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The Indonesian Digital Policy: Lessons from PRC's Experiences

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Abstract

Digitalisation era affects consumer behaviour in various activities, such as shopping, travelling, learning, financial transaction implementation, and many others. In this case, PRC has a significant development, especially in the digital economy. Therefore, this study aims to analyse five research problems related to the opportunities and challenges in developing the performance of the digital economy in Indonesia, the performance of digital economy between Indonesia and PRC, the lesson learned from PRC's experiences to develop digital economy in Indonesia, the digital economy prospects during the Covid-19 pandemic and post Covid-19, and the policy strategy priority that should be stipulated in developing the digital economy in Indonesia.

This research found that Indonesia which has similarities on PRC has a great potential to develop digital economy since the internet penetration is 62,8 per cent over the total population, such as digital tools in F&B sectors, the textile and clothing, electronic product, smart product, fintech, transportation and manufacture. Beside socioeconomic impact development and regional disparities are reduced. However, the contribution of the digital economy is not significant for 2,9 per cent of GDP. The slow growth of the workforce remains a primary challenge to generate productivity.

Related to the problem above, Indonesia learns from PRC since it has innovative human resource and entrepreneurs supported by the digital economy, friendly environment, and socio-political stability. Besides, PRC's valuable benchmarking in the digital economy, precisely in strengthening ICT policies and the enabling environment, such as create significant digital ecosystems, upskilling human resource, as well as ICT-related policies of personal data protection, security, privacy laws, taxation policies. Reflecting on Indonesia, it has the potential to generate an inclusive economy. Moreover, the middle class plays an important role to increase consumption. The elevating trend of using fintech also contribute to an inclusive economy. Besides, Covid-19 pandemic plays a significant role in the digital economy

Key words: Covid-19 impact, Digital economy, Digital policies, Digital strategies, ICT development

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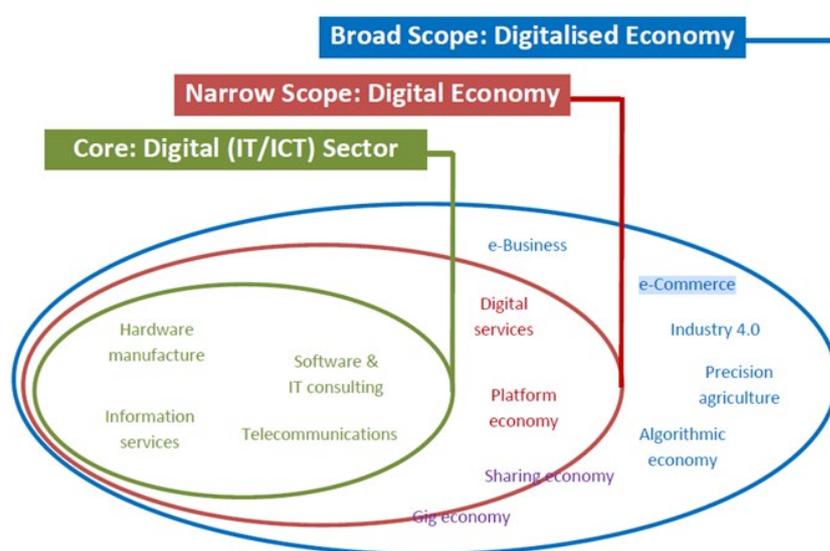
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1. Background

The internet has grown since mid of the 1990s, the digital landscape also develops and transform the business operates. In a disruption era, the economy depends on digital technology and the internet. The number of internet user rapidly growing so that it changes the way people work, communicate, shopping, and conducting daily activities. The development of digital technology transforms so that it generates economic and social benefit for society, business, and government. Digital technology offers opportunities for inclusiveness and sustainable economic growth in all economic sectors.

The idea of defining digital economy has been much discussed throughout the years, considering its dynamic nature due to the rapidly changing technological innovation (Barefoot et al., 2018). Even though, Bukht & Heeks (2017) defined digital economy as 'that part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services'. However, previous other authors have different emphasis on definition, such as: Lane (1999) and Mesenbourg (201) on e-commerce; G20 DETF (2016) on networked and intelligent ICTs; European Parliament (2017) and House of Commons (2016) on competition and regulation of the digital economy; and Elmasry et al. (2016) on measurement of digitisation (Bukht & Heeks, 2017).

Figure 1: Scoping the Digital Economy



Source: Bukht & Heeks (2017)

Currently, the concept of digital economy and Information and Communications Technology (ICT) often used interchangeably. This could be understood since the development ICTs are the primary reason digital economy could flourish, one of the examples is e-commerce that incorporated into digital economy definition after dot com bubble (Mesenbourg, 2001). As a matter of consequence, there is no exact definition of digital economy due to its blurred boundaries (OECD, 2014). To address this problem, Bukht & Heeks (2017) synthesise the digital economy into three-scope model: ICT sector (core), digital economy (narrow scope), digitalised economy (broad scope) (Figure 2). ICT sector consists of hardware manufacture, telecommunications, information services, and software & IT consulting. Moreover, ICT sector play a role as

backbone that make possible for digital services and platform to exist. As more services, manufacturing, and primary sectors has been through intense digitalisation process; the economy, in the broad sense, has been digitalised.

In Asian countries such as India, PRC (People's Republic of China), and ASEAN; the digital economy is thriving at unprecedented levels due to its large and young populations, rising middle classes, and high-density megacities that enhance competitive advantages in platform & scale effect in internet-related and mobile telecommunications industries (Honoratus, 2018; Mittal & Lloyd, 2016). Another reason is because of Asian countries' weaknesses in the past, and it turns into strength in the future: lag at technological development and late industrialisation (Mittal & Lloyd, 2016). Because of these factors, Asian countries could leapfrog into the new economy without being disturbed by the old economic structure. The results are exemplary; one of them is PRC's success becoming the most extensive financial technology (fintech) in the world.

PRC's digital economy contribution to the Chinese economy is not greater related to OECD average, mainly in terms of ICT employment (Garcia-Herrero & Xu, 2018). Moreover, there is also an issue about the widening gap between rural and urban regions in terms of internet penetration in PRC signalling the unequal development of digital economy across regions (Dahiman, Mealy, and Wermelinger, 2016). However, PRC has proven their technological 'leapfrog' to enhance overall economic development through the twin-track strategy that merges industrialisation and informatisation (Dai, 2002). This development was a crucial part and best time for PRC in the 1990's as a developing country who encountered a handicap called 'digital divide' between information-rich and information-poor countries.

Similar to PRC and the other Asian countries, Indonesia in the middle of digitalisation. According to McKinsey (2016), even though Indonesia considered as the most active in the world and belongs to a dynamic start-up ecosystem, however, as a whole Indonesia remains left behind in utilising digital technology. ICT Infrastructure is weak, and the employment of digital is uneven within and between the various business sector, which results in the benefits of digitisation cannot be obtained optimally. McKinsey (2016) also states that e-commerce in Indonesia is proliferating but is constrained by limited access to technology, lack of technological proficiency, and lack of use of credit cards. It is no wonder that Indonesia has not been able to achieve the benefits of the digital economy.

Therefore, this paper aims to solve five research problems. First, how are the opportunities and challenges in developing the performance of the digital economy in Indonesia? Second, how are the performance of digital economy between Indonesia and PRC? Third, what is the lesson learned from PRC's experience to develop the digital economy in Indonesia? Fourth, how is the digital economy prospects during the Covid-19 pandemic and post Covid-19? Finally, how is the policy strategy priority should be stipulated in developing the digital economy in Indonesia?

2. The Digital Economy in Indonesia: Opportunities and Challenges

Indonesia is an excellent archipelago with for about 17.504 islands, but the infrastructure is limited. The number of people in Indonesia is the fourth highest people with an abundance of young people and actively drives the economy. In 2030-2040, Findex predicted Indonesia to have a demographic bonus, namely productive age (115-

64 years old) greater than unproductive people (under 15 years old and above 64 years). The Global Findex (2017) predicted Indonesia, now categorised as the world's 16th largest economy and will be the 7th largest economy in 2030. McKinsey (2016) predicts economic digitalisation for about USD 150 billion or the same as Gross Domestic Product in 2025. The Indonesian Ministry of Finance (2020) forecast USD 2.8 trillion in 2040 through technology adoption digital technology historically plays a significant role in structural changes and economic growth. Productivity in all economic sectors is driven by digital technology, even though the digitalisation acceleration requires a business process to transform. Digitalisation is an essential driver of productivity. The development of digital technology, such as remote sensors, intelligence machines, big data will maximise resource allocation, increase efficiency, product quality and services that generate faster process.

In Indonesia, there are four types of the digitalisation process, such as mobile internet, cloud technology, internet of things, big data, and advanced analytics (McKinsey, 2016). First, mobile internet develops since mobile devices are more than fixed-line devices. Moreover, almost 60% of all online traffic nowadays comes from the cellular device (McKinsey, 2016). Second, the development of the digital economy in Indonesia is driven by cloud technology because using the internet is cheaper and faster, so that it is powerful to be accessed remotely (McKinsey, 2016). Third, big data and advance analytics also encourage the development of the digital economy in Indonesia because the internet traffic reaches one zettabyte has sent info for every second (McKinsey, 2016). Fourth, the Internet of Things (IoT) plays a great role in the digital economy in Indonesia because the internet can connect many devices. In 2015, there are for about 18,2 billion internet-connected devices, compared in 2020, becomes 50 billion internet-connected devices (McKinsey, 2016).

The Survey of the Indonesian Internet Providers Association (APJII) in 2018 shows that for about 171,17 million people or 64,8 per cent of the population has used internet connection (APJII, 2018). This number increases 10,12 per cent compared to the previous year. McKinsey (2016) predicts that the impact of digital technology development in Indonesia reaches for about USD 150 billion in 2025 if the digitalisation improves the participation of the workforce and its productivity. The labour productivity of Indonesia must be developed. Otherwise, PRC has a labour force for almost seven times of Indonesia, but its labour activity is two times of Indonesia (Mc Kinsey, 2016). Digital technology also provides opportunities to increase productivity using biosensors and chips, so that the company can measure and monitor labour productivity and analyse affecting it. By this information, the company can reallocate human resources, redesign the human-related process, and restructure organisations. Moreover, Mc Kinsey (2016) predicted that digital technology could add 3.7 million jobs and USD 35 billion a year toward Indonesia economy in 2025. It can be conducted using, for example, the platform that connects job seekers and employing company.

Besides, digital technology also increases a wide array of business setting. The rise of productivity, as well as increases, cost savings and efficiency between value chains from product development, operational, until sales. It is because digital technology can generate new ideas since product development until it increases sales. Components of suppliers can collect consumers data and comprehending the key success and failure factor modes. The company also will understand the need of consumers better through promotion target, advertising, and increasing opportunities to conduct cross-selling and up-selling. Optimisation of the industrial sector will contribute USD 98 billion for Indonesia economy in 2025 (Mc Kinsey, 2016). The other sectors, such as retail, transportation, mining, agriculture, telecommunication and media, healthcare, public

sector & utilities, and the financial sector is predicted to contribute 120 billion in 2025 (Mc Kinsey, 2016).

Opportunities for digital economic development are open in various sectors (The Indonesian Ministry of Finance, 2020). First, digital tools in food and beverage reduce waste material, and the digital platform integrates all sale channels. Second, all decision making in the production process, quality control, predictive maintenance, and the use of big data for quality verification & traceability in electric, hybrid, and autonomous vehicles using digital tools. Third, the new textile and clothing products use digital tools from monitoring, e-commerce platforms, and virtual 3D modelling to optimise industrial processes. Fourth, all electronic products such as automatic domestic lighting products, security and efficiency systems, mobile healthcare applications and real-time data for smart agriculture use digital tools. Fifth, smart products, such as shoes with automatic size adjustment and e-commerce platforms to communicate directly with suppliers and customers, require digital tools. Sixth, the use of digital tools in fintech will improve financial inclusion and expand SMEs access to finance through peer-to-peer payments, lending, and equity crowdfunding. Seventh, there are positive spill over effects in environmental and economic activities if we use electric motorcycles and microgeneration in the energy sector. Eighth, productivity gains in manufacturing through the use of digital tools and becoming factory solutions. Ninth, socioeconomic development and regional disparities are reduced by increasing investment in the digital infrastructure.

Therefore, the development of the digital economy in Indonesia is entirely potential if we can take advantage of these three opportunities. First, international linkages such as Facebook, Google, Telegeography and the other international bandwidths are also opportunities to develop the digital economy in Indonesia. Second, the domestic cable network is estimated to increase six times in 2020 with the linkages through submarine and overland fibre optic. This opportunity will strengthen the network connecting western, central, and eastern Indonesia. Third, Indonesia's last mile 4G coverage has increased. Moreover, internet user access in Indonesia has also increased, in fact, covering areas outside Java Island.

Even though opportunities lie ahead and the number of internet users in Indonesia is proliferating, it turns out that currently, the digital economy's contribution to the economy has not been significant. The digital economy contributes only 2.9% of the total Gross Domestic Product (The Indonesian Financial Services Authority, 2019). Although the number is slightly higher than the average of ASEAN countries (2.8%), Indonesia still lagging compared to Singapore (3.2%) and Vietnam (4%) (Katadata, 2019). Some possible explanations according to The Economist Intelligence Unit (2020) are Indonesia's 2020 Inclusive Internet Index on government regulations, internet quality, and digital literacy that below those countries. One should note that those numbers does not account for indirect effects of digital economy towards other sectors, thus causing the value of digital economy underrepresented in GDP statistics (Watanabe et al., 2018).

Moreover, Brynjolfsson & Collis (2019) provide a further explanation that digital goods and services often do not charge the consumers in exchange the value and benefit provided to them. For instance, the usage of search engine, navigation apps, and restaurant aggregator apps to help consumers finding restaurant they favour. Although this activity contributes to the increase on the value of food and beverages sector, digital economy sector has almost zero increase in value. Hence, GDP should not be the sole indicator to measure the performance of digital economy sector. Based on this problem,

Brynjolfsson et al. (2019) offer GDP-B as an alternative indicator to measure contributions to consumer well-being from free goods. Using large-scale survey, this methodology asks consumers how much they are willing to give up to keep the usage of free goods such as Wikipedia and Facebook.

Indonesia still has a long way to go, according to McKinsey (2016) Indonesia is still lagging in achieving the potential of the digital market in terms of infrastructure, consumers, and businesses. Geographical location is also a challenge in the development of the digital economy in Indonesia. Digital infrastructure investment is also still limited; thus, the investment is needed to close ICT infrastructure gaps and implement new technology. Indonesia is also still facing various challenges in formulating policies related to supporting technology adoption by SMEs and promoting research and development (R&D).

The great challenge of the digitalisation of manufacturing is workforce development. The slow growth of the labour force with limited productivity and lower manufacturing growth rates holds the development of the digital economy in Indonesia. Besides, it requires skilled workers who are expert of computer & data sciences, mechanical & electrical engineering, dan other sciences with interdisciplinary sciences, such as technology, engineering, and math. Workers with low skills should be provided with more training. Therefore, they can adapt to new environments and technologies. Moreover, this problem arises in small and medium scale industries which have less capital and have to retrain their workers. The government is expected to be able to encourage investment related to the digitalisation of manufacturing that should be increased, especially research & innovation investment, for example, by providing tax credit, R&D funding. Significant resources, such as the use of reliable ICT infrastructure, should be allocated to address market failures.

3. Lesson Indonesia can learn from PRC's Digital Economy

If we compare between Indonesia and PRC, there are similarities and differences within the two countries. First of all, both countries have large populations with PRC occupying the first position and Indonesia occupying the 4th position as the largest population (World Bank, 2019). The existence of a large population caused a country has the potential to go through a period of demographic bonus which has been faced in 1990 and Indonesia is projected to undergo a demographic bonus in 2030 (Cai, 2010). Furthermore, both countries were classified as developing countries, and both will have the same tendency to get the title of a developed country in the future. A further reason why PRC is used as a comparative variable with Indonesia in the development of the digital economy is that PRC has innovative human resources and a large number of entrepreneurs who support their digital economy. PRC also has incredible success in several determining factors that a developing country should possess to build its digital economy. Those factors are business-friendly environment (protection of intellectual property) and socio-political stability such as funding for research related to the digital economy, skilled labour, ICT infrastructure, and data & cybersecurity regulations (Dahlman, Mealy, and Wermelinger, 2016). However, PRC can compete with the US and EU in terms of digital economy policies (Hoontrakul, 2018).

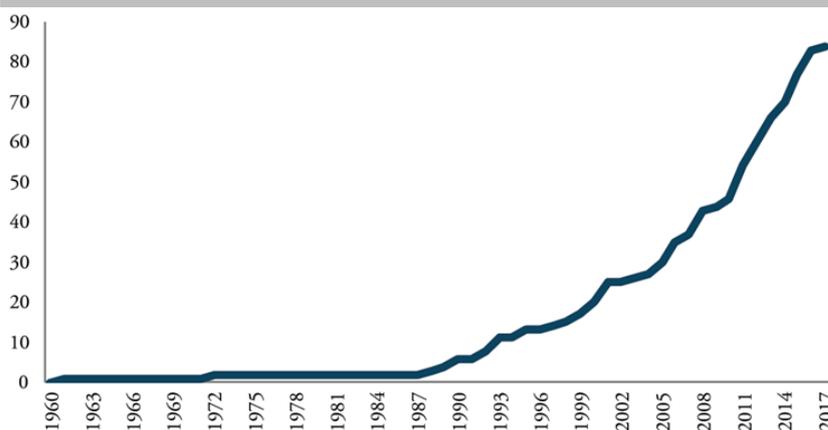
The comparison on the digital economy policies between Indonesia and PRC comprised into eight chapters¹: (1) general data protection and privacy rules; (2) data ownership

¹ https://unctad.org/system/files/official-document/BRI-Project_RP2_en.pdf

policies; (3) data protection and privacy; (4) data security; (5) regulating cross border data flow; (6) building skill for data-driven development; (7) taxation on digital platform; and (8) institutional support. However, before starting the discussion in each chapter, we should precisely define several important terms such as ‘data ownership’, ‘data sovereignty’, ‘data flows’, and ‘data localisation’.

The concept of data ownership has been much debated in the realm of legal and economic perspective. Due to the ease of data conversion, copying, and transmission; data has low barrier of excludability, in addition to its non-rivalry inherent nature (Duch-Brown et al., 2017). Hence, causing problem in regard to assigning exclusive property right to a natural or legal problem. Moreover, Heverly (2003), as cited in Duch-Brown et al. (2017), proposed ‘hybrid ownership regime’ to reconcile conflicting objective between exclusive private rights and exceptions for common use or access.

Figure 2: Cumulative Number of Restrictions on Cross-Border Data Flows



Source: Ferracane (2017)

The diverse interpretation of data ownership between school of thought in law has caused different policy toward data regulations, one of them is data sovereignty. Irion (2012) defined national data sovereignty as ‘government’s exclusive authority and control over all virtual public assets, which are not in the public domain, irrespective whether they are stored on their own or third parties’ facilities and premises’. Based on data sovereignty principle, a nation could impose data localisation policy as means to ‘assert sovereignty over a borderless medium (Bowman, 2017).

According to Selby (2017), data localisation is a policy from national government to force internet content hosts to store data about internet users in servers located within jurisdiction of national government. However, each country has different accentuation regarding the implementation of data localisation policy. Russia and PRC implement broad definition of data localisation, meanwhile USA and EU only impose the policy at narrow sense. Furthermore, Ferracane (2017) extends the distinction on data localisation, as means to restrict cross-border data flows, into four groups: no restrictions, local storage, local processing, and ban on transfer. Using Digital Trade Estimates database, Ferracane (2017) shows the increasing trend of restriction on cross-border data flows, or data protectionism, amidst the so-called era of globalisation (Figure 2). A further discussion on these topics will be covered in the upcoming sections.

3.1. General Data Protection and Privacy Rules

According to ASIFMA (2020), Indonesia does not have general law for its data protection and privacy rules. Some regulations are containing general personal data privacy such as Law No. 11/2008 on Electronic Information and Transaction that amended by Law No. 19/2016, Government Regulation No. 71/2019 on Administration of Electronic System and Transaction (GR No. 71) and Minister of Communication and Information Regulation No. 20/2016 on the Protection of Personal Data in Economic System. Also, there are several sectoral legislations that explains data privacy, but it is not the main concern of the regulation. Compared to PRC, which has drafted regulations regarding the data protection and privacy rules, they were way ahead progressive for the importance of protecting data privacy in terms of the numbers of regulations they have drafted. For example, The Cyber Security Law of the People's Republic of PRC (the "PRC") (the "CSL") released by the Standing Committee of the National People's Congress and came into force in 2017 (Baker McKenzie, 2019). Besides, several sectoral laws that consist of data privacy and protection are also regulated comprehensively and do not intersect with their Cyber Security Law as the primary regulation.

However, Indonesia government plans to finalise a draft regarding the data privacy protection wherein this draft shade several laws related to the rights of individuals such as human rights law, Electronic and Information Technology Law (EIT) Law, population and administration law, banking law, health law, consumer protection law, public information disclosure law, and telecommunication law. The draft that was planned to be enacted in November 2020 contains four elements for its draft, namely data sovereignty, data owner, data user, and data flows. The formulation of this policy provides legal certainty in the field of personal data protection in which case Indonesia is still left behind compared to the other countries. Besides, the Standing Committee of the National People's Congress (NPCSC) was planning to draft and issue the consolidated Personal Information Protection Law and the Data Security Law in 2020 to provide insufficient regulatory certainty and provide guidance for a rigid court system limiting the scope for judges to make new interpretations of the law. With the existence of regulations governing personal data protection policies, digital policies will be easier to implement, considering that the two are interconnected. Several categories support the sustainability of digital policies such as data ownership policies, data protection privacy, data security, cross border data flow regulation, building skill for data-driven development, taxation of digital platforms, and institutional support.

3.2. Data Ownership Policies

Protection of data ownership is one of the natural rights that provides data owner protection against theft, piracy, and wiretapping. Some countries implicitly regulate data ownership protection rights in their constitution, although not directly stated. Indonesia set their data ownership in the law of Personal Data Protection No. 20 of 2016. As the owner of the data, an individual has the following rights: access and update, deletion, and destruction, and right to be forgotten. Eventually, these rights will be updated through the Personal Data Protection Bill (2020), which includes several owner rights such as the right to request information about the clarity of identity, the basis of legal interests, the purpose of requesting and using Personal Data and the accountability of parties requesting Personal Data. Besides, personal data protection regulates the type of personal data, such as general data and specific personal data. Data ownership protection is also emphasised on government regulation No. 71/2019 that electronic data has no longer relevant will be removed. Data deletion consists of deleting electronic data and deleting information from search engine results (Baker McKenzie, 2019).

PRC has different data ownership protection according to their cybersecurity law. The term "data owner" does not mean that a person has right over the data because Chinese law does not regulate it. The data owner is adopted to refer to network/business operators who control, manage, and have a legal interest in the data so that the owner of personal data, in fact, does not have full power (Dentons, 2020). On the other hand, PRC does not include the right to privacy in its constitution. Precisely, they do not define the right to privacy as a type of private right that must be protected as their civil law. It will make it difficult for the subject who owns the data because, in addition to its existence not being protected by the constitution, the existence of this right will undoubtedly be underestimated rather than individual rights. Several rights for data ownership that set in Chinese cybersecurity law are right to access to data/copies of data, right to rectification of errors, right to deletion/right to be forgotten, right to restrict processing, right to data portability, right to withdraw consent, right to object to marketing, and right to complain to the relevant data protection authorities (ICLG, 2020). Moreover, both countries have paid attention to the regulation of the importance of data ownership. It is by providing its people access or request to data and/or copy data and can be used as long as it does not conflict with the law.

3.3. Data Protection & Privacy

Data protection plays a vital role in digital policy in a country. Especially in the economic sector, the existence of data protection and privacy will encourage property rights. In this case, the meaning of property rights itself is data privacy as it contains several rights that can only be consumed by the private sector. Data privacy, such as personal identity, can play an essential role in digital economic policy as well as in the implementation of e-commerce. Meanwhile, the absence of data privacy protection can weaken the relationship between businesses and consumers, thereby increasing consumer vulnerability that could lead to unfair commercial practices and causing uncertainty and lack of trust by consumers (Rosadi & Tahira, 2018).

One of the problems of the Indonesia digital economy is the absence of physical clues in e-commerce that affect consumer trust and reduce consumer trust formation (Gustavsson, 2006). There are several consumer protections risks in the digital economy. First, consumers must have the right to accurate information about the location of the company, its legal entity, and the sector of work performed, this is necessary so that the company gets the trust of consumers for either the goods or services offered and the consumer gets a credible track record to facilitate the trade process. Second, consumers must obtain the right to information related to good products and services offered so that consumers can decide for a product. Third, in digital transactions, system security factors and consumer personal data protection are crucial given the involvement of electronic systems that can be easily damaged by viruses and the extent to which the seller's data protection will be maintained. Last but not the least, consumers must receive education and socialisation to be aware of their rights, especially in the digital economy, which for most consumers, is still new. This action should be in the spotlight due to the rapid development of e-commerce requiring people to do market activity through online media.

PRC has an issue for data privacy protection. On the other hand, Indonesia is struggling to perform a data privacy protection system to enhance a capable digital economy. PRC has its problems that arise based on the existence of privacy rights that have no profound meaning. This problem refers to the Beijing court that privacy generally refers to a person's interests and personal relationships, including personal life, personal information, personal space, secrets, and any aspects of life that a person does not

want to share with the world (Cheung, 2009). Besides, privacy violation depends on how the information obtained, how it disclosed, the scope of the disclosure, the purpose, and the consequence. Hence, if no violation results in the loss of a right to privacy, then it is legally done. Although Cybersecurity Law was enacted in 2017, PRC has not passed a wide-range data protection legislation. So, the provisions of data protection and privacy originate from a multitude of laws and regulations. PRC has significant pronouncements that form the base of data protection (Singh, 2018). The presence of Chinese culture results in the boundaries of privacy being blurred and judged by the level of intimacy the person attaches to various circles of social relationships. What is considered an individual's privacy in one circle can be no privacy in another (Wang, Balnaves, and Sandner, 2020).

In the context of digital economic policy, there are implementations of cybersecurity laws that might be implemented. It is related to data localisation and security assessment. For any cross-border of data transfer that is not related to business needs, a safety assessment must be implemented. The draft stipulates that "network operators must arrange security assessments for cross-border data transfers before data is transferred abroad and will be responsible for the results of the assessment ". Based on the statement, it is clear that one aspect of the security assessment requires the internal processes of a company to prepare, maintain security, and check data collection regularly and transfer regarding data transfer policies abroad (Beiten Burkhardt, 2018).

3.4. Data Security

Data security protects the data system from being stolen or corrupted by unauthorised access. Compared to data protection that protects data individually, data security secure data on a massive and system-wide scale that include data encryption, hashing, tokenisation, and essential management practices to protect data in all platforms. The regulations on data security were regulated by the party who has the authority over technology and information affairs. In Indonesia, data security fare regulations regulated by the house of representative and the government, which is represented by the president and the minister of communication and information. However, in PRC, the regulations about data security were drafted by NPC and the president with several further explanations arranged by The Interpretations of the Supreme People's Court and the Supreme Procuratorate.

Comparing the digital economy, Indonesia has built a national getaway system that mandates all domestic and possibly all international transfers diverted in one stop. The consolidation of payment processing into one central system heightens security risks instead of distributing the risk across payment processors, thereby introducing, and amplifying the same vulnerabilities ascribed to local data centre operators (Meltzer & Lovelock, 2018). Besides, Indonesia government obligated all telecommunication operators, internet platform companies and others in Indonesia that provide "public services" to Indonesian customers through electronic systems are required to establish a national data centre and data recovery centre. It is in order to create legal certainty in data security and aimed at law enforcement and data protection (GSMA, 2018). Public services, which are the independent variables of data security, include non-government institutions such as banking, communications, health, insurance, industrial services, security, and the social network sector, for example in the fintech sector. Digital banking and financial technology can harm financial stability when other parties access data and documents via the internet network along with the increasing amount of data being distributed, and the relationship between devices in accessing the internet. With a

massive scale, the problem of data piracy in the banking sector will have an impact on other related sectors which will cause economic losses (Tayibnapis, Wuryaningsih, and Gora, 2018).

The Standing Committee of the National People's Congress plans to draft and issue the consolidated Personal Information Protection Law and the Data Security Law in 2020. Regulations on Multilevel Network Security Protection will be issued to support the implementation of a tiered network security protection scheme, in which each information system or network operator must be classified at a certain level based on the degree of cybersecurity risk and subject to different requirements in terms of personnel management, system construction, operation and maintenance and technical safeguards applicable to the appropriate operator network level.

The PRC government has set an orientation for its data management, focusing on data security. Key regulations such as the Cybersecurity and Encryption Act place national security at the core of their data law objectives. The main objective so far has been to take preventive action against data attacks, either its data leaks or data hijacking, by taking a very structured technical approach. Otherwise, they exert control over Internet content and cyberinfrastructure for success in achieving these goals. Based on the policies projected above, PRC has new ambitions to reap economic benefits from PRC's enormous data resources through a regulated data economy (Boullenois, 2020). Their data security policy measures have been embedded in several articles in CSL. Referring to Article 40 of CSL, network operators as data managers are responsible for taking technical and other measures necessary to ensure the security of the personal data they collect, and for building and improving systems for the protection of user information (ICLG, 2020). As one of the prioritised things to achieve their goals, CSL participates in regulating criminal provisions regarding data security breaches. Against the maximum penalty for data security breaches: under Article 64 of the CSL, in the event of a serious breach, the operator or provider who breaches data security can face a fine of up to RMB 1 million (or ten times the illegal revenue), suspension of related business, closure for repairs, closure of any website, and revocation of business license. That indirect responsibility can face fines of up to RMB 100,000 (ICLG, 2020).

3.5. Regulating Cross Border Data Flow

Meltzer & Lovelock (2018) highlights several cross-border data flow restrictions such as the data cannot be transferred outside national borders, the data could be transferred, but a copy must be preserved domestically, and required prior consent. For the context of Indonesia, GSMA (2018a) argued that cross-border data flows are permitted in Indonesia in principle but subject to an agreement and coordination with the Indonesian Ministry of Communications and Informatics. In the process, one of the requirements to cross-border data flows is that the operator must submit a detailed plan regarding transfer date, the reason for transfer, the recipient country, and the destination country. The operator itself is distinguished between public and private operators. One of the differences between those two is data localisation policy is restricted to public operators, meanwhile private operators can store their data outside Indonesia borders but are subject to surveillance by the government institution (Baker McKenzie, 2019; Ikigai Law, 2020).

Based on current regulation on cross-border data flows, Indonesia exercises a not-so-major amount of data transfer restriction relative to other countries, such as PRC. However, there are still data restriction policies, such as the government's data sovereignty law, GR 82, and several sector-specific regulations that require data centres

and disaster recovery centres to be located in Indonesia (HHP, 2018; Meltzer & Lovelock). According to GSMA (2018b), productivity improvements due to the usage of cross-border data flows, and digitalisation process contributed to Indonesia's GDP by the amount of \$24.5 billion for retail sales sector and \$34.5 billion for the manufacturing sector. One of the success stories is Go-Jek, a company which successfully raising billions investment, which rose from a small company in 2014 to a unicorn in just a few years (GSMA, 2018b). However, if the government decided to implement data localisation and other barriers to data flows, there will be a \$0.5 billion cost (ACCA, 2017). Another calculation came from Bauer et al. (2014). The restriction on cross-border service providers such as data platforms and cloud computing will reduce Indonesia's GDP by 0.5 per cent annually.

Table 1: PRC Data Localisation Policy in 2006-2020

No.	Year	Regulation(s)
1.	2006	PRC introduced measures for e-banking that require banking companies to keep their servers domestically.
2.	2011	PRC enacted a law that forbids offshore storage, processing, or analysing of Chinese personal financial information.
3.	2013	PRC introduced new rules about credit reporting that requires all credit information regarding Chinese citizens to be stored and processed domestically.
4.	2014	PRC issued new rules that require medical and health information to be stored locally.
5.	2015	For the insurance industry, PRC released draft administrative regulations that include data localisation requirements.
6.	2016	PRC issued new regulations that forced companies involved in internet-based mapping services to store data domestically.
7.	2016	PRC enacted new laws regarding online publishing that require all servers used to provide services on app stores, online literature databases, online gaming, and audio and video distribution platforms; to be located locally.
8.	2016	PRC introduced Counter-Terrorism Law that requires providers of critical information infrastructure such as internet and telecommunications company to provide encryption keys and store data locally. Besides, any data transfer offshore must be through a security assessment process.
9.	2016	PRC issued a new cybersecurity law that enforces a wide range of companies (compared to previous regulations) to store users' personal information and any business data domestically.
10.	2016	PRC introduced a new law regarding cloud computing services that excludes foreign companies and enforces local-data storage requirements.
13.	2017	PRC released a draft circular that extends data localisation requirements from critical information infrastructure to all network operators. Furthermore, any data transfer outflow would be prohibited if it brings any risk to the security of national defence, political system, science and technology, and economy.
14.	2020	PRC introduced several individual rights about personal data into their civil laws.

Source: (Cory, 2017; ICLG, 2020)

Mueller and Grindal (2019) found evidence supporting PRC's data protectionism policy. The study found that there is a robust negative relationship between the balance of trade in goods and web traffic balances across all subregions. Hence, there is a justification of data protectionism in PRC that may succeed in increasing PRC's producers' web requests share, yet not increase their global competitiveness.

3.6. Building skill for data-driven development

Indonesia has a profound intensity of internet usage, according to We Are Social and Hootsuite (2017), Indonesia is ranked seventh in Global Social Network Penetration with an average of 4 hours and 17 minutes per daytime spent by users on social media. However, Indonesia has a relatively low rank of ICT Development Index in 2017 (111 out of 176 countries), even though there is an increase in Indonesia's score from 3.85 in 2015 to 4.33 in 2016. BPS/Statistics Indonesia (2019a) extended the score calculation and found the continuation of a positive trend. Indonesia's ICT Index continues to increase from 4,96 in 2017 to 5,07 in 2018 with remarkable growth in access and infrastructure sub-index (5,05%). Even though the other sub-index, such as skill and usage, seems to be stagnated with only 0,35% and 0,17% growth.

Furthermore, BPS (2019a) also highlights the disparity across provinces regarding ICT penetration, such as infrastructure, access, skill, and usage. The two most extreme cases are Special Region Jakarta's score (7,14) is more than twofold compared to Papua's score (3,30). In addition, there is also an issue of the inequality between urban and rural areas. BPS (2019a) found that only 27 out of 100 rural residents were already using the internet, significantly lower compared to 51 out of 100 urban residents. In 2018, only 1 out of 5 of individuals have a computer in their home with only three out of 100 individuals using fixed broadband (BPS, 2019a). In terms of operating computers, 28 out of 100 urban residents already have access, compared to 10 out of 100 rural residents (BPS, 2019b). Although younger and educated people tend to use mobile internet via smartphones rather than featured phones, as a complementary to a personal computer, the dominant usage is still information handling capacity in daily life rather than to support productive activities (Puspitasari & Ishli, 2016).

Moreover, Gayatri et al. (2015) found that almost all of the surveyed children and adolescents in Indonesia have been internet users. For those who did not, the most common reasons are the unavailability of equipment to access the internet, cost barrier, and forbidden by their parents. This study highlights the inequality of internet access between Java Island residents and non-Java Island residents in terms of computer ownership and internet access. This finding coincides with Jurriens & Tapsell (2017) that one of the main barriers is the unavailability and underdeveloped digital infrastructure provision, especially in disadvantaged regions in Indonesia.

PRC has already proven its commitment to providing digital infrastructure in order to support skill building for data-driven development. According to ITU (2017), PRC is the world's telecommunication markets in several indicators such as the number of fixed telephones, mobile telephone, fixed-broadband subscriptions, and exported ICT products. Besides, although PRC had a mediocre rank on ICT Development Index in 2017, one of the reasons is due to unequal outcome between urban and rural areas, PRC has an exceptionally positive trend of improvement especially in several indicators such as mobile-broadband subscriptions and tertiary enrolment per 100 population. These successes were due to the complementary relation between large ICT manufacturing base, private-sector operation, and government direction. Besides, PRC's government also actively pursues the upskilling of their labour forces through "Upskilling and Certifying the Digital Skills of Chinese Vocational College Students" (ICDL, 2019). One of the policies is to drive vocational students to obtain one or more occupational skill-based certifications in digital-related areas. This policy is implemented to answer the needs of Chinese firms for professionals with a bunch of digital proficiencies to gain a competitive advantage (Xinhua, 2019).

3.7. Taxation of Digital Platform

The taxation of digital economy, as a part of unilateral measure taken by a country, could be categorized into two forms namely direct tax and indirect tax (Sukardi & Jiaqian, 2020). Direct tax is predicated on permanent establishment concept that applies to companies that are based within a country (Arellano et al., 2016). Direct tax could be implemented in the form of income tax; in many countries applied as digital services tax (DST), or withholding task, or digital permanent establishment (Sukardi & Jiaqian, 2020). In addition, indirect tax charges consumer in accordance with goods and services they consume. Indirect tax could be taken form as goods and services tax (GST) and value added tax (VAT).

The digital economy era requires countries to update and improve their taxation policies as a part of value capture efforts (UNCTAD, 2019). The policy should be implemented in order to prevent under taxation of main digital platforms since there is a substantial tendency of mismatch in profits that are currently taxed and how value is created. According to Terada-Hagiwara, Gonzales, and Wang (2019), there are four implications of the growing size and complexity of the digital economy. First, tax revenue loss due to the increasing business operations in digital platforms. The digitisation could escalate BEPS which multinational companies try to obtain double non-taxation and reallocate their taxable income. Second, missing taxable matters because business operations could be conducted without any physical presence in any country. Whereas, international tax regulations still only acknowledge the physical presence, but not digital presence as shown by the regulation that only allows the source country to tax a non-resident business profit if they present a permanent establishment. Third, unclear income characterisation because digitalisation makes it distinguish some types of income (e.g., business profits, service fees, and royalties), and hence to determine the means and size of the taxation.

Finally, ineffective value-added tax (VAT) collection especially in consumer-to-consumer (C2C) and business-to-consumer (B2C) transactions. The central issue is about the mechanism of collecting tax in low-value transactions of goods, which the collecting cost may exceed its revenue. Besides, there is also an issue about VAT collection on service and intangible transactions that may complicate online and cross-border transactions. Peng (2016) extends the argument about digital economy trade

which happens in cyberspace where there is no such thing as a contract document. It raises several issues about tracking resulting income trading position, sales revenue, service income, use fee, and other types of income. Besides, the development of technology has increased the tendency of tax avoidance in the field of the digital economy. As a matter of consequence, the tax base might continue to be eroded in the future.

Indonesia is not yet collecting full economic value from the digital economy, including its potential to contribute to economic inclusion and development (Pangestu & Dewi, 2017). This condition was proven by the concentration of success stories about the digital economy in two sectors: retail sales and transportation. One of the factors is the development of the digital economy itself was not pioneered by the government but by the role of large conglomerates and tech companies in raising capital both domestically & abroad, and also shaping and dominating the sector (Pangestu & Dewi, 2017; Moore, 2017). These conglomerates were investing in the digital economy start-ups because they realise if they did not, they would be redundant in the next ten years; such perseverance that seems lacking in authority (Cosseboom, 2015). As emphasised by Tambunan & Rosidana (2020), Indonesia's regulations are not enough to answer the existing challenges due to the Government of Indonesia's (Gol) inertia to proportionally and adequately keeping up with the current dynamic of the digital economy.

Interestingly, Covid-19 pandemic has changed the Gol attitude toward taxation on electronic transaction as a means to ensure the stability of financial system and national budget. By means of Government Regulation in Lieu of Law No. 1/2020, the Gol decided to impose unilateral measure in the shape of electronic transaction tax on goods and services conducted using e-commerce from foreign sellers to domestic consumers. There are two criteria for the regulation to be binding: (1) significance economic presence from foreign e-commerce seller in Indonesia; and (2) e-commerce seller came from a partner country of double tax avoidance agreements. If a business entity could satisfy those two conditions, it could not be categorized as permanent establishment who subjected to income tax. According to Macquarie (2020), this policy is a breakthrough since the Gol indirectly differentiate between electronic transaction tax and income/business tax.

Later on, as a concrete implementation of Government Regulation in Lieu of Law No. 1/2020, the Gol enacted Regulation of the Minister of Finance No. 48 of 2020 that says trading through electronic systems will be subjected to VAT with a 10 per cent tax rate as of July 1. This policy includes all business-to-business (B2B) and business-to-consumer (B2C) online transaction of companies who exceed IDR 4.8 billion registration threshold. In accordance with International VAT/GST Guidelines published by OECD (2017), VAT should be levied in the jurisdiction where the financial consumption located. This rule could be called as destination principle to tackle the confusion that came from cross-border transactions. One of the examples is the Gol's effort to levy VAT on online streaming apps such as Spotify and Netflix (The Jakarta Post, 2020). However, Cano (2020) pointed the expanded VAT policy will reduce Indonesia's competitiveness and may hamper the attempt to attract more investment since the multinational investors would like to compare the tax regime between countries. Furthermore, the Gol enacted Law No. 2/2020 to enforce previous regulation. Law No. 2/2020 imposes tax on electronic transaction conducted by non-resident digital players with significant economic presence that required to have permanent establishment. However, if permanent establishment could not be satisfied due to existing international tax agreement, electronic transaction tax could be imposed (Sukardi & Ichwan, 2020).

Regulation of the Minister of Finance No. 48 of 2020 defined 'digital goods' as 'any intangible goods in the form of electronic or digital information, which includes any goods as a result of conversion and any goods that are originally in an electronic form, including but not limited to software, multimedia, and/or electronic data'. Meanwhile, 'digital services' defined as 'any services transmitted through the internet or an electronic network, which are automatic or involve minimal human interaction, and are impossible to transmit without information technology, including but not limited to services such as software'. One could argue that these definitions may possess great challenge on tax enforcement in terms of assigning property right and relations with international tax treaty. Although the situation of pandemic had catalysed reform on Indonesia's tax regime on digital economy transaction, but after all, the regulation must be combined with the improvement of tax authorities' human resource capability and the use of information technology in order to adapt with the recent business development (Tambunan & Rosdiana, 2020).

Meanwhile, a similar situation also happened in PRC in 2016; they have been already making progress in tax reform through value-added tax (VAT) on e-commerce transactions as a part of unilateral measures, from previously using business tax (BT). Those reforms were necessary decisions since the discussion about BEPS in the International Taxation Forum still did not conclude any concrete solution (Terada-Hagiwara, Gonzales, and Wang, 2019). Even though, PRC still has a rigid VAT system, which generally in practice requires the physical presence of a business establishment (KPMG, 2016). Besides, PRC's VAT registration still excludes foreign entities, and its invoicing system is still paper-based dominated. In the current development, there is still a significant discrepancy between value-added taxes which the government should collect and its collecting (VAT gap). Based on OECD (2015), there is approximately 55 per cent of all VAT in PRC that is not properly accounted for. These conditions are challenges to PRC's tax reform efforts in the digital economy.

3.8. Institutional Support

From the previous discussion, it has been stated that tech companies and conglomerates carried digital economy initiatives in Indonesia. This phenomenon raises a question about the Gol's role in terms of facilitating and regulating digital breakthroughs. According to Huang, Ismiraldi, and Thornley (2016), Indonesia does not have any comprehensive framework to promote, direct, and integrate digital breakthroughs. It is proven by the unavailability of "one institution tasked and sufficiently backed to promote and integrate digital innovation. Although the Gol already mandated the Executive Office of the President and Open Government Indonesia as two national bodies to coordinate and facilitate digital innovation in the public domain, those two national bodies are not capable enough to coordinate digital innovation services due to the lack of necessary resources and sufficient legal mandate. Huang, Ismiraldi, and Thornley (2016) extended the assertion that the current digital innovation in Indonesia is still led and dominated by technocrats, such as data analysts and software engineers. Even though, in essence, the digital governance tools should presuppose a socio-cultural shift about the delivery of public services by the government.

Furthermore, the challenges are not solely predicated on the Gol's will but also about the detailed planning and implementation. According to Tayibnapis, Wuryaningsih, and Gora (2018), there are still several challenges in regard to infrastructure, collaboration, and regulation that need to be addressed to support the growth of the digital economy. It should be noted that the existence of government is crucial to encourage collaboration between digital economy stakeholders to support digital innovation in

providing goods and services in a convenient, faster, cheaper, practical, time-saving, and labour-intensive approach (Tayibnapis, Wuryaningsih, and Gora, 2018). One of the examples is for micro, small, and medium enterprises (MSME); the Gol could provide facilitators as a business intermediary or aggregator so they can access the online platform.

According to Hoontrakul (2018), there are three reasons why PRC, 31 out of 163 global unicorns with \$154 billion total valuations, has been a prominent leader in the digital economy: entrepreneurship, innovation, and scale. First, the Chinese entrepreneurs are characterised as "an early follower, then a creative adaptor, and later a business innovator" like founders of Baidu, Alibaba, and Tencent (BAT) that later creates a virtuous cycle of knowledge. Second, technology and innovation, as shown by the amount of PRC's GDP on research and development (\$373 billion), second highest in the world in terms of purchasing power parity. This great attention to research and development has led PRC to be a leader in digital innovation such as fintech, e-commerce, mobile payment, QR code, etc. Last, PRC's large population and a high percentage of the middle class in the post-long-term planning of industrialisation with an autocratic government. The government also imposed a Great Firewall policy to protect its internet system from foreign intervention. This situation created opportunities for entrepreneurs and computer science graduates to follow western models and scale up with Chinese characteristics.

The previous explanation also coincides with Woetzel et al. (2017), who started the massive amount of PRC's internet users encourages perpetual attempt and supports digital players to achieve economies of scale quickly. Also, the intensity and scale of customer consumption create PRC as a demonstration ground for cutting-edge innovations and later enabling a rich digital ecosystem. An interesting take away from Woetzel et al. (2017) is that PRC's government not only acts as a policymaker; but as well as an investor, consumer, and innovator to catalyse the digitisation process. In 2015, PRC's government proposed Internet Plus strategy with a detailed blueprint to integrate internet of things (IoT), big data, and cloud computing with traditional manufacturing and consumer industries (Xu, 2015; Hristov, 2017).

Besides, PRC's government also mixed action and inaction approaches to enhance its digitisation process. At first, they only started regulating a flourishing digital sector after giving the innovators enough time to do their experiment. After that, the PRC's government actively supported the world-class infrastructure as an investor, developer, and consumer (Woetzel et al., 2017). As creative destruction, digital innovations have a profound impact on the economic structure in PRC. For instance, Yin et al. (2019) demonstrated the benefits of technological innovation in mobile payment such as changing people's risk attitude and foster business risk-taking, dissemination of information and enriches social networks and eases the credit constraints. As a caveat, Hong (2017) emphasised that although internet plus strategy may become a risky strategy due to the combination of state-power decentralisation and externally oriented commodity chains for the digital economy, it could benefit PRC's digital economy development but not in the sense of global scale.

4. Digital Economy Prospects in Indonesia

Indonesia's digital economy has experienced a gigantic leap from just \$8 billion in 2015 to be \$40 billion in 2019. It is estimated that Indonesia's digital economy could be valued at \$133 billion in 2020 (Paine, 2020). From another indicator, the gross merchandise volume of the e-commerce market in Indonesia shows a gigantic increase from \$1.7

billion in 2015 to be \$20.9 billion in 2019 (Statista, 2020). One of the reasons is due to the growing e-commerce consumers and revenue, with 138.1 million people with \$219.13 average revenue per user as the current condition in 2020. Statista (2020) expected that the trend would keep rising, as shown by the forecast of increasing user penetration from 50.5 per cent in 2020 to 73.3 per cent in 2024. In addition, Indonesia's middle class is overgrowing, with a 10 per cent average increase annually (World Bank, 2019). Dartanto, Moeis, and Otsubo (2020) found that 34.4 per cent of the poor people in 1993 already moved into the middle class in 2014, contributing to a nine-fold increase in Indonesia's middle class.

Middle class, as an economically secured class compared to the poor, tend to increase the volume and variety of their consumption (Ansori, 2019). As the need for necessities goods is already fulfilled, the middle class tries to acquire amenities goods; such as fashion, electronics, media, and hobby-related goods. Statista (2020) found that in 2019, the fashion segment was the top contributor of e-commerce revenue (32 per cent), followed by electronics & media (24.5 per cent) and toys, hobby, & DIY (14.4 per cent). In addition, the consumers also shared optimism and enthusiasm regarding Indonesia's fast-growing e-commerce sector. A survey from Facebook & BCG (2020) found that 91 per cent of consumers surveyed have an interest in shopping or increase their transactions in e-commerce after doing a conversational commerce feature. These factors contribute to the growing volume and value of e-commerce transactions in Indonesia.

The digital economy in Indonesia also has the potential to foster an inclusive economy. According to BPS (2019), 84.21 per cent of e-commerce business entities were categorised as micro-enterprises with one to four employees. Moreover, 12.28 per cent of them were classified as small enterprises with five to 19 employees, leaving only 3.51 per cent of enterprises who have more than 20 employees. E-commerce also provides the consumer and the seller a more convenient way to do the transaction with financial technology support. Data from Statista (2020) shows that there is an increasing trend of the usage of financial technology among e-commerce consumers, such as bank transfer, electronic cards, and e-wallet. Otherwise, cash on delivery payment decreases from 21.9 per cent in 2017 to only 18.5 per cent in 2020. It is a great innovation to support financial inclusion in Indonesia, considering the current banking penetration, which was 48.9 per cent in 2017 (OJK, 2020).

4.1. Covid-19's Impact on Indonesia's Digital Economy Development

Despite the impact of pandemic conditions on the contraction of Indonesia's economy due to lock-down policy and the shortage of consumer's demand, the ICT sector has proven to be exceptional. According to CEIC (2020), the ICT sector has a good 10.88 per cent (YoY) growth in the third quarter, in contrast with the bleak decline in transport & warehousing (-30.84 per cent) and hotels & restaurants (-22.22 per cent) sector. One of the explanations is due to enforced closures of offline stores selling non-essential goods, the producers and consumers shift their activity into online channels (Oxford Business Group, 2020). A survey on digital merchants from World Bank & Bukalapak (2020) found that online sales have been more resilient than offline sales in response to the pandemic. Furthermore, micro, and small merchants were more likely to experience a sales decline compared to micro and large merchants. Also, the survey also found several sectors were more likely to have sales increase, such as office products, baby products, and health & women's fashion products.

From a more specific standpoint, a pandemic has proven to deliver a profound impact on the wellbeing of micro, small, and medium enterprises (MSMEs). A survey from DRI (2020) discovered that 9 out of 10 MSMEs experienced sales decline, and 1 out of 3 faced difficulty in marketing. Hence, to adapt to current situations, a quarter of MSMEs surveyed decided to use digital marketing as the most common strategy. A similar finding was found by BPS (2020) that 27 per cent of businesses are starting to use information technology and the internet to assist their online marketing efforts. World Bank & Bappenas (2020) also affirm this finding with 42 per cent of firms surveyed started to use or increased their use of the internet, social media, and digital platforms in response to a pandemic.

Nevertheless, the adaptation of digital marketing is still concentrated by MSMEs who reside in Java Island (29.18 per cent), in contrast with outside Java Island MSMEs (16.16 per cent). On top of that, MSMEs in Special Region Jakarta have the highest adaptation of digital marketing with 41.57 per cent prevalence. These findings raise a question about the inequality of access and knowledge about the adaptation of digital marketing between MSMEs across Indonesia.

The increasing penetration of digital marketing due to pandemic occurs on not only the seller's side, but also the consumers. A survey from MMA (2020) discovered 70 per cent of the consumers had tried at least one new digital service during the pandemic. For a more detailed description, 38 per cent of the consumers have tried telehealth apps, 34 per cent for online education apps, 27 per cent for work from home software, 25 per cent for digital entertainment apps, and 20 per cent for online groceries apps. Bukalapak also reported an increase of new users by 10 per cent during March 2020, accompanied by expanding grocery selection (Chan, Trihermanto, and Sebastian, 2020).

4.2. Digital Economy Priority Policies

The bright prospect of Indonesia's digital economy and great window opportunities during Covid-19 should be accompanied by the government's supporting policies and enabling environment. Chan, Trihermanto, and Sebastian (2020) pointed to three areas that Indonesia's government should focus on capitalising digital economy potential: upgrading ICT infrastructure to strengthening digital ecosystems, upskilling workers' ICT, and digital skills, and strengthening ICT-related policies.

Meanwhile, education and economic condition are two intertwined indicators since people with higher income tend to have a higher probability of accessing to the cellular phone, computer, and internet compared to people with lower income (World Bank, 2019). Furthermore, a survey from the Di Grupello, Kruse, & Tandon (2013) found that almost half of the employers surveyed claimed that their staff lack the required computer skills. To answer these problems, Indonesia could adopt PRC's policy in developing vocational school curriculum to include digital skills as one of the certifications to obtain a job in the digital economy sector. Moreover, the government should intervene to provide ICT infrastructures such as computers (especially in public building and school) and fixed broadband network (fibre optic) to ensure the supporting environment to develop skills needed.

Furthermore, Indonesia's government should accelerate the process of Personal Data Protection Law this year, as planned before, to provide a secure environment for consumers to do the transaction in e-commerce platforms or using financial technology apps. Moreover, cybersecurity policies must be focused on three main elements, such

as the strategy to protect assets, and integrate security into technology environment across the value chain, a system which proactively detects probabilities of early attack, as well as people as the stakeholder who monitor and comprehending the information value integrated to cyber resilience into the process of wide company governance. Furthermore, despite PRC's protectionism policy on cross-border data flows, Indonesia should not adopt a similar policy due to different context, political inclination, and the scale of the economy between the two countries. The findings support this recommendation several studies that the liberalisation policy on cross-border data flows gives a positive impact on the economy of Indonesia, with security assessment should be maintained as a caveat (Bauer et al., 2014; GSMA, 2018b; Meltzer & Lovelock, 2018).

Finally, OJK (2020) already created "Digital Finance Road Map and Action Plan for 2020-2024" which contain three regulatory and supervisory strategies: an enabling but balanced framework, agile regulations, and market-conduct supervision. However, other than a road map, the government must create a coherent and comprehensive framework among government institutions such as the Indonesian Ministry of Finance, the Indonesian Ministry of Information and Communications, and the Indonesian Financial Services Authority. Some of the examples to mitigate tax base erosion and profit shifting (BEPS) are through improving the tax registration system, e-commerce transaction monitoring, and strengthening law enforcement capacity. These approaches demand profound cooperation among the stakeholders and could not be done single-handedly by an institution only.

5. Conclusion

Digitalisation era has transformed consumer behaviour of the world when they are shopping, travelling, learning, deciding transportation, and conducting a financial transaction. As well as other countries, digital economy in Indonesia also starts developing, which is proven by fast internet penetration growth for about 64,8 per cent of the total population have used the internet. However, the contribution to the digital economy is not significant. Contribution of the digital economy is only 2.9 per cent of the total Gross Domestic Product (The Indonesian Financial Service Authority, 2019). The digital economy is expected to accelerate economic growth and diminishing economic inequality. The digital economy contribution is significant on the PRC economy. PRC has proven to have a progressive leapfrog in the digital economy. Moreover, if we compare Indonesia and PRC, there are some similarities between the two countries. Indonesia and PRC are countries with densely population. The economic prospect of the two countries is also great. Therefore, to generate more benefit from the digital economy in Indonesia, PRC can be one of the benchmarking to develop the digital economy in Indonesia.

Reflecting from PRC, economic development strategy formulation of the digital economy in Indonesia should focus on upgrading infrastructure into strengthening ICT-related policies. The government of Indonesia must conduct data protection to provide a secure environment for consumers while using the transaction in e-commerce platforms or to use financial technology apps. Besides, it must mitigate tax base erosion, profit shifting through maintaining tax registration system and strengthening e-commerce transaction monitoring as well as strengthening law enforcement capacity. The formulation of digital economic development policies in Indonesia is critical since the digital economy prospect to boost the national economy. The consumer behaviour transformation while doing activities supported by digital technology will increase enthusiasm and optimism that the role of the digital economy in the economy is crucial.

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