

# How Tourism Education Faces The Industrial Revolution 4.0

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**Abstract**—The industrial revolution has gotten into our life. It is important to find out a solution of incompatibility labour with the world of work. The relevance of education and work needs to be adjusted to the development of the era and education science. The tourism department is known to absorb a fairly good workforce. However, this sector must prepare itself to face the industrial revolution 4.0. Becoming a challenge to institution that create a graduate who have competencies who can operate and even provide services digitally. In order for graduates to be competitive, the curriculum needs a new orientation. Students must be face to all changes. The development of technology and information system is more advanced and it must be followed by students' adaptation to this development. This research is part of the preliminary doctoral research. In this preliminary article, the author uses qualitative research methods. Data collected in the form of secondary data (literature study), source book studies, also from previous studies. Background issues and literature studies on tourism education and industrial revolution 4.0 were analysed descriptively. This analysis leads to the role of tourism education in producing graduates who are capable and ready to face the industrial revolution 4.0.

**Keywords:** *curriculum; tourism education; industrial revolution 4.0*

## I. INTRODUCTION

Technology advances provide benefits and there is also an impact of weaknesses. Therefore, the industrial revolution must be addressed wisely. The 4.0 industrial revolution should not only be seen as excitement, but how to deal with it. How is the readiness to face the challenges of revolution 4.0 so that we or the workforce is not crushed by machinery and technology? One that arises due to technological advances that are all robotic, is the problem of unemployment. It is necessary to find a solution so that labour problems that are not in accordance with the world of work can be overcome. The relevance of education and work, needs to be adjusted to the development of era and science and technology while still paying attention to aspects of humanities [1]. By the arising of Internet, social media became a popular marketing tool among business companies – such in the hotel industry. Facebook, Twitter and

Trip Advisor (etc.) have a remarkable impact on the industry and determine both of private and business life [2]. The fact remains that tourism and hospitality education has tended to remain introspective. In part, this is because not only have the demands of the globalizing sector moved ahead of tourism and hospitality education's ability to deliver, but also as a field of study, tourism is youthful and has had to concern itself with many fundamental issues, long since resolved in more mature subject academic fields [3]. It is questionable whether the goal of tourism education is reducible to solely vocational education directly applicable to daily operations in the tourism industry. Whether skill development and field experiences are successful or not, these vocationally focused tourism education programmes raise questions regarding the role of tourism education. In the midst of the vocational focus of tourism programmes, schools are sending out professionals who could influence the host communities' culture and society [4]. Based on the background, the problem to be discussed in this article is how the industrial revolution relates to the development of the tourism industry and the readiness of the world of tourism education to face the industrial revolution.

## II. THEORETICAL REVIEW

The industrial revolution has gotten into our life. Technological advances provide benefits and there is also an impact of weaknesses. Therefore, the industrial revolution must be addressed wisely. The 4.0 industrial revolution should not only be seen as an aspect of information technology and communication purposes, but how to face it. How is the readiness to face the challenges of revolution 4.0 so that we or the workforce is not crushed by machinery and technology? The era of revolution 4.0 makes everything borderless with unlimited use of computing and data power, because it is influenced by the development of massive internet and digital technology as the core of the movement and connectivity of humans and machines. This era will also disrupt various human activities, including the fields of science and technology (science and technology) and higher education.

The challenge must be answered as an opportunity. Minister of Research, Technology and Higher Education Mohamad Nasir said that the challenge of the industrial revolution 4.0 must be responded quickly and appropriately by all stakeholders in the Ministry, Research, Technology and Higher Education environment in order to be able to increase the competitiveness of the Indonesian people amid global competition. Strategic policies need to be formulated in various aspects ranging from institutions, fields of study, curriculum, resources, and cyber university development.

The tourism sector has a workforce that is data literacy, technology and humanists. The answer is in the education sector, which is prepare its students to have the skills of knowledge, skills and attitudes that meet the demands of the tourism world.

According to the report in 2024 there will be websites which are operated by travel brands and offer “virtual reality samples” that show the potential traveller the view of the particular destination she/he plans to see and be able to hear the sounds as well and enables to the user to take an amazingly realistic walk through the streets for instance [5, Ch.33]. Virtual reality technology makes it easy for prospective travellers to see, hear and feel the tourist destinations they will go to. Technology makes it easy for tourists to get the information they want to travel. With communication information technology facilitates human work by using robotic or artificial intelligence (AI). A gap in curriculum research in tourism is evident from this analysis. This gap is caused by the fact that existing analyses of the curriculum operate within a research paradigm that results in only a partial account of the possible curriculum for tourism higher education [6]. Increased global concern about sustainability has placed pressure on businesses to justify the value of their products and services beyond personal profit and to take responsibility for the negative impacts of their activities. Tourism is particularly susceptible to this pressure, given its generally poor track record in terms of negative social, cultural and environmental impacts, and the lack of compelling evidence of benefits for either the individual tourist or destination communities [7].

The report from the World Economic Forum (WEF) 2016 stated that there was a change in skills needed by employers in 2015 and in 2020. The main skills needed by the world of work in 2015 and 2020 are as follows:

TABLE I. THE 10 SKILLS YOU NEED TO THRIVE IN THE FOURTH INDUSTRIAL REVOLUTION

No.	2015	2020
1	Complex Problem Solving	Complex Problem Solving
2	Coordinating with Others	Critical Thinking
3	People Management	Creativity
4	Critical Thinking	People Management
5	Negotiation	Coordinating with Others
6	Quality Control	Emotional Intelligence
7	Service Orientation	Judgement and Decision Making
8	Judgement and Decision Making	Service Orientation
9	Active Listening	Negotiation
10	Creativity	Cognitive Flexibility

Source: World Economic Forum, 2016

Complex problem solving is the main skill that college graduates must have in the world of work. Socio-economic and community problems that are increasingly complex and interrelated require high-level thinking skills and the ability to synthesize problems and solutions to any existing problems. Complex problem solving requires critical thinking skills and creative thinking. In 2020, these three skills must be possessed by students to be able to compete in the world of work, able to adapt to changes in the global environment, and excel in international settings. Education programmes have emerged in response to the following needs for human resource development in a challenging environment: (a) Keeping the industry abreast with the latest technology and trends; (b) The availability of qualified replacement staff at all times; (c) Raising the image of careers in tourism. (d) Staffing new and growing tourist industries; (e) Employment regulation; (f) Reduction of foreign labour; (g) Responding to increasingly demanding service and communications requirements of customers [8].

### III. METHODS

Research is part of the preliminary part of doctoral research. Articles are written using qualitative research methods, namely by searching the literature. Data collected in the form of secondary data (literature studies), source book studies, also from previous sources, previous studies. Background issues and literature studies on tourism education and industrial revolution 4.0 were analysed descriptively. This analysis leads to the role of tourism education in producing graduates who are capable and ready to face the industrial revolution 4.0.

#### IV. FINDING AND DISCUSSION

The tourism department is known to absorb a fairly good workforce. However, this sector must prepare itself to facing the 4.0 industrial revolution. The tourism sector should not only be an audience, but be able to take an advantage the advancement of information technology as an opportunity to gain foreign exchange. The tourism sector has actually been using information and communication technology for a long time in running its business. For example, airline ticket booking systems, trains, application-based transportation, hotel bookings and many other aspects. In the year prior to 2000, there were still many travel agents who sold airplane tickets. Minister of Tourism Arief Yahya reminded travel business people who still use manual methods to switch to a more practical system, based online. In addition, education in the tourism department must hold the concept of sustainability. APEC Sustainable Tourism amidst the Fourth Industrial Revolution in 2017, alludes to the industrial revolution 4.0, namely [9]:

1. Tourism industry is non-tradable so each member has its own opportunities –a perfect case for win-win partnership at APEC.
2. People are more free thanks to automation: the demand for T&T is increasing.
3. Robot and AI are competing but will co-exist with human led tourism.
4. Technology-enabled new offering for tourism: space travel, blended traveling.

The above description is an example of the use of technology in tourism. Becoming a challenge to institution that create a graduate who have competencies who can operate and even provide services digitally. The success of tourism marketing cannot be done conventionally anymore. Moreover, with the online application, tourists can find out the quality of a hotel or tourist destination by reading comments from other tourists who have come there. Ownership of hotels is no longer carried out by entrepreneurs who have large property and land. With the online application, everyone can rent rooms or houses to tourists. Of course, in this way, the expenditure of the travel budget can be lowered.

Meanwhile, the government through the Ministry of Research, Technology and Higher Education explained that there were five important elements that must be considered and will be carried out by the Ministry of Research, Technology and Higher Education to encourage national economic growth and competitiveness in the 4.0 Industrial Revolution, there are [10]:

1. Preparation of a more innovative learning system in higher education such as adjusting the learning curriculum, and increasing the ability of students in terms of data Information Technology (IT), Operational Technology (OT), Internet of Things (IoT), and Big Data Analytics, integrating physical objects, digital and human to produce competitive and skilled higher

education graduates, especially in the aspect of data literacy, technological literacy and human literacy.

2. Reconstruction of institutional policies for higher education that are adaptive and responsive to the 4.0 industrial revolution in developing the required transdisciplinary and study programs. Besides, Cyber University programs are being pursued, such as distance learning lecture systems, thereby reducing the intensity of lecturer and student meetings. Cyber University is expected to be a solution for the nation's children in remote areas to reach quality higher education.
3. Preparation of human resources, especially lecturers and researchers as well as engineers who are responsive, adaptive and reliable to deal with the industrial revolution 4.0. In addition, the rejuvenation of infrastructure and construction of educational, research and innovation infrastructure also need to be carried out to support the quality of education, research and innovation.
4. Breakthroughs in research and development that support the Industrial Revolution 4.0 and the ecosystem of research and development to improve the quality and quantity of research and development in Universities, R&D Institutions, Industry, and Society.
5. Breakthrough innovation and strengthening innovation systems to improve industrial productivity and improve technology-based start-up companies.

Meanwhile the Director General of Learning and Student Affairs of the Ministry of Education and Information [1] said that lifelong learning needs to be facilitated by the university (because education does not stop after obtaining a diploma). In order for graduates to be competitive, the curriculum needs a new orientation, because there is an Era of Industrial Revolution 4.0, not only enough Old Literacy (reading, writing, & mathematics) as the basic capital for acting in society. There is new literacy that must be mastered by college graduates, namely:

1. Data Literacy; The ability to read, analyse and use information (Big Data) in the digital world.
2. Technology Literacy; Understand how the machine works, the application of technology (Coding, Artificial Intelligence, & Engineering Principles).
3. Human Literacy; so that humans can function properly in the human environment: humanities, communication & design. Universities need to look for methods to develop student cognitive capacity: higher order mental skills, critical & systemic thinking: very important to survive in the era of industrial revolution 4.0. Human literacy is part of General Education that must be mastered by students. Data literacy & technology can be applied in elective courses.

Regarding government policy, Directorate General Belmawa issued policies relating to the Era of the Industrial Revolution 4.0:

1. Curriculum Reorientation: New literacy (data, technology, humanities) is developed and taught. Extra-curricular activities for developing leadership and working in teams to continue to be developed. Entrepreneurship and internship to be required.
2. Hybrid/Blended Learning, Online Implement a Hybrid/Blended Learning teaching system.
3. Life-long Learning Special Unit, it is recommended that higher education institutions have units that specifically provide life-long learning services.
4. HIGHER EDUCATION Policy of the Directorate General of Belmawa Era of the Industrial Revolution 4.0. Grant and Bimtek from Belmawa to reorient the curriculum (GEN-RI 4.0) to 400 universities [1].

Higher education needs to implement a hybrid teaching system, in which part of the academic burden of students is followed face-to-face, while others can be obtained through online lectures, both those provided by higher education institutions and other institutions/universities. In this system, students still need to come to campus, not only to attend face-to-face lectures, but also no less important is to interact with other students in various extracurricular activities, which will foster social solidarity and shape their personality, which will be useful later in the field work as well as citizens [9, Ch.115-255]. Moreover, in the preparation of tourism curricula, it must be based on the concept of sustainable tourism development. One of the principles of implementing tourism development upholds human rights, cultural diversity and local wisdom. In the context of pluralistic community understanding, in addition to culture, ethnicity, Indonesian society also consists of various regional customs and cultures, which are territorial in nature, which are meetings of various customs, cultures of ethnic groups in the area [12]. Multiculturalism may need to be understood not only as a training for competencies geared towards managing diversity, but rather a process of educating students and staff for integration in an intercultural working environment. It is believed colleges and universities, offering hospitality and tourism programmes, can readily support learning in these areas by providing greater focus within their curricula to legal and other aspects of multiculturalism and multi-ethnicity [13]. It is certainly important to teach students from a variety of perspectives about sustainability to lessen hospitality and tourism's negative impacts and maximize its positive impacts in general, but more specifically teaching sustainability is important because a destination's natural and cultural resources are tremendously strategic resources [2].

Tourism universities must address this, by choosing alternative strategies to learning in higher education. According to [11, Ch.157], to deal with all these advances and the need to remain rooted in Indonesian values (such as mutual cooperation, nationality and nationalism), of course a new and different set of skills and knowledge is needed from the previous one that must be possessed by students both bachelor or master degree, there are:

1. The ability to think creatively, critically, and innovatively, and interdisciplinary and multidisciplinary sensitivity.
2. Mastery of communication technology and cyber-space research capabilities.
3. Receptive mind and multiculturalism.
4. The importance of teamwork, negotiation and geographical mobility.
5. Effective communication skills.
6. Think globally, act locally, and internationally collaborate.
7. Science of data skills
8. Understanding of Indonesia, nationality and diversity.

Students must be face to all changes. The development of technology and information system is more advanced and it must be followed by students' adaptation to this development. Not only that, innovation also continues to develop in all aspects of life, both socio-economic and cultural.

Tourism is a relatively new field of study that emerged from vocational education. The nature of tourism education seems to contribute toward tourism pedagogies, driven by business and economic considerations [4]. Based on the results of meetings of teachers and tourism practitioners in Austria, reports on an initiative to examine the future of tourism education into the years 2010–2030. The responses of 16 participants were summarized and the following four categories emerged [14]:

1. Destination Stewardship Skills: (a) Management of real and virtual networks, (b) Knowledge sharing skills; (c) Ability to respect and work with all stakeholders; (d) Managing complex adaptive systems; (e) Environmental management skills.
2. Political and Ethical Skills: (a) Ethical behaviour: demonstration and motivation; (b) Integration of basic human values into the workplace; (c) Lobbying and the ability to influence the political process.
3. Enhanced Human Resource Skills: Team building; (b) Effective listening and negotiation; (c) Motivation and leadership; (d) Working with distributed, virtual project teams; (e) Emotional intelligence.
4. Dynamic Business Skills: (a) Flexibility; (b) Multitasking; (c) Critical thinking; (d) Optimal use of common sense; (e) Innovation/entrepreneurship Communication skills using new multimedia technologies; (f) Cross-cultural competencies; (g) Risk identification, estimation, and control; (h) Avoiding problems rather than solving them.

Tourism education is closely linked to vocational education. 21st century literacy must be mastered by tourism students. From the aspect of higher education, curriculum development must be flexible following market developments, Technology (IT), Operational Technology (OT), Internet of Things (IoT), and Big Data Analysis. However, the understanding of Indonesia, nationality and diversity must still

be roots in the values of nationalism. Think globally, act locally, and internationally collaborate.

## V. CONCLUSIONS

Technological advances provide benefits and there is also an impact of weaknesses. For this reason, the industrial revolution must be addressed wisely. The era of revolution 4.0 makes everything become borderless with infinite (unlimited) use of computational power and data. One that arises due to technological advances that are all robotic, is the problem of unemployment. It is necessary to find out a problem solution of incompatibility labour with the world of work can be overcome.

The tourism department is known to absorb a fairly good workforce. However, this sector must prepare itself to facing the 4.0 industrial revolution. Becoming a challenge to institution that create a graduate who have competencies who can operate and even provide services digitally. In order for graduates to be competitive, the curriculum needs a new orientation, because of the Era of the Industrial Revolution 4.0. There is new literacy that must be mastered by college graduates, namely (1) Data Literacy, (2) Technology Literacy, and (3) Human Literacy.

Curriculum development must be flexible following market developments, Technology (IT), Operational Technology (OT), Internet of Things (IoT), and Big Data Analytics. Universities need to implement a hybrid teaching system. In the preparation of a tourism curriculum, it must be based on the concept of sustainable tourism development. One of the principles of implementing tourism development upholds human rights, cultural diversity and local wisdom. To deal with all these advances and the need to remain roots in Indonesian values (such as mutual cooperation, nationality and nationalism), students must be open to all changes.

Future research can develop a socio-cultural tourism curriculum. The research is closely related between culture and social sphere in tourism learning. The socio-cultural

aspect becomes an asset that must be maintained and preserved, which in turn becomes a capable tourist attraction.

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