

March 2022

# **Review of ASEAN Commitments in Computer and Related Services under AFAS 10 and RCEP**

## **Notes**

The terms country and economy as used in this study also refer, as appropriate, to territories or areas; the designations employed and the presentation of the material do not express opinion whatsoever on the part of the ASEAN-Japan Centre concerning the legal status of any country, territory, city or area, or its authorities, or the delimitation of its frontiers or boundaries.

The tables use the following symbols:

- Two dots (..) indicate that data are not available or are not separately reported.
- A dash (-) indicates that the item equals zero or its value is negligible.
- Use of an en-dash (–) between dates representing years, *e.g.*, 2015–2016, signifies the full period involved, including the beginning and end years.
- Reference to “dollars” (\$) means United States dollars, unless otherwise indicated.

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# Contents

<b>I. Introduction</b> .....	<b>1</b>
<b>II. Ascendancy of Computer and Related Services Trade</b> .....	<b>3</b>
1. Mode 1: Cross-Border Supply .....	<b>3</b>
2. Mode 3: Commercial Presence .....	<b>8</b>
3. Modes 2 and 4: Consumption Abroad and Movement of Computer Services Staff .....	<b>11</b>
<b>III. Trade Agreements and Regulations among and in ASEAN Member States</b> .....	<b>12</b>
<b>IV. Impacts of Further Liberalization of Computer and Related Services     on the Economy</b> .....	<b>16</b>
1. Economic Impacts .....	<b>16</b>
2. Need for Regulation .....	<b>18</b>
<b>V. Policy Recommendations and Promotion Measures for Computer     and Related Services</b> .....	<b>19</b>
<b>Annexes:</b>	
<b>Specific Schedule of Commitments for “Computer and Related Services” Under AFAS (10th package, signed in November 2018) by ASEAN Members and Under RCEP (Signed in 2020) by ASEAN Members and Their Five Dialogue Partners</b> .....	<b>33</b>
<b>Annex A. Specific Commitment Tables for Computer and Related Services Under AFAS (10th package)</b> .....	<b>35</b>
<b>Annex B. Specific Commitment Tables or Reservation Tables for Computer and Related Services Under RCEP</b> .....	<b>44</b>

## I. Introduction

Computer and related services are an indispensable input into the economic activities of ASEAN. The General Agreement on Trade in Services (GATS) administered by the World Trade Organization (WTO) lists<sup>1</sup> the following five job categories under “Computer and related services”:<sup>2</sup>

1. Consultancy services related to the installation of computer hardware
2. Software implementation services
3. Data processing services
4. Database services
5. Other.

Figure 1 displays the position and role of computer and related services in value-creating economic activities on a value chain curve. The coverage (the shaded square in the figure) of computer and related services is broad, encompassing the whole production chain. Because of this, whereas the industry can operate in a stand-alone manner, it also tends to work in combination with other industries such as telecommunication services (especially for Internet services and research and development services) and thereby form the basis for e-commerce or artificial intelligence (AI) businesses. Computer and related services ensure smoother (in the horizontal direction, known as the “value chain”) and more efficient (in the vertical direction, referred to as “value added”) operation of a country’s entire value-creating activities for the entire industry.

An important and relevant concept to consider is transaction costs, *i.e.*, the costs associated with accounting transactions and information transactions in connection with business activities. The introduction of computer and related services could significantly reduce (unnecessary) transaction costs. Trade in computer and related services is therefore expected to reduce those transaction costs to a large extent, an effect that would not be possible with domestic suppliers of computer and related services, as computer-related firms based in advanced countries, for instance, possess a much greater comparative advantage.

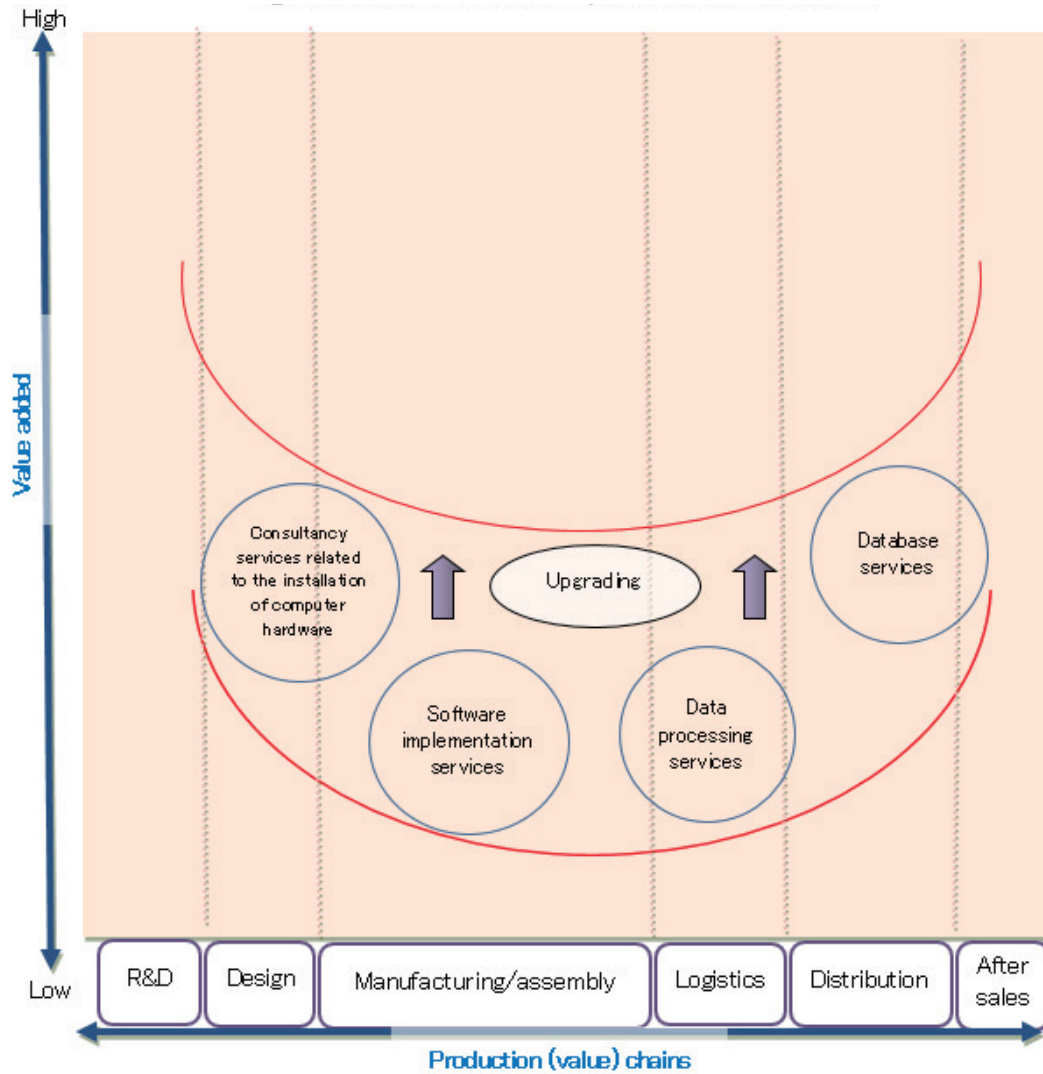
The use of computer-based information facilities can reduce the degree of information asymmetry among workers in business firms and across various job categories. This is another reason why trade in computer services should be promoted in the ASEAN region and in the global economy at large.

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<sup>1</sup> “Services Sectoral Classification List” (MTN.GNS/W/120, released 10 July 1991).

<sup>2</sup> This paper addresses computer and related services using computers as online (Internet) and offline instruments. Internet services fall under telecommunication services.

**Figure 1 . Value chains and computer and related services**



Source: ASEAN-Japan Centre.

Note: Positions of job categories are simply placed in a relevant place along the value chain and do not necessarily represent the most suitable place.

## II. Ascendancy of Computer and Related Services Trade

Table 1 shows the estimated value and share of computer and related services supply by mode of supply (in 2015). Both services are supplied to foreign markets from ASEAN (exports) and are received from abroad (imports), which are estimated at roughly \$1 trillion; computer and related services account for 2 per cent of the former and 6 per cent of the latter (table 1). Like other services, computer and related services are provided through four modes (Mode 1 to Mode 4). Exports through commercial presence (Mode 3) is the largest, 1.5 times greater than cross-border trade (Mode 1) (table 1). Supply of computer and related services through consumption abroad (Mode 2) and through movement of persons (Mode 4) are negligible. The following subsections discuss these in order by size.

**Table 1. Estimated value and share of computer and related services supply, by mode of supply, 2015**

(Billions of dollars and per cent)

Mode of supply	Receipts from the world (imports)				Supply to the world (exports)			
	Computer services		Total services		Computer services		Total services	
	Value	Share	Value	Share	Value	Share	Value	Share
Mode 1	8 <sup>a</sup>	13	308	30	8 <sup>a</sup>	33	302	30
Mode 2	3 <sup>b</sup>	5	103	10	3 <sup>b</sup>	12	101	10
Mode 3	48 <sup>c</sup>	75	565	55	11 <sup>c</sup>	46	554	55
Mode 4	5 <sup>d</sup>	9	51	5	2 <sup>d</sup>	8	50	5
<i>ASEAN total</i>	64	100	1,027	100	24	100	1,007	100

Source: AJC, based on own estimates, UNCTAD for total services and WTO for the mode shares of total services.

<sup>a</sup> For Brunei Darussalam, data are available only for Telecommunications, computer and information services. Therefore, the ratio of Computer services to this sector from the Philippines was applied to estimate the Computer services only. For 2015, data are available only for the Services total. Therefore, first, the Telecommunications, computer and information services are estimated by using its ratio to Services total. Then the Philippines' ratio of Computer services was applied.

For Cambodia, Indonesia and Thailand, Information services may be included.

For Lao People's Democratic Republic, data are available only for Telecommunications, computer and information services. Therefore, Myanmar's average ratio of Computer services to this sector from 2014 and 2015 was applied to estimate the Computer services only.

For Malaysia, data are available only for Telecommunications, computer and information services for 2010 onwards. Therefore, the ratio from Computer services to this sector in 2009 was applied to estimate the Computer services only for 2010 onwards. Information services may be included.

For Myanmar, data for Telecommunications, computer and information services only available for 2012 onwards, which is the same as Telecommunications services for 2012 and 2013. From 2014 onwards Computer services became available. Therefore the average ratio of Computer services to this sector from 2014 onwards was applied to estimate the Computer services for 2012 and 2013.

For Singapore, data are available only for Telecommunications, computer and information services. Therefore, the average ratio of Computer services to this sector from Indonesia, Malaysia, the Philippines and Thailand was applied to estimate the Computer services only.

<sup>b</sup> Estimated as one third of Mode 1.

<sup>c</sup> See table 6.

<sup>d</sup> Estimated as one tenth of Mode 3.

Note: For total services, each mode share as estimated by the WTO for the global supply is applied to ASEAN. The basic data for estimates by mode is cross border-services (Mode 1) from UNCTAD. Shares in each mode are applied to calculate the value of each mode.

### 1. Mode 1: Cross-Border Supply

The export and import statistics for computer and related services show the amounts of cross-

border supply from ASEAN to the world and from the world to ASEAN (tables 2 and 3). Singapore is the largest exporter in this sector, while Philippines is the second largest with a bit more than one third of Singapore's value. However, in terms of share in total exports of services, Philippines' figures are by far the highest, with more than 10 per cent. Other than Philippines, exports of computer and related services may not be one of the comparative advantages of ASEAN member states. As to imports, Singapore has the largest imports, followed by Indonesia and Malaysia. Philippines imports a smaller amount.

Additional information such as the trend line and export competitiveness supplement the basic statistics. The slope of these trade data measures the former (table 4), and the revealed comparative advantage measures the latter (table 5). All countries, except Lao People's Democratic Republic, Philippines and Viet Nam, import more than they export, resulting in negative comparative advantages.

- Brunei Darussalam's performance is one of the lowest among ASEAN member states. Its export slope and export competitiveness are negative (reflecting the fact that the country's computer and related services sector has not taken off in a full-fledged manner).
- Although Cambodia's export figures were the third lowest among ASEAN member states, a considerable increase occurred in the last years. The facts that Cambodia had the highest positive export slope and an improvement in the export competitiveness index reflect this progress. These are the results of the country's recent integration into the ASEAN regional market.
- Indonesia's exports are increasing gradually, and its export slope is positive; however, its export competitiveness is negative, reflecting that its current comparative advantage is not in the computer and related services sector.
- While the exports of the Lao People's Democratic Republic remained low, its export slope was positive and greater than the ASEAN average.
- Malaysia is performing well, as it has an extensive manufacturing base centered on electronics. It ranked third in terms of export volume; however, although positive, its export slope was lower than the ASEAN average, and the export competitiveness index was negative in 2020.
- Myanmar's export figures oscillate between the third and fourth lowest among ASEAN member states, but its export slope is higher than the ASEAN average, presumably because it has been facilitating the marketization of the overall economy; its export competitiveness was negative.
- Philippines' exports are the second highest, and its export slope is significantly positive. This is largely because of its established business facilities for exporting information and computer technology (ICT)-related services, most importantly for undertaking offshore business.
- Singapore's export values are by far the largest, and its export slope is positive and higher than the ASEAN average. This reflects the highly developed ICT-related facilities in the country. The export competitiveness index oscillated around zero, given that the export values were also by far the largest in the region.
- Thailand's export values remain rather low because the country focuses on the automotive industry. Its export slope is positive yet slightly less than the ASEAN average.
- Viet Nam's exports increased (reflecting its ongoing transition to a more market-based economy), but the level remains rather low. Its export slope, however, is positive and higher than the ASEAN average; its export competitiveness index is also positive and higher than the ASEAN average (which is negative).

**Table 2. Exports of computer services and their share in total exports of services and in total export of goods and services, 2005–2020 (millions of dollars and per cent)**

Country	Annual average 2005–2010	Annual average 2011–2015	2016	2017	2018	2019	2020
<b>Computer services exports</b>							
Brunei Darussalam*	9	0	0	0	1	1	4
Cambodia	1	1	5	3	5	23	20
Indonesia	144	222	205	184	297	327	414
Lao PDR <sup>o</sup>	1	2	1	0	0	0	..
Malaysia	932	1,481	1,441	1,751	1,695	1,798	1,771
Myanmar <sup>†</sup>	..	5	5	10	14	11	15
Philippines	1,039	2,624	4,706	4,616	4,581	4,730	4,371
Singapore <sup>+</sup>	1,576	5,175	9,256	10,318	12,534	11,299	11,244
Thailand <sup>o</sup>	19	35	38	40	52	88	141
Viet Nam <sup>o</sup>	43	181	313	338	373	410	..
<b>ASEAN total</b>	<b>3,763</b>	<b>9,725</b>	<b>15,970</b>	<b>17,260</b>	<b>19,551</b>	<b>18,687</b>	<b>17,979</b>
<b>Share in total exports of services</b>							
Brunei Darussalam	1.2	0.0	0.0	0.0	0.1	0.1	1.4
Cambodia	0.0	0.0	0.1	0.1	0.1	0.4	1.2
Indonesia	1.0	1.0	1.0	0.8	1.1	1.2	3.3
Lao PDR	0.3	0.2	0.2	0.0	0.0	0.0	..
Malaysia	3.3	4.0	4.5	5.3	4.9	5.1	9.6
Myanmar	..	0.2	0.1	0.3	0.3	0.2	0.4
Philippines	7.7	12.0	16.6	14.9	13.7	13.4	16.5
Singapore	2.0	4.0	6.7	6.8	7.0	6.1	7.1
Thailand	0.1	0.1	0.1	0.1	0.1	0.1	0.5
Viet Nam	0.7	1.9	1.6	1.8	1.7	1.7	..
<b>ASEAN total</b>	<b>2.2</b>	<b>3.5</b>	<b>5.2</b>	<b>5.2</b>	<b>5.2</b>	<b>4.8</b>	<b>6.8</b>
<b>Share in total exports of goods and services</b>							
Brunei Darussalam	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Cambodia	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Indonesia	0.1	0.1	0.1	0.1	0.2	0.2	0.3
Lao PDR	0.1	0.1	0.0	0.0	0.0	0.0	..
Malaysia	0.4	0.6	0.7	0.8	0.7	0.8	0.8
Myanmar	..	0.0	0.0	0.1	0.1	0.1	0.1
Philippines	1.7	3.5	5.8	5.0	4.9	4.9	5.5
Singapore	0.4	1.0	2.1	2.1	2.3	2.2	2.4
Thailand	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Viet Nam	0.1	0.1	0.2	0.2	0.2	0.2	..
<b>ASEAN total</b>	<b>0.4</b>	<b>0.7</b>	<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	<b>1.2</b>	<b>1.3</b>

Source: AJC based on own data from UNCTAD and ASEANstats.

\* Data are available only for telecommunications, computer and information services. Therefore, the ratio of computer services to this sector from Malaysia is applied to estimate the computer services sector only.

<sup>o</sup> Data are available only for telecommunications, computer and information services. Therefore, the ratio of computer services to this sector from Myanmar in 2014 is applied to estimate the computer services sector only.

<sup>†</sup> For 2012–2013 data are available only for telecommunications, computer and information services. Therefore, Myanmar's ratio of computer services to this sector from the year 2014 is applied to estimate the computer services sector only.

<sup>+</sup> For 2005–2010 data are available only for telecommunications, computer and information services. Therefore, Singapore's ratio of computer services to this sector from the year 2011 is applied to estimate the computer services sector only.

<sup>o</sup> For 2014–2020, the computer services total was calculated as telecommunications, computer and information services minus telecommunication services.

<sup>o</sup> For 2005–2009 data are available only for telecommunications, computer and information services. Therefore, Viet Nam's ratio of computer services to this sector from the year 2010 is applied to estimate the computer services sector only.

**Table 3. Imports of computer services and their share in total imports of services and in total imports of goods and services, 2005–2020 (millions of dollars and per cent)**

Country	Annual average 2005–2010	Annual average 2011–2015	2016	2017	2018	2019	2020
<b>Computer services imports</b>							
Brunei Darussalam*	9	40	27	19	32	46	76
Cambodia	1	22	48	38	45	37	21
Indonesia	657	815	1,295	1,624	1,875	2,113	2,188
Lao PDR <sup>o</sup>	0	1	1	0	0	0	..
Malaysia	811	1,528	1,656	1,474	1,607	1,708	1,899
Myanmar <sup>†</sup>	..	4	50	52	49	97	49
Philippines	84	226	342	348	474	594	580
Singapore <sup>+</sup>	1,472	7,501	9,755	11,638	10,839	12,128	12,438
Thailand <sup>o</sup>	235	458	397	386	436	631	471
Viet Nam <sup>o</sup>	8	121	195	185	198	201	..
<b>ASEAN total</b>	<b>3,277</b>	<b>10,714</b>	<b>13,767</b>	<b>15,763</b>	<b>15,553</b>	<b>17,555</b>	<b>17,722</b>
<b>Share in total imports of services</b>							
Brunei Darussalam	0.7	1.9	1.8	1.7	2.3	3.0	7.4
Cambodia	0.1	1.3	2.2	1.5	1.7	1.3	1.2
Indonesia	2.6	2.6	4.7	5.6	5.7	6.3	10.6
Lao PDR	0.2	0.1	0.1	0.0	0.0	0.0	..
Malaysia	2.8	3.8	4.5	3.9	4.1	4.6	6.8
Myanmar	..	0.2	2.2	2.0	1.6	3.1	1.7
Philippines	0.9	1.4	1.6	1.5	2.0	2.5	3.8
Singapore	1.8	5.5	6.8	7.2	6.2	6.8	8.5
Thailand	0.6	1.1	1.0	0.9	0.9	1.3	1.2
Viet Nam	0.1	1.0	1.3	1.2	1.3	1.3	..
<b>ASEAN total</b>	<b>1.7</b>	<b>3.8</b>	<b>4.7</b>	<b>5.0</b>	<b>4.6</b>	<b>5.1</b>	<b>6.6</b>
<b>Share in total imports of goods and services</b>							
Brunei Darussalam	0.2	0.7	0.7	0.5	0.6	0.8	1.5
Cambodia	0.0	0.2	0.4	0.2	0.3	0.2	0.1
Indonesia	0.5	0.4	0.9	1.0	1.0	1.2	1.6
Lao PDR	0.0	0.0	0.0	0.0	0.0	0.0	..
Malaysia	0.5	0.7	0.9	0.7	0.7	0.8	1.0
Myanmar	..	0.0	0.3	0.3	0.2	0.5	0.3
Philippines	0.1	0.3	0.3	0.3	0.4	0.5	0.6
Singapore	0.4	1.6	2.4	2.6	2.2	2.5	2.9
Thailand	0.1	0.2	0.2	0.2	0.2	0.3	0.2
Viet Nam	0.0	0.1	0.1	0.1	0.1	0.1	..
<b>ASEAN total</b>	<b>0.3</b>	<b>0.8</b>	<b>1.1</b>	<b>1.1</b>	<b>1.0</b>	<b>1.1</b>	<b>1.3</b>

Source: AJC based on own data from UNCTAD and ASEANstats.

\* Data are available only for telecommunications, computer and information services. Therefore, the ratio of computer services to this sector from Malaysia is applied to estimate the computer services sector only.

<sup>o</sup> Data are available only for telecommunications, computer and information services. Therefore, the ratio of computer services to this sector from Myanmar in 2014 is applied to estimate the computer services sector only.

<sup>†</sup> For 2012–2013 data are available only for telecommunications, computer and information services. Therefore, Myanmar's ratio of computer services to this sector from the year 2014 is applied to estimate the computer services sector only.

<sup>+</sup> For 2005–2010 data are available only for telecommunications, computer and information services. Therefore, Singapore's ratio of computer services to this sector from the year 2011 is applied to estimate the computer services sector only.

<sup>o</sup> For 2014–2020 the computer services total was calculated as telecommunications, computer and information services minus telecommunication services.

<sup>o</sup> For 2005–2009 data are available only for telecommunications, computer and information services. Therefore, Viet Nam's ratio of computer services to this sector from the year 2010 is applied to estimate the computer services sector only.



**Table 4. Export trend line for computer services**

Country	Slope (in log)
Brunei Darussalam	-0.302
Cambodia	0.340
Indonesia	0.062
Lao PDR	0.127
Malaysia	0.069
Myanmar	0.186
Philippines	0.174
Singapore	0.187
Thailand	0.116
Viet Nam	0.211
<b>ASEAN average</b>	<b>0.117</b>

Source: Calculated from table 2.

**Table 5. Export competitiveness index of computer services, 2005–2020**

Country	2005–2010 Average	2011–2015 Average	2016	2017	2018	2019	2020
Brunei Darussalam	0.00	-1.00	-1.00	-1.00	-0.96	-0.98	-0.90
Cambodia	-0.27	-0.91	-0.82	-0.86	-0.81	-0.24	-0.01
Indonesia	-0.64	-0.57	-0.73	-0.80	-0.73	-0.73	-0.68
Lao PDR	0.64	0.47	0.28	..	..	..	..
Malaysia	0.07	-0.02	-0.07	0.09	0.03	0.03	-0.03
Myanmar	..	0.10	-0.83	-0.68	-0.55	-0.80	-0.54
Philippines	0.85	0.84	0.86	0.86	0.81	0.78	0.77
Singapore	0.03	-0.18	-0.03	-0.06	0.07	-0.04	-0.05
Thailand	-0.85	-0.86	-0.83	-0.81	-0.79	-0.75	-0.54
Viet Nam	0.69	0.20	0.23	0.29	0.31	0.34	..
<b>ASEAN average</b>	<b>0.06</b>	<b>-0.19</b>	<b>-0.29</b>	<b>-0.33</b>	<b>-0.29</b>	<b>-0.27</b>	<b>-0.25</b>

Source: Calculated from tables 2 and 3.

Note: The export competitiveness index is defined as (Exports - Imports) / (Exports + Imports).

### Box 1. The impact of COVID-19 on the computer services trade

Since March 2020, the COVID-19 pandemic has led to the adoption of drastic measures such as lockdowns and social distancing to reduce the pace of virus transmission. Even in societies where most of the population is already vaccinated, governments still cannot re-establish “normal life”, given the emergence of mutations of the virus, such as the Delta variant. Consequently, computer services became essential for allowing the exchange of ideas and information in societies and for maintaining connectivity and resiliency of global value chains. Tasks such as remote work, distance learning, online shopping, telehealth, payments and transactions through the Internet, among others, were newly implemented or were fully disseminated, opening new opportunities for the computer and related services sector.

Observing the data for 2020 it is possible to grasp if and how computer services were affected in ASEAN member states.

Interestingly, for all countries the share of computer services in total services exports increased, revealing the importance of the sector during the pandemic period. In the case of imports, some countries have considerable reductions, such as Brunei Darussalam, Cambodia, Myanmar and Thailand, while other countries had small increases in values. Once again the shares of computer services over total services imports increased for most countries, with Cambodia, Myanmar and Thailand having minor decreases.

## 2. Mode 3: Commercial Presence

Table 6 shows estimated sales of computer and related services through commercial presence (Mode 3) (box 2). Unlike in Mode 1, in this mode all ASEAN member states recorded deficits in services trade (receipt being greater than supply). In other words, the presence of foreign companies in ASEAN is much larger than the ASEAN presence abroad for individual member states. In terms of the number of inward investments, Singapore attracted the largest number of investors, followed by Malaysia and Philippines (box 3). As for the sales value, Singapore, Malaysia and Philippines are faring well. On the export side, Singapore dominates ASEAN's services supply market abroad in computer and related services.

**Table 6. Estimated sales of computer-related services through foreign presence. 2015**

Country	(Number and millions of dollars)			
	Receipts from abroad		Supply to the world	
	Number of foreign entities	Estimated sales <sup>a</sup>	Number of ASEAN entities abroad	Estimated sales <sup>a</sup>
Brunei Darussalam	5	23 (4)	1	0 (0)
Cambodia	5	153 (1)	1	.. (1)
Indonesia	98	2,463 (46)	16	325 (8)
Lao People's Democratic Republic	1	63 (0)	0	–
Malaysia	246	12,108 (32)	93	299 (47)
Myanmar	4	77 (2)	0	–
Philippines	161	5,385 (11)	22	151 (6)
Singapore	572	20,144 (92)	227	10,021 (89)
Thailand	119	1,575 (33)	13	59 (7)
Viet Nam	109	5,662 (17)	25	46 (3)
<b>ASEAN total</b>	<b>1,320</b>	<b>47,651</b>	<b>398</b>	<b>10,901</b>

Source: AJC, based on data from Toyo Keizai Shimposha, UNCTAD, Thomson Reuters and Orbis.

<sup>a</sup> Figures in parentheses indicate the number of entities for which sales cannot be estimated.

Note: For estimated sales, see the estimation procedure in the main text.

### Box 2. How to estimate services supply in Mode 3

Almost no developing countries compile foreign affiliate statistics. ASEAN member states are no exception. The supply of computer and related services and of other services through commercial presence must therefore be estimated from the sales of foreign affiliates engaged in such services. The ASEAN-Japan Centre estimated this supply using the following steps:

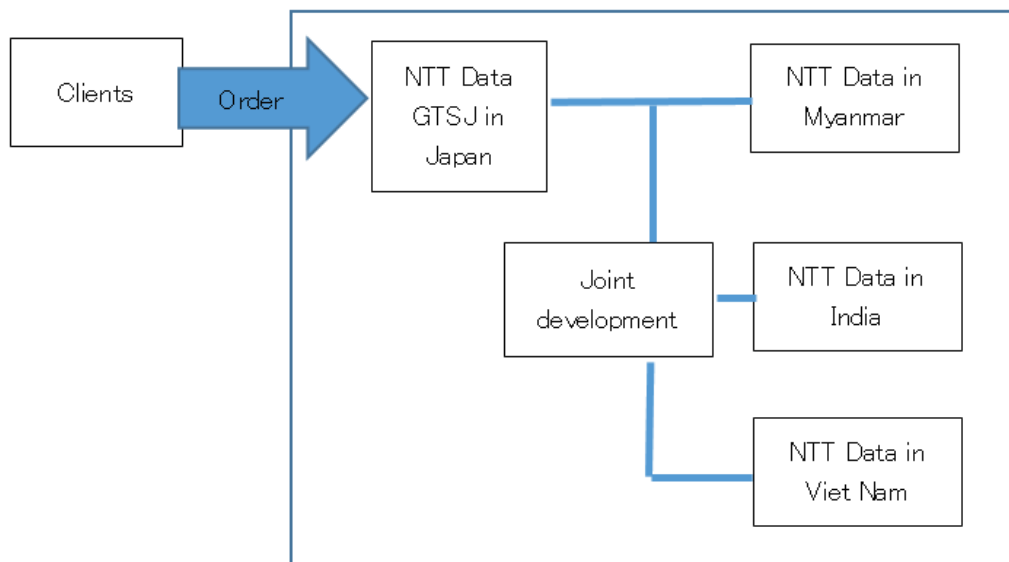
- (1) Identify foreign affiliates in each country by examining the lists of foreign companies compiled from various sources, including Toyo Keizai's database for Japanese affiliates in ASEAN, Orbis and Who Owns Who databases for non-Japanese foreign affiliates in ASEAN and individual foreign investment cases from Thomson One and the *Financial Times'* fDi Markets database.
- (2) Because many of these identified foreign affiliates do not provide sales data, calculate the ratio of sales to firm size based on affiliates that have information on both sales and firm size (*i.e.*, capital size, asset size or investment size). To estimate sales, apply this ratio to affiliates that at least have data on firm size.
- (3) Do not include affiliates for which estimates of sales were not possible, effectively assuming that they are small and do not affect the totality.

For sales by ASEAN affiliates abroad, the same estimation procedure is applied. In both estimates (supply of services by foreign affiliates in ASEAN and supply of services by ASEAN affiliates abroad), ASEAN-Japan Centre tends to underestimate because it includes only those identified affiliates and only those whose main business is computer and related services. Companies whose main business is not computer services can also provide such services. However, in the calculations for Mode 3, supply by this type of firms is not covered.

Table 7 shows foreign affiliates in ASEAN and ASEAN affiliates abroad in computer and related services by source and destination country. Some 1,300 foreign computer services companies operate in ASEAN, and close to 400 ASEAN computer services companies operate abroad. These numbers are substantial, when compared with those of telecommunication services companies. As for foreign direct investment into ASEAN, the dominant position of the United States in the number of affiliates and in estimated sales is clear. Europe and Japan follow the United States. Although parent firms are large, many affiliates established in ASEAN are small. Some, such as NTT Data, create networks in Asia to undertake joint development of software (box 4). Affiliates from other ASEAN countries also show significant presence.

#### Box 4. A Japanese ICT company's offshore development centers in Asia

NTT Data Global Technology Service Co., Ltd. Japan (NTT Data GTSJ), fully utilizes bases in Viet Nam and Myanmar, with a main focus on India. The company offers a software development system that is suitable for any project. It has software development centers in India (in six cities), Myanmar, Singapore, Viet Nam (in two cities) and Japan. More specifically, development and testing of software are done in Myanmar, while design, development and testing are undertaken in India and Viet Nam. The reduction of transaction costs (or service-link costs) enables the company to contribute to decreasing the digital divide in ASEAN in software development.



Source: ASEAN-Japan Centre, based on company information.

As for investment outflows from ASEAN (in terms of number of affiliates), ASEAN ranks first, followed by Europe and the United States (table 7). In terms of the number of ASEAN affiliates abroad, India and Hong Kong (China) hold almost as many as Europe and the United States. ASEAN firms' investment in Japan is not as active.

**Table 7. Foreign affiliates in ASEAN and ASEAN affiliates abroad in computer and related services, by source and destination country**

		(Number and millions of dollars)					
		Foreign affiliates in ASEAN			ASEAN affiliates abroad		
	Country	Number of affiliates	Estimated sales <sup>a</sup>		Number of affiliates	Estimated sales <sup>a</sup>	
Developed countries	United States	420	13,803	(30)	33	1,427	(19)
	Europe	280	9,146	(27)	36	3,474	(10)
	Japan	216	5,599	(45)	16	247	(2)
	Others <sup>b</sup>	72	3,217	(14)	27	1,116	(6)
	<b>Subtotal</b>	<b>988</b>	<b>31,765</b>	<b>(116)</b>	<b>112</b>	<b>6,264</b>	<b>(37)</b>
Developing countries	ASEAN <sup>c</sup>	140	2,527	(76)	157	2,633	(80)
	China	10	162	(2)	26	746	(8)
	Korea, Republic of	13	1,792	(1)	6	54	(0)
	India	83	4,988	(14)	32	286	(11)
	Hong Kong (China)	24	3,835	(6)	32	458	(14)
	Taiwan Province of China	6	876	(1)	9	368	(4)
	Others <sup>d</sup>	42	1,558	(9)	24	93	(7)
	<b>Subtotal</b>	<b>318</b>	<b>15,738</b>	<b>(108)</b>	<b>286</b>	<b>4,637</b>	<b>(124)</b>
Unspecified		<b>14</b>	<b>149</b>	<b>(12)</b>	<b>0</b>	<b>0</b>	<b>(0)</b>
World		<b>1,320</b>	<b>47,651</b>	<b>(236)</b>	<b>398</b>	<b>10,901</b>	<b>(161)</b>

Source: AJC, based on data from Toyo Keizai Shimposha, UNCTAD, Thomson Reuters and Orbis.

<sup>a</sup> Figures in

<sup>b</sup> Includes

<sup>c</sup> The number of foreign affiliates in ASEAN and ASEAN affiliates abroad should balance. However, either the destination or the source country of some of these affiliates is not available. Therefore they do not match.

<sup>d</sup> Includes, for *foreign affiliates in ASEAN*, Bermuda, Brazil, Belarus, Israel, Kenya, Cayman Islands, Marshall Islands, Mongolia, Mauritius, Panama, Qatar, Russian Federation, Saudi Arabia, Turkey, the Virgin Islands (British) and South Africa. Similarly, for *ASEAN affiliates abroad*, the United Arab Emirates, Argentina, Bangladesh, Ghana, Israel, Lebanon, Sri Lanka, Oman, Pakistan, Saudi Arabia, Tokelau, Turkey, the Virgin Islands (British) and South Africa.

Note: For estimated sales, see the estimation procedure in the main text.

### 3. Modes 2 and 4: Consumption Abroad and Movement of Computer Services Staff

Purchases of computer repair services by foreign residents visiting a supplier country are recorded as exports of computer services in Mode 2 (consumption abroad). Services provided by self-employed workers who travel to a customer's country are considered as exports in Mode 4 (movement of natural persons). In the ASEAN context, local engineers with computer-related skills could provide such services in Mode 2 or Mode 4. As such service suppliers are often affiliated with companies and not self-employed, these transactions could be part of activities related to or incorporated into Mode 3 (supply of services through commercial presence). For these reasons, no public data on computer and related services are available in Mode 2 or Mode 4.

### III. Trade Agreements and Regulations among and in ASEAN Member States

The ASEAN Framework Agreement on Services (AFAS) is a progressive and comprehensive service-related commitment that is a part of ASEAN members' trade agreement. The Regional Comprehensive Economic Partnership (RCEP), signed in November 2020, is another important trade agreement involving all ASEAN member states and their five dialogue partners (Australia, China, Japan, New Zealand and Republic of Korea). This section presents an overview of these two service-related agreements through indexation and categorization of the regulations used.

Table 8 shows the Hoekman index<sup>3</sup> for computer and related services under AFAS (10th package, signed in November 2018). As shown, the ASEAN averages in Modes 1–3 are rather high. Individually, most ASEAN member states are fully committed to this sector. This signifies that in terms of market access and national treatment, computer and related services are already fairly open. Mode 1 and Mode 2 exhibit the full scores in terms of liberalization in all countries. In Mode 3, five countries (Cambodia, Lao People's Democratic Republic, Malaysia, Philippines and Viet Nam) have committed to full liberalization.

**Table 8. Hoekman index of AFAS (10th package) commitments for computer and related services**

	Mode 1	Mode 2	Mode 3
Brunei Darussalam	1.00	1.00	0.95
Cambodia	1.00	1.00	1.00
Indonesia	1.00	1.00	0.75
Lao PDR	1.00	1.00	1.00
Malaysia	1.00	1.00	1.00
Myanmar	1.00	1.00	0.50
Philippines	1.00	1.00	1.00
Singapore	1.00	1.00	0.80
Thailand	1.00	1.00	0.75
Viet Nam	1.00	1.00	1.00
ASEAN average	1.00	1.00	0.88

Source: AJC, calculated from the specific commitment tables of AFAS (10th package).

Note: AFAS (10th package) was signed in November 2018. In the index calculation, the least conservative interpretation of the specific commitment tables is made. For example, when only the subsectors in the sector (computer and related services) are liberalized (partially), the index values are given full scores and calculated as such.

<sup>3</sup> Hoekman (1995) proposes an indexation method for measuring the GATS-style degree of commitment in the services sector. The index takes a value between 0 and 1, with 0 referring to the most restricted situation and 1 being the most open. The method assigns values to each of eight cells (four modes and two aspects—market access or national treatment) as follows: assign the value 1 for a sector that is "fully liberalized", 0.5 for one that is "limited (but bound)" and 0 for one that is "unbound" (government has not committed to liberalize) by subsector, by mode and by aspect (market access or national treatment); take the simple average for aggregation and then calculate the average value by services sector and by country. The higher the figure, the more liberal the country's services trade commitments are to members of a free trade agreement. Using the database constructed for this paper series, the Hoekman index is derived for each of 155 subsectors. Then the simple average for the 11 sectors is calculated.

Table 9 shows the Hoekman index for ASEAN member states under RCEP. The agreement combines positive and negative listings, depending on member country. Because the indexation method can only be applied to positive listings, the table shows the results for those ASEAN members that use positive listing. As the table shows, most countries are fully committed to full liberalization in Mode 1; in Mode 2, all ASEAN members (with positive lists) are fully committed; and in Mode 3, most ASEAN member countries are committed at a high level of liberalization, albeit the average degree of commitment is a little less than that under AFAS (10th package).

**Table 9. Hoekman index of RCEP commitments by ASEAN member states for computer and related services**

	Mode 1	Mode 2	Mode 3
Brunei Darussalam	NA	NA	NA
Cambodia	1.00	1.00	1.00
Indonesia	NA	NA	NA
Lao PDR	1.00	1.00	1.00
Malaysia	NA	NA	NA
Myanmar	1.00	1.00	0.80
Philippines	1.00	1.00	0.75
Singapore	NA	NA	NA
Thailand	0.85	1.00	0.75
Viet Nam	1.00	1.00	0.75
ASEAN average (Countries with positive lists only)	0.98	1.00	0.84

Source: AJC, calculated from the specific commitment tables of RCEP.

NA – not applicable due to negative listing

Note: RCEP was signed in November 2020. In the index calculation, the least conservative interpretation of the specific commitment tables is made. For example, when only the subsectors in the sector (computer and related services) are liberalized (partially), the index values are given full scores and calculated as such.

Table 10 lists (together with Annex A) the type and frequency of policy regulations by ASEAN members under AFAS (10th package). The following are some observations by country.

- **Brunei Darussalam:** Not much restriction is used; use of E (measures that restrict or require specific type of legal entity) and F (limitations on the participation of foreign capital, with foreign majority ownership allowed) is observed.
- **Cambodia:** The sector is fully liberalized for trade.
- **Indonesia:** E (measures that restrict or require specific type of legal entity) and F (limitations on the participation of foreign capital) are used equally; as for F, a 49 per cent upper limit for foreign equity participation alone is used.
- **Lao People's Democratic Republic:** The sector is fully liberalized for trade.
- **Malaysia:** The sector is fully liberalized for trade.
- **Myanmar:** E (measures that restrict or require specific types of legal entity) is the only policy type used.
- **Philippines:** The sector is fully liberalized for trade.
- **Singapore:** This sector is already open (although its commitment table does not mention "other (services)").
- **Thailand:** Use of E (measures that restrict or require specific types of legal entity) and F

(limitations on the participation of foreign capital) is dominant; as for F, 49 per cent and 70 per cent limits on foreign equity are used.

- **Viet Nam:** The sector is fully liberalized for trade.

**Table 10. Status of restrictions in computer and related services under AFAS (10th package)**

	N = none/ no limitation	D = limitations on the total number of natural persons	E = measures that restrict or require specific type of legal entity	F = limitations on the participation of foreign capital	G = government approval requirement	U = Unbound (no commitment)
Brunei Darussalam	29	0	1	1 (70%:1)	0	0
Cambodia	30	0	0	0	0	0
Indonesia	25	0	5	5 (49%:5)	0	0
Lao PDR	30	0	0	0	0	0
Malaysia	30	0	0	0	0	0
Myanmar	26	0	4	0	0	0
Philippines	30	0	0	0	0	0
Singapore	24	0	0	0	0	6
Thailand	25	0	5	5 (49%:3; 70%:2)	0	0
Vietnam	30	0	0	0	0	0

Note: The way commitments are recorded differs across ASEAN members, hence the diversity in the number of N (no limitation); only commitments defined under the GATS are counted.

Source: Calculated from each country's specific commitment table under AFAS (10th package).

Table 11 lists the status of restrictions in computer and related services by country under RCEP (see Annex B for the original specific commitment tables under RCEP). Country observations are as follows:

- **Brunei Darussalam:** Negative listing is applied.
- **Cambodia:** The sector is fully liberalized for trade, just as in the case of AFAS (10th package).
- **Indonesia:** Negative listing is applied.
- **Lao People's Democratic Republic:** The sector is fully liberalized for trade, just as in the case of AFAS (10th package).
- **Malaysia:** Negative listing is applied.
- **Myanmar:** E (measures that restrict or require specific types of legal entity) is the only type of policy used, just as for AFAS (10th package).
- **Philippines:** E (measures that restrict or require specific types of legal entity) and F (limitations on the participation of foreign capital) are used with the same frequency; as for F, 100 per cent foreign ownership is allowed (on condition of compliance with the minimum paid-in equity capital for domestic market enterprises).
- **Singapore:** Negative listing is applied.
- **Thailand:** F (limitations on the participation of foreign capital) is the only type of policy used; as for limit on foreign equity, 70 per cent is dominant.
- **Viet Nam:** D (limitations on the total number of natural persons) is the only policy limitation used.



**Table 11. Status of restrictions in computer and related services under RCEP**

	N = none/no limitation	D = limitations on the total number of natural persons	E = measures that restrict or require specific type of legal entity	F = limitations on the participation of foreign capital	G = government approval requirement	U = Unbound (no commitment)
Brunei Darussalam	NA	NA	NA	NA	NA	NA
Cambodia	30	0	0	0	0	0
Indonesia	NA	NA	NA	NA	NA	NA
Lao PDR	30	0	0	0	0	0
Malaysia	NA	NA	NA	NA	NA	NA
Myanmar	26	0	4	0	0	0
Philippines	25	0	5	5 (100% on condition:5)	0	0
Singapore	NA	NA	NA	NA	NA	NA
Thailand	24	0	0	5 (49%:1; 70%:4)	0	2
Vietnam	25	5	0	0	0	0

Note: NA—not applicable because of negative listing. The way commitments are recorded differs across ASEAN members, hence the diversity in the number of N (no limitation); only those commitments defined under the GATS are counted.

Source: Calculated from each country's specific commitment table under RCEP.

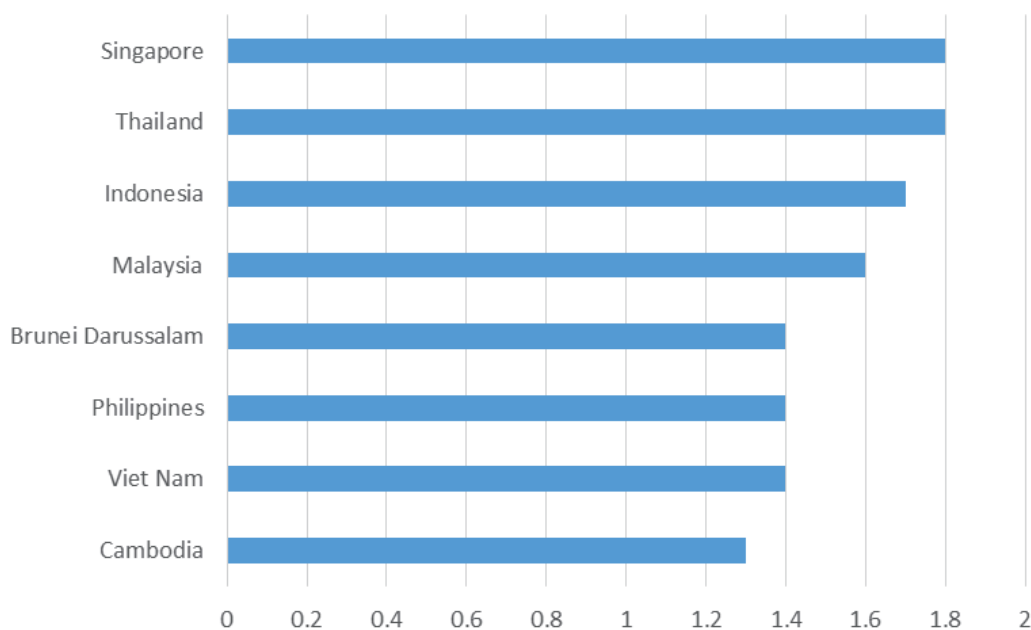
Clearly an important aspect of AFAS is its positive spillover effect for RCEP, involving ASEAN member states and their dialogue partners (Australia, China, Japan, New Zealand and the Republic of Korea). Both agreements are rather similar, if not identical, in terms of commitments, especially for computer and related services. The AFAS commitments might have served as a useful reference point for ASEAN members in opening their market to the dialogue partners under RCEP. This is desirable, because computer and related services are network oriented, rather than domestic market oriented. Value chains with neighbouring countries and dialogue partners would be indispensable for constant upgrading of technologies used in this technologically intensive service sector. The use of RCEP, once it comes into effect, is expected to facilitate ASEAN member states' further value creation, not just for computer and related services, but also for other sectors because of the infrastructural nature of the digital technologies/information technologies (IT) embedded in this sector.

## IV. Impacts of Further Liberalization of Computer and Related Services on the Economy

### 1. Economic Impacts

Computer-related services are an essential input to any product, influencing the level of a product's market competitiveness. Products embodying more computer software such as automobiles and electronic products are more competitive than other similar products. Game software, a direct derivative of software development, is another product that can be sold at high prices. Computer-related services, both alone and in the use of another product, do affect the competitiveness of other products. The multiplier effects (which measure the overall impact of the economy due to one unit increase in the demand for computer and related services) range from 1.3 for Cambodia to 1.8 for Thailand and Singapore (figure 2). There are ripple effects on other industries. In particular, Thailand, which has the largest impact among ASEAN member states, also has a relatively small amount of outputs and value added (table 12) and needs measures to promote investment in this sector.

**Figure 2. Multiplier effects of IT and other information services in ASEAN, 2015**



Source: AJC, based on the Organisation for Economic Co-operation and Development (OECD) Input-Output table database.

Note: The OECD database does not cover Lao People's Democratic Republic and Myanmar.

IT and other information services account for less than 1 per cent of ASEAN economies' value added in ASEAN. An investment in this service subsector has an impact of 50 per cent more in the overall economy than what is spent in this subsector, as the multiplier effects are more than 1.5 in half of ASEAN member states (figure 2). The productivity in this subsector is slightly lower than in the overall economy. In other words, the ratio of value added to output in this subsector is slightly lower than that of the whole economy (table 12). The largest producer country, Singapore, has the second lowest ratio. For this and other countries with lower ratios, policy measures should include

greater engagement in value-creating computer software products and processing activities.

**Table 12. Value added and output of IT and other information services compared with all industries, 2015 (millions of dollars and ratio)**

Country	IT and other information services			All industries		
	Value added	Output	Ratio of value added to output	Value added	Output	Ratio of value added to output
Brunei Darussalam	16	25	0.64	13,174	22,921	0.57
Cambodia	38	56	0.68	16,984	30,075	0.56
Indonesia	2,247	4,306	0.52	833,734	1,635,254	0.51
Malaysia	2,930	6,445	0.45	292,523	763,255	0.38
Philippines	1,372	2,164	0.63	286,120	555,126	0.52
Singapore	5,472	16,126	0.34	275,238	770,936	0.36
Thailand	854	2,702	0.32	378,162	917,981	0.41
Viet Nam	903	1,578	0.57	175,692	570,060	0.31
<b>ASEAN total</b>	<b>13,831</b>	<b>33,400</b>	<b>0.41</b>	<b>2,271,628</b>	<b>5,265,607</b>	<b>0.43</b>

Source: AJC, based on the OECD Input-Output table database.

Note: The OECD database does not cover Lao People's Democratic Republic and Myanmar.

External factors may drive export competitiveness in computer and related services, *e.g.*, through imports of key inputs from abroad. Foreign value added in exports provide such data (table 13). Most ASEAN members listed have higher levels of foreign value-added content in their computer and related services exports than China, Japan and the Republic of Korea, ranging from 10 per cent for Indonesia to nearly 34 per cent for Singapore. Only Japan uses few foreign inputs in their exports, at 5 per cent. In other words, foreign input is dominant in ASEAN's exports of computer and related services.

**Table 13. Foreign value-added share of gross exports (to the world) for IT and other information services, 2005–2015 (per cent)**

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>ASEAN members</b>											
Brunei Darussalam	11	11	11	11	14	15	13	16	17	13	14
Cambodia	10	13	12	12	12	11	12	11	11	12	14
Indonesia	8	7	7	8	7	7	8	10	10	11	10
Malaysia	27	26	27	27	27	28	27	27	27	27	27
Philippines	21	25	19	17	15	15	12	14	12	11	14
Singapore	30	24	24	26	24	25	25	27	30	33	34
Thailand	34	34	33	35	32	32	33	33	32	32	31
Viet Nam	16	17	17	17	16	16	17	16	21	22	26
<b>Memorandum</b>											
China	18	18	16	15	13	13	13	20	13	12	10
Japan	3	4	4	4	3	4	4	4	5	5	5
Korea, Republic of	14	14	13	15	15	15	17	17	17	16	16

Source: AJC, based on the OECD Input-Output table database.

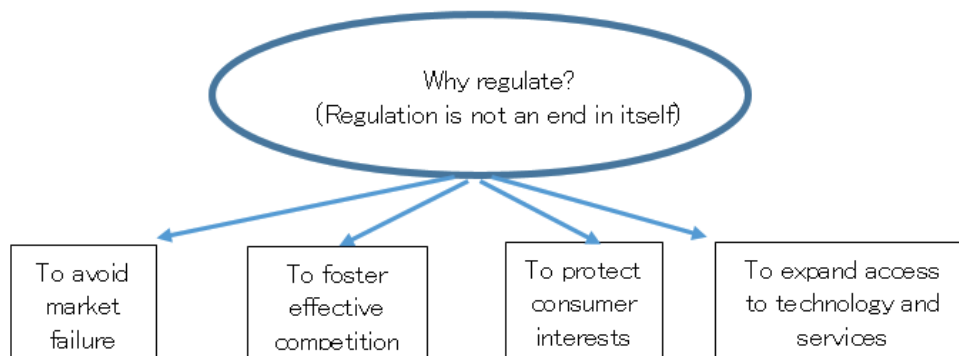
Note: The OECD database does not cover Lao People's Democratic Republic and Myanmar.

## 2. Need for Regulation

Considering the issue of why and when regulation is needed in computer and related services is worthwhile. Figure 3 categorizes four reasons for regulation. In the presence of perfect market functioning, regulation would not be needed because the market does the business of matching demand and supply at a fair price. In computer and related services that is not achievable because emerging new technologies cause positive and negative externalities throughout the industry. Positive externalities include *de facto* establishment of standards in new computer services (e.g., Internet phones and online businesses including e-commerce, gaming and chatting); negative externalities involve coping with security concerns, including email spam and fraud on the Internet. Fostering effective competition and protecting consumer interests while securing access to new technologies and services are also important reasons why regulation is needed.

When regulations are retained and competition-promoting liberalization is undertaken at the same time, the ASEAN economy as a whole can move further up the value chain curve (as shown in figure 1). The impact is not easy to quantify though, precisely because of the all-encompassing nature of computer and related services. Ubiquitous technology (*i.e.*, computer chips embedded in virtually all commodities for geographical detection) and the Internet of things, for instance, would reduce business-related transaction costs and wholly change the business landscape in manufacturing activities and logistics services in an as yet unfathomable manner.

**Figure 3. Goals of regulation in computer and related services**



Source: Adapted from World Bank and International Telecommunication Union (2011), figure 1.4.

## V. Policy Recommendations and Promotion Measures for Computer and Related Services

Promotional measures solely targeting trade in computer and related services might not be the right focus, as the sector requires that telecommunication facilities (including the Internet) allow such services. For example, digital/ICT requires services from telecommunications and computer-related areas and liberalization in other subsectors. Combining telecommunication services and computer services in addressing policy issues would be more appropriate.

As most ASEAN member states have already liberalized trade in computer and related services and considering that such services require smaller-scale facilities than telecommunication services (both are part of ICT services), implementing workable promotional measures is important as a next step. Regulatory measures exist for computer and related services at the regional and multilateral levels, yet they are rather expected to promote cross-border trading while avoiding market failures. Box 4 (the case of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership or CPTPP<sup>4</sup>) and box 5 (for the case of RCEP) provide examples of regulations for promoting e-commerce.

### Box 4. Facilitation and regulations on e-commerce under multilateral agreements: The case of CPTPP

e-Commerce, which the GATS-style service classification does not cover, is a growing and important area pertinent to trade in computer services. Chapter 14 of CPTPP (or TPP [Trans-Pacific Partnership] in the following legal text) provides useful key regulations:

**Cross-border electronic data transfers.** Article 14.11 requires each TPP party (government) to allow the cross-border transfer of information, including personal information, by electronic means, “when this activity is for the conduct of the business of a person”. Article 14.11 allows a party (government) to adopt or maintain a measure inconsistent with this obligation only “to achieve a legitimate public policy objective”.

**Ban on forced localization of computing facilities.** Under Article 14.13, no party (government) may require a person to use or locate computing facilities in that party’s territory as a condition for conducting business in the territory.

**Ban on requiring transfers of source code.** Article 14.17 prohibits any party (government) from requiring the transfer of, or access to, software source code as a condition for the import, distribution, sale or use of such software, or products containing such software, in the party’s territory.

**Customs duties on electronic transmissions.** Article 14.3 prohibits parties (governments) from imposing customs duties on cross-border electronic transmissions, including content, between citizens of the various TPP countries. This commitment largely follows the

<sup>4</sup> The following 11 parties signed CPTPP (also known as TPP11) in March 2018: Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore and Viet Nam (note that the United States is not included, while the country was a negotiating member of the original Trans-Pacific Partnership).

[moratorium on e-commerce customs duties agreed among WTO members in 1998](#). Article 14.3, however, does not preclude parties from imposing internal taxes, fees or other charges on “content transmitted electronically”, provided such measures are imposed in a manner consistent with TPP.

**Non-discriminatory treatment of digital products.** Article 14.4 prohibits a party (government) from providing less favourable treatment to digital products and the creators and owners of those digital products, of other parties than it accords to “other like digital products”.

**Access to the Internet for e-commerce.** Article 14.10 secures the benefit of consumers’ ability to access and use online services and applications of their choice and to connect the devices of their choice to the Internet.

#### Box 5. Facilitation and regulations on e-commerce under multilateral agreements: The case of RCEP

Computer services can promote cross-border electronic commerce, which has a promising scope with and after the COVID-19 crisis. Following is an excerpt from Chapter 12—Electronic Commerce under RCEP.

Article 12.5: Paperless Trading

1. Each Party shall: (a) work towards implementing initiatives which provide for the use of paperless trading, taking into account the methods agreed by international organisations including the World Customs Organization;

Article 12.6: Electronic Authentication and Electronic Signature 1. Except in circumstances otherwise provided for under its laws and regulations, a Party shall not deny the legal validity of a signature solely on the basis that the signature is in electronic form.

Article 12.11: Customs Duties 1. Each Party shall maintain its current practice of not imposing customs duties on electronic transmissions between the Parties.

Article 12.14: Location of Computing Facilities 1. The Parties recognise that each Party may have its own measures regarding the use or location of computing facilities, including requirements that seek to ensure the security and confidentiality of communications.

ASEAN, in the context of computer and related services (including telecommunication services), has released a road map—the ASEAN Digital Masterplan 2025 (ADM 2025)—that is expected to be implemented from 2021 to 2025. Promotion of trade in digitally enabled services should be undertaken in line with ADM 2025<sup>5</sup>. The technology trends up to 2030, mentioned in the masterplan, are as follows.

- Internet will continue to be present in its current form and evolve to provide a wide range of Cloud services.
- AI will be very powerful in specific problem areas.

<sup>5</sup> For details, see ASEAN Secretariat (2015).

- Connectivity has mostly reached the point of delivering all people need where it is geographically available.
- Big data are valuable in delivering new insights through data analytics.
- Virtual reality will remain niche, but augmented reality might play a larger role.
- Robotics are currently widely used in manufacturing autonomous vehicles and will evolve slowly and have limited impact by 2025.
- The Internet of things will deliver productivity gains and better working devices.
- Three-dimensional printing could substantially reduce time to market of new products.

Along with these technological trends, concrete promotional measures for ASEAN member states could be considered. In view of their socioeconomic status, the promotional measures should cover four areas:

1. Database construction for trade in digital/ICT services (because detailed statistical information on digital/ICT-related trade is lacking)
2. Addressing of the digital divide in the form of either Mode 2 trade or capacity building as economic cooperation (as ASEAN member states seem to be divided in terms of digital/ICT utilization)
3. Participation of small and medium-size enterprises (SMEs) (the majority of ASEAN-based firms)
4. Implementation of digital/ICT farming applications (because ASEAN member states are located mainly in tropical areas where unique agri-based businesses can prosper).

More specifically, the proposed measures and policies could include the following focal points. For (1), database construction for trade in digital/ICT services, information on digital/ICT-based trade is rather limited because most international digital/ICT-related transactions take place *inside* companies, in diverse and rather confidential forms. International and/or regional organizations (including the ASEAN-Japan Centre) in cooperation with the relevant agencies of ASEAN member states could launch a concrete pilot project to understand and measure the business modality and price level of digital/ICT-related trade. This type of bottom-up project implementation is expected to lead to the establishment of a broader-scale database on ASEAN-wide digital/ICT trade in all four modes.

On (2), addressing of the digital divide in the form of either Mode 2 trade or capacity building as economic cooperation, relevant workshops could be organized to highlight how the digital divide happens: Both the lack of physical digital/ICT facilities and the lack of knowledge on how to use them effectively can contribute to the digital divide. In such workshops (including the seminar organized by the ASEAN-Japan Centre in February 2017 for ASEAN), information exchange on these two aspects could occur. As the trade policy framework for digital/ICT is already fairly open, the important point would be to start small and grow later; in this sense, the implementation of small-scale workable projects is as important as meticulous but rather time-consuming planning. Importantly, the process itself could also be facilitated by utilizing digital/ICT-based offshoring of inputs in Mode 1.

Concerning (3), participation of SMEs, indigenous companies—especially those based in Brunei Darussalam, Cambodia, the Lao People's Democratic Republic and Myanmar—could be invited to workshops where they could receive necessary ICT-related training (which could be seen as Mode 2 import of digital/ICT services).

Regarding (4), implementation of digital/ICT farming tools could be applied, for example, on

growing tropical plants for food or medicinal use. Digital/ICT-based technology can be useful for monitoring the growth of such plants. Database construction and analyses of business potential along the value chain (*i.e.*, where to export and how much to sell) and, more upstream, agri-based research and development using digital/ICT technologies (*e.g.*, DNA coding of tropical plants to increase yields at the time of harvesting) could be undertaken by utilizing digital/ICT facilities. Concrete pilot projects could be launched in this respect to raise awareness.

The concrete promotional measures described are fully in line with ADM 2025, hence pilot projects could be formulated closely with the masterplan. Especially in the context of COVID-19, ADM 2025 produces desired outcomes (DOs) as follows.

#### **D01 Actions of ADM 2025 prioritized to speed ASEAN's recovery from COVID-19**

- 1.1 Make the economic case for prioritizing ADM 2025 actions
- 1.2 Assess the economic case for facilitating use of digital services that would help recovery from the COVID-19 pandemic

#### **D02 Increase in the quality and coverage of fixed and mobile broadband infrastructure**

- 2.1 Encourage inward investment in digital and ICT
- 2.2 Move towards best practice permission and access rights for local and national infrastructure, including submarine cable repair
- 2.3 Facilitate adoption of region-wide telecommunications regulation best practices by market players to provide regulatory certainty
- 2.4 Ensure adequate international Internet connectivity
- 2.5 Reduce the carbon footprint of telecommunications operators in ASEAN
- 2.6 Ensure increased and harmonized spectrum allocation across the region
- 2.7 Adopt regional policy to deliver best practice guidance on AI governance and ethics, Internet of things spectrum and technology
- 2.8 Develop regional mechanisms to encourage skills in integrated and end-to-end services
- 2.9 Establish a centre of excellence for best practice rural connectivity

#### **D03 The delivery of trusted digital services and the prevention of consumer harm**

- 3.1 Enable trust through greater and broader use of online security technologies
- 3.2 Build trust through enhanced security for finance, health care, education and government
- 3.3 Identify improvements in legal and regulatory measures on the management of protection of data and other data-related activities that could be harmful
- 3.4 Improve coordination and cooperation for regional computer incident response teams
- 3.5 Promote consumer protection and rights in relation to e-commerce

#### **D04 A sustainable competitive market for the supply of digital services**

- 4.1 Continue to identify opportunities to harmonize digital regulation to facilitate cross-border data flows
- 4.2 Deepen collaboration between ICT and competition regulatory authorities across ASEAN on the ICT sector and digital economy



4.3 Monitor developments in regulation of digital platforms in other jurisdictions

#### **D05 Increase in the quality and use of e-government services**

5.1 Establish ASEAN-wide reporting on the level of use of e-government services in line with International Telecommunications Union requirements

5.2 Help make key government departments more productive through their internal use of ICT and e-services

5.3 Explore how to introduce digital identities in each ASEAN member state (AMS) in a way that safeguards civil liberties

5.4 Help developing AMSs improve the quality of their e-government e-services

5.5 Improve the cohesion of AMSs by making key government e-services interoperable across the ASEAN region

#### **D06 Digital services to connect business and to facilitate cross-border trade**

6.1 Facilitate compliance and secure the benefits of telecommunications services and electronic commerce in line with relevant ASEAN trade agreements

6.2 Support trade digitalization through seamless and efficient flow of electronic trade documents (e.g., invoices) and goods within ASEAN

6.3 Assess the net benefits of including Industrial Revolution (IR) 4.0 technologies in trade facilitation processes

6.4 Reduce regional business travel costs by lowering roaming rates for mobile data services across ASEAN

6.5 Promote e-commerce trade in ASEAN, enhance last-mile fulfilment cooperation, and improve competitiveness in the digital economy

#### **D07 Increased capability for business and people to participate in the digital economy**

7.1 Continue to support the advancement and harmonization of ICT qualifications across ASEAN

7.2 Promote development of advanced digital skills, such as coding, hackathons and innovative challenges

7.3 Develop a framework that encourages the development and growth of digital start-ups in ASEAN

7.4 Progress the work on smart cities begun in AIM 2020

#### **D08 A digitally inclusive society in ASEAN**

8.1 Ensure citizens and businesses have the skills and motivation to use digital services

8.2 Reduce affordability barriers to getting online

8.3 Reduce accessibility barriers to getting online

8.4 Encourage deeper adoption and use of “vertical” digital services

With respect to a post-COVID-19 policy stance informed by what is called “theory of the firm”, table 14 lists the stage of regional integration under differing economic situations and desirable policy directions.

Table 14. Stage of regional integration and policy options		
Stage of regional integration	Economic situation	Desirable policy direction
Stage A	If a local ASEAN firm is entirely responsible for the return of the asset, the firm should own it.	Separate, local business operations are desirable. This is the policy option fit for pre-ASEAN Economic Community before 2015.
Stage B	If managing two firms results in an economy of scale/scope, these firms should have a common ownership (albeit in the absence of business transactions).	Policy to facilitate mergers should be adopted, creating a domestic selection effect.
Stage C	If a downstream ASEAN-based firm is supplied by its upstream firm through a global value chain (GVC) but with a small degree of trade volume (or business transactions), a non-equity mode, long-term contract relationship should exist between the two firms for efficient operations (in terms of managerial capacities and principal-agent incentives).	Policy to facilitate cross-border business transactions should be adopted, creating a cross-border learning effect.
Stage D (with/after COVID-19)	If the industry is declining in terms of market demand, the firms should merge to save on overhead costs (in connection to headquarter functions, including adoption of emerging digital technologies)	Policy to facilitate cross-border mergers of digital / ICT firms could be adopted, creating intra-ASEAN digital breakthroughs.

Source: Made by the authors based on Williamson (1985), Hart (1991) and Urata and Baek (2021).

As in the table, four stages of policy directions can be conceptualized in connection to the degree of regional integration by ASEAN. The focus here is Stage D, *i.e.*, with/after COVID-19. Computer and related services as an input industry (supplying application software products as intermediate inputs for manufacturing and service-supplying firms) is declining overall in the face of COVID-19. As smaller-scale firms, which possess entrepreneurial spirit, tend to face relatively higher overhead costs (*e.g.*, fixed-asset tax, utility bills and insurance costs, aside from direct production costs), reduction of these indirect costs would become a top priority. In this situation, integrating (or merging) existing companies would be better; considering the dynamically changing advancement of computer-related technologies (including 5G and 6G telecommunication standards that enable widespread use of network-connected non-telephone devices across society), cross-border integration between ASEAN firms and those outside ASEAN countries (including Australia, China, Japan, New Zealand and Republic of Korea, *i.e.*, ASEAN's trade partners under RCEP) would be a feasible policy option. When security of in-house technology becomes a sensitive issue, a non-equity mode alliance with some degree of technological cross-licensing under a long-term contract would be another desirable option for business firms in the computer and related services sector.

From the perspective of GVCs, digital technologies as computer services can facilitate manufacturing and other service activities spanning multiple ASEAN and non-ASEAN countries. Benefits of GVCs include the following: They (1) optimize global allocation of production resources and greatly increase the productivity and market value of companies in developed countries; (2) encourage developing countries to participate in the international production system and create domestic employment (including skilled and unskilled labor, according to the comparative advantage of the country) and help economic development through technology transfer; (3) enable consumers to obtain a wide variety of foreign products at low prices and (4) contribute to stabilizing international relations, increasing cross-border communication and reducing the risk

of mutual distrust<sup>6</sup>. Thus, post-COVID-19 recovery for ASEAN members should be pursued with a greater degree of participation in GVCs.

In connection with concrete promotional measures, representatives of ASEAN member states discussed and provided various policy options to promote trade in ICT services at the second Seminar on Promoting Services Trade in ASEAN Member States (for telecommunication services and computer and related services specifically) on 23–25 February 2017. Box 6 details a list of policy options suggested by ASEAN member state representative at the seminar.

#### **Box 6. Policy options suggested by ASEAN member state representatives for promoting trade in telecommunication services and computer and related services**

These policy options are categorized along the most updated list of ICT indicators approved by the International Telecommunications Union.<sup>7</sup> To ensure anonymity, names of member states are intentionally not disclosed.

##### ***(1) ICT infrastructure and access***

- Affordable connectivity nationwide
- Reduced roaming charges
- Reduced cost of Internet for public and/or end users; increased speed of Internet lines and reduced tariff and non-tariff barriers that inhibit Internet trade among ASEAN countries
- Harmonized domestic and international legislation
- Establishment of market competition at an affordable price
- Strong policy for liberalization of telecommunication market
- Infocomm Media 2025 plan, which seeks to address shortcomings related to infrastructure and access
- A new economic model aimed at pulling the country out of the middle-income trap and developing it as a high-income country
- Three elements that mark a significant change in a country's economy and production:
  - The first aims to enhance the country's standing to become a high-income nation through developing as a knowledge-based economy, with an emphasis on research and development, science and technology, creative thinking and innovation.
  - The second moves towards an inclusive society with equitable access to prosperity and development.
  - The third focuses on sustainable growth and development, without destroying the environment.

<sup>6</sup> Remark by Satoshi Inomata (<https://www.rieti.go.jp/jp/events/bbl/20051501.html>).

<sup>7</sup> ITU, "Core List of ICT Indicators, March 2016 Version", [http://www.itu.int/en/ITU-D/Statistics/Documents/coreindicators/Core-List-of-Indicators\\_March2016.pdf](http://www.itu.int/en/ITU-D/Statistics/Documents/coreindicators/Core-List-of-Indicators_March2016.pdf).

- Tight management of service prices
- Consideration of this area as the core sector to encourage
- Acceleration of the application of ICT in government management systems
- Digital economy and society development plan consisting of six strategic actions as follows:
  - Build country-wide high-capacity digital infrastructure
  - Boost the economy with digital technology
  - Create a quality and equitable society through digital technology
  - Transform into digital government
  - Develop workforce for the digital era
  - Build trust and confidence in the use of digital technology.

### ***(2) ICT access and use by households and individuals***

- Establish regional e-commerce platform
- Build a national digital payment system
- Build trust and confidence through data security, data protection and privacy
- Provide free Wi-Fi in public areas
- Get more involvement from housewives, students and the rural population
- Establish universal service obligation policy
- Establish telecommunication plan
- Establish licensing for permission for telecommunication and/or Internet service providers and operators
- Ensure transparency in licensing procedures
- Strengthen services introduction to local households and individuals through free public services channels (telephone, Internet, TV, cable, *etc.*)
- Prepare a digital economy and society development plan.

### ***(3) ICT access and use by enterprises***

- Increase awareness of ICT benefits to businesses; *e.g.*, cloud computing
- Encourage businesses to have extranet services
- Establish regional e-commerce platform
- Provide subsidies for exportation of ICT products and services
- Facilitate exports
- Promote use of fintech
- Build a national digital payment system

- Build trust and confidence through data security, data protection and privacy
- Provide affordable, fast and reliable connectivity
- Improved performance of supporting enablers such as logistics, digital banking and offline banking
- Prepare ICT master plan
- Establish law and regulations regarding e-commerce and cyber security
- Follow practices such as System, Applications and Product and Enterprise Resource Planning
- Encourage the use of ICT in every sector
- Expand scope for improvement by building stronger digital capabilities for enterprises, especially among SMEs; prepare digital economy and society development plan and quickly publish laws and circulars on e-commerce transactions, IT and intellectual property.

#### ***(4) ICT sector and trade in ICT goods***

- Development of attractive investment incentives for foreign ICT companies, experts and value chains in focus areas:
  - Incentives for research and development in focus areas
  - Embassy assistance to facilitate trade
  - Establishment of shared innovation facilities
  - Business matching programs in focus areas
  - Establishment of technology and knowledge transfer system
  - Introduction of Industry 4.0 program
  - Seeking of opportunities in global value chains
  - Promotion of innovative local and foreign start-ups
- Universal categorization system for ICT goods that enables accurate data collection and supports comparative and qualitative analysis
- Standardization of ICT goods
- Export promotion in ICT goods
- Government encouragement of the ICT sector
- Cooperation that harmonizes government and private sector efforts
- Building of stronger digital capabilities for trade, especially among SMEs
- Strengthening of international cooperation (experts exchange, training seminars, exhibition, business matching and so on).

***(5) ICT in education***

- Increase science, technology, engineering and mathematics passing rate
- Produce Industry 4.0-ready workforce
- Promote e-learning
- Improve ICT services for education as early as from secondary school (for governments)
- Increase usage and appreciation of ICT as a tool in education
- Provide e-library in every school, especially in primary schools, through cooperation with ministries and government
- Provide multimedia classroom facilities in school and universities
- Reduce the digital divide between urban and rural areas
- Beyond young students, support continual workforce skills upgrading through the Skills Future movement, which provides re-training programs to equip citizens of all ages with skills relevant to the future economy
- Consider pricing subsidy for the education sector
- Encourage sponsorship for local and remote area.

***(6) ICT in government***

- Enhance marketing of the country's value propositions to investors and experts
- Enhance open data platform
- Improve e-government services
- Continually improve ICT skills for government employees in various sectors
- Implement according to the e-government master plan
- Promote cooperation between line ministries and other related fields
- Develop human resources in ICT fields to nurture ICT-skillful persons
- Improve cyber security to develop deeper capabilities in analytics and to strengthen engagement with citizens via online and mobile platforms
- Implement Digital Government Master Plan (2016–2018).

***(a) Database construction for trade in ICT services***

- Set up committee to enhance existing online business registration platform
- Gather baseline data
- Improve technology and human resources and build capacity
- Establish a secured framework and infrastructure of personal data protection
- Promote digital trade and data security principles
- Improve data compilation at the company level and compile data from micro companies

- Establish cyber law
- Make enhanced cyber security a best practice with the cooperation of ASEAN and dialogue partners
- Establish a national ICT web portal
- Promote digital trade
- Establish data security principles
- Establish network security best practices
- Build country-wide high-capacity digital infrastructure
- Build trust and confidence in the use of digital technology
- Strengthen data and network security capacity.

***(b) Addressing of the digital divide in the form of capacity building as economic cooperation***

- Enhance capacity-building programs for micro companies and SMEs
- Strengthen capacity building between ASEAN and Japan
- Develop ICT human resources and promote e-service delivery
- Promote and/or encourage economic cooperation activities in business contract negotiations (after-sales capacity-building work programs that allow for technology transfer)
- Develop human resource development to nurture skillful ICT persons
- Provide ICT infrastructure
- Promote ICT awareness through seminars and workshops to close the digital divide
- Address digital divides
- Develop smart cities
- Track new technology trends
- Build country-wide, high-capacity digital infrastructure
- Create a quality and equitable society through digital technology
- Ensure inclusive and equal access to digital technology
- Develop digital literacy and/or media and information literacy
- Create local digital content and knowledge resources
- Provide education opportunities with digital technology
- Increase access to health care with digital technology.

***(c) Participation of SMEs***

- Support and facilitate the exportation of innovative ICT products and services

- Provide embassy assistance to facilitate trade
- Provide holistic outreach programmer for micro, small and medium-sized enterprises (MSMEs) on free trade agreements
- Include MSMEs in policy and regulatory reforms
- Expose MSMEs to participation in capacity-building programs within ASEAN, Asia-Pacific Economic Cooperation, etc.
- Nurture and provide access and framework for start-ups
- Harmonize regulations, broadband access and affordability, interoperability and infrastructure resilience best practices
- Establish measures to enable the security of the supply chain; measures that encourage cost-efficiency in the available ICT infrastructure—competitive rates and fast service
- Recognize the importance of SMEs, which are the core of national economic development
- Promote the SMEs sector by using ICT that can benefit national economic development
- Provide e-commerce platform that can encourage SMEs, start-ups and entrepreneurs in business development and market penetration
- Prepare systematic road map for SMEs
- Nurture ICT products and services trade
- Enhance infrastructure resilience with best practices
- Establish Cloud computing platform
- Raise capacity and competitiveness in all economic sectors with digital technology, including agriculture, manufacturing and services, with a strong focus on SMEs and community businesses
- Boost the economy with digital technology
- Create and foster digital technology start-ups
- Promote more SMEs in agriculture, manufacturing and services sectors to leverage digital technology to compete regionally and globally
- Create policies to lower roaming charges
- Publish law on SME support
- Build competitiveness capacity (seminars, training workshops and international experiences exchange)
- Support SMEs in trade promotion and market access information.

***(d) Implementation of ICT farming***

- Public-private-people partnership with Japan on innovative farming solutions by local universities
- Learning from countries with best practices, especially Japan



- Equipment of remote areas with ICT facilities
- Sustainable and green ICT practices
- Limited ICT farming, which requires measures to increase awareness of ICT in selected strategic segments (*e.g.*, aquaculture)
- Need to promote awareness of ICT farming through seminars, exhibitions and television programs
- Support for round-the-clock continuous electricity
- Financial support by government and development partners from international organizations
- Sustainable and green ICT practices
- Supportive ecosystem development
- Strong focus on SMEs and community business to raise capacity and competitiveness in all economic sectors with digital technology, including agriculture, manufacturing and services
- Invitation to international farming expert to introduce and train on ICT applications in farming
- Publication of new policies to support farmers in applying ICT to production processes and daily life
- Encouragement of ICT providers to build up particularly favourable subscriptions for farmers
- Building of a mechanism to accelerate ICT enterprises to develop new farming applications.

Services drive productivity growth and require both fixed investment in building and in digital/ICT technologies (ASEAN and the World Bank, 2015). Utilizing digital/ICT technology for ASEAN-wide productivity improvement is a cross-cutting policy issue and not just for a single line ministry mandated to cover ICT services. A major hindering factor for most ASEAN member states at present seems to be the low level of in-country and international coordination to capture digital/ICT-based network externalities. An ASEAN-wide implementation of concrete projects could be launched, possibly coordinated by international organizations and led by ASEAN member states.

Further, implementing digital/ICT-related activities would not only contribute to intra-ASEAN promotion of trade in digital/ICT services but also effectuate the use of RCEP among ASEAN member states and their dialogue partners (Japan included). Although technological advances in computer and related services normally overwhelm the effectiveness of policy-driven productivity improvement, policymakers in ASEAN member states have much to do to capture the technological advances in computer and related services, a highly promising market for trade expansion.

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## Annexes:

# Specific Schedule of Commitments for “Computer and Related Services” Under AFAS (10th package, signed in November 2018) by ASEAN Members and Under RCEP (Signed in 2020) by ASEAN Members and Their Five Dialogue Partners

Note: Only tables for ASEAN members are included here.

Legend for these annexes:

(1) means Mode 1 (cross-border supply of services); (2) means Mode 2 (consumption abroad); (3) means Mode 3 (commercial presence); and (4) means Mode 4 (movement of natural persons).

MA means market access; NT means national treatment.

The meaning of the alphabetical classification in the right-hand column of each specific commitment table is as follows:

N: none (no restriction)

A: limitations on the number of service suppliers, whether in the form of numerical quotas, monopolies, exclusive service suppliers or the requirements of an economic needs test

B: limitations on the total value of service transactions or assets in the form of numerical quotas or the requirement of an economic needs test

C: limitations on the total number of service operations or on the total quantity of service output expressed in terms of designated numerical units in the form of quotas or the requirement of an economic needs test<sup>8</sup>

D: limitations on the total number of natural persons who may be employed in a particular service sector or who a service supplier may employ and who are necessary for, and directly related to, the supply of a specific service in the form of numerical quotas or the requirement of an economic needs test

E: measures that restrict or require specific types of legal entity or joint venture through which a service supplier may supply a service

F: limitations on the participation of foreign capital in terms of maximum percentage limit on foreign shareholding or the total value of individual or aggregate foreign investment” (Part III: Specific Commitments, Article XVI: Market Access, subparagraph 2).

<sup>8</sup> Subparagraph 2(c) does not cover measures of a member that limit inputs for the supply of services.

Under AFAS, ASEAN member states do not actually use restriction types A, B and C in the sector "Computer and Related Services". In addition to these six types of market-access restrictions, the following two restrictions are observed:

G: Government approval requirement

H: Tax or fee payment requirement.

## Annex A. Specific Commitment Tables for Computer and Related Services Under AFAS (10th package)

### Brunei Darussalam

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
Consultancy services related to the installation of computer hardware (CPC 841)	(3) None	(3) N	(3) None	(3) N
Software implementation services (CPC 842)				
Data processing services (CPC 843)				
Database services (CPC 844)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) Commercial presence is permitted only through a company that is registered in Brunei Darussalam with foreign equity not exceeding 70%.	(3) EF70	(3) None	(3) N
Maintenance and repair services of office machinery and equipment including computers (CPC 845)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) None	(3) N	(3) None	(3) N
Other computer services (CPC 849)				

## Cambodia

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>				
(a) Consultancy services related to the installation of computer hardware (CPC 841)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) None	(3) N	(3) None	(3) N
(b) Software implementation services (CPC 842)				
(c) Data processing services (CPC 843)				
(d) Database services (CPC 844)				
(e) Other (CPC 845+849)				

## Indonesia

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>				
Consultancy services related to the installation of computer hardware (CPC 841)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) Aggregate foreign equity participation is permitted up to 70% provided that up to 49% is through foreign direct investment and the remaining percentage through other mechanisms	(3) EF49	(3) None	(3) N
Software implementation services (CPC 842)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) Aggregate foreign equity participation is permitted up to 70% provided that up to 49% is through foreign direct investment and the remaining percentage through other mechanisms	(3) EF49	(3) None	(3) N

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
Input preparation services (CPC 84310)	(1) None (2) None (3) Joint venture with foreign equity participation not exceeding 70%	(1) N (2) N (3) EF70	(1) None (2) None (3) None	(1) N (2) N (3) N
System analysis services (CPC 84320)	(1) None (2) None	(1) N (2) N	(1) None (2) None	(1) N (2) N
Time sharing services (CPC 84330)	(3) Only through a locally incorporated joint-venture corporation in the form of Limited Liability Enterprise (Perseroan Terbatas/ PT) with Indonesian individuals or Indonesian-controlled corporations or both and the aggregate foreign shareholding in the joint-venture corporation shall not exceed 49%	(3) EF49	(3) None	(3) N
Other data processing services (CPC 84390)				
Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
Database services (CPC 84400*)	(1) None (2) None (3) Aggregate foreign equity participation is permitted up to 70% provided that up to 49% is through foreign direct investment and the remaining percentage through other mechanisms	(1) N (2) N (3) EF49	(1) None (2) None (3) None	(1) N (2) N (3) N
Maintenance and repair services of office machinery and equipment including computers (CPC 845)	(1) None (2) None (3) Only through a locally incorporated joint-venture corporation in the form of Limited Liability Enterprise (Perseroan Terbatas/ PT) with Indonesian individuals or Indonesian-controlled corporations or both and the aggregate foreign shareholding in the joint-venture corporation shall not exceed 49%	(1) N (2) N (3) EF49	(1) None (2) None (3) None	(1) N (2) N (3) N

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
Other computer services (CPC 849)	(1) None (2) None (3) Only through a locally incorporated joint-venture corporation in the form of Limited Liability Enterprise (Perseroan Terbatas/PT) with Indonesian individuals or Indonesian-controlled corporations or both and the aggregate foreign shareholding in the joint-venture corporation shall not exceed 49%	(1) N (2) N (3) EF49	(1) None (2) None (3) None	(1) N (2) N (3) N

#### Lao People's Democratic Republic

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N
Consultancy services related to the installation of computer hardware (CPC 841)				
Software implementation service (CPC 842)				
Database services (CPC 844)				
Data processing services, excluding sensitive data and for non-commercial purpose (CPC 843)				
Other: Maintenance and repair services of computer (Part of CPC 84500)				



## Malaysia

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>	(1) None	(1) N	(1) None	(1) N
a. Consultancy services related to the installation of computer hardware [CPC 841]	(2) None	(2) N	(2) None	(2) N
b. Software implementation service [CPC 842]	(3) None	(3) N	(3) None	(3) N
c. Data processing services [CPC 843]				
d. Database services [CPC 844/84400]				
e. Other <ul style="list-style-type: none"> <li>•Maintenance and repair services of office machinery and equipment including computers [CPC 845]</li> <li>•Data preparation services from clients not involving data processing services [CPC 84910]</li> <li>•Other computer services not elsewhere classified [CPC 84990**]: <ul style="list-style-type: none"> <li>- Covering training services for staff of clients; data recovery services and development of creative content.</li> </ul> </li> </ul>				

## Myanmar

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>				
a. Consultancy services related to the installation of computer hardware (CPC 841)	(1) None	(1) N	(1) None.	(1) N
	(2) None	(2) N	(2) None.	(2) N
	(3) Commercial presence of foreign service suppliers and/or providers are permitted in accordance with the Myanmar Investment Law (2016) of the Republic of the Union of Myanmar. The investment may be carried out in any of the following forms: i. Carrying out an investment by a foreigner with 100% foreign capital on the business permitted by the Commission ii. Carrying out a joint venture between a foreign and a citizen or the relevant government department and organization iii. Carrying out by any system contained in the contract approved by both parties.	(3) E	(3) a. Foreign service suppliers and/or providers must comply with existing laws, rules and regulations concerning investment, taxation, immigration and labour. b. Foreign organizations and persons are not allowed to own land in Myanmar; however, land may be on long-term lease, depending on the individual circumstances.	(3) DE
b. Software implementation services (CPC 842) System and software consulting services (CPC 8421) System analysis services (CPC 8422) System design services (CPC 8423) Programming services (CPC 8424) System maintenance services (CPC 8425)				
c. Data processing services (CPC 843) Input preparation services (CPC 8431) Data processing and tabulation services (CPC 8432) Time-sharing services (CPC 8433) Other data processing services (CPC 8439)				

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
d. Database services (CPC 844)				
e. Other (CPC 845, CPC 849) Maintenance and repair services of office machinery (CPC 845) Other computer services (CPC 849) Data preparation services (CPC 8491) Other computer services (CPC 8499) System integration services software development services				

## Philippines

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>				
Consultancy services related to the installation of computer hardware* (CPC 841)	(1) None.	(1) N	(1) None	(1) N
	(2) None.	(2) N	(2) None	(2) N
	(3) 100% foreign equity participation is allowed.	(3) N	(3) None	((3) N
Software implementation services (CPC 842)**	(1) None.	(1) N	(1) None	(1) N
	(2) None.	(2) N	(2) None	(2) N
	(3) 100% foreign equity participation is allowed.	(3) N	(3) None	(3) N
Data processing services (CPC 843)	(1) None. (2) None.	(1) N (2) N	(1) None (2) None	(1) N (2) N
Database services (CPC 844)	(3) 100% foreign equity participation is allowed.	(3) N	(3) None	(3) N
Others (CPC 845, CPC 849)				

## Singapore

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of MA
<b>B. Computer-Related Services</b>				
Consultancy services related to the installation of computer hardware (CPC 84100)	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N
Software implementation services (CPC 842)	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N
Information technology consultancy services	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N
Data processing services	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N
Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
Database services (CPC 84400)	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N
Maintenance and repair services of computers	(1) None (2) None (3) None	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N

## Thailand

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
<b>B. Computer and Related Services</b>				
(a) Consultancy services related to the installation of computer hardware (CPC 841)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section	(1) N (2) N (3) EF49	(1) None (2) None (3) None	(1) N (2) N (3) N
Hardware consultancy services (CPC Version 1.1: part of 83141)	(1) None (2) None (3) As indicated in 3.1 of the horizontal section	(1) N (2) N (3) EF70	(1) None (2) None (3) None	(1) N (2) N (3) N

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
(b) Software implementation services (CPC 842)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section	(1) N (2) N (3) EF49	(1) None (2) None (3) None	(1) N (2) N (3) N
Software consultancy services (CPC Version 1.1: part of 83142)	(1) None (2) None (3) As indicated in 3.1 of the horizontal section	(1) N (2) N (3) EF70	(1) None (2) None (3) None	(1) N (2) N (3) N
(c) Data processing services (excluding those provided over public telecommunications network) (CPC 843)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section	(1) N (2) N (3) EF49	(1) None (2) None (3) None	(1) N (2) N (3) N
Data processing services (excluding those provided over public telecommunications network) (CPC Version 1.1: 85960)	(1) None (2) None (3) As indicated in 3.1 of the horizontal section	(1) N (2) N (3) EF70	(1) None (2) None (3) None	(1) N (2) N (3) N
Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
(d) Database services (excluding those provided over public telecommunications network) (CPC 844)	(1) None (2) None (3) As indicated in 3.1 of the horizontal section	(1) N (2) N (3) EF70	(1) None (2) None (3) None	(1) N (2) N (3) N
(e) Other computer services: Maintenance and repair services of office machinery and equipment including computers (CPC 84500)	(1) None (2) None (3) As indicated in 3.1 of the horizontal section	(1) N (2) N (3) EF70	(1) None (2) None (3) None	(1) N (2) N (3) N

### Viet Nam

Sector or Subsector	Limitation on Market Access	A-H Classification of MA	Limitation on National Treatment	A-H Classification of NT
Computer and related services (CPC 841-845, CPC 849)	(1) None (2) None (3) None, branching is allowed.	(1) N (2) N (3) N	(1) None (2) None (3) None	(1) N (2) N (3) N

Source: <https://cil.nus.edu.sg/database/cil/2018-protocol-to-implement-the-tenth-package-of-commitments-under-the-asean-framework-agreement-on-services/>

## Annex B. Specific Commitment Tables or Reservation Tables for Computer and Related Services Under RCEP

### Brunei Darussalam

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12. Sector	: Business Services
Subsector	: Computer and Related Services
Type of Obligation	: National Treatment (Article 8.4 and Article 10.3) Market Access (Article 8.5)
Description of Measure	: <u>Trade in Services and Investment</u> A foreign national or enterprise may not provide computer and related services through a commercial presence unless they are ordinarily resident in Brunei Darussalam and through an enterprise established in Brunei Darussalam.
Source of Measure	: <i>Companies Act (Chapter 39)</i> <i>Authority for Info-Communications Technology Industry of Brunei Darussalam Order, 2001</i> Administrative Measures and Guidelines

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### Cambodia

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
a) Consultancy services related to the installation of computer hardware (CPC 841)	(1)None (2)None (3)None	(1) N (2) N (3) N	(1)None (2)None (3)None	(1) N (2) N (3) N
b) Software implementation services (CPC 842)	(4) Unbound except as indicated in the horizontal commitments	(4) U	(4) Unbound except as indicated in the horizontal commitments	(4) U
c) Data processing services (CPC 843)				
d) Database services (CPC 844)				
e) Other (CPC 845 + 849)				

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**Indonesia**

17. Sector	: Computer and Related Services
Subsector	: Consultancy Services Related to the Installation of Computer Hardware (CPC 841)
Type of Obligation	: National Treatment (Article 8.4) Market Access (Article 8.5)
Description	: <u>Trade in Services</u> Indonesia reserves the right to adopt or maintain any measure with respect to trade in services as defined in subparagraph (r)(i) of Article 8.1 (Definitions).  Indonesia reserves the right to adopt or maintain any measure with respect to trade in services as defined in subparagraph (r)(iii) of Article 8.1 (Definitions) that require supply through commercial presence to be in the form of joint operation requirement through a representative office in Indonesia and the domestic partner must be a member of an Indonesian consultant association.
18. Sector	: Computer and Related Services
Subsector	: Software Implementation Services (CPC 842) only for CPC 84210
Type of Obligation	: National Treatment (Article 8.4) Market Access (Article 8.5)
Description	: <u>Trade in Services</u> Indonesia reserves the right to adopt or maintain any measure with respect to trade in services as defined in subparagraph (r)(iii) of Article 8.1 (Definitions) that requires supply through commercial presence to be subject to following conditions:  (a) only through a locally incorporated joint venture corporation in the form of Limited Liability Enterprise ( <i>Perseoran Terbatas</i> ) with Indonesian individuals or Indonesian-controlled corporations or both;  (b) shall apply to foreign services supplier with capital value above IDR 100 billion, and investment value above IDR 15 billion; and  (c) the domestic partner must be member of Indonesian consultant association.
19. Sector	: Computer and Related Services
Subsector	: Database Services (CPC 844) only for advance database services
Type of Obligation	: National Treatment (Article 8.4) Market Access (Article 8.5)
Description	: <u>Trade in Services</u> Indonesia reserves the right to adopt or maintain any measure with respect to trade in services as defined in subparagraph (r)(i) of Article 8.1 (Definitions).  Indonesia reserves the right to adopt or maintain any measure with respect to trade in services as defined in subparagraph (r)(iii) of Article 8.1 (Definitions) that requires supply through commercial presence to be subject to following conditions:  (a) only through a locally incorporated joint venture corporation in the form of Limited Liability Enterprise ( <i>Perseoran Terbatas</i> ) with Indonesian individuals or Indonesian-controlled corporations or both and joint venture with domestic ownership of the data;  (b) shall apply to foreign services supplier with capital value above IDR 100 billion, and investment value above IDR 15 billion; and  (c) the domestic partner must be member of Indonesian consultant association.

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20. Sector	: Computer and Related Services
Subsector	: Maintenance and Repair Services of Office Machinery and Equipment Including Computers (CPC 845)
Type of Obligation	: National Treatment (Article 8.4) Market Access (Article 8.5)
Description	: <u>Trade in Services</u> Indonesia reserves the right to adopt or maintain any measure with respect to trade in services as defined in subparagraphs (r)(i) and (r)(iii) of Article 8.1 (Definitions).  Any non-conforming measure adopted or maintained after the entry into force of this Agreement in relation to the paragraph above shall be deemed to be an existing non-conforming measure and subject to paragraph 1 of Article 8.8 (Schedules of Non-Conforming Measures).

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### Lao People's Democratic Republic

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
NT computer and related services (CPC 84)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) None	(3) N	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal section	(4) U	(4) Unbound, except as indicated in the horizontal section	(4) U

### Malaysia

No listing



## Myanmar

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
a) Consultancy services related to the installation of computer hardware (CPC 841)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) None, subject to compliance with the provisions of existing rules and regulations	(3) N	(3) None	(3) N
	(4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations and ENT will be applied to all categories of natural persons, if necessary	(4) D	(4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations	(4) D
a) Software implementation services (CPC 842) <ul style="list-style-type: none"> <li>• System and software consulting services (CPC 8421)</li> <li>• System analysis services (CPC 8422)</li> <li>• System design services (CPC 8423)</li> <li>• Programming services (CPC 8424)</li> <li>• System maintenance services (CPC 8425)</li> </ul>	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) Subject to compliance with the provisions of existing rules and regulations	(3) E	(3) None	(3) N
	(4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations and ENT will be applied to all categories of natural persons, if necessary	(4) D	(4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations	(4) D

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
h) Data processing services (CPC 843) <ul style="list-style-type: none"> <li>• Input preparation services (CPC 8431)</li> <li>• Data processing and tabulation services (CPC 8432)</li> <li>• Time-sharing services (CPC 8433)</li> <li>• Other data processing services (CPC 8439)</li> </ul>	(1) None (2) None (3) Subject to compliance with the provisions of existing rules and regulations (4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations and ENT will be applied to all categories of natural persons, if necessary	(1) N (2) N (3) E (4) D	(1) None (2) None (3) None (4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations	(1) N (2) N (3) N (4) D
d) Database services (CPC 844)	(1) None (2) None (3) Subject to compliance with the provisions of existing rules and regulations (4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations and ENT will be applied to all categories of natural persons, if necessary	(1) N (2) N (3) E (4) D	(1) None (2) None (3) None (4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations	(1) N (2) N (3) N (4) D

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
(a) Other (CPC 845, 849)	(1) None	(1) N	(1) None	(1) N
(i) Maintenance and repair services of office machinery (CPC 845)	(2) None	(2) N	(2) None	(2) N
(ii) Other computer services (CPC 849)	(3) Subject to compliance with the provisions of existing rules and regulations	(3) E	(3) None	(3) N
• Data processing services (CPC 8491)	(4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations and ENT will be applied to all categories of natural persons, if necessary	(4) D	(4) Subject to Myanmar's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons), which complies with the provisions of existing rules and regulations	(4) D
• Other computer services (CPC 8499)				
• System integration services				
• Software development services				

## Philippines

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
a) Consultancy services related to the installation of computer hardware (CPC 8410)	(1) None.	(1) N	(1) None	(1) N
	(2) None.	(2) N	(2) None	(2) N
	(3) Up to 100% foreign equity is allowed provided that the minimum paid-in equity capital for domestic market enterprises is complied with. Otherwise, only up to 40% foreign equity is allowed. Limitations listed in the horizontal commitments shall also apply.	(3) EF40	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal commitments.	(4) U	(4) Unbound, except as indicated in the horizontal commitments	(4) U

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
b) Software implementation services (CPC 8420) - Systems and software consulting services (CPC 8421) - Systems design services (CPC 8423) - Programming services (CPC 8424)	(1) None.	(1) N	(1) None	(1) N
	(2) None.	(2) N	(2) None	(2) N
	(3) Up to 100% foreign equity is allowed provided that the minimum paid-in equity capital for domestic market enterprises is complied with. Otherwise, only up to 40% foreign equity is allowed. Limitations listed in the horizontal commitments shall also apply.	(3) EF40	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal commitments.	(4) U	(4) Unbound, except as indicated in the horizontal commitments	(4) U
c) Data processing services (CPC 843), including game development	(1) None.	(1) N	(1) None	(1) N
	(2) None.	(2) N	(2) None	(2) N
	(3) Up to 100% foreign equity is allowed provided that the minimum paid-in equity capital for domestic market enterprises is complied with. Otherwise, only up to 40% foreign equity is allowed. Limitations listed in the horizontal commitments shall also apply.	(3) EF40	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal commitments.	(4) U	(4) Unbound, except as indicated in the horizontal commitments	(4) U

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
d) Database services (CPC 844)	(1) None.	(1) N	(1) None	(1) N
	(2) None.	(2) N	(2) None	(2) N
	(3) Up to 100% foreign equity is allowed provided that the minimum paid-in equity capital for domestic market enterprises is complied with. Otherwise, only up to 40% foreign equity is allowed. Limitations listed in the horizontal commitments shall also apply.	(3) EF40	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal commitments.	(4) U	(4) Unbound, except as indicated in the horizontal commitments	(4) U
e) Other computer related services (CPC 849), including online games except betting or gambling	(1) None.	(1) N	(1) Unbound	(1) U
	(2) None.	(2) N	(2) None	(2) N
	(3) Up to 100% foreign equity is allowed provided that the minimum paid-in equity capital for domestic market enterprises is complied with. Otherwise, only up to 40% foreign equity is allowed. Limitations listed in the horizontal commitments shall also apply.	(3) EF40	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal commitments	(4) U	(4) Unbound	(4) U

## Singapore

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42. Sector	: All
Subsector	: -
Industry Classification	: -
Type of Reservation	: Most-Favoured-Nation Treatment (Article 8.6 and Article 10.4)
Description	: <u>Trade in Services and Investment:</u> Singapore reserves the right to adopt or maintain any measure that accords differential treatment to countries under any bilateral or multilateral international agreement in force or signed prior to the date of entry into force of this Agreement.*  Singapore reserves the right to adopt or maintain any measure that accords differential treatment to Member States of ASEAN under any international agreement in force or signed after the date of entry into force of this Agreement.  Singapore reserves the right to adopt or maintain any measure that accords differential treatment to countries under any international agreement in force or signed after the date of entry into force of this Agreement involving:  D. aviation matters, including air services; E. maritime and services auxiliary to maritime matters; and port matters; F. land transport matters; G. postal and courier services matters; H. telecommunications and information technology matters; I. electronic commerce matters; and J. environmental matters.  * For greater certainty, the wording in this paragraph extends to any differential treatment accorded to a country pursuant to a subsequent review or amendment of the relevant bilateral or multilateral agreement mentioned in this paragraph.
Existing Measure	: -

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## Thailand

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
a) Consultancy services related to the installation of computer hardware (CPC 841)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) As indicated in 3.3 of the horizontal section (foreign equity participation must not exceed 70% of the registered capital or unless otherwise specified in the sector-specific commitments)	(3) F70	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal section	(4) U	(4) Unbound, except as indicated in the horizontal section	(4) U
- Hardware consultancy services (CPC Version 1.1: 83141**)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) As indicated in 3.3 of the horizontal section	(3) F70	(3) None	(3) N
	(4) Unbound	(4) U	(4) Unbound	(4) U
b) Software implementation services (CPC 842)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) As indicated in 3.3 of the horizontal section	(3) F70	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal section	(4) U	(4) Unbound, except as indicated in the horizontal section	(4) U
- Software consultancy services (CPC 1.1: 83142**)	(1) None	(1) N	(1) None	(1) N
	(2) None	(2) N	(2) None	(2) N
	(3) As indicated in 3.3 of the horizontal section	(3) F70	(3) None	(3) N
	(4) Unbound	(4) U	(4) Unbound	(4) U

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
c) Data processing services (excluding those provided over public telecommunications network) (CPC 843)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section (4) Unbound, except as indicated in the horizontal section	(1) N (2) N (3) F70  (4) U	(1) Unbound (2) None (3) None  (4) Unbound, except as indicated in the horizontal section	(1) U (2) N (3) N  (4) U
- Data processing services (excluding those provided over public telecommunications network) (CPC Version 1.1: 85960)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section (4) Unbound	(1) N (2) N (3) F70  (4) U	(1) None (2) None (3) None  (4) Unbound	(1) N (2) N (3) N  (4) U
d) Database services (excluding those provided over public telecommunications network) (CPC 844)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section (4) Unbound, except as indicated in the horizontal section	(1) N (2) N (3) F70  (4) U	(1) None (2) None (3) None  (4) Unbound, except as indicated in the horizontal section	(1) N (2) N (3) N  (4) U
e) Other computer services: - Software training services for staff of clients (part of CPC 849)	(1) None (2) None (3) As indicated in 3.3 of the horizontal section (4) Unbound, except as indicated in the horizontal section	(1) N (2) N (3) ***  (4) U	(1) None (2) None (3) None  (4) Unbound, except as indicated in the horizontal section	(1) N (2) N (3) N  (4) U



Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
- Maintenance and repair services of office machinery and equipment, including computers (CPC 845)	(1) None	(1) N	(1) Unbound	(1) U
	(2) None	(2) N	(2) None	(2) N
	(3) As indicated in 3.1 of the horizontal section (foreign equity participation must not exceed 49% of the registered capital or unless otherwise specified in the sector-specific commitments; and the number of foreign shareholders must be less than half of the total number of shareholders)	(3) EF49	(3) None	(3) N
	(4) Unbound, except as indicated in the horizontal section	(4) U	(4) Unbound, except as indicated in the horizontal section	(4) U

### Viet Nam

Sector or Subsector	Limitations on Market Access	A-H Classification of MA	Limitations on National Treatment	A-H Classification of NT
Computer and Related Services (CPC 841-845, CPC 849)	(1) None.	(1) N	(1) None.	(1) N
	(2) None.	(2) N	(2) None.	(2) N
	(3) None. Branching is allowed.	(3) N	(3) The chief of the branch has to be a resident of Viet Nam.	(3) D
	(4) Unbound, except as indicated in Viet Nam's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons).	(4) U	(4) Unbound, except as indicated in Viet Nam's Schedule in Annex IV (Schedules of Specific Commitments on Temporary Movement of Natural Persons).	(4) U

Source: RCEP website (<https://rcepsec.org/legal-text/>).

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