

Decision Support System for Selecting Casual Daily Workers to Become Permanent Employees Using the Profile Matching Method

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Abstract

Information is the result of processing data from one or more sources, which is then processed to provide value, meaning and benefits. In modern times, the use of technology plays a very important role as a means of information and promotion, especially in the field of websites in delivering information. Technological advances in the field of computers are very helpful in the current decision-making process. One method of decision support systems is profile matching. This method is used to determine the assessment in selecting daily employees to become employees. Profile matching is broadly a process of comparing individual competition in job competition so that the difference in competition (also called gap) can be known, the smaller the gap produced, the greater the weight of the value which means that there is a greater chance for employees to occupy the position. After the calculation using the Profile Matching method, the ranking value that meets the requirements is in the alternative with the name of the worker, namely Bakhtiar with a score of 4.535 and is recommended to become a permanent employee. By applying this method, it is very helpful in determining the selection of casual laborers to become permanent employees.

Keywords : Decision Support System, Profile Matching, Ranking, Alternative.

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1. Introduction

Decision Support System (DSS) is a system that is able to provide problem-solving capabilities and communication capabilities for problems with semi-structured and unstructured conditions. This system is used to assist decision-making in semi-structured and unstructured situations, where no one knows for sure how decisions should be made [1][2]. Artificial Intelligence is a term where the ability of a computer to think like humans or even better than humans. Artificial intelligence systems are usually realized in the form of software or a machine. The purpose of an artificial intelligence system is to replace the role of humans, so that a problem can be done more easily and efficiently. One of the information systems that adopts the characteristics of the concept of artificial intelligence is a decision support system (DSS) [3]. A decision support system is an interactive information system that provides information, modeling, and data manipulation. The system is used to assist decision making in semi-structured and unstructured situations, where no one knows for sure how decisions should be made. Decision support systems are usually built to support a solution to a problem or to evaluate an opportunity. Decision support systems [4]

Profile matching is broadly a process of comparing individual competition in job competition so that the

difference in competition (also called gap) can be known, the smaller the gap produced, the greater the weight of the value which means that there is a greater chance for employees to occupy the position [5]. A daily freelancer is someone who works alone and is not tied to a company owner in the long term. Daily freelancers also have obligations that must be fulfilled as something that must be done if daily workers want to get their salary, by doing large target work without taking into account working hours, this is the only obligation that must be done because daily casual workers are not bound by a permanent work agreement where usually in a permanent work agreement, workers must comply with every regulation set by the company [6]. A permanent employee is someone who works with conditions made by the company in the job and all work activities have been arranged and processed in payroll carried out with a basic salary set by the company every month [7]. Therefore, KOPERBAM makes an assessment in selecting daily employees to become permanent employees by making decisions based on assessments made in the field, thus the need for decision-making such as a computerized decision support system so that decisions can be made quickly and accurately, thus this decision support system uses a profile matching method that will be used between the permanent employee profile and the casual daily laborer profile with a review process against the criteria

that will be set to meet the requirements of the candidates.

The need for human resources in Koperbam greatly influences many aspects of determining the success of the company's performance, especially to increase highly productive human resources. For this reason, employees are needed who have the skills appropriate to the type of work they face in the field they occupy and who can carry out their work duties with full responsibility. Koperbam is engaged in the field of cooperative savings and loan services as a unit engaged in the service sector to meet the needs of casual daily laborers in the local population. This cooperative is not only in the field of savings and loan services, but also provides equipment for workers who work in the port to make it easier to do their work. Therefore, this cooperative is divided into several parts and according to the division of tasks determined by the cooperative leadership.

In the decision support system process for selecting casual laborers to become permanent employees at Koperbam, it cannot be separated from the current system. A series of activities in the decision support system process for selecting casual laborers to become permanent employees require fast and accurate information about the casual labor candidates to be selected, and relatively large amounts of data. While the casual labor profiles have not been organized in a single database that is easy to access and takes a long time to obtain information. The problem that occurs when making decisions to select casual laborers to become permanent employees is a very complicated process because the daily labor data has not been created in one database, so the decision-making process takes a long time because there are so many candidates to be selected as permanent employees. Therefore, there is a need for a computer-based decision support system so that in the decision-making process, the data of the candidates to be selected is already in one database to facilitate decision-making and influence and accelerate the performance of leaders in selecting casual laborers to become permanent employees accurately.

The advancement of technology in the field of computers is very helpful in the decision-making process today. One of the methods of decision support systems is profile matching. This method was chosen because it can select the best candidates from the many workers selected. Therefore, this method helps cooperative leaders in making decisions to determine permanent employees at the cooperative.

Previous research on Decision Support Systems (DSS) using the Profile Matching method has been conducted extensively. One of them is a study that aims to determine the best employees for promotion or bonuses. This study uses six main criteria, namely

Honesty, Loyalty to the company, Attitude, Productivity, Discipline, and Ability to Work Together, with each criterion having specific sub-criteria. The results of this study indicate that the application developed can select the best employees and allow the addition of new criteria in the future [8]. Other studies focus on determining employees who deserve awards as the best employees, by prioritizing the Productivity and Quality aspects in calculating and comparing candidate profiles. The findings of this study are that the system can rank candidates based on the highest competency weight value to determine the best employees [9].

In addition, there is a study that evaluates the Key Performance Index (KPI) of each employee as part of the recruitment process. This study uses three aspects of assessment, namely Intelligence, Attitude, and Behavior. In the Intelligence Aspect, it is further detailed into creativity, intellectual activity, solutions, initiative, concentration, and anticipation. The Attitude Aspect includes thoroughness, responsibility, sense of control, motivation, planning, and caution. Meanwhile, the Behavioral Aspects include compliance, sincerity, independence, dynamics, and influence. The results of this study indicate a change in candidate rankings after weighting using the Profile Matching method, with employees who were previously in second place in simple manual calculations, now occupying first place with the highest value of 6.55 [10].

Previous studies have discussed the determination of the best employees using the TOPSIS and Borda methods. The TOPSIS method is used for decision making in each assessor, while the Borda method is used to combine the results of decisions from each assessor to obtain the final result in the form of the best employees at the Lombok Garde hotel [11]. Previous studies that discuss the profile matching method include studies that propose a privacy-preserving profile matching protocol that functions in proximity-based social networks (PMSNs). In this study, the profile matching method was applied effectively. Other studies have discussed the application of the profile matching method to solve the problem of selection and decision making. This study used five data samples, where each sample has its own credit score. The credit score is divided into a range between 1 and 3, with the number 1 indicating the lowest (worst) value and the number 3 indicating the highest (best) value. The results of the study indicate that the profile matching method can also be applied well in this context [12]. Furthermore, there is a study that aims to recommend hiking tourist destinations using the Profile Matching method. The data for this study were collected through questionnaires distributed to three groups of nature lover organizations, with each group receiving 10 questionnaires. This study involved five alternative destinations and six criteria. Based on calculations using the Profile Matching method, the results showed

that Mount Rinjani was the most recommended climbing destination [13]. The next study Using Profile Matching Method to Employee Position Movement. The position of employee transfer discussed in this study is in Tanggamus Regency. This study produces a ranking order of prospective employees who have good performance that has been selected, and the output of the application can help decision makers to choose alternative transfers of tasks or office transfers of employees in Tanggamus Regency in order to increase employment and better performance in the new workplace again [14].

2. Research methodology

The research methodology is explained in the research framework. The research framework is a series of steps in carrying out a research activity. The research framework of this study is shown in Figure 1.

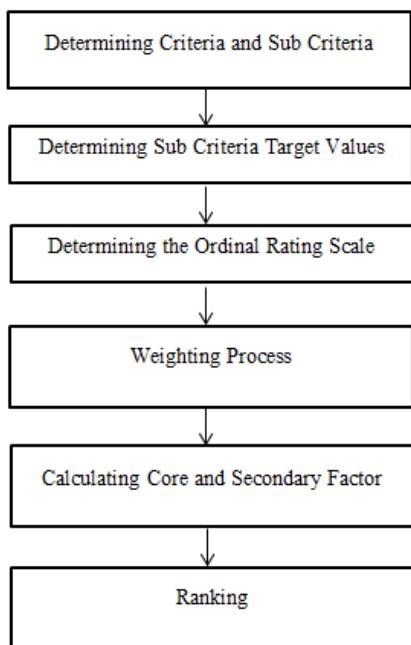


Figure 1. Research Framework

The steps in the Profile Matching method are as follows:

1. Determining Criteria and Subcriteria
2. Determining the Target Value of Subcriteria
3. Determining the Ordinal Rating Scale
4. Weighting Process, the difference between the profile of the prospective permanent employee to be assessed and the profile expected by the voter or the target value.
5. Calculating Core Factor and Secondary Factor

$$NCF = \frac{\sum NC(i,s,p)}{\sum IC} \quad (1)$$

Information :
 NCF : Average core factor value

$\sum NC(i,s,p)$: Total number of core factor values
 $\sum IC$: Number of core factor items

Secondary factor (SF) is a supporting aspect and its nature is to support/add to the main criteria owned by i CF. Meanwhile, the calculation for the secondary factor can be shown in the following formula equation (2):

$$NSF = \frac{\sum NS(i,s,p)}{\sum IS} \quad (2)$$

Information :
 NSF : Average secondary factor value
 $\sum NS(i,s,p)$: Total number of secondary factor values
 $\sum IS$: Number of secondary factor items

Next, calculate the total value of each aspect. This calculation is done after obtaining the percentage value of CF and SF [9]. The calculation of the total value of the aspect uses the following equation:

$$(x)\% \cdot NCF(i,s,p) + (X)\% \cdot NSF(i,s,p) \quad (3)$$

Information :
 $NCF(i,s,p)$: Average value of core factor
 $NSF(i,s,p)$: Average secondary factor value
 $N(i,s,p)$: Total value of the aspects
 $(x)\%$: The percentage value entered

6. Ranking

The final result of the profile matching process is the ranking of the candidates submitted to refer to certain calculation results. The calculation and determination of the ranking can be seen in the following formula (4):

$$ranking = (x)\% \cdot N1 + (x)\% \cdot N2 + (x)\% \cdot N3 \dots (xn) \cdot Nn \quad (4)$$

Information :

$N1$: Criteria Value 1
 $N2$: Criteria Value 2
 $N3$: Criteria Value 3
 $(x)\%$: The percentage value entered

Calculation of ranking value for each alternative with terms of company, namely 30% for work attitude aspects, 20% for personality, 30% for responsibility, 20% for professionalism.

3. Results and Discussion

3.1 Determination of Criteria and Subcriteria

In the *profile matching method*, it is necessary to determine what criteria and sub-criteria are used as guidelines in determining whether a daily worker is

selected or not to become a permanent employee. The following are the criteria and sub-criteria in the assessment of the selection of prospective permanent employees :

1. Assessment Criteria for Prospective Permanent Employees

The assessment criteria can be seen in Table 1:

Table 1 Assessment Criteria for Prospective Permanent Employees

Criteria	Subcriteria	Types of	Criteria	
			1. Honesty	CF (core factor)
1. Work Attitude	2. Ability	CF (core factor))
	3. Accuracy	SF (secondary factor))
	1. Compliance	CF (core factor))
2. Personality	2. Appearance	CF (core factor))
	3. Accuracy	SF (secondary factor))
	1. Punctual attendance	CF (core factor))
3. Responsibility	2. Accuracy in completing tasks	CF (core factor))
	3. Acceptance of additional tasks	SF (secondary factor))
	1. Integrity	CF (core factor))
4. Professionalism	2. Shows a mature personality	CF (core factor))
	3. orientation	SF (secondary factor))

2. Determination of Subcriteria Target Values

In each criterion, the value of each sub-criteria is determined. The determination of the value in each worker criterion is obtained from the weight range that has been determined by the leader to be used as a target value taken based on the worker criteria to be made a permanent employee from the observation results , as in Table 2:

Table 2 Target Value Criteria for Permanent Employee Candidate

Criteria	Subcriteria	Assessment Target Value
	1. Honesty	5
1. Work attitude	2. Ability	4
	3. Accuracy	3
	1. Compliance	4
2. Personality	2. Appearance	5
	3. Behavior	3
	1. Punctual attendance	4
3. Responsibility	2. Accuracy in completing tasks	5
	3. Acceptance of additional tasks	3
	1. Integrity	4
4. Professionalism	2. shows a mature personality	5
	3. Orientation	4

3. Determination of Ordinal Assessment Scale

Determination of the ordinal scale or preference weight number in the *profile matching method* is an assessment scale that becomes a guideline that will be used to assess the results of the permanent employee selection. Ordinal scale (preference weight number) , such as table 3:

Table 3 Ordinal Scale of Assessment

Mark	Information
1	Very less
2	Not enough
3	Enough
4	Good
5	Very good

4. Weighting Process

The weighting process is the difference between the profile of the prospective permanent employee who will be assessed with the profile expected by the voter

or the target value. The weighting value is can be seen in table 4 as follows:

Table 4. GAP Value Weighting Table

Gap	Weight of Value	Information
0	5	Competencies according to requirements
1	4.5	<i>Profile</i> competency excess 1 level
-1	4	Competency <i>profile</i> lacking 1 level
2	3.5	Competency <i>profile</i> excess 2 levels
-2	3	Competency <i>profile</i> lacking 2 levels
3	2.5	Competency <i>profile</i> advantages 3 levels
-3	2	Competency <i>profile</i> deficiencies 3 levels
4	1.5	Competency <i>profile</i> advantages 4 levels
-4	1	Competency <i>profile</i> deficiencies 4 levels

After determining the gap value weight for all aspects, it is divided into two parts, namely Core Factor (Main Factor) and Secondary Factor (Supporting Factor).

1. Work Attitude Aspects

a. Worker Name: Boy Indra

$$NCF = \frac{4+4}{2} = 4$$

$$NSF = \frac{5}{1} = 5$$

b. Worker Name: Bakhtiar

$$NCF = \frac{4+5}{2} = 4.5$$

$$NSF = \frac{5}{1} = 5$$

c. Worker Name: Mulfitri

$$NCF = \frac{4+5}{2} = 4.5$$

$$NSF = \frac{5}{1} = 5$$

d. Worker Name: Kaul

$$NCF = \frac{3.5+4}{2} = 3.75$$

$$NSF = \frac{4.5}{1} = 4.5$$

e. Worker Name: Ibe Zaro Mendrofa

$$NCF = \frac{2+4}{2} = 3$$

$$NSF = \frac{4.5}{1} = 4.5$$

f. Worker's Name: Dodi Masriandi

$$NCF = \frac{4+5}{2} = 4.5$$

$$NSF = \frac{4.5}{1} = 4.5$$

g. Worker Name: Syafri

$$NCF = \frac{5+5}{2} = 5$$

$$NSF = \frac{5}{1} = 5$$

h. Worker Name: Jafri

$$NCF = \frac{5+5}{2} = 5$$

$$NSF = \frac{4}{1} = 4$$

Table 5. Table of Values of Attitude Aspects of Work Criteria

N o	Worker Name	Subcriterion a			NCF	NSF
		1	2	3		
1	Boy Indra	4	4	5	4	5
2	Bakhtiar	4	5	5	4.5	5
3	Mulfitri	4	5	5	4.5	5
4	vows	3.5	4	4.5	3.75	4.5
5	Ibe Zaro Mendrofa	2	4	4.5	3	4.5
6	Dodi Masriandi	4	5	4.5	4.5	4.5
7	Syafri	5	5	5	5	5
8	Jafri	5	5	4	5	4

Table 6. Table of Values of Attitude Aspects of Personality Criteria
Criteria: Personality

N o	Worker Name	Subcriterion a			NCF	NSF
		1	2	3		
1	Boy Indra	4	3	4.5	3.5	4.5
2	Bakhtiar	4.5	4	4.5	4.25	4.5
3	Mulfitri	5	2	4	3.5	4
4	vows	3	3	4	3	4
5	Ibe Zaro Mendrofa	4.5	2	4	3.25	4
6	Dodi Masriandi	4	4	4.5	4	4.5

No	Worker Name	Criteria: Personality			NCF	NSF		
		Subcriterion a						
		1	2	3				
7	Syafri	4.5	3	4	3.75	4		
8	Jafri	3	4	4.5	3.5	4.5		

Table 7. Table of Values of Attitude Aspects of Responsibility Criteria

No	Worker Name	Criteria :			NCF	NSF		
		Responsibility						
		Subcriterion a						
		1	2	3				
1	Boy Indra	3	4	5	3.5	5		
2	Bakhtiar	4.5	4	5	4.25	5		
3	Mulfitri	4	4	5	4	5		
4	vows	3	2	3.5	2.25	3.5		
5	Ibe Zaro Mendrofa	5	4	4.5	4.5	4.5		
6	Dodi Masriandi	4.5	4	5	4.25	5		
7	Syafri	4.5	5	5	4.75	5		
8	Jafri	4	4	4	4	4		

Table 8. Table of Values of Attitude Aspects of Professional Criteria

No	Worker Name	Criteria :			NCF	NSF		
		Responsibility						
		Subcriterion a						
		1	2	3				
1	Boy Indra	4	4	4	4.	4		
2	Bakhtiar	5	4.5	4	4.75	4		
3	Mulfitri	5	3	4	4	4		
4	vows	3	2	5	2.5	5		
5	Ibe Zaro Mendrofa	4	5	5	4.5	5		
6	Dodi Masriandi	5	5	4	5	4		
7	Syafri	3	5	4	4	4		
8	Jafri	5	3	3	4	3		

From the calculation results of each aspect above, the total value is then calculated based on the percentage of

core and secondary factors that can be estimated to affect each profile . Calculated using equation 3 can be seen in Table 9.

Table 9. Table of Percentage Values of CF and SF

No	Alternative	N1	N2	N3	N4	N
		NT	NT	NT	NT	
1	Boy Indra	4.4	3 , 9	4.1	4	4.13
2	Bakhtiar	4.7	4,	4.55	4.45	4,535
3	Mulfitri	4.7	3 ,7	4.4	4	4.36
4	vows	4.05	3.4	2.75	3.5	3.42
5	Ibe Zaro drops	3.6	3,	4.5	4.7	4.08
6	Dodi Masriandi	4.5	4, 2	4.55	4.6	4,475
7	Syafri	5	3.85	4.85	4	4,525
8	Jafri	4.6	4.6	4	3.6	4.19

The final result of the profile matching process is the ranking of the candidates submitted to refer to certain calculation results. The calculation of the ranking value for each alternative with the provisions of the company is 30% for the work attitude aspect, 20% for personality, 30% for responsibility, 20% for professionalism. Then the value of each aspect is added up and the results can be seen in Table 10, the following is the calculation using equation 4.

a. Worker Name: Boy Indra

$$N= 0.3(4.4) + 0.2(3.9) + 0.3(4.1) + 0.2(4) = 4.13$$

b. Worker Name: Bakhtiar

$$N=0.3(4.7) + 0.2(4.35) + 0.3(4.55) + 0.2(4.45) = 4.535$$

c. Worker Name: Mulfitri

$$N=0.3(4.7) + 0.2 (3.7) + 0.3 (4.4) + 0.2(4) = 4.36$$

d. Worker Name: Kaul

$$N=0.3(4.05) + 0.2(3.4) + 0.3(2.75) + 0.2(3.5) = 3.42$$

e. Worker Name: Ibe Zaro Mendrofa

$$N=0.3(3.6) + 0.2(3.55) + 0.3(4.5) + 0.2(4.7) = 4.08$$

f. Worker's Name: Dodi Masriandi

$$N=0.3(4.5) + 0.2(4.2) + 0.3(4.55) + 0.2(4.6) = 4.475$$

g. Worker Name: Syafri

$$N=0.3(5) + 0.2(3.85) + 0.3(4.85) + 0.2(4) = 4.525$$

h. Worker Name: Jafri

$$N=0.3(4.6) + 0.2(4.5) + 0.3(4) + 0.2(3.6) = 4.19$$

Table 10 . Ranking Table

No	Alternative	N	Rank	Decision
1	Boy Indra	4.13		
2	Bakhtiar	4,535	1	Recommended
3	Mulfitri	4.36		
4	vows	3.42		
5	Ibe Zaro drops	4.08		
6	Dodi Masriandi	4,475		
7	Syafri	4,525	2	Recommended
8	Jafri	4.19		

So the qualifying ranking value is in the alternative with the name of the worker, namely Bakhtiar, with a score of 4.535 . The final result of the ranking is obtained from the process of determining the gap value weight, Calculation of *core factors* and *secondary factors* for each aspect of the criteria , calculation of the total value. This process is carried out because it is in accordance with the calculation of the weight and request from the leader. This helps the KOPERBAM leadership in determining permanent employees who meet the requirements. The calculation of the weight of the criteria aspects has been determined based on the needs monitored from the performance of the workers, previously leader has observed from all aspects of the assessment which have been truly calculated transparently.

4. Conclusion

Based on the results of observations and analysis of the system design that has been carried out at the Teluk Bayur Port Unloading Cooperative (KOPERBAM), several conclusions can be drawn that the Design of Decision Support Systems using the profile matching method at KOPERBAM Teluk Bayur Port has helped in determining the selection of casual laborers to become permanent employees. The application of the *Profile Matching method* to the Decision Support System at KOPERBAM Teluk Bayur has helped in the selection of permanent employees according to targets based on assessments and the preparation of reports can

be done easily and the selection of permanent employees can be done in a fairly fast time.

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