

Indonesian Government Policies for Education in Facing the Fourth Industrial Revolution (4IR)

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Abstract:- Digital transformation In the industrial era 4.0, describing the world is entering a fourth-generation industrial revolution (Fourth Industrial Revolution, 4IR). The fourth-generation was marked by the emergence of supercomputers, smart robots, driverless vehicles, genetic editing and the development of neuroethology that enabled humans to further optimize brain function. It can be believed that there is integration between science and technology, and it was in this era that the Science and Technology were finally able to come together so that education in this era was an education that implemented a digital system. One product of the integration of information technology into the world of education is e-learning or electronic learning. In higher education institutions, e-learning has opened new understandings in terms of the teaching and learning process. In the industrial era, e-learning is considered capable of helping the process of increasing student competency. In the face of the industrial revolution, educators must follow the core competency program that is by the needs of the industrial revolution 4.0. Five important Kemenristekdikti (Ministry of Higher Education) policies must be implemented to encourage competitiveness in the global arena in the era of the Industrial Revolution 4.0, namely: (1). Preparation of more innovative learning systems in tertiary institutions, 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, digital and human objects to produce competitive and skilled college graduates, especially in the aspects of data literacy, technological literacy, and human literacy. (2). Reconstruction of higher education institutional policies that are adaptive and responsive to the industrial revolution 4.0. (3). Preparation of human resources especially educators and researchers as well as responsive, adaptive and reliable engineers to deal with the industrial revolution 4.0. (4). Breakthroughs in research and development that support the 4.0 Industrial Revolution and research and development ecosystems to improve the quality and quantity of research and development in universities, R&D institutions, LPNK, industry, and society. (5). Breakthrough innovation and strengthening innovation systems to increase industrial productivity and improve technology-based startups.

Keywords:- 4IR, Government Policies, Education, Indonesia.

I. INTRODUCTION

The improvement of the quality of human resources is determined by the exceptional education that is quality education in preparing students to be able to think critically and creatively in facing the challenges of the industrial revolution era 4.0. Educators are one who has a very large role by focusing on improving the quality of learning in the learning process in the classroom. Efforts to improve the quality of students is very important for capital to face the industrial era. active, creative, innovative, collaborative and have skills communicative and can answer challenges in the future. When this is said to be the millennial century because students must require learning experiences and self-maturity in facing the changing era of globalization and adaptation in the level of life that continues to develop in the world community. In the 21st Century, it was said with the 4.0th Industrial evolution that a condition in the 21st century was a massive change in various fields through the integration of technology. Where information technology has become the basic in human life and all things become borderless with the use of unlimited computing and data, because it is influenced by the development of the internet and digital technology as a massive backbone of human movement and connectivity and machinery (Kemristekdikti, 2018a).

Changes in the world are now entering the era of the industrial revolution 4.0 or the world industrial revolution where higher education must prepare qualified graduates who can compete globally, and mastering technological development is important for everyone and important for the future of a country.

In the 21st century, the role of higher education is now important to equip students' abilities, especially prospective teachers, to be able to play an active role in developing capabilities. Someone categorized capable (capable) are those who know how to learn; creative; have a high level of self-efficacy; can apply competence . new and familiar situation; and work well with other people. The competency elements formulated in the study program curriculum must also include (1) affection, (2) character, (3) higher-order thinking skills, (4) certain abilities that are relevant to the needs of individuals, groups, outside communities, (5) opportunities for self-development. Affection is grown and developed in students, in accordance with the foundation of personality and work behavior in Presidential Regulation No. 08/2012 concerning KKN (Widodo et al, 2015). Thus, the support and role of higher education are expected to

increase the competitiveness of the Indonesian people amid the global competition of the rapid development of information technology (Berry, 2016). According to (KemristekDikti, 2017) states that the role of science and technology is expected to make a real contribution to the national economy.

The Millennials generation in the industrial era 4.0 held a commitment to increase flexibility in manufacturing, *masse*, with better quality and productivity, (Zhong, et al., 2017). Rapid changes experienced by the community due to the rapid development of information technology brings many impacts on human life, generally positive and negative (Hariastuti et al., 2017). Mohammad Nasir, Minister of education and culture revealed "industrial revolution 4.0 includes the preparation for a learning system that is more innovative in college, or adjust the existing curriculum related to technological development is so rapid, so that, in preparation for the network system should be developed continuously," (Rialita, 2018).

The development of digital technology has disrupted a variety of human activities, not only as a driving force for the economy but also including the fields of science and technology and higher education. Strategic policies need to be formulated in various aspects ranging from institutions, fields of study, curriculum, resources, and the development of innovating in Higher Education in Indonesia are required to be able to anticipate the rapid technological development that occurred in the era of the industrial revolution 4.0. The curriculum design and education method must also be able to adjust to the evolving business climate, educational services, and industrial business are also very fast developing, and increasingly competitive that must follow the development of technology and information. Changes that occur in the era of the industrial revolution are also very influential on human character, the world of work so that the skills needed are also rapidly changing. The challenge we face is how to prepare and map the workforce of education graduates who are really ready to work, which in other words professional by their fields of expertise, in the face of the industrial revolution 4.0. The world of work in the industrial revolution era 4.0, is an integration of the use of the internet with this product in the industrial world that utilizes the sophistication of technology and information (Maemunah, 2018).

II. MATERIALS AND METHODS

This study was using the study of qualitative. Method used in this paper is the method of analysis, the literature review coupled analysis of descriptions through various studies literature in strengthening analysis supported from various sources that have a depth of theories of experts on education policy in the era of revolution industry 4.0. Through the analysis approach to the decision, studies can be used as a basis in developing government policies in the field of education, the priority aspect can be used as a reference in the face of developments that continue to develop.

III. RESULTS AND DISCUSSIONS

Ordinary policy refers to a set of objectives, plans or proposals, programs and, presents a number of influences, as well as laws or regulations. Educational policy is public policy in the field of education. Policy of education is the key to excellence, even the existence, for government nations in global competition, so that the policy needs to be given priority access to ere- globalization (Mark Olsen, et al.2008). One of the main arguments is that globalization brings the value of democracy. Democracy the results are supported by educators' democracies. As stated earlier, educational policy is understood as part of public policy, namely public policy in the field of education. Education policy then is a policy that aims to achieve the purpose the build a country, nations in the field of education, one of the development goals a country nation as a whole.

While educational policies based on the nature of education are the whole process and the results of the formulation of educational strategic steps outlined in the vision, mission of education, to realize the achievement of educational goals in a society for a certain period of time. Educational policy in Indonesia based on the Republic of Indonesia Law No. 20 of 2013 concerning the National Education System. To determine choices in formulating policies in education, it is necessary to be safe about the views on policy objectives, namely: (1) policy objectives are seen from the community level, (2) policy objectives are viewed from the level of politicians, and (3) policy objectives are seen from the economic level. The basic problem in the world of education in Indonesia is the low quality of education. This is shown, with the high quality of education inequality across a region. Educational development indicators at the provincial level show two trends, namely in the category of the category above the national standard and below the national standard. The strategy to achieve national education in the 21st century within the Unitary State of the Republic of Indonesia, which is a diversity of geodemographic, culture, and taking into account global and local issues related to national culture and character, as well as potential, must include the responsibilities of relevant stakeholders in determining policy and political will to solve the task of shifting paradigms (Maemunah, 2018). The education strategy includes operational implementation to achieve the following paradigm goals:

1. Increase commitment, expand the power of stakeholders, among others, the central executive body in the regions and their ranks, as well as the central and regional legislative bodies through appropriate tasks and functions.
2. Increasing the participation of the informal sector and non-governmental organizations, especially in non-formal and formal education, following the new paradigm.
3. Promote and enhance the creative potential of innovative communities in the development and implementation of paradigms that are consistent with the local culture.

4. Growth and improvement of human resources in education, which is related to the application of the paradigm.
5. Expansion and alignment of the existence of formal and non-formal education by the needs of the community and the potential development of their respective regions. (Hadi, H. 2002).

The education sector in revolution Industry 4.0 describes the various ways to integrate various cyber technologies. The 4.0 industrial revolution in the world of education is a leap from the 3.0 era of education which included the meeting of neuroscience, cognitive psychology, and educational technology, using web-based digital and mobile technologies, including applications. Hardware and software, and other matters relating to the internet network. Education of the 4.0 revolution era is far above the 3.0 era in several ways namely, education 4.0 is a phenomenon that responds to the need for a fourth industrial revolution. According to MuhadjirEfendy (Minister of Education and Culture, .2017) Where humans and machines are aligned to get solutions, solve problems and of course discover new possibilities of innovation. The education sector needs to revise the curriculum by adding five competencies in the face of the industrial revolution 4.0, namely:

- a) Students are expected to have the ability to think critically
- b) It is expected that students have created and innovative abilities.
- c) The need for communication skills and skills possessed by students.
- d) Cooperate and collaborate.
- e) Students must have confidence in themselves.

In the era of industrial revolution 4.0, the role of the teacher was no longer required to only serve the transfer of knowledge in front of time, and the task of the teacher was no longer limited to making students smart, but also providing motivation, building character so that they become individuals or individuals with integrity. In today's digital world, the role of the teacher is still very important even though knowledge is now accessible from many sources. In this industrial revolution era, demanded that teachers can give birth to learners who are creative, innovative, able to challenge the source - a source of credible, following scientific rules and also ethics.

Minister of education and culture also explained that there are several important elements which should be a concern and will be implemented by Kemenristekdikti to boost economic growth and competitiveness of the nation in the era of the Industrial Revolution 4.0, namely:

1. Reconstruction of higher education institutional policies that are adaptive and responsive to the industrial revolution 4.0 in developing the transdisciplinary science and study programs needed. Besides, the Cyber University program has begun to be pursued, such as distance learning lecture systems, thereby reducing the intensity of lecturer and student meetings. Cyber University is later expected to be a solution for children

of the nation in remote areas to reach high quality higher education.

2. Breakthroughs in research and development that support the 4.0 Industrial Revolution and research and development ecosystems to improve the quality and quantity of research and development in universities, R&D institutions, LPNK, industry, and the community.
3. Preparation of more innovative learning systems in higher education such as adjusting the learning curriculum, and enhancing students' abilities in terms of Data Information Technology (IT), Operational Technology (OT), Internet of Things (IOT). Data Analytics, integrating physical, digital and human objects to produce competitive and skilled college graduates, especially in the aspects of data literacy, technological literacy, and human literacy.
4. Preparation of human resources, especially teachers and researchers as well as responsive, adaptive and reliable engineers to deal with the industrial revolution 4.0. In addition, the renewal of infrastructure facilities and the construction of educational infrastructure, research, and innovation also need to be done to sustain the quality of education.
5. Innovative breakthroughs and strengthening of innovation systems to increase industrial productivity and improve technology-based startups. Everything in the face of the industrial revolution era 4.0 needs to be prepared carefully, for example, changing learning methods or applying learning media to support learning activities to be carried out effectively and efficiently. Students need to have various abilities to be able to face the era of the industrial revolution 4.0. One of the skills students need to have is Creative and Critical Thinking. Creative and Critical Thinking becomes indispensable because it is not limited to ordinary thinking processes, but curiosity, analyzing something, observing and suspecting or doubting about something will cause students to think critically and creatively (ElfiraYasni, 2018).

A. *Learning in the industrial revolution era 4.0*

The 21st century is marked by the emergence of the industrial revolution era 4.0 as a century of openness, a century of globalization, a century without limits, a century of chaos, or a century of technological disruption, meaning that human life in the 21st century underwent fundamental changes that differ from the order of life in the previous century. It is said that the 21st century is a century that asks for quality in all human endeavors and work. Approximately 80% of innovations in manufacturing are based on ICT (Wahlster,2012). The broad digitalization and application of ICT makes it possible to integrate all systems throughout the supply chain and value and enables data aggregation at all levels. Furthermore, Wahlster revealed that recent advances in the ICT sector formed the basis of Industry 4.0 because industrial processes had begun to go beyond simple production automation that began in the early 1970s.

Naturally, the 21st century demands quality human resources, which are produced by professionally managed institutions so that they produce superior results. Along with the era of industrial disruption, education also experienced severe disruption, which affected learning in schools. Educators so far have played a role as the main source of knowledge and began to shift. The possibility that one day, the presence of teachers in the classroom is no longer expected. Also, in the future teachers will be needed who have the creativity and technological literacy. The following table 1 presents the evolution of learning following the industrial revolution.

The era of the industrial revolution 4.0 is a formidable challenge for teachers and lecturers in Indonesia. Teachers and lecturers must be able to change the way of teaching and teaching and learning (PMB), otherwise, our generation will have difficulty dealing with life to come. In the future education must be able to create the next generation of the

nation that is able to face the competition of the times, be able to surpass machine intelligence and be wise in using machines for the good of humanity. Current learning must be learning that applies creativity, critical thinking, collaboration, communication skills, social skills, and character skills, must be maintained. Utilization of a variety of learning activities based on ICT with virtual materials, robot education, learning games, establish program creative, interactive, challenging, and content-rich learning is not just complete a necessity. This condition is contrary to the current implementation of education and learning which is limited by classroom walls that do not allow students to explore the real educational environment, namely the family, community, and school. The learning process at school is no more a routine of repetition and delivery (informative) content of knowledge that does not sharpen students to develop creativity, taste, intention, and work and social care.

Element	Learning 1.0	Learning 2.0	Learning 3.0	Learning 4.0
operational	teacher centered	Center on test standards	Learning centered	on creating the future as a source of creativity focus students are taught, as recipients of passive information
Focus	students are taught, as passive recipients of information	many students are involved in dialogue	sharing between teacher and students	students and teachers create together in the application of knowledge in shaping the future
Method	passive, individual	active, social, standard	active, social, cooperative	participatory, collaborative, community
Subject	hierarchy, top down	hierarchy, bottom up	ecosystem	Network
Construct	Same content	main context	stakeholders in compiling the curriculum	primary community
Material provider	Expert	determined by the user	made by stakeholders	made by users and machines
Theory	behavioristic	cognitive and constructivist	network	social networking

Table 1:- Stages of Evolution of Learning

B. Government Policy in the Field of Education in the Era of the Industrial Revolution 4.0

The face in education in the era of the Industrial Revolution 4.0 is certainly a lot of challenges, one of which is equal distribution development, there are also disadvantaged areas throughout Indonesia. Even though the government has tried to reduce the development gap in Indonesia, it cannot be denied that the development equality gap in Indonesia is still occurring and this is still in the process of the government in resolving it. One characteristic of an area that has been touched by development is usually marked that the area has already been electrified. But there are still many villages that have not been touched by electricity. This certainly has implications for the distribution of education in Indonesia.

Electricity is a symbol of progress so that it can be called an area left behind because it has not been electrified. From this data alone shows that not all regions are ready for all the changes that occur due to the 4.0 industrial revolution. Internet network connectivity is also one of the conditions if we want to implement education in the era of the industrial revolution 4.0. At present not all regions of Indonesia can be connected to the internet connection, especially schools, other challenges in implementing curriculum in Indonesia. As already explained earlier that improving the quality of human resources, including the 10-point p Indonesia programmer making it 4.0 which decides by the government. One of the programs is to align the national education curriculum with future industrial needs.

C. Solutions in Welcoming Indonesian Education 4.0 era

In order to welcome Education in the 4.0 era, then inevitably all the latent problems above must be able to find a solution, there needs to be reforms and updates on all aspects of education. According to RhenaldKasali, several steps must be taken in the field of education in this 4.0 era, namely disruptive mindset, self-driving, and reshape or create. Disruptive mindset is how humans think that is determined by the settings we make before thinking and acting. In the field of education, today is in the fast-paced digital era, high mobility, access to information is a primary need of every person. In addition, today's society demands immediate and real-time. Everything that is needed must be immediately available. If access to these needs takes too long, the community will leave them and move on to other services. In essence, demands in this era of disruption are a response.

The response speed will greatly affect the user. This is called RhenaldKasali as a corporate mindset (the mindset corporate). This mindset needs to be developed by actors in the field of education. so that the services provided to users are no longer bureaucratic. Furthermore, Rhenald said, the characteristics of people with a corporate mindset are; first, not bound by time and place. It works not limited to hours and workspace. People like this have realized that time and place are no longer a barrier to work, technology has turned it off. Humans today can be connected 24 hours a day, 7 days a week, independent of time and place. If the mindset is applied in the management of educational institutions, an effective and efficient managerial system will be formed. Furthermore, when drawn in the context of learning, teachers will be more flexible and flexible in carrying out their tasks and functions. Second, to provide proactive services. Learning activities that are still concentrated in the transfer of knowledge from the teacher and are confined in the classroom, will be difficult to produce highly competitive graduates. Educational paradigm has changed, no longer a teacher centered, but student centered. Teachers are required to be more proactive in providing facilities, guidance, and assistance to students. Third, not fixated on the budget. Unlike the mental bureaucrats which are completely bound by costs (not working if there is no budget). People with a corporate mindset do not stop innovating because of money constraints. Fourth, maximize the function of social media. Educational managers today must be able to take advantage of the advancement of available communication media. Social media is no longer mere entertainment, it has been transformed into an effective communication tool, work aids, and inspiration in innovation. This opportunity must be able to be put to good use. Fifth, think about the solution when faced with a problem. Not busy thinking about reasons to save themselves. Sixth, not allergic to change. It is precisely in this era, change has become a necessity. An institution if it persists or is static in its management, will be inferior to an institution whose management is more dynamic. And Seventh, think and act strategically. The steps in managing educational institutions must have a clear roadmap that is planned to be realistic.

Self- Driving, the organization is agile and dynamic in adapt disruption across the ocean is an organization that has the HR (Human Resources) mentality a good driver (good drivers) rather than passengers' mentality. Good Human Resources drivers will want to open up, fast and precisely read the situation, have integrity, be agile in acting, be alert to all bad possibilities, and be able to work effectively, innovatively, and efficiently. These abilities are especially needed by leaders and managers of educational institutions. They are required to be able to become reliable drivers for their institutions. Therefore, managerial competence is not enough. But must also be accompanied by the ability to lead. While human resources with a mentality of passengers will tend to be bureaucratic, rigid, slow, and lack discipline.

Reshape or Create. There is a popular genealogy of thought which is still held to this day. The Genealogy is "maintaining good old ones and adopting new ones that are better". As many alluded to above, that era 4.0 is an era where speed and ease are human demands. This certainly requires massive adjustments. So there are two logical choices for education to face this era, namely, reshape or create. Reshape in the genealogy above means maintaining a good old one. A right but, in the era of industry 4.0 sustain alone is not enough, there must be sharpened. The old ways and systems that are still good and relevant need to be modified following the changes and developments of the times. For example, at the level of management and professionalism of human resources, including educators, it is necessary to strengthen and improve their competence and capacity. It can be through training, training, seminars, workshops, study scholarships, and so on.

Alternative more is create, invent something entirely new or in genealogy over "a new take on the better". This means the old ways and systems are obsolete. So it can't be used anymore. The only way out is to create a completely new method and system. For example, developing a new digital-based service system. So that educational institutions can freely access all needs related to education and administrative services. Another example is developing contemporary learning models by fully utilizing digital technology, such as E-learning, Blended Learning, and so on.

IV. CLOSING

Education has an important role in preparing students to be able to think critically and creatively in facing the challenges of the industrial revolution 4.0 era. One of the improvements in the quality of students is done by teachers who focus on improving the quality of learning in the classroom with high-level thinking skills-oriented. The design of improving the quality of learning to improve the quality of students which ultimately improves the quality of Education in Indonesia. The learning that is carried out by the teacher must be able to encourage students to be able to think critically and solve problems, be communicative, creative, innovative, and collaborative, as well as master literacy, so that they have higher thinking skills (HOTs). There is no best learning model or approach, there is a

learning model or approach that is the most suitable or appropriate in facing the era of industry 4.0 in the future.

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