and enhancing recruitment and selection procedures. *International Journal for Global Academic & Scientific Research, 2*(2), 78–93. https://doi.org/10.55938/ijgasr.v2i2.50

Rozario, S. D., Venkatraman, S., & Abbas, A. (2019). Challenges in recruitment and selection process: An empirical study. *Challenges, 10*(2), 35. https://doi.org/10.3390/challe10020035

Saeidi, P., Mardani, A., Mishra, A. R., Cajas Cajas, V. E., & Carvajal, M. G. (2022). Evaluating sustainable human resource management in manufacturing companies using an extended Pythagorean fuzzy SWARA-TOPSIS method. *Journal of Cleaner Production, 370*. https://doi.org/10.1016/j.jclepro.2022.133380

Shakerian, H., Dehnavi, H. D., & Ghanad, S. B. (2016). Implementation of the hybrid model SWOT-TOPSIS by a fuzzy approach to evaluate and rank human resources and business strategies in organizations (Case study: Road and Urban Development Organization in Yazd). *Procedia-Social and Behavioral Sciences, 230*, 307–316. https://doi.org/10.1016/j.sbspro.2016.09.039

Sharma, N. K., Kumar, V., Verma, P., & Luthra, S. (2021). Sustainable reverse logistics practices and performance evaluation using fuzzy TOPSIS: A study on Indian retailers. *Cleaner Logistics and Supply Chain*. https://doi.org/10.1016/j.clscn.2021.100007

Shih, H.-S., & Olson, D. L. (2022). *TOPSIS and its extensions: A distance-based MCDM approach.* Springer. https://doi.org/10.1007/978-3-031-09577-1

Stephen, E. G., Cinjel, D. N., Apikins, M. W., & Samuel, I. A. (2019). Recruitment, selection, and placement of human resources in International Civil Service Commission. *International Journal of Sciences: Basic and Applied Research, 48*(4), 188–200.

Tripathy, L. K. (2023). Analyzing the importance of screening process during recruitment in Indian IT sector. *Community Practitioner, 20*(11), 384–395. https://doi.org/10.5281/zenodo.10301297

Wardlaw, M. K. (2019). *Effective human resources recruiting and hiring practices for improving organizational performance*, [Dissertation Walden University]