# Implementation of Profile Matching and TOPSIS in Decision Support System for New Employee Recruitment at DBC Manufacturing Group in Indonesia

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***Abstract***- The development of information technology nowadays has been able to help people in making decisions. This is possible because of the increasingly rapid development of computer technology, both in terms of hardware and software. DBC (Djabesmen Co.) is a group of companies in Indonesia engaged in the building material business with 8 business units, requires manpower as executors in carrying out its operational activities. Each business unit in DBC group has its own criteria, but still refers to the existing recruitment standard procedures. Assessment to determine employee acceptance is still carried out conventionally, takes a long time, and is prone to errors, especially if there are many applicants. In addition, the process and results of the assessment are still regulated by the Human Resource (HR) division, allowing subjectivity and manipulation to the results of new employee selection. Therefore, it is necessary to have a decision support system (DSS) that can help HR division in selecting employees according to company criteria. The methodology used to develop the system starts from data collection, system analysis, system design, system development, and implementation. The algorithm used in this research are Profile Matching to compare the ability of prospective employees with the criteria for the position they are applying for so that the difference can be seen and TOPSIS for ranking candidates who meet the criteria. The result of this research is a web-based system that can help company in selecting prospective employees.

***Index Terms***- DSS, Recruitment, Profile Matching, TOPSIS, Web

## I. INTRODUCTION

Human resources (HR) are important company assets because they are the driving force in running the company. The quality of the company is determined by the human resources in it, because a good business strategy needs to be carried out by people who are capable of moving quickly and precisely and has innovative ideas. Getting qualified human resources according to company needs requires a long process, starting from determining the right criteria to procuring a series of tests as a reference in making decisions in the selection process for prospective employees.

DBC is a company group in Indonesia engaged in the building materials business with 8 business units consisting of PT Wahana Duta Jaya Rucika, PT Djabesmen, PT Granitoguna Building Ceramics, PT Superex Raya, PT Wahana Tunas Utama Rucika, PT Djabes Tunas Utama, PT Djabesdepo Fortuna Raya, PT Djabesdepo Fortuna Medan. The trademarks of this group that are well known in the market include Rucika, Royal Board, Djabesmen, Granito, Superex, and others. In DBC group, each business unit has its own criteria but still carries out the recruitment standard procedures. Assessment to determine employee acceptance is still carried out conventionally, takes a long time, and also is prone to errors especially if there are many applicants. In addition, the process and results of the assessment are still regulated by the Human Resources (HR) division, allowing subjectivity and manipulation to the results of new employee selection.

In order to avoid the subjectivity of the decision making for new employee candidates, it is necessary to have a decision support system (DSS) that can assist HR personnel in selecting employees according to company criteria and minimizing errors in making decisions related to hiring new employees. One of the algorithms in DSS that can be used to select prospective employees is Profile Matching. The algorithm is very suitable to be used in the process of comparing individual competencies with the criteria of a position so that differences can be seen (or called gap). In addition, one of the algorithms that can be used to rank prospective employees applying for certain positions is TOPSIS (Technique for Orders Preference by Similarity to Ideal Solution). This algorithm is computationally efficient and the concept is simple and easy to understand.

In this research, the author will design and build a decision support system for new employee recruitment in DBC group with Profile Matching algorithm which can be used to compare the ability of prospective employees with the criteria for the position they are applying for and TOPSIS algorithm for ranking candidates who meet the criteria. With the combination of the two algorithms, it is hoped that the assessment of prospective new employees will be more precise because it is based on the criteria determined by the company.

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## II. LITERATURE REVIEW

### *A. Recruitment Process in DBC Group*

According to Irham Fahmi (2016: 28), recruitment is often referred to as labor recruitment, which is the process of searching for prospective employees who meet the requirements in the number and type required.

In DBC group, recruitment aims to find prospective employees according to the specifications needed to fill certain positions in order to fulfill the Man Power Plan (MPP). This activity consists of searching, selecting, and placing employees. The flow of the recruitment process at the DBC group of companies is shown in Figure 1.

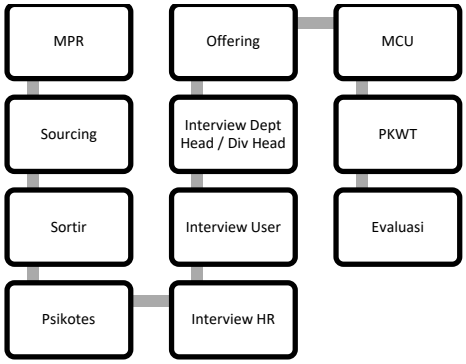


*Figure 1. Flow Process of Recruitment in DBC Group*

The process begins with the MPR (Man Power Request) and then HR division will do sourcing and sorting based on the job specifications provided. Furthermore, a psychological test was carried out for consideration and further analysis when HR conducted the interview. Interviews are conducted in stages starting with HR interview, user interview, and department head or division head interview. The offering process is carried out after the candidate has successfully passed the interviews. If there is an agreement between the candidate and the company, then candidate will do a medical test or MCU (Medical Check Up). If the medical test results are recommended, the candidate will undergo a PKWT (Fixed Term Work Agreement) period of at least 6 months. After serving a job during the PKWT period, candidates will be evaluated to determine the appointment of new employees.

### *B. Decision Support Systems (DSS)*

Decision support systems (DSS) refer to computer-based systems that aim to help decision makers by utilizing certain data and models to solve an unstructured problem. The decision support system was introduced by G. Anthony Gorry and Michael S. Scott Morton, professors from MIT, in an article entitled "A Framework for Management Information System". They developed a framework of thinking about the use of computer applications in the decision-making process for the management level. Based on this framework, it can be defined that this decision support system is closely related to an information system or analysis model designed to help decision makers and professionals obtain accurate information.

### *C. Profile Matching Algorithm*

Profile matching in several writings is known as the gap analysis approach. In the process of matching profiles, the process of comparing individual competencies to job competencies so that they can identify the differences (gap). The smaller the gap, the greater the weight of the value, which means that the candidate has a greater chance of occupying the position (Handojo, A. and Setiabudi, D., 2010).

The steps in the profile matching algorithm are as follows:

1) Gap calculation. Gap is the difference between the value of each aspect/criterion and the target value.
$$Gap = Criteria\ Value - Target\ Value \quad (1)$$
2) After obtaining the gap from each profile, the weighted value is calculated by referring to the gap value weight table.
3) Calculation and grouping of core factor and secondary factor. Core factor (main factor) is the competency aspect most needed by a position which is estimated to produce optimal performance, while secondary factor (supporting factor) is another aspect besides the core factor. The core factor calculation can be formulated as follows:
$$NCI = \frac{\sum NC}{\sum IC} \quad (2)$$
Information:
$NCI$ = Core factor average value
$NC$ = The total number of core factor values
$IC$ = Number of core factor items
Meanwhile, the calculation of secondary factor can use the following formula:
$$NSI = \frac{\sum NS}{\sum IS} \quad (3)$$
Information:
$NSI$ = Secondary factor average value
$NS$ = The total number of secondary factor values
$IS$ = Number of secondary factor items
4) Calculation of the total value of each aspect. From the calculation of each aspect above, the total value is calculated based on the percentage of the core factor and the secondary factor which is estimated to affect the performance of each profile.
$$NI = x\,NCI + y\,NSI \quad (4)$$
Information:
$NI$ = Total value of each aspect
$NCI$ = Core factor average value
$NSI$ = Secondary factor average value
$x$ = percentage of core factor criteria value
$y$ = percentage of secondary factor criteria value
5) Rank calculation. The final result of the profile matching process is the ranking of candidates submitted to fill a certain position. Ranking refers to the results of certain calculations.

### *D. TOPSIS Algorithm*

TOPSIS (Technique for Orders Preference by Similarity to Ideal Solution) algorithm is based on the concept that the alternative was selected the best not only have the shortest distance from the ideal positive solution but also have the longest distance from the ideal negative solution.

The TOPSIS algorithm steps are as follows:

1) Determine the normalization of the matrix. Normalized value $r_{ij}$:

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$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (5)$$

Information:
$i = 1, 2, \ldots, m$
$j = 1, 2, \ldots, n$

2) Determine the normalized weight of the decision matrix. The normalized weight values are as follows:

$$y_{ij} = w_{ij} \times r_{ij} \quad (6)$$

Information:
$i = 1, 2, \ldots, m$
$j = 1, 2, \ldots, n$

$$A^+ = (y_1^+, y_2^+, \ldots, y_n^+) \quad (7)$$

$$A^- = (y_1^-, y_2^-, \ldots, y_n^-) \quad (8)$$

Information:

$$y_j^+ = \begin{cases} \max y_{ij} & ; if\ j\ is\ advantage\ attribute \\ \min y_{ij} & ; if\ j\ is\ cost\ attribute \end{cases}$$

$$y_j^- = \begin{cases} \min y_{ij} & ; if\ j\ is\ advantage\ attribute \\ \max y_{ij} & ; if\ j\ is\ cost\ attribute \end{cases}$$

$j = 1, 2, \ldots, n$

3) The distance between $A_i$ alternative and the positive ideal solution is formulated as:

$$D_i^+ = \sqrt{\sum_{j=1}^{n} \left(y_i^+ - y_{ij}\right)^2} \quad (9)$$

Information:
$i = 1, 2, \ldots, m$
$j = 1, 2, \ldots, n$

4) The distance between $A_i$ alternative and the negative ideal solution is formulated as:

$$D_i^- = \sqrt{\sum_{j=1}^{n} \left(y_{ij} - y_i^-\right)^2} \quad (10)$$

Information:
$i = 1, 2, \ldots, m$
$j = 1, 2, \ldots, n$

5) The preference value for each alternative ($V_i$) is given as:

$$V_i = \frac{D_i^-}{D_i^- + D_i^+} \quad (11)$$

Information:
$i = 1, 2, \ldots, m$

A larger $V_i$ value indicates that the alternative $A_i$ is preferred.

## III. RESEARCH METHOD AND DISCUSSION

The research method in establishing a decision support system for recruitment of new employee at DBC group can be seen in Figure 2.

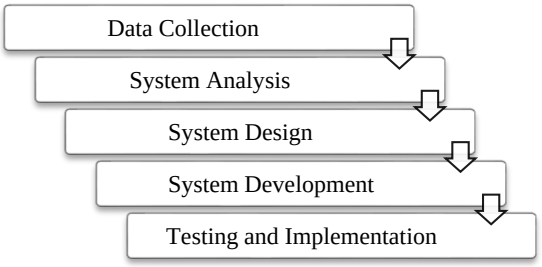


*Figure 2. Stages of Research*

### *A. Data Collection*

The data used in this research is from interviews and observations with the Human Resource (HR) division of the DBC group. Data obtained in the form of the flow process of new employee selection, criteria for the assessment of the psychological test, and weights used in used in determining the decision to accept prospective employees.

At the psychological test stage, the criteria used to determine the results are cognitive aspects and work attitude aspects of prospective employees. The cognitive aspect is an individual's ability in various areas of intelligence or reasoning, which can help determine his potential in the field of education and work. Cognitive aspects used for the assessment of prospective employees in DBC group include inductive reasoning (IDR), deductive reasoning (DDR), spatial abilities (SPS), arithmetic abilities (MAT), and memory (MMR). The work attitude aspect is the individual's ability to perform a variety of more specific tasks. Aspects of the work attitude used for the assessment of prospective employees in DBC group are precision (PES), persistence (PSR), and durability (CON). From the results of a psychological test, then the score will be interpreted in accordance with the table of norms for each subtest are shown in Table 1.

*Table 1.Table of Norms for Each Subtest*

| Category | Standard Scores | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|---|
| Good (3) | 20 | | 23 - 25 | 27 - 30 | | | | 124 - 238 | 1653 - 1960 |
| | 19 | 35 | 21 - 22 | 26 | | | | 117 - 123 | 1563 - 1652 |
| | 18 | 33 - 34 | 20 | 24 - 25 | 25 | | | 111 - 116 | 1473 - 1562 |
| | 17 | 30 - 32 | 18 - 19 | 23 | 23 - 24 | 25 | | 104 - 110 | 1383 - 1472 |
| | 16 | 28 - 29 | 17 | 21 - 22 | 21 - 22 | 24 | | 98 - 103 | 1293 - 1382 |
| | 15 | 26 - 27 | 15 - 16 | 19 -20 | 19 - 20 | 22 - 23 | 87 - 90 | 91 - 97 | 1203 - 1292 |
| | 14 | 24 - 25 | 14 | 18 | 17 - 18 | 21 | 81 - 86 | 84 - 90 | 1113 - 1202 |
| | 13 | 22 - 23 | 12 - 13 | 16 - 17 | 16 | 20 | 75 - 80 | 78 - 83 | 1023 - 1112 |
| Fair | 12 | 20 -21 | 11 | 14 - 15 | 14 - 15 | 18 - 19 | 69 - 74 | 71 - 77 | 933 - 1022 |

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| Category | Standard Scores | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|---|
| (2) | 11 | 18 - 19 | 10 | 13 | 12 - 13 | 17 | 63 - 68 | 65 - 70 | 843 - 932 |
| | 10 | 15 - 17 | 8 - 9 | 11 - 12 | 10 - 11 | 15 - 16 | 57 - 62 | 58 - 64 | 753 - 842 |
| | 9 | 13 - 14 | 7 | 9 - 10 | 8 - 9 | 14 | 51 - 56 | 51 - 57 | 663 - 752 |
| Poor (1) | 8 | 11 - 12 | 5 - 6 | 8 | 6 - 7 | 12 - 13 | 44 - 50 | 45 - 50 | 573 - 662 |
| | 7 | 9 - 10 | 4 | 6 - 7 | 4 - 5 | 11 | 38 - 43 | 38 - 44 | 483 - 572 |
| | 6 | 7 - 8 | 2 - 3 | 4 - 5 | 2 - 3 | 10 | 32 -37 | 32 - 37 | 393 - 482 |
| | 5 | 5 - 6 | 0 - 1 | 3 | 0 - 1 | 8 - 9 | 26 - 31 | 25 - 31 | 303 - 392 |
| | 4 | 3 - 4 | | 0 - 2 | | 7 | 20 - 25 | 18 - 24 | 213 - 302 |
| | 3 | 0 - 2 | | | | 5 - 6 | 14 - 19 | 12 - 17 | 123 - 212 |
| | 2 | | | | | 3 - 4 | 8 - 13 | 5 - 11 | 33 - 122 |
| | 1 | | | | | 0 - 2 | 0 - 7 | 0 - 4 | 0 - 32 |

*B. System Analysis*

The decision support system that will be created implements profile matching and TOPSIS algorithm. Aspects of the criteria being assessed are:

1. Cognitive Aspects

The test that measures cognitive aspects consists of 5 subtests, namely: IDR, DDR, SPS, MAT, and MMR.

2. Work Attitude Aspects

The test that measures aspects of the work attitude consists of three subtests, namely: PES, PSR, and CON.

The results of the assessment in DSS for recruitment of new employees at DBC group are shown in Table 2.

*Table 2. Range of Assessment Results*

| Category | Result |
|---|---|
| Recommended | >= 5 |
| Be Considered | 4,50 - 4,99 |
| Not Recommended | < 4,50 |

For example, it takes an employee to fill a Business Analyst position. The minimum position criteria are described in Table 3 with a comparison of the value of the core factor (CF) and secondary factor (SF) is 60:40.

*Table 3. Minimum Criteria for Business Analyst Section Head*

| Category | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|
| **Good (3)** | | | | | | ✓ CF | ✓ CF | |
| **Fair (2)** | ✓ CF | ✓ CF | ✓ SF | ✓ SF | ✓ CF | | | ✓ CF |
| **Poor (1)** | | | | | | | | |

There were several candidates who applied for the position with the results of the psychological score shown in Table 4.

*Table 4. Examples of Candidates Results*

| Candidate | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|
| A | 21 | 24 | 17 | 22 | 8 | 69 | 106 | 667 |
| B | 23 | 16 | 22 | 14 | 19 | 55 | 55 | 695 |
| C | 27 | 11 | 15 | 17 | 22 | 66 | 112 | 712 |
| D | 15 | 5 | 15 | 18 | 20 | 85 | 55 | 974 |
| E | 23 | 9 | 15 | 19 | 19 | 71 | 63 | 694 |

Based on the table of norms for each subtest in Table 1, the candidate test results are described in Table 5.

*Table 5. The Results of Candidates' Psychological Test Interpretations*

| Candidate | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|
| A | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 2 |
| B | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| C | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 |
| D | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 3 |
| E | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 |

From the data above, the value of the gap or the difference in the results of the candidates' psychological tests is calculated with the minimum requirement criteria for the position they are applying for, in this case the position of the Business Analyst Section Head in Table 6.

*Table 6. Gap Calculation Results*

| Candidate | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|
| A | 0 | 1 | 1 | 1 | -1 | 1 | 0 | 0 |
| B | 1 | 1 | 1 | 0 | 0 | -1 | -1 | 0 |
| C | 1 | 0 | 0 | 1 | 1 | -1 | 0 | 0 |
| D | 0 | 0 | 0 | 1 | 1 | 0 | -1 | 1 |
| E | 1 | 0 | 0 | 1 | 0 | -1 | -1 | 0 |

After obtaining a gap in each subtest, each subtest is given a weighted value based on the weight of the gap value as shown in Table 7.

*Table 7. Weight of Gap Value in DSS of DBC Group*

| Gap | Weighted Value | Description |
|---|---|---|
| 0 | 5 | There is no difference (competency as required) |

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| Gap | Weighted Value | Description |
|---|---|---|
| 1 | 5,5 | The competence of individual exceeds one level |
| -1 | 4 | The competence of individual lacks one level |
| 2 | 6,5 | The competence of individual exceeds two level |
| -2 | 3 | The competence of individual lacks two level |
| 3 | 7,5 | The competence of individual exceeds three level |
| -3 | 2 | The competence of individual lacks three level |
| 4 | 8,5 | The competence of individual exceeds four level |
| -4 | 1 | The competence of individual lacks four level |

Thus, these candidates have weight values as shown in Table 8.

*Table 8. Weights of Several Candidates*

| Candidate | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|
| A | 5 | 5,5 | 5,5 | 5,5 | 4 | 4 | 5 | 5 |
| B | 5,5 | 5,5 | 5,5 | 5 | 5 | 4 | 4 | 5 |
| C | 5,5 | 5 | 5 | 5,5 | 5,5 | 4 | 5 | 5 |
| D | 5 | 4 | 5 | 5,5 | 5,5 | 5 | 4 | 5,5 |
| E | 5,5 | 5 | 5 | 5,5 | 5 | 4 | 4 | 5 |

Then the value of candidate A can be calculated:

NCI = (IDR + DDR + MMR + PES + PSR + CON) / 6
= (5 + 5,5 + 4 + 4 + 5 + 5) / 6
= 4,75

NSI = (SPS + MAT) / 2
= (5,5 + 5,5) / 2
= 5,5

With a comparison of the core factor (CF) and secondary factor (SF) values of 60:40, then:

N = (60% x NCI) + (40% x NSI)
= (60% x 4.75) + (40% x 5.5)
= 5.05

By looking at the range of results in Table 2, it can be concluded that candidate A is "Recommended". Table 9 is the result of the complete calculation of several candidates.

*Table 9. Profile Matching Results*

| Candidate | NCI | NSI | N | Result |
|---|---|---|---|---|
| A | 4,75 | 5,5 | 5,05 | Recommended |
| B | 4,83 | 5,25 | 5 | Recommended |
| C | 5 | 5,25 | 5,1 | Recommended |
| D | 4,83 | 5,25 | 5 | Recommended |
| E | 4,75 | 5,25 | 4,95 | Be Considered |

From the data, it can be concluded that the candidates who meet the criteria are candidates A, B, C, and D. After that, the candidates who meet the criteria are ranked using the TOPSIS algorithm. The first step is to form a decision matrix based on the preference value of each aspect of candidates who meet the job criteria shown in Table 10.

*Table 10. Decision Matrix*

| Candidate | IDR | DDR | SPS | MAT | MMR | PES | PSR | CON |
|---|---|---|---|---|---|---|---|---|
| A | 2 | 3 | 3 | 3 | 1 | 2 | 3 | 2 |
| B | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 |
| C | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 2 |
| D | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 3 |

the next step is to normalize the value of the decision matrix with a formula:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}} \quad (12)$$

Information:

$i$ = 1, 2, …, $m$

$j$ = 1, 2, …, $n$

and the R value is obtained as follows:

$$R = \begin{pmatrix} 0{,}392 & 0{,}626 & 0{,}588 & 0{,}539 & 0{,}209 & 0{,}436 & 0{,}588 & 0{,}436 \\ 0{,}588 & 0{,}626 & 0{,}588 & 0{,}359 & 0{,}417 & 0{,}436 & 0{,}392 & 0{,}436 \\ 0{,}588 & 0{,}417 & 0{,}392 & 0{,}539 & 0{,}626 & 0{,}436 & 0{,}588 & 0{,}436 \\ 0{,}392 & 0{,}209 & 0{,}392 & 0{,}539 & 0{,}626 & 0{,}655 & 0{,}392 & 0{,}655 \end{pmatrix}$$

After obtaining a normalized matrix, then the normalized matrix value is multiplied by the preference value for each criterion at the Business Analyst Section Head position:

$$W = (2 \;\; 2 \;\; 2 \;\; 2 \;\; 2 \;\; 3 \;\; 3 \;\; 2)$$

then it can be calculated the normalized weight matrix y with the formula:

$$y_{ij} = w_{ij} \times r_{ij} \quad (13)$$

$$y = \begin{pmatrix} 0{,}784 & 1{,}251 & 1{,}177 & 1{,}078 & 0{,}417 & 1{,}309 & 1{,}765 & 0{,}873 \\ 1{,}177 & 1{,}251 & 1{,}177 & 0{,}718 & 0{,}834 & 1{,}309 & 1{,}177 & 0{,}873 \\ 1{,}177 & 0{,}834 & 0{,}784 & 1{,}078 & 1{,}251 & 1{,}309 & 1{,}765 & 0{,}873 \\ 0{,}784 & 0{,}417 & 0{,}784 & 1{,}078 & 1{,}251 & 1{,}964 & 1{,}177 & 1{,}309 \end{pmatrix}$$

By looking at the maximum and minimum values for each column, then:

$A^+$ = (1,177 1,251 1,177 1,078 1,251 1,964 1,765 1,309)

$A^-$ = (0,784 0,417 0,784 0,718 0,417 1,309 1,177 0,873)

After that, it is followed by determining the distance between the weighted values of each candidate to the positive and negative ideal solutions with formula:

$$D_i^+ = \sqrt{\sum_{j=1}^{n} \left(y_i^+ - y_{ij}\right)^2} \quad (14)$$

$$D_i^- = \sqrt{\sum_{j=1}^{n} \left(y_{ij} - y_i^-\right)^2} \quad (15)$$

So that it is obtained:

$D_A^+$ = 1,212 and $D_A^-$ = 1,151

$D_B^+$ = 1.126 and $D_B^+$ = 1.085

$D_C^+$ = 0.973 and $D_C^+$ = 1.224

$D_D^+$ = 1.162 and $D_D^+$ = 1.202

The final step is to calculate the preference value for each candidate with formula:

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$$V_i = \frac{D_i^-}{D_i^- + D_i^+} \quad (16)$$

$$V_A = \frac{1{,}151}{1{,}212 + 1{,}151} = 0{,}487$$

$$V_B = \frac{1{,}085}{1{,}126 + 1{,}085} = 0{,}491$$

$$V_C = \frac{1{,}224}{0{,}973 + 1{,}224} = 0{,}557$$

$$V_D = \frac{1{,}202}{1{,}162 + 1{,}202} = 0{,}508$$

From the results of the above calculations, candidate C has the highest preference value with a value of 0.557, higher than candidate D with a value of 0.508 and candidate B with a value of 0.491. While candidate A has the smallest preference value with a value of 0.487. It can be concluded that the most suitable candidate for Business Analyst Section Head based on the aspects of inductive reasoning, deductive reasoning, spatial ability, arithmetic, memory, precision, persistence, and durability.

### *C. System Design*

The decision support system for recruitment of new employees at DBC group is shown through the context diagram in Figure 3.

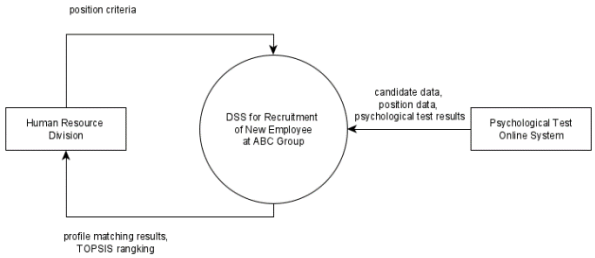


*Figure 3. Context Diagram of DSS for Recruitment of New Employee at DBC Group*

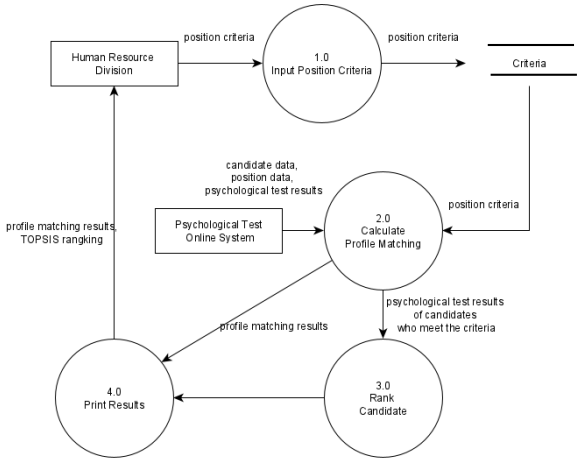


*Figure 4. Data Flow Diagram Level 0 of DSS for Recruitment of New Employee at DBC Group*

The Human Resource (HR) division of the company inputs the job/position criteria data in the decision support system (DSS) for recruitment of new employees at DBC group. In addition, data on candidates who have conducted a psychological test will also be included in the DSS as input. The system will calculate profile matching score, TOPSIS ranking, and provide the calculation results to the company's HR division. For more details, it can be seen through the Data Flow Diagram (DFD) level 0 in Figure 4.

### *D. System Development*

Decision support system for new employee recruitment decisions for the DBC company group was created using the PHP 5.6 and Microsoft SQL Server 2016 as its database management system. In writing the program, Sublime Text was used as a text editor and Mozilla Firefox as a browser to interact with the system. The author also used Microsoft IIS 8 as a web server.

1. Profile Matching Results Page

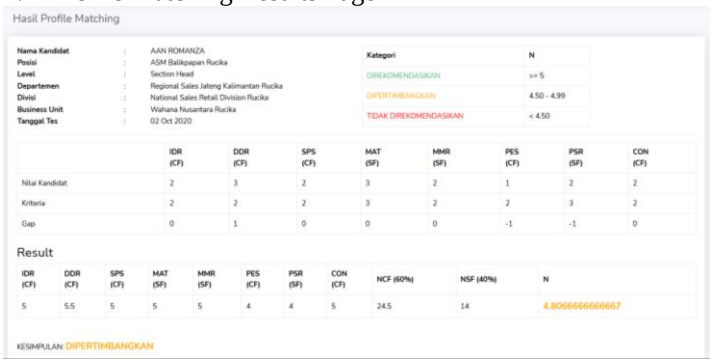


*Figure 5. Profile Matching Results Page View*

Profile matching results page displays the results of profile matching calculation of the new employee's psychological test results with the position criteria, as seen in Figure 5. On this page, users can see gaps or differences in the results of the candidate's psychological test with the criteria for the position they applied for. In addition, users can see the calculation of the average value of the core factor (NCF), the average value of the secondary factor (NSF), and also the total value of each aspect (N). From this total value, the system can conclude that the candidate is Recommended, Considered, or Not Recommended based on the applicable assessment considerations.

2. Candidate Ranking Results Page

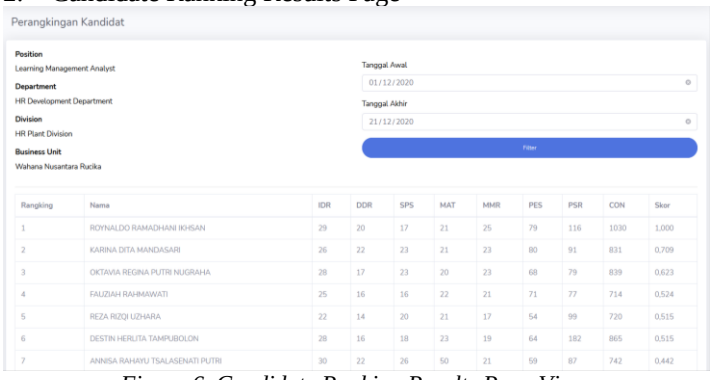


*Figure 6. Candidate Ranking Results Page View*

The ranking results page displays the results of the calculation of TOPSIS ranking algorithm as seen in Figure 6. The candidate data displayed are candidates who meet the criteria of the position

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using the profile matching algorithm. Users can filter based on the test date of candidates who apply for certain positions. The system will then screen candidates who meet the criteria for the position and rank them based on the candidate's test results.

### *D. Testing and Implementation*

After the DSS is created, the system will be tested with SIT (Integrated Testing System) by researcher. The method used is black box testing in which is based on application details such as application views, existing functions in the application, and the suitability of the function flow with the desired business process.

## IV. CONCLUSIONS AND RECOMMENDATIONS

Some conclusions that can be drawn from this research include:

1. Comparison of the ability of prospective employees at the DBC group with the criteria for the position they applied for was successfully carried out using the Profile Matching method.
2. TOPSIS method was successfully used to calculate scores and rank candidates who met the criteria based on the Profile Matching method for selecting prospective employees of the DBC group.
3. This research succeeded in designing and building a decision support system for new employee selection in DBC group of companies which implemented Profile Matching algorithm to compare the ability of prospective employees with the criteria for the position they are applying for and TOPSIS algorithm for ranking prospective employees who meet the criteria for the position.

The development for further research includes implementing other algorithms such as SAW (Simple Additive Weighting), VIKOR (Visekriterijumsko Kompromisno Rangiranje), AHP (Analytical Hierarchy Process), or other algorithms. In addition, further research can also add other criteria and alternatives that can measure the ability of prospective employees with a more detailed measurement scale.

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