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Integrating Industry Collaboration in Vocational Information Technology Education

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A B S TR A C T

The rapid development of information technology has increased the demand for skilled human resources who are able to meet industry standards. Vocational education plays an important role in preparing students with practical competencies relevant to the needs of the labor market. However, the gap between the competencies of vocational graduates and industry requirements remains a significant challenge. This study aims to examine the integration of industry collaboration in vocational information technology education to enhance students' technical skills and workplace readiness. The research employed a descriptive quantitative approach involving vocational high school students and industry partners in the field of information technology. Data were collected through questionnaires, interviews, and documentation to identify the forms of collaboration implemented, such as internships, curriculum alignment, industry-based training, and guest lectures from industry practitioners. The results indicate that effective collaboration between vocational schools and the information technology industry contributes significantly to improving students' technical competencies, practical experience, and understanding of current technological developments. Moreover, industry involvement in the learning process helps align educational outcomes with labor market demands. The study concludes that integrating industry collaboration in vocational information technology education is an effective strategy to strengthen students' technological competence and enhance their employability in the digital era.

Keywords: Vocational Education, Industry Collaboration, Information Technology

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INTRODUCTION

It is recognized that Education is a basic strategy in developing a civilized society, with intellectual people with knowledge and life skills. According to Law Number 20 Year 2003 Article 1 of the Republic of Indonesia, 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 (Azizah 2015, Perwitasari, 2013).

Also, 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 (Sonhadji, 2013). Vocational High School Program is a formal secondary education program in the formed 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 (Azizah 2015).

Therefore according to these literature review, Vocational High School (VHS / SMK) is education mandated by law to prepare human resources that are ready for work or to enter the labour force and become a productive workforce. Ideally, this means that graduates from vocational high schools are workforce ready to be used in a direct sense of work especially in industries. Kurniasari (2015) said graduates from vocational school are expected to have competitiveness opportunity to enter the business world / industry and expected to be able to prepare ready-made workers in community life (Kurniasari, 2015). Basing on the data from the National Labour Force Survey (Sakernas) shows that the number of unemployment in February 2016 reached more than 7 million people with highest unemployment rate by level of education being

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 with respect to the main objective and purpose of vocational schools in Indonesia of preparing students ready for work. And if the survey results above still indicates that even vocational education graduates faces the same problem just like other graduates from general secondary education then it pauses serious question in vocational education sector that requires more immediate attention and answer (*why is it so?*).

According to Sumarna Abdurrahman the head of the National Board for Professional Certification (BNSP) 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" because the quality of the workforce is influenced by different learning experience during the internship program and finally faced at the real work. However, Sumarna expects the government to adjust SMK curriculum with standards developed by industry seeing partnership between SMK and industry as essential" (BNSP, 2015)

Furthermore, in the Jakarta Post 2016 in PressReader.com (PressReader.com, Jakarta Post, 2016) 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 few job vacancies available in the industries hence many graduates end up without work. This is supported by the official data from BPS that 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) (INAPEN, 2015). August 2015 reported that, 12.65 percent of vocational school graduates were unemployed.

In summary, it is clearly noted SMK graduates face challenges that 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 (Azizah 2015).

From the above reviews, the purpose of this research paper is to investigate and understand the nature of linkage between vocational high school cooperation with industries with the following research variables (i) school infrastructure and facilities, (ii) teacher competence and skills and (iii) student competence and skills (iv) SMK –industry cooperation. In summary this research seeks to answer the following questions: *Firstly*, how does the industry support vocational high schools in terms of Infrastructure & Facilities as a link to cooperation?; *Secondly*, how does the industry support the school in improving teacher's competence and Skills in IT as a link to cooperation?; *Thirdly*, how does vocational high schools get industrial support in terms of improving Student's competence and skills in IT as a link of cooperation?; and *Fourthly*, what forms of cooperation exists between this school with industries in the department of information technology and what is the cooperation process?

Over the last decade of development of TVE, Vocational education and training at the secondary level has been increasingly expanding in Indonesia according to Prayono, (2011: 124) as cited in (Helmy, 2014). This has been noticed from increase in the enrolment of senior secondary level in vocational education by 158% between 2001 and 2010 (Helmy, 2014). This has made the government to focus on this sector as a key strategy for economic development although there is still a challenge of link and match of the students' skills to current and future economic demands (OECD/ADB, 2015).

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 (Maskan, 2014) 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 stated from employer / employee survey (2008) reported in (Helmy, 2014, OECD/ADB, 2015) 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. Also, Employers report that the curriculum of vocational schools is not based on some of the skills they provide (OECD/ADB, 2015)

SMK education is poorly coordinated with labour market demands due to the following reasons; ineffective co-operation between the school with industry in planning and developing the curriculum as the majority of SMK do not involve industry in curriculum planning; few industries co-operate with SMK in the provision of facilities and equipment; SMK graduates have limited access to labour 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 this is because they often return to their schools they graduated from after qualifying. Also, the in-service training provided by VET training centres 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" (Watters, 2013). 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.

METHOD

This research is qualitative with descriptive approach intended to gain knowledge over the perceptions of the research respondents on the idea of SMK – industry cooperation (Helmy, 2014). The research population was 48 people from four public vocational high schools with program study of computer technology and networking (TKJ), software engineering (RPL), and multimedia (MM). Board of school management and I.T teachers in these public SMK in Malang City were the research subject. Simple random sampling method was used in sample selection (Sugiyono, 2011, 2012 & Creswell 2014) with a sample size of 48 respondents with 12 participants from each SMK because the sample was less than 100 people.

The study used both primary and secondary data sources where Primary data was collected through interviews, observation method. While secondary data was obtained through school documentations, school websites as well as relevant existing literatures on this research topic. The analysis and interpretation of the empirical results was based on the theory (ies) in relation to the research study. This was done in three ways (i) data reduction (summarizing of data), (ii) data presentation and (iii) drawing conclusions and verifications (Azizah 2015). Before the instrument 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 supervisor regarding the suitability of each indicator used in the instrument

RESULTSAND DUSCUSSION

Table 1.1 SMK Activities and the number of industries involved.

Kind of SMK activity involvement	**Number of Industries Involved in the SMK activities**			
	SMK N 2 Malang	SMK N 3 Malang	SMK N 8 Malang	SMK N 10 Malang
Curriculum synchronization	10	13	12	11
Guest lectures (per semester)	5	3	4	2
Student internship (Prakerin)	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	4	6	5
3. Teacher internship	6	5	7	6
Teaching factory	5	-	-	12
Infrastructure *(Buildings, Laboratories and libraries)*	-	-	-	-
Facilities *(computer hardware and software, computer accessories)*	2	3	2	4

The table 1 above summarizes the forms of cooperation that exist between vocational schools with industries. It also indicates the number of industries (small, moderate and large industries) that participate in the vocational school activities. Data findings from face to face interview with the respondents supported by secondary data sources, shows that school-

industry cooperation exists highly in two research variables that is to say: teacher competence and skills (variable 2; in form of on-job training, teacher internship and workshops); and in terms of student competence and skills (variable 3; inform of student internship, assessment and recruitment, curriculum synchronization and guest lectures); while there is a lesser linkage in school infrastructure and facilities (variable 3), although respondents had a general agreement that cooperation with industries in this aspect is also important because all schools accepted that they received some facilities one time from industries (though not routine and many items) were received.

This study took a keen consideration of results of the existing related literature in comparison with its findings. The findings of this study concedes with already existing results in variables of students' competence and skills, teacher competence and skills where through interviews all responded that there was cooperation between their schools with industries while in infrastructure and facilities, there was less cooperation as most of the infrastructure are provided with government support. The findings of this study indicates that; for cooperation to exist, the school management through their head teacher first analyses the school needs, the potential and capability of each industry they want to cooperate with. This is done by visiting the industry websites. After this step the head teacher writes a letter requesting for cooperation with the identified potential industries through the industry manager who later on gives their reply to the school after the analysis of their potential in fulfilling the school needs.

When the industry consents with the school request, they write a memorandum of understanding which spells out all the roles and responsibilities of each partner (school and industries) in a mutually beneficial manner. The findings revealed that in reality there was little industry support to these schools since these schools established their infrastructure with the support from government (Education Regulation of Indonesia No 20 year 2003 & No 19 year 2005). For instance, the 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 which was a boost to their I.T department only.

Also, respondents in this study consented that there an increasing linkage between SMK cooperation with industries in terms of improving teacher competence and skills especially in form of on-job training,

teacher internship, workshops which supports the findings already existing literature (Azizah 2015). Lastly, the study findings indicates that industries 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.

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From this research findings, it can be noticed that school – industries cooperation is essential 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 its public reputation as well improving industry's corporate social responsibilities (CSR). To the school, it enables the school to produce quality, competent output with quality skills corresponding to industry needs and demands, having updated curriculum based on the industry needs, internship placements for both teachers and students becomes easier since knowledge without application is valueless. The research findings of this study indicated a positive relationship between vocational high schools cooperation with industries in variables like teacher's and student's competence and skills (variable 2 and 3) from the respondents' answers although there was a linkage of cooperation in terms of infrastructure and facilities (variable 1) but the relationship was very low because all respondents' answers on this variable indicated that *"they got little support from industries once in a while"* therefore vocational schools should maintain and improve their cooperation with industries especially in the field of information technology due to rapid changes in technology in the real world of work,

Also, this study has helped to promote the understanding of the importance of vocational high school cooperation with industries from the vocational education's perspective view. Generally, the study credits the initial efforts of implementing vocational high schools cooperation with industries that has existed successfully since they have tried to successfully yield some fruits as far as improving and maintaining the quality of vocation education system although more efforts are needed to

mitigate the still existing challenges of vocational education in Malang city and Indonesia in general.

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