CHAPTER 4

ECONOMIC CONSEQUENCES OF DIGITAL TRANSFORMATION

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1. BACKGROUND

1.1. DISRUPTIVE INNOVATIONS

At the advent of the internet in the 1990s, Harvard Business School Professor Clayton Christensen foresaw the possibilities for market disruption caused by new technologies. In 1995, Christensen made a speech on technology and innovation that evolved into his theory on 'disruptive innovation' (Bower and Christensen, 1995). This term is used to describe products and services that make use of new technologies and business models. These innovations disrupt the market by creating new demands and new types of consumers. Eventually, these innovations will replace products and services from established business players. In 2013, Christensen observed the collapse of 'sustaining' companies: those that do not innovate using new technologies, but only improve their existing services. Examples of these sustaining firms are companies that produce giant mainframe computers and those that manage fixed line telephony. These companies charge the highest prices to their most demanding and sophisticated customers to achieve the greatest profits.

According to Christensen, these great firms are collapsing since they are reluctant to open the door towards 'disruptive innovations'. Disruptive innovation allows a new population of consumers to access products or services that were historically only accessible to rich consumers. The term 'disruptive innovation' is rooted in the 'creative destruction' theory of economist Joseph Schumpeter, which describes a 'process of industrial mutation...that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one' (Schumpeter, 1942: 83).

1.2. MAKING THE BEST OF TECHNOLOGICAL DISRUPTIONS

Indonesia's task in the coming years is to find a way to elegantly monetise this wave of disruptive technologies. Trisetyarso and Hastiadi (2016) found that the wave of disruptive technology has significantly contributed to recent world economic growth. Our findings suggest that disruptive innovations will create significant capital accumulation, which is more than enough to accelerate global economic growth in the long run. Disruptive innovation follows evolution theory – the fittest survive. The capital, knowledge, and labour of disruptive innovation will remain, while the capital, knowledge, and labour in mainstream technology will not.

Governments should catch the wave of technological disruption. Regulation plays an essential role in harnessing disruptive innovations. This chapter tries to address the dynamics of such regulation, along with tapping the tangible value of the intangible digital sectors in the Indonesian economy.

Imposing taxes or tariffs/duties on intangible digital products (IDPs) is one of the most discussed topics in today's economic policy debates. With the broad classification of IDPs, proponents have stated that imposing IDP tariffs/duties will generate revenue for the government and give fair treatment for both tangible (material) and intangible products. The idea of implementing a tariff/duty on electronically transmitted/digital products is controversial as IDPs can also be considered services and it is difficult to pinpoint the boundary between their 'goods' and 'services' aspects.

Members of the World Trade Organization agreed not to impose import duties on electronically transmitted products through a moratorium that has been in place since 1998. However, several countries have voiced their intention to end the moratorium and impose such a tariff/duty – including Indonesia. Chapter 99 of the Ministry of Finance Regulation No. 17/PMK.010/2018 sets a 0% rate duty on digital goods, which are defined as 'operating system software, application software, multimedia audio visual, supporting driver data for machinery system, and other software and digital goods'.

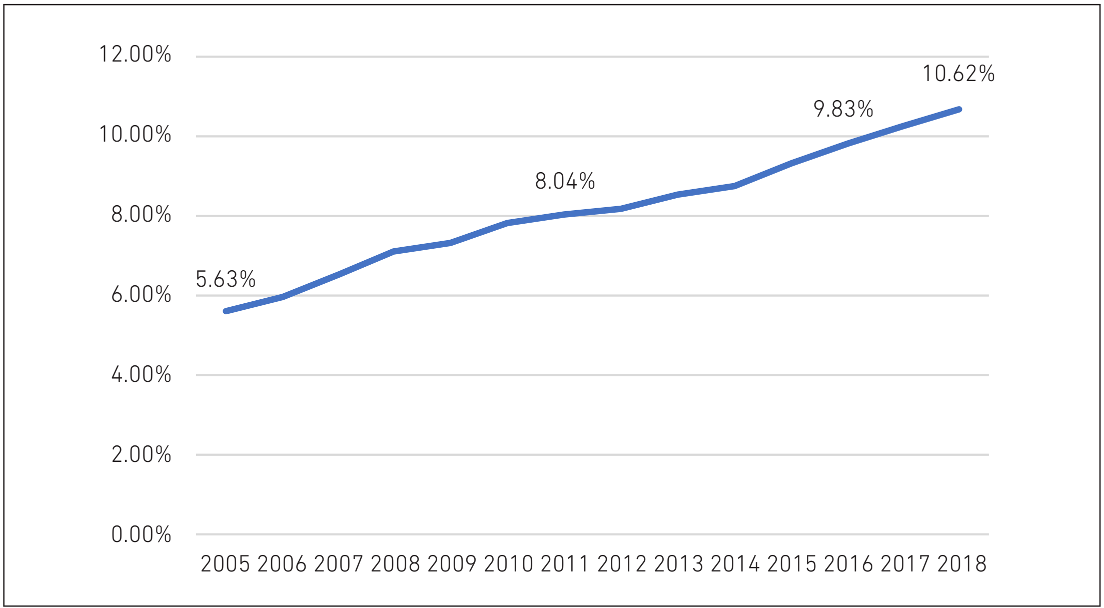
This chapter explores the potential economic contributions of the intangible digital product sectors – along with the possibility of retaliations from trade partners if we impose tariffs on the particular sector It is divided into five sections: section 1 provides a literature review of the digital economy, section 2 explains the method of analysis, section 3 describes the sectoral interlinkages along with the potential loss if retaliatory actions are taken by other countries, and section 4 concludes.

2. LITERATURE REVIEW

2.1. AN APPROACH TO ESTIMATING THE DIGITAL ECONOMY

Studies by McKinsey & Company projected the transaction value of the digital economy to reach $150 billion, equivalent to 10% of Indonesia's gross domestic product (GDP), if Indonesia is digitalised by 2025 (Das et al., 2016). However, the measurement of the digital economy presents some challenges since it is difficult to identify whether many items that are traded on the internet include goods or services (Moulton, 2000). Some of them are even free of charge. The quality of the economic data is very important to develop the economy, particularly in today's fast-changing environment. For instance, releases of GDP statistics, which are often monitored by policymakers and financial analysts, are useful for analysing the economic situation. Economic statistics play an important role in public policy decisions (Barbet and Coutinet, 2001).

Figure 4.1 **Contribution of the Digital Economy to US GDP, 2005–2018**



GDP = gross domestic product, US = United States.

Source: Authors' illustration, based on United States Bureau of Economic Analysis Database (2020).

As depicted in Figure 4.1, the contribution of the digital economy to GDP in the United States (US) rose steadily from 5.63% in 2005 to 10.62% in 2018. Conceptually, a digital economy account must include all goods and services related to the digital economy. Yet, what is presented in the figure is still based on goods and services in the digital economy in general. The figure is unable to separate items that are, for example, 'partially digital'. This means that some components of the digital economy, such as peer-to-peer (P2P) e-commerce, are not included in the US Bureau of Economic Analysis calculations. In the figure, the goods or services that are taken into account include hardware, software, telecommunications, e-commerce, and digital media. However, the contribution of software remained relatively small, at 1.34%, in 2016.

According to Haltiwanger and Jarmin (1999), to measure the digital economy, data are required to measure investment in physical infrastructure (e.g. information technology (IT) equipment including computers, telephone lines, switches, fibre optic cables, satellites, wireless networks, and local area network (LAN) equipment); investment in software infrastructure; other internet capacity in communication networks; actual traffic on information systems; and depreciation in infrastructure (IT equipment, software, or hardware).

In their efforts to calculate the contribution of the digital economy to the overall economy, Barbet and Coutinet (2001) noted several approaches, including:

(i) Organisation for Economic Co-operation and Development (OECD) Approach
   (a) Working Party on Indicators for the Information Society
       In 1997, this approach classified the digital economy into three sectors: the computer hardware manufacturing industry; telecommunications hardware and services, and software; and information (content) activities (press, editing, television shows, etc.) (Working Party on Indicators for the Information Society, 2002).
   (b) OECD
       In 2000, the OECD complemented the previous indicators by defining digital economic products in goods/manufacturing and services. Digital economy goods/manufacturing products are goods that are intended to fulfil information processing and communication functions, including electronic transmission and display. Meanwhile, digital economic service products are services that are intended to enable information and communication processing functions by electronic means. Contingent upon the International Standard Industrial Classification of All Economic Activities (ISIC), the OECD classification covers the following goods: accounting and office computing machines; insulated wires and cables; electronic valves and tubes and other electronic components; transmitters and television and radio equipment for telephone lines and telegraphic channels;

television receivers and radios; sound or video recording or reproduction devices; and related goods, instruments, and equipment for measuring, examining, testing, and navigating, as well as equipment for controlling industrial processes. The services include wholesale sales of machinery, equipment, and information and communication technology (ICT) supplies; rental of machinery and office equipment (including computers); telecommunications services; and services related to computer activities (OECD, 2000).

(ii) US Approach

(a) US Department of Commerce Approach

The digital economy is defined as economic activity that is very closely related to digital activity. For this reason, in this approach, economic activities that are considered closely related to digital activities are the hardware industry, the software industry and services, and the communications equipment and service industry. The hardware industry is a supplying industry that provides (both through wholesale and retail sales) computers and equipment, office machines, and other electronic equipment for measurement. The software industry and services are industries and services that provide pre-packaged software and computer-related services. The communications equipment and service industry is a supplying industry that provides material and non-material 'infrastructure' that enables connections between computers and servers that become the basis of internet development and electronic commerce (U.S. Department of Commerce, 2000).

(b) North American Industry Classification System Approach

This approach focuses on industries that provide ICT-based information rather than industries that provide ICT hardware. This sector consists of companies that produce and distribute information, provide means to transmit or distribute data/communication services, and data processing. For example, it comprises the software publishing industry, internet publishing and broadcasting, internet service providers, web search portals, and data processing services (Executive Office of The President of The United States, 2002).

(c) US Census Bureau Approach to Electronic Economics

The electronic economy entails electronic business, electronic commerce, and electronic business infrastructure. Electronic business is any process carried out by business organisations (including non-profits and governments) through computer-mediated network channels. Electronic commerce, on the other hand, is any transaction completed through a computer-mediated network that transfers ownership of, or the right to use, goods or services. Finally, electronic business infrastructure is economic infrastructure that is used to support electronic business processes and conduct electronic trade transactions (Atrostic, Gates, & Jarmin, 2000).

(iii) European Approach

(a) Eurostat Approach

This approach considers the fact that an increase in the volume of ICT-related goods and services is produced outside the traditionally established ICT industry. It arises from the emergence of the concept of 'embedded intangibility' because of the increasingly vague boundaries between tangible and intangible goods, goods and services, visible and invisible trade, knowledge-based work, etc. (Eurostat, 2000).

2.2. RETALIATION POTENTIAL FROM TAXING THE DIGITAL ECONOMY

One of the discussions that has become a concern lately is taxing the digital economy. This issue attracts quite a lot of attention, not only in Indonesia, but also throughout the world, such as in the European Union (Lee-Makiyama, 2018). Taxation of the digital economy is an important issue for reasons of justice – equality of tax treatment for the conventional economy and the digital economy – and to fulfil the roadmap stipulated in Presidential Regulation No. 74 of 2017 (Solikin, 2017).

Nevertheless, as Lee-Makiyama (2018) argued, taxing the digital economy could harm a country's economy instead of increasing tax revenue. One potential disadvantage is retaliation – actions taken by countries whose exports are adversely affected by tariff increases or other trade-restrictive measures taken by other countries. This is possible if several companies engaging in the digital economy are foreign companies that export their services or goods to Indonesia or establish their companies in Indonesia. Retaliation occurs when an importing country, say country A, sets tariffs for all or many of their imported goods, so that internationally it will reduce the national welfare of its trading partners, say country B. If country B wishes to maintain its own national welfare, it is likely to set tariffs on goods imported from country A. One effective way to reduce losses in national welfare is to respond with tariffs on imported goods. Retaliation also has the potential to create trade wars.

To avoid retaliation from trading partners, Indonesia must continue to adhere to the international system. It cannot impose taxes or tariffs arbitrarily without involving trade partners in negotiations. The imposition of taxes or tariffs must be discussed during trade negotiations. If negotiations are not carried out, the potential for retaliation and trade wars will rise. Retaliation will adversely affect Indonesia. International negotiations can help avoid trade wars (Krugman, Obstfeld, and Melitz, 2012).

To assess the adverse effects of taxation or tariffs, we must identify the extent of Indonesia's exports or direct investments to partner countries which would tax the goods. For example, if Indonesia imposes a digital economy tax on country X, we must look at the size of Indonesia's exports and direct investment related to the digital economy to country X. The greater the export and direct investment, the greater the potential loss that Indonesia would experience. Instead of obtaining a fiscal advantage over the taxation, Indonesia would suffer a fiscal loss. This framework, issued by Lee-Makiyama (2018), attempted to assess fiscal losses if the European Union were to impose a digital services tax.

3. RESEARCH METHODS

This part uses the input–output (IO) method to analyse the linkages between sectors and key sectors and multiplier analysis. It conducts analysis of inter-sectoral linkages and key sectors to see which sectors have strong links with other sectors, both upstream and downstream, and to identify which sectors are key. Meanwhile, multiplier analysis is performed to see which sectors have high multipliers in output, household income, and value added.

3.1. ANALYSIS OF LINKAGES BETWEEN SECTORS AND IDENTIFICATION OF KEY SECTORS

Linkage index analysis is applied to look at inter-sectoral linkages, which can be seen as backward and forward linkages. Backward linkage refers to linkage with the raw material and is calculated according to the column in the IO table, while forward linkage refers to the sales of finished goods and is calculated according to the rows in the IO table.

Within the framework of the IO model, production by certain sectors has two types of economic impacts on other sectors of the economy – backward and forward. If sector 1 experiences an increase in output as a result of increased demand, sector 1 will need more inputs to produce its output so that sectors that become suppliers (upstream sector) to sector 1 will feel the effects of increased output in sector 1. A sector that has strong linkages with the input providers has a strong backward linkage. On the other hand, an increase in output in sector 1 means that an additional amount of product from sector 1 is available to be used as input to other sectors for their own production because there will be an increase in supply from sector 1 (as a seller) for sectors that use the output of sector 1 in their production. A sector that has strong links with the sectors that use its output as input goods is a sector that has strong forward links. The term backward linkage is used to indicate the type of interconnection of a particular sector with the sectors (upstream) from which it purchases inputs. Meanwhile, the term forward linkage is used to indicate this kind of interconnection from a particular sector with the sectors (downstream) where it sells its production.

A comparison of the strength of backward and forward linkages for sectors in an economy provides a single mechanism for identifying key or leading sectors in the economy. Consequently, economic policymakers can identify which sectors should be considered. If the backward or forward linkage from sector *A* is greater than that of sector *B*, an expansion value of Rp1 from sector *A* output will be more beneficial to the economy than the same expansion in sector *B* output.

3.2. MULTIPLIER ANALYSIS

The inter-sectoral linkage analysis technique does not show a series of effects from one sector to another sector in an economy. Therefore, a multiplier analysis needs to be performed to trace the series of effects of a sector on the economy as a whole. Basically, a multiplier is a measure of the response to the stimulus of change in an economy, expressed in a causal relationship. The multiplier in the IO model is assumed as a response to the increasing demand for a sector.

In general, a multiplier analysis is an analysis used to track the impact of exogenous changes on the economy. The type of multiplier for which impacts are most often seen is (i) the output of sectors in the economy, (ii) income earned by households in each sector due to new output, (iii) the number of jobs generated in each sector due to new output, and (iv) value added created by each sector in the economy due to new output. In this study, the type of multiplier is limited to output, household income, and value added. The number of jobs is not taken into account due to data limitations.

4. RESULTS AND DISCUSSION

4.1. CONTRIBUTION OF THE DIGITAL ECONOMY TO THE OVERALL ECONOMY

4.1.1. Relationship Analysis Between Sectors

Based on the IO processing results, the backward and forward linkage index of each sector is formed. From these results, the researcher identifies which sectors can be classified as key sectors. Key sectors are sectors that possess strong backward and forward linkages. In this case, both indices – the Index of Total Forward Linkage (ITFL) and the Index of Total Backward Linkage (ITBL) – must have values exceeding 1. Our calculation successfully identifies nine key sectors, as depicted in Table 4.1.

Table 4.1 Key Sectors

No.	Sector
1	Machinery and equipment industry
2	Chemical, pharmaceutical, and traditional medicine Industry
3	Coal and oil and gas refinery industry
4	Food and beverages industry
5	Electricity and gas procurement
6	Metal goods industry; computers, electronics, and optics; and electrical equipment
7	Paper and paper products industry; printing and reproduction of recording media
8	Craft
9	Basic metal industry

Source: Authors' compilation.

Table 4.1 lists the key sectors, which have great potential for driving other sectors. The increase in demand in these sectors has the potential to lift output in other sectors, on both the upstream and downstream sides. Nonetheless, if we recall the main topic of this research – IDPs – not many key sectors are related to IDPs. Table 4.2 demonstrates the results of the analysis of inter-sectoral linkages in sectors that have linkages to IDPs.

Of the 14 sectors identified to have a strong relation to IDPs (Table 4.2.), only two sectors are classified key sectors: (i) metal goods; computers, electronics, and optics; and electrical equipment; and (ii) craft. The information and communication sector, though not identified as a key sector, has strong backward linkages.

Table 4.2 Analysis Results of Inter-Sectoral Linkages in Sectors Related to IDPs

No.	Sector	ITBL	ITFL	Key sector
1	Metal goods; computers, electronics, and optics; and electrical equipment industry	✔	✔	✔
2	Craft	✔	✔	✔
3	Information and communication	✔	-	-
4	Photography	-	-	-
5	Application and game developer	-	-	-
6	Television and radio	-	-	-
7	Advertising	-	-	-
8	Product design	-	-	-
9	Interior design	-	-	-
10	Performing arts	-	-	-
11	Visual communication design	-	-	-
12	Fine Arts	-	-	-
13	Music	-	-	-
14	Film and animation and video	-	-	-

ITBL = Index of Total Backward Linkage, ITFL = Index of Total Forward Linkage.

Source: Authors' compilation.

Overall, the sectors that are related to IDPs do not have strong linkages with inter-sectoral supply chains. The increase in demand for these sectors does not have adequately strong linkages to increase output in other sectors of the economy. Weak linkages between sectors are generally caused by sector productivity, institutional relationships and frameworks, supply chain health, production structures, spatial linkages, types of goods produced, complexity of the goods production process, and the amount of raw material needed to produce an item (Miller and Blair, 2009; Subramaniam and Reed, 2009).

The weak inter-sectoral linkages in the sectors that have linkages to IDPs may occur due to the production structure of IDPs, which do not require a lot of raw materials to produce since they tend to be created from intellectual property (Karius, 2016). Intellectual property may not be supplied from other sectors, so the intangible goods sector does not have a sufficiently strong relationship with the upstream sector. Based on the researcher's calculations, on average, the IDP sector produces 48.49% of its own input. This implies that almost half of the input is obtained from the sector itself and is not purchased from other sectors. On the other hand, IDPs are generally final goods, not intermediate goods, so they cannot be used as inputs for other sectors. Based on the researchers' calculations, on average, the IDP sector only contributes 6.65% of the total inputs needed by other economic sectors. This is different from the metal goods industry sector; computers, electronics, and optics; and electrical equipment; and craft sector, whose products can also play a role as semi-finished goods. To this point, it can be concluded that the nature of the IDPs causes these sectors not to have strong backward and forward linkages.

4.1.2. Multiplier Analysis

Table 4.3 shows that only two sectors are related to IDPs (4 and 6), which are included in the 10 sectors with the highest output multiplier. This denotes that the sectors that have linkages to IDPs are not sectors that can provide major boosts to economic output.

Table 4.3 Ten Sectors with the Highest Output Multiplier Figures

No.	Sector	Output multiplier
1	Machinery and equipment industry	3.193
2	Electricity and gas procurement	3.160
3	Metal goods; computers, electronics, optics; and electrical equipment industry	2.758
4	Paper and paper products industry; printing and reproduction of recording media	2.622
5	Air transportation	2.393
6	Craft	2.387
7	Sea transportation	2.358
8	Construction	2.354
9	Basic metal industry	2.313
10	Other processing industries; repair and installation services of machinery and equipment	2.293

Source: Authors' compilation.

Table 4.4 presents the 10 sectors with the highest income multipliers. It is evident that there is a unique sector (intangible) amongst the other sectors, i.e. music.

Table 4.4 Ten Sectors with the Highest Income Multiplier

No.	Sector	Income multiplier
1	Educational services	0.663
2	Government administration, defence, and mandatory social security	0.646
3	Other services	0.473
4	Health services and social activities	0.390
5	Machinery and equipment industry	0.372
6	River and lake river transportation	0.367
7	Music	0.356
8	Mining and other excavations	0.351
9	Leather industry, leather goods, and footwear	0.348
10	Government administration, defence, and mandatory social security	0.336

Source: Authors' compilation.

Table 4.5 shows the 10 sectors with the highest value-added multiplier. Six of the 10 sectors are related to IDPs. This means that IDP-related sectors are those that can provide a significant increase in the economic value added. Value added is defined as the difference in value between an industry's output (consisting of sales or revenue and other operating income, commodity taxes, and inventory changes) and intermediate input costs (including energy, raw materials, semi-finished goods, and services purchased from all sources). Value added describes what happens when a commercial company processes a product by increasing its value (and its price) and by adding extra processes to its manufacturing phase or by providing additional services. IDP sectors produce goods with high value added.

Table 4.5 Ten Sectors with the Highest Value-Added Multiplier

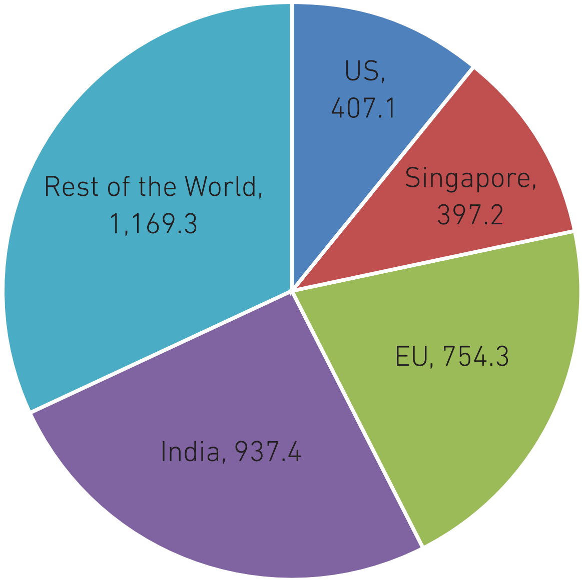
No.	Sector	Value-added multiplier
1	Music	1.008
2	Publishing	1.004
3	Advertising	1.004
4	Fashion	1.002
5	Application and game developer	1.001
6	Film and animation and video	1.000
7	Educational services	1.000
8	Performing arts	1.000
9	Financial intermediary services	1.000
10	Visual communication design	1.000

Source: Authors' compilation.

4.2. POTENTIAL FOR IMPACT OF RETALIATION FROM DIGITAL ECONOMY TAXATION

The study employed the analytical framework used by Lee-Makiyama (2018) to explore the potential impacts, particularly on fiscal retaliation, which would occur if a digital economy tax were applied. However, there is lack of data related to digital services in Indonesia. This is therefore proxied by the export and import data of the information and communication sectors (D58T63: Information and communication) taken from the OECD Trade in Value Added (TiVA) database. We also applied several scenarios for tax rates (i.e. 3%, 5%, and 10%) to proxy the tax rate for the digital economy. Figure 4.2 displays the volume of imports of Indonesia's information and communication by country of origin. The chart indicates that almost 25.57% of Indonesia's information and communication imports are from India. Together with the European Union (EU) and the US, the three countries have a cumulative share of around 57.26% of Indonesia's information and communication imports. In 2015, Indonesia's global information and communication imports reached $3.6 billion, of which $2.1 billion were from India, the EU, and the US.

Figure 4.2 Indonesia's Information and Communication Imports by Country of Origin, 2015 ($ million)



EU = European Union, US = United States.

Note: EU-28 refers to the 27 EU member states plus the UK.

Source: Authors' illustration based on OECD TiVA Database (2021).

At present, according to the Regulation of Minister of Finance (Peraturan Menteri Keuangan/PMK) No. 6 of 2017, machinery and electronics are subject to tariffs, which vary from 0% to 15%, reinforcing our chosen scenario of 3%, 5%, and 10%. By imposing tariff rates of 3%, 5%, or 10%, our simulation shows that the government will obtain a fairly high tax revenue, as depicted in Table 4.6.

Table 4.6 Potential Tax Revenues from Information and Communication Imports

Source of revenue ($ million)	Scenario		
	3%	5%	10%
Potential revenue from India	28.12	46.87	93.74
Potential revenue from EU-28	22.63	37.72	75.43
Potential revenue from US	12.21	20.36	40.71
Potential revenue from all over the world	109.96	183.27	366.53

Source of revenue (Rp trillion)*	Scenario		
	3%	5%	10%
Potential revenue from India	0.40	0.67	1.34
Potential revenue from EU-28	0.32	0.54	1.07
Potential revenue from US	0.17	0.29	0.58
Potential revenue from all over the world	1.57	2.61	5.22

EU = European Union, US = United States.

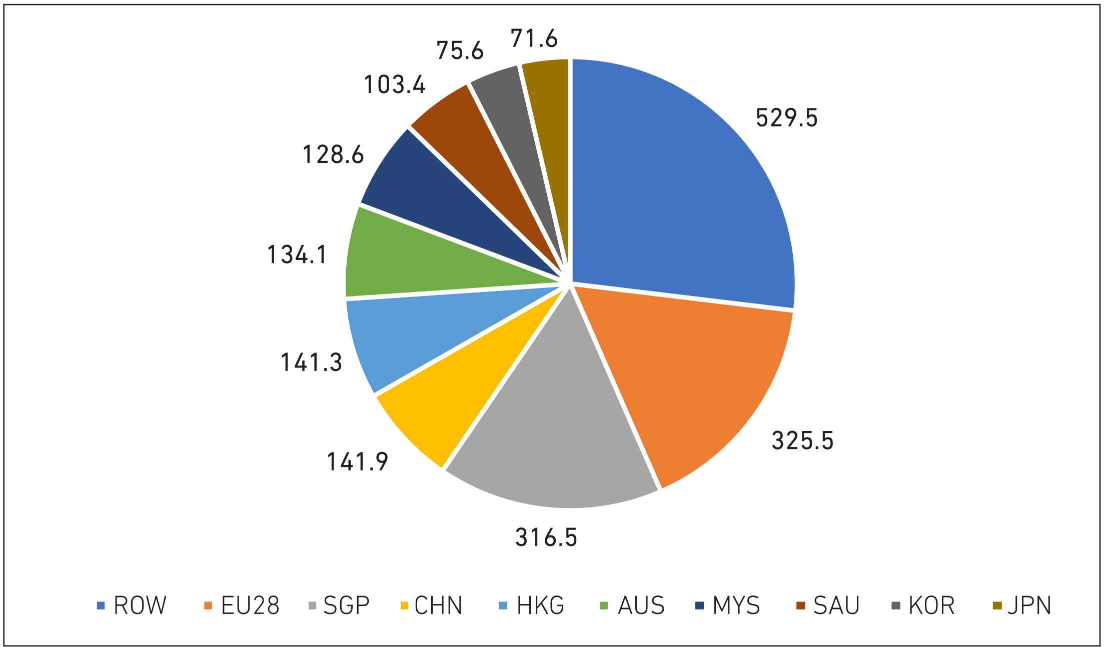
Note: EU-28 refers to the 27 EU member states plus the UK.

* Assumed rate: $1 = Rp14,247.20.

Source: Authors' calculations.

Based on Table 4.6, we can see that the potential tax revenue from imposing an additional tariff of 3%–10% will at least generate Rp1.57 trillion for the government. Nonetheless, setting a tariff has the potential of creating another problem – potential retaliation from trading partners. To make this clear, we need to know the size of our exports.

Figure 4.3 Indonesia's Information and Communication Exports by Country of Destination, 2015 ($ million)



AUS = Australia, CHN = China, EU = European Union, HKG = Hong Kong, JPN = Japan, KOR = Republic of Korea, MYS = Malaysia, ROW = rest of the world, SAU = Saudi Arabia, SGP = Singapore.

Note: EU-28 refers to the 27 EU member states plus the UK.

Source: Authors' illustration based on OECD TiVA Database (2021).

Unlike imports, Indonesia's main trading partners in information and communication exports are diverse. If imports from the three countries dominate half of the total imports, in the context of exports, at least a combination of five trading partners – the EU-28, Singapore, China, Hong Kong, and Australia – are needed to achieve the same level of dominance. In total, Indonesia's exports from the information and communication sector are small in comparison to its imports. Indonesia's imports from the information and communication sector are almost twice its exports. From this figure, we may at least expect that the potential loss may not be as large as the potential revenue received, if retaliation occurs.

Table 4.7 reveals the potential tax to be paid if trading partners retaliate. If we compare this with the potential tax revenue that will be gained, the potential for tax payments will not generate a significant amount. The potential for tax payments is always smaller than the potential for tax revenue. On average, the potential for tax payments is only equivalent to 53.7% of the potential tax revenue. But this not the end of the story – tax retaliation on digital goods might go beyond what we have seen here.

Table 4.7 Potential Tax Payments (Retaliation Effect) from Information and Communication Exports

Spending ($ billion)	Scenario		
	3%	5%	10%
Potential tax payments to EU-28	9.77	16.28	32.55
Potential tax payments to Singapore	9.50	15.83	31.65
Potential tax payments to China	4.26	7.10	14.19
Potential tax payments to Hong Kong	4.24	7.07	14.13
Potential tax payments to Australia	4.02	6.71	13.41
Potential tax payments to all over the world	59.04	98.40	196.80

Spending (Rp trillion)*	Scenario		
	3%	5%	10%
Potential tax payments to EU-28	0.14	0.23	0.46
Potential tax payments to Singapore	0.14	0.23	0.45
Potential tax payments to China	0.06	0.10	0.20
Potential tax payments to Hong Kong	0.06	0.10	0.20
Potential tax payments to Australia	0.06	0.10	0.19
Potential tax payments to all over the world	0.84	1.40	2.80

EU = European Union, US = United States.

Note: EU-28 refers to the 27 EU member states plus the UK.

* Assumed rate: $1 = Rp14,247.20.

Source: Authors' calculations.

A tariff rate of 3%-10% would generate at least Rp1.57 trillion in potential fiscal revenue for the government. Yet, setting a tariff could cause retaliation from Indonesia's trading partners on a wide range of goods. Table 4.8 summarises three possible scenarios. The first scenario does not cause a severe impact to Indonesia's fiscal revenue. In fact, even though the trade partners retaliate, Indonesia still receives more revenue than it loses, as we saw in Table 4.7. Nonetheless, the other two scenarios may incur more revenue loss than revenue received. Unfortunately, the second and third scenarios will be the most likely actions from the trade partners – covering more than just the information and communication sector. With this in mind, the fiscal side will also face some negative effects.

Aside from the fiscal effects, there are other impacts on the quantity of goods imported. The decline in imported goods would be a problem if the imported goods were semi-finished or raw, so that they could be used as input for the domestic industry. When the government decides to raise tariffs, prices will become more expensive, so the input goods that will be used by domestic industries to process outputs become more expensive. In the end, the input used will be cut off to control the total cost of production.

Table 4.8 Potential for Impact of Retaliation from Digital Economy Taxation
(Rp trillion)

Tariff rate	Potential fiscal revenues	Potential fiscal losses*	Potential fiscal losses**	Potential fiscal losses***	Differ-ence*	Differ-ence**	Differ-ence***
3%	1.57	0.84	4.97	23.64	0.73	-3.40	-22.07
5%	2.61	1.40	8.28	39.40	1.21	-5.67	-36.79
10%	5.22	2.80	16.56	78.80	2.42	-11.34	-73.58

EU = European Union.

Note: EU-28 refers to the 27 EU member states plus the UK.

* The scenario where the trading partners set tariffs only on information and communication exports.

** The scenario where the EU-28, Singapore, China, Hong Kong, and Australia set tariffs only on the type of goods/services with the largest export value.

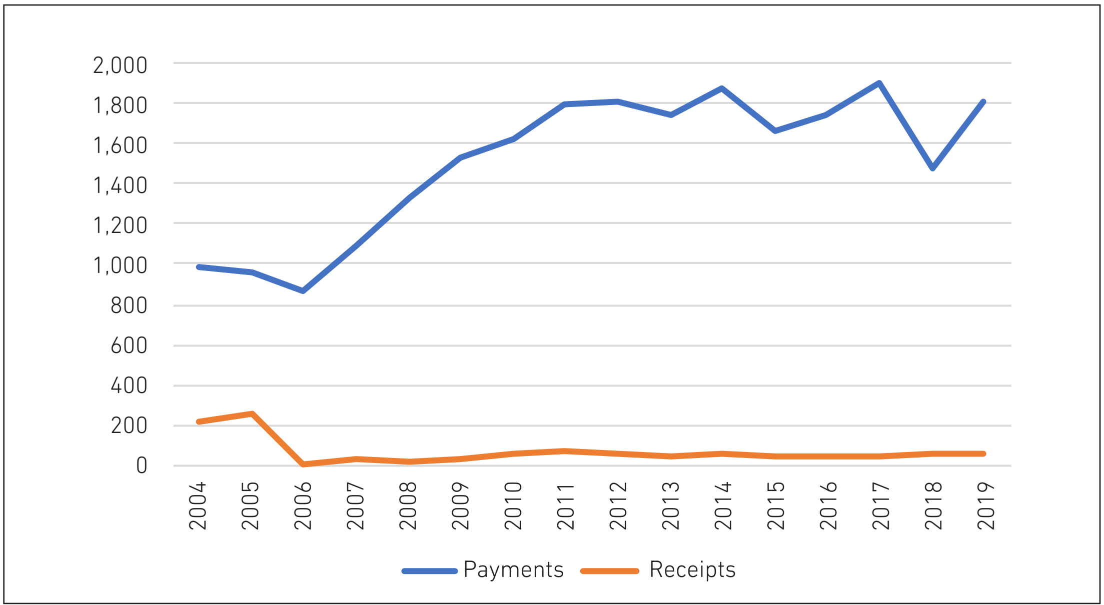
*** The scenario where the EU-28, Singapore, China, Hong Kong, and Australia set tariffs on all Indonesian exports, regardless of the type of goods/services.

Source: Authors' calculations.

Figure 4.4 illustrates the high amount paid by Indonesia to use intellectual property rights. This implies that many goods that are protected by intellectual property rights are used in Indonesia – for household consumption or as inputs in the production process.

Raising tariffs could hurt domestic industry as it would increase the price of production inputs, considering that 33% of Indonesia's imports are semi-finished goods. The results show that a tariff increase of 3%–10% would reduce domestic output by Rp17.2 trillion or up to Rp57.3 trillion, which is equivalent to an output decrease of 0.09%–0.29%. Although there is a difference in tax revenue of Rp14.74 trillion–Rp49.13 trillion, an output decrease that is greater than that difference needs to be taken into consideration. Moreover, the trading partners could retaliate in other sectors that are not related to the sectors of concern.

Figure 4.4 **Indonesian Charges for the Use of Intellectual Property, 2004–2019**
(balance of payments, current $ million)



Source: Authors' illustration based on World Bank's World Development Indicator Database (2021).

Several studies have argued that tariff hikes, through potential retaliation, would damage economic welfare and cause net losses in production and employment as well lower income levels. York, Pomerelau, and dan Bellafiore (2019) predicted that the tariff increases under US President Donald Trump would reduce economic growth by 0.74%, decrease income by 0.48%, and increase unemployment by 570,591 people. A study of the US–China trade war found that trade conflicts have sporadic impacts on various countries in the world. The same study also found that China's GDP would fall by more than 1% and US GDP would drop by 0.2% over a 2- to 3-year period. Meanwhile, developing countries in Asia experience a rather positive impact because the region has benefited from the diversion of trade in electronics and textiles. The inclusion of car tariffs and auto parts is more damaging for developed countries (e.g. the EU and Japan) than for developing Asian countries. Furthermore, a large negative effect on employment in China and the US takes the form of a rise in unemployment of 8.6 million people (1%) in China and 329,000 people (0.2%) in the US (Abiad et al., 2018). Another study by Li, He, and Lin (2018) found that the trade war between China and the US would result in a decline of 0.541% in Chinese welfare, 2.459% in GDP, 3.858% in employment, 7.912% in trade, 12.263% in exports, and 2.653% in imports. Although the same study projected US welfare to increase by 0.041% and GDP to rise by 0.611%, employment was forecast to fall by 0.918%, exports were expected to plunge by 2.244%, and imports were predicted to stumble by 12.203%. Additionally, the study found that global welfare would decrease by 0.016%, GDP would drop by 0.264%, manufacturing production would decrease by 1.227%, employment would fall by 0.668%, and trade would decrease by 2.099%. The World Bank stated that the US–China trade war could cut global exports by 3% ($674 billion) and global income by 1.7% (41.4 trillion), with losses in all regions. Income losses range from 0.9% for South Asia to 1.7% for Europe and Central Asia (Freund et al., 2018).

5. CONCLUSION

Rapid technological development and innovation in Indonesia have created an exciting array of opportunities across stakeholders. The technology industry is increasingly working to develop software, devices, network solutions, and other tools that meet the needs of the people, with applications in everything from public safety to energy management to library operations. The opportunities presented, however, do not come without risk. Without a clear sense of direction or standards, and in the absence of a proper understanding of the sectoral interlinkages, regulation may hinder sectoral growth and could pose threats to partner countries.

Based on our analysis, taxing the intangible sectors will provide some unprecedented effects in the form of retaliation. The study also shows that IDP-related sectors, albeit having insignificant output and income multipliers, can generate high value added across sectors. Implementing such tariffs could put Indonesia in a weaker position in the international trade arena. Indonesia should not risk being subjected to retaliatory measures, especially for IDP-related products, where the domestic industry still does not have the capacity to meet the demand.

Governments should catch the wave of technological disruption. Regulation plays an essential role in harnessing disruptive innovations. However, regulation could also preclude quality-enhancing lower-cost innovations from entering the market. Flexible regulations should be there to cope with this trend.

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