

# A study of the impact of cooperation between vocational high school and industries in Malang City

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**Abstract.** Education is a basic strategy in developing potential human resources and empowering unprivileged individuals to get life skills and knowledge which are recognized engines of economic growth and social development in any nation. TVET holds the master key for achieving this growth because it is driven by wheels of training skilled and entrepreneurial workforce needed in workplace. Also the strength and success of TVET lie in nature of their cooperation with industries. The purpose of this study was to ascertain the linkage between vocational high school (SMK) and industries in the field of information technology in Malang City. Quantitative design with descriptive approach in four (4) public vocational high schools selected with simple random sampling method with 32 participants. School management and Information Technology teachers are as the subject. The study findings showed that cooperation between vocational high schools with industries has great impact on the quality of vocational education as seen in the strong positive relationship. The study also revealed that various challenges of attaining quality vocational education in Malang. Still, the study revealed that common cooperation type that exist between SMK with industry is mainly Internship placement and job recruitment, on-job training with no significant cooperation in infrastructure.

## 1. Introduction

Education is a basic strategy in developing a civil society, noble character and personality with intelligence and life skills. According to Law Number 20 Year 2003 Article 1, explains that: "Education is a conscious and planned effort to develop the potential citizens to have spiritual power, self-control, personality, intelligence as well as skills needed by society, nation and state. In this regard, affording the quality human resources has become a demand and necessity for Indonesia. One way to achieve this is to improve the quality of education in which vocational education and training (VET) is the master key. According to the Law no. 20 of 2003 on the National Education System article 15, explains that "Vocational Education is an education system that prepares students to work in a particular field". It is education intended for graduates of SMK to be ready for work in certain fields of expertise [1] [2].



According to the Government Regulation No. 29 of 1990 states that vocational education is the development of students' ability to carry out certain types of work with the priority in preparing the students to enter the workforce with a developed professional attitude. Similarly to this, vocational High schools organize educational programs that are tailored to the types of employment or trains people for work [3]. Program Vocational High School is a secondary education program in the form of strengthening vocational education with the aim of preparing graduates who do not continue the higher education gap to be more ready to enter the world of work with competence owned in the field [1].

Therefore according to that literature review, Vocational High School (VHS / SMK) was mandated by law to prepare human resources that are ready for work or to enter the workforce and become a productive workforce. Ideally, graduates from vocational high schools are workforce ready to use in a direct sense of work especially in industries. This is supported by Kurniasari who said graduates from vocational schools are expected to have competitiveness, opportunity to enter the business world / industry and is expected to be able to prepare ready-made workers in community life [4].

However, from the preliminary research observation conducted on November 2016 in nine both public and private SMK in Malang city shows that many graduates from SMK are not all easily absorbed by the industries as it is assumed by the vision and objectives. This is because in SMK there is (1) skills gap due to mismatch in SMK programs and industries' needs and demands, (2) weaknesses in curriculum, (3) incompetent teachers with limited industrial training and experience, (4) large number of annual graduates leading to high competition among graduates, and (5) inadequate up to date learning facilities and infrastructure in vocational schools (SMK). This implies that vocational high schools currently still faces educational challenges that are generally related to equipment limitations, little practices, and the learning environment that does not conform to the world of work.

Basing on the data from the National Labor Force Survey (Sakernas) shows that the number of unemployment in February 2016 reached more than 7 million people. The highest unemployment rate by level of education was dominated by the graduates of general high school (22%) and followed by SMK (19.19%), junior high (18.70%), elementary (17.35%), while for University (9.90%) and Diploma 3 (30%). Referring to this data, the rate of absorption of vocational graduates in the workforce is still relatively low.

From this survey, unemployment rate of SMK graduates (19.19%) is still very high because the main objective and purpose of vocational schools is to prepare its students to be ready for work. However, if the survey results about unemployment rate by level of education still indicates that even vocational education graduates faces the same problem just like other graduates from general secondary education then this means that there is a serious problem in vocational education sector that requires more attention.

This observation is supported by the speech of Mr. Sumarna Abdurrahman the head of the National Board for Professional Certification (BNSP) who said; "Although, it is assumed that Technical and vocational education and training (TVET) or SMK programs are designed to prepare learners to profit and progress through it however, one of the problem facing TVET in Indonesia is the curricula failure to reflect the actual needs of industries. According to the National Board for Professional Certification (BNSP), the quality and competitiveness of vocational high school (SMK) graduates is still low. BNSP head Sumarna Abdurrahman says "our workforce is not much absorbed by the industry" adding that the quality of the workforce is influenced by different learning experience during the internship program and they finally face the real work. However, Sumarna expects the government to adjust SMK curriculum with standards developed by industry as well as Sumarna sees partnership between SMK and industry is essential" [5, 6].

Furthermore, in the Jakarta Post 2016 in PressReader.com [7], it is reported that every year 1.3 million SMK graduate students from over 12,000 vocational schools across the archipelago. Meanwhile, the population of SMK graduates according to Malang Education head office report 2016, is about 8,937 students who graduate every year which rises the competition for jobs vacancies in the industries hence leaving out many without work. Similarly, the official data shows that the unemployment rate of SMK graduates is higher than that of graduates of all other educational

institutions. The Central Bureau of Statistics (BPS) [8] August 2015 reported that, 12.65 percent of vocational school graduates were unemployed.

Therefore, it is clearly noted from the results of preliminary observation in 12 SMK in Malang supported by this evidence indicated above that the major problems facing SMK graduates can be summarized as follows; Skills gap (mismatch or link and match) between SMK curriculum and the industry needs, lack of field experiences by teachers, inadequate update learning facilities especially the equipment for school practices and stiff competition. Therefore, in order for SMK to improve the competence and quality of its graduates, SMK / VHS should establish and implement cooperative relationship with Industries (DU / DI). It is believed that the principal of SMK / VHS graduates in the real workforce that improves the quality of vocational high schools [1]. From the above discussions, the main objective of this research is to ascertain and understand the linkage between vocational high school cooperation with industries basing on industry support and contribution to these vocational schools in (i) school infrastructure and facilities, (ii) teacher competence and skills and (iii) student competence and skills.

In summary this research seeks to understand the following: *Firstly*, the way of the industry support vocational high schools in terms of Infrastructure & Facilities as a link to cooperation; *Secondly*, supporting of the industry to the school in improving teacher's competence and Skills in IT as a link to cooperation; *Thirdly*, the efforts of the vocational high schools getting the industrial support in terms of improving Student's competence and skills in IT as a link of cooperation; and *Fourthly*, identify the forms of cooperation exists between this school with industries in the department of information technology and describe the cooperation process.

## 2. Current state of vocational high school education in Indonesia

Vocational education and training at the secondary level has been increasingly expanding in Indonesia over the last decade of the development of TVET according to Prayono as cited in [9]. This has been evidenced from enrollment of senior secondary level in vocational education that increased by 158% between 2001 and 2010.

This has made the government to be focused on this sector as a key strategy for economic development although it has the challenge of link and match of the students' skills to current and future economic demands [10, 11].

The government of Indonesia recognizes that Technical and Vocational Education (SMK) plays a vital role in human resource development of the country through creating skilled manpower, enhancing industrial productivity and improving the quality of life. The Indonesian government through the Ministry of Education and Culture is efforts of attaining complete transition of students' enrolment ratio of general high school (SMA) to vocational high school (SMK) from 70:30 to 30:70 respectively implying that currently the government values more of vocational education to general education with the purpose of improving their human resource development with quality skills and knowledge. According to [12] says Vocational high schools in Indonesia are mandated to preparing students to be ready for workers and developing their professional attitude which could achieved through dual education system as a public policy in the form of professional skill education.

As noted earlier in the introduction, SMK in Malang still faces challenges and it is significant for SMK to develop strategic means of mitigating those challenges especially through cooperation with industries in their related school programs. Noted also, the success of effective vocational education and training is the engine of the curriculum, upgrading teacher skills with work sabbaticals or opportunities to interface more closely with industry, industry oversight in student assessment, and ensuring that SMK facilities and tools keep pace with the latest technological developments of industry [9, 10].

As stated from employer / employee survey (2008) reported in [9, 10], on the quality of graduates from vocational senior secondary schools (SMKs) revealed that SMK students have inadequate understanding of the curriculum which is not industry-specific. This criticism reflects the quality of the vocational education and training (VET) teachers employed and their qualifications [9, 10]. Also,

employers report that the curriculum of vocational schools is not based on some of the skills they provide [9, 10]

Therefore, a number of reasons can explain why SMK education is poorly coordinated with labor market demands to mention these includes; ineffective co-operation between the school with industry in planning and developing the curriculum as the majority of SMKs do not involve industry in curriculum planning; few industries co-operate with SMK in the provision of facilities and equipment; also, SMK graduates have limited access to labor market information; and inadequate number of teachers with both teaching and work experience in their area of specializations which makes them less relevant in comparison that the workplace requires.

Also, OECD/ADB research indicates that teachers in SMKs have limited exposure to the workplace because they often return to their schools they graduated from after qualifying. Also, the in-service training provided by VET training centers is weakly linked with industry, and there is a low turnover of teachers, as the majority of the staff interviewed had taught at their school for decades. It is also confirmed by findings of the literature that there is no way of managing or removing underperforming teachers [9, 10]. The quality and qualifications of teachers are important if students are to learn successfully.

The Indonesian government also recognizes that the strength and success of vocational high school education lies in entirely in the nature of their cooperation with industries that is why it introduce the “*Link and Match policy*” with efforts to improve the quality of vocational education. This is supported by Ghost who said that “to ensure the relevance of learning in school education, educators need to understand how workplace skills are continually changing” [13]. This means that the schools should know the current trends in the industries especially in workplace skills and dispositions while industries should know school activities and how to contribute to skill development thus requiring knowledge sharing. Therefore this makes school-industry cooperation very important.

According to Rediyono as cited in [14] says “Cooperation between the schools with industry is very essential and necessary in connection to technological development in the industry. Due to this rapid change means that the school would be far behind if it is not cooperating with the industry because the school is not possible to provide all the equipment in accordance with the needs of industry in the learning process in schools. In addition, cooperation with industry will also assist in distributing school graduates because the industry already know the extent of competences of the graduates of the school who have been cooperating with the industries concerned”.

### 3. Methodology

This research is a quantitative descriptive research with correlational approach. The research sample 32 people from four public vocational high schools with program study of computer technology and networking (TKJ), software engineering (RPL), and multimedia (MM). School management and I.T teachers in these public SMK in Malang City were the research subjects. Simple random sampling technique was used to select the sample [15, 16, 17] with a sample size of 32 respondents with 8 participants from each SMK.

The research study was conducted to investigate the linkage between vocational high school cooperation in the field of information technology in Malang city and used both primary and secondary data sources. Primary data were collected through questionnaire administration which was closed-ended type where each item / question was relevant to one or more aspects of the study. While secondary data was obtained from the school documentations, school websites as well as literatures on relevant to this research. Also, a brief face-to-face interview with respondents for 40 minutes as a support to the questionnaire results was used.

Statistics in the presentation and analysis of the empirical results was applied. Before the instruments were used to collect data, validity and reliability tests were conducted such as construct validity test of the questionnaire was carried out through consultations with the experts regarding the suitability of each indicator used in the instrument. Then, after consultation, the experimental stage was analyzed by correlation between the score of questionnaire items with total score using the

computations and the instrument were proved valid and reliable. The numerical data will be supported with qualitative information collected through face-to-face responden interview.

#### 4. Research findings

The Table 1 below summarizes the forms of cooperation that exist between vocational schools with industries.

**Table 1.** SMK Activities and the number of industries involved

Kind of SMK activity involvement	Number of Industries Involved in the SMK activities			
	SMKN 2 Malang	SMKN 3 Malang	SMKN 8 Malang	SMKN 10 Malang
Curriculum synchronization	10	13	12	11
Guest lectures (per semester)	5	3	4	2
Student internship	30	35	35	30
Competence assessment	4	6	3	5
Students job recruitment	13	13	13	13
Teacher training				
1. On-job training	7	5	7	8
2. Workshops	5		6	5
3. Teacher internship	6	4	7	6
		5		
Teaching factory	5	-	-	12
Infrastructure & Facilities	2	3	2	4

Table 1 also indicates the number of industries (small, moderate and large industries) that participate in the vocational school activities. Data findings from questionnaire returned supported by a brief face to face interview with the respondents, shows that school-industry cooperation exists mainly in the two research variables that is to say: teacher competence and skills (variable 2; in form of on-job training, teacher internship and workshops); student competence and skills (variable 3; in form of student internship, assessment and recruitment, curriculum synchronization and guest lectures); while in school infrastructure and facilities (variable 3), there is no significant cooperation identified from the collected data although through face to face interview with respondents, there was a general agreement by respondents from all the vocational schools that cooperation with industries in this aspect is also important. All schools accepted that they received some facilities from industries once in a while (not routine) and not so many items were received when they were interviewed by the researcher.

The research findings were computed and the following is the result of Pearson correlation analysis on each independent variable with respect to the dependent variable :

**Table 2.** Correlation of research variables

SMK – Industry Cooperation		
Research variables	Correlation values.	
Infrastructure & facilities	Pearson Correlation	0,634**
	Sig. (2-tailed)	<0,001
	N	32



Teacher competence & skills	Pearson Correlation	0,702**
	Sig. (2-tailed)	<0,001
	N	32
Students competence & skills	Pearson Correlation	0,739**
	Sig. (2-tailed)	<0,001
	N	32

\*\*Correlation is significant at the 0.01 level (2-tailed).

From the Table 2 above, it is noted that the correlation between SMK with industries in terms of infrastructure and facilities is 0.634 which means a moderate positive correlation with the sig value (P) 0.000. While the correlation between SMK with industries in terms of teacher's competence and skills is 0.702 which is a strong correlation with the sig value (P) 0.000. Also, the correlation between SMK with industries in terms of student's competence and skills is 0.739 which indicates a strong correlation with the sig value. (P) 0.000.

Using multiple regression in testing, Table 3, for the hypothesis, the following conclusions were drawn from the research results.

*H01: Industrial support to vocational schools in terms of infrastructure and facilities as a linkage of cooperation has great importance*, the multiple correlation coefficient between SMK with industries in terms of infrastructure and facilities was 0.054 which shows moderate correlation coefficient with a positive relationship. Sig value (P) is 0.036. This means the sig value (P) <0,05, and because the sig value (P) is less than significant level 0,05 with positive (r) value, it can be concluded that *H01* is accepted and *Ha1* rejected, meaning there is positive and significant relation between SMK with industries in terms of infrastructure and facilities although its contribution is small.

**Table 3.** Multiple correlation between variables coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standard. Coefficients	t	sig
	B	Std. Err.	Beta		
(Constant)	51.898	2.118		24.499	<0.001
Infrastructure	0.054	0.025	0.284	2.208	0.036
Teachers	0.081	0.036	0.322	2.217	0.035
Students	0.097	0.039	0.373	2.460	0.020

a. Dependent Variable: SMK – Industry Cooperation

*H02: Industrial support to vocational schools in terms of improving teacher's competence and skills in I.T has great value as a link to cooperation*, it can be seen that the multiple correlation coefficient between SMK with industries in terms of improving teacher's competence and skills was 0.081. This means a strong correlation with positive directional relationship. In addition sig (p) 0.035 is less than 0.05. This means that the *H01* is accepted, implying that contribution of this variable in SMK – industries cooperation in terms of improving teacher's competence and skills is high therefore being essential as well.

*H03: Industrial support to vocational schools in terms of improving teacher's competence and skills in I.T has great value as a link to cooperation*, it can be seen from the correlation between SMK cooperation with industries in terms of improving student's competence and skills is 0.097. This also means a strong multiple correlation coefficient with positive relationship with sig. (p) is 0.020 <0, 05. And because the value of sig. (p) is less than significant level 0,05, it implies that the contribution of this variable is so high in influencing the SMK – industry cooperation. Therefore *H03* accepted and reject *Ha3*.

Currently, industries have involved in 10 SMK activities as shown in Table 1 above. The higher number of industries participation is in the internship program (30-35 industries) following by the

student job recruitment activities (13 industries). Three activities in the teacher training supported by industries are on the job training, workshop and teacher internship. The industries have less supporting in enabling infrastructure and facilities. Teaching factory is supported by industries in two SMK but not for two others.

## 5. Discussion of the research findings

The results of the findings of this study that were obtained through both questionnaire and brief face to face interview with respondents shows that; there is no significant linkage between vocational high school cooperation with industries in terms of infrastructure and facilities although there is a positive attitude that this cooperation is important for the schools. In reality schools have no infrastructure support from industry since these schools established all their infrastructure with the support from government [18, 19, 20]. Respondents accepted that one time they got some facility support only in terms of computer hardware and software which was not given to them on routine basis. Also, there is both significant and positive linkage between SMK cooperation with industries in terms of improving teacher competence and skills especially in terms of on-job training, teacher internship, workshops etc.

Lastly, industry supports SMK with student's internship placement, recruitment, curriculum synchronization, guest lectures, and student's assessment as one form of improving student's competence and skills. This implies that there is significant and positive linkage between SMK cooperation with industries in terms of improving student competence and skills.

## 6. Conclusion and Recommendations

From this research findings, it can be clearly seen that cooperation between vocational high school with industries is crucial for both institutions (the schools and industries) because it enables the industry to get the competent and knowledgeable workforce at reduced costs since industry without knowledge cannot thrive to live, improving the public reputation and to the school enables it to produce quality output, updated curriculum based on the industry needs, internship placements becomes easier since knowledge without application is valueless.

From this research findings, it can be clearly seen that much as cooperation between vocational high schools with industries is crucial for both institutions (the schools and industries) although there are still many shortcomings to be fixed, for example there is still little industry support to the school in terms of infrastructure and facilities as well as low quality of employees for the industry needs. The research findings of this study indicated a positive and significant relationship between vocational high schools cooperation with industries in variable 2 (teacher's competence and skills) hence industry support to schools already exists. The research findings of this study also indicated a strong positive and significant relationship between vocational high schools cooperation with industries in variable 3 (students' competence and skills) which seems to be the main driving factor for SMK – industry cooperation. The research findings of this study finally indicated that the common forms of SMK – industry cooperation include: student's internship, guest lectures, student's assessment and recruitment, on-job training for teachers, teacher internship, and workshops.

Recommendations of this research include:

According to data findings of this research study obtained through the questionnaire method, the researcher has the following recommendations as given below:

Firstly, the researcher suggests that school has to establish the cooperation with industries. The cooperation give benefits for both student and teacher in term of improving competence and skills. Furthermore, students get more benefit in internship placement, job seeking and staff recruitment, The benefits for industries could be getting high qualification staff in competence and skills, free staffs during internship program, and also potential market for their products. Enhancing the level of cooperation should be done by the both party to obtain more benefit of the cooperation. Secondly, the researcher also suggests that the duration of dual education system in form internship placement of

students in industries should be increased from 3-6 months to at least minimum of one (1) year during the period of their programs. Furthermore, the research recommends the application of different methodologies and instruments of research in order to generate a more holistic information on the linkage between vocational high school cooperation with the industries in the field of information technology.

It is also recommendable that future study on a similar and related research should cover a wider geographical area that extends the boundaries of Malang city in comparison with the size and number of vocational institutions for more accuracy and clear perspective of the cooperation partners. More so, the research recommends future study to incorporate (include) even private vocational high schools in either Malang or across the boundaries of Malang city since this study only considered public vocational high schools in Malang city. Lastly vocational high schools should apply examples of some successful models such as Germany dual system, South Korea - a contract-based training and China models.

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