Gauging Readiness for Digital Economy Agreements

Taojun XIE

Mark CHAN

Keith DETROS

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Executive Summary

The Digital Economy Agreement (DEA) is a new kind of free trade agreement that deals specifically with establishing interoperable rules in digital trade among countries. DEAs aim to enable cross-border data flows and facilitate innovation in digital business models while protecting data and maintaining trust in the digital systems. Singapore has been at the forefront of signing DEAs and has current agreements with Chile, New Zealand, and Australia. Negotiations for a similar formal treaty with Republic of Korea, United Kingdom, and Vietnam are on-going. Given the importance of laying down the foundations of international standards and benchmarks for digital trade, it is expected that Singapore will continue to seek digital partnership with key economies around the globe.

This technical policy report aims to establish a DEA Readiness Framework to gauge how ready is a particular economy in signing a DEA with Singapore. Taking off from the existing DEAs, the framework looks at five policy areas or "modules": artificial intelligence, data regulations, digital payments and identification, open government data, and paperless trade. Thirty (30) indicators were selected across the five modules to offer an assessment whether each policy area is ready to move forward with formal negotiations or not. DEAs are modular in nature and one module can move first forward in negotiations independent of the others. Hence, the DEA Readiness framework does not offer an overall index for a country, but instead an assessment score for each of the module.

DEA module can also be classified into three layers: digital interoperability, digital rules, and emerging technologies such as artificial intelligence and innovation. This study streamlines the layers into two categories: *fundamental* modules and *nascent* policies module. Data regulations, digital payments and identification, and paperless trade fall into the fundamental category. On the other hand, the artificial intelligence and open government data modules are considered as nascent policies.

In general, the DEA Readiness Framework is a tool to help identify countries with the most potential to conclude DEAs with Singapore and specific policy modules that can serve as a starting point for negotiations. Applying framework to ASEAN-6 economies and using Chile, New Zealand, and Australia as a benchmark, Singapore can start formal discussions with its regional neighbors in the fundamental aspect of data regulations including cross-border data flows. Singapore can also leverage its expertise to help shape the emerging policy issues of AI governance in ASEAN. On the other hand, digital payments and identification systems will face the most challenge in interoperability given the wide gap and varying levels of development among the ASEAN-6 economies.

1. BACKGROUND

Digital economy agreements (DEA) are a new form of government-to-government economic engagements which seek to establish digital trade rules and allow for digital economy collaborations between countries (MTI, 2020). With the pandemic rapidly accelerating the adoption of digital business models, DEAs are seen as a tool to fill gaps in international standards especially in emerging technologies and policy areas such as artificial intelligence and digital identities. In particular, DEAs seek to:

  i.   align digital rules and standards, and facilitate interoperability between digital systems;
  ii.   support cross-border data flows and safeguard personal data and consumer rights; and
  iii. encourage cooperation among economic partners in nascent areas.

Singapore aims to forge DEAs with key economic partners as a complement to its network of free trade agreements and international initiatives (MTI, 2020). As of 2020, there are two DEAs that Singapore has signed and are currently in-force. The Digital Economy Partnership Agreement (DEPA) with Chile and New Zealand, signed in June 2020, is the first DEA concluded. The DEPA seeks to address differences in policy regimes and issues related to digitalization. The second DEA is the Singapore-Australia Digital Economy Agreement (SADEA) which was formalized in August 2020. The SADEA builds on the existing free trade agreement between Singapore and Australia and included seven Memorandum of Understanding (MOUs) to clearly define the collaboration efforts of the two countries.

Singapore plans to continue to sign DEAs with like-minded states and are willing to move forward with countries that are "most able to do so first" (Goh, 2020). There are on-going negotiations for DEAs with the Republic of Korea and with the United Kingdom (MTI, 2020). The UK-Singapore DEA, should it be completed, is the first of its kind region-to-region agreement on digital trade rules. Most recently, talks for a DEA between Singapore and Vietnam has started in June 2021[1]. Given DEAs potential to establish international standards in digital trade rules, it is expected that Singapore will forge more DEAs with partner economies around the globe.

This technical policy paper aims to establish a DEA Readiness Framework to assess which countries are ready for DEA negotiations with Singapore. In addition, it hopes to determine which of the digital policy areas can move forward first with discussions for alignment. The next sections will delve deeper into the methodology including the structure of the framework and the indicators selected for each digital policy modules.

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[1] https://thediplomat.com/2021/06/vietnam-singapore-begin-negotiations-on-digital-trade-agreement/
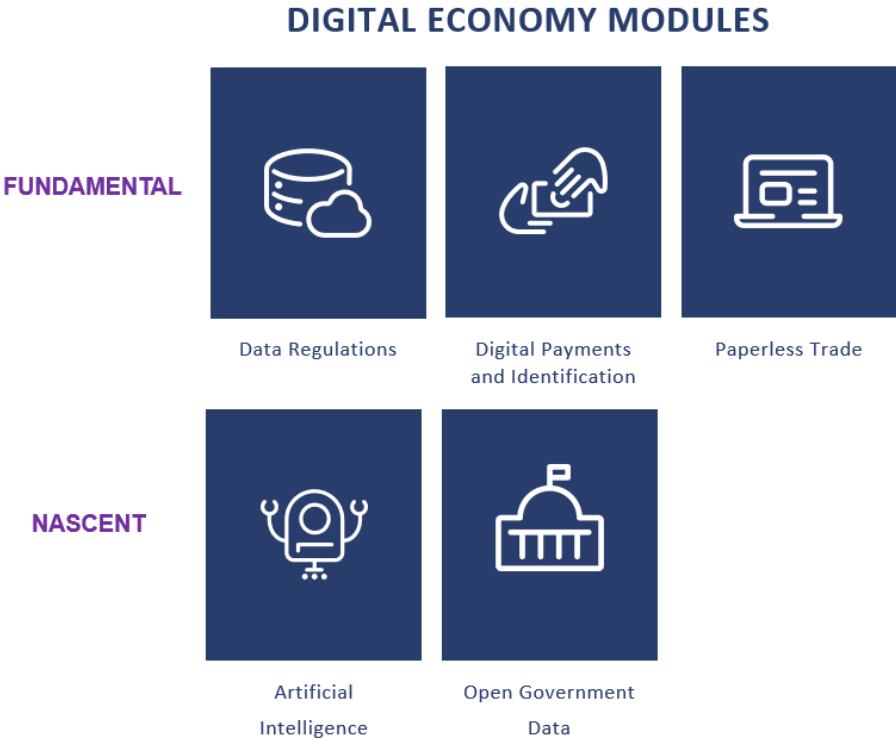
2. METHODOLOGY

The DEA Modules

This paper uses the identified areas of collaboration in existing signed partnerships as basis to gauge readiness among potential partner economies. The policy areas for alignment are called "modules". The Ministry of Trade and Industry highlighted nine modules in their website which are areas that are considered under existing DEAs and can become part of future ones (MTI, 2020). These modules include artificial intelligence governance, cross-border data flows, personal data protection, data innovation, digital identification, electronic invoicing, fintech and electronic payments, open government data, and paperless trade.

It is important to note that not all modules need to be formalized in a memorandum of understanding (MOU) in order to have a DEA with Singapore. DEAs are modular in design and specific policy areas can be signed independent of the other modules. Nonetheless, an assessment using the current modules can help identify which countries are ready for DEA discussions and which modules can move forward first.

Figure 1. DEA Readiness Framework

DIGITAL ECONOMY MODULES

FUNDAMENTAL

Data Regulations

Digital Payments and Identification

Paperless Trade

NASCENT

Artificial Intelligence

Open Government Data

Notes: Data regulations include modules on: 1) Cross-border data flows, 2) Personal Data Protection, and 3) Data Innovation. Digital payments include modules on: 1) E-invoicing, 2) Fintech and e-Payments, and 3) Digital ID.

For modules that are closely related to each other, this study has opted to combine them together to reflect the overall policy environment. For example, cross-border data flows, personal data protection, and data innovation were grouped into the Data Regulations module. In addition, e-invoicing, fintech and e-payments, and digital identification are under Digital Payments and Identification. In total, the DEA Readiness Framework has five modules for assessing of potential partner countries (Figure 1).

Using a tiered approach, the DEA modules identified are also considered into two broader categories: *fundamental* modules and *nascent policies* module. The two categories are a result of streamlining the various layers of DEAS which includes digital interoperability, digital rules, and emerging technology policy such as AI. For this study, data regulations, digital payments and identification, and paperless trade are areas considered as fundamental modules. On the other hand, artificial intelligence, and open government data fall under the nascent policies module. In essence, the fundamental categories serve as foundations for a harmonized digital trade regime between two countries, while modules in the nascent category tend to deal with emerging areas of digital trade and innovation.

Structure of the DEA Readiness Framework

The DEA Readiness Framework is designed to assess specific modules and does not compute an overall index. The framework focuses more on the score that is calculated for each module. The scores reflect a country's current state of digital capabilities and policy environment. The score is based on indicators using selected data from various sources such as the World Economic Forum, International Telecommunications Union, the United Nations, and the World Bank. Indicators within each module have been given equal weightage and a simple average was done to obtain a composite score. In total, 30 indicators have been selected. Table 1 summarizes the indicators selected and the sources of data.

Table 1. Indicators of the DEA Readiness Framework

Indicator	Source
FUNDAMENTAL MODULES	
MODULE 1: DATA REGULATIONS	
1.1 Data Protection and Privacy Legislation	United Nations Conference on Trade and Development, 2020

Indicator		Source
1.2	Cybersecurity Index	International Telecommunications Union, 2020
1.3	Legal Framework Adaptability to Digital Business Models	World Economic Forum Network Readiness Index, 2020
1.4	Data Policies Enabling Digital Trade	Digital Trade Restrictions Index, ECIPE, 2018
MODULE 2: DIGITAL PAYMENTS		
2.1	Account ownership at a financial institution or with a mobile-money-service provider (% of population ages 15+)	World Development Indicators, 2017
2.2	Made or received digital payments in the past year (% age 15+)	G20 Financial Inclusion Indicators, 2017
2.3	E-payments regulatory and policy environment	APEC E-Payment Readiness Index, 2016
2.4	Proportion of businesses placing orders via the internet	Government E-Payments Adoption Ranking, 2018
2.5	B2G payments availability	Government E-Payments Adoption Ranking, 2018
2.6	G2B payments availability	Government E-Payments Adoption Ranking, 2018
2.7	Existence of Digital ID	Government E-Payments Adoption Ranking, 2018
MODULE 3: PAPERLESS TRADE		
3.1	Automated customs system	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.2	E single window system	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.3	E-customs declaration submission	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.4	E-application and issuance of import/export permit	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.5	E-sea cargo manifest submission	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.6	E-air cargo manifest submission	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.7	E-application and issuance of preferential COO	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021

Indicator		Source
3.8	E-payment of customs duties/fees	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.9	E-exchange fo customs declaration	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.10	E-exchange of COO	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.11	E-exchange of SPS	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
3.12	Paperless collection of LoC	UN Global Survey on Digital and Sustainable Trade Facilitation, 2021
NASCENT POLICIES MODULES		
MODULE 4: ARTIFICIAL INTELLIGENCE		
4.1	Adoption of emerging technologies	World Economic Forum Network Readiness Index, 2020
4.2	Investment in emerging technologies	World Economic Forum Network Readiness Index, 2020
4.3	Digital skills in the active population	World Economic Forum Network Readiness Index, 2020
4.4	Government promotion of investment in emerging technologies	World Economic Forum Network Readiness Index, 2020
MODULE 5: OPEN GOVERNMENT		
5.1	ODIN Coverage Score	Open Data Watch, 2020
5.2	ODIN Openness Score	Open Data Watch, 2020
5.3	ODB Readiness to Use	Open Data Barometer, 2016

Normalization

Given that the DEA Readiness Framework borrows from several sources, normalization is needed to make the data comparable. Most of the indicators selected are in a scale of 0-100 and are configured in which higher scores indicate better outcomes. For raw data that is not in the same 0-100 scale, a minimum-maximum normalization method is used to transform it. The formula used is:

$$100 \; x \, \frac{(value - \text{minimum})}{(\text{maximum} - \text{minimum})}$$

For indicators in which higher scores means a restrictive policy environment or worse policy outcomes, a reverse normalization formula was used[2]:

$$100 \; x \, \frac{(maximum - value)}{(maximum - minimum)}$$

Setting the Readiness Threshold

Countries with existing DEAs were used as the benchmark of readiness. The main assumption of the DEA framework is that countries with close to the level of development of those with existing DEAs are also ready to engage Singapore in digital economy negotiations. Policy alignment and prospects of interoperability will also have a clear starting point of discussion. The average scores of Chile, New Zealand, and Australia were computed for each module and a threshold of 10 was selected as the basis for readiness. This means if a country being assessed scores within 10 of the average of those with existing DEAs, then discussions for formal agreements and policy alignment can move forward.

The next section deals with each module and the definitions of each indicators used.

3. MODULE INDICATORS

Module 1: Data Regulations

DEAs aims to align rules that would allow for data to move freely across borders. The unimpeded cross-border data flows make it easier for firms to tap into a wider consumer base in different jurisdictions and innovate products to cater to new markets. A key component also of cross-border data flow is the presence of legal frameworks that would ensure data privacy and cybersecurity. DEAs aim to promote compatibility of legal measures to protect data of citizens and maintain trust in the digital economy. In general, a robust data regulatory environment accelerates cross-border digital trade.

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[2] A reverse normalization was used for one indicator: the Data Policies Enabling Digital Trade.

Four indicators were selected to assess readiness in data regulations and normalized to a 0-100 range, where applicable. A composite score is calculated by averaging the scores with equal weightage.

1.1 Data protection and privacy legislation

This indicator reflects the presence (or absence) of a personal data protection legislation in a country. Personal data protection legislation are key starting points of discussion for mutual recognition of legal privacy measures. Data is from the United Nations Conference on Trade and Development which tracks privacy legislation and records its status in 0-3 range (0=no data; 1=no legislation; 2=pending legislation; 3=with legislation). For this framework, data has been normalized to a 0-100 scale.

1.2 Cybersecurity

This indicator reflects the level of cybersecurity commitments of countries across legal, technical, organizational, capacity building, and cooperation measures. This indicator reflects a country's ability to respond to cyber threats and help preserve trust in the use of digital business models. Data is from the Global Cybersecurity Index 2020 of the International Telecommunications Union.

1.3 Adaptability to Digital Business Models

This indicator measures experts' perception on how a country's legal framework adapts to emerging technologies. This indicator is included as a proxy for data innovation and data sandboxing—both key elements in allowing businesses to pilot new use cases of data in a safe and trusted environment. This indicator is a sub-indicator from the Network Readiness Index 2020 and can also be found on the WEF Executive Opinion Survey 2018-2019. It is a mean score of the answer to the question: *In your country, how adequately is the legal framework adapting in Artificial intelligence, Robotics, App- and web-enabled markets, Big data analytics, and Cloud computing?*

1.4 Data policies enabling digital trade

This indicator measures the restrictions on data movement and usage in cross-border digital trade including data localization, data retention, intermediate liability, and content access. Data is a sub-indicator of the Digital Trade Restrictiveness Index by the European Center for International Political Economy. The data was in 0-1 range, with a higher score indicating a more restrictive data regulatory environment. A reverse normalization was done to transform this indicator to a 0-100 scale with a higher score now reflecting a favorable regulatory environment for digital trade.

Economy Highlights

Figure 2. Comparison of Data Regulations readiness by economy
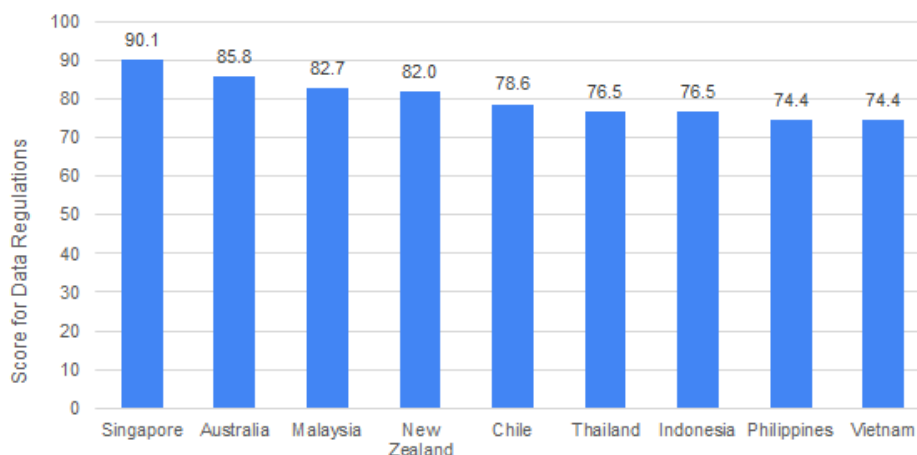
DEA economies Singapore (90.1) and Australia (85.8) score highly for Data Regulations readiness. Malaysia (82.7) outperforms New Zealand (82) and Chile (78.6), demonstrating its ambition and capabilities in enabling data innovation.

Module 2: Digital Payments

Fintech and e-payments services function as alternatives to physical cash in transactions. DEA agreements aim to improve the inter-operability of payment systems among domestic e-payment providers, as well as between payment systems across borders. This will make digital transactions faster, cheaper and more accessible, in addition to making foreign e-payment regulations easier to navigate for Fintech businesses

The DEA agreements also provide attention to the interoperability of e-invoicing standards, which will allow e-invoices to be generated and received by digital finance and accounting systems across borders. This will reduce transaction costs and payment times for e-invoices and payments compared to physical invoices.

Moreover, national digital identity systems help create verified identities for individuals and companies from existing government sources, thus enabling quicker and more convenient online identity verification. This will speed up digital onboarding processes and access to online services, such as bank account opening and company registration.

Indicators Selected

Seven indicators were selected to assess Digital Payments readiness, each with a 0-100 score range. A composite score is calculated by averaging the scores with equal weightage.

2.1   Account ownership at a financial institution or mobile-money-service provider

This indicator refers to the % of respondents above 15 years in a country who report having an account (by themselves or together with someone else) at a bank or another type of financial institution or report personally using a mobile money service in the past 12 months. This indicator is included as account ownership at a financial institution or e-money provider is a key measure for access to financial services, including digital financial services, which is a critical enabler for digital payments. Data on this indicator was obtained from the World Bank's World Development Indicators (2017).

2.2   Made or received digital payments in the past year

This indicator measures the % of respondents above 15 years in a country who report using mobile money, a debit or credit card, or a mobile phone to make a payment from an account, or report using the internet to pay bills or to buy something online, in past 12 months. This indicator was included as the making or receiving of digital payments measures actual use of digital payments in economy by individuals. Data on this indicator was obtained from the World Bank's Financial Inclusion Database (2017) and is also available from the G20 Financial Inclusion Indicators (2017) dataset.

2.3   E-payments regulatory and policy environment

This indicator measures the assesses effectiveness of APEC economies at regulating e-payments, which is a key enabler for payments innovation. Data is a sub-indicator from APEC's E-Payment Readiness Index (2016). It is computed from 8 sub-indicators, which are: time and cost to start business; efficiency of dispute settlement framework; efficiency of legal framework to challenge regulation; impact of rules on FDI; laws on ICT development; government's future ICT vision; government success in ICT promotion; and availability of financial services.

2.4   Proportion of businesses placing orders via the internet

This indicator measures the proportion of businesses with more than 10 employees that place orders via the Internet. This indicator was included as the actual enterprise use of e-commerce and online buying served as a proxy for digital payments uptake by businesses. Data is a sub-indicator from the Economist Intelligence Unit and Visa's Government E-Payment Adoption Ranking (2018). The indicator data is primarily populated with data from the United Nations

Conference on Trade and Development (UNCTAD). National statistical sources or other reliable sources were used where UNCTAD data was unavailable.

2.5   Business-to-Government payments availability

This indicator measures the degree to which businesses can undertake key business-to-government (B2G) payments via an online e-government platform. Data is a sub-indicator from the Economist Intelligence Unit and Visa's Government E-Payment Adoption Ranking (2018). The B2G payments assessed are: business income tax payments; VAT/sales tax payments; business pension contributions; and company registration and payment of fees. Each of the four payments categories were scored on a 0-4 scale based on the fulfilment of the following criteria: payment amount calculation; online filing; online payment; and includes instructions for payments. The score for each country was average and then normalised on a 0-100 scale.

2.6   Government-to-Business payments availability

This indicator measures the degree to which governments can undertake key government-to-business (G2B) payments via an online e-government platform. Data is a sub-indicator from the Economist Intelligence Unit and Visa's Government E-Payment Adoption Ranking (2018). The G2B payments assessed are: business income tax refunds; VAT/sales tax refunds; business payments for goods and services; and disbursement of loans. Each of the four payments categories were scored on a 0-4 scale based on the fulfilment of the following criteria: payment refund calculation; online refund status check; online e-payment refund; and includes instructions to obtain refunds. The score for each country was average and then normalised on a 0-100 scale.

2.7   Existence of national Digital Identification system

This indicator measures the extent to which national electronic digital identification systems are available and facilitate access to digital payments capabilities and government e-services. The data is a sub-indicator from the Economist Intelligence Unit and Visa's Government E-Payment Adoption Ranking (2018). This measure is scored on a 0-3 scale based on the fulfilment of the following criteria: national e-ID exists; e-ID is used for one or more e-services; e-ID has e-payment capabilities. The score for each country was average and then normalised on a 0-100 scale.

Economy Highlights

Figure 3. Comparison of Digital Payments readiness by economy
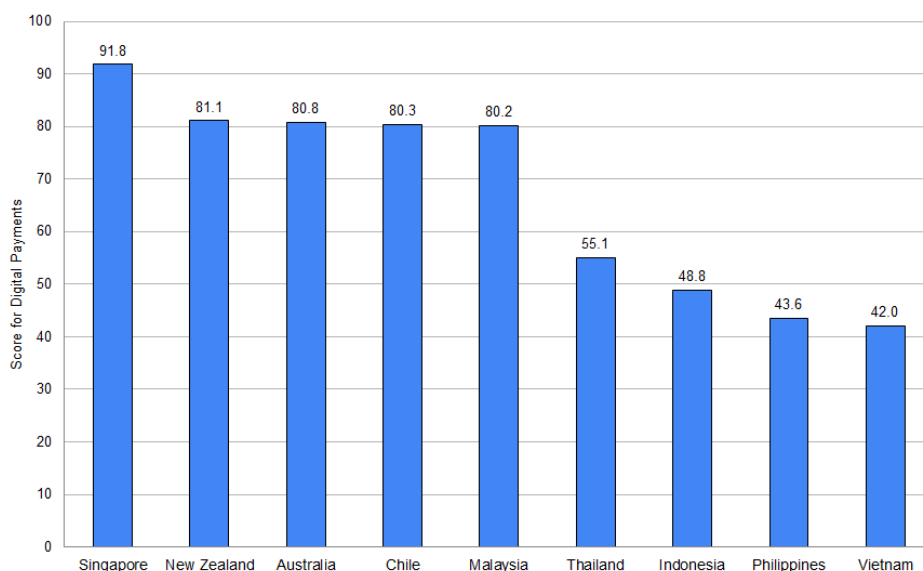
Singapore scores a 10-point lead above existing DEA economies New Zealand (81.1), Australia (80.8) and Chile (80.3) - with Malaysia (80.2) demonstrating near parity to DEA performance. A significant gap with other ASEAN-6 economies exists.

Module 3: Paperless Trade

The digitalisation of trade documents enhances trade administration and cargo clearance processes, enabling faster and less costly administrative processes for key documentation (e.g., Certificates of Origin and Sanitary & Phytosanitary Certificates). This will allow for shorter waiting and delivery times at destinations, as the necessary documentation is quickly retrievable and verifiable.

Additionally, connections between National Single Windows involving secure data connections will allow for the re-use of export and import data. This will reduce the time and cost of conducting business while avoiding errors from manual data re-typing.

Indicators Selected
The 12 indicators were picked from an original list of 53 survey indicators from the UN Global Survey on Digital and Sustainable Trade Facilitation (2020). The twelve indicators relate specifically to the digitalisation of trade documentation and administrative processes.
Each were scored on a 0-3 scale, where: 0 indicated non-implementation of a digital trade process; 1 is a digital trade process in planning stage; 2 is partial implementation of a digital trade process; and 3 is full implementation for a digital trade process. A composite score is subsequently calculated by averaging the scores with equal weightage, which is then normalised on a 0-100 scale.

The 12 indicators selected were:

3.1   Automated customs system
3.2   E single window system
3.3   E-customs declaration submission
3.4   E-application and issuance of import and export permits
3.5   E-sea cargo manifest submission
3.6   E-air cargo manifest submission
3.7   E-application and issuance of preferential Certificates of Origin
3.8   E-payment of customs duties and fees
3.9   E-exchange for customs declaration
3.10   E-exchange of Certificates of Origin
3.11   E-exchange of Sanitary and Phytosanitary (SPS) documents
3.12   Paperless collection of Letters of Credit

Economy Highlights

Figure 4. Comparison of Paperless Trade readiness by economy
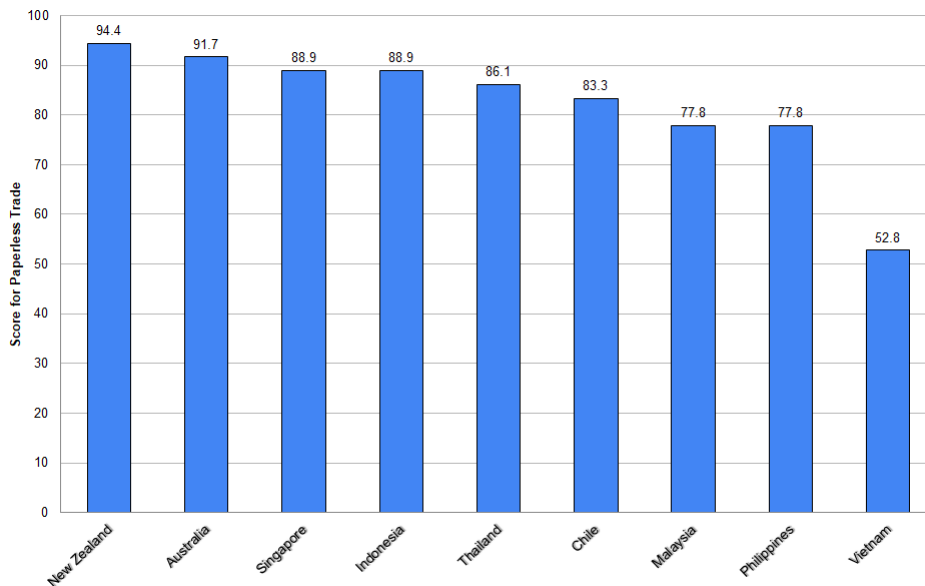
New Zealand (94.4), Australia (91.7) and Singapore (88.9) lead for Paperless Trade readiness. Despite ASEAN-level paperless trade harmonisation initiatives such as the ASEAN single Window, there was significant performance variation among ASEAN-6 economies.

Module 4: Artificial Intelligence

Emerging technologies such as artificial intelligence (AI) are key factors in maximizing the benefits of digital trade. AI allows for faster processing of data and can help facilitate creation of new digital goods and services. DEAs aim to establish key guidelines to ensure fair and transparent use of AI especially when data is transferred across borders. Core principles for ethical and responsible use of AI are deemed essential to strengthen trust between and among governments, businesses, and citizens in the conduct of digital trade.

Indicators Selected

Four indicators were selected to assess readiness in artificial intelligence governance, and normalized to a 0-100 range, where applicable. A composite score is calculated by averaging the scores with equal weightage.

4.1 Adoption of emerging technologies

This indicator measures experts' perception on adoption of emerging technologies including AI in the country. This indicator is included as a proxy indicator on how widespread AI adoption is for a potential DEA partner. Data is a sub-indicator from the Network Readiness Index 2020 and can also be found on the WEF Executive Opinion Survey 2018-2019. It is a mean score of the answer the question: *In your country, to what extent are companies adopting Artificial intelligence, Robotics, App- and web-enabled markets, Big data analytics, and Cloud computing?*

4.2 Investment in emerging technologies

This indicator measures experts' perception on the investment in emerging technologies including artificial intelligence in a country. This indicator is included as a proxy indicator for level of investment in AI in a potential DEA partner. Data is a sub-indicator from the Network Readiness Index 2020 and can also be found on the WEF Executive Opinion Survey 2017-2018. It is a mean score of the answer to the question: *In your country, to what extent do companies invest in emerging technologies (e.g. Internet of Things, advanced analytics and artificial intelligence, augmented virtual reality and wearables, advanced robotics, 3D printing)?*

4.3 Digital skills in the active population

This indicator measures experts' perception on the digital skills among the active population of a country. This indicator is included as proxy indicator to measure AI skills needed for a potential DEA partner to effectively use AI for cross-border trade. Data is a sub-indicator from the Network Readiness Index 2020 and can also be found on the WEF Executive Opinion Survey 2018-2019.

This measure answers the question: *In your country, to what extent does the active population possess sufficient digital skills (e.g. computer skills, basic coding, digital reading)?*

4.4 Government promotion of investment in emerging technologies

This indicator measures experts' perception on how governments foster investment in emerging technologies including AI in a country. This indicator is included as a proxy indicator for overall policy environment in AI development. Data is a sub-indicator from the Network Readiness Index 2020 and can also be found on the WEF Executive Opinion Survey 2018-2019. It is a mean score of the answer to the question: *In your country, to what extent does the government foster investment (public and private) in Artificial intelligence, Robotics, App- and web-enabled markets, Big data analytics, and Cloud computing?*

Economy Highlights

Figure 5. Comparison of AI readiness by economy
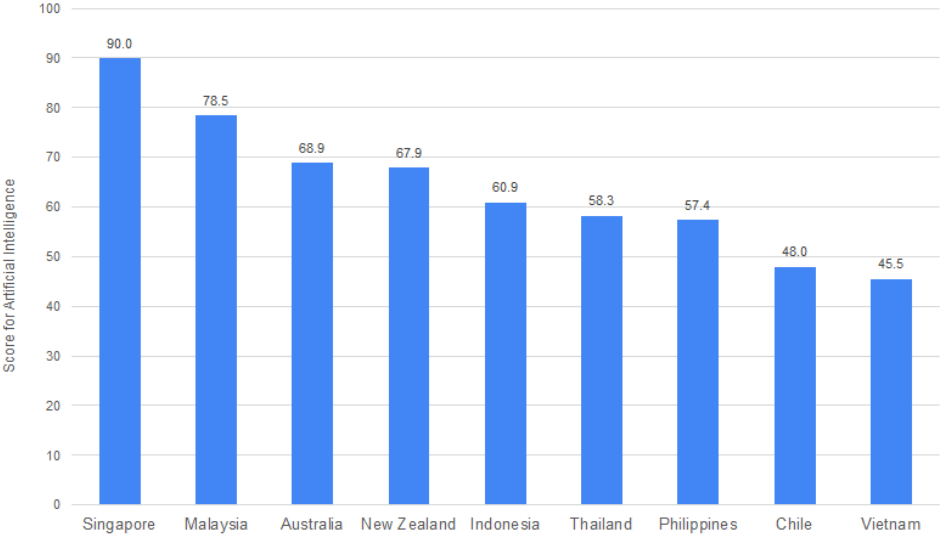
ASEAN economies Singapore (90) and Malaysia (78.5) perform well, with higher AI readiness scores than DEA economies Australia (68.9), New Zealand (67.9) and Chile (48). Notably, despite having signed a DEA including AI collaboration, Chile is outperformed by all ASEAN-6 economies except Vietnam (45.5).

Module 5: Open Government

Access to a wider range of government data can facilitate innovation by businesses and helps generate new economic opportunities. The availability of open 'Big Data' also enables innovation in Artificial Intelligence and Machine Learning by providing key ingredients for creating and enhancing models.

Indicators Selected

Three indicators were selected to assess Open Government readiness, each with a 0-100 score range. A composite score is calculated by averaging the scores with equal weightage.

5.1   Data coverage

This indicator assesses the availability of data across 22 key categories of government data. The data is a sub-indicator from Open Data Watch's Open Data Inventory (ODIN) Global Rankings (2020). Data coverage for each of the 22 categories is assessed based on the following criteria: extent of indicators and sub-indicators available; availability of last 5-years data; availability of last 10-years data; availability of data at first administrative level; and availability of data at second administrative level.

5.2   Data openness

This indicator assesses the ease and terms of access to data across 22 key categories of government data. The data is a sub-indicator from Open Data Watch's Open Data Inventory (ODIN) Global Rankings (2020). Data coverage for each of the 22 categories is assessed based on the following criteria: machine readability; availability in non-proprietary format; metadata availability; download options; and availability under open license.

5.3   Readiness to use data

This indicator assesses the ability of government stakeholders, civil society, and entrepreneurs/businesses to utilise data to create positive outcomes from an open government data initiative. The data is a sub-indicator from Open Data Barometer's Global Rankings (2016). Variables used to calculate this indicator primarily comprised of responses from expert survey questions aimed at government, civil society of business stakeholders – in addition to secondary data on open data use by each stakeholder group.

Economy Highlights

Figure 6. Comparison of Open Government readiness by economy
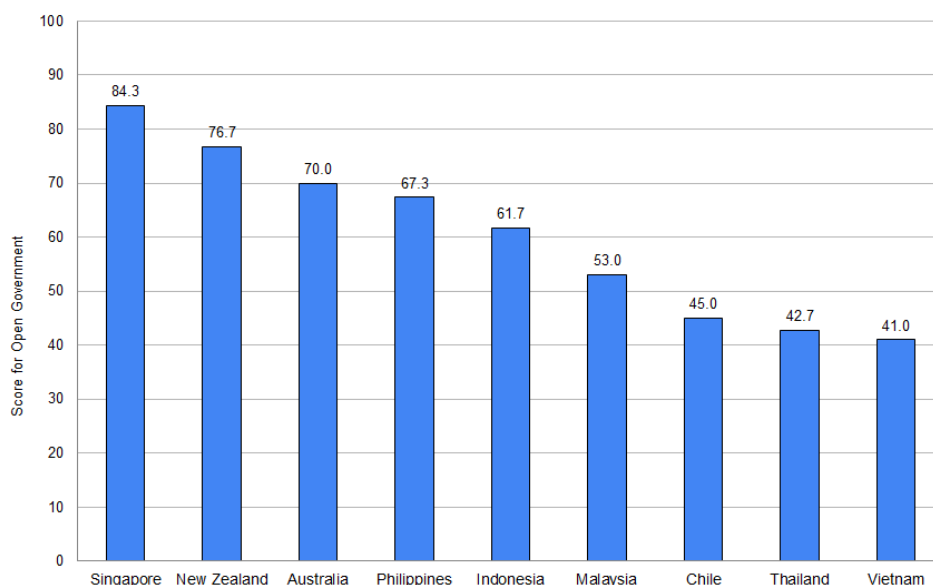
DEA economies Singapore (84.3), New Zealand (76.7) and Australia (70) perform well on Open Government readiness. The Philippines (67.3) excels among ASEAN-6 countries and has near-comparable performance with Australia (70). Notably, DEA member Chile (45) scores low for Open Government readiness.

4. INITIAL FINDINGS AND WAYS FORWARD

## *Singapore, DEA Partner Economies, and the Rest of ASEAN-6*

To demonstrate the utility of the DEA Readiness Framework, we applied it to Singapore, the current DEA partner economies, and the rest of ASEAN-6. Across all five digital economy modules, Singapore scores higher than the DEA partner economy average, and the rest of the ASEAN-6 average.

When comparing Singapore and its current DEA partners, policy alignment is more evident in the fundamental modules of data regulations, digital payments and identification, and paperless trade. Chile, New Zealand, and Australia performs well with an have an average of 80 in areas needed for interoperability of standards and harmonized digital trade rules. Paperless trade is the module where Singapore and the current DEA partner economies have almost the same level of development.

In nascent policies of AI and open government data, Singapore and DEA partners can still cooperate even with a wider gap in development. DEA partner economies score around 60 in these modules. Chile for example, which scores 48 on the artificial intelligence, signed a DEA which includes a module on AI even though Singapore would almost double its score. The same

can be said with the open government data where the average of DEA partner economies is 63.9, while Singapore is at 84.3.

Figure 7. Singapore's performance for DEA readiness versus ASEAN-6 and existing DEA economies
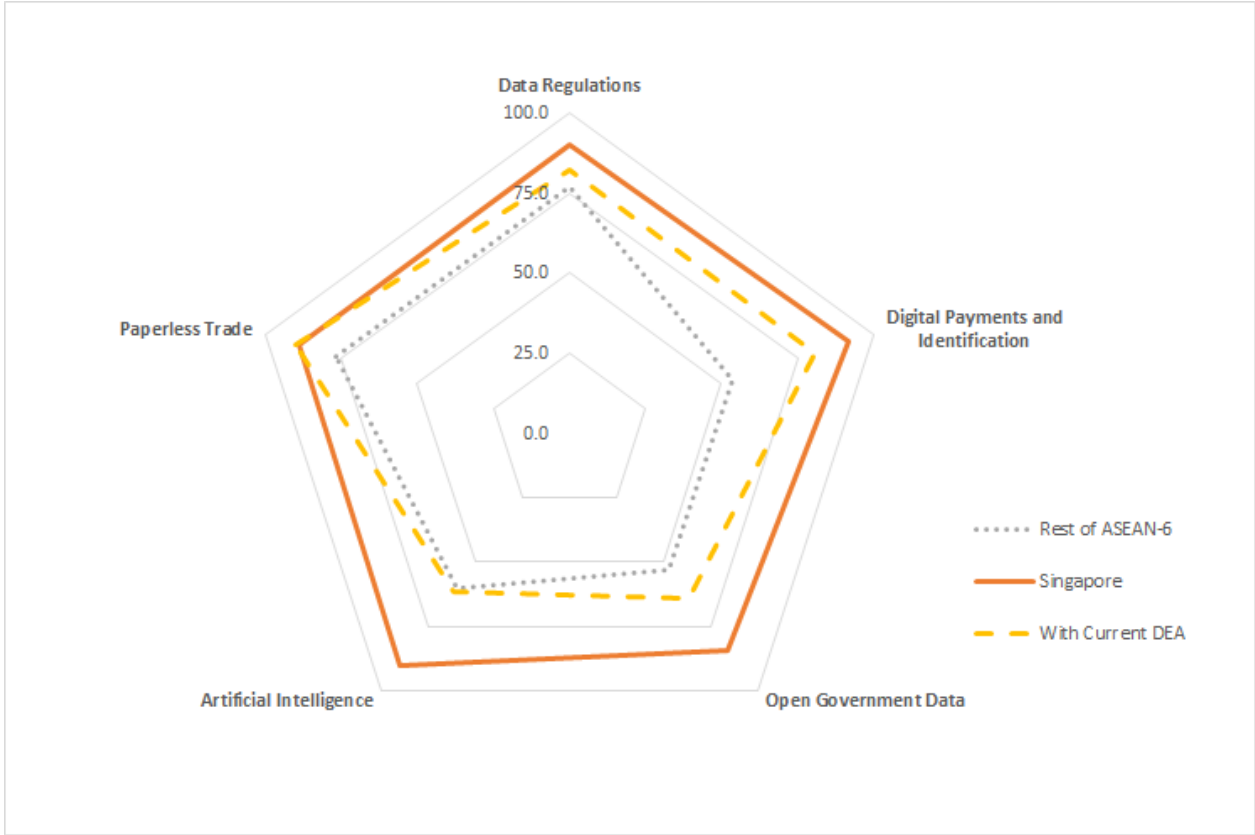
In comparison to ASEAN-6 economies, Singapore clearly is way ahead of its regional neighbors. The closest module between Singapore and the rest of ASEAN-6 are data regulations and paperless trade, although both modules are still more than 12 points behind Singapore. The ASEAN-6 countries have some legislation in data protection, but not all are part of international initiatives in privacy standards such as the APEC Cross-Broder Privacy Rules System. The ASEAN Single Window also helps in aligning policies across ASEAN economies in terms of paperless trade but countries are also on different levels of implementation.

What stands out however is the clear lead of Singapore in digital payment and identification systems. The rest of ASEAN-6 stands at 53.9 while Singapore is at 91.8. This highlights the varying levels of digital payments adoption in the region. Singapore and Malaysia lead the way in this module, while the Philippines and Vietnam are lagging due to the prevalent use of cash in transactions.

Finally, using the threshold for readiness set by this study, a case can be made that discussions on data regulations can already move forward between Singapore and the ASEAN-6. This is because Singapore's neighbors are close to the level of development with current partner DEA economies. Data regulations is also a fundamental module that can serve as a foundation for other areas of digital trade to be negotiated in the future. The nascent area of artificial intelligence is also another area of possible collaboration. Even with a wide gap, there is room for alignment in ethical use and governance of AI.

More work is needed in digital payments and identification systems, open government data, and paperless trade. The biggest challenge for Singapore and DEAs among the ASEAN-6 economies is in digital payment and identification system. The wide gap in development entails that discussions on having interoperable digital payment systems and seamless identity verification may take more time.

Country Reports

Using the DEA Readiness Framework, we identify data regulations and artificial intelligence as digital economy policy areas in which Singapore can highlight in forming DEAs with the rest of the ASEAN-6 economies. Singapore can leverage their leadership in these areas to help shape the digital trade rules for ASEAN in cross-border data flows and artificial intelligence. However, as highlighted by the wide margins in digital payments and identification, open government data, and paperless trade, the ASEAN is on varying levels of development in digital economy. Thus, country reports are needed to validate modules for each country. In-depth country reports would also identify specific challenges per country.

Overall, the DEA Readiness Framework can also be used outside ASEAN to help assess potential DEA partner economies for Singapore around the globe and identify specific modules that has the most potential for policy alignment.

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