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RESEARCH SUMMARY

EMPLOYMENT OPPORTUNITIES AND HUMAN RESOURCES DEVELOPMENT IN DIGITAL ERA:
A Case Study in Industrial Sector

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Abstract

Transformation of digitalization in large industries has an impact on the automation of production equipment, including the replacement of production machines from conventional machines (manual) to digital machines. Meanwhile, automation of production equipment requires workers with higher skills, in fact the existing workforce does not have expertise in carrying out all-digital equipment. The impact is a reduction in labor (layoffs). Machine replacement is done in stages so that the reduction of workforce (PHK) in bulk is not visible. However, the inconsistency between the preparation in the world of education and the needs in the world of work continues to occur today. Until now, vocational development based on local resources has not been operating optimally and needs serious attention from the local government. The government on various occasions mentioned four leading sectors that will be strengthened in the development of vocational institutions, namely maritime, tourism, agriculture (food security), and the creative industry. In addition, the government is also developing a policy scheme for Skill Development Funds (SDF), which is a skills improvement program for workers affected by automation (PHK), including through Vocational Training Center (*BLK).*

Keywords: Employment, Human Resources Development, Digital Era, Industrial Sector

Abstrak

Transformasi digitalisasi di industri besar berdampak pada otomatisasi peralatan produksi, termasuk penggantian mesin produksi dari mesin konvensional (manual) ke mesin digital. Sementara itu, otomatisasi peralatan produksi membutuhkan pekerja dengan keterampilan yang lebih tinggi, bahkan tenaga kerja yang ada tidak memiliki keahlian dalam melakukan semua peralatan digital. Dampaknya adalah pengurangan tenaga kerja (PHK). Penggantian mesin dilakukan secara bertahap sehingga pengurangan tenaga kerja (PHK) secara massal tidak terlihat. Namun, ketidakkonsistenan antara persiapan di dunia pendidikan dan kebutuhan di dunia kerja terus terjadi saat ini. Hingga saat ini, pengembangan kejuruan berbasis sumber daya lokal belum beroperasi secara optimal dan perlu perhatian serius dari pemerintah daerah. Pemerintah dalam berbagai kesempatan menyebutkan empat sektor unggulan yang akan diperkuat dalam pengembangan institusi kejuruan, yaitu maritim, pariwisata, pertanian (ketahanan pangan), dan industri kreatif. Selain itu, pemerintah juga mengembangkan skema kebijakan untuk Skill Development Funds (SDF), yang merupakan program peningkatan keterampilan bagi pekerja yang terkena dampak otomatisasi (PHK), termasuk melalui Badan Latihan Kerja (BLK).

Kata kunci: *Pekerjaan, Pengembangan Sumber Daya Manusia, Era Digital, Sektor Industri*

INTRODUCTION

Digitalization of work arises because of the development of technology that causes changes in the way human produces and interacts. Technological developments in the world were first seen from the first industrial revolution that occurred in England in the early 18th century until the beginning of the 19th century. This first revolution was marked by the discovery of steam engines and coal energy use. The findings of this first technology succeeded in turning the base of agriculture into an industrial base as a community economic structure. In subsequent developments, at the end of the 19th century, new energy sources, namely electricity, gas, and oil, were discovered which gave rise to the second industrial revolution and was initiated by America.

As a result, the development of mass production began to be made easier as well as the discovery of communication devices and faster transportation routes such as cars and planes. After a century later, in the middle of the 20th century or 1969, came the third industrial revolution, which also began in America. It was marked by the discovery of new energy which has greater potential, namely nuclear energy. In this third industrial era, there emerged an era of a high level of automation in production because of two major discoveries, namely Automatons-Programmable Logic Controllers (PLC) - and robots (Sentryo, 2017).

Today, the world is entering the beginning of the fourth industrial revolution, which began in the 2000s with the emergence of the internet. In contrast to the previous three revolutions which were always marked by the emergence of new energy, the fourth industrial revolution was more directed at the complexity of industrial technology where the previous machines were found to work independently. Now all machines can be connected simultaneously and allow the interaction of all production facilities real-time. Findings of technologies such as Cloud, Big Data Analytics, and Industrial Internet enable all production activities to be carried out digitally and integrated (World Economic Forum, 2016). The history of the emergence of the internet (internetworking) originated from the findings of the Advanced Research Project Agency Network (ARPANET) in America in 1974, which was used for military purposes. Then in the 1980s, the development of the internet was expanded to more open digital communication with the release of the World Wide Web (www) by the European Organization for Nuclear Research (CERN) in Geneva (Tsatsou, 2014).

The availability of the internet gave rise to more complex technological findings and enabled all production facilities with the use of Cloud, Big Data, and so on, that led to global digitalization. This transformation began to be implemented at the beginning of the millennium, which changed not only the means of production but also the socio-economic conditions in the community.

Digitalization can be interpreted as a digital manufacturing process of everything that can be digitized and the process of changing the format of information to digital (Fors, 2012). In the context of business, digitization allows it to be carried out in all phases of production to how to obtain market information using Big Data. In businesses with digital bases such as online transportation in Indonesia that have been rife since 2011 (Gojek, Uber, GrabBike), all business processes are carried out online. As for conventional businesses that produce goods and services such as handicrafts and food, digital technology can help in the bookkeeping process with data storage using the cloud, and the use of social media as a tool for promotion and selling of its products. A simple digitization system can increase speed, scope, and efficiency in communication. Digitalization can also be seen as a bridge to encourage the interaction of global community networks (Tsatsou, 2014). The digital sector is projected to contribute 3% to the growth of Gross Domestic Gross (GDP) in 2020 in developing countries and in developed countries included in the G20, the digital economy is even projected to contribute to raising GDP by 8% (Burrow, Sharan & Byhovskaya, 2016).

In the era of industrial revolution 4.0, digitalization is not only the use of computer and internet technology to communicate, but more than that, the internet is used as a

database to map market changes that occur. At present, some new types of work are emerging, such as web content writers, YouTube, creators of mobile applications, video journalists, online editors, and intelligent markets. Digitalization can also cause jobs to be more flexible without the constraints of time and space and increase the autonomy of workers (Burrow, Sharan & Byhovskaya, 2016).

By using a smartphone, workers can do their jobs without being hindered by time and location. The expertise of workers also adapts to these technological changes. For instance, marketers are not only able to make printed advertisements, but also must be able to develop interesting content through websites or social media in promoting their products. Online promotion is essential because the effectiveness of marketing through the web and social media basis produces the same effect compared to using conventional media, but online promotion costs less. In today's digital era, consumers spend more time online and make decisions based on digital content, including consumer reviews and product descriptions that are on a website page than advertisements on conventional media (Bernoff & Li, 2008).

Routine jobs can also be done by machines and replace the position of human power. In the financial sector, the availability of e-banking and other mobile applications has made it easier for customers to make online transactions without having to transact directly to the bank office. More broadly, studies conducted in America show that 9% of routine jobs at high risk can be replaced by automated technology. It happens because 70% of the types of work can be done automatically, while jobs that only require 25% of routine work are still not can be replaced by technology (Benedikt Frey et al., 2013).

In Indonesia, Hill & Sen (2005) mentioned that the internet entered in the mid-1990s with the rise of internet cafes (internet cafes) as public spaces that were used for personal interests. Then in the 21st century, there has been a growth in the mobile market, which allows individuals to be more flexible in using the internet (Jurriens & Tapsell, 2017). In 2014, Puskakom UI noted that the penetration rate of internet users in Indonesia was 34.9% or 88.1 million residents. Most of the internet users use cell phones (85% of users) and the rest use computers with fixed networks (fixed wireless networks). Seen from the demographic aspect, 49% of internet users ranged in age from 18-25 years with an average education at the high school level. The large population of internet users, which are mostly claimed by the government, can open opportunities for Indonesia to become a pioneer in digital-based economic transformation.

This research aims to analyze changes in employment opportunities and human resources development in the digital era, specifically in the industrial sector. The changes analyzed include production process, labor relations, and absorption, relevant policies governing workforce preparation in both national and local levels, as well as the consequences of technological changes to the workforce preparation. In the subsequent part of this introduction will be followed by methods, elaboration on results and discussion of the research in some cases, and concluded with the main argument of the study.

METHODS

This research was carried out using qualitative research methods for two years, during 2017-2018 by analyzing several aspects such as:

a. The technology used by large and small industries in the digital era
b. Changes in the ways of production and work relations in the digital era
c. Absorption of labor in the digital era
d. Workforce preparation policy

RESULTS AND DISCUSSION

Amid conversations about disruption, especially those that rocked the technology of manufacturing industries in Indonesia, there was optimism about new economic opportunities growing from MSMEs. This is like the two poles that are mutually away. In the one pole, the manufacturing industry experiences a severe shock due to the tendency of robotization and

digitalization, causing gradual layoffs of factory workers. In the other pole, MSMEs are stretching because the digital era creates new market chains and increase production from MSMEs. The general view on this matter, especially the stretch of MSMEs in the digital era is almost acceptable to many people today.

On the other hand, the stretch of MSMEs does not seem to be followed by the development of production technology used. From this point of view, MSMEs can be said to have not experienced digitalization, unlike what has happened in large manufacturing industries, for example. The technology of MSMEs in this digital era has hardly changed significantly, namely maintaining traditional technology, with simple equipment and not even robotic. In other words, MSME technology is still wholly manual, done by human hands one by one or in groups or together.

Increasing the market chain on the one hand, and maintaining the traditional MSME production methods, on the other hand, have stimulated this business sector, as well as shown a profile that is contrary to the terminology disruption above. The tendency of MSMEs in the digital era to be the opposite of disruption is at least shown in the following three things:

1) The market chain created through digital technology, among others, in the form of new market places and new social media networks has opened up new markets and developed market chains not only at the local level but also national, regional, and global. This new market chain also creates new employment opportunities for the service sector, including in the form of freight forwarding services that move at the regional level mentioned above. At present, shipping services are not only dominated by state-owned companies such as PT. Pos Indonesia. Other private companies have also developed. All of which have increased freight traffic to various parts of the country.
2) Increasing orders for goods through the new market has direct implications for increasing the production of goods in MSME units, ranging from individual units, households, and joint business groups to other micro units such as the larger household industry. Production of goods also has implications for the need for raw materials, both those supplied in the area and imported from other regions. In other words, the MSME production process has increased rapidly due to the development of the new market.
3) Increasing the market and production has also driven the rural economy through the absorption of labor-force in these MSME units. The number of workers involved in the market chain and the production process of MSMEs has increased rapidly and has been able to become a new source of livelihood for rural and urban unemployed people.

In two research locations, namely Bantul - DIY and Bandung, the stretch of MSMEs was prominent, among others. It is seen from the increasing number of goods and labor production involved in the production units. This can also be traced from the crowded MSME outlets in the market place as well as trade traffic on social media. These two regions are the new icon of MSMEs in the digital era, where the process of producing goods and labor for MSMEs has been experiencing rapid dynamics lately.

However, notwithstanding the disruption relationship has not been proven with the growth of MSMEs, at least for factory workers who were laid off for the reason the company transferred its technology from manual machines to robotic and digital. Market places and social media have become new spaces for them to try a business that is more independent or not dependent on large companies. Some workers who were laid off in Bandung who was met said this. They can develop their own business and market the results more freely.

Indeed, it cannot be said that in this digital era, MSMEs act like a "crisis bearing" from the disruption. However, the development of MSMEs on the market size, production, employment, and the creation of new jobs for workers who have been laid off, does not seem excessive if said so. The flexible nature of MSMEs in regulation has developed into a

new power in this era of disruption. Although the new power has a traditional face, in some ways, traditionality that contains authenticity has its niche.

In DIY, for example, in recent years MSME communities have grown flexibly, no longer limited to physical space but on communication networks. The new communities have become a new forum for the development of MSMEs in DIY that shows strong social characteristics, besides their clear economic orientation. They encourage each other to develop their respective businesses through the concept of mutual assistance and help through new ways, such as sharing experiences, solving problems, making new products, marketing strategies, and so forth.

In other words, disruption as conceptually conveyed by various groups is not proven in the MSME sector. Perhaps the statement is true in large industries, especially the manufacturing sector, which experiences shocks from the power-work side. Alternatively, maybe a new market that changes, so that a new theory of balance is needed to restore the disruption period. In MSMEs, this theory does not seem to be proven because what happens is the opposite. It is not a disruption but new development, which is characterized by new markets, increased production and labor-power, and the creation of new business fields.

Ngelosari is one of 22 hamlets in Srimulyo Village, Piyungan Bantul District. The area of Ngelosari Hamlet is 142.26 ha or around 28.4 percent of the total area of Srimulyo Village. In general, the land in Ngelosari Hamlet is used as dryland agriculture. In this hamlet, there is a banana chip business which began with training by universities in Yogyakarta in collaboration with universities in South Korea.

The establishment of the banana chips business was the first initiative of mothers in the local village through assistance from one of the village youth who graduated from college who did not look for work outside the area. Before establishing the business, the mothers received training from UII students who collaborated with the South Korean Government. The training was conducted for two years. After the training was completed, Pandansari's joint venture group (KUBE) was formed. This Pandansari business group produces not only banana chips but also tempe chips. However, until now, the banana chips production that has is good enough to be the focus of this paper.

In terms of history, the pioneering business of banana chips made by a joint business group in Ngelosari Srimulyo Bantul began in 2013. In the period 2013 to 2017, the production was still carried out in the homes of members of the joint business group. It had an impact on low production yield and product efficiency. Therefore, the members agreed to establish a banana chips production house, which was established in 2017. The production house is the central activity for making the chips. The establishment of this production house was inseparable from the assistance of the Indonesian Islamic University of Yogyakarta in collaboration with South Korea. This assistance was carried out for two years, covering all aspects of the business such as production methods, raw material selection, marketing, and equipment maintenance.

Mentoring is the key to strengthening small and medium business centers. Without continuous assistance, small and medium businesses usually will walk in place. Assistance carried out starts from strengthening capital, strengthening skills to marketing. Moreover, the current development of SMEs is also faced with the fast development of information technology. Therefore, the assistance provided by "Facilitators" plays a significant role in moving SMEs using more advanced internet technology and is the key to success in online businesses (Kursehi, 2011). Assistance undertaken has shown results with a broader marketing reach. Moreover, the usage will improve business transformation through the speed, accuracy, and efficiency of information exchange in large numbers (Amaliyanah, 2017). This can occur if there is continuous assistance, which is followed by assessment capacity and production capacity.

As happens in other industries, there is a distribution chain in the banana chips business, starting from raw materials, producers, to consumers. The raw material for the banana

industry in Ngelosari hamlet is obtained from the local farmers. However, in a large production capacity, the availability of bananas in the hamlet is insufficient, so they must look for raw materials in the market. Accuracy and ability to choose quality banana raw material is very necessary so that high-quality chips are obtained following the marketing agent's request. At the beginning of the establishment of the business, there were no problems with raw materials because they were still enough available on the market. However, in line with the increase in production capacity, problems began to be found in the availability of raw materials. Often found bananas on the market are too ripe and not suitable for chips.

After the raw material is obtained, the next chain is the production process of banana chips, which is carried out in the production house. Banana production is currently carried out by a group of mothers. These mothers do all the work, starting from the supply of raw materials to marketing. Besides running this banana chip business, they also do other daily work, including housework and farming. In this condition, the business of banana chips is still limited to a side business, so they are not focused on developing the business.

The lack of skilled human resources to develop businesses appears to occur in Srimulyo Village. The less favorable condition of natural resources makes most of the youth in this hamlet prefer to work in factories in Yogyakarta and Bantul cities, to working in the local hamlet. The development of SMEs in the village of Srimulyo is also relatively underdeveloped comparing to other areas outside of Piyungan District. This situation led to the lack of development centers for small and medium industries in Srimulyo Village and Piyungan District. Digital village programs that have developed in other regions have not developed in this area.

The process of developing home industries in the form of processed banana chips has penetrated the market in urban areas. In sales, digital devices have also been relied on. Even so, in its development, sometimes the printing industry has difficulty in meeting the market needs because of constrained capital and continuity of production. Capital is a classic problem in small and medium enterprises. This also relates to collateral owned if you want to borrow capital in a bank. Banks certainly see collateral pledged by small and medium industries before providing capital. Although in reality, small industries are resistant to economic shocks compared to large industries, unfortunately, they have not been thoroughly looked at by banks, even if looking forward to the development of digitalization on all fronts. The opportunities for small industries to grow are tremendous, like in the ceriping industry in Srimulyo Bantul. The results of another study in 2016 at the Bandung Skoci Center and Batik Trusmi Cirebon showed that digitalization had an effect on improving SME performance in the forms of access to new domestic customers (30.67%), increased sales and revenues (26.67%), ease of transactions with customers and supplier (20.33%), advertising costs are cheaper (14.78%) and new market access abroad (7.56%) (Slamet et al., 2016).

The main challenge in developing SME chips in Srimulyo in the face of digitalization is not yet fully understood how effective marketing uses online media. Amelia et al. (2017) also found that (2017) that knowledge of MSME producers or owners in Indonesia regarding technology is still far from enough. This was also found in Triyono's study, et al. (2017), that the ability of UMK businesses in the area of 40 years had difficulties in accessing and marketing MSME products because of the low technological literacy.

On the other hand, banana chip makers have used online media, such as Facebook as a marketing media. However, it needs to be improved, both in terms of quality and quantity. This is actually the primary key to marketing this banana chips product. The challenge of large-scale production is also an obstacle in marketing, using the internet as a marketing base. The results of the interview showed that the craftsmen still have a fear that if marketing goes online massively, but there is not enough stock of banana chips, it would kill the market of this industry. Continuity is a challenge in its own right, primarily since the industry is run

in this village has not been entirely focused on becoming the main job. This job is still aside. When researchers conducted field research on the spot, the production was stopped because there was a celebration at the neighbor. This is the challenge of production continuity. Therefore, marketing is still limited to the network owned. Especially in the use of digital marketing through the internet, this allows the potential customers to get every kind of information about the products and do the transaction via the internet (Dedi et al., 2017). Therefore, if the order is not immediately responded, it will affect the banana chip industry brand itself.

One of the networks of this chip industry is a gift shop, namely Lovers in the Kauman area of Yogyakarta. Orders made by gift shops in the area can reach one quintal, in the form of a processed quality banana chip whereas the processed non-quality chips are sold by themselves with plastic packages for one thousand rupiahs.

The clearing business in Ngelosari is a household production business even though it already has its own production house. The business is family-based where the business is run by a joint business group of 4 members. The division of income is based on the profits obtained and divided equally by the four members. The income earned from banana chips is not yet a major income, because the working principle in the chip industry is additional work. In the management, they have not provided detailed profit details on a regular basis, so that monthly income from banana chips has not been recorded properly. The production of banana chips has also not continued continuously.

On the other hand, this joint venture group business was founded on the principle of cooperation of mothers who have the same perception to increase the family income. Then, the ingredients in making banana chips themselves are obtained from the surrounding community. If the raw material needs increase, for example, before *Eid Al-Fitr*, but the banana raw material if it is not enough from the surrounding community, they bring the banana raw material from other regions.

The working relationship that is built between business actors and Lovers shops is a partnership relationship. The businessman produces chips in specific quantities and quality, and the store buys the product from the business actor. However, the product from the hamlet is still processed by snack shops to be a type of snack with various flavors and particular packaging. Snack shops try to make food that is attractive and in accordance with market taste, including foreign markets.

CONCLUSION

The industrial sector is an economic sector that is very important for Indonesia, given its immense contribution to the economy, especially in absorbing workers. BPS data shows that in 2017, the industrial sector can absorb 14 percent of the total employment opportunities available, after the agriculture, trade, and social services sectors. Indonesia still needs the manufacturing industry to absorb the increasing number of labors every year. The problem is how the influence of digital technology on the industrial sector, namely the use of labor.

At this time, the world entered the 4th era of industrial revolution since the discovery of the internet in the 2000s. The development of digital technology can be seen from the growing business and trade transactions that use the internet as the means of communication, collaboration, and marketing between companies or between individuals. Economic sector is affected by the emergence of this digital technology, including the industry sector. The development of digital technology was responded to by the Indonesian government by building industrial designs that were expected to be able to respond to the industrial revolution 4.0, in details contained in the points of the National Industrial Development Plan (RIPIN). In RIPIN, the preparation of technology transfer is designed to be prepared from 2015 to 2035. In the first four years, five industrial sectors are prioritized to face the digital era, namely the food and beverage industry, automotive, electronics, textiles, and chemicals (in Law No. 14 of 2015),

even high-tech investors get incentives. In the textile industry, the technological application is carried out in all phases of production, from the supply of raw materials to the markets.

This transformation is targeted by the government not only in large industries but also in small industries, by using technology. Realizing these ideals, the government created the Act No. 3 of 2014 concerning Industry Article 14 to develop programs for industrial revolution 4.0 in various regions in Indonesia following their designation. These programs include the development of the Industrial Growth Center (WPPI), the development of the Region Industrial Allocation, construction of Industrial Estates, and development of Small and Medium Industry Centers. In addition to infrastructure development through the implementation of IT, the quality of human resources in the field of technology is also the emphasized point in future industrial policies.

In the case study of the manufacturing industry sector, digitalization, and global demand, automation of production equipment is a necessity in order to survive in global competition. One consequence that must be faced is labor efficiency because machines replace the use of labor. Labor-intensive industries, such as the garment and textile industry, is one example of the industries affected by digitalization. Digitization or automation in the garment industry is also due to the market demands and competition at the global level. As the largest garment industry in Southeast Asia, which exports most of its production, the demands of consumers abroad are an absolute thing to consider.

The amount of demand for certain quality goods is a prerequisite for the continuity of the industry with a total workforce of 34 thousand people. Some of the strategies carried out by the company in the face of labor reduction are not to extend the contract system that has expired or to do labor rolling in other parts. Workers who are not able to do work outside of the usual work will feel depressed and eventually resign themselves. Although it is not frontal to do termination of employment (PHK), this strategy is a subtle way done by employers to reduce labor.

Meanwhile, in the case of small industries of Wooden Batik and small food industries in Bantul, they can still maintain their business, even digital technology could support business activities to be more developed. Small industries that produce goods and services using conventional methods utilize the internet in increasing product promotion and sales through simple digital applications such as Whatsapp, Facebook, and Instagram. This simple digital system can increase efficiency in communication and production. Entrepreneurs can promote products without having to do promotions using conventional methods. Besides being able to save time, online promotions cost less.

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