## Internet of Things as Engine of Economic Growth in Indonesia

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#### ABSTRACT

The economic diversification concept gives hope for a country with rich natural resources to strengthen its economic basis. Thus industrial revolution era of 4.0 provides great opportunity to fasten the process. A study by McKensey in 2011 proved that the internet in the developing country contributes around 3.4% towards its GDP which means that the internet has become a new hope for the economy in the future. Indonesia is one of the countries that is attempting to maximize the role of the Internet of Things (IoT) for its economic growth. The attempt has made the retail and tourism industries as the two main sectors to experience the significant effect of IoT. In the process of optimizing the IoT to support the economic growth, Indonesia faces several issues especially in the term of the internet network quality and its distribution, the inclusive access of financial access and the infrastructure.

**Keywords:** Internet of Thing, IoT, economic growth. JEL Classification:030

#### INTRODUCTION

The majority of countries with significant natural resources have been depending on the extractive industry and not yet been able to provide the economic diversification. (Ossowski & Halland, 2016). Whereas theoretical and empirical studies show that the economy of the country that relies on extractive industry is very vulnerable to global economic turmoil (Ayuk & Klege, 2017; Oxfam, 2007). In the long run, the economic growth with extractive base is not an option. Besides that, the uncertainty of global political and economic stability along with continued global innovation on the renewable resources have often caused the raise commoditv on extractive prices (Cuming et al., 2015; Suhaimi et al., 2016).

#### LITERATURE REVIEW

Another side of the extractive industry to pay attention to is the employment rate is not equal to its economic growth proportion. For example in 2016, data from the Indonesian Central Statistics Agency (BPS) showed that the proportion of Indonesia's economic growth from the extractive sector was around 10% but only absorbed workers not more than 1,5% (Badan Pusat Statistik, 2015, 2018). Another fact is that when commodity prices increase. the domestic consumption of countries whose resources are rich will rise and be able to boost GDP. However, the high purchasing power with an unequal productivity of non-extractive industry will significantly affect the country's economic stability when the commodity's price drops (Ossowski & Halland, 2016).

While Indonesia is in the process to maintain its economic growth and diversification, the informatics and communication technology, especially the internet, has provides opportunities new economic create sectors to because internet is efficient tool for transferring information, cheaper and In the era of industrial faster.

revolution 4.0, the existing challenges are not only able to offer new business opportunity but also to support the GDP in the macro field by providing new employment opportunity (Statistics SA, 2014; World Economic Forum, 2016).

Since the late 90s the internet has been predicted to be an important technology in economic and business growth. The internet will facilitate all aspects of business from marketing goods and services. accounting standards that are better and on the consumer side, consumers will get more competitive prices due to information disclosure. Study in Chinese provincial internet significant has role in promoting economic growth in China (Hasan, Wachtel, & Zhou, 2009). Other studies also found evidence that the internet plays important role in economic after investment ratio. government ratio, and inflation (Lio, Liu, & Ou, 2011).

A study by McKinsey 2011 showed that the internet in the developing countries is able to support the GDP to 3.4% with household sector as its main activator. The household internetbased consumption in a global scope contributes 1.8% for the developed countries. This research also showed that the internet has opened a wider opportunity for entrepreneurship and that it significantly helps the Small Medium Enterprises (SMEs) in its activity. In the developed countries, the internet has helped the SMEs to grow even faster and reach a wider market (Manyika & Roxburgh, 2011).

Apart from the great potential of having new job fields due to the IoT, there are some researches that found when technology is not balanced with the good management and planning, there is a chance that the technology will give a destructive effect towards the productivity. (Michelacci & Lopez-Salido, 2007). Therefore, there is a need to make а mapping for identification towards the opportunity and challenges to have a sustainable positive impact.

The number of the internet user in 2017 has reached 3.8 billion with 51% (Internetworldstats.com, penetration n.d.) Indonesia itself has 151 million active internet user with a higher global penetration which reaches 54% (Maulana, 2018). The internet users' high rate of penetration is inevitable; the internet will ease the coordination inter-regional. accelerate of the information exchange in all fields such as trading, education and even health (Cuming et al., 2015; The Government Office for Science, 2014).

For example, the internet in India has been used to conduct online assessments to see the potential of human resources it has so as to increase one's chances of getting the right job. In Germany the internet has been used to help regulate traffic lights according to road density. In fact, in our daily lives we are getting used to ordering food, shopping for clothes and investing in an internet-based platform. This concept is called the Internet of Things (IoT)

The IoT is an internet concept for all life purposes to facilitate the accessibility and mobility which eventually will increase the productivity (Miorandi. Sicari. De Pellegrini, & Chlamtac, 2012; Xu, He, & Li, 2014). This strength point of IoT is one thing to develop in many countries, including Indonesia so that it can support the welfare distribution through economic growth and job opportunities. Based on the excellence we can achieve from the internet and bv considering the potential in Indonesia, thus this research aims at describing the IoT's potential and challenges as the accelerator of Indonesian economic growth.

## METHOD, DATA, AND ANALYSIS

This research is a qualitative one with phenomenology approach. This research applied several theoretical points of view and empirical data to analyze the internet-based economic growth in Indonesia. The data in this research were secondary data from various sources. The data then were put in a table for the processing stage to achieve the research's purpose.

# RESULT AND DISCUSSION

Many people believe that the industrial revolution 4.0 will change the structure. Repetitive work and administrative work will begin to be replaced with artificial intelligence and information systems. But in addition to the threat of labor reduction, the industrial revolution 4.0 also opens many new employment opportunities. Job opportunities that may be open with the development of technology can be seen with the many Start-up companies that continue to emerge from the fields of transportation, accommodation to Finance Technology (Fintech). The investment value of these startup companies in 2017 has reached USD 2,4 billion and is the three main sectors with the largest

investment value in Indonesia and since 2013 the funding trend received by the Startup continues to increase (Yusra, n.d.).

## E-Commerce

The proportion of internet-based economic growth in Indonesia at the end of 2017 has dominated by the ecommerce sector. Total transactions in this sector reach in 2017 is in the range of USD 5.5 billion. In real terms the development of e-commerce-based marketplaces such as Bukalapak and Tokopedia also increases the growth of new entrepreneurs. In 2017 there were 2 million sellers in Bukalapak and 2.7 million sellers in Tokopedia with 70% of vendors in Tokopedia were new business owner. Currently 35 million Indonesians have been shopping online and are predicted to continue to increase (Yasa, n.d.).





Figure 1. Startup funding distribution

In 2018, 31 million Indonesians have been shopping online and are predicted to continue to increase (Katadata, 2018). The high purchasing power through the Indonesian digital platform and increasing market range is the main driver of e-commerce sales growth in Indonesia. This trend also makes many players who have been selling offline also try in the online market.

The continuous rise of Indonesian ecommerce transactions is also inseparable from the increasing middle class in Indonesia. It is estimated that in 2030 the middle class in Indonesia will reach 90 million people. Most highincome middle class spend most of their salary to buy goods online. Another influence is the growth of social media users in Indonesia which reached 11.24 percent. Currently, there is 35.65 percent of Indonesians accessing social media. In 2020, it is predicted that 42.6 percent of Indonesia's population will access social media (Dhani, 2016).

Social media is one powerful tool for influencing shopping decisions. Twitter said one in four people in Indonesia followed a fashion brand account and one in five Twitter users in Indonesia wanted to know more about the fashion account. Twitter users who follow a certain fashion brand have a 62 percent chance of buying a renewable product from the brand if they release the latest series. As many as 67 percent of them reclaimed the purchase as a fun activity and appreciated positively the buying and selling response (Maulana, 2018).



Figure 2. E-commerce transaction in Indonesia (Billion USD)

Meanwhile. 2017 Instagram in announced its business community has grown to 25 million accounts, dominated by SMEs. This number increased from a total of 15 million Julv 2017. accounts in Currently Instagram has 800 million monthly active users. In its official statement, Instagram said, more than 80 percent had followed a business account, of which 200 million users had visited their business profiles actively every day (Iskandar, 2017).

However, the e-commerce sector in Indonesia has only contributed 1% of total retail sales. In other words, in Indonesia only 1 of 100 transactions are made online still lagging far behind compared to China and United States which reached 14% (Julianto, 2017). With Indonesia's population of more than 260 million and penetration of internet users even higher than global penetration, the e-commerce industry is still very prospective to encourage economic growth, especially in the retail trade sector.

Indeed there is no exact data on how many workers in the e-commerce sector, but seeing the trend of transactions and the number of online sellers at least in the two giant Indonesian marketplaces Bukalapak and Tokopedia, we can see that this sector is truly potential to support economic growth and new job opportunity in the future.

The large transaction value of the ecommerce sector also affects the derivatives industry, especially logistics shipping services. Since experiencing a downturn's performance in 2010, the industrv continues to experience significant growth. In general, the trend of the growth of the number of workers in the logistics, warehousing and communication sectors from 2013 to 2017 continued to experience growth with an average of 2.71% even since 2015 the growth trend of workers in this sector has always been above the average of the last five years (Badan Pusat Statistik, 2015, 2018). JNE as one of the main players in the field of logistics delivery revealed that in 2017 the company's revenue rose 30% and 50% came from e-commerce transactions (Julianto, 2017).

## Tourism

The tourism sector in the industrial revolution era of 4.0 is experiencing a significant increase in global GDP which reached USD 7.6 Billion in 2016. The amount equals with 10.2% of the total GDP. The world's tourism accommodation sector 2016 in contributed 6 million iob new opportunities worldwide. Statistically, in the same year, the tourism sector grew around 3.1% and was projected to keep on growing above 3% rate by the World Travel & Tourism Council (WTTC, 2017). There reasons to support the tourism accommodation sector are the improvement of the global economy and the high tendency for millennial generation and urban community to travel as their primary need. The most important thing about this improvement is that people get easy access to information and accommodation online (Huang, Goo, Nam, & Yoo, 2017; Xiang, Magnini, & Fesenmaier, 2015)

In Indonesia, the tourism sector is one of the best four contributors to foreign exchange. Since 2013 the foreign exchange value from tourism sectors keeps increasing, while the CPO, coal, gas, and oil, in contrary, are decreasing. The tourism sector, in fact, in Indonesia, is the second highest contributor after the CPO in the year 2016 and the projection in 2020 reveals that the tourism sector will be the highest contributor to the Indonesian economic growth (Kementerian Pariwisata, 2017).

The good performance shown by the Indonesian tourism sector is partly due the guite high penetration of to Indonesian tourism information. The World Economic Forum (WEF) in 2017 places Indonesia's tourism branding performance as the second best after Singapore in the ASEAN region. WEF during its assessment used 3 indicators namely Digital demand, online search and Brantag. The assessment presented by WEF proved that the internet plays an important role in the performance of foreign tourist visits and this needs to be optimized (WTTC, 2017).

Although Indonesia's online marketing strategy for tourism gets a lot of appreciation, globally the Indonesia's position of branding performance is still at number 47. Next, in real terms even though performance continues to improve, foreign tourist arrivals in 2016 only touched 11.52 million, still lagging far behind compared to Malaysia and Thailand, where foreign tourist arrivals reached 18 and 25 million (World Bank, 2018).



Figure 3. Trend of Indonesia Foreign Exchange Earnings

Indonesia's tourism potential and the penetration of high numbers of searches on the Internet by citizens of the world gives hope that Indonesia's tourism industry will continue to grow. Positive trends in Indonesian tourism will make tourism sector one of the main sectors in creating jobs. This is reinforced by data that creating jobs in the tourism sector is the cheapest thing to do (Kementerian Pariwisata, 2017).

## Fintech

The Fintech industry in the world has reached a large amount of time. In the early stages in most countries, Fintech significant market gained appeal, especially for underserved populations. According to the EY Fintech Adoption Index, the average use of FinTech is 33% globally (EY FinTech Global Network, 2017). FinTech enables greater access to financial access so that it will increase Indonesia's financial inclusiveness ratio. The impact in real terms with the development of Fintech is that the financial transaction costs are expected to be cheaper, capital access will be more open and more efficient in time and more practical in administrative terms.

Fintech's growth in Indonesia can be seen from the investment funds that enter this sector. Fintech gets an investment portion of 22% of the total Start-up investment funds in Indonesia (Yusra, n.d.). The growth of Fintech's start-up in Indonesia in addition to opening job opportunities that are no less important is the opening of greater access to financial inclusiveness. The Ministry of Cooperatives of the Republic of Indonesia revealed that in 2018 only 20% of SMEs received Bank financing. This is also believed by many experts on the low competitiveness of Indonesian SMEs (Putra, n.d.). Therefore. the Indonesian Financial Services Authority (OJK) hopes that Fintech will become one of the bridges between SMEs and capital access (Putra, n.d.).

## **Others Sector**

In the government sector, starting from filing business licenses, data services to tax payments can all be done online. Internet service encourages faster and more efficient information and services. Some studies also show that internet-based public services are only ineffective when agencies do not want to be open to technological changes and tend to change. Basically, the internet will really improve the quality of public services (Dečman, Stare, & Klun, 2010).

Research from 34 European countries during the period of 2003 until 2014. aims to evaluate the impact of egovernment strategy on economic and social development and its ability to enhance wealth creation and to improve exciting social policies. The research provide an evidence of the positive significant effect of e-government implementation GDP on growth (Gustova, 2017).

In the transportation sector, Go-Jek in March 2018 had one million partners as drivers, this shows that the start-up in the transportation sector was able to absorb such a large workforce (Aco, 2018). In fact, according to a partner's income report, every month can be estimated at Rp.3-5 million per month (Aco, 2018). The development of onlinebased transportation such as Go-jek does only affect employment not opportunities to become drivers but also opportunities provides for the development of new businesses.

Internet access and online transportation services will make it easier for people to market and deliver their products. A concrete example of the existence of the internet and the Go-Massage feature presented by Go-Jek will surely increase the chance of a masseur in meeting with his prospective clients, even now Go-Jek has also begun to improve its cash-less payment feature as one of Fintech's services.

#### Discussion The number of e-commerce transactions and actors in Indonesia which is quite large in fact for the total contribution of retail sales as a whole is not more than 1%. The confirmation on online buyers in Indonesia until the year 2018 strengthen the previous statement which reaches the amount of 35 million buyers(Katadata, 2018). Whereas internet users in Indonesia have reached 150 million with 80% of users of

productive age (APJII, 2016). E-commerce as a driver of economic growth has been proven by China. China's digital economy accounted for 30.3 percent of China's total GDP over the year. Taking its spillover effect into account, digital economy contributed 69.9 percent to the GDP in 2016, it added (China Daily, 2017). Learning from the statistics of China's digital trade, the e-commerce sector can truly be a hope a driver of Indonesia's future as economic growth. Therefore, the government must continue to encourage Indonesia's digital economic development infrastructure ranging from guality and penetration of internet users to access to digital financial inclusiveness.

Indonesian cable internet speeds sit at number 93 with a download rate of 13.38 Mbps, and a sequence of 106 for mobile internet speeds with a download speed of 9.73 Mbps (Speedtest.net, n.d.). Next in terms of geography, the internet users majority of and penetration are still on Java Island, of course with the concept of Indonesia's centric development of inequality of quality and penetration of internet connectivity must immediately find a solution

Globally, both cable and internetbased internet in Indonesia are still far behind. Indonesian cable internet speeds sit at number 93 with a download rate of 13.38 Mbps, and a sequence of 106 for mobile internet speeds with a download speed of 9.73 Mbps (Speedtest.net, n.d.). Next in terms of geography, the internet majority of users and penetration are still on Java Island, of course with the concept of Indonesia's centric development of inequality of quality and penetration of internet connectivity must immediately find a solution (katadata, n.d.).

Meanwhile, in terms of financial inclusiveness, the latest data shows that the level of inclusion of Indonesian financial services reaches 69% of the total population. Inclusiveness of digital finance will certainly be able to increase the velocity of money in the ecommerce sector which will eventually open up new employment opportunities. The World Bank study shows that an increase of one percent in financial inclusion system facilities could increase GDP growth per capita by 0.03 percent (Otoritas Jasa Keuangan, 2016).

In Indonesia. digital financial inclusion is marked by the presence of Fintech regulations through POJK Number 77/2016 concerning P2P Lending. With this rule, Fintech companies can target customers who have not been touched by banking institutions and provide financing with a maximum credit value of USD 2 million. Through this Fintech, it is expected that people who have not been touched by banking access, including SMEs entrepreneurs, can be fostered and given financing to develop the business and are expected to someday be able to become a bankable class.

The increase in actors and transactions in the e-commerce sector as discussed in the results section will also have an impact on the derivative sector, especially the logistics services sector. The increase in the e-commerce transaction volume will cause the increase in the shipping volume. The increase in the e-commerce transaction volume increases the shipping volume which eventually makes a greater demand of workforce in the logistics service sector. But what needs to be taken into account is that growth in this sector continues to accelerate, SO physical infrastructure such as roads, airports, and ports must also be a priority

Adequate infrastructure will reduce costs and in accordance with demand theory when costs can be reduced, the volume of demand for goods will increase. The fact is in accordance with the demand theory which says that the low cost can increase the goods demand. Infrastructure development is also very influential in the tourism sector. The WEF data which shows that Indonesian tourism is known online through digital campaigns on the internet proves that Indonesia is on the right track, but Indonesia's popularity in the digital realm will not have a significant impact if access to tourism is still inadequate. Eventually, the IoT cannot go by itself to be the driving force for the economic sector. An adequate physical infrastructure is a key to make the IoT become a great economic accelerator.

# CONCLUSIONS

Based on the latest data on several internet-based economic sectors in Indonesia, it can be concluded that Indonesia has the potential to continue develop an IoT-based economy. to However, what needs to be considered is the supporting infrastructure such as the quality and distribution of the internet, the level of inclusiveness of finance, especially for SMEs and physical infrastructure.

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