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# The Impact of the Industrial Revolution 4.0 on Employment in Indonesia

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## Abstract

This research was conducted to find out the impact of the Industrial Revolution 4.0 on employment in Indonesia. The method used in this study is a qualitative research method with data in the form of literature review and analyzed with content analysis. The results of this study indicate that the 4.0 industrial revolution has hit the world, including Indonesia. The basis of the 4.0 Indonesian Revolution lies in the progress in communication and connectivity compared to technology. The Industrial Revolution 4.0 was marked by the emergence of technological breakthroughs in a number of fields, including robotics, artificial intelligence, nano technology, quantum computing, biotechnology, the Internet of Thing (IoT), 3D printing, and autonomous vehicles. This revolution creates opportunities and of course saves the various challenges that must be faced. The industrial revolution has significantly affected labor aspects. The policies that can be taken by the government to improve labor capabilities are: First, harmonization of standardization and competency certification through cross-sectoral, cross-regional, and cross-country business partner cooperation, within the framework of market openness. Second, the development of partnership programs between the government and business / industry and between the central government and regional governments to improve the quality of the workforce. Third, improving governance in organizing training programs to accelerate worker certification. Fourth, expanding economies of scale towards sectors / sub-sectors with high productivity. The conclusions of this research: increasing the workforce and decreasing unemployment as well as the increasing number of young people who succeed in digital business shows that Indonesia has successfully exploited the opportunities of the Industrial Revolution 4.0.

**Keywords:** Industrial Revolution 4.0, Technology, Labor

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## 1. Introduction

The vocabulary of the Industrial Revolution 4.0, the digital economy, the era of disruption and the like are the most frequently cited words in various writings and discussions. Being the theme most often discussed in various seminars or other scientific meetings. The media did not miss discussing in every report.

The phrase Industrial Revolution 4.0 was first coined by Klaus Schwab in 2016, and was introduced the same year at the World Economic Forum in San Francisco. The basis of the 4.0 Indonesian Revolution lies more in progress in communication and connectedness than in technology. The Industrial Revolution 4.0, built on the Digital Revolution, represents new ways as technology becomes embedded in society and even the human body. The Industrial Revolution 4.0 was marked by the emergence of technological breakthroughs in a number of fields, including robotics, artificial intelligence, nano technology, quantum computing, biotechnology, the Internet of Thing (IoT), 3D printing, and autonomous vehicles (Savitri, 2019).

As explained by Shwab (2016) that the world has experienced four stages of revolution, namely: 1) Industrial Revolution 1.0 occurred in the 18th century through the invention of steam engines, thus allowing goods to be mass produced, 2) Industrial Revolution 2.0, occurred in the century 19-20 through the use of electricity which made production cheap, 3) the Industrial Revolution 3.0, occurred in the 1970s through the use of computerization, and 4) the Industrial Revolution 4.0 itself occurred around the 2010s through intelligence engineering and the internet of things as the backbone human and machine movement and connectivity (Prasetyo, 2018).

Most of the Megatrends that must be mastered today have roots from the 20th century, where many disruptive technologies (technological breakthroughs that replaced established technologies) began. The two most disruptive technologies emerged in the second half of the 20th century and have helped drive the transition from the industrial era to the information age: computers and the internet. And both of these technologies are constantly driving the occurrence of various Megatrends today. Two Megatrends which have broad coverage are digitization and globalization; they are interrelated and influence and reinforce all other trends. Digitization (the process of converting information into digital format) forms the basis of computer and internet functions, allowing information in various formats (text, photos, illustrations, audio, video, etc.) to be converted, stored and communicated electronically. Initially, computers and the internet created a platform that helped drive the transition from the industrial era to the information age by facilitating information sharing and communication activities. Currently, relatively, the same platform is also used as a social platform, which allows people from all over the world to communicate and share in real time. Now the use of this platform also changes the way we learn, work, produce something, exchange and pay for goods and services, consume media, vote, and even drive our cars, or maybe, the way our cars will move us (Dorris, 2018)

The rise of the phenomenon of digital technology in the world can also be seen from the ranking of 10 Big Companies in the United States based on market capitalization in 2017 ie successively: Apple, Alphabet, Microsoft, Berkshire Hathaway, Amazon.com, Facebook, ExxonMobil, Johnson & Johnson, JPMorgan Chase and General Electric.

This data is clearly visible from the 1st to 3rd rank, and the 5th and 6th rank is filled by digital companies. In fact, around the early 2000s companies such as General Electric, ExxonMobil, Citibank, Walmart still ranked at the top.

In Indonesia, a similar phenomenon also occurs. Application-based transportation companies have a greater market capitalization than conventional models. Grab in 2016, market capitalization reached Rp 20 trillion, GoJek reached Rp. 38 trillion while Blue Bird is only Rp 9.8 trillion (Kasali, 2018).

The Fourth Industrial Revolution, in the end, will not only change what we do but also change who we are. Our identity will be affected, as will all related matters; privacy, understanding of ownership, consumption patterns, time devoted to work and leisure, how we develop our careers and improve skills, meet others, and maintain relationships (Schwab, 2017).

Among the various aspects that were affected by the 4.0 Industrial Revolution were employment. Labor aspects become one of the aspects that is significantly affected. It is therefore important to manage these changes so that employment will get a positive impact from the 4.0 Industrial Revolution.

## 2. Employment

According to Subandi (2002) the workforce (manpower) consists of the labor force and not the labor force. The labor force consists of those who work and those who are unemployed and those who are looking for work. Meanwhile, groups that are not in the labor force consist of those who are still in school, people who manage the household, and other groups or recipients of income (people with disabilities, elderly people and retired people). The three non-workforce groups above are also called potential workforces, because these groups can at any time offer their services for work.

A larger number of workers means that it will increase the level of production, while a larger population growth means that the size of the domestic market is greater. Thus, a large number of workers can mean increasing the amount of productive labor available. Therefore, increasing labor productivity is expected to increase production which also means increasing economic growth.

In recent years the population of Indonesia continues to increase, and is predicted to continue to increase in the coming years. According to data released by BPS, in 2018 the population in Indonesia reaches 265 million. Then in 2024 the number has the potential to increase to 282 million people and around 317 million by 2045. In 2018 the population aged 20-35 reaches 24 percent or equivalent to 63.6 million people who are of productive age (14- 64 years old). With this composition, Indonesia has a demographic bonus.

The biggest challenge for Indonesia in the era of the Industrial Revolution 4.0 is how to take advantage of opportunities from the demographic bonus to accelerate development. Do not let the demographic bonus actually become a burden of development. The hard task of the government together with all components of the nation is how to create easy access to employment for young people.

## 3. Labor in the Industrial Revolutionary Era in Indonesia

Since 2011, Indonesia began to enter the era of the Industrial Revolution 4.0. this is marked by increased connectivity, loss of boundaries between people and territories caused by technological and information advancements.

In general, assets that are important for development are physical capital, human capital and natural capital. Technological progress affecting these aspects is also important (World Bank, 2000).

The positive side of the Industrial Revolution is increasing time and cost efficiency, reducing errors, increasing work productivity both in terms of quantity and quality and of course making the quality of human life much better.

Artificial Intelligence (AI) creates new levels of productivity and improves life in many ways. As in the past Industrial Revolution, it can also be a disruptive force, evicting people from work, and raising questions about the relationship between humans and machines (Savitri, 2019).

Innovation presents hope or threat. The power of innovation that creates wealth and wealth inequality also allows hackers to steal your identity or break through your home. Computers that can speed up the analysis of legal documents can also reduce the number of lawyers in the workforce. Social networks can open doors to new connection formats or create new types of social anxiety. Digitizing payments can facilitate trade or open the way for new versions of fraud (Ross, 2018).

Every change, technological progress or revolution itself always presents two inseparable sides of the positive and negative sides. New technology makes life better and

improves the quality of human life but on the side that leaves residues in the form of loss of other human jobs. The same thing happened in Indonesia.

Conflict between motorcycle taxi and online taxi drivers with conventional motorcycle and taxi drivers at the beginning of the emergence of application-based transportation service providers. The reason is because conventional motorcycle taxi and taxi drivers feel that their source of income is being taken away by motorcycle taxi and online taxis. However, according to the government's readiness, the conflict can be resolved.

In general there are many research reports that discuss the takeover of human work by robots and fears about the future about the absence of work for humans. A paper from researchers at Oxford University predicts that 47 percent of jobs in the United States are "high risk" computerized over the next two decades. Another research report released in 2015 by the McKinsey Global Institute found that 45 percent of work activities will be automated, including 20 percent of the responsibilities held by CEOs with very high salaries in the world, such as analyzing operational data. Another paper from economists at Boston University and Columbia University found that "smart machines" would result in a long-term decline in labor income. PricewaterhouseCoopers released an outspoken statement that almost 40 percent of jobs in the United States could be immediately transferred to robots, followed by 30 percent of jobs in the UK, 35 percent of jobs in Germany, and 21 percent of jobs in Japan (Skinner, 2019).

The most valuable resource a country has is the collective talents of its children. Therefore, socially and economically there is nothing more important than supporting their talents by providing the best education possible. Facing the era of the digital world, mathematical abilities and analytical thinking are increasingly needed. No wonder there is a general tendency in the world of education to reduce curricula that are considered useless, such as foreign languages, art, history, and music and to invest resources in mathematics, reading and science. The purpose of education is, or at least should be, something more than just producing a gear that will drive the Industry 4.0 engine. As humans, the goals we want to achieve need to involve creativity in them and creative minds generated from diverse knowledge and experience (Dorris, 2018).

The Commonwealth Scientific and Industrial Research Organization (CSIRO) report, an Australian government agency has listed ten main forces that change the dynamics of work: (Skinner, 2019).

- Increasing importance of education and training
- The need for new capabilities for new jobs in the future
- The need for digital literacy, in addition to numeracy and literacy skills

- Change in the importance of STEM.
- Skills and mindset to overcome dynamic labor markets
- Challenges to perceptions and norms about the type of work
- Increased labor participation from vulnerable demographics
- The need to move towards the pointed pension model
- A new model for predicting the prerequisites of work transition
- Increased understanding of peer-to-peer economics (and casual workers)

Likewise in the report entitled Future of Jobs by the World Economic Forum released the ten skills most needed namely:

1. Solving complex problems
2. Critical thinking
3. Creativity
4. Human management
5. Coordinate with others
6. Emotional intelligence
7. Assessment and decision making
8. Service orientation
9. Negotiations
10. Cognitive flexibility

There are various reasons to be optimistic in facing the current Industrial Revolution 4.0 era. call the arguments put forward in 1776 by Scottish economist Adam Smith, publishing The Wealth of Nations, perhaps the most important economic manifesto of all time. In the eighth chapter of his first volume, Smith proposes the following new argument: when a landlord, weaver or shoemaker earns more profit than he needs to support his own family, he uses that advantage to hire more assistants, to further increase his profits. The more profits he gets, the more assistants he can employ. In conclusion, an increase in the profits of private entrepreneurs is the basis for increasing wealth and collective prosperity (Harari, 2017).

What was said by Adam Smith a few decades ago is still very relevant to today. That every progress and change will definitely lead to the improvement of development and

human welfare. The same thing was found in the study of endegon growth theory, concluding that economic growth was influenced by the accumulation or mastery and innovation of technology (Zagler 2005). Because it is very realistic to remain optimistic in the face of every industrial revolution that occurs including the current Industrial Revolution 4.0.

Another thing can be seen in the tremendous change in the BRIC economy (Brazil, Russia, India, and China) made possible through the digital revolution that began 70 years ago and has become manifest as a new ecosystem today. An ecosystem that is driven by automation. We will digitize everything that can be digitized, and when we do, everything is connected quickly and cheaply. This is the purpose of the Internet for Everything (IoT), making everything connected quickly and cheaply. Not only are goods connected to each other quickly and cheaply, humans too. Then comes the urge to reach a state of inclusion. From this circumstance This is why Bill Gates predicts that no more people will suffer poverty in 2035 like conditions in the last century. Nobody else is poor because of the system. Wealth may be controlled by a handful of people, but giving everyone all access to the network, increasing their access to knowledge and information, giving them the opportunity to build a business anywhere, anytime, from zero, is the biggest transformation in the fourth revolution of humanity (Skinner, 2019).

The steps taken by the government as conveyed by Bappenas in a press release in Jakarta on May 22, 2017 stated that related to labor, one of the policy directions was to strengthen labor competitiveness in entering the global labor market. The policy is implemented through five main strategies. First, harmonizing standardization and competency certification through cross-sectoral, cross-regional, and cross-country business partner cooperation, within the framework of market openness. Second, the development of partnership programs between the government and business / industry and between the central government and regional governments to improve the quality of the workforce. Third, improving governance in organizing training programs to accelerate worker certification. Fourth, expanding economies of scale towards sectors / sub-sectors with high productivity.

In addition, the government has made a very good program that is increasing the competence of human resources through a link and match program between education and the industrial world. To succeed, this program builds synergy between ministries and related institutions namely the Ministry of Industry, Bappenas, the Ministry of Manpower, the Ministry of Trade and the Ministry of Education and Culture.

Based on data released by BPS in 2019, the number of labor force in February 2019 was 136.18 million people, up 2.24 million people compared to February 2018. In line with

the increase in the labor force, the Labor Force Participation Rate (TPAK) also increased by 0 12 percent. In the last year unemployment decreased by 50 thousand people, in line with the TPT which fell to 5.01 percent in February 2019. The working population of 129, 36 million people increased 2.29 million from February 2018. Employment increased the percentage of the population working mainly in providing accommodation and eating and drinking (0.43 percentage point), trade (0.39 percentage point) and construction (0.34 percentage point). For more details, the following table shows the workforce and unemployment in Indonesia in the last three years:

Table 1: Labor, Working and Unemployed in Indonesia in 2016-2018 (in million people).

| Year | Labor | Worker | Unemployment |
|---|---|---|---|
| 2016 | 127,8 | 120,8 | 7,0 |
| 2017 | 128,1 | 121,0 | 7,0 |
| 2018 | 133,9 | 127,1 | 6,9 |

*Source: BPS*

From the table above clearly shows that in the last three years namely from 2016 to 2017 there has been a significant increase in the number of workers and employed. Within three years the increase in the workforce in Indonesia amounted to 6.1 million. For workers who work, the increase reaches 6.3 million. while unemployed decreased by 0.1 million. The increase in the workforce employed and the decrease in unemployed workers is a pretty good achievement for Indonesia.

These achievements show that the effects of the Industrial Revolution 4.0 had a positive influence. Positive achievements in employment such as an increase in the labor force and a decrease in unemployment prove that Indonesia has successfully utilized the momentum of digital economic development. Other evidence can be seen from the increasing number of young people in Indonesia who are successful becoming successful young entrepreneurs in the digital field. Some examples of names that can be referred to are Nadiem Makarim, the founder of PT. Gojek Indonesia, Ahmad Zaky founder of Bukalapak (online trading site), William Tanuwijaya, owner of Tokopedia online buying and selling site, Ferry Unardi Ceo Traveloka, Andrew Darwis Kaskus owner, Jason Lamuda owner of Berrybenka (the biggest fashion site in Indonesia), and many more another.

The fact that many young people have entered and succeeded in the digital industry shows that the young generation in Indonesia has the quality and potential to develop the business

## 4. Conclusion

The industrial revolution 4.0 not only has the opportunity but also saves the challenge. For Indonesia, seeing various facts and policies taken by the government shows that Indonesia has succeeded in taking advantage of opportunities from the Industrial Revolution 4.0. This can be seen from the labor conditions in Indonesia and the emergence of successful young generation in the digital business field.

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