Social-Economic Background of The Economic Digitalization in Indonesia

Nurul Infitah

Postgraduate of Yogyakarta University
nurul0021pasca.2020@student.uny.ac.id

Abstract

Currently, almost all activities of the world community are facilitated by technological developments. Including in the economic field, technology emerges, so the world community calls it economic digitization. Economic digitization is all economic activities based on digital technology. This paper each indicator such as the ICT Development Index or the Information and Communication Technology Development Index (IP-TIK), the Global Innovation Index or the Global Innovation Index (IIG), the Networked Readiness Index or the Network Readiness Index (IKJ), Share of Households with Internet or Internet User Households (RTPI) and High-Technology Exports (% of manufactured exports) or High-Technology Exports (ETT). The data used is secondary data taken from BPS related to IP-TIK, IKJ, RTPI and ETT.

Keywords: digitalization, technology, social economic

1. INTRODUCTION

Currently, almost all activities of the world community are facilitated by technological developments. Including in the economic field, technology emerges, so the world community calls it economic digitization. Economic digitization is all economic activities based on digital technology (M.A. Afonasova, 2018). The existence of economic digitization facilitates economic relations between countries. Countries in the world are competing to do research to support the development of information technology. Even in developed countries, it is not only focused on how people can use technology but has also focused on how to create technology that makes it easy for its users.

The paper entitled Social and Economic Background of Digital Economy: Conditions for Transition is an explanation related to the level or stages of economic digitization. Comparative research is the main focus of this paper by making comparisons between the Russian Federation and leading European countries. The paper also looks at the socioeconomic background of digitalization between the Russian Federation and European countries. A comparison of economic digitization is carried out by identifying gaps in the development of the digital sector. The analysis of indicators used in this paper uses the ICT Development Index, Global Innovation Index (GII), Networked Readiness Index, Share of Households with Internet and High-Technology Exports (% of manufactured exports).

The results of the paper show that Internet users in Russian households represent almost 75 percent. This condition indicates that the Russian Federation already has a suitable infrastructure for digital technology, but still this percentage is lower than in European countries. The top positions on the Global Innovation Index level are occupied by the Netherlands, Norway and Switzerland, which are countries that are included in the European continent. Meanwhile, Russia is still lagging behind at the bottom and coupled with the current crisis situation (Union, 2017). The limitation of this paper is that it only makes comparisons in

several countries and does not cover all countries in the world, including Indonesia as one of the countries in Asia in the category of developing countries.

Indonesia is one of the countries that is transforming to create a digital climate. This digital climate is being campaigned so that the Indonesian people can be technology literate. Technology is used to facilitate people in their activities, so as to create efficiency, integration and effectiveness. Therefore, the analysis in this paper is necessary because it is part of the reading material that needs to be published so that the public can know the level of economic digitization in Indonesia. Likewise, this paper is useful for decision makers to be used as a basis before making policies related to economic digitization. Of course, in making decisions, it is necessary to conduct in-depth studies related to the characteristics of the digitalization of a country's economy, so that the decisions taken can be targeted, efficient and effective.

This paper analyzes each indicator such as the ICT Development Index or the Information and Communication Technology Development Index (IP-TIK), the Global Innovation Index or the Global Innovation Index (IIG), the Networked Readiness Index or the Network Readiness Index (IKJ), Share of Households with Internet or Internet User Households (RTPI) and High-Technology Exports (% of manufactured exports) or High-Technology Exports (ETT). The data used is secondary data taken from BPS related to IP-TIK, IKJ, RTPI and ETT. Meanwhile, the Global Innovation Index is obtained from Publication data released by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO).

2. LITERATURE REVIEW

The emergence of a digital society must be understood as a rapid transformation of social and economic institutions (Athique, 2019). Transformation provides changes in social and economic aspects. With the digitization of community activities, it will be easier to integrate the needs needed in this digitalization era. Digital technology leads to a reduction in production costs and distribution costs and sometimes even in initial production costs, thereby causing important structural changes in the economy and potentially increasing social welfare globally (Rayna, 2008).

Ease occurs because of the increase in the quantity, quality and variety of goods and services available in the digital economy. The diversity of economic activities has been used as a key element of digital information and knowledge (Ibragimova Guliano, 2019). Therefore, today's digital products are very diverse and can be used according to the needs of each individual. However, on the convenience side, the digitalization of the economy also demands that we have qualified Human Resources (HR) so that we can take full advantage of digital technology. This paper will explain the level of economic digitization in Indonesia by looking at the social and economic background of the Indonesian people.

Before understanding the meaning of information and communication technology, we must understand the meaning of each term of technology, information and communication separately. Technology is a scientific method to achieve practical goals or applied science (Kompas.com, 2020). Information is information, notification, news or news about something. Communication is a process when a person or persons, groups, organizations and society create and use information to connect with the environment and other people (Wikipedia, 2021). Therefore, it can be concluded that information technology or ICT is a forum for electronic means that support the activity of disseminating information, notifications, news, news and the process of connecting or integrating people, groups or organizations.

3. RESEARCH METHOD

The research method used is a qualitative approach with a literature review type of research. This is because the object under study is in accordance with the approach to the theme being studied. The data collection use observation and documentation.

4. RESULTS AND DISCUSSION

IP-ICT is very important as a standard measure of the level of ICT development in a region that can be compared across time and between regions. IP-TIK is able to measure the growth of ICT development, measure the digital gap or digital divide between regions, and measure the potential for ICT development. 2019 is the fourth year that BPS-Statistics Indonesia has calculated IP-TIK with the latest method based on the 2016 Measuring Information Society book published by ITU. In the calculation, there are 11 indicators that make up IP-TIK which are divided into 3 sub-indices, namely the access and infrastructure sub-index, usage sub-index, and expertise sub-index. The following is data on the access and infrastructure sub-index, use and expertise of Indonesia in 2016-2019.

Subindeks	IP-TIK 2015	IP-TIK 2016	IP-TIK 2017
(1)	(2)	(3)	(4)
Akses dan Infrastruktur	4,81	4,88	5,16
Penggunaan	2,21	3,19	4,44
Keahlian	5,38	5,54	5,75
IP-TIK	3,88	4,34	4,99
IP-TIK (versi ITU)	3,85*)	4,33*)	-**)

Subindeks	2018	2019	Pertumbuhan (%)
(1)	(2)	(3)	(4)
Akses dan Infrastruktur	5,34	5,53	3,56
Penggunaan	4,45	4,85	8,99
Keahlian	5,76	5,84	1,31
IP-TIK	5,07	5,32	4,96

Sumber: (BPS, (IP-TIK), 2016, 2017, 2018, 2019)

Based on the data above, it can be concluded that the 3 (three) sub-indices that are used as benchmarks in determining the level of IPTIK in Indonesia from 2016-2019 have increased. Likewise, the overall IPTIK index has increased. In 2019, the sub-index growth that contributed the largest was in the usage sub-index, which was 8.99% and the smallest growth was in the expertise sub-index of 1.31%. Then the following is data regarding the spread of ICT in 34 provinces in Indonesia:
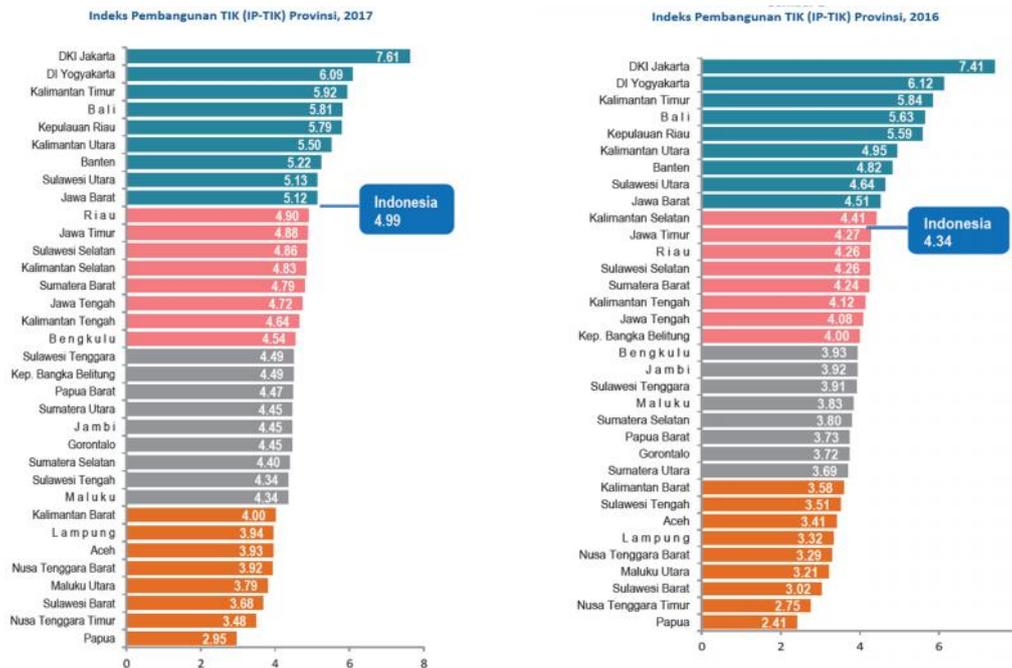
Kategori	2016		2017	
	IP-TIK	Jumlah Provinsi	IP-TIK	Jumlah Provinsi
Tinggi	4,49 ≤ IPTIK	9	5,06 ≤ IPTIK	9
Sedang	3,97 ≤ IPTIK < 4,49	8	4,52 ≤ IPTIK < 5,06	8
Rendah	3,61 ≤ IPTIK < 3,97	8	4,34 ≤ IPTIK < 4,52	9
Sangat Rendah	IPTIK< 3,61	9	IPTIK< 4,34	8

Indeks Pembangunan TIK (IP-TIK) Provinsi, 2018

Indeks Pembangunan TIK (IP-TIK) Provinsi, 2019
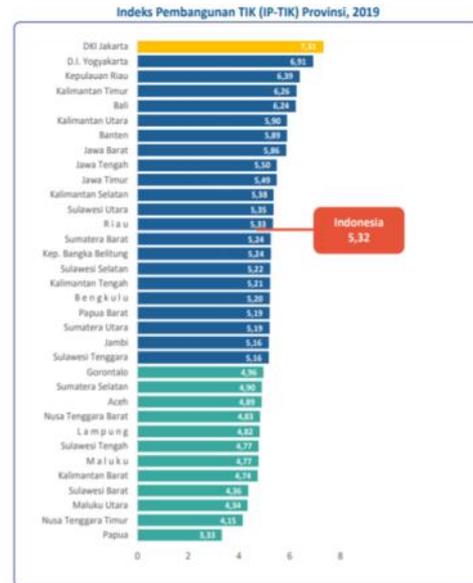
Keterangan Kategori IP-TIK

Kategori	IP-TIK	Warna Grafik
(1)	(2)	(3)
Tinggi	7,26-10,00	
Sedang	5,01-7,25	
Rendah	2,51-5,00	
Sangat Rendah	0,00-2,50	

Sumber: (BPS, (IP-TIK), 2016, 2017, 2018, 2019)

Based on the distribution graph of the distribution of IPTIK in 34 provinces in Indonesia in 2016, the number of provinces with very low categories was 9 provinces and decreased to 8 provinces in 2017. DKI Jakarta is still the province that has the highest ICT, namely 7.41 in 2016 and 7, 61 in 2017 while Papua became the lowest ICT Province at 2.41 in 2016 and 2.95 in 2017 in the very low category. Then in 2018 there were no provinces that were included in the high category and in 2019 DKI Jakarta was able to become a province with a high ICT category, which was 7.31. However, in 2019 Papua was still a province with a low category of ICT. Based on the table above, it can be concluded that the criteria determined each year are different and higher. Therefore, continuous strategies and efforts are needed in order to create an increasing Indonesian ICT. In addition, it can be concluded that the level of the ICT gap in each province in Indonesia is still high, therefore a truly appropriate policy is needed to address the ICT gap, especially seeking development in areas with low ICT.

After learning about Indonesian ICT and its distribution in each region in the province, the following is the total contribution of each sub-index for 2018-2019.

Gambar 1
Kontribusi Subindeks terhadap
IP-TIK Indonesia 2018

Keahlian 22,72%
Akses dan Infrastruktur 42,16%
Penggunaan 35,12%

Gambar 2
Kontribusi Subindeks terhadap
IP-TIK Indonesia 2019

Keahlian 21,93%
Akses dan Infrastruktur 41,60%
Penggunaan 36,47%
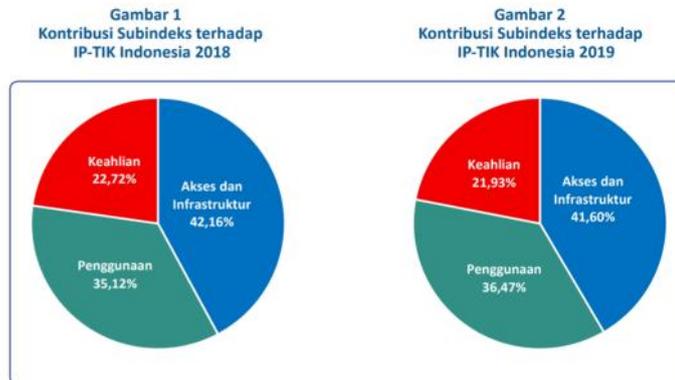
Sumber: (BPS, Statistik Telekomunikasi Indonesia, 2019)

Based on the diagram above, it can be concluded that the lowest sub-index is on expertise and the highest sub-index is on access and infrastructure. The percentages of the lowest and highest sub-indexes still maintain the same position in 2019. Therefore, it can be concluded that Indonesia needs to make efforts to increase expertise or human resources in the ICT sector in order to produce a skilled workforce. If efforts to increase human resources are successful, the Indonesian people can fully utilize technology and can have an impact on reducing unemployment and poverty problems.

The Global Innovation Index (GII) is an index used to measure a country's capability in terms of innovation. Innovation can be in the form of institutional structures, supporting activities, and infrastructure, where it plays a key role in promoting innovation activities and having an impact on economic growth (Nuno Fernandes Crespo, 2016). According to a publication issued by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO), it is stated that to measure GII, input and output indicators are needed. The indicators are described in the following table:

Inputs	Outputs
Institutions	**Knowledge and Technology Outputs**
• Political environment	• Knowledge creation
• Regulatory environment	• Knowledge impact
• Business enviroment	• Knowledge creativity
Human capital and research	**Creative Output**
• Education	• Intangible assets
• Tertiary education	• Creative goods and services
• Research and Development	• Online Creativity
Infrastructure	
• Information and Communication technologies (ICTs)	
• General Infrastructure	
• Ecological Sustanebility	
Market Shopistication	
• Credit	
• Investment	

|	
• Trade, Competition and market scale	
Business Shopistication • Knowledge workers • Innovation Linkages • Knowledge Absorption	

Sumber: (Nations, 2020)

Based on the table above, we can conclude that in measuring the Global Innovation Index using input and output indicators, each indicator has criteria that need to be measured in a country. According to a publication issued by Cornell University, INSEAD, and the World Intellectual Property Organization (2020) explaining that the following is Indonesia's ranking based on 131 countries based on inputs and outputs indicators.

Year	GI	Inputs	Outputs
2016	88	99	76
2017	87	99	73
2018	85	90	73
2019	85	87	78
2020	85	91	76

Sumber: (Nations, 2020)

Based on the table above, it can be concluded that Indonesia's innovation in 2016 increased from 88 to 87th in 2017 and then 85th in 2018 and could stay at 85th in 2019 and 2020. Then, based on other sources, the following chart shows Indonesia's GII ranking. on from year to year:
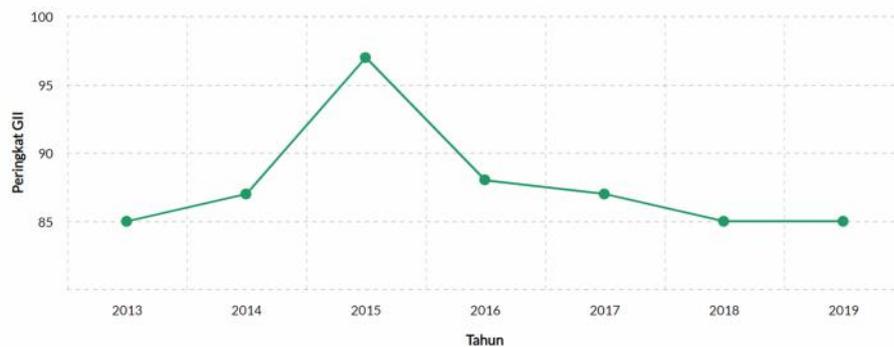
Sumber: (Lokadata, 2019)

In 2019, Indonesia was ranked 85th in the Global Innovation Index (GII) from 129 countries. The 2019 ranking is the same as the previous year. However, Indonesia's score decreased from 0.01 to 29.7 (scale 0-100). Since 2013, Indonesia has been stagnant at 85th place. In which, GII's ranking has dropped to 97th in 2015 (Lokadata, 2019). Based on the graph above, it can be concluded that Indonesian Innovation is still stagnant at 85th rank and is still lagging behind other countries. Therefore, it is

necessary to increase human resources equipped with complete infrastructure in order to support efforts to increase innovation in Indonesia.

The Network Readiness Index (NRI) is one of the leading global indices on the application and impact of information and communication technologies (ICTs) in economies worldwide (Institute, 2020). This indicator explains how Indonesia's network is ready. The level of network readiness is one of the indicators in seeing the stages of digitization in Indonesia. This paper will look at the level of network strength that can support digitalization in Indonesia. NRI Indonesia 2007-2016 are as follows:
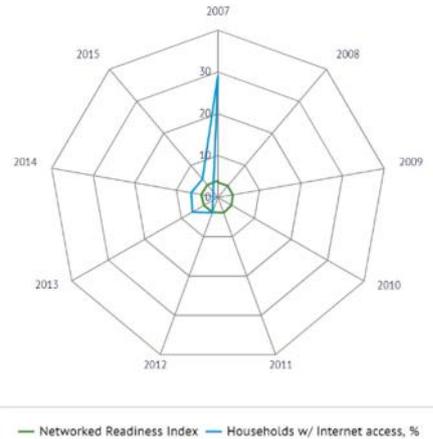
Sumber: (Atlas, Indonesia - Networked readiness index, 2016)

Then besides that, according to data from the Portulans Institute for NRI Indonesia in 2020

Figure 4: Performance of Indonesia against its income group and region, overall and by pillar
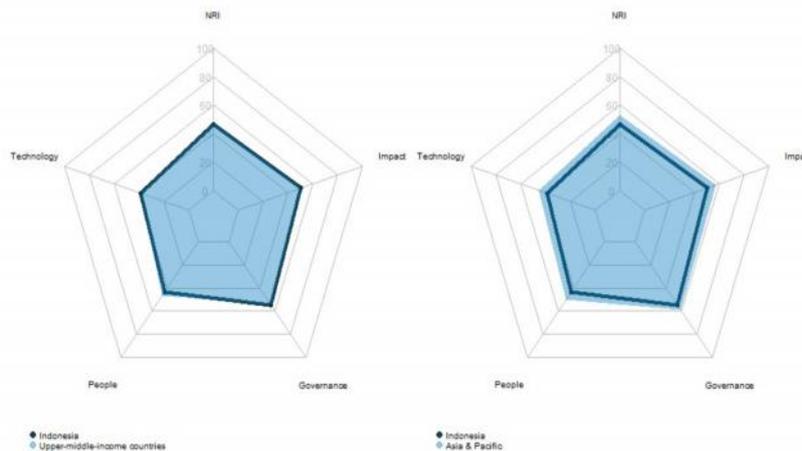
Sumber: (Institute, 2020)

According to the Portulans Institute, the indicators used to measure NRI consist of Technology, People, Governance and impact. The following are the results of measuring Indonesia's NRI indicators in 2020:

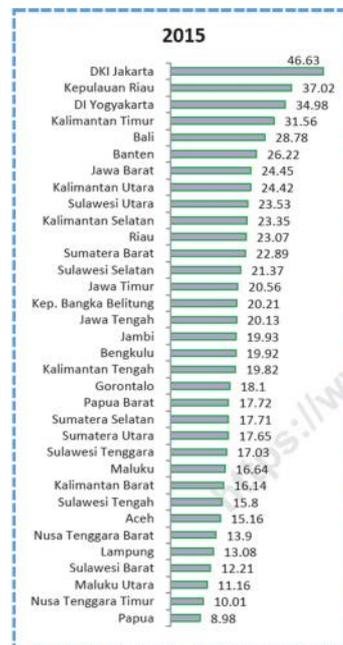| Dimension	Indonesia	Upper-middle-income countries	Asia & Pacific
NRI	46.71	47.39	52.76
Technology	38.38	38.42	45.33
People	43.26	46.66	49.64
Governance	54.99	54.31	59.20
Impact	50.20	50.17	56.86

Sumber: (Institute, 2020)

Based on the data above, it can be concluded that the highest NRI indicator lies in Governance, which is 54.99. Governance indicators are Indonesia's strengths which lie in the excellent performance of e-commerce legislation, the prevalence of the performing economy, and the Government's promotion of investment in new technologies. On the other hand, the lowest indicator is in the technology sector at 38.38. Indicators of technology are Indonesia's shortcomings which lie in the low capacity of human resources who can manage websites for companies, lack of technicians and professionals, as well as in the socio-economic gap in the use of digital payments. We can see that the use of digitization in digital payments is not fully applicable in all regions in Indonesia.

Indonesia's total NRI score is 46.71, when compared to high-middle income countries and countries in the Asia Pacific, Indonesia's NRI score is still below them. Therefore, an effort is needed from Indonesia to increase human resources in the field of technology. Currently, Indonesia has conducted free online training such as digital talent and is collaborating with several institutions in its field such as Google and others. However, what is needed is an evaluation of whether the training provided is really effective and can increase the training participants' human resources according to the needs of digitalization.

In this indicator is to analyze how large the number of Internet users in Indonesia. According to BPS Publication Data on Indonesian Telecommunication Statistics, the following is the household data of Internet users aged 5 years and over in the last 3 months in 2015-2019.

Provinsi/Province		Tahun/Year			
		2016	2017	2018	2019
	(1)	(2)	(3)	(4)	(5)
11	Aceh	35,23	44,83	56,89	65,16
12	Sumatera Utara	40,44	52,15	60,70	68,91
13	Sumatera Barat	48,19	54,91	64,00	69,67
14	R i a u	49,23	58,41	68,73	76,00
15	Jambi	42,81	51,49	62,43	70,81
16	Sumatera Selatan	39,10	49,73	59,41	66,42
17	B e n g k u l u	40,80	49,76	58,49	67,36
18	L a m p u n g	33,61	45,25	60,41	68,68
19	Kepulauan Bangka Belitung	45,51	54,76	65,78	74,80
21	Kepulauan Riau	65,86	73,33	78,41	87,96
31	DKI Jakarta	76,96	85,70	89,04	93,33
32	Jawa Barat	49,43	62,04	70,61	77,55
33	Jawa Tengah	46,93	57,48	66,73	75,16
34	D.I. Yogyakarta	65,36	71,71	79,10	83,68
35	Jawa Timur	46,11	56,36	65,01	73,24
36	Banten	55,43	64,11	75,39	82,25
51	Bali	60,65	67,10	74,15	79,59
52	Nusa Tenggara Barat	34,59	42,95	53,03	65,25
53	Nusa Tenggara Timur	27,26	36,18	42,21	49,83
61	Kalimantan Barat	37,62	45,81	54,99	64,71
62	Kalimantan Tengah	42,95	52,92	60,31	71,84
63	Kalimantan Selatan	50,26	55,66	66,67	74,35
64	Kalimantan Timur	62,68	69,06	78,98	84,17
65	Kalimantan Utara	58,32	65,68	75,71	80,72
71	Sulawesi Utara	52,41	61,78	67,60	74,06
72	Sulawesi Tengah	35,55	47,77	53,42	61,66
73	Sulawesi Selatan	47,14	55,95	65,22	72,62
74	Sulawesi Tenggara	41,90	50,85	61,95	71,21
75	Gorontalo	45,92	54,52	63,76	72,68
76	Sulawesi Barat	33,71	41,31	50,44	59,09
81	M a l u k u	42,66	47,81	55,16	58,52
82	Maluku Utara	30,18	39,23	49,06	53,61
91	Papua Barat	39,39	49,18	61,95	66,62
94	Papua	19,26	27,33	29,50	31,31
	Indonesia	**47,22**	**57,33**	**66,22**	**73,75**

2015

Province	Value
DKI Jakarta	46.63
Kepulauan Riau	37.02
DI Yogyakarta	34.98
Kalimantan Timur	31.56
Bali	28.78
Banten	26.22
Jawa Barat	24.45
Kalimantan Utara	24.42
Sulawesi Utara	23.53
Kalimantan Selatan	23.35
Riau	23.07
Sumatera Barat	22.89
Sulawesi Selatan	21.37
Jawa Timur	20.56
Kep. Bangka Belitung	20.21
Jawa Tengah	20.13
Jambi	19.93
Bengkulu	19.92
Kalimantan Tengah	19.82
Gorontalo	18.1
Papua Barat	17.72
Sumatera Selatan	17.71
Sumatera Utara	17.65
Sulawesi Tenggara	17.03
Maluku	16.64
Kalimantan Barat	16.14
Sulawesi Tengah	15.8
Aceh	15.16
Nusa Tenggara Barat	13.9
Lampung	13.08
Sulawesi Barat	12.21
Maluku Utara	11.16
Nusa Tenggara Timur	10.01
Papua	8.98

Sumber: (BPS, Statistik Telekomunikasi Indonesia, 2019)

Based on the table above, it can be concluded that the use of the internet by the Indonesian population aged 5 years and over from 2015-2019 has increased. For example, the percentage of users in 2015-2019 in Papua Province was 8.98%, 19.26%, 27.33%, 29.50%, and 31.31%. It also increased in DKI Jakarta Province in 2015-2019 respectively by 46.63%, 76.96%, 85.70%, 89.04%, and 93.33%. This means that people are starting to realize the importance of using the internet in the current era of economic digitization. However, it should be underlined that internet users spread across several regions of Indonesia, there are still high gaps, for example in the area between Papua and DKI Jakarta. There needs to be adequate infrastructure development so that people throughout Indonesia can use the internet, especially the Papua region, which has less than 50% internet users in 2019.

High-tech exports are products with high R&D intensity, such as aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery (Bank, 2021). The following is data regarding Indonesia's high-tech exports in 2010-2019:

DATE	VALUE	CHANGE, %
2019	6,285,817,887	-1.62 %
2018	6,389,604,745	6.94 %
2017	5,974,888,118	10.26 %
2016	5,418,668,848	-8.17 %
2015	5,900,470,886	-10.64 %
2014	6,603,091,281	1.27 %
2013	6,520,318,705	-9.97 %
2012	7,242,007,286	-0.68 %
2011	7,291,773,259	3.20 %
2010	7,065,519,398	

Source: World Development Indicators (WDI)

Sumber: (Atlas, Indonesia - High-technology exports in current prices, 2019)

Based on the table above, in 2019, Indonesia's high technology exports amounted to US$ 6,285 million. Although Indonesia's high-tech exports have fluctuated substantially in recent years, they tended to decline during the 2010 - 2019 period which ended at US$ 6,285 million in 2019.

In addition, the following data regarding Technology Exports (% of manufacturing exports):

High Technology Ekspor Indonesia 2015-2019					
Year	2015	2016	2017	2018	2019
Persentages	8,9	8	8,5	8,2	8,1

Sumber: (Atlas, World Data Atlas, 2019)

Indonesia is ranked 60th, when compared to other countries Hong Kong is the top country with high technology exports (% of manufacturing exports) in the world. In 2019, high-tech exports (% of manufacturing exports) in Hong Kong were 65.6%. The top 5 countries also include the Philippines, Singapore, Malaysia and Vietnam. Given these conditions, serious efforts are needed by the Government in order to gain the ability to improve export technology. Efforts made of course require support from

various parties. Not only the government but academics, practitioners and society in general also need to help increase exports of high technology in Indonesia.

5. CONCLUSSION

This paper aims to determine the level of digitalization in Indonesia as seen from the ICT Development Index or Information and Communication Technology Development Index (IPTIK), Global Innovation Index or Global Innovation Index (IIG), Networked Readiness Index or Network Readiness Index (IKJ), Share of Households with Internet (RTPI) and High-Technology Exports (% of manufactured exports) or High-Technology Exports (ETT). The first indicator, ICT Indonesia in 2016-2019 regarding improvement, but the index between regions there are still high gaps such as the gap that occurred in DKI Jakarta and Papua. On the other hand, DKI Jakarta's ICT can already be categorized as having a high index. The second indicator of GII, Indonesia is still standing at 85th. The third indicator, the Network Readiness Index, which shows Indonesia's strength is in the Governance indicator and its weakness is in Technology. Effective training is needed to improve the ability of the Indonesian people to be technology literate. The fourth indicator, internet user households from 2015-2019 has increased even in 2019 exceeding 50% of the total population between regions in Indonesia except Papua which still has a percentage of 31.31%. Fifth indicator, high technology exports which have not yet reached the top 50 rankings.

Based on the indicators that have been discussed, Indonesia's advantage lies in internet users, meaning that there is already an infrastructure that supports the Indonesian people to access the internet. But on the other hand, Indonesia's shortcomings are in exports of high technology, low expertise and innovation. The gap between regions in Indonesia is also a note for the government to take strategic steps to reduce the existing gap. For example, by prioritizing infrastructure development and improving human resources in eastern Indonesia, such as Papua.

The contribution of this paper is as an illustration of the level of digitization in Indonesia as seen from these 5 indicators. It is hoped that this paper can be used as a reference for digitalization policy making in Indonesia. The policies taken can see the main problems of conditions in Indonesia such as high disparities between regions, lack of mastery of information and communication technology. The policies implemented can take advantage of Indonesia's digitalization potential in the field of governance such as e-commerce legislation, the prevalence of economic performance, and the Government's promotion of investment in new technologies. The next paper is expected to be able to describe in more detail the level of digitization by developing a discussion of more than 5 indicators. In addition, it can also make comparisons with other Asian countries.

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