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Industry Revolution 4.0:

The Challenge for Secondary Education on Tourism and Hospitality in Indonesia

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***Abstract*—The purpose of this paper is to discuss the impacts of industrial revolution 4.0 to the tourism and hospitality industry and how the secondary vocational education respond to the impacts. The paper analyses discourses found in the literature. The result shows that the industrial revolution 4.0 needs basic skills, namely communication, critical thinking, and problem-solving that should be aligned with current information and technology skills. Indonesian government has developed vocational education revitalization policy that generated collaborative actions among several ministries to accelerate quality improvement for students. Some regional policies attribute to curriculum that emphasizes on hard skills improvement. This paper recommends concern on strengthening the characters that could enhance creativity, innovation, and ethics to prepare students in industrial revolution 4.0.**

Keywords—industry revolution; tourism and hospitality; secondary school; vocational education

I. INTRODUCTION

Vocational school at the secondary level *(Sekolah Menegah Kejuruan or SMK)* has been a priority in Indonesian education system. SMK will be used as terminology to refer the Indonesian vocational school at secondary level, hereafter.

The government understands that not all students could study at the tertiary education. After graduating from secondary education, some students also prefer to work. Therefore, the vocational schools are established to prepare the students with the skills and competence to work at some industrial sectors. Hence, those who might not continue to higher education could suffice their skills that meet the industrial demand.

The changing pattern of business landscape due to the Industrial Revolution 4.0 requires skills to adjust to the condition. Indonesia has four national development priority sectors, namely maritime, tourism, agriculture, and Creative Industries. These sectors are labours intensive that could provide some advantages to reduce unemployment at the society. As a result the community welfare would increase.

Furthermore, the government endeavours to accelerate quality improvement to this education scheme through Presidential Instructions No. 9, 2016 about SMK Revitalization [1]. The policy contains six strategic issues on updating link-and-match in curriculum design; fostering learning innovation; improving teacher's and education staff's professionalism; developing partnership and networks among schools, industries, and higher education; establishing infrastructure and facilities standardization; and good governance. Moreover, there are six ministries involved in the process of the revitalizations, namely Education and Culture; Research, Technology, and Higher Education; Industry; Workforce; Maritime and Fishery; Transportation; State Own Enterprises Energy and Mineral Resources; Health.

This paper focuses on revitalizations in Tourism and Hospitality SMK, in particular, discusses the impacts of industrial revolution 4.0 on the businesses landscape and how the school responds to these impacts.

II. THE IMPACTS OF INDUSTRIAL REVOLUTION 4.0 IN TOURISM AND HOSPITALITY BUSINESS LANDSCAPE

A. Industrial Revolution 4.0

Due to the continuous technology invention and improvement, society has changed the way of work, communication, and living [2]. The chronological industrial revolution 4.0 as follow. In the past, the steam engine was introduced at the 18th century and it altered the production system into a mechanical process. Machines substituted workforce that continually reduced the cost of labour and produced mass products. It is then called as the first industrial revolutions. The electricity-powered industry was introduced in the 19th century that marked the second industrial revolution. The 20th century, people begin to use computer intensively in their business, they also develop the Internet to support the business system and procedure, the third industrial revolution came up. The communication highway and globalization emerged during that time. At present, the 21st century, the previous technology developed faster. The combination of Internet-of-things, big data, artificial intelligence, fast data network leads to smart business and factories development. The integration of machines and human intelligent in this era has shaped different business landscape.

In responding to this situation, the industrial revolution 4.0 has threatened to 40% of jobs due to automatic and computerized systems [3]. Therefore, low-skilled labours would be replaced by machines.

Wilkesmann and Wilkesmann discussed discursive opinion about technology advancement that could be used as tools for supporting routine activities or, on another way, they could contribute to innovation [4]. They came up with the conclusion that the revolution is still at the early stage of its progress; the technology is still emphasized on supporting the routine activities, and not for innovation yet. Therefore, in the future, human would play an important role to shift the technology for innovation.

III. How The School Responds The IR 4.0

Indonesian Presidential Instruction number 9 Year 2016 about Secondary Vocational School (SMK) Revitalization to Improve Quality and Competitiveness of Indonesian Human Resources stated six priorities in improving the quality of SMK and ministries involved in this agenda.

The ministries and government institutions that involved in revitalizing the school are as follow:

- Ministry of Education and Culture, with responsibilities for developing the school roadmap, a link-and-matched curriculum that meets the industrial requirements, enhancing vocational school teacher's competency, improving collaboration with other ministries and institution as well as the industries, establishing the school development working group.
- Ministry of Research, Technology, and Higher Education, focuses on accelerating teacher competence through education and recognition system. The Ministry also encourages to develop study program at universities that can provide teachers for secondary vocational school.
- Ministry of Industry has responsibility to identify the industrial needs on human resources, improve access for internship for the students, support teaching factories and infrastructure development, and accelerate National Occupation Competency Standard.
- Ministry of Manpower focuses on forecasting the demand of secondary vocational school graduates, including the demand of the competency level, the type of work, numbers, location and time; accessibility in having internship at the training centres developed by the ministry, improving the quality of training centres, and accelerating National Occupation Competency Standard.
- Ministry of Transportation, Ministry of Maritime and Fishery, Ministry State Owned Company, Ministry of Energy and Mineral Resources, and Ministry of Health have roles in supporting certification, internship for the students and teachers, and also accelerating National Occupation Competency Standard.
- Ministry of Finance, developing standard and procedure for teaching factory development that is effective, efficient, and accountable.

The Head of National Certification for Profession Council is also involved in the revitalization. Governors in Indonesian Provinces have also roles in providing access to communities to have vocational education services, and developing teachers, educational staff, good governance, and competitive vocational school.

This paper will focus on analysing the curriculum structure that is regulated by Director General of Primary and Secondary Education, Ministry of Education and Culture, Number 07/D.D5/KK/2018 about The Structure of Curriculum for Vocational Secondary School (Sekolah Menegah Kejuruan) and Islamic Vocational Secondary School (Madrasah Aliyah Kejuruan). The regulation contains National, Local, and Vocational skills and competence required from the working occupational standard. It also provides minimum requirement for basic competence of each subjects, the samples of syllabus and lesson plan, and occupational competency standard for work certification.

The curriculum structure for tourism and hospitality field consists of 4 different competences that could be found in different majors at schools. The majors are 1) Travel Agency Operations, 2) Hotel Operations, 3) Marine and Ecotourism Operations, 4) Hotel and Restaurant operation. The first and second major, Travel Agency and Hotel Operations, is a three-year secondary education. While the later, Marine & Eco Tourism and Hotel & Restaurant operations, is a four-year education. The differences lie on complexity of subject, level expertise skills achieved, and specialization.

The structure of curriculum of those majors is as follow.

TABLE I. Three-Year Tourism and Hospitality Vocational Secondary School Curriculum Structure

National Content	**Credit Hours**
Religion and Character Education	318
Pancasila and Civics Education	212
Indonesian Language	320
Mathematics	424
Indonesian History	108
English and Other Foreign Language*	352
Sub Total	1,734
Local Content	**Credit Hours**
Art and Culture	108
Sport and Health Education	144
Sub Total	
Vocational Skills Content	**Credit Hours**
C1. Foundation of the Work Competency	
Digital Simulation and Communication	108
Applied Science	108
Tourism Knowledge	108
C2. General Competency	Credit Hours
Tourism Industry Communication	108
Sanitation, Hygiene, and Work Safety	108
General Administration	108
Other Foreign Language (Elective Course)	144
C3. Expertise Competence-Travel Agency Operations*)	Credit Hours
Reservation and Air Tariff Calculation	596
Travel Planning and Management	420
Tour Guiding	350
Meeting, Incentivem Conference, and Exhibition Management	348
Creative Products and Entrepreneurship	524

Table I. Cont.

Vocational Skills Content	Credit Hours
Sub Total	3,030
Total	5,016
C3. Expertise Competence - Hotel Operations*)	Credit Hours
Hotel Industry	133
Front Office	418
Housekeeping	384
Laundry	384
Food and Beverage	384
Creative Products and Entrepreneurship	524
Sub Total	3030
Total	5,016

The structure of curriculum consists of National Content, which is compulsory to all students at secondary schools. The local content subjects are different among schools because it contains local culture and geographic conditions of the schools. Vocational skills content consists of the foundation of work competence, general and specific competency. Travel agency and hotel operations have different specific competency but same credit hours. The internship is conducted during their second and third year. The students are send for 3-6 months at hotels, restaurants, travel agencies, or tourists attractions.

The four-year curriculum structure also have the same subjects at the national and local content. However, the specific competences subjects are more specific and the credit hours are also higher than the previous one. The structure is as follow.

TABLE II. FOUR-YEAR TOURISM AND HOSPITALITY VOCATIONAL SECONDARY SCHOOL CURRICULUM STRUCTURE

National Content	
Religion and Character Education	318
Pancasila and Civics Education	212
Indonesian Language	320
Mathematics	424
Indonesian History	108
English and Other Foreign Language*	488
Sub Total	1,870
Local Content	
Art and Culture	108
Sport and Health Education	144
Sub Total	252
Vocational Skills Content	
C1. Foundation of the Exepertise Competency	
Digital Simulation and Communication	108
Applied Science	108
Tourism Knowledge	108
C2. Basic Program Competency	
Tourism Industry Communication	108
Sanitation , Hygiene, and Work Safety	108
General Administration	108
Other Foreign Language (Elective Course)	144
C3. Expertise Competence - Marine and Eco Tourism	
Marine and Eco Tourism Planning and Management	762
C3. Expertise Competence - Marine and Eco Tourism	
Marine Tour Guiding	796
Eco Tourism Guiding	726
Reservation. Tour Leader, and Special Events	586
Creative Products and Entrepreneurship	864
Sub Total	4,526
Total	6,648

Table II. Cont.

C3. Expertise Competence - Hotel & Restaurants*)	
Front Office	520
Housekeeping	520
Laundry	520
Food and Beverage Service	902
Banquet Management	204
Rooms Division Management	204
Creative Products and Entrepreneurship	864
Sub Total	4,526
Total	6,648

Both of the curriculums contain less technology-related subjects. There is one subject, Simulation and Technology Digital Communication, which is also applied to all vocational secondary schools other than tourism and hospitality. The credit hours cover 2% of the total.

There are some subjects that might relate to technological skills, such as reservation and front office, however some schools might found it difficult to provide the facilities to introduce the technology on that field. It needs large amount of money to invest on the computerized system for the air reservation or front office, for instance.

IV. DISCUSSION

Madsen, Bilberg and Hansen found demand for vocational skills in education increases to cope with complexity in the technology used in manufacture in this industrial revolution 4.0 [2]. It will also give impacts to tourism and hospitality work, for example in computerized reservation system and communicating among employees, employers, or customers via Internet devices at hotel, restaurants, and travel agencies operations.

From the curriculum structures mentioned above, it is hard to evaluate that the schools has prepared for industrial revolutions 4.0.

However, technology is very dynamic and it is quite difficult for the curriculum to keep pace with the changes. Therefore, there are several issues to respond with this condition, and they are set out below.

First, strengthen internship program to transfer the technological knowledge for students. The technology at tourism and hospitality industry has changed rapidly. The use of computerized system in the industries demands specific skills. However, some schools has difficulty to provide facilities to respond to this needs. For instance, the travel bureau needs ticketing staff that familiar with computerized reservation system (CRS). Schools need significant investment for CRS or Global Distribution System (GDS) facilities. Some schools do not have sufficient materials and facilities to train the students for the skills. As a result, there will be a gap between the graduates and industrial demand. On the other hand, the internship could be solutions with schools that have the limitation in facilities. Sending students to industries for on the job training will provide them with an opportunity to learn and obtain the first-hand experience from the industry. However, an internship could be a drawback for students at the tourism and hospitality school [5]. Having experienced

working in the environment during the internship made the students devoid jobs in tourism and hospitality. This situation occurs due to the unfavourable tourism work characteristics. Tourism and hospitality occupation has a minimum salary, low skilled, negative work image, display unfavourable management, part-time, seasonal, plays as a "refugee sector", and have no viable career structure [5].

Secondly, technology skills should be complemented with soft skills. The curriculum structure has provided with character education and subjects related to develop the professionalism. Those subjects give a significant influence to soft skills development. Therefore, even though there is a limited subjects on technological skills, the soft skills are expected to be anticipate the lack on the technological skills.

When the students participate in the internship, they have to be able to adjust with the technology system fast. Hence, it is important to provide students on learning to cope with the new environment. Self-motivation, creativity, critical thinking, ethics, and communication skills would be important in the adjustment process. Those are soft skills that are also developed in the curriculum. Those skills would prepare the students to be able to live at the society. The corroborated result on education as a vehicle for students to live in the society [6].

Thirdly, the students are also encouraged in participating some students' competency competitions. There is an annual agenda for such competition held by the government. It could prepare the students with creativity, problem-solving, and how to live in a competitive environment. The competition is also intended to increase the students' critical thinking ability and agility.

In the final analysis, even though tourism and hospitality curriculum structure has less technological subjects, it could provide students with soft skills to learn and adjust quickly in the environment. Furthermore, it calls for good academic climate at the schools to support the critical analysis, communication, and other soft skills development. The qualified teachers are also important to support the learning environment at the schools.

V. CONCLUSION

In conclusion, it is important to improve the learning environment that enables students to have first-hand industrial experience through an internship, soft skills development, and competency competition. Therefore, vocational education could provide students with an ability to adapt in the dynamic environment caused by the technology advancement.

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