



NOVRIAN SATRIA PERDANA

Optimizing Workforce Absorption of Vocational High School Graduates to Prepare for the Era of Industrial Revolution 4.0

ABSTRACT: Vocational School is one of the educational unit level institutions, whose role is to create qualified and competent human resources in their fields for the needs of the business and industry. Unfortunately, the needs of the business and industry for a competent workforce still cannot be met, because the quality of the existing Vocational Schools is still lacking. The purpose of this study is to analyze the optimization of the absorption of vocational graduates needed by the business and industry world in an effort to achieve a balance of the labour market in the era of industrial revolution 4.0. This study was using a qualitative approach with secondary and primary data analysis methods. This research was conducted in East Java Province in 2018, by holding discussions with Vocational Schools, Companies, and the East Java Provincial Education Office. The results of this study are required for the integration process of the three educational institutions (vocational, courses, and training), which organize vocational education into three things, namely: sharing resources; integrating the learning process; and equalizing minimum service standards.

KEY WORD: Vocational; Labour; Industrial Revolution 4.0.

ABSTRAKSI: “Mengoptimalkan Penyerapan Tenaga Kerja Lulusan Sekolah Menengah Kejuruan untuk Mempersiapkan Era Revolusi Industri 4.0”. Sekolah Kejuruan adalah salah satu lembaga tingkat unit pendidikan yang berperan untuk menciptakan sumber daya manusia yang berkualitas dan kompeten di bidangnya untuk kebutuhan bisnis dan industri. Sayangnya, kebutuhan bisnis dan industri untuk tenaga kerja yang kompeten masih belum dapat dipenuhi, karena kualitas Sekolah Kejuruan yang ada masih kurang. Tujuan penelitian ini adalah untuk menganalisis optimalisasi penyerapan lulusan kejuruan yang dibutuhkan oleh dunia usaha dan industri dalam upaya untuk mencapai keseimbangan pasar tenaga kerja di era revolusi industri 4.0. Penelitian ini menggunakan pendekatan kualitatif dengan metode analisis data sekunder dan primer. Penelitian ini dilakukan di Provinsi Jawa Timur pada tahun 2018, dengan mengadakan diskusi dengan Sekolah Kejuruan, Perusahaan, dan Dinas Pendidikan Provinsi Jawa Timur. Hasil penelitian ini diperlukan untuk proses integrasi dari tiga lembaga pendidikan (kejuruan, kursus, dan pelatihan), yang mengatur pendidikan kejuruan menjadi tiga hal, yaitu: berbagi sumber daya; mengintegrasikan proses pembelajaran; dan menyamakan standar layanan minimum.

KATA KUNCI: Kejuruan; Tenaga Kerja; Revolusi Industri 4.0.

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INTRODUCTION

The vision and mission of the current Jokowi-JK (Joko Widodo – Jusuf Kalla)'s administration, 2014-2019, contained in the *Nawacita* (Nine Ideals) Program puts quality of education, competitiveness, and national character as priorities in the national development. The *Nawacita* Program aims to improve the quality of lives and productivity of Indonesian people, and also the competitiveness in the international market. This means that development for quality and productive human resources is essential to actualize national economic independence and global competitiveness, so that Indonesia as a nation can advance and rise together with other nations (Wedhaswary, 2014; Fachrudin *et al.*, 2017; and Hafidz, 2017).

Human resources is a main asset in advancing national development. The abundance of natural resources, capital resources, and advancement of technology would have no valuable contribution or outcome without being supported by quality human resources. A large number of competent and skilled human resources with high productivity will ensure an optimal growth and high competitiveness against other countries, which is necessary in this era of globalization (Itika, 2011; Mathis & Jackson, 2008; and UNECE, 2013).

Regarding Indonesia's competitiveness as a nation, based on the data from World Economic Forum 2018, Indonesia ranked 45th in the Global Competitiveness Index, far below other neighboring ASEAN (Association of South East Asian Nations) countries, such as Singapore (7th), Malaysia (21st), and Thailand (28th). Particularly, for the 6th pillar regarding skills, Indonesia was on rank 62, still below other ASEAN countries like Singapore (20th) and Malaysia (24th), but excelled from Thailand which was on rank 66. This shows how Indonesia still lack competitiveness in global market, including the competitive quality of human

resources. Competitiveness is a set of intuitions, policies, and factors determining the productivity level of a country (*cf* UNIDO, 2013; Rahadi, 2016; and Schwab, 2018).

Education sector is a main source of supply for competent workforces. However, there is still a gap between the demand for quality human resources in industry and the human resources produced by educational institutions. In this context, Bastiana (2017) and other scholars described that every component of implementation of education in the system must be improved in accordance with the fast development of science and technology. The internal as well as external components of educational process must have equal treatment (Timperley *et al.*, 2007; Bastiana, 2017; and Darling-Hammond, 2019).

Another assumed threat is the influx of foreign workers entering the competition in this country, when all globalization doors are opened. The implication is that even in meeting the workforce needs of local industry, the standard quality has to meet the global standard, so that Indonesian people is able to compete with those foreign workers and doesn't end up being excluded in their own country's job market competition (Kuptsch & Fong eds., 2006; Manyika *et al.*, 2016; and Thamrin, 2019).

Prevalent criticism by the industries who employ Indonesia's school graduates is that the competencies of the graduates still fall far behind the competency standards that the industry determined. Most industries still find it hard to get qualified and certified workforces; and, thus, have to spend a lot of fund and time for a training program to adjust the fresh graduated workers' competencies with the work system in the industries. The business and industry needs for competent workers today is yet to be met by the supply of potential workers (Widiyanto, 2013; Pardjono, Sugiyono & Budiyo, 2015; and Sayuti, 2015).

In 2018, for example, it was recorded

that the Indonesian workforces consisted of mostly just elementary school graduates with no higher degrees. Data shown in the figure 1 from Statistics of Indonesia (2018) depict that 16,923,691 of Indonesian workers consisted of 20.28% hard-labor workers/employees; 76.55% farm free workers; and 56.73% non-farm free workers held only an elementary school diploma or no education degree at all. The large numbers of elementary school graduates who didn't continue their education to higher degrees is feared to be a hinder in Indonesian workers' productivity since this low level of education means they have yet to master enough skills and competency to compete in the industry. This could end with them being unemployed or unable to compete with foreign workers with more skills and competency (BPS Indonesia, 2018). See again the figure 1.

Apart from this human resources challenge, Indonesia is also faced with challenges in the 4th Industrial Revolution era. The peak of Industry 4.0 is marked by the rise of digital technology massively impacting most aspects of human lives all across the globe. Challenges for the industry in this era is the integration of internet use with the production line to utilize the sophisticated technology and information optimally. The characteristics of Industry 4.0 include digitalization, optimization, and customization of production; automation and adaptation; interaction between machine and human; added value of business and services; automatic data exchange and communication; and use of internet technology (Schwab, 2016; Stankovic *et al.*, 2017; and Anbumozhi & Kimura eds., 2018).

One of the ways is by focusing on the development of manpower sector since industrial transformation will succeed with the support of competent workforce. In facing the Industry 4.0, there are at least three points to focus on. Firstly is quality, which means the effort to produce quality

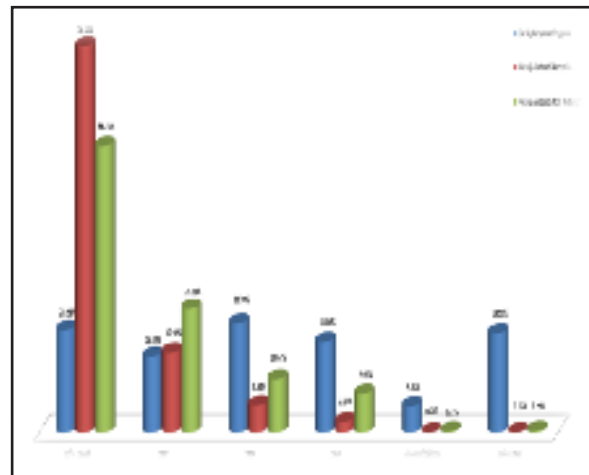


Figure 1:
Number of Indonesian Work Force
by Education Level
(Source: BPS Indonesia, 2018)

human resources to meet the needs of job market based on digital technology. Secondly, quantity, which means to optimally produce enough quality human resources to meet the industry needs. Lastly, distribution of human resources, which now has yet to be evenly distributed across sectors and areas (UNECE, 2013; Rojko, 2017; and Anbumozhi & Kimura eds., 2018).

In line with *Nawacita* Program, it is paramount for national education, especially vocational education, to contribute in preparing skilled and highly competitive human resources. Vocational high schools are a part of secondary education focusing on preparing work-ready graduates with specific skills for specific sector. According to Jatmoko (2013), and other scholars, vocational high schools are educational institutions with a potential to prepare work-ready workforces to be immediately absorbed by business and industry since applicative theory and practices are given to students from the very start of their school years, in hope of producing vocational high school graduates with competencies that meet the needs of the industries (Jatmoko, 2013; Pardjono, Sugiyono & Budiyo, 2015; and Mariah, 2017).

Similarly, Husaini Usman *et al.* (2013) and other scholars also explained that vocational education is also called technical education and occupational education. All with the same purpose: to prepare graduates to work in their specific sectors (Usman *et al.*, 2013; Mariah, 2017; and Puspendik, 2018). See the figure 2.

Vocational high school graduates are expected to contribute in the supply of quality workforces. The supply of quality workforces is important to ensure a win in the competition of global job market. In regards to the quality of graduates, figure 2 shows data of the national exam results of vocational high school students in the academic year 2017/2018, which reveals a national average score of 45.20. Among 34 Provinces in Indonesia, only 10 Provinces showed an average score above the national average score. This indicates the still lacking quality of vocational high school graduates and the uneven distribution of quality across Indonesia (Puspendik, 2018).

In line with the quality condition of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates, the number of unemployment for SMK graduates also increases each year. In 2016, for example, the number of unemployed SMK graduates was 1,348,327 people. It increased to 1,383,022 people in 2017; and in 2018, it increased again to 1,424,428 people (BPS Indonesia, 2019).

According to the Directorate General of Primary and Secondary Education MoEC (Ministry of Education and Culture) of the Republic of Indonesia, there were various aspects causing this significantly high number of unemployment for SMK graduates, among them were the problem of quality of the graduates that didn't match with the standards in the industry, and also

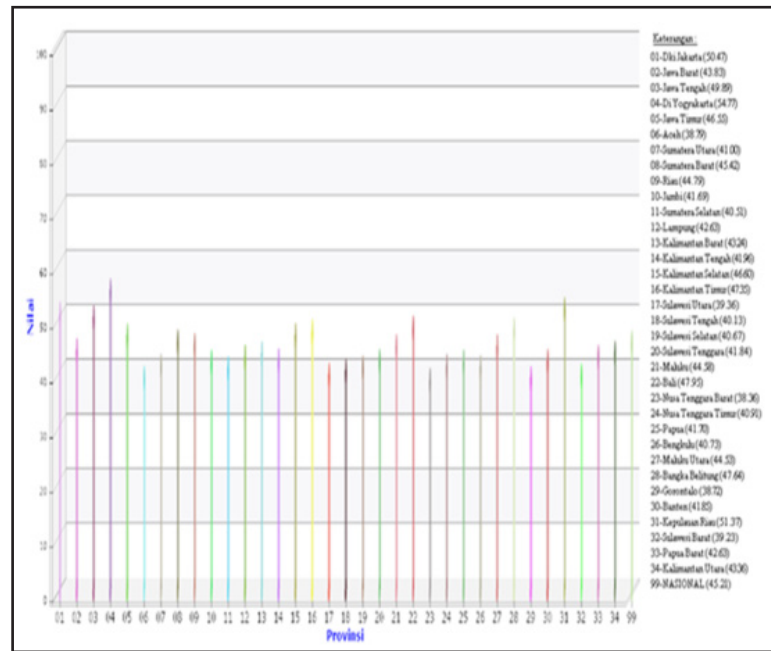


Figure 2:
Average Vocational National Examination Values, 2017/2018
(Source: Puspendik, 2018)

the excessive supply of graduates (OECD/ ADB, 2015; MoEC, 2016; and Yunikawati *et al.*, 2017).

This condition needs specific strategy to make sure vocational high school graduates able to enter the job market immediately, while also taking into consideration the Industry 4.0 demand. Workforce absorption is the number of workers employed in a specific business or industry. In other words, workforce absorption is the number of human resources working in and spread across various sectors in mass production of products or services (Adriyanto, 2013; Brewer, 2013; and Yunikawati *et al.*, 2017).

According to Vera Haryani Siburian *et al.* (2013), and other scholars, absorption of workforce is the number of job positions that have been filled, which is reflected in the number of people with jobs or being employed. Employed people are distributed across various economic sectors. The absorption of people in the work field means there is a demand for workforces. Thus, workforce absorption can be said as

workforce demand. Workforce absorption is influenced by both external and internal factors. External factors are economic growth, industrial output, inflation rate, unemployment rate, and interest rate; whereas internal factors are wage rate, workforce productivity, quality of job applicants, capital, and non-personnel cost (cf ILO, 2013; Siburian *et al.*, 2013; and Parray *et al.*, 2017).

There have been researches discussing the strategy of workforce absorption for vocational high school graduates. One of those research report written by Nugraha Aditia Tarsa (2017) entitled “Factors that Influence the Employment of Labor on Small Industry Processing of Fish in Bandar Lampung City”. The result of the analysis shows that the variable of working capital and the level of output have positive and significant effect on the absorption of labor in small fish processing industry in Bandar Lampung City, Sumatera, Indonesia. Variable wages have a negative and significant effect on the absorption of labor in small fish processing industry in Bandar Lampung City (Tarsa, 2017).

Another research report written by Muhammad Fuad Kadafi (2013), entitled “Analisis Faktor yang Mempengaruhi Penyerapan Tenaga Kerja pada Industri Konveksi Kota Malang” (Analysis of Factors Affecting the Workforce Absorption in the Garment Industry in Malang City)”, defined the workforce absorption (as the dependent variable) in relation to the independent variables including capital, sales volume, level of education, and wage. The analysis result showed that the level of education and wage had positive influence on the dependent variable. Whereas, simultaneously, the capital, sales volume, level of education/quality of graduates, and wage had significant influence on the workforce absorption (Kadafi, 2013).

It can be concluded that in welcoming the Industry 4.0 era, Indonesia still needs

to improve the quality and optimize the quantity of human resources. The low level of educational background of workers that mostly only hold elementary school diploma, quality gaps, and uneven distribution of quality of the vocational school graduates indicate how Indonesian human resources condition still lack footing in facing the global job market.

Thus, a particular strategy is needed to prepare Indonesian workforces better in entering the competitive job market. This is why author chose to conduct this study titled “Optimizing Workforce Absorption of Vocational High School Graduates to Prepare for the Era of Industrial Revolution 4.0”. This study aims to analyze the ways to boost workforce absorption of vocational high school graduates in line with what the business and industry need, in order to reach a job market balance in the Industry 4.0 era.

METHODS

This study used mixed method approaches, combining both qualitative and quantitative approaches, and used both primary and secondary data analysis. Secondary data were obtained from Statistics of Indonesia published database, the Ministry of Education and Culture of the Republic of Indonesia (for the education database), and the Ministry of Manpower of the Republic of Indonesia (for the data of workforces’ educational background). Meanwhile, the primary data regarding the strategy to meet the demand for and the supply of quality vocational high school graduates were obtained by conducting a FGD (Focus Group Discussion) with selected vocational high school principals, the provincial education office staff who managed vocational high schools, Surabaya State Polytechnic, and representatives from the BLKI (*Balai Latihan Kerja Industri* or Center for Industrial Work Training). The sample area selected for this study was East Java Province, and the data was collected in 2018 with purposive sampling based on

the number of industries in the area and the number of vocational high school graduates (Creswell, 2003; Driscoll *et al.*, 2007; and Williams, 2007).

This study also uses secondary data to determine the factors that influence employment, especially SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates, where the research variables are arranged based on theory and some results of previous studies used in this study. Some secondary data, which is also a variable in this study, include the number of vocational graduates who work with vocational education levels, the results of vocational graduates competency test, wages for vocational graduates, and the value of large and medium industrial output in East Java Province, 2008-2018. Some of the data is, then, processed according to the statistical model below (*cf* Driscoll *et al.*, 2007; Williams, 2007; and Fitriyanto, 2019).

The data also carried out several statistical tests, including classic assumption deviation test, regression analysis using SPSS (Statistical Package for the Social Sciences) 21, hypothesis testing, F-test, and coefficient of determination R^2 . In this study using natural logarithms, because the use of logarithms can minimize one of the deviations in the OLS (Ordinary Least Square) assumption, namely heteroscedasticity (Ghozali, 2007; Williams, 2007; and Ainiyah, Deliar & Virtriana, 2016).

The model form of the regression function above is, then, formed into multiple linear regression functions, whose forms of development are as follows:

$$\text{Ln}Y = \text{Ln}\beta_0 + \beta_1 \text{Ln}X_1 + \beta_2 \text{Ln}X_2 + \beta_3 \text{Ln}X_3 + \mu$$

Notes:

Y = Workforce absorption of vocational high school graduates in East Java Province (people).

β_0 = Intercept.

$\beta_1, \beta_2, \beta_3$ = Regression partial coefficient.

X1 = Quality of education of East Java

vocational high school graduates (competency exam result).

X2 = The wage of East Java vocational high school graduates (Rp).

X3 = Industrial output value in East Java Province.

μ = Disturbance error.

The result of data processing using SPSS (Statistical Package for the Social Sciences) 21 was, then, brought up and discussed in the FGD (Focus Group Discussion) with informants from the East Java Provincial Education Office, East Java Provincial Manpower Office, Department of Industry of the East Java Province, selected vocational high school principals from the skills competency relevant to the priority sectors the government focus on in facing the Industrial Revolution (food and beverages, chemistry, textile and clothes, automotive and electronics), the business and industry which had partnership with the schools, and practitioners. The FGD was conducted to formulate strategy in optimizing the workforce absorption of vocational high school graduates. In conducting the FGD, researcher used a guideline the East Java Province. The FGD result was expected to help formulate the optimal strategy in boosting the number of vocational high school graduates, who would be employed in the relevant business and industry (Ghozali, 2007; Williams, 2007; and Boateng, 2012).

FINDINGS AND DISCUSSION

Findings. Data analysis method used in this research was multiple regression analysis, which is a regression equation involving 2 (two) or more variables (Gujarati, 2013). Multiple regression is used to figure out how significant a change in independent variables affects the dependent variable. The data processing used regression calculation with the help of SPSS (Statistical Package for the Social Sciences) version 21.0, and implementing table of list to make analysis easier (Ghozali, 2007;

Gujarati, 2013; and Seltman, 2018).

Classical Assumption Test. It is consisted of: Normality Test, Multicollinearity Test, Heteroscedasticity Test, and Autocorrelation Test. The explanations are as following here:

Normality Test. The data processing resulted in normally distributed data with no deviation, and the data could be processed through the following methods. This was proven by observing that the data were scattered around diagonal curve in “Normal P-Plot of Regression Standardized Residual” on the figure above. Thus, it can be said that the regression model in this research is normally distributed.

Multicollinearity Test. Multicollinearity test is done to examine whether there is a correlation between the independent variables in the regression model. The formulation using SPSS (Statistical Package for the Social Sciences) version 21.0 resulted in VIF (Variance Inflation Factor) value and tolerance as follows: (1) Quality of graduates variable had VIF value of 1.006 and tolerance of 0.994; (2) Wage variable had VIF value of 1.493 and tolerance of 0.670; and (3) Industry output score variable had VIF value of 1.658 and tolerance of 0.603.

Based on the existing theory, if the VIF value < 10 and tolerance > 0.10 , then there is no disturbance of multicollinearity in the data. This means the values above fell between the accepted range and, thus, the regression model showed no multicollinearity (Ghozali, 2007; Williams, 2015; and Frost, 2017).

Heteroscedasticity Test. Heteroscedasticity test is used to examine whether there is similarity among variances from residual of one observation to another in the regression model. The graphic above shows no specific pattern, and it's randomly distributed, so it can be concluded that the data don't show heteroscedasticity problem.

Autocorrelation Test. This test is used to determine whether there is correlation between disturbance errors in certain period in the regression model. To test for

autocorrelation, this research used J. Durbin & G.S. Watson (1951) statistic. The calculation resulted in J. Durbin & G.S. Watson (1951) value of 1.876 and fell in the range of $-2 < DW \leq 2$; thus, this model doesn't show autocorrelation issue (cf Durbin & Watson, 1951; Montgomery, Peck & Vining, 2001; and Burlea-Schiopoiu & Mihai, 2019).

Regression Analysis. Data processing using the SPSS (Statistical Package for the Social Sciences) version 21.0 resulted in the following equation:

$$\text{LnY} = 2.328 + 0.396 \text{ LnX}_1 - 0.293 \text{ LnX}_2 + 0.149 \text{ LnX}_3 + \mu$$

The above multiple regression equation shows that:

Firstly, coefficient of quality of graduates variable in the equation is positive 0.396. This means that for every 1% increase of the quality of graduates, the workforce absorption would increase as much as 0.396%.

Secondly, coefficient of wage variable in the equation is negative 0.293. This means that for every 1% wage decrease, the workforce absorption would increase as much as 0.293%.

Thirdly, coefficient of industry output value variable is positive 0.149. This means that for every 1% increase of the industry output value, the workforce absorption would increase as much as 0.149%.

Hypothesis Testing. The results from the calculation using SPSS (Statistical Package for the Social Sciences) version 21.0 are as follow:

Firstly, *Quality of Graduates Variable (X1)*. The null hypothesis is $H_0 : \beta_1 = 0$, Quality of graduates (X1) has no partial positive and significant effect towards workforce absorption (Y) $H_a : \beta_1 > 0$. The statistic calculation for quality of graduates variable (X1), resulted in $t = 8.257$ with t significance of 0.000. Therefore, H_0 is rejected and H_a is accepted, and the hypothesis stating there is a partial positive and significant effect of quality of graduates (X1) towards the

workforce absorption (Y) is true.

Secondly, *Wage Variable (X2)*. The null hypothesis is $H_0 : \beta_2 = 0$, there is no partial negative and significant effect of wage (X2) towards the workforce absorption (Y) $H_a : \beta_2 < 0$, there is a partial negative and significant effect of wage (X2) towards workforce absorption (Y). The statistic calculation for wage variable (X2) resulted in $t = -2.384$ with t significance of 0.007. Therefore, H_0 is rejected and H_a is accepted, and the hypothesis stating there is a partial negative and significant effect of wage (X2) towards workforce absorption (Y) is true.

Thirdly, *Industry Output Value Variable (X3)*. The null hypothesis is $H_0 : \beta_3 = 0$, there is no partial positive and significant effect of industry output value (X3) towards the workforce absorption (Y) $H_a : \beta_3 > 0$, there is a partial positive and significant effect of industry output value (X3) towards workforce absorption (Y). The statistic calculation for industry output value variable (X3) resulted in $t = 2.106$ with t significance of 0.003. Therefore, H_0 is rejected and H_a is accepted, and the hypothesis stating there is a partial positive and significant effect of industry output value (X3) towards workforce absorption (Y) is true.

F-Test. The F-test is used to examine the significance of all the independent variables [quality of graduates (X1), wages (X2), and the industry output value (X3)] together on the dependent variable [workforce absorption (Y)]. The calculation using SPSS (Statistical Package for the Social Sciences) version 21.0 resulted in statistic $F = 157.748$ with significance of $F = 0.000$.

Therefore, statistic $F > \text{table } F$; F significance = 0.000 is less than 0.05. This means H_0 is rejected and H_a is accepted, and the hypothesis stating that independent variables [quality of graduates (X1), wage (X2), and industry output value (X3)] have a positive and significant effect together towards dependent variable is true.

Coefficient of Determination (R^2).

The percentage of significance of all the independent variables towards dependent variable is determined by the score of Coefficient of Determination (R^2). Coefficient of Determination (R^2) shows how significant is the independent variable affecting the dependent variable, which is expressed in percentage (Ghozali, 2007; Gujarati, 2013; and Seltman, 2018). Independent variables explained by dependent variable at 83.7%; while the other 16.3% is explained by other factors.

Discussion. This research analyzes the workforce absorption of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates in the Province of East Java, Indonesia, using the multiple regression analysis method with Ordinary Least Square. It specifically measures and analyzes the significance and relation of the independent variables consisted of quality of graduates (X1), wage (X2), and industry output value (X3) towards the dependent variable, workforce absorption (L) which is explained by a multiple regression equation system. The data sample period used for the model assumption was data from 2008 – 2018.

Firstly, the constant is 2.328, which means if it's assumed that the variables are constant, X1, X2, dan X3 the number of graduates being employed are 2 people.

Secondly, the quality of graduates has positive significance towards workforce absorption in medium and big industries in East Java Province, Indonesia. Quality employees have higher productivity compared to the less qualified workforce; thus, it has positive impact to workforce absorption.

Thirdly, wage has negative significance towards workforce absorption in medium and big industries in East Java Province, Indonesia. This is because the higher the wage demand is, the more the workforce absorption decrease. This means if there's increase in the employees' standard wage, the optimal employment rate by companies

will be less than the previous number. Vice versa, if the wage decreases, the companies will be able to hire more people and so the optimal employment rate will increase.

Fourthly, the output value has positive and significant effect on workforce absorption in medium and big industries in East Java Province, Indonesia. The increase in production value will increase demand for the product, so the need for more workforce will occur. When there is increase in the production value variable, the workforce absorption in medium and big industries in East Java Province also increases.

Based on the above calculation, it can be concluded that quality of graduates is a highly significant factor in the workforce absorption of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates in the East Java Province, Indonesia. Therefore, a further discussion with relevant informants were conducted to discuss the strategy to improve the quality of SMK graduates in order to improve their employment in the industries especially facing the digital era of industry 4.0.

The quality of SMK graduates in East Java Province, Indonesia, in 2018, had a steep decline compared to the previous year. As shown in the picture above, the average score for the quality of SMK graduates' competence in the East Java Province reached 75.07 in 2017. However, it dropped sharply to 44.22 in 2018. This drop of quality in achievement of SMK graduates would certainly affect the workforce absorption of SMK graduates in the Province, as was explained by the regression analysis using SPSS (Statistical Package for the Social Sciences) 21 in the previous section.

In an effort to improve the quality of graduates, it can be started from the creation of learning models. Among several learning models, there is a learning model that is proven to be effective in improving student learning achievement. This is evidenced through research conducted by Sofia Edriati

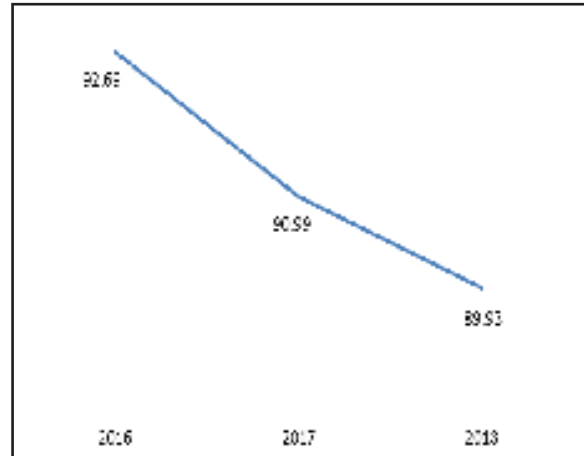


Figure 3:
Supply and Demand of SMK Graduates
in East Java, Indonesia

et al. (2016), and other scholars, which concluded that quantum teaching model learning that has been implemented has succeeded in increasing student learning achievement. The most significant increase occurred in students who had mathematical, interpersonal, and naturalist dominant intelligence (*cf* Kosasih & Dede, 2013; Dumanig, 2014; Ridwan, 2015; Edriati *et al.*, 2016; and Sholikhah, 2017). See the figure 3.

In line with the regression result, the workforce absorption of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates in East Java Province, Indonesia had been fluctuating. Looking at the figure 3, the balance point for the East Java Province in 2016 was 92.16, but it went down to 90.99 in 2016. It, then, dropped slightly to 89.93 in 2018.

According to the FGD (Focus Group Discussion), some of the reasons causing this trend were the lack of available work in the job market that was fit and correspond to the skill and competence of SMK graduates, the low quality of graduates, and high standard of worker selection set by the industries. This caused many graduates unable to be directly absorbed in the industries in East Java Province. Some of those who didn't get jobs directly would continue to study in non-

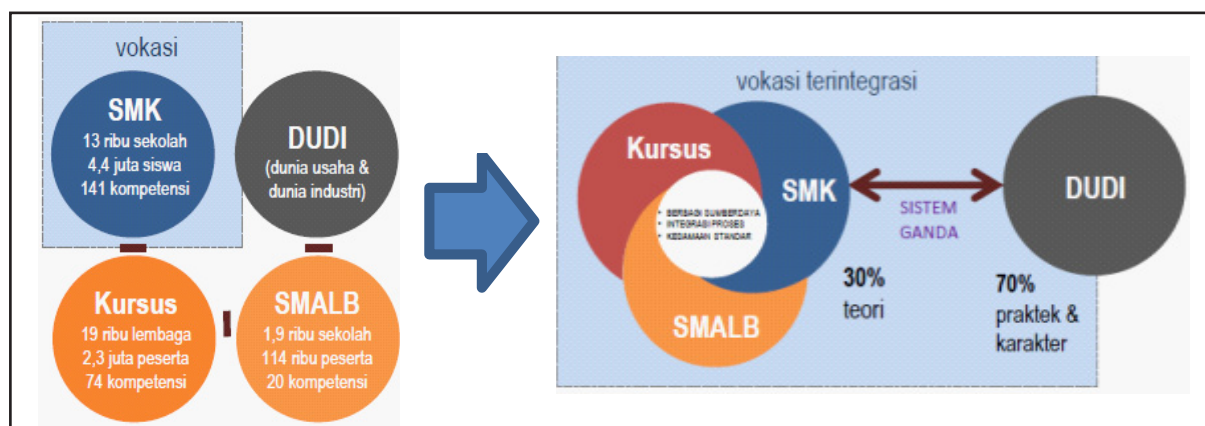


Figure 4:
Guarantee the Workforce Absorption

formal training, or courses, or a polytechnic to improve their competence in order to get jobs in the industry.

In reference to the regression result about the quality of achievement of SMK graduates and the balance curve of SMK graduates worker, a FGD then conducted with relevant informants from District Education Office, representatives from SMK and industries, Surabaya State Polytechnic, and representatives from Industry Training Centers or BLKI (*Balai Latihan Kerja Industri*) to discuss further the strategy to optimize the workforce absorption of SMK graduates.

The discussion pointed out that industries prefer graduates with strong positive characters, such as discipline, honesty, and hardworking. The SMK had always been putting effort to improve the quality of their graduates based on what the industry needs, but it still fell short, due to lack of facilities and infrastructures at schools, and the limited competency of teachers. To overcome this problem, SMKs had initiated cooperation and collaboration with polytechnic and training institutions. Furthermore, to accelerate the absorption of graduates as workforce, schools built a network of employed alumni together with other more qualified SMKs, and in cooperation with the industries and polytechnic (*cf* OECD/ADB, 2015; Kaylene

& Rosone, 2016; and Teixeira, Amoroso & Gresham, 2017). See figure 4.

Another point in the discussion was there was still a gap between the supply and demand of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates, so a concept to synergize all vocational institutions and industries is needed to guarantee the workforce absorption, as shown in figure 4. Related to the management of vocational education, the Ministry of Education and Culture of the Republic of Indonesia acknowledges three types of educational units in vocational education, which are: SMK, non-formal training and course, and special senior high school or SMALB (*Sekolah Menengah Atas Luar Biasa*). These three types of educational units have different education implementation processes, and are also under different management. SMK and SMALB are under formal education, while training and course is under non-formal education. These three types of education so far have always managed the education process separately (OECD/ADB, 2015; MoEC, 2016; and Yunikawati *et al.*, 2017).

Ideally, this integration process should start from the integration of the three types of vocational education units in three aspects, which are: resource sharing, process integration, and process unity. Resource

sharing means there could be a sharing of facilities, infrastructures, or teachers among the education units. This integration has another benefit of operational cost savings in vocational education implementation. Since the construction of vocational laboratories cost a lot, provisioning one in each education unit definitely requires a huge budget from the state and regional budget, or APBN (*Anggaran Pendapatan dan Belanja Nasional*) and APBD (*Anggaran Pendapatan dan Belanja Daerah*); and also a considerable amount of time (*cf* Brewer & Comyn, 2015; MoEC, 2016; and Usman, 2016).

By integrating all vocational education units in East Java Province, Indonesia, SMK can share its labs with training and course institutions and SMALB. This facility-sharing can be in the form of time-sharing meaning using it alternately, so the SMK students can still use the labs. Another sharing that can be initiated is sharing teachers and staff. As is known, vocational education units still short on productive teachers. Since teachers have to fulfill a 24-hours teaching requirement a week, teacher sharing could be a solution to ensure teachers meet the teaching hour requirement by having them teach similar subject and program in other SMK, SMALB, or training and course institutions.

CONCLUSION ¹

From the regression analysis and FGD (Focus Group Discussion) with relevant informants, it can be concluded that quality

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of graduates has positive significance; wage has negative significance; and output value has positive significance towards the workforce absorption of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates in the medium and big industries in the East Java Province, Indonesia. Quality of graduates has the greatest influence on the absorption of workforce graduates of SMK.

To improve the quality of SMK graduates in optimizing the workforce absorption in the era of Industry 4.0, an integration process of three types of vocational education units, such as SMK, SMALB (*Sekolah Menengah Atas Luar Biasa* or Special Senior High School), and training and courses, is needed. This integration can be in the form of resource sharing, learning process integration, and equalizing minimum service standards.²

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²**Statement:** I, hereby, declare that this article is my original academic work, and it is not the result of plagiarism. All the sources cited in the analysis and discussion, I include clearly and completely in the Reference list. This article has also not been submitted, reviewed, and published by other scientific journals. I am willing to be academically sanctioned, if what I declare turns out to be, later on, it is not true.

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One of the SMKs in East Java, Indonesia
(Source: <https://www.smkn2sby.sch.id/read>, 27/12/2018)

To improve the quality of SMK (*Sekolah Menengah Kejuruan* or Vocational High School) graduates in optimizing the workforce absorption in the era of Industry 4.0, an integration process of three types of vocational education units, such as SMK, SMALB (*Sekolah Menengah Atas Luar Biasa* or Special Senior High School), and training and courses, is needed. This integration can be in the form of resource sharing, learning process integration, and equalizing minimum service standards.