

Development of Knowledge Sharing Model Using Decision Support System In Determine Feasible on the Job Training In Vocational School Using Vikor Method

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Abstract

Decision support system (SPK) as a system that can process input data into one information that can be used as a more accurate decision support for the school in recommending students who meet the categories or requirements in following the Job Training. The system that was built carried out the process of determining decision support based on the Vise Kriterijumska Optimizajica I Kompromisno Resenje (VIKOR) method which is able to simplify complex problems in determining feasible to follow the On The Job Trainings based on criteria using formulas whose results are right on target.

Keywords: Decent Determination of PKL, Decision Support System, VIKOR

1. Introduction

Vocational High School (SMK) is a form of formal education unit that organizes vocational education at the secondary education level as a continuation of SMP / MTs or other equivalent forms. Vocational Schools aim to: (1) prepare students to be able to work, either independently or fill existing jobs in the business and industrial world as a middle-level workforce, in accordance with the fields and programs of interest they are interested in, (2) equip students to be able to choose a career, be tenacious and be persistent in competence and be able to develop professional attitudes in the areas of expertise that are of interest, and (3) equip students with Science and Technology (Science and Technology) to be able to develop themselves through higher education levels.

The reality that occurs is very different from what is expected in learning and school goals. Middle school championships (SMKs) are the highest contributor to open unemployment in Indonesia. This is contrary to the initial plan to make SMK graduates as graduates who can be directly absorbed by the business world. The Central Statistics Agency (BPS) noted, of the 7 million open unemployment as of August 2018, 11.24% were vocational graduates. That percentage is higher than the open unemployment of 7.95% high school graduates according to Articles in Kompas.com in 2019.

Data from the Central Statistics Agency in 2017 shows that the largest number of unemployed is dominated by vocational high school (SMK) graduates, amounting to 9.84 percent. President Joko Widodo instructed to revamp the vocational education system. In addition, the government must also reorient vocational education towards demand driven. Through Presidential Instruction (Inpres) No. 9 of 2016 stressed the need for SMK revitalization to improve the quality of human resources. The Presidential Instruction assigns the Ministry of Education and Culture to create a road map for SMK development, as well as perfecting and aligning the SMK curriculum with competencies according to graduate users (link and match). The Ministry of Education and Culture is also tasked with increasing the number and competency of vocational educators. By increasing cooperation with ministries / institutions, local governments, as well as

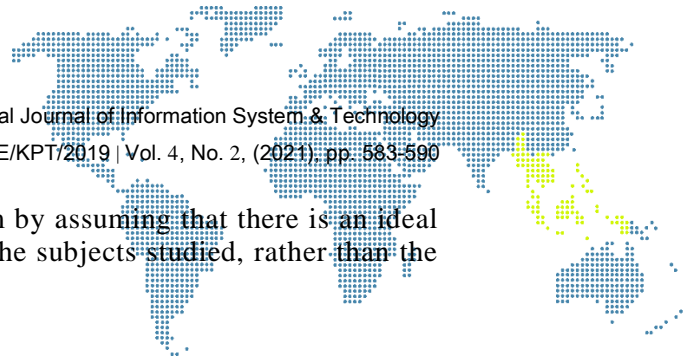
business and industry. Not only that, the Ministry of Education and Culture also continues to improve access to graduate certification and vocational accreditation. The establishment of a vocational school development working group has also been carried out.

Of course there are many factors that influence vocational graduates to compete in the industrial world. In addition to improvements and improvements made through the curriculum, the need for the support of business actors or each company. Some obstacles that usually arise when aviation vocational high school students do street vendors are (1) Limitations of basic Aviation science. They cannot be asked to do anything, especially those directly related to aircraft, especially those that relate directly to Safety and also the Critical Area because they do not understand Basic Aircraft, including Standard Practice, Hardware Safety and Quality materials, etc. which are mandatory for activities on the plane. (2) Legality. In Aviation, there are often audits from local and foreign authorities. Authorities often see the capability possessed by each personnel. For example when there is a mechanic who does engineering work, it will be found because he is considered not legal to do the work because it is not legal to be an engineer. (3) Some of them still have student mentality so that when they are treated they are rarely among those who can be serious. That may be considered dangerous if they are given responsibility, especially those who have direct contact with the nurses.

Knowledge is a basic need that every human being must have in life. Humans are beings who think, act, and feel also act. Attitudes and actions are based on knowledge gained through feeling or thinking activities. The source of knowledge can come from anywhere. One such source is the world of education or school. Students are expected to have good knowledge, which will be applied in the real world or the world of work. Schools must be able to compete and innovate in responding to challenges from the outside world. The development of science requires students to keep abreast of the development of knowledge so that they can compete in the world of work [1]

Knowledge Sharing is a method of knowledge management that is used to provide opportunities for members or groups to share information with other parties, both information about skills or expertise. [2] Knowledge Sharing is recognized as a positive force for the survival of an organization [3], in transferring or disseminating knowledge among organizations, groups or individuals that will bring up new ideas [4]. With Knowledge Sharing as a bridge between industry knowledge and school knowledge, it becomes a unity that can be a collaboration of knowledge that supports the educational process in schools. The use of other Knowledge Sharing by users is limited to using existing online media, such as Facebook, Whatsapp, Instagram and many other online media. Users usually use these media in terms of sharing knowledge. Whether it's new knowledge, or old knowledge. Through this online media, users provide information both in the form of writing and pictures. Knowledge Sharing is not only used as information for teaching materials, but is able to provide information for teachers in providing information to students before they move towards practical fieldwork. Therefore, before students conduct fieldwork practices, it is expected that there is better communication between students and teachers and parties related to fieldwork practices.

The current condition is that students who will carry out On The Job Trainings are limited to a few general requirements. At present the requirements that must be carried out by students before pkl are students must be class XI and have passed all subjects with nothing remedial. Therefore, to help the problems that occur in Aviation Vocational Schools in determining the feasibility of street vendors for students, a method in the Decision Support System is needed, the Profile Matching method. Profile Matching is one of the methods in a Decision Support System.



Profile matching is a decision making mechanism by assuming that there is an ideal level of predictor variables that must be met by the subjects studied, rather than the minimum level that must be met or passed [5].

2. Research Methodology

2.1. On The Job Training

Field Work Practice is one of the ways undertaken by the school in helping students get to know the world of work. PKL is one part of education that must be done by every student in the education process. On the Job Training or Field Work Practice is a form of application of the educational process that has been carried out, so that with this PKL it becomes a very positive value for students to be used as benchmarks or evaluations of educational success in the real world especially teachers and students [6][9][10]. Every school has its own rules in determining the street vendor process. In vocational school PKL travel schedule is done when students are in class XI (eleven) or second grade. While the period of street vendors is done for 6 months or 1 semester. The place to do street vendors is usually companies that must have cooperation with the school.

2.2. Decision Support System

The concept of SPK (Decision Support System) was first revealed in the early 1970s by Michael S. Scott Morton with the term Management Decision System. The term SPK refers to a system that utilizes computer support in the decision making process, the following is the opinion of experts about the understanding of SPK, including by Man and Watson namely SPK (Decision Support System) is a system that can help make decisions through the use of data and models the decision to solve problems that are semi-structured or unstructured [5] [7]. The concept of a Decision Support System will assist decision makers in determining an outcome from several alternative choices in order to provide a more accurate end result [8][17][18].

2.3. VlseKriterijumska Optimizacija I Method Kompromisno Resenje (VIKOR)

VlseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR) is a multi-criteria optimization and compromise solution, which is one of the many MCDM techniques. VIKOR was first introduced by Serafim Opricovic in 1998 [12] [13] [14]. Then used in the problem of multi-criteria decision making in 200 VIKOR is based on the best solution obtained based on the closest ideal solution. Next do the ranking by comparing the distance to the ideal solution. The VIKOR method also uses linear normalization in order to get the best solution [15] [11].

The steps for calculation using the VIKOR method [11] [12] [16], as follows:

- a) Normalize using the following formula:

$$R_{ij} = \frac{x_j^+ - x_{ij}}{x_j^+ - x_{ij}^-} \quad (1)$$

Where R_{ij} and X_{ij} ($i = 1, 2, 3, \dots, m$ and $j = 1, 2, 3, \dots, n$) are elements of the decision making matrix (alternatives to the criteria j) and $X^+ + j$ are the best element of criteria j , X_j^- is the best element of criteria j .

- b) Calculate S and R values using the formula:

$$S_i = \sum_{j=1}^n W_j \left(\frac{x_j^+ - x_{ij}}{x_j^+ - x_{ij}^-} \right) \quad (2)$$

Where W_j is the weight of each criterion j . And...

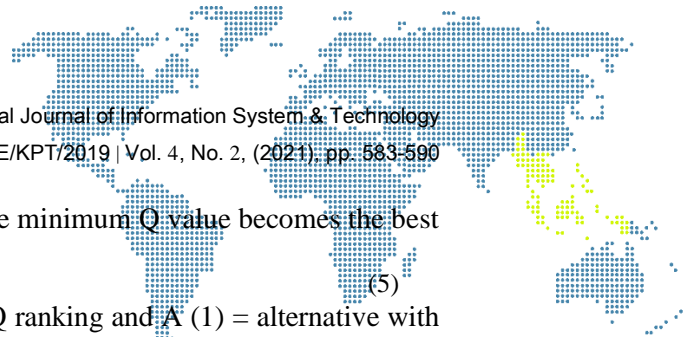
$$R_i = \max_j \left[\left(\frac{x_j^+ - x_{ij}}{x_j^+ - x_{ij}^-} \right) \right] \quad (3)$$

Determine the index value

$$Q_i = \left[\frac{S_i - S^+}{S^+ - S^-} \right] V + \left[\frac{R_i - R^+}{R^+ - R^-} \right] (1 - V) \quad (4)$$

Where $S^- = \max S_i$, $S^+ = \min S_i$ and $R^- = \max R_i$, $R^+ = \min R_i$ and $v = 0.5$.

- c) Grinding results are the results of sorting by S, R, Q.



- d) The best alternative ranking solution based on the minimum Q value becomes the best rating with the following conditions:
 $Q(A^{(2)}) - Q^{(1)} \geq DQ$ (5)
 Where A (2) = alternative with second order in Q ranking and A (1) = alternative with the best sequence in Q ranking while $DQ = 1 - (m-1)$, where m is the alternative number. Alternative A (1) must be in the best rank on S and / or R

3. Results and Discussion

In this study the criteria used to determine the best PKL Eligibility are Administration, Academic, Non Academic. This research will discuss a support system that can help to determine the best Raskin recipients using the VIKOR method. The following is a list of alternatives and criteria for the selection of Raskin assistance, which are in Table 1 and Table 2.

Table 1. Alternative Data

Alternative	Name
A1	Sahren
A2	Adinda
A3	Prasetyo
A4	Muamar
A5	Kayla

Table 2. Criteria Data

Alternative	Name	Weight
C ₁	Administration	0,3
C ₂	Academic	0,4
C ₃	Non Akademik	0,2
C ₄	Psychology	0,1
Total Weight		1

Furthermore, in tables 3 to 6 the weight of the criteria is Administration, Academic, Non Academic, Psychology Criteria.

Table 3. Administration

Code	Administration
Ad-01	SPP money
Ad-02	Street vendors
Ad-03	Medical certificate

Table 4. Academic

Code	Akademic
Ak-01	Basic Aviation
Ak-02	Basic Aircraft
Ak-03	Standard Practice
Ak-04	Hardware Safety and Quality

Table 5. Non Academic

Kode	Non Akademik
Na-01	Pre OJT
Na-02	Pre OJT Result



Table 6. Psychology

Code	Psychology
Ps-01	Teamwork
Ps-02	Behavior

In table 7, is a table that contains a rating of compatibility between alternatives and criteria.

Table 7. Match Ratings

No	Alternatif	Kriteria										
		Ad-01	Ad-02	Ad-03	Ak-01	Ak-02	Ak-03	Ak-04	Na-01	Na-02	Ps-01	Ps-02
1	Sahren	5	3	3	3	4	3	3	3	4	2	2
2	Adinda	2	3	4	5	4	3	5	5	4	5	5
3	Prasetyo	4	5	5	3	4	5	5	4	3	2	4
4	Muamar	3	2	4	3	3	5	5	5	4	5	4
5	Kayla	3	2	4	5	2	5	3	5	3	5	4

Step 1 Calculate Normalization

Table 8. Match Ratings

No	Alternatif	Kriteria												
		Ad-01	Ad-02	Ad-03	Ak-01	Ak-02	Ak-03	Ak-04	Na-01	Na-02	Ps-01	Ps-02	M	M
1	Sahren	5	3	3	3	4	3	3	3	4	2	2	5	2
2	Adinda	2	3	4	5	4	3	5	5	4	5	5	5	2
3	Prasetyo	4	5	5	3	4	5	5	4	3	2	4	5	2
4	Muamar	3	2	4	3	3	5	5	5	4	5	4	5	2
5	Kayla	3	2	4	5	2	5	3	5	3	5	4	5	2

Make a normalization matrix (N) by determining the maximum and minimum values to get the ideal solution for each criterion.

$$R_{11} \frac{5-5}{5-4} = 0 \quad R_{12} \frac{5-5}{5-3} = 0 \quad R_{13} \frac{5-4}{5-3} = 0.5 \quad R_{21} \frac{5-5}{5-4} = 0 \quad R_{22} \frac{5-4}{5-3} = 0.5 \quad R_{23} \frac{5-5}{5-3} = 0$$

And so on so that the results obtained by normalizing the value of R based on the table above is seen in the table below:

Table 9. Normalization Results

Ad-01	Ad-02	Ad-03	Ak-01	Ak-02	Ak-04	Ak-04	Na-01	Na-02	Ps-01	Ps-02
0	0.67	0.67	0.67	0.33	0.67	0.67	0.67	0.33	1	1
1	0.67	0.33	0	0.33	0.67	0	0	0.33	0	0
1	0.67	0.33	0	0.33	0.67	0	0	0.33	0	0
0.33	0	0	0.67	0.33	0	0	0.33	0.67	1	0.33
0.67	1.00	0.3	0.0	1.00	0.0	0.67	0.0	0.67	0.0	0.3

Calculate the weight normalization matrix by multiplying criteria weights (W) with normalized data values

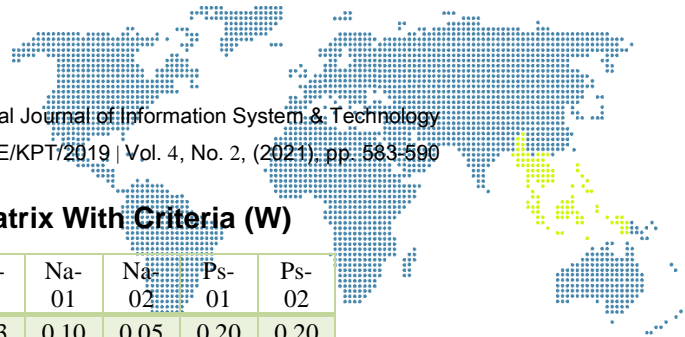


Table 10. Weight Normalization Matrix With Criteria (W)

Ad-01	Ad-02	Ad-03	Ak-01	Ak-02	Ak-04	Ak-04	Na-01	Na-02	Ps-01	Ps-02
0	0.20	0.20	0.23	0.12	0.23	0.23	0.10	0.05	0.20	0.20
0.30	0.20	0.10	0	0.12	0.23	0	0	0.05	0	0
0.30	0.20	0.10	0	0.12	0.23	0	0	0.05	0	0
0.1	0	0.0	0.23	0.12	0	0	0.05	0.10	0.20	0.07
0.2	0.30	0.10	0	0.35	0	0.2	0	0.10	0	0.07

Step 2: Calculate the values of S and R

Table 11. S And R Values

Ad-01	Ad-02	Ad-03	Ak-01	Ak-02	Ak-03	Ak-04	Na-01	Na-02	Ps-01	Ps-02	Si	Ri
0	0.20	0.20	0.23	0.12	0.23	0.23	0.10	0.05	0.20	0.20	1.77	0.23
0.30	0.20	0.10	0	0.12	0.23	0	0	0.05	0	0	1.00	0.30
0.30	0.20	0.10	0	0.12	0.23	0	0	0.05	0	0	1.00	0.30
0.10	0	0	0.23	0.12	0	0	0.05	0.10	0.20	0.07	0.87	0.23
0.20	0.30	0.10	0	0.35	0	0.23	0	0.10	0	0.07	1.35	0.35

Step 3 : Ranking

Table 12. S And R Values

Alternative	Si Values	Ri Values
A1	1.77	0.23
A2	1.00	0.30
A3	1.00	0.30
A4	0.87	0.23
A5	1.35	0.35
S+ dan R+	1.77	0.35
S- dan R-	0.87	0.23

$$Q1 = \frac{1.77 - 1.77}{0.87 - 1.77} (0.5) + \frac{0.23 - 0.35}{0.23 - 0.35} (1 - 0.5)$$

$$Q2 = \frac{1.00 - 1.77}{0.87 - 1.77} (0.5) + \frac{0.30 - 0.35}{0.30 - 0.35} (1 - 0.5)$$

$$Q1 = \frac{0.87 - 1.77}{0.87 - 1.77} (0.5) + \frac{0.23 - 0.35}{0.30 - 0.35} (1 - 0.5)$$

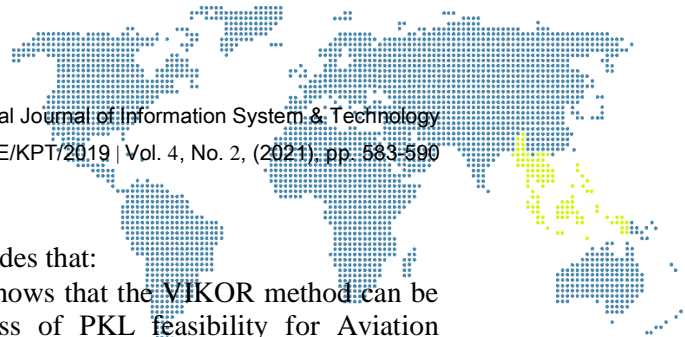
$$Q1 = \frac{0.87 - 1.77}{0.87 - 1.77} (0.5) + \frac{0.23 - 0.35}{0.23 - 0.35} (1 - 0.5)$$

$$Q1 = \frac{0.87 - 1.77}{0.87 - 1.77} (0.5) + \frac{0.35 - 0.35}{0.23 - 0.35} (1 - 0.5)$$

Table 13. Ranking

Q1	0.50
Q2	0.64
Q3	0.64
Q4	1.00
Q5	0.23

Step 4: The best alternative ranking solution based on the minimum Q value. Then the index value or which ranks 1 with the smallest result of 0.23 selected is Q5 or A5, namely Kayla. Thus the student named Kayla has the right to take On The Job Training first compared to other friends.



4. Conclusions

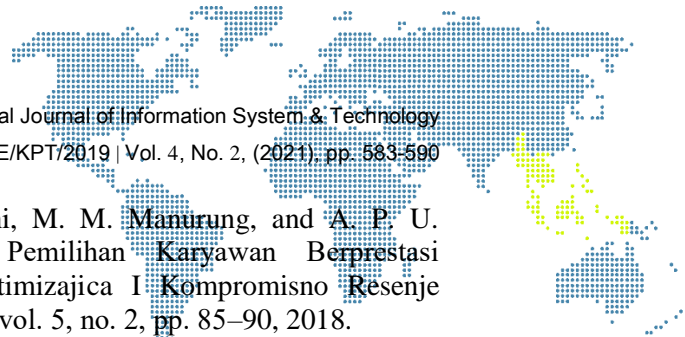
Based on the discussion above, the researcher concludes that:

- a) Analysis of the test using the VIKOR method shows that the VIKOR method can be used to assist in making the selection process of PKL feasibility for Aviation Vocational students based on the appropriate weight and type preference requirements.
- b) As for the assessment of student criteria based on three fields, namely Administrative, Academic, Non-Academic and Psychological, the VIKOR method is expected to be able to help in increasing transparency in the determination of eligibility for students as recommendations for improving the quality of education for students to be placed on the airline.

The selection results for selection of high school students using the VIKOR method, based on several criteria and interests of students 18 data from 30 tested samples, therefore, the accuracy value is as much as 60%. While based on existing data as many as 25 of the 30 data samples tested, so the value of accuracy is as much as 83%.

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