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Decision Support System for Recruitment of Employees in CV. Fajar Jaya Using TOPSIS Method

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Abstract

Employees are one of the main needs of the company because if there are no employees, there will be no productivity in the company. Recruitment is a human resource management planning decision regarding the number of employees needed, when they are needed, and what criteria are needed. CV Fajar Jaya has a problem in making employee recruitment decisions. Decision making is very important for individuals and organizations. The difficulty of recruiting qualified employees is the main problem in this study, with the above problems, it is necessary to design a decision support system that is expected to help CV. Fajar Jaya, in making decisions to obtain information to determine prospective employees using the TOPSIS method, which is expected to use the topsis calculation method, the final results of the selection process for new employee candidates are more effective, selective, efficient and accurate at CV. Fajar Jaya.
Keywords: Recrutment, TOPSIS, Passion

Abstrak

Karyawan merupakan salah satu kebutuhan utama perusahaan karena jika tidak ada karyawan, maka tidak akan ada produktivitas dalam perusahaan. Rekrutmen merupakan keputusan perencanaan manajemen sumber daya manusia mengenai jumlah karyawan yang dibutuhkan, kapan dibutuhkan, dan kriteria apa saja yang dibutuhkan. CV. Fajar Jaya memiliki masalah dalam pengambilan keputusan rekrutmen karyawan. Pengambilan keputusan merupakan hal yang sangat penting bagi individu maupun organisasi. Sulitnya merekrut karyawan yang berkualitas menjadi permasalahan utama dalam penelitian ini, dengan adanya permasalahan di atas, maka perlu dirancang sebuah sistem pendukung keputusan yang diharapkan dapat membantu CV. Fajar Jaya, dalam mengambil keputusan untuk mendapatkan informasi untuk menentukan calon karyawan dengan menggunakan metode TOPSIS, yang diharapkan dengan menggunakan metode perhitungan topsis, hasil akhir dari proses seleksi penerimaan calon karyawan baru lebih efektif, selektif, efisien dan akurat pada CV. Fajar Jaya.
***Kata-kata kunci**: Rekrutmen, TOPSIS, Keinginan*

1. Introduction

Recruitment is the process of finding employees to work in a company, and the company tentuntarily carries it out to identify and attract prospective employees to be hired by the company. Then, the company will recruit prospective employees who can meet the company's requirements [1]. The recruitment process is certainly in the hands of company management that uses HR (human resources) as a determining factor for prospective company employees; employee recruitment consists of several steps, such as the labor acquisition process, labor screening process, and labor placement process.

CV. Fajar Jaya is a textile company that has successfully merged professionalism with a dash of determination, hard effort, and love. One of Indonesia's most important and ancient businesses is the textile sector. The enormous population of Indonesia contributes to the expansion and development of this business in addition to the rising need for a variety of modes. The textile industry in Indonesia can grow in both the upstream and downstream domains. From sourcing raw materials to completing touches and building an incredibly effective supply chain

The decision-making process is a reasonable effort to achieve the goals that have been set at the beginning of the plan. The process begins and ends by considering the decisions to be made and requires creativity, decision-making skills, and experience. Decision-making includes several steps, such as identifying the problem, analyzing the existing situation, developing alternatives, analyzing alternatives, choosing the best alternative, etc. So from these steps, the decision-making process confirms the decision is the process of choosing alternative solutions to solve the best problem; this process is certainly quite time-consuming if done logically but can reduce errors. The ease of decision-making depends on the number of alternatives available; the more native alternations are available, the more difficult it is for us to make a decision [2] The primary issue identified in this study is the challenge of recruiting qualified personnel. Where the employee recruitment process is on a CV. Fajar Jaya still uses the old way, where applicants will come to the company to register and submit documents to be seen by the company. After that, all applicant data is stored in the form of files and written documents; this causes the recruitment carried out to take approximately up to two weeks; in addition, the occurrence of errors in processing files cannot be denied when collecting files can be lost when going to manual selection. This recruitment is one of the important processes in determining whether or not prospective employee participants will apply to be employees on a CV. Fajar Jaya.

In previous research from testing [3] recruitment process is one of the routine activities carried out by a company to meet one of its targets and achievements. However, this is sometimes different from expectations, so companies need help to place employees as needed. Research [4] shows that companies need employees with qualities that match the required criteria. However, in practice, many businesses continue to need help with the hiring process. [5] a system that is able to solve problems efficiently and effectively, which aims to help decision-making by choosing various decision alternatives. Research [6] There are still many companies that need help in the employee recipient process. This is due to many factors, such as the number of assessment criteria that become a benchmark in the employee recruitment process. One way to solve this problem is to create a decision assistant system that applies one of the MCDM and research methods [7]. To select qualified employees, a decision support system (SPK) is needed to help companies find the best employees [8].

The process of selecting new hire prospects is ultimately more efficient, accurate, selective, and effective when the TOPSIS calculation approach is used. Fajar Jaya will choose candidates for new hires according to the standards, criteria, and options that the business has decided upon. Therefore, the author is interested in making it a research topic with the title "Decision Support System for Employee Recruitment in CV. Fajar Jaya Using Topsis Method (case study: CV. Fajar Jaya)"

2. Method

Concept for research **[4]** The framework is made up of several sections that outline how the TOPSIS method research process works in a decision support system to identify CV Fajar Jaya's top workers. A framework chart is shown here. **Figure 1** will provide the following description of the study concept's flow.

Figure 1. Draft Study

1. Data collection

   The process of gathering the information or data required for the study is known as data collecting. Interviews, documentation, and literature reviews are the methods utilized to gather data.

2. Identification of problems

   Problem identification begins with knowing the needs of the research object and knowing the problems that this research can solve. At this stage, it begins by discussing previous research related to the method that will be used.

3. Application Development

   a. Application Development Using the *Prototype* Method

   The application of the prototype method is a software development method that models the work system of software that still needs to be completed by the *user*. Making *prototyping* for system developers aims to collect information from users so that users can interact with the *prototype* model developed because prototypes describe the initial version of the system for the continuation of the real system. Waterfall method is presented on **Figure 2.**

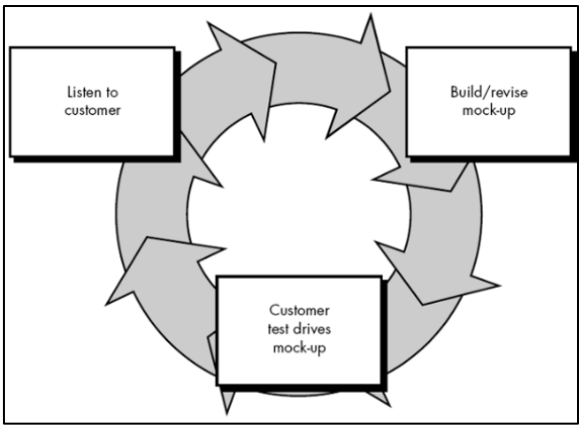

Figure 2. Waterfall Method [9]

   b. TOPSIS method

   One of the multi-criteria decision support techniques is TOPSIS (Technique for Order Preference by Similarity to Ideal Solution). Stages of the TOPSIS method:

   1) Create a normalized pairwise comparison matrix [10].

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

   With i=1,2,….m; and j=1,2,….n;

Where :

r_{ij}= Element Matrix normalized [i][j]

X_{ij}= Element matrix X's decision

2) Produce a decision matrix that is weight normalized.

$y_{ij} = w$ ere (2)

w_j= weight criteria to -j

r_{ij}= elements of the normalized decision matrix

3) Find the ideal solution matrix that is positive (A^+) Find the ideal solution matrix that is positive(A^-)

$$y_j^+ = \begin{cases} \max y_{ij} \ jika\ j\ adalah\ atribut\ keuntungan\ (benefit) \\ \min y_{ij} \ jika\ j\ adalah\ atribut\ biaya\ (cost) \end{cases} \quad (3)$$

$$y_j^- = \begin{cases} \min y_{ij} \ jika\ j\ adalah\ atribut\ keuntungan\ (benefit) \\ \max y_{ij} \ jika\ j\ adalah\ atribut\ biaya\ (cost) \end{cases} \quad (4)$$

$$A^+ = (y_1^+ + y_2^+ + y_3^+, \ldots., + y_n^+ \quad (5)$$

$$A^- = (y_1^- + y_2^- + y_3^-, \ldots., + y_n^- \quad (6)$$

4) Using both a positive and a negative ideal solution matrix, find the distance between each alternative's values.

$$D_i^+ = \sqrt{\sum_{i-1}^{n}(y_i^+ - y_{ij})^2} \quad (7)$$

$$D_i^- = \sqrt{\sum_{i-1}^{n}(y_{ij} - y_i^-)^2} \quad (8)$$

5) Ascertain the value of preference for every option.

$$V_i = \frac{D_i^-}{D_i^- + D_i^+} \quad (9)$$

3. Results and Discussion

In the creation of an analysis system set to have a very important role in making a system, software analysis is a step to understand a problem before taking action or decision. The design stage of this system is to change the details of the system from the results to the design form so that users can easily understand it. Performing analysis is an effort to understand a system, identify alternative solutions, and decide solutions that have problems. Several things must be considered in determining the needs of a system to be developed.

3.1 Prototyping

The stage of listening to customer needs is the stage of learning how to determine a criterion. The process that is appropriate to the needs of the company will be known by conducting interviews and collecting data.

System requirements analysis are some employee recruitment criteria that the HRD has determined on the website of the decision support system made, namely Education, Experience, Age, Ability, Marital Status, Address, Appearance, and Test. Each criterion has a different assessment weight; the attribute used in this website uses the MAX attribute because the priority of the value on the criterion is the largest value. Weight of employee recruitment criteria is presented on **Table 1**.

Table 1. Weight of Employee Recruitment Criteria.

Kode Kriteria	Kriteria	Bobot
C1	Pendidikan	5
C2	Pengalaman	5
C3	Usia	1
C4	Kemampuan	5
C5	Status Perkawinan	5
C6	Alamat	2
C7	Penampilan	5
C8	Tes	5

Use of the website who process this website system, only one, namely admin CV. Fajar Jaya Purwokerto. This system can enter the required data, such as the value of the criteria, each of which has its value, such as education, experience, age, ability, marital status, address, appearance, and tests. After the required data has been entered, the ranking will then display the results of the SPK calculation that had previously been inputted values in the matrix value. The creation of a decision support system for hiring at CV. Fajar Jaya utilizes the Technique for Order Preference, similar to the Ideal Solution (TOPSIS) approach, which comes next once the system analysis is finished.

3.2 System Architecture Design

Using the Technique for Order Preference similar to the Ideal Solution (TOPSIS) method, the Decision Support System for personnel recruitment at CV. Fajar Jaya is briefly explained in **Figure 3.**

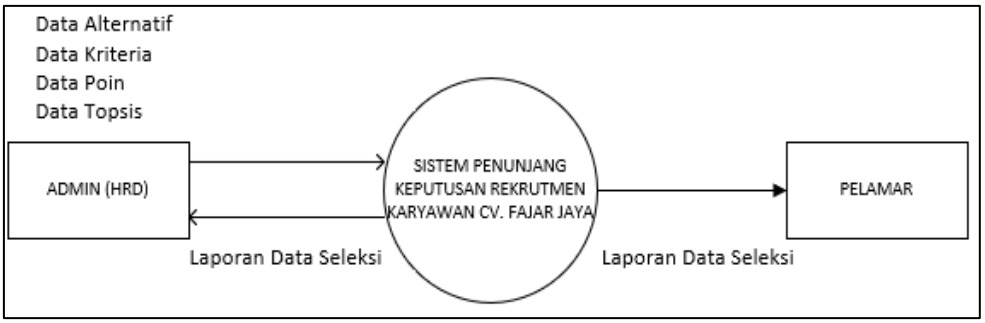

Figure 3. Context Diagram

The Employee Recruitment Decision Support System Using the Technique for Order Preference similar to the Ideal Solution (TOPSIS) technique is briefly explained in Figure 3.

a. In the admin entity, Cv. Fajar Jaya shows that the admin entered the login data. If correct, then the login confirmation is successful

b. The applicant data, criteria data, and prospective employee data are displayed in the admin entity Cv. Fajar Jaya. These data are entered using the Technique for Order Preference, which is similar to the Ideal Solution (TOPSIS) technique, which will subsequently provide result data.

c. Selection result data will be produced by the calculation procedure utilizing the technique for order preference, which is similar to the ideal solution (TOPSIS) approach.

d. the admin entity indicates that the admin received the results of the employee recruitment selection in accordance with the specified criteria.

DFD level 1 is presented on **Figure 4.**

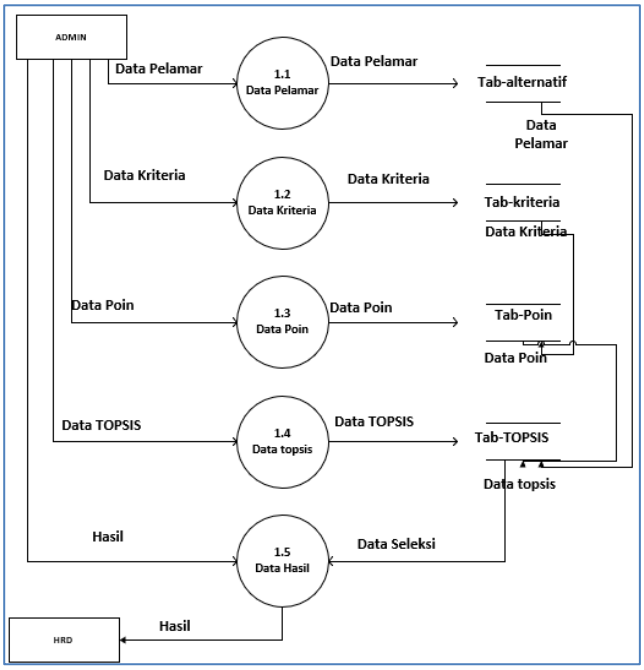

Figure 4. DFD Level 1

Figure 4 is solution (TOPSIS) method can be briefly explained as follows:

a. On the admin entity, Cv. Fajar Jaya shows that the admin enters login data. If it is correct, then the login confirmation is successful.

b. The applicant data, criteria data, and prospective employee data are displayed in the admin entity Cv. Fajar Jaya. These data are entered using the Technique for Order Preference, which is similar to the Ideal Solution (TOPSIS) technique, which will subsequently provide result data.

c. Selection data will be produced by the computation procedure utilizing the technique for order preference, which is similar to the ideal solution (TOPSIS) approach.

d. The admin entity indicates that the admin received the results of the employee recruitment selection that matches the specified criteria.

3.3 System Implementation

a. Table Design

In building the system, first, of course, we create a table in the database to do coding and continue to build the system implementation. **Table 2** is presented alternative table, **Table 3** is presented criteria table, **Table 4** is presented points table, and **Table 5** is presented TOPSIS table.

Table 2. Alternative Table

#	Name	Type	Collation	Attributes	Null	Default
1	id_alternatif	int(11)			No	None
2	nik	varchar(25)	latin1_swedish_ci		No	None
3	nama_alternatif	varchar(50)	latin1_swedish_ci		No	None
4	bagian	varchar(50)	latin1_swedish_ci		No	None

Table 3. Criteria Table

#	Name	Type	Collation	Attributes	Null	Default
1	id_kriteria	int(10)			No	None
2	nama_kriteria	varchar(50)	latin1_swedish_ci		No	None
3	keterangan	text	latin1_swedish_ci		No	
4	bobot	float			No	None

Table 4. Points Table

#	Name	Type	Collation	Attributes	Null	Default
1	id_poin	int(10)			No	None
2	poin	varchar(10)	latin1_swedish_ci		No	None
3	sub	varchar(25)	latin1_swedish_ci		Yes	NULL

Table 5. TOPSIS Table

#	Name	Type	Collation	Attributes	Null	Default
1	id_alternatif	int(10)			No	None
2	id_kriteria	varchar(10)	utf8mb4_general_ci		No	None
3	nilai	float			No	None
4	Id	int(11)			No	None
5	tanggal	date			Yes	NULL

3.4 Topsis Application Results

The alternative menu is used to add names, Nik, and sections for prospective employees on a CV. Fajar Jaya will later have the results on the alternative table menu.

a. Alternative Menu

An alternative menu is used to display the name of the prospective employee on a CV. Fajar Jaya, which has previously been inputted on the add alternative form is presented on **Figure 5.**

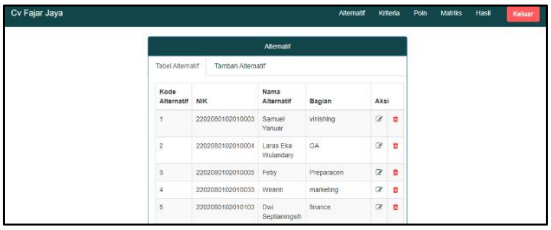

Figure 5. Alternative Menu

b. Menu Point

Point table menu to display points previously added by admin in the add points table; the points themselves have value descriptions such as 1 = Very Low, 2 = Low, 3 = Enough, 4 = High, and 5 = Very High. Points tbale menu is presented on **Figure 6**.

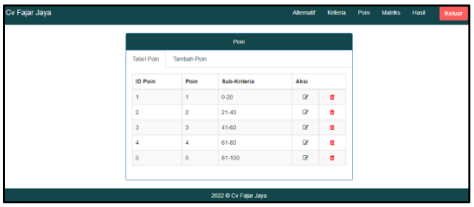

Figure 6. Points Table Menu

c. Matrix Grading Menu

The matrix grading display menu is used to process calculations using the TOPSIS method. This menu also has an alternative name to be calculated by prospective employees on Cv. Fajar Jaya is given a value according to the ability of prospective employees. Here are some criteria: education, experience, age, ability, marital status, address, appearance, and test Grading display menu is presented on **Figure 7**.

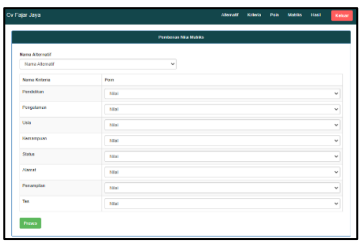

Figure 7. Matrix Grading Display Menu

3.5 Results Menu

The calculation result menu form using the Topsis method is used to show the results of the calculation system and ranking that have been carried out during the calculation process on the website. The selection form has several tables, including Ranking, Value, Normalized Performance Rating (r_{ij}), Normalized Weight Rating, Positive Perfect Resolution (A+), Ideal Negative Solution (A-), Positive Distance (D_i^+), Negative Distance (D_i^-). **Figure 8** is presented result menu.

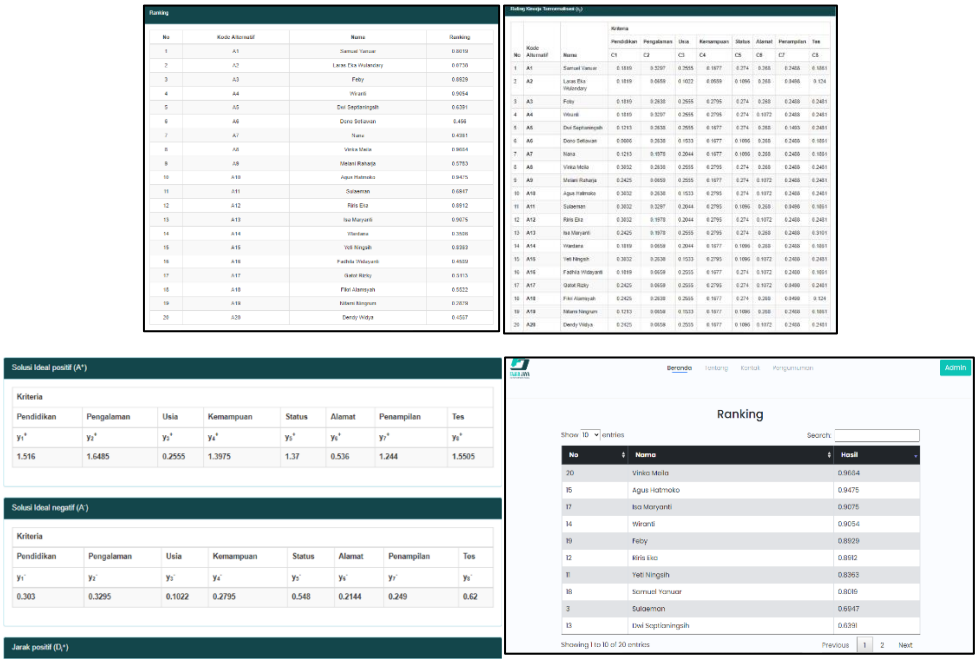

Figure 8. Result Menu

4. Conclusion

The following conclusions can be made in light of the preceding discussion and explanation: A website for Cv. Fajar Jaya's Decision Support System for Employee Recruitment has been developed. Employers can expedite and streamline the staff recruitment and selection process by utilizing the TOPSIS Method, which can serve as a channel of information

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