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DECISION SUPPORT SYSTEM FOR NEW EMPLOYEE SELECTION IN CV. KALIA UTAMA NUSANTARA USES TECHNIQUE FOR ORDER PREFERENCE BY SIMILARITY TO IDEAL SOLUTION METHOD

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ABSTRACT

This study aims to evaluate the Decision Support System (DSS) in the employee recruitment selection process at CV Kalia Utama Nusantara. The method used in this study is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method to determine the best candidates based on performance, experience, and ability criteria. The results of the study show that the TOPSIS method is effective in providing weighted scores for employees based on predetermined criteria. The study reveals that 40% of prospective employees are not suitable for the company's needs, and non-meritocratic factors such as money politics and internal recruitment often cause mismatches between work and employee potential. This research recommends developing the system by adding criteria or adjusting weights according to company needs.

KEYWORD
Decision Support System,
TOPSIS,
Effectiveness,

1. Introduction

An employee is someone who works for a company or organization with a ststus as a permanent or contract employee by doing work and giving the results of his work to the employer who works on them [1], [2], [3]. Where the results of their work are in accordance with their profession or work on the basis of expertise as their livelihood by getting a salary or wage in return for the work they do. In line with this, according to Law No. 14 of 1969 concerning the subject of labor, an employee is every person who is able to carry out work, both inside and outside the employment relationship in order to produce services or goods to meet the needs of the community [4], [5].

Fig. 1.CV Building. Kalia Utama Nusantara

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Fig. 2.CV Workspace. Kalia Utama Nusantara

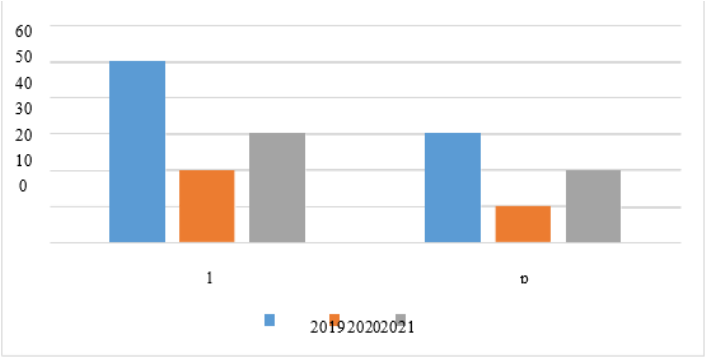

Fig. 3. Prospective employees of CV. Kalia utama nusantara. Women and men each year

CV Kalia Utama Nusantara (CV KUN) is a company engaged in General Trade and Services. The company is located at Perum Mangkalaya Residence Block B5 no 11, RT.01/RW.07, Gunung Guruh District, Sukabumi. In the figure above, it can be seen that 40% of prospective employees at CV Kalia Utama Nusantara are not suitable for the company's needs, although they are slowly trying to adapt to the Employee Admission Selection Decision Support System and the work environment. As many as 25% don't match, only 15% are quite suitable, and 20% are very suitable. This shows that there is an error on the part of management in the employee recruitment process

The stages of selecting prospective employees include:

- Locker information
- Suspension,
- Employment agreement
- Performance review (3 months)
- Permanent employees

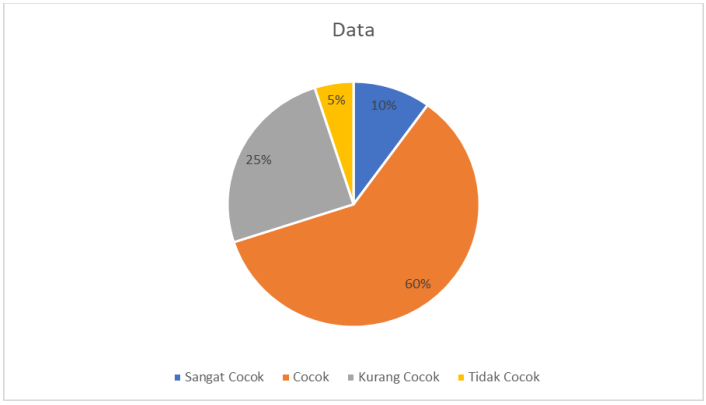

Fig. 4. Conditions of the feasibility level of the job position with potential

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In the picture above, it can be seen that 60% of prospective employees at CV Kalia Utama Nusantara are suitable for the position they are placed in because they are in accordance with the potential of the employee.

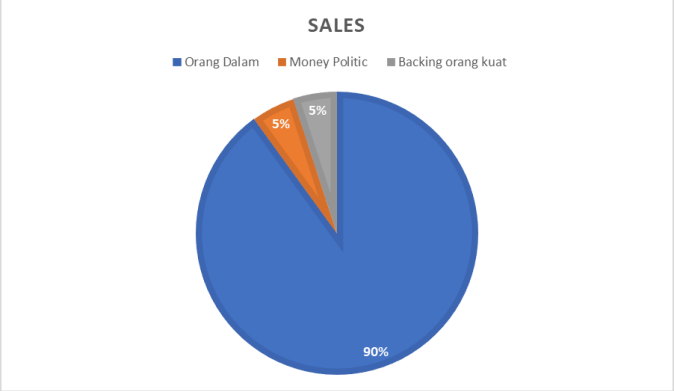

Fig. 5. Factors Causing Dismatch Between Jobs With Potential Incompatibility Between Jobs

Potential is often caused by non-meritocracical factors such as insider recruitment, money politics, and the backing of the strong. In the image above,

It can be seen that 90% of the candidates accepted as employees at CV Kalia Utama Nusantara are those who have a strong connection with the Company itself so that there is often a mismatch between the work and the potential they have, and there is only 5% political money as well as many strong people backing 5%.

2. Literature riview

2.1 Previous research

The research conducted by Arista Qiyamullaily, Silvia Nandasari, and Yusuf Amrozi (2022) is titled "Comparison of the Use of SAW and AHP Methods for Decision Support Systems for New Employee Admissions". Highlight the challenges companies face in selecting the best employees based on performance, experience, and ability criteria. This research was conducted at PT. Tunas Bersama Yamansari, Tegal Regency. Variables Used: Performance (C1): Measuring work results, quality, and efficiency on an ordinal scale, Experience (C2): Measuring the number of years of work, type of work, and qualifications on a nominal or ordinal scale, Ability (C3): Measuring technical, communication, and teamwork skills on an ordinal scale. Simple Additive Weighting (SAW): This method calculates the weighted value of employees based on predetermined criteria. Analytical Hierarchical Process (AHP): This method determines the order of priority of employees based on the assessment of relevant criteria [6].

2.2 Reseach result

The AHP method is effective in the decision-making process of accepting new employees. The AHP-based system is able to provide the best employee recommendations to the company.

This research suggests the development of the system by adding criteria or adjusting weights to adjust to the needs of the company.

Application of the TOPSIS Method in Employee Selection

In addition to the SAW and AHP methods, the TOPSIS method has also been widely used in various studies for employee admission selection. Some of the relevant research with the TOPSIS method include:

The 2019 research in a property company used five criteria: Application Administration File, Academic Grades, Test Scores, Health Tests, and Interviews. The results show that the TOPSIS method can help companies in the process of selecting new employees by considering these criteria.

2018 research at PT. Indah Jaya Asahan uses the criteria of Education, Work Experience, Skills/Abilities, Age, and Character. The results of the study show that the TOPSIS method is successfully applied in the selection process of new employees and can rank prospective employees based on their proximity to positive ideal solutions [7].

2022 Research at PT. The Indofurn Cab Padang panel uses seven criteria: Education Level, Work Experience, Skills/Expertise, Appearance, Ability to Work Together in a Team, Written Test Results, and Interview Test

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Results. This study shows that the TOPSIS method is successfully applied to rank prospective employees based on preference values [8].

2.3 Thingking Framework

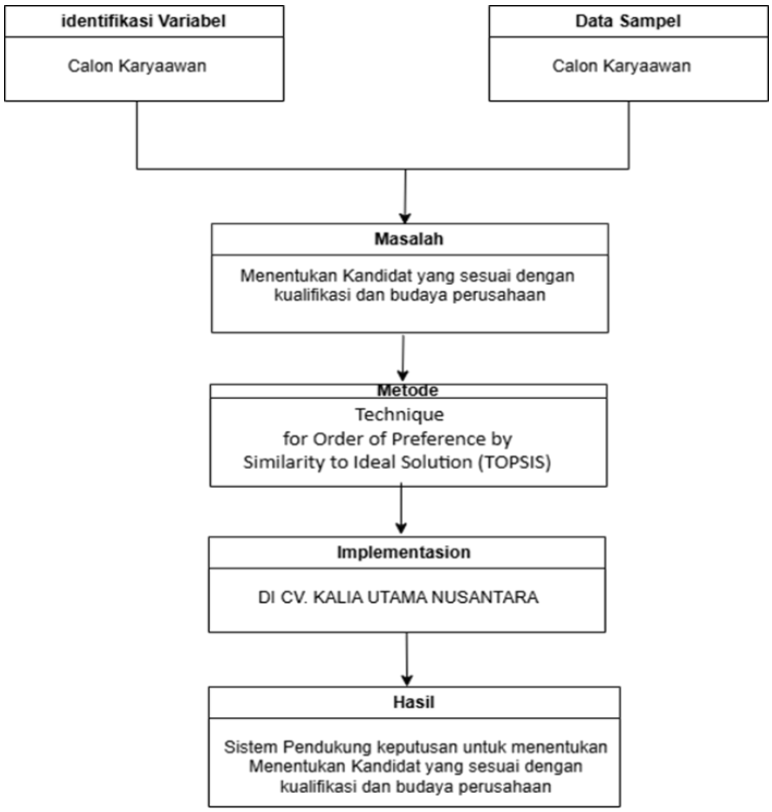

Fig. 6. Thingking Framework

3. Methodology

3.1 Tools and Material

- Laptop
- PC
- Windows 11
- Microsoft Word
- Microsoft Excel
- CV Employee Test Data. Kalia Utama Nusantara

3.2 Detail Dokumen

Table 1. Alternative table

Prospective Employee Name	Last Education	Age	Work Experience (Years)	Written Test Scores	Interview test scores	Job asessment
Ahmad Dani	SMA	22	1	85	80	80
Budi Santoso	S1	25	2	90	85	90
Cindy Wijaya	SMK	21	0	78	75	65

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Dewi Permata	D3	23	1	82	82	80
Erik Gunawan	S1	26	3	92	90	80
Fitri Handayani	SMA	22	1	80	78	75
Galih Mahardika	SMK	20	0	75	70	60

Criteria	Weight
Pendidikan Terakhir	2
Usia	1
Pengalaman Kerja	2
Nilai Tes Tertulis	1
Nilai Tes Wawancara	1
Penilaian Kerja	3

1) Abbreviation/Terms/Notes/Symbols

In this study, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method will be used to evaluate and rank prospective employees based on several predetermined criteria [9], [10]. The TOPSIS method was chosen because of its ability to handle qualitative and quantitative criteria simultaneously, as well as consider the positive and negative ideal solutions of each alternative. The selection process will involve the stages of normalization of the decision matrix, weighting criteria, determining positive and negative ideal solutions, calculating the distance of each alternative to the ideal solution, and calculating the value of relative preferences. The final result will be a ranking of prospective employees based on the highest relative preference value, which shows the prospective employee who is closest to the positive ideal solution and the furthest from the negative ideal solution. The use of the TOPSIS method is expected to provide more comprehensive and accurate results in the employee selection process, taking into account the relative distance of each alternative to the ideal solution, so that the company can choose the best candidate who has the best performance in various relevant criteria.

2) Measurment

TOPSIS Methode Formula :

a) create a normalized decision

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

with i = 1,2…,m dan j=1,2,…,n.

b) create a matrix of normalized decisions with weights.

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The positive ideal solution A+ and the negative ideal solution A- can be determined based on the normalized weight rating (Yij) as:

$$Y^{ij} = W^{i}r^{ij}$$

with i = 1,2…, m and j=1,2, …, n.

c) determined the positive ideal solution matrix and negative ideal solution matrix.

A+=(y1+,y2+,...,yn+)

A−=(y1−,y2−,...,yn−)

With :

$$y_j^+ = \begin{cases} max_i y_{ij} & Jika\ j\ adalah\ atribut\ keuntungan \\ min_i y_{ij} & Jika\ j\ adalah\ atribut\ biaya \end{cases}$$

$$y_j^- = \begin{cases} min_i y_{ij} & Jika\ j\ adalah\ atribut\ keuntungan \\ max_i y_{ij} & Jika\ j\ adalah\ atribut\ biaya \end{cases}$$

d) Determine the distance between the value of each alternative and the positive ideal solution matrix dan negative ideal solution matrix.

The distance between the Di, alternative and the positive ideal solution is formulated as :

$$D_i^+ = \sqrt{\sum_{j=1}^{n}(y_i^+ - y_{ij})^2}\ i = 1, 2, ...,$$

The distance between the Ai, alternative and the negative ideal solution is formulated as:

$$D_i^- = \sqrt{\sum_{j=1}^{n}(y_{ij} - y_{ij}^-)^2}$$

e) Determining the preference value for each alternative.

TOPSIS requires a performance rating of each Ai alternative on each normalized Cj criteria, namely:

The preference value for each alternative (Vi) is given as

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

3.3 Reserch Schedule

This research was carried out in the period from May 13, 2024 to May 27, 2024 with two meetings. Data collection was carried out through online interviews (Zoom) with the management of CV Kalia Utama Nusantara to obtain complete information about the criteria used in the employee selection process, as well as data on prospective employees to be evaluated. In addition, interviews were also conducted to obtain a paired comparison assessment between the criteria from the management. The data obtained is then analyzed using the Analytic Hierarchy Process (AHP) method to rank prospective employees based on their suitability with predetermined criteria and preferences.

4. Result and Discussion

4.1 Result

1) Assessment Criteria

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The basic concept of the TOPSIS method is to find the weighted sum of the rating rating on each alternative on all attributes. With the results of these calculations, decision-makers can easily make calculations using the TOPSIS method based on the provisions that have been set. [1]

The selection of new employee admissions using TOPSIS uses 5 criteria, including the Application Administration File obtained from the completeness of the application file submitted, Academic Score obtained from GPA or UAN assessment, Test Score obtained from test assessment (psychological test and field ability), Health Test obtained from the results of health tests, and Interview obtained from the results of interviews with prospective employees.

2) Pictures and tables

Based on the results of data processing using Microsoft Excel with the AHP method, it was obtained that the best vendor that will provide the best raw materials for HL Bakery is Toko Uwa with a matrix value of 0.398.

3) Making Normalized Decisions

Table 2. Making Normalized Decisions

Cost benefit	**Benefit**	**Benefit**	**Benefit**	**Benefit**	**Benefit**
Interest	**2**	**2**	**3**	**4**	**4**
Criteria	**Education**	**Age**	**Work Experience (Years)**	**Interview test scores**	**Job asessment**
Ahmad Dani	1	22	1	80	80
Budi Santoso	3	25	2	85	90
Cindy Wijaya	2	21	0	75	65
Dewi Permata	2	23	1	82	80
Erik Gunawan	3	26	3	90	80
Fitri Handayani	1	22	1	78	75
Galih Mahardika	2	20	0	70	60
Dividers	5,656854249	60,32412453	4	212,2686976	201,8662924

Normalizing Formula

$$\frac{(Data)}{(akar\ hasil\ pangkat\ perkriteria)}$$

Table 3. Normalized table

0,176776695	0,364696548	0,25	0,376880816	0,396301924
0,530330086	0,414427896	0,5	0,400435867	0,445839664
0,353553391	0,348119433	0	0,353325765	0,321995313
0,353553391	0,381273664	0,25	0,386302836	0,396301924
0,530330086	0,431005012	0,75	0,423990918	0,396301924
0,176776695	0,364696548	0,25	0,367458796	0,371533053
0,353553391	0,331542317	0	0,329770714	0,297226443

4) Making normalization weighted

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Table 4. Weighted normalized table

0,353553391	0,729393097	0,75	1,507523264	1,585207695
1,060660172	0,828855792	1,5	1,601743468	1,783358657
0,707106781	0,696238865	0	1,41330306	1,287981252
0,707106781	0,762547328	0,75	1,545211346	1,585207695
1,060660172	0,862010023	2,25	1,695963672	1,585207695
0,353553391	0,729393097	0,75	1,469835183	1,486132214
0,707106781	0,663084633	0	1,319082856	1,188905771

5) Finding the Max and Min of Weighted Normalization

Table 5. Max and Min of Weighted Normalization

0,353553391	0,729393097	0,75	1,507523264	1,585207695	
1,060660172	0,828855792	1,5	1,601743468	1,783358657	
0,707106781	0,696238865	0	1,41330306	1,287981252	
0,707106781	0,762547328	0,75	1,545211346	1,585207695	
1,060660172	0,862010023	2,25	1,695963672	1,585207695	
0,353553391	0,729393097	0,75	1,469835183	1,486132214	
0,707106781	0,663084633	0	1,319082856	1,188905771	
A+	0,353553391	0,663084633	0	1,319082856	1,188905771
A-	1,060660172	0,862010023	2,25	1,695963672	1,783358657

6) Finding D+ D- in Each Formula Alternative

Table 6. Finding D+ D- in Each Formula Alternative

D+	D-
0,871471063	1,68593026
1,791856951	0,756621867
0,380516229	2,353779062
0,951620794	1,564251545
2,429231499	0,198150962
0,823387293	1,705011701
0,353553391	2,392171543

7) Find V/Result and apply Ranking to each calculation result

Table 7. Result and apply Ranking

V	Hasil	Ranking

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0,659236	Ahmad Dani	4
0,296892	Budi Santoso	6
0,860836	Cindy Wijaya	2
0,621753	Dewi Permata	5
0,075418	Erik Gunawan	7
0,674344	Fitri Handayani	3
0,871235	Galih Mahardika	1

Based on the table above, Galih Mahardika was obtained as the candidate employee with the highest score.

4.2 Discussion

Based on the results of the calculation using the TOPSIS method, Galih Mahardika was obtained as a prospective employee with the highest preference score. This score shows that Galih Mahardika is the candidate closest to the positive ideal solution and the furthest from the negative ideal solution, based on predetermined criteria (Application Administration File, Academic Grades, Test Scores, Health Test, and Interview). Although Galih Mahardika has the lowest score in the Work Experience criteria, but his excellence in other criteria, especially Interview Test and Job Assessment Scores, makes him the most recommended candidate to be accepted as an employee at CV Kalia Utama Nusantara. It is important to note that these results are based on the data and weights of the criteria that have been determined. Changes to the data or criterion weights can result in different rankings. Therefore, it is recommended to conduct a sensitivity analysis to see how changes in the weight of the criteria may affect the final ranking.

5. Conclusion

Based on the results of the calculation using the TOPSIS method, Galih Mahardika was obtained as a prospective employee with the highest preference score. This score shows that Galih Mahardika is the candidate closest to the positive ideal solution and the furthest from the negative ideal solution, based on predetermined criteria (Application Administration File, Academic Grades, Test Scores, Health Test, and Interview). Although Galih Mahardika has the lowest score in the Work Experience criteria, but his excellence in other criteria, especially Interview Test and Job Assessment Scores, makes him the most recommended candidate to be accepted as an employee at CV Kalia Utama Nusantara. It is important to note that these results are based on the data and weights of the criteria that have been determined. Changes to the data or criterion weights can result in different rankings. Therefore, it is recommended to conduct a sensitivity analysis to see how changes in the weight of the criteria may affect the final ranking.

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