TECHNOLOGY AND INNOVATIVE AMBIDEXTERITY TOWARDS DIGITAL INFRASTRUCTURE DEVELOPMENT IN INDONESIA

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ABSTRACT
The rapid increase in technological development triggers companies to optimally explore their potential. Based on the 2017/2018 report of the World Economic Forum (WEF) on the Global Competitiveness Index, Indonesia is 45th out of 140 countries. However, it aims at becoming the fourth-largest economy in the world in 2030, by revitalizing the manufacturing sector through technological developments. Companies need to continuously inculcate innovative ambidexterity to survive in this rapidly changing environment, and avoid the complexity of developing digital infrastructure. The result showed that Indonesia needs to prepare management plans for the analysis, design, development, and implementation of the Industrial Revolution 4.0.

Keywords: Digital Infrastructure; Innovative Ambidexterity; Technology

1. INTRODUCTION
There is a rapid increase in industrial development in this globalization era, which has triggered many companies to explore their potential to identify key success factors. One of the techniques used to excel and increase competitiveness is technology, which is rapidly developing. With the development of technology, companies have the potential to carry out cost-efficient production activities capable of generating more profits with a positive impact on the country's economic growth rate. In the Y20 summit conference held in 2018, Indonesia and other countries stated that the future in which human work might be replaced by technology. Octavia (2019) stated that job loss is closely related to automation efficiency which also affects labor restructuring.

The Gross Domestic Product (GDP) is one of the macroeconomic factors that play a key role in determining the house price in a country (Leimbach, Kriegler, Roming, & Schwanitz, 2017). According to 2019 data from the Central Intelligence Agency (CIA), there was an increase in GDP growth by 3.3%, 3.2%, and 3.7% in 2015, 2016 and 2017, respectively. Statista (2019), obtained data from 20 countries with the largest GDP, as 2017 shown in the figure 1. Based on the data, Indonesia is the only country in Southeast Asia on the list. In addition, the long-term projections released by Standard Chartered Plc has the ability to trigger the country into becoming the fourth-largest economy by 2030 (Indonesian Ministry of Industry, 2019b). To achieve this goal, productivity needs to be improved, with industrial innovation for a potential increase in the country's GPD, which consists of 13.7% agriculture, 45.3% service and 41% industry (Central Intelligent Agency, 2017).

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When the products offered are only goods, the manufacturing industry becomes uncompetitive, and without appeal assuming the services is offered to consumers. The company's success in providing the best products to consumers includes a combination of the goods and services in their respective portions. However, in this era of globalization, the manufacturing and service industries are competing in the scope of certain regions and covering the global area to create growth and generate profits. This manufacturing industry also contributes 20% to Indonesia's GDP (Indonesian Ministry of Industry, 2019a).

Generally, industrial activity consistently provides a broad chain that affects the economy in the region and nationally with a fairly good production industry growth rate of 4.1%. Based on the 2017/2018 report of the World Economic Forum (WEF) on the Global Competitiveness Index, Indonesia is 45th out of 140 countries (Schwab & Sala-i-Martin, 2016). This shows that industrial products in Indonesia have the ability to compete adequately in the export market.

The Minister of Industry, Airlangga Hartanto stated that one of the fastest ways to achieve Indonesia's vision to become the 10th largest economy in the world is to revitalize its manufacturing sector. Currently, the country is planning for the Making Indonesia 4.0, which is a roadmap to a number of strategies planned for the industrial era. These strategic plans involve various parties, namely government institutions, industry associations, business actors, technology providers, as well as research and education institutions.
Kim and Heshmati (2019) stated that information and communication technology is one of the main driving activities for the economic growth of developing countries in the Middle East and North Africa (MENA) as well as in Sub-Saharan Africa (SSA) from 2007-2016. This paper also revealed that several important policies are needed to benefit from the economic growth of information and communication technology.

Industry 4.0 uses more sophisticated technologies such as Artificial Intelligence, the Internet of Things, 3D Printing, Robotics, etc. Therefore, Indonesia needs to accelerate the development of digital infrastructure which includes high-speed internet and its capabilities in collaboration with government, public and private sectors to be able to invest in digital technology (Indonesian Ministry of Industry, 2019a).

2. TECHNOLOGY

Dwi (2013) stated that technology is a design tool for action that reduces uncertainty in a causal relationship to achieve the desired goal. Its choice is essential for the growth of the country. According to Jatmoko (2019), when elections are wrongly conducted, the technology becomes expensive and the benefits are not fully obtained by the community. When wisely utilized, technology tends to have a very important meaning for well-being by increasing quality and reach (Budiman, 2017).

Industry 4.0 is widely considered to possess the capability of opening more specific new job opportunities, with high competence. Therefore, many industry players are transforming their skills for human resources with more focus on the field of information technology. Some of these technologies include Artificial Intelligence, Internet of Things, 3D Printing, Robotics, etc. Artificial intelligence is becoming widely used in everyday life such as at toll gates which currently do not require human labor, and the automation of work carried out by machines in the production process.

3. INNOVATIVE AMBIDEXTERTY

In this globalization era, environmental changes tend to rapidly occur internally and externally, therefore, Indonesia needs to adapt, withstand, explore, and exploit these changes to avoid being eroded by other countries. When a company only focuses on exploitation, it leads to innovative failure and inability to meet future market needs. Similarly, when it only focuses on exploration, it leads to efficiency and waste of poor organizational resources.

Wankel (2008) defined ambidexterity as organizational activities that aim to maintain existing business and determine entrepreneurial opportunities. According to Moreno Luzon and Valls Pasola (2011), ambidexterity is the ability of an organization to use similar skills, with a focus on exploitation and exploration. Ambidexterity is also defined as a new approach consisting of a combination of exploration and exploitation (Menguc & Auh, 2008). Tushman and O’Relly (1996) reported that ambidextrous companies operate simultaneously to exploit and explore to achieve superior performance. This certainly makes it easy for them to meet temporary demands simultaneously and anticipate future changes.

Companies need to exploit in accordance with behavioral mechanism which includes the absorption of new approaches into a series of existing routines such as efficiency, production, selection, and implementation (Zollo & Winter, 2002). The main purpose of this exploitation is to meet the needs of existing customers based on the use and expansion of knowledge and skills possessed by the company.

Changes in the internal and external environment of companies are fast and need to be adapted to avoid being undermined by competitors. Therefore, a company is required to continuously
explore by reconfiguring assets, resources, and its ability to meet changes in the external and internal environment (Ambrosini, Bowman, & Collier, 2009).

Asif and de Vries (2015) stated that companies need to also explore to prepare future needs where the competencies tend to be different from the present. According to Blair (2012) exploration includes variation activities for improvement, experimentation, flexibility, risk-taking, and innovation. The main objective of this exploration is to meet the needs of customers and emerging markets due to the development of technology, products, markets, business models or new competencies (Tushman & O'Reilly, 1996).

Innovation is increasingly complex, fast, interactive, and needs access to external and internal knowledge for the development of new products or services. In addition, O'Reilly III and Tushman (2013) stated that for companies to compete in new technologies a competitive advantage is derived from the ability of organizations to explore and exploit simultaneously. In Indonesia, organizations still conduct activities focused on exploitation or exploration, which is better known as ambidexterity and difficult to implement simultaneously.

4. DIGITAL INFRASTRUCTURE

According to the Minister of Industry, Airlangga Hartanto, digital infrastructure spurs industrial competitiveness to be more competitive at the global level (Indonesian Ministry of Industry, 2018). Based on the A.T. report Kearney reported that digital infrastructure investment in Indonesia is currently worth 1.3% of total GDP. This value is certainly smaller than other Southeast Asian countries, such as Singapore (6.6%), Malaysia (4.5%) and Thailand (2.4%) (Fauzan, 2019). In terms of infrastructure, Indonesia ranks fourth among the ASEAN countries after Singapore, Malaysia and Thailand. Therefore, to overcome this infrastructure lag, the government needs to make efforts to increase the value of the investment in the digital infrastructure sector to 2.5% of the total GDP in the next few years.

In addition, the Minister of Communication and Information, Rudiantara stated that digital infrastructure is analogous to three ecosystems namely network, device and application. The government is still seeking to evenly distribute 4G access throughout Indonesia, despite currently seeking for is the use of 5G. In terms of device, the government has set 30% domestic component policy to support the network, and confident that the number of e-commerce and start-ups has the ability to drive a new economy in terms of application.

One way to support and implement the Industrial 4.0 revolution, is to accelerate the development of digital infrastructure which includes high-speed internet in collaboration with government, public and private sectors to invest in digital technology (Indonesian Ministry of Industry, 2019a). In addition, the availability of abundant electricity resources, internet network infrastructure with large bandwidth/coverage, large data centre, modern logistics infrastructure, and employment policies are things that support digital development in industry 4.0.

5. CONCLUSION

Industry 4.0 phenomenon which uses more sophisticated technology is currently widely used in daily life. The company's activities have the efficiency to increase productivity, with development technology. In addition, innovative ambidexterity which consists of exploitation and exploration needs to be conducted to make it more efficient to meet temporary demands simultaneously and anticipate future changes. This technology development and innovative ambidexterity planning are prepared to avoid the complexity of digital infrastructure. Therefore, Indonesia is expected to prepare plans for proper management of analysis, design and system development to support the implementation of the Industrial Revolution 4.0.
The limitation in this study briefly discusses the technology, innovative ambidexterity, development of digital infrastructure, and access to data on technological development. The authenticity of this research is to provide information on the development of digital infrastructure based on technology and innovative ambidexterity, which influences the building of digital infrastructure in Indonesia. Also, the influence of technology and innovative ambidexterity creates competitive advantages with the ability to provide added value.

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