How Education Might Decrease Unemployment in Indonesia

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Abstract

Unemployment is a person who does not work at all, looking for work or job seekers who are trying to find decent work. The number of workers causes unemployment, and the number of jobs is not balanced, technological progress, skills and experience are not following the criteria, lack of education, poverty, capital market competition, difficulties in finding job vacancies, and expectations for prospective workers are too high. The data used are empirical data that is data that contains information on the results of observations or experiments taken from the Central Statistics Agency on open unemployment according to the highest level of education from 2010 - 2018 with the level of unschooled, not / not yet graduating from Elementary, Elementary, Junior High School, Senior High School, Vocational High School, Academy / Diploma, and University use the TOPSIS and Entropy approach that will weigh the data presented and rank the highest up to the lowest of these data by knowing the results obtained from the data presented can give view and solution to reduce unemployment in Indonesia.

Keywords — *Calculation, Education, Entropy, Evidence, Indonesia, Unemployment, TOPSIS.*

I. INTRODUCTION

Unemployment is a macroeconomic problem faced by human life that directly in Indonesia, the unemployment rate is quite high and always significant every year. Unemployment is a problem that never stopped to discuss. Unemployment can happen to anyone who cannot produce goods or services that have economic value and be useful to others, not only with the skill of creating unemployment but his lack of education in which one education is one issue that closely connected with the development and progress of a nation. Education must produce change and be able to develop the life of a nation. Therefore, the success of the program must be able to help create national goals in their respective fields. The statistical centre every year has recorded in the form of data on unemployment according to education through Empirical, which is a situation based on real events that have been experienced through research, observation, or obtained from data that is correct with the reality in the field.

Education is also a significant factor in realising quality human resources (HR). However, in reality, not everyone can get an education because of the high costs involved; this condition then encourages the inclusion of a clause on education in the 1945 amendments. The constitution mandates the government's obligation to allocate 20% of the education budget from the APBN (State Budget) and APBD (Local Government Budget) so that people can enjoy education services, especially education essential. Education will also determine the direction, purpose and meaning for life, humans need education through a process of awareness and try to explore and develop their potential with teaching methods and in other ways.

Education is not only sufficient to the necessary level but must continue to a higher level of education in the form of secondary education, namely education that prepares students to become members of the community who can hold reciprocal relationships with the social, cultural and natural environment and can develop further abilities in the world of work or higher education.

As time goes by and development in the field of education, the role of education higher is significant to prepare students to become members of the community who have professional academic abilities that can establish, develop, and create technological science and art. However, in reality, there still are people who do not go to school and do not go to school.

Therefore, several methods used to find out and analyse a case, particularly in the world of education so that they can find out and evaluate which level graduates are highest in the community each year. So it can be used to be a consideration of what must be done so that people want to pay attention to education in order to reduce the unemployment rate. Empirical data on open unemployment per year can help in analysing the highest unemployment rate in a year given. By using the TOPSIS and Entropy method is a method that can help in making decisions so that it can find out the unemployment rate highest of several years presented.

II. LITERATURE REVIEW

National Labour Force Survey Data (Sakernas) 2004-2014 showed unemployment Vocational High School in February 2013 amounted to 864.649 (Central Bureau Statistik, 2014). Data in August 2013 the unemployment rate increased by 45.51 % of the data in February 2013. Data in February 2014 decreased by 32.65 % of the data in August 2013 and by further unemployment rose by 67.34 % in August 2015 increase in the unemployment rate in August due to post-graduate students. It caused by a one-factor imbalance between the numbers of jobs provided by the number of potential workers and occur a lack of compatibility link and matches the needs of the competencies needed by the company with the education provider. The problematic number of job seekers exceeded the number of jobs available will be able to be minimised by the ability of student entrepreneurs who owned the time of graduation[1]. The fundamental problem is that concerning the Indonesian economy, the standard concepts of 'labour force' and 'participation rates' are hard to define at all precisely[2]. There Measuring unemployment in developing countries is not straight- forward due to the presence of a large number of discouraged workers[3].

The complexity of problems at work and high working demands require students to develop various skills. One of the alternatives for encountering those conditions is through the process of Entrepreneurship activities or training, especially in vocational-based higher education and other public higher education[4]. Vocational education is required to produce a competent workforce in order to increase productivity and efficiency as well as the readiness of the international labour market competition in the era of globalisation [5]. Unemployment in Indonesia includes issues that are still difficult to overcome by the government. Many factors affect the unemployment rate, one of which is inflation, financial crisis to low levels of community education[6].

III. RESEARCH AIMS & SIGNIFICANCES

The main intentions of the study are mention as follows:

- Highlight the significance of unemployment in Indonesia.
- Arrange that a direct relationship exists between several factors used in this research.
- Characterise alternative tools in evaluation performance that can be used more creatively and efficiently for calculating the unemployment in Indonesia.

The proposed research is noteworthy as not only highlights the importance of the unemployment rate highest of several years but provides strategies that can be employed by management to improve the quality of the education more effective and efficient manner. Theory, as well as applied strategies, can be tied to the proposed study using several case studies with different strategies employed by education in Indonesia.

IV. RESEARCH METHODS

TOPSIS, initially developed by Hwang and Yoon in 1981, is a sophisticated but straightforward ranking methodology used in many information technology applications of science and engineering[7]. TOPSIS is one of the MADM methods, which is simple in its methodology and logic[8]. Besides, Entropy is a critical concept in social sciences, physics, and information theory. When the data of a decision matrix are entirely specified, this method can be used to evaluate the weights[9]. A lately study by Mufrida & Ghalih (2019) on the evaluation of lecturer performance in Politeknik Negeri Tanah Laut, Indonesia used a concept of TOPSIS and Entropy[10]. Also, in the other study about total export coffee in Indonesia by Mufrida, Ghalih & Ali, (2019) uses techniques for order preference by similarity to ideal solution (TOPSIS) combined within formation Entropy weight to examine the Total Exports Indonesian Coffee focus on April Group in Several Exporting Countries[11].

Step 1. Create a data evaluation matrix

$$D=\left[x_{ij}\right]_{m\times n}=\begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array}\begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \end{array} \\ \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}_{m\times n} \end{array}$$

$$i=1,2,\ldots,m\ ,\ j=1,2,\ldots,n \qquad (1)$$

Step 2. Normalise the matrix

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

$$i=1,2,\ldots,m\ ,\ j=1,2,\ldots,n \qquad (2)$$

$$R=\left[r_{ij}\right]_{m\times n}=\begin{array}{c} \\ A_1 \\ A_2 \\ \vdots \\ A_m \end{array}\begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_n \end{array} \\ \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix}_{m\times n} \end{array}$$

$$i=1,2,\ldots,m\ ,\ j=1,2,\ldots,n \qquad (3)$$

Step 3. Calculate objective weight with Entropy

$$e_j = -\frac{1}{\ln m}\sum_{i=1}^{m} r_{ij} \ln r_{ij}$$
$$i = 1, 2, \ldots, m \ , \ j = 1, 2, \ldots, n \quad (4)$$

Recalculate the value of each evaluation criterion

$$W = (w_1, w_2, ..., w_n)$$
$$w_j = \frac{1 - e_j}{\sum_{j=1}^{n} (1 - e_j)}$$
$$i = 1, 2, \ldots, m \ , \ j = 1, 2, \ldots, n \quad (5)$$

Step 4. Weight matrix

$$v_{ij} = r_{ij} \times w_j \quad (6)$$

$$V = \left[v_{ij} \right]_{m \times n}$$
$$i = 1, 2, \ldots, m \ , \ j = 1, 2, \ldots, n \quad (7)$$

Step 5. Calculate the positive and negative ideal solutions

$$V^+ = \left\{ v_1^+, v_2^+, ..., v_n^+ \right\} \quad (8)$$
$$V^- = \left\{ v_1^-, v_2^-, ..., v_n^- \right\} \quad (9)$$

Step 6. Calculate the distance between the sample being evaluated and the positive and negative ideal solutions

$$S_i^+ = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^+ \right)^2}$$
$$i = 1, 2, \ldots, m \ , \ j = 1, 2, \ldots, n \quad (10)$$
$$S_i^- = \sqrt{\sum_{j=1}^{n} \left(v_{ij} - v_j^- \right)^2}$$
$$i = 1, 2, \ldots, m \ , \ j = 1, 2, \ldots, n \quad (11)$$

Step 7. Calculate the value of the student's relative ability indicator

$$C_i = \frac{S_i^-}{S_i^+ + S_i^-} \quad (12)$$

Step 8. Sorting (Ranking)

According to the relative distance value of each C*i* evaluation sample, it is the relative pros and cons of each evaluation sample after evaluation. 0 <C*i* <1, C*i* the closer the value is to 1, the closer the evaluation sample is to the positive ideal solution; it also means that under the existing evaluation criteria, the evaluation illustration is the best evaluation sample relative to other evaluation samples. Conversely, if the values of C*i* are further apart from each other, it means that the evaluation sample is poor and there is sufficient room for improvement.

V. RESULTS AND DISCUSSION

This research-based on empirical data that has been presented by the Central Statistics Agency on Open Unemployment According to the Highest Education Completed 2010-2018 in Indonesia. Unemployment which occurred due to the amount of labour and the number of Jobs is not balanced, the advancement of technology, skills and experience do not match the criteria, lack of education, poverty, competitive capital markets, difficulty into a search for vacancies workers, and hope for prospective employees is too high. Unemployment can occur in someone who lacks the education to the highest level of education. This study uses TOPSIS method and Entropy which aims to determine the changes that occur from year to year on the open unemployment according to the highest education in Indonesia and determine the result of the highest ratings of unemployment that occur on open education in Indonesia and able to make decisions on reducing unemployment that occurred that aims to prosper the community.

Indonesia struggles to provide inclusive, high-quality education to its citizens. The country has much lower literacy levels than those of other Southeast Asian nations. An analysis by the World Bank showed that 55 per cent of Indonesians whom complete school is functionally illiterate compared with only 14 per cent in Vietnam and 20 per cent in member countries of the Organization for Economic Cooperation and Development. Tertiary attainment levels, likewise, are deficient: The percentage of Indonesians over the age of 25 that had attained at least a bachelor's degree in 2016 was just under 9 per cent, the lowest of all the member states of the Association of Southeast Asian Nations (ASEAN). There may not be much incentive to obtain a tertiary degree—unemployment rates are highest among university-educated Indonesians.

TABLE 1 OPEN UNEMPLOYED UNEMPLOYMENT

Education	2010	2011	2012	2013	2014	2015	2016	2017	2018
Unschooled	0.0347	0.0438	0.0350	0.0326	0.0362	0.0319	0.0307	0.0316	0.0089
Did Not / Did Not Finish Elementary School	0.1835	0.1899	0.1838	0.1704	0.1732	0.1726	0.1882	0.1936	0.1629
Elementary School	0.4679	0.3709	0.4736	0.4661	0.4512	0.4119	0.4505	0.4471	0.3927
Junior High School	0.5309	0.5817	0.5694	0.5910	0.5647	0.5357	0.5214	0.5146	0.5011
Senior High School	0.6814	0.6972	0.6453	0.6351	0.6680	0.7160	0.6991	0.7049	0.7537
Vocational High School	0.4050	0.3324	0.3441	0.3573	0.3776	0.4860	0.5735	0.6114	0.6643
Academy / Diploma	0.1570	0.1092	0.0756	0.0644	0.0673	0.0896	0.0938	0.1003	0.1098
University	0.2447	0.1726	0.1648	0.1446	0.1548	0.2159	0.2524	0.2494	0.3196

TABLE 2 : OBJECTIVE VALUES WITH ENTROPY

Education	2010	2011	2012	2013	2014	2015	2016	2017	2018
Unschooled	-0.1165	-0.1371	-0.1174	-0.1117	-0.1201	-0.1098	-0.1070	-0.1092	-0.0421
Did Not / Did Not Finish Elementary School	-0.3111	-0.3155	-0.3113	-0.3016	-0.3037	-0.3033	-0.3143	-0.3179	-0.2956
Elementary School	-0.3554	-0.3679	-0.3540	-0.3558	-0.3591	-0.3653	-0.3592	-0.3599	-0.3671
Junior High School	-0.3362	-0.3152	-0.3207	-0.3108	-0.3227	-0.3344	-0.3396	-0.3419	-0.3462
Senior High School	-0.2614	-0.2515	-0.2827	-0.2883	-0.2695	-0.2392	-0.2502	-0.2465	-0.2131
Vocational High School	-0.3661	-0.3661	-0.3671	-0.3677	-0.3678	-0.3507	-0.3189	-0.3008	-0.2717
Academy / Diploma	-0.2907	-0.2418	-0.1953	-0.1766	-0.1817	-0.2161	-0.2220	-0.2306	-0.2426
University	-0.3445	-0.3032	-0.2972	-0.2796	-0.2888	-0.3310	-0.3475	-0.3464	-0.3646

TABLE 3 POSITIVE AND NEGATIVE IDEAL SOLUTIONS

V+	0.0701	0.0696	0.0648	0.0688	0.0703	0.0828	0.0751	0.0741	0.1169
V-	0.0036	0.0044	0.0035	0.0035	0.0038	0.0037	0.0033	0.0033	0.0014

TABLE 4 UNEMPLOYMENT RATING

Education	C_i	Ranking
Unschooled	0.0000	8
Did Not / Did Not Finish Elementary School	0.2221	6
Elementary School	0.5959	4
Junior High School	0.7498	2
Senior High School	1.0000	1
Vocational High School	0.6742	3
Academy / Diploma	0.1102	7
University	0.3071	5

In table 2, the objective value with Entropy produces data that is different from the normalised data because it uses the Entropy method, namely the method of weighting the criteria of unemployment unschooled, did not / did not finish from elementary, elementary, junior high school, senior high school, vocational high school, Academy/Diploma, and University. Furthermore, it clear that from table 3 about positive and negative ideal solutions summarising the results of empirical data about open unemployment where the results are different from table 2 using the Entropy method because of weighting data, while table 4 about open unemployment ranks knows that open unemployment data is high school education level General / High School ranks 1 with C*i* (1,0000), Junior High School ranks 2 with C*i* (0.7498), and rank 3 in Vocational High School / Vocational High School with C*i* (0.6742) so that from the ranking results it can be used as an evaluation in future decision making in overcoming the problem of open unemployment in Indonesia according to education levels because of the rating is the level that embraces the world of education but experiences the highest unemployment.

VI. CONCLUSIONS

The results of empirical data from the TOPSIS and Entropy approach to open unemployment in Indonesia are a system used to make a decision about unemployment that occurs in Indonesia to overcome open unemployment with current levels of education. The TOPSIS and Entropy method is a different method from the other methods in which this method produces data through weighting and produces the top to bottom ranking with the final data used as an alternative in overcoming unemployment which every year experiences an increase and decrease in data. Empirical data presented on unemployment is open from never / never attended school, not / not yet graduated from elementary, elementary, junior high, high school / high school, Vocational high school / vocational school, academy/diploma, and university from 2010 to 2018 it is can be recognized that Senior High School was ranked 1 with C*i* (1,0000), Junior High School was ranked 2 with C*i* (0.7498), and rank 3 was Vocational High School with C*i* (0.6742) with the known unemployment highest result occurring was the level that received the education world compared to those who did not receive the education world.

So that the data is used as a strategy to overcome unemployment that seeks to prosper the community through the government balancing employment with job seekers and improving their skills and endurace to find a job. Even though outbound student flows are presently small, demographic and socioeconomic factors suggest that Indonesia will play a significant role in international education in the years to come. Not only does Indonesia have by far the most significant student age population in the ASEAN, but it also has the third-largest population under the age of 25 in the entire world: More than 117 million in 2017, following only India (616,550,830) and China (417,665,920). Consider that more than 40 per cent of Indonesia's population is under the age of 25, with approximately 27 per cent under the age of 15; the median age is approximately 30.5 years. This large university-age population means that Indonesia has a substantial pool of potential international students.

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REFERENCES

[1] E. Ismail, S. Samsudi, and D. Widjanarko, "Development of Technopreneurship Learning Model in Vocational High School Machinery Program," J. Vocat. Career Educ., vol. 2, no. 2, 2017, doi: 10.15294/jvce.v2i2.13811.

[2] H. W. Arndt and R. M. Sundrum, "Employment, unemployment and under-employment," Bull. Indones. Econ. Stud., vol. 16, no. 3, pp. 61–82, 1980, doi: 10.1080/00074918012331333839.

[3] D. Suryadarma, A. Suryahadi, and S. Sumarto, "Measuring unemployment in developing countries: The case of Indonesia," Labour, vol. 21, no. 3, pp. 541–562, 2007, doi: 10.1111/j.1467-9914.2007.00374.x.

[4] H. Hidayat, S. Herawati, E. Syahmaidi, A. Hidayati, and Z. Ardi, "Designing of technopreneurship scientific learning framework in vocational-based higher education in Indonesia," Int. J. Eng. Technol., vol. 7, no. 4, pp. 123–127, 2018, doi: 10.14419/ijet.v7i4.9.20632.

[5] H. Hidayat, S. Herawati, . K., B. Y. Tamin, and E. Syahmaidi, "How is the practicality of technopreneurship Scientific learning model design in vocational higher education?," Int. J. Sci. Res. Manag., vol. 6, no. 09, pp. 631–636, 2018, doi: 10.18535/ijsrm/v6i9.el01.

[6] A. Wanto et al., "Levenberg-Marquardt Algorithm Combined with Bipolar Sigmoid Function to Measure Open Unemployment Rate in Indonesia," Conf. Pap., pp. 1–7, 2018.

[7] S. Rostampour, "An application of TOPSIS for ranking internet web browsers," Decis. Sci. Lett., vol. 1, no. 2, pp. 53–58, 2012, doi: 10.5267/j.dsl.2012.09.001.

[8] V. B. Vommi, "TOPSIS with statistical distances : A new approach to MADM," Decis. Sci. Lett., vol. 6, pp. 49–66, 2017, doi: 10.5267/j.dsl.2016.8.001.

[9] M. Bagheri, P. Shojaei, and M. T. Khorami, "A comparative survey of the condition of tourism infrastructure in Iranian provinces using VIKOR and TOPSIS," Lett. Decis. Sci., vol. 7, pp. 87–102, 2018, doi: 10.5267/j.dsl.2017.4.001.

[10] M. Zein and M. Ghalih, "An Evaluation of Lecturer Performance in PoliteknikNegeri Tanah Laut, Indonesia," Am. Int. J. Bus. Manag. ISSN, vol. 2, no. 7, pp. 1–07, 2019.

[11] M. Zein, M. Ghalih, and A. M. Ali, "An Evaluation , the Total Exports Indonesian Coffee , focuses on April Group in Several Exporting Countries," SSRG Int. J. Econ. Manag. Stud., no. August, 2019, doi: 10.14445/23939125/IJEMS-V6I8P109.

[12] Information on https://www.bps.go.id/ accessed on 28 November 2019.