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Prosperous APAC

Digital economy enablers



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The coalition for the Digital Prosperity for Asia is an organization consisting of a growing group of innovative Asian digital companies promoting the democratization of digital technologies across all sectors. Our mission is to support national governments and policymakers in APAC to grow their digital economies and reap the benefit of digital technologies.

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Important notice on contents

This report has been prepared by AlphaBeta (part of Access Partnership), commissioned by the Digital Prosperity for Asia (DPA), which consists of: Accredify, Appmedia, Doctor2U, Kinobi, Opn, and ShareChat, with endorsements from Amazon Web Services (AWS). All information in this report is derived or estimated by AlphaBeta analysis and from publicly available information. Where information has been obtained from third party sources, this is clearly referenced in the footnotes. This report should be cited as follows: "AlphaBeta, part of Access Partnership (commissioned by the Digital Prosperity for Asia) (2022), Prosperous APAC: *Digital economy enablers*".

Background information on research

This research was conducted by AlphaBeta (Part of Access Partnership) and commissioned by the Digital Prosperity for Asia (DPA) coalition. All information in this report is derived or estimated by AlphaBeta analysis using both proprietary and publicly available information. The DPA has not supplied any additional data, nor does it endorse any estimates made in the report. Where information has been obtained from third party sources and proprietary sources, this is clearly referenced in the footnotes.

The financial figures in this report are estimated in US dollars. Conversions, where applicable, are based on the following average exchange rates taken from the period between December 2020 and December 2021:

Country	Local currency unit (LCU)	LCU equivalent of US\$1
1 Australia	Australian dollar (AUD)	0.76
2 India	Indian Rupee (INR)	0.014
3 Indonesia	Indonesian Rupiah (IDR)	0.00007
4 Japan	Japanese Yen (JPY)	0.01
5 Malaysia	Malaysian Ringgit (MYR)	0.24
6 Pakistan	Pakistani Rupee (PKR)	0.005
7 Philippines	Philippine Peso (PHP)	0.02
8 Singapore	Singapore Dollar (SGD)	0.75
9 South Korea	South Korean Won (KRW)	0.00085
10 Thailand	Thai Baht (THB)	0.03
11 Vietnam	Vietnamese Dong (VND)	0.00004

This report and the relevant country summaries containing insights for the 11 countries included in the study are available online at:
<https://alphabeta.com/our-research/prosperous-apac-digital-economy-enablers/>

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Capturing the benefits of APAC's thriving digital economy

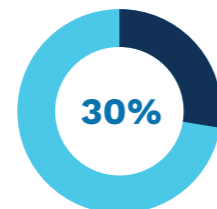
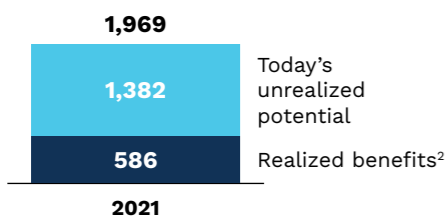


APAC economies¹ have successfully captured 30% of their digital economy potential in 2021

Countries are realizing the digital economy benefits of **US\$586 billion** in 2021, but are forgoing **US\$1.4 trillion** of opportunity

The APAC economies have captured **30%** of their full digital potential in 2021

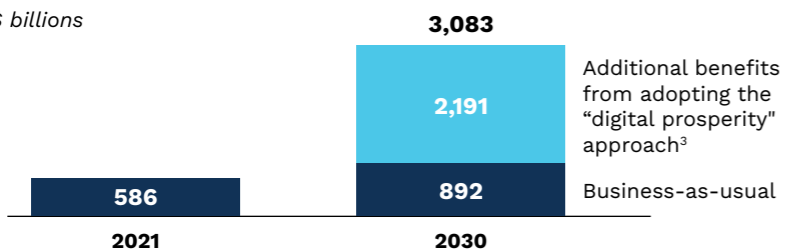
US\$ billions



There is a US\$2.2 trillion upside if APAC economies¹ can fully capture the benefits of the digital economy in 2030

Adopting the "digital prosperity" approach could create additional benefits of **US\$2.2 trillion** in 2030, capturing the full benefits of **US\$3.1 trillion**

US\$ billions



1. The 11 APAC economies included in this study are Australia, India, Indonesia, Japan, Malaysia, Pakistan, the Philippines, Singapore, South Korea, Thailand, and Vietnam.

2. The realized benefits include cost savings and productivity gains to businesses through leveraging the latest digital technologies, as well as the value of exports of virtual goods (e.g., apps, digital content) and of physical products enabled by digital technology (e.g., e-commerce).

3. This report coins a new term "digital prosperity" to provide a more nuanced interpretation of the issues related to "digital sovereignty", while still accounting for all the domestic and international concerns and prioritizing the main goal of providing protection and support for citizens. The "digital prosperity" approach focuses on creating an open digital economy with minimal impediments to cross-border data flows, enabling businesses and consumers to access the latest digital products and services, while ensuring adequate and appropriate data management safeguards and building up the local industry.

Adopting the "digital prosperity" approach is key to capturing the digital economy opportunity

Priority actions for governments

POLICY



Adopt risk-based and accountability-driven approaches to data governance

COMPETITION



Allow local organizations to access international digital service providers

CAPABILITY



Provide support to help MSMEs adopt digital technologies and engage in international trade

INFRASTRUCTURE



Extend access to digital infrastructure, especially rural areas

Executive Summary

In 2021, Asia Pacific (APAC) accounted for 37% of the global Gross Domestic Product (GDP), up from 26% ten years ago.¹ Fast-growing Internet penetration, increasing purchasing power and expanding trade links have fueled the growth, but new headwinds are emerging. In a world of economic uncertainty and long-term disruptions due to COVID-19, digital technologies are becoming all the more crucial to the region's growth and prosperity — and yet, according to our research, APAC countries are capturing only a fraction of the potential benefits.

Key conclusions of this report include:

The APAC-11 only captures 30% of US\$2 trillion digital economy opportunity in 2021

It is estimated that potential aggregated domestic benefits from the digital economy in 11 of APAC's largest economies (Australia, India, Indonesia, Japan, Malaysia, Pakistan, the Philippines, Singapore, South Korea, Thailand, and Vietnam or referred to as "APAC-11" in this report), could be worth around US\$905 billion – or 6% of the APAC-11's total GDP in

2021.² That's not including the potential benefits of trade in the digital economy.³ Today, cross-border data flows are surging and exert a larger impact on GDP growth than the trade in physical goods, bringing the trade of digital goods and services to a potential US\$1.1 trillion (or 7% of exports).⁴ APAC-11's digital economy domestically and in exports has grown considerably and is estimated to be US\$586 billion in 2021. While the APAC-11 has successfully captured 30% of its digital potential, there is room for much more growth as if captured fully, the economic benefits could amount to approximately US\$2 trillion.⁵



1. YicaiGlobal (2020), "APAC Becomes Biggest Contributor to Global GDP".

Available at: <https://www.yicai.com/news/apac-becomes-biggest-contributor-to-global-gdp>

2. We define size of the economy by the GDP.

3. At present, there is no specific definition of what we mean by digital trade. Part of what makes defining digital trade difficult is the rapidly changing nature of the digital economy. In this study, we define digital trade as the exports of three categories of products: (i) digitally-enabled goods, referring to goods that are traded electronically via the Internet (i.e., e-commerce); (ii) digitally-enabled services, referring to services that are provided using digital technologies; and (iii) indirect digital services (embedded in other exports), referring to imported digital services that get used in the export of other products and services. Digitally-enabled services include the export of data processing, online software consultancy services, and other direct e-service exports such as online booking and electronic banking; Examples of indirect digital services include telecommunication services such as email, video conferencing, digital file-sharing, and Voice over Internet Protocol (VOIP) services used by a mining firm when exporting overseas.

4. McKinsey Global Institute (2016), Digital globalization: The new era of global flows.

Available at: <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows>

5. The digital economy benefits refer to domestic benefits (cost savings and time savings from improved productivity) and revenue from the exports of digital goods and services.

The APAC-11 has the potential to capture over US\$2.2 trillion in additional economic benefits (beyond business-as-usual) in 2030

While digital technologies are universally accepted as important, varying views exist on how to best leverage them while maintaining sovereignty in the digital space.⁶ Most countries fall somewhere within the spectrum of two extremes: the “digital isolationism”, which seeks to inhibit an open digital economy in view of boosting local domestic competitive advantage, and “digital globalism”, which focuses on establishing an open digital economy with minimal impediments to cross-border data flows and foreign direct investments, but potentially limiting the ability to incubate and grow local firms.⁷

Both sides present valid concerns and benefits, setting the stage for a third option: the “**Digital Prosperity**” approach, which combines the supportive regulations of “digital globalism” with the focus on nurturing domestic capabilities in “digital isolationism”.⁸ The “digital prosperity” approach, which consists of recommendations related to enablers critical of the digital economy, is well-poised to play a significant role in the continued rise of the digital economy in the APAC-11 — namely by unlocking an additional US\$2.2 trillion in economic benefits (as compared to business-as-usual) in 2030.



The significant benefits of the digital economy can be harnessed if the APAC-11 focuses on four enablers — policy, competition, capability, and infrastructure

AlphaBeta’s “Digital Connectivity Index”, comprising 26 parameters relating to the four enablers of the digital economy, pinpoints the gaps in current enablers for each country that are hindering the realization of the full benefits of the digital economy. By focusing efforts on the four enablers, the APAC-11 will be able to capture additional economic benefits in 2030.

This report aims to quantify the digital economy’s yet unrealized potential, explain the gaps behind it and suggests a “digital prosperity” approach to fully capture the benefits of the digital economy.

6. Digital sovereignty is defined as the capacity for digital self-determination by states, companies, or individuals. It focuses on the control over data, infrastructure, and software that are created and relied on to operate in the digital world. IDC (2022), Trusted Cloud: Overcoming the Tension Between Data Sovereignty and Accelerated Digital Transformation. Available at: https://d1awsstatic.com/whitepapers/Whitepaper_Overcoming_the_Tension_Between_Data_Sovereignty_and_Accelerated_Digital_Transformation_2022.pdf

7. A literature review of the issue regarding digital openness and connectivity highlights that it relates to the capacity for digital self-determination by states, companies, or individuals. It focuses on the control over data, infrastructure, and software that are created and relied on to operate in the digital world. The current literature is largely dominated by proponents of “digital isolationism”, which is a state-centered narrative. A disparity also exists, where arguments against digital openness and connectivity are driven by security-politics narrative, ignoring the socio-economic perspective. There seems to also be a misunderstanding, where governments assume that there is only one alternative to “digital isolationism”: “digital globalism”, which would erode their national sovereignty and pose security risks.

8. While there are some existing definitions of digital sovereignty, there is no standardized definition that considers all the domestic and international concerns. Therefore, we propose a new term “digital prosperity” which is more nuanced in this report.

BOX E1: OVERVIEW OF THE FOUR ENABLERS

- Policy.** This includes policies that enable cross-border data flows, safeguard data sovereignty by ensuring continued control over and access to data, and reduce border frictions impeding digital trade and foreign investment. Across the APAC-11, some governments have been ramping up efforts to develop digital policies and regulations, creating an enabling regulatory environment for businesses. However, greater efforts need to be committed to develop consistent cross-border data flow regulations and interoperable data privacy frameworks in the region. Additionally, to facilitate digital trade and foreign investment, governments can focus efforts to tackle border frictions like administrative and fiscal barriers for digital exports, improve digital payment options, as well as ease local registration requirements and foreign investment restrictions.
- Competition.** For businesses to benefit from the digital economy and be competitive, they need access to a wide range of local and imported digital technologies at an affordable cost. By focusing efforts on minimizing local sourcing requirements, removing preferences for local firms in open government procurement, and promoting fair software licensing terms, businesses can gain greater access to the latest digital technologies and boost their revenues.
- Capability.** This includes efforts to equip workers and businesses with the required capabilities to thrive in the digital economy. To access digital technologies and opportunities, workers and businesses should be equipped with the necessary skills and support for digital adoption. Digital adoption in Southeast Asia has accelerated during the last few years and has the potential to grow further if governments, businesses, and consumers ramp up existing digitalization efforts. For businesses, a clear government strategy supporting digital transformation efforts (with a dedicated agency to drive change) is crucial. This effort must comprise crucial elements such as support for cloud adoption of micro, small and medium enterprises (MSMEs) and the public sector, as well as intellectual property (IP) protection, and regulatory flexibility for new technologies, among others.
- Infrastructure.** This includes initiatives that lay the foundations for digital connectivity and cloud services adoption at scale, as well as initiatives that facilitate robust cybersecurity systems in the country. While governments in the region remain committed to increasing access and investment in infrastructure, more can be done to further improve access and reduce costs for consumers in the APAC-11. Furthermore, to ensure that users are operating in digitally secure environments and can leverage digital technologies safely and effectively, greater concerted efforts to develop robust and relevant cybersecurity frameworks as well as participate in international cybersecurity partnerships is critical.

1.1 BENEFITS OF THE DIGITAL ECONOMY — AT HOME AND ABROAD

A thriving digital economy means that local businesses have access to the latest digital technologies, and this in turn increases the productivity of the businesses' domestic operations as well as supports their exports (Exhibit 1). Access to cloud services in particular, is critical to businesses digitalization and the ability to innovate using cutting edge computing and technologies — evidenced by the accelerated adoption of artificial intelligence (AI), machine learning (ML), and big data analytics, both globally and within the APAC-11.⁹ Given the criticality of access to cloud services to a functioning digital economy, the subsequent economic impact analysis assumes that domestic and international companies operating in each of the APAC-11 economies can access and procure the broadest range of cloud services, and are not met with any inadvertent regulatory or policy

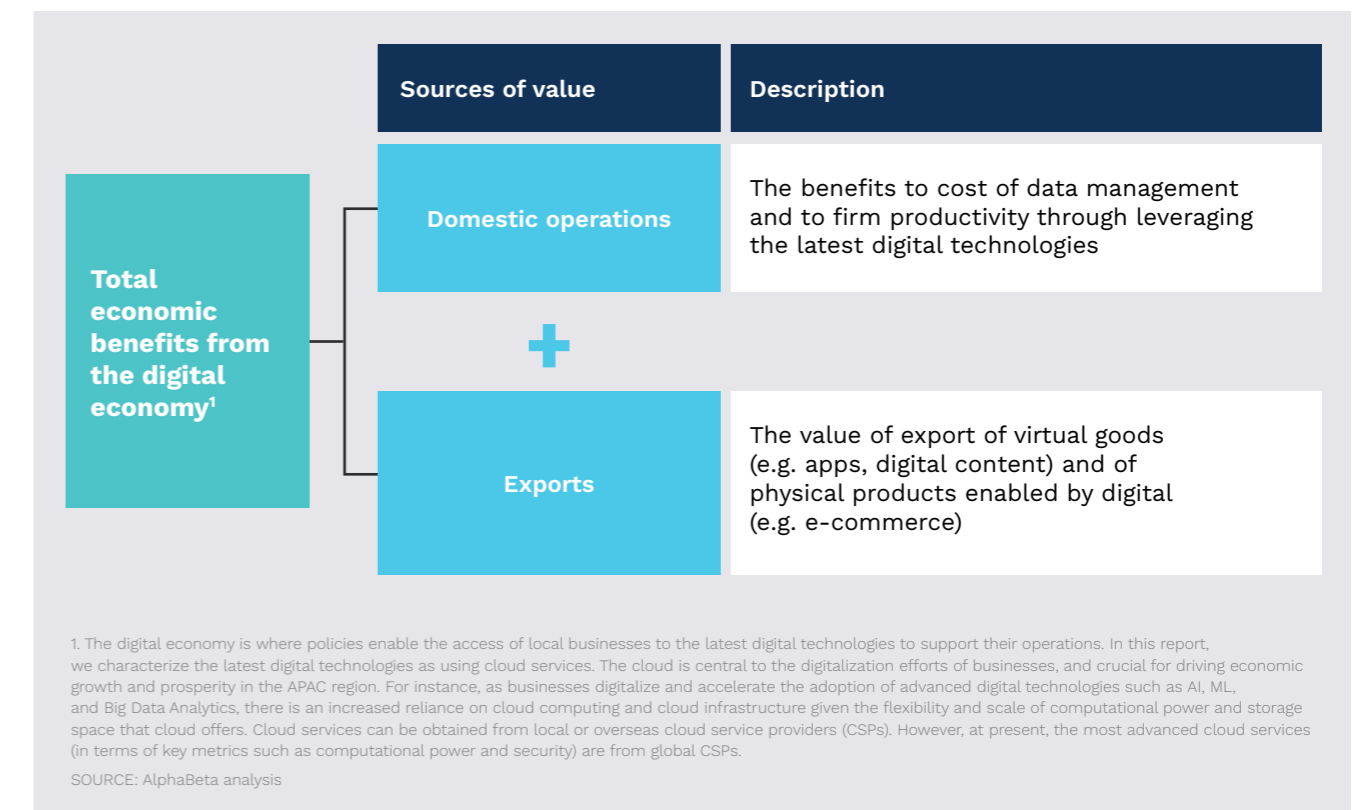
blockers preventing access to this broad range of cloud services.

More specifically, these benefits include:

- **Cost savings and benefits to data security in domestic operations.** The total amount of data created, captured, copied and consumed globally is said to have reached over 64 zettabytes in 2020 — and could nearly triple in the next five years.¹⁰ Meanwhile, COVID-19 accelerated the pace of digitization, as illustrated by a study that found more than 60 million new digital consumers were added to the digital economy in the first year of the pandemic, with nine in ten new digital service users intending to continue using them post-pandemic.¹¹ This exponential growth in data

EXHIBIT 1

The digital economy benefits both domestic operations and digital exports



chapter

01

Sizing the prize: The economic benefits of the digital economy

The APAC-11's digital economy generates immense benefits both at home and abroad. Through productivity gains and revenue boosts, the collective digital economy of 11 of the largest markets in APAC has grown considerably. It is estimated to be US\$586 billion in 2021, capturing 30% of its digital potential. This is significant, and there is room for further growth as if captured fully, the economic benefits could amount to approximately US\$2 trillion in 2021.

9. Euronovate Group (2020), "The role of Cloud Computing in Digital Transformation". Available at: <https://www.euronovategroup.com/the-role-of-cloud-computing-in-digital-transformation/>

10. Information from Statista. Available at: <https://www.statista.com/statistics/871513/worldwide-data-created/>

11. Bain & Company (2021), e-Economy SEA 2021. Available at: https://www.bain.com/globalassets/noindex/2021/e_economy_sea_2021_report.pdf

consumption has several implications for Asia's businesses. One is related to costs. A survey by McKinsey & Company uncovered that average spending on data management by companies across industries and enterprise sizes will likely increase by roughly 47% annually — and that was before the pandemic massively spiked digital adoption rates.¹³ These expenditures will likely be on data sourcing, data architecture (i.e., the hardware and software to manage data), data governance (i.e., data monitoring and classification), and data analysis (i.e., costs associated with data reporting and analysis). Such costs already comprise a large share of information technology (IT) budgets and are only expected to grow (Exhibit 2), leading many companies to seek more cost-efficient data management capabilities.

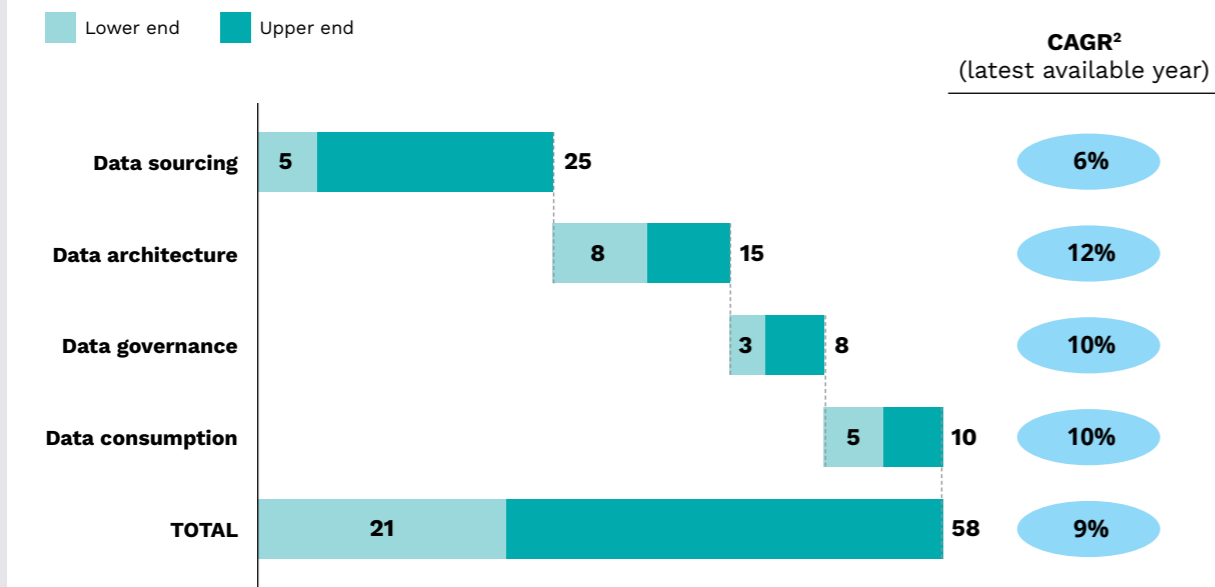
Using cloud services as a proxy for the latest digital technologies, it is estimated that compared to on-premises IT infrastructure, cloud services enable more efficient data management, with cost savings of up to 60%.¹⁴ But beyond savings, cloud services offer an additional benefit that cannot be overlooked: data security, particularly in cases with sensitive data that have high-security requirements. Also, today's scale of cloud facilities can now provide certainty of access, redundancies for backup as well as secure locations, and this is particularly the case when enterprises and companies use global CSPs. A study by RapidScale, a managed cloud services company, showed that 94% of businesses saw improved security after switching to a cloud, while 91% said moving to cloud has made it easier to meet government compliance requirements.¹⁵

EXHIBIT 2

Data management costs are a large share of IT costs and growing quickly

DIFFERENT TYPES OF DATA MANAGEMENT COSTS AS A SHARE OF TOTAL INFORMATION TECHNOLOGY COSTS OF A MIDSIZE FIRM¹

Percent (%), 2020



1. A midsize firm has revenues with \$5 billion to \$10 billion and operating expenses of \$4 billion to \$6 billion.

2. Rounded to the nearest whole number.

SOURCE: Literature review; McKinsey & Company; AlphaBeta analysis

13. McKinsey & Company (2020), Reducing data costs without jeopardizing growth.

Available at: <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/reducing-data-costs-without-jeopardizing-growth>

14. McKinsey & Company (2018), Creating value with the cloud. Available at: <https://www.mckinsey.com/-/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Creating%20value%20with%20the%20cloud%20compendium/Creating-value-with-the-cloud.ashx>

15. Salesforce (2021), "12 Benefits of Cloud Computing".

Available at: <https://www.salesforce.com/products/platform/best-practices/benefits-of-cloud-computing/>

“ Cloud services are a foundational technology for businesses in the APAC-11 and are critical for businesses’ operational effectiveness and innovation. ”

BOX 1: CLOUD AND THE DIGITAL ECONOMY

Cloud services are a foundational technology for businesses in the APAC-11 and are critical for businesses’ operational effectiveness and innovation. By extension, the ability to access cloud services is therefore crucial to economic growth and prosperity in the APAC region. As cloud services are accessed via public internet infrastructure, businesses can source cloud services and software/ applications delivered via the cloud, locally or from overseas cloud service providers (CSPs), regardless of where the business is physically located. However, the most advanced cloud services (in terms of metrics like computational power and security) are from global CSPs with experience serving customers from multiple jurisdictions.¹²



12. Sources include Datamation (2021), "Top Cloud Service Providers & Companies of 2022." Available at: <https://www.datamation.com/cloud/cloud-service-providers/>; Zdnet (2021), "Top cloud providers: AWS, Microsoft Azure, and Google Cloud, hybrid, SaaS players." Available at: <https://www.zdnet.com/article/the-top-cloud-providers-of-2021-aws-microsoft-azure-google-cloud-hybrid-saas/>; Solutions Review (2019), "The 12 Best Managed Cloud Security Services Providers." Available at: <https://solutionsreview.com/cloud-platforms/the-12-best-managed-cloud-security-services-providers/>

- **Productivity benefits.** Productivity can also be enhanced significantly through the latest digital technologies, particularly when it comes to improved decision-making, greater collaboration, and operational efficiency. For instance, AI enables businesses to draw insights from millions of data points, potentially unlocking up to US\$5.8 trillion in annual value.¹⁶ This is achieved by reducing the likelihood of errors and employees' time spent on menial data processing work, and instead redirecting them towards more high-value activities such as strategy and business development. Modern digital technologies are also key to greater collaboration, inviting any number of users to access the same information and tools, from any device and from anywhere. Remote robotic surgery, for example, allows surgeons to perform a complex operation regardless of where they – or the patient – are physically located. Furthermore, when it comes to operational efficiency, the latest cloud services can help organizations optimize their resources and focus them on innovation

and problem-solving, rather than managing their own data center infrastructure, which is time consuming and resource intensive.¹⁷

- **Benefits from exporting digital goods and services.** Digital technologies are creating entirely new markets that previously did not exist. There is still no single accepted definition of digital trade (see Box 3), and traditional economic measures fail to adequately measure the value of digital trade to exports. Such digital trade opportunities include e-commerce, digital apps, online video advertising and digital infrastructure services (such as the export of video conferencing, digital file-sharing, and Voice Over Internet Protocol (VOIP)). The World Trade Organization (WTO) estimates that by 2030, global trade will rise by 34% as a direct result of digital technologies.¹⁸ Meanwhile, e-commerce platforms involved in cross-border transfers are estimated to have helped local businesses reduce their cost of distance in trade by 60%.¹⁹



16. McKinsey Global Institute (2018), Notes from the AI frontier: Insights from hundreds of use cases. Available at: <https://www.mckinsey.com/-/media/mckinsey/featured%20insights/artificial%20intelligence/notes%20from%20the%20ai%20frontier%20applications%20and%20value%20of%20deep%20learning/notes-from-the-ai-frontier-insights-from-hundreds-of-use-cases-discussion-paper.pdf>

17. A significant amount of time is required to set up and manage on-premises data center, which entail construction, planning the required capacity, power, and rack requirements, as well as maintaining the infrastructure. TRG Datacenters, "How to Build Your Own Data Center." Available at: <https://www.trgdatacenters.com/resource/how-to-build-your-own-data-center/>

18. Joshua P. Meltzer (2020), How APEC can address restrictions on cross-border data flows. Available at: <https://app.glueup.com/resources/protected/organization/895/event/29824/f4ede14f-b70e-45a4-84e4-098bc975a67b.pdf>

19. Global Data Alliance (2020), Submission for National Trade Estimate on Foreign Trade Barriers. Available at: <https://www.globaldataalliance.org/downloads/10292020GDA2020NTESubmission.pdf>

“ A recent report by the World Economic Forum (WEF) showed that by 2025, while 85 million jobs globally may be displaced by technology, 97 million new roles will emerge. ”

BOX 2: INDIRECT BENEFITS OF THE DIGITAL ECONOMY

Beyond cost savings and improved productivity, the digital economy also brings other indirect but important benefits, including the creation of new and high value-added jobs, new revenue sources and faster innovation cycles. A recent report by the World Economic Forum (WEF) showed that by 2025, while 85 million jobs globally may be displaced by technology, 97 million new roles will emerge.²⁰ Past research estimated that in India, technologies such as cloud computing is expected to generate over a million new jobs, such as cloud architects and infrastructure engineers, with these roles potentially earning double the salaries of traditional IT professionals.²¹

Companies can also leverage technology to improve their revenue and profitability. Key drivers of revenue increases include the automation of sales and marketing processes, leveraging data for revenue forecasting and delivering better products and services. For instance, by using a cloud-based tool to offer shoppers personalized recommendations, Southeast Asian brand Pomelo Fashion saw a 400% increase in return on investments within a month and a nearly 20% jump in revenue.²² A past survey of 1,400 companies globally found that firms with leading digital transformation were seeing almost twice the revenue growth compared to those who lagged digitally.²³ Moreover, going digital has proven crucial to product innovation, with digital solutions like idea management systems or simulation tools often expediting the conceptualization and design processes.²⁴

20. World Economic Forum (2020), The Future of Jobs Report 2020. Available at: <https://www.weforum.org/reports/the-future-of-jobs-report-2020>

21. The Economic Times (2018), "India to see over 1 million cloud computing job roles by 2022: Report." Available at: <https://economictimes.indiatimes.com/jobs/one-million-cloud-computing-jobs-to-be-created-by-2022-in-india-report/articleshow/6671045.cms?from=mdr>

22. AWS (2021), "Pomelo Fashion Enhances Shoppers' Experience, Increases Revenue Using Amazon Personalize." Available at: https://aws.amazon.com/solutions/case-studies/pomelo-case-study/?did=cr_card&trk=cr_card

23. Forbes (2021), "Digital Raises Revenues, But Unevenly, Study Says." Available at: <https://www.forbes.com/sites/joemckendrick/2021/09/29/digital-raises-revenues-but-unevenly-study-says/?sh=6119f1b51ee8>

24. Kroll et al (2018), Effects of automatization and digitalisation on manufacturing companies' production efficiency and innovation performance." Available at: <https://www.econstore.uib.no/bitstream/handle/10419/176701/1/1015780695.pdf>

BOX 3: DEFINING DIGITAL TRADE

Defining “digital trade” is difficult because of the rapidly changing nature of the digital economy. As a result, different organizations have been using different definitions.

The World Trade Organization (WTO) calls it “electronic commerce”, which has become the more commonly used term (rather than “digital trade”) and is understood as “the production, distribution, marketing, sale or delivery of goods and services by electronic means”.²⁵ On the other hand, while the Association of Southeast Asian Nations (ASEAN) Member States defines “e-commerce” as trade in goods and services enabled electronically under the Work Plan on the Implementation of ASEAN Agreement on Electronic Commerce in 2021, the Member States believe that the term does not fully reflect the breadth and depth of digital trade and it suggests the alternative term “digital economy” which encompasses e-commerce and all other digitally enabled economic activities.²⁶ The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) takes yet another broader approach, measuring the value of digital exports and seeking to capture the digital infrastructures related to exports and any digital goods and services.²⁷

For the purposes of this report, we define “digital exports” as comprising these three categories:

- **Digitally-enabled goods.** Refers to goods that are traded electronically via the Internet (i.e., e-commerce).
- **Digitally-enabled services.** Refers to services provided through digital technologies, such as data processing and online software consultancy services. It also includes other direct e-service exports like online booking and electronic banking through these categories cannot be measured due to data unavailability. Noteworthy is the size of the category because most services across the region have adopted digital technologies in some form and offer e-services to varying degrees.
- **Indirect digital services (embedded in other exports).** Refers to imported digital services that get used in the export of other products and services. Examples include telecommunication services such as email, video conferencing, digital file-sharing and VOIP services used by a mining firm when exporting overseas.



25. UNESCAP (2016), Internal trade in a digital age. Available at: <http://www.unescap.org/sites/default/files/aptr-2016-ch7.pdf>

26. Association of Southeast Asian Nations (2022), Work Plan on the Implementation of ASEAN Agreement on Electronic Commerce. Available at: https://asean.org/wp-content/uploads/2022/03/Work-Plan-E-commerce-Agreement_endorsed_logo.pdf

27. UNESCAP (2016), Internal trade in a digital age. Available at: <http://www.unescap.org/sites/default/files/aptr-2016-ch7.pdf>

BOX 4: SUCCESSFUL USE CASES OF CLOUD SERVICES

The digital economy at the same time enables and requires businesses to leverage the benefits of the latest technologies, including cloud services.

DENSO CORPORATION: IMPROVING PRODUCTIVITY OF ENGINEERS AND IT RESOURCES²⁸

DENSO Corporation is a global automotive components manufacturer headquartered in Kariya, Japan. The company needs to keep up with the fast evolution of image sensors, which use ML to support safe driving. To develop the necessary ML models required for image recognition, DENSO built Graphics Processing Unit (GPU) clusters in its on-premises environment. But with multiple ML engineers sharing limited GPU resources, productivity was invariably impacted. Since DENSO was operating and maintaining its ML solution in-house, its engineers were also spending significant amounts of time managing the servers and file systems.



To address these challenges, DENSO decided to migrate to Amazon Web Services (AWS) and implement Amazon SageMaker to help their data scientists and developers prepare, build, train and deploy high-quality models more quickly and effectively. Data engineers wound up reducing the time spent on data management by 55%, while ML engineers reduced hours spent on repeat work by 66%. Using Amazon SageMaker also resulted in a 20% cost savings compared to maintaining on-premises GPU clusters.

HERBS & CROPS OVERSEAS: EXPANDING INDIAN MSME'S FOOTPRINT INTERNATIONALLY THROUGH CROSS-BORDER E-COMMERCE²⁹

Based in Ahmedabad, India, Herbs & Crops Overseas specializes in natural herbs for healthcare, food supplements and cosmetics. Though established in 2013, the company only began tapping into e-commerce in 2016. E-commerce not only unlocked a wider market but also facilitated a more efficient order management system that provides key sales analytics. Since then, the MSME has, within a year, seen a 200% surge in sales through its access to customers abroad in countries such as the United States (US), United Kingdom (UK), and Japan.



Photo Source: <https://www.aboutamazon.in/news/small-business/from-a-family-business-in-electronics-to-trading-herbs-how-this-young-man-realised-his-dream>

28. Amazon Web Services (2021), “DENSO Automates ML Model Development for Driving Support Using Amazon SageMaker, Reduces Work Time by 55%-66%.” Available at: https://aws.amazon.com/solutions/case-studies/denso-corporation/?did=cr_card&trk=cr_card

29. Amazon, “Global Selling Success Story – Herbs & Crops Overseas.” Available at: <https://youtu.be/Tx4ao67qUMw>

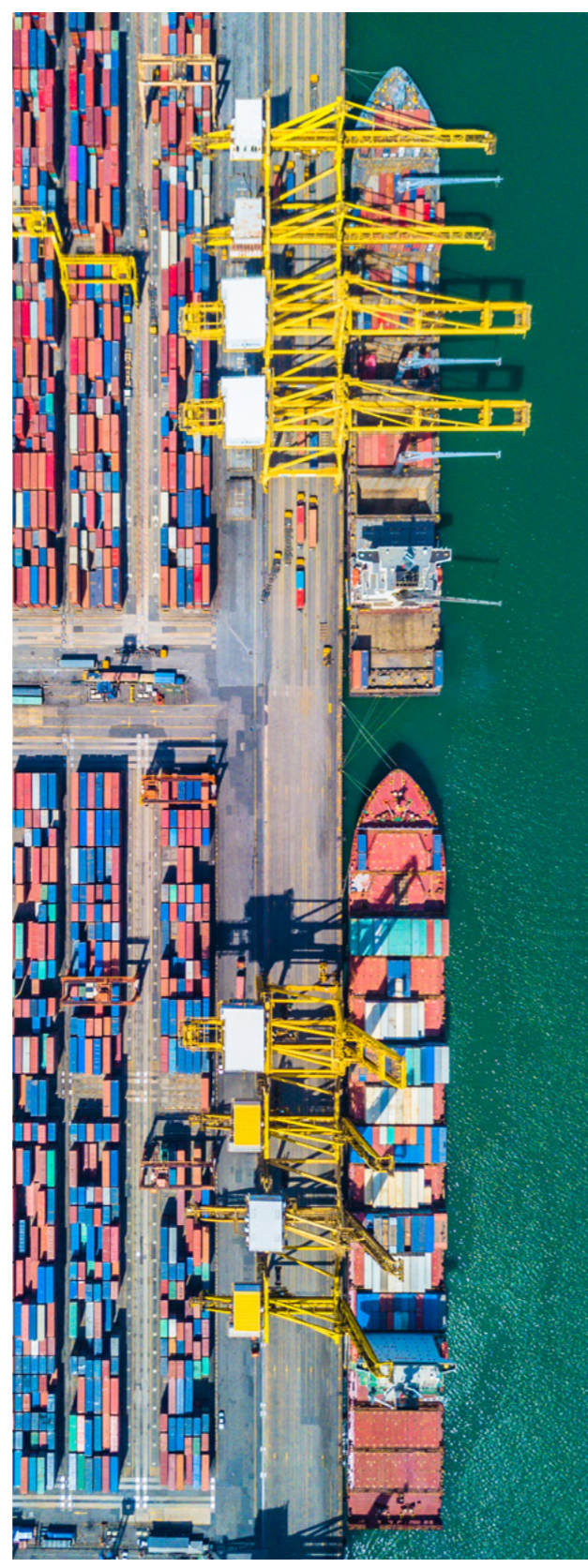
1.2 THE APAC-11 HAS SUCCESSFULLY CAPTURED 30% OF THEIR DIGITAL ECONOMY POTENTIAL IN 2021

The collective digital economy of the APAC-11 has grown considerably in recent years, and it is estimated to be US\$586 billion in 2021, capturing 30% of its digital potential (Exhibit 3).

1.3 IF CAPTURED FULLY, BENEFITS OF DIGITAL ECONOMY COULD REACH US\$2 TRILLION IN 2021

Benefits for the APAC-11 stemming from digital economies are potentially significant. In total, domestic benefits (in terms of improved efficiencies) and digital exports could have been worth around US\$2 trillion in 2021, with values varying by country (Exhibit 4).³⁰ It is worth noting that these estimates assume that countries can fully migrate and access best-in-class digital technologies and universal cloud-enabled tools to maximize their potential to be in line with relevant benchmark countries (see Appendix A5 for further details on the methodology).

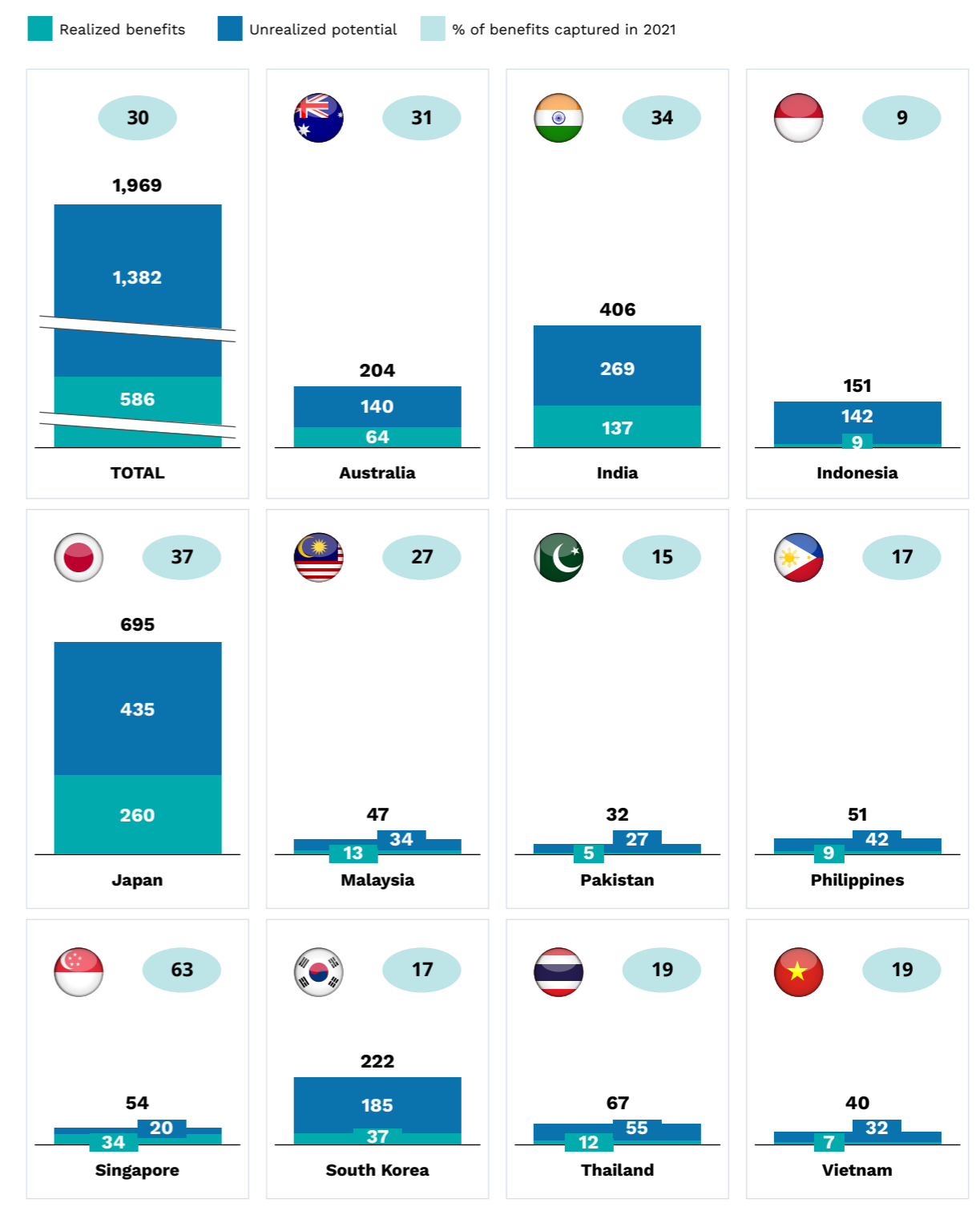
The digital economy is a powerful economic engine for growth and prosperity among the APAC-11, but the unrealized potential is a missed opportunity. The next chapter assesses the economic upside if the identified gaps are addressed.



30. The digital economy benefits refer to domestic benefits (from cost savings and time savings from improved productivity) and revenue from exports of digital goods and services.

EXHIBIT 3 The digital economy for the APAC-11 is estimated to be US\$586 billion in 2021, capturing 30% of its digital potential

REALIZED BENEFITS AND UNREALIZED POTENTIAL FROM THE DIGITAL ECONOMY¹, 2021; US\$ billions

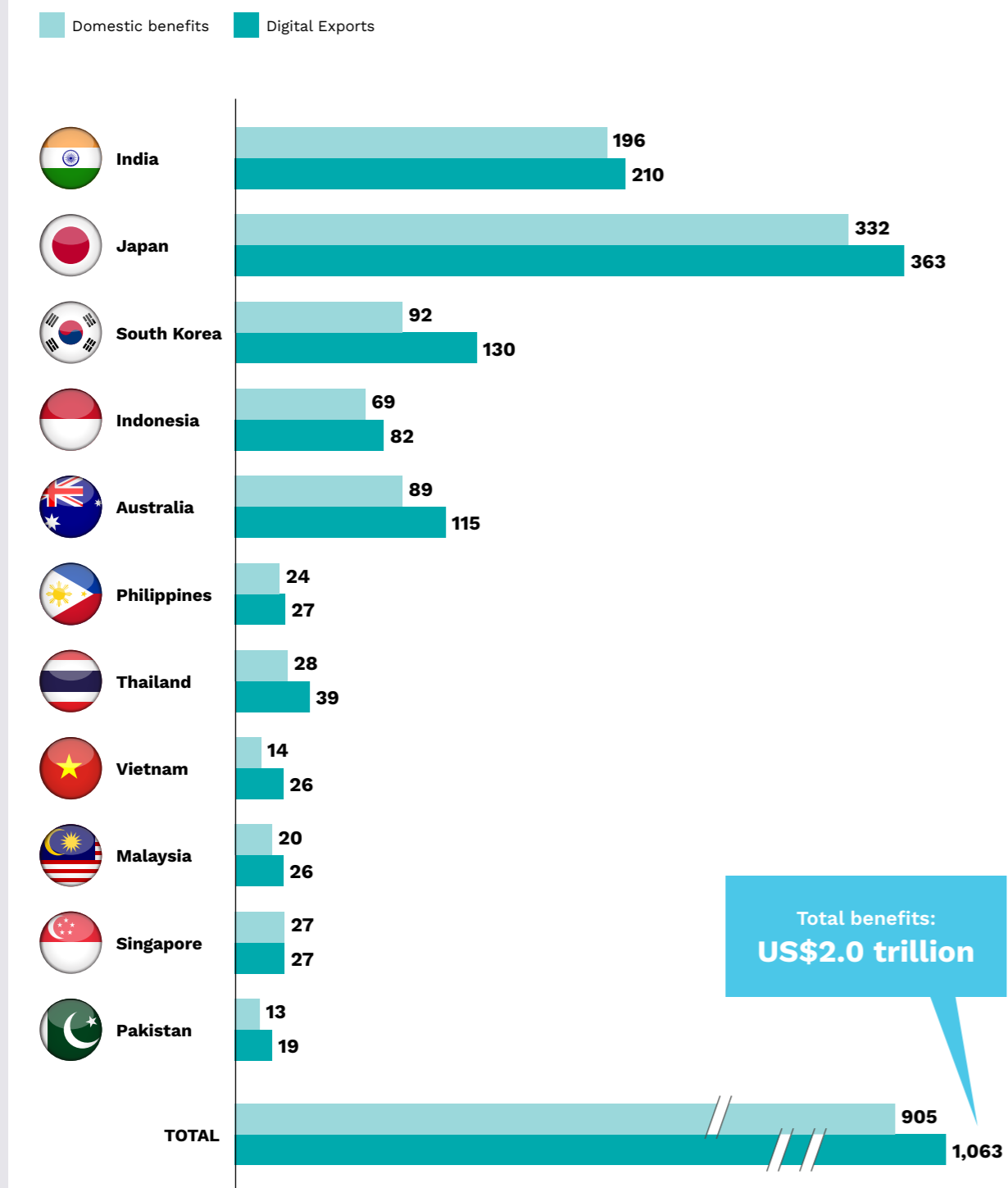


1. The digital economy benefits refer to domestic benefits (from cost savings and time savings from improved productivity) and revenue from exports of digital goods and services. SOURCE: AlphaBeta analysis

EXHIBIT 4

The digital economy could potentially have delivered US\$2 trillion in benefits for the APAC-11 in 2021

POTENTIAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY¹, 2021;
US\$ billions



1. The digital economy benefits refer to domestic benefits (from cost savings and time savings from improved productivity) and revenue from exports of digital goods and services.

SOURCE: AlphaBeta analysis

chapter 02

Attaining the unrealized: Recommendations on capturing the digital economy opportunity

An upside potential worth US\$2.2 trillion is achievable in 2030 if the APAC-11 focuses efforts on four enablers — policy, infrastructure, capability, and competition. The four enablers are determined based on AlphaBeta's Digital Connectivity Index, which showcases the key steps needed for the APAC-11 to fully capture the potential of the thriving digital economy.

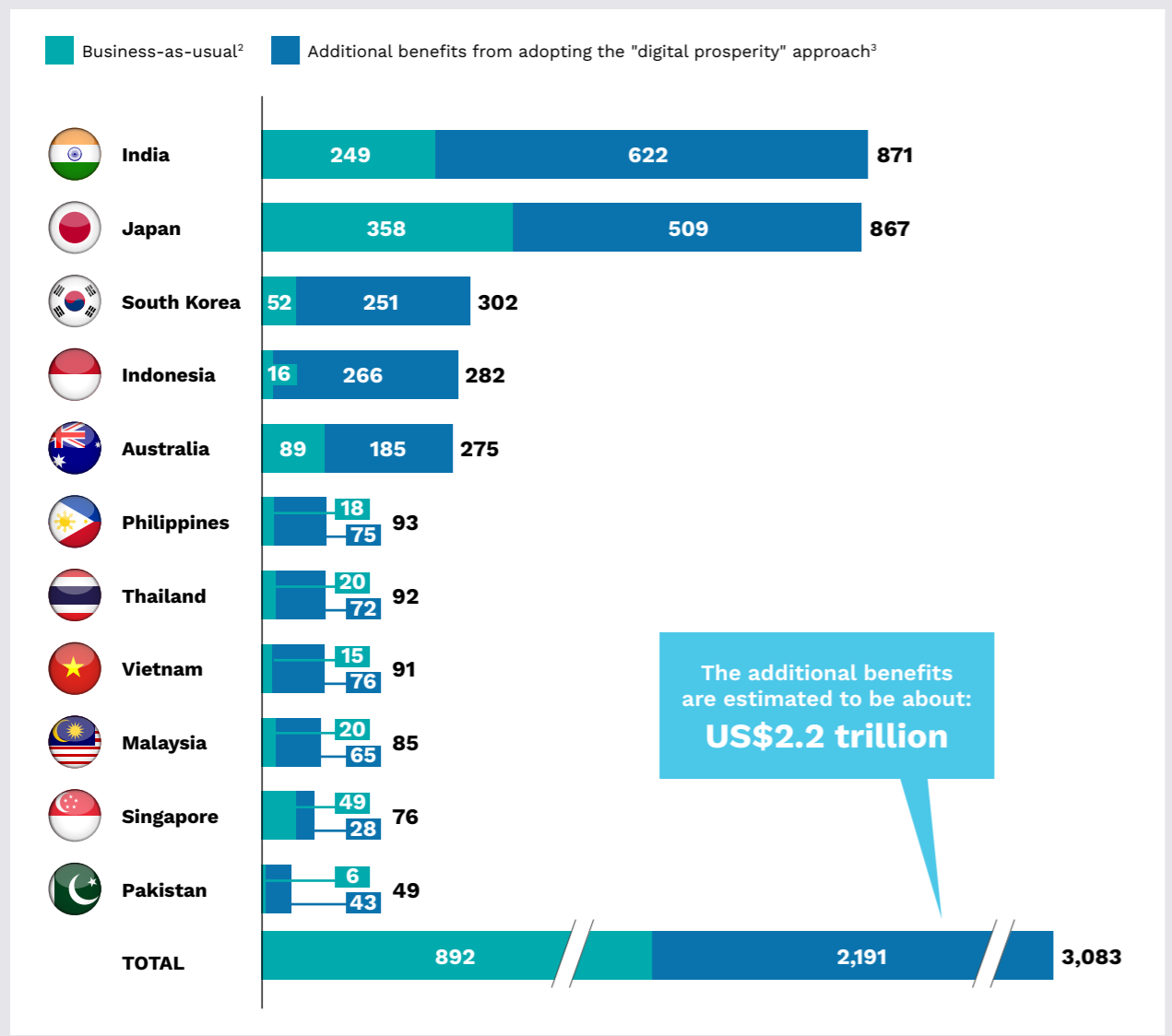
Our research has shown that by adopting a new approach — dubbed here as “digital prosperity”, which seeks to merge the benefits of flexible regulations, widespread access to global technologies and a strong focus on domestic capabilities and skills, countries will be able to fully capture the benefits of the digital economy. This approach presents key recommendations that are critical to the digital economy.

2.1 THERE IS AN UPSIDE OF US\$2.2 TRILLION IF THE APAC-11 CAN FULLY CAPTURE THE BENEFITS OF THE DIGITAL ECONOMY

If the APAC-11 maintains current policy settings, the countries will collectively capture a potential US\$892 billion from the digital economy in 2030 (Exhibit 5). However, if countries ramp up efforts on current enablers, a far greater prize — over US\$3 trillion, or an additional US\$2.2 trillion above the business-as-usual approach — is the more likely prize in 2030.

EXHIBIT 5
Ramping up efforts on current enablers can unlock an additional US\$2.2 trillion in 2030

POTENTIAL ANNUAL ECONOMIC BENEFITS¹ FROM THE DIGITAL ECONOMY UNDER DIFFERENT SCENARIOS, 2030; US\$ billions



1. The digital economy benefits refer to domestic benefits (from cost savings and time savings from improved productivity) and revenue from exports of digital goods and services.
2. This scenario looks at the value in 2030 based on current digital adoption.
3. This scenario looks at the full potential value in 2030 based on accelerated digital adoption (i.e., the domestic benefits that can be realised if 100% of enterprises in the country adopt digital technology and the export benefits that can be realised based on the best-in-class share of GDP).
SOURCE: AlphaBeta analysis

2.2 THIS WILL REQUIRE ADDRESSING THE GAPS FOR FOUR ENABLERS — POLICY, INFRASTRUCTURE, CAPABILITY, AND COMPETITION

Despite the significant growth opportunities posed by the digital economy, as shown in Chapter 1, the APAC-11 has only captured less than a third of the achievable economic value. What can be done to realize the full potential of their digital economies? Based on an extensive literature review, we identified four enablers that are crucial to capturing the benefits of the digital economy (Exhibit 6).

According to AlphaBeta's Digital Connectivity Index (which examines 26 specific parameters under these four enablers), the specific areas for each country to work on to capture more of the digital economy vary (Exhibit 7).³¹

Based on the four enablers (Exhibit 8), we evaluated what the APAC-11 has done well and where the gaps are.³²



31. See Appendix A2 and A3 for further details.
32. The individual parameters of the Index and each country's digital economy performance are detailed in Appendix A1 and A2.

EXHIBIT 6 Four enablers are crucial to capturing the digital economy opportunity

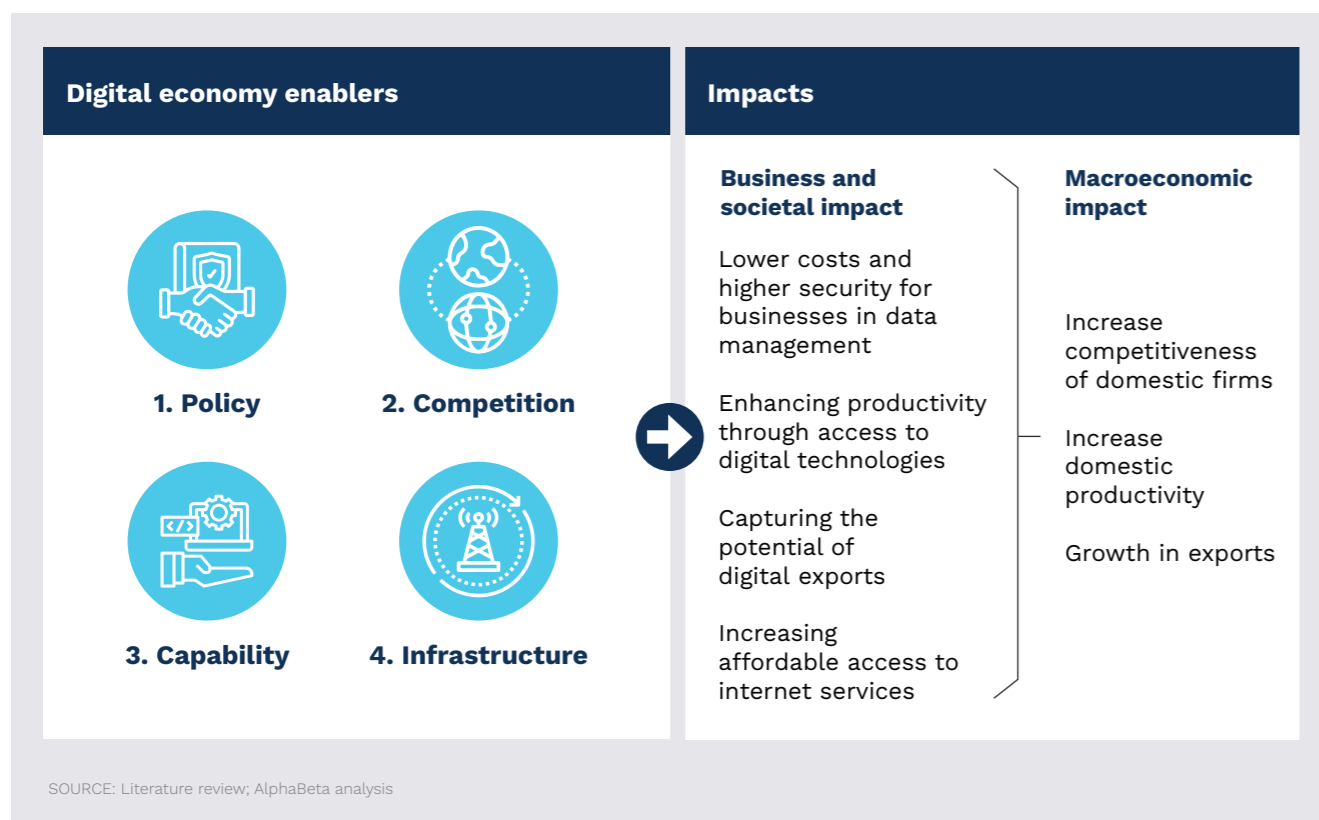


EXHIBIT 7 The APAC-11 vary significantly in their performance across the 4 enablers

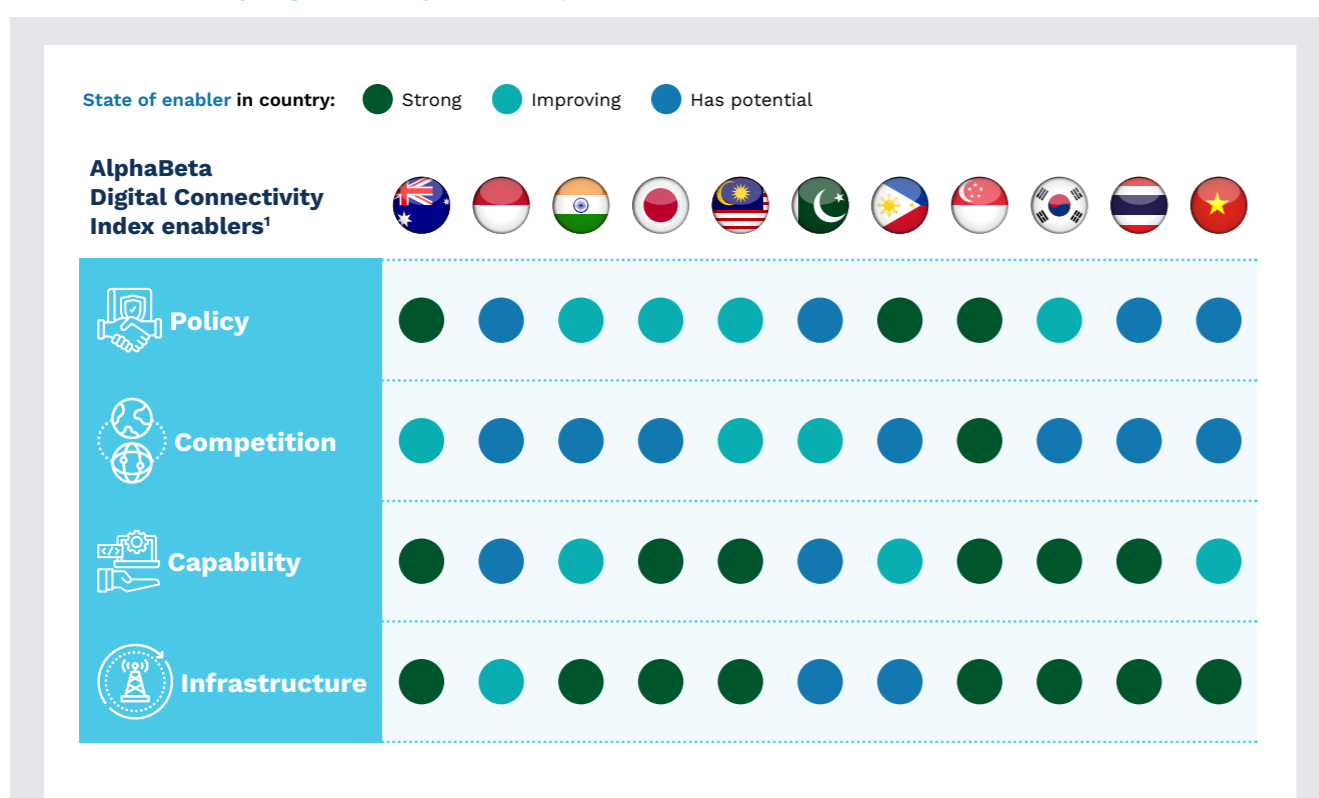


EXHIBIT 8 26 parameters across the 4 enablers are instrumental to a well-functioning digital economy

Digital economy enablers		
 Policy	1. Appropriate data governance frameworks 2. Minimal data localization restrictions 3. Clarity on notification and bases for processing cross-border data (e.g., consent; authority approval) 4. Interoperability of cross-border frameworks 5. Guidelines on public authority access to data locally	6. Guidelines on public authority access to cross-border data 7. Minimization of administrative and fiscal barriers for digital exports 8. Interoperability of digital payment regulations and supportive digital payment initiatives 9. Absence of local registration requirements and minimal limitations on foreign ownership and investment
 Competition	10. Absence of local sourcing requirements 11. Open government procurement	12. Competitive businesses environment with fair software licensing principles 13. Access to international digital service providers
 Capability	14. Access to digital skills 15. Micro, small and medium sized enterprises (MSME) digital adoption and exporting 16. Clear digital transformation strategy 17. Access to cloud computing among local enterprises	18. Flexible regulations to accommodate evolving technologies 19. Cloud-first government policy 20. Strong intellectual property (IP) protection
 Infrastructure	21. Broadband access 22. Affordable broadband costs 23. Robust and relevant cybercrime and cybersecurity policy frameworks	24. Comprehensive organizational setup within the government 25. Adequate capacity development 26. Strong international partnerships

SOURCE: Literature review; AlphaBeta analysis



1. POLICY

The policy enabler includes supportive policies that enable cross-border data flows while safeguarding privacy and data sovereignty aims, as well as initiatives that minimize border frictions impeding digital trade and foreign investment. The seamless movement of data is crucial to capturing the benefits of the digital economy, be it coordination across geographically separated teams, pooling global data to derive business insights, or supporting the exports of digital goods and services. Examples of how the APAC-11 has successfully addressed the digital enablers over the last few years include strong participation in Mutual Legal Assistance Treaties (MLATs) by countries such as Australia, Malaysia, and Vietnam to facilitate cross-border information and data sharing³³, as well as the development of clear frameworks with multiple bases for processing data in Japan, Thailand, and the Philippines to enable cross-border data flows.³⁴ However, more can be done to create an enabling policy environment for businesses and the following gaps are making it especially challenging:

- Room for improvement in data governance frameworks.** The absence of risk-based data governance frameworks and the lack of consistent approaches to the definitions of data types and use-cases subject to regulation increases uncertainty and business risks, and creates unnecessary regulatory compliance costs. For example, the Law on Cybersecurity in Vietnam, and its implementing Decree No. 53/2022/ND-CP (Decree 53) includes data localization requirements for all “user data”.³⁵ This includes personal information, information about social relationships, as well as network IP addresses and credit card data.³⁶ This goes beyond what is typically covered in data protection or government data classification frameworks, causing significant confusion to businesses operating in Vietnam, as well as across the region. This is likely to result in over-classification of data, leading to more burden on businesses to distinguish and identify the governance processes for different data types.

33. Sources include Australia Government (2021), “Australia-US CLOUD Act Agreement”. Available at: <https://www.homeaffairs.gov.au/about-us/our-portfolios/national-security/lawful-access-telecommunications/australia-united-states-cloud-act-agreement>; BSA (2018), Country Report: Malaysia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf; and BSA (2018), Country Report: Vietnam, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Vietnam.pdf

34. Sources include Linklaters (2020), “Data Protected - Japan”. Available at: <https://www.linklaters.com/en/insights/data-protected/data-protected---japan/>; Data Guidance (n.d.), “Japan - Data Protection Overview”. Available at: <https://www.dataguidance.com/notes/japan-data-protection-overview/>; Securiti (2020), “Thailand’s first-ever Personal Data Protection Act”. Available at: <https://securiti.ai/blog/thailand-personal-data-protection-act/>; National Privacy Commission (2017), Various Queries Regarding the Implementing Rules and Regulations (IRR) of the Data Privacy Act (DPA) of 2012. Available at: https://www.privacy.gov.ph/wp-content/files/attachments/advopn/NPC_AdvisoryOpinionNo_2017-018.pdf; and ABLI (2020), Comparative Review of Data Transfer Laws and Regulations in Asia. Available at: <https://abliasia/NEWS-EVENTS/Whats-New/ID/134>

35. Rouse (2022), “Vietnam: Cybersecurity Law Decree Issued”. Available at: <https://rouse.com/insights/news/2022/vietnam-cybersecurity-law-decree-issued>

36. Rouse (2022), “Vietnam: Cybersecurity Law Decree Issued”. Available at: <https://rouse.com/insights/news/2022/vietnam-cybersecurity-law-decree-issued>

- Stringent data localization restrictions.** Due to security and data privacy concerns, some countries have been restricting the movement of certain data types across borders.³⁷ In practice, many businesses would not find it practicable to “carve out” data that is covered by these requirements and would often have to restrict the manner in which all data is processed and the corresponding workloads. In the most extreme cases, businesses stop using the cloud and any software or applications offered by cloud service providers entirely. This may therefore result in consumers and businesses no longer being able to benefit from cost savings and increased economic activity made possible by seamless cross-border data flow (e.g., using more cost-efficient global CSPs).³⁸ Additionally, these requirements might undermine cybersecurity instead, as businesses and consumers could be prevented from accessing the most state-of-the-art secure infrastructure, applications or software. Furthermore, the cross-border sharing of data is needed to identify systemic vulnerabilities³⁹ and for the security community to work together to address these vulnerabilities.
- Limited cross-border, interoperable frameworks.** With digital information traversing the globe seamlessly, interoperable and robust privacy frameworks are more crucial than ever. Participating in multilateral agreements allows countries to benefit from data protection controls and discourages deviations from best-in-class standards. Many APAC-11 countries are not yet members of actionable cross-border data flows frameworks, or have openly acknowledged global certifications (e.g., Global Cross-Border Privacy Rules (CBPR) system, ISO 27018 or ISO 27701). Some APAC-11 countries have also not participated in any multilateral agreements. Even for those that have, the agreements that they are a part of may include some restrictions on cross-border data transfers (e.g., data flows may be restricted when there is a legitimate public policy concern such as those deemed sensitive from a national security perspective) (Exhibit 10).
- Administrative and fiscal barriers.** Administrative and fiscal barriers such as complex customs processes, extensive document requirements and low customs thresholds significantly increase regulatory compliance and administrative costs for businesses. This, in turn, reduces participation in digital trade activities amongst businesses. The International Chamber of Commerce (ICC) has recommended that countries establish a global baseline de minimis threshold of at least US\$200 to generate economic benefits, drive economic growth and generate jobs.⁴² Some APAC-11 countries such as India, Indonesia, Japan, and Malaysia have set very low customs thresholds (less than US\$200, see Box 6) beyond which taxes are charged. This imposes significant administrative costs to businesses, making it challenging for them to engage in international trade.⁴³
- Unclear and onerous notification and bases for processing data across borders.** Unclear and onerous user notification and bases for processing data (such as consent of data owners, or approval from the authority for any cross-border transfers of data) create significant barriers to cross-border data flows. With user notification requirements differing from country to country, compliance costs for both businesses and governments are likely to escalate. This has been observed in Indonesia, where an Electronic System Operator (ESO)⁴⁰ must obtain not only written consent from each personal data owner but must also seek approval from the Minister of Communications and Informatics (MoCI) before they can transfer the data.⁴¹

37. Sources include Salesforce and Access Partnership (2021), Data Beyond Borders 2.0.

Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

38. GSMA (2018), Cross-Border Data Flows Realising benefits and removing barriers.

Available at: https://www.gsma.com/publicpolicy/wp-content/uploads/2018/09/GSMA-Cross-Border-Data-Flows-Realising-benefits-and-removing-barriers_Sept-2018.pdf

39. ITIF (2021), “How Barriers to Cross-Border Data Flows Are Spreading Globally, What They Cost, and How to Address Them”.

Available at: <https://itif.org/publications/2021/07/19/how-barriers-cross-border-data-flows-are-spreading-globally-what-they-cost>

40. ESOs are defined as persons, business entities, or communities that operate an electronic system. Source: Baker Mackenzie.

Available at: <https://www.globalcompliance.com/2021/01/17/indonesia-indonesia-regulates-foreign-private-electronic-system-operators11122020/>

41. Herbert Smith Freehill (2021), “Cross-border data transfers- an Indonesian law update”.

Available at: <https://www.lexology.com/library/detail.aspx?g=c93c325c-65ab-4b9d-8ad4-7cadabcb6287>

42. Trade Facilitation Implementation Guide (n.d.), “De minimis”.

Available at: <https://ftiq.unece.org/contents/de-minimis.htm#-text=ICC%20recommends%20establishing%20a%20global%20economy%20and%20enhancing%20job%20creation.>

43. Global Express Association (2021), Overview of de minimis value regimes world wide.

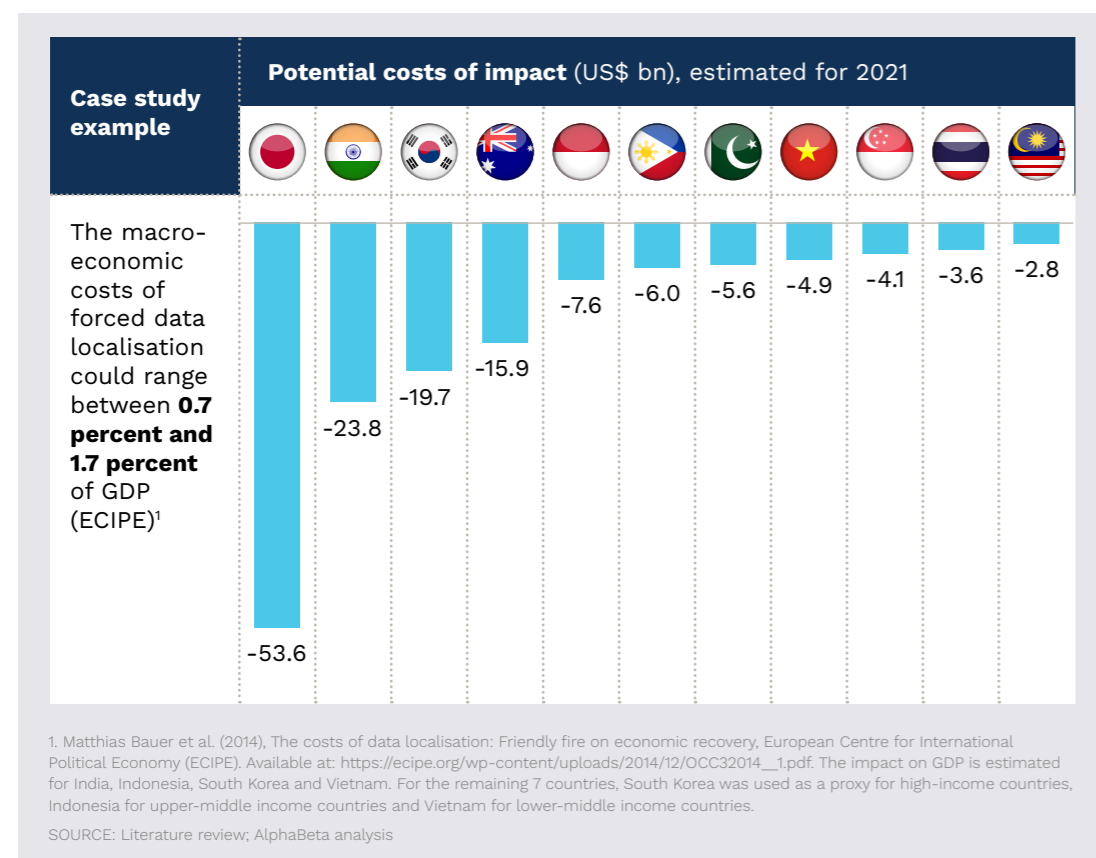
Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf

BOX 5: THE IMPACT OF RESTRICTED CROSS-BORDER DATA FLOWS

Constraints on cross-border data flows not only affect the digital sector, but also the broader economy. Research has shown that the macroeconomic costs of forced data localization range between 0.7% and 1.7% of GDP, as it reduces trade, slows productivity, and increases costs for the affected industries.⁴⁴ Exhibit 9 below shows the adverse impact of cross-border data restrictions across the APAC-11 based on implemented and potential regulations. Another recent research by Salesforce (prepared by Access Partnership) highlights a positive linkage between cross-border data openness and the performance of economic indicators like economic growth and competitiveness.⁴⁵

EXHIBIT 9

Data localization requirements could significantly impact the APAC-11 countries



44. Matthias Bauer et al. (2014), The costs of data localization: Friendly fire on economic recovery, European Centre for International Political Economy (ECIPE). Available at: https://www.aicasia.org/wp-content/uploads/2017/06/OCC32014_1.pdf

45. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0.

Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

- Limited interoperable payment regulations and initiatives.** Inadequate digital payment regulations and initiatives may adversely impact cross-border payments, discouraging local businesses from exporting their goods to or procuring digital services from abroad - potentially due to a lack of infrastructure or differing standards. For instance, a key reason Pakistan has not yet captured the digital economy's full potential is its underdeveloped digital payment infrastructure such as payment gateways and weak financial inclusion (low credit card penetration rate of 1%).⁴⁶ Payment gateways, which are critical in enabling cross-border digital transactions, are not available in Pakistan currently due to the high costs of entry, money laundering issues, and clearance complications, further stifling growth in the industry.⁴⁷
- Stringent registration requirements and limits on foreign ownership and investment.** Studies have shown that stringent local registration requirements and limitations on foreign ownership and investment are likely to have severe impacts on the digital

economy, as they reduce spillovers of knowledge and foreign direct investment, not to mention the adoption of foreign technologies by domestic businesses.⁴⁸ In the Philippines, prior to new amendments in 2022, there were restrictions on e-commerce business ownership.⁴⁹ Unless the business' paid-up capital was more than US\$2.5 million for general business, or US\$250,000 per store for luxury products, foreign entities could only own at most 40% of the e-commerce business.⁵⁰ Such restrictions hindered foreign participation in digital trade activities, making it all the more challenging for the country to further unlock the potential of its digital economy. However, in the first half of 2022, the Philippines significantly eased restrictions to foreign direct investments.⁵¹ For instance, while there are still some requirements (e.g., hiring of local workers and the introduction of advanced technology), the amendments to the regulations greatly lowered the minimum paid-up capital needed and increased the potential of full foreign equity.



44. Trade Facilitation Implementation Guide (n.d.), "De minimis".

Available at: <https://tfiq.unecce.org/contents/de-minimis.htm#~:text=ICC%20recommends%20establishing%20a%20global,economy%20and%20enhancing%20job%20creation.>

45. Global Express Association (2021), Overview of de minimis value regimes world wide.

Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf

46. Sources include PPRO (2022), "Pakistan". Available at: <https://www.ppro.com/countries/pakistan/>; and Javed, Asif (2020). "Prospects and Problems for E-commerce in Pakistan." Asian Journal of Economics, Finance and Management (2020): 131-139. Available at: https://www.researchgate.net/publication/346812786_Prospects_and_Problems_for_E-commerce_in_Pakistan

47. Javed, Asif (2020). "Prospects and Problems for E-commerce in Pakistan." Asian Journal of Economics, Finance and Management (2020): 131-139.

Available at: https://www.researchgate.net/publication/346812786_Prospects_and_Problems_for_E-commerce_in_Pakistan

48. ECIPE (2018), Digital Trade Restrictiveness Index. Available at: https://ecipe.org/wp-content/uploads/2018/05/DTRI_FINAL.pdf

49. ECIPE (2018), Digital Trade Restrictiveness Index. Available at: https://ecipe.org/wp-content/uploads/2018/05/DTRI_FINAL.pdf

50. Zico Law (2021), "The State of E-commerce in Philippines." Available at: <https://www.zicolaw.com/resources/alerts/the-state-of-e-commerce-in-philippines/>

51. Zico Law (2022), "Amendments to Philippine Foreign Investments Act Passed". Available at: https://www.zicolaw.com/resources/alerts/amendments-to-philippine-foreign-investments-act-passed/#_ftn3; and ASEAN Briefing (2022), "The Philippines Amends its Foreign Investment Act". Available at: <https://www.aseanbriefing.com/news/the-philippines-amends-its-foreign-investment-act/>

EXHIBIT 10

Many of the APAC-11 are not part of multilateral agreements related to cross-border data flows and privacy frameworks

	EXAMPLES OF AGREEMENTS				
	CPTPP Comprehensive & Progressive Agreement for Trans-Pacific Partnership	US-Japan Digital Trade Agreement	Singapore-Chile-NZ DEPA Singapore-Chile-NZ Digital Economy Partnership Agreement	SADEA Singapore-Australia Digital Economy Agreement	APEC CBPR APEC Cross Border Data Privacy Rules
	Part of bilateral/multilateral agreement			Part of bilateral/multilateral agreement	Part of bilateral/multilateral agreement
	Part of bilateral/multilateral agreement	Part of bilateral/multilateral agreement			Part of bilateral/multilateral agreement
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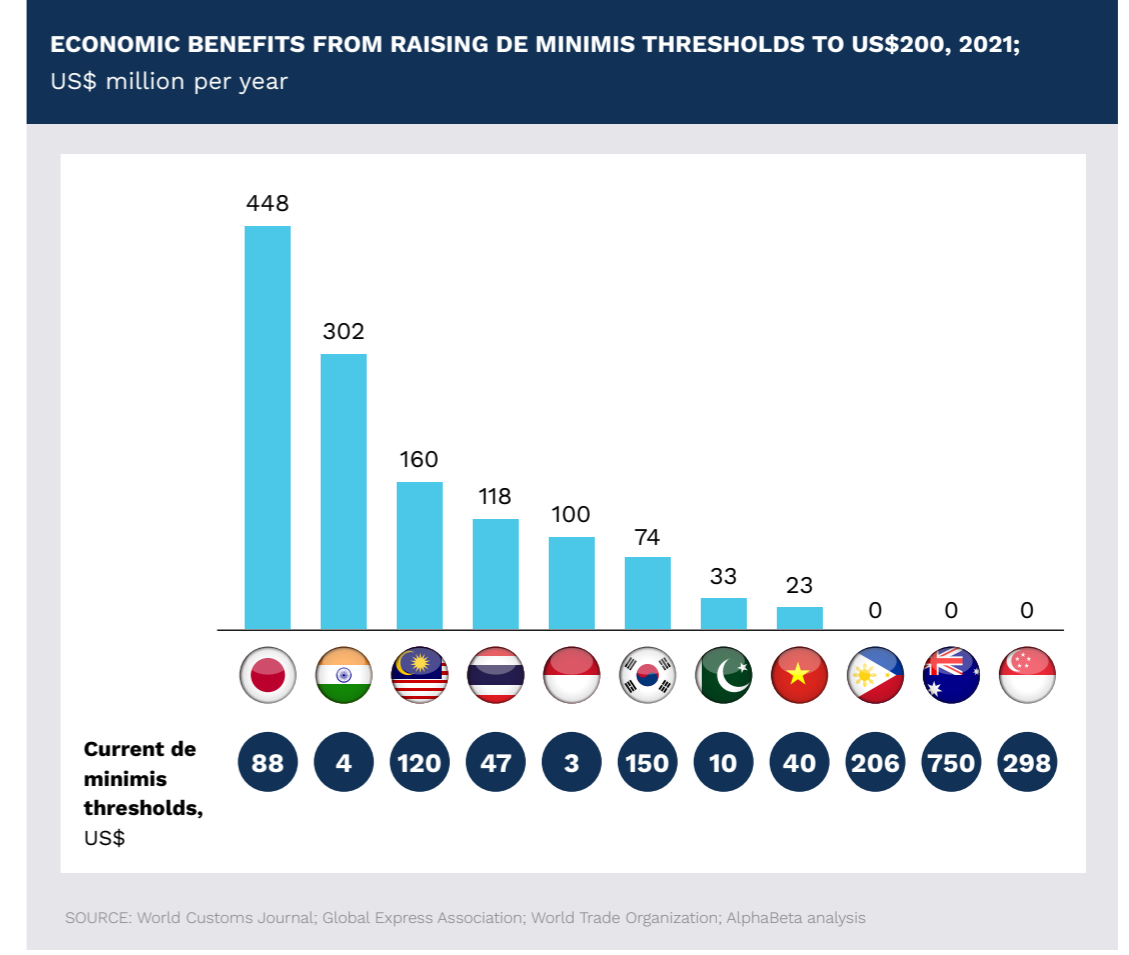
SOURCE: Literature review; AlphaBeta analysis

BOX 6: WHY ARE DE MINIMIS THRESHOLDS CRITICAL?

The de minimis threshold is the customs threshold below which less or no taxes are charged on cross-border shipments, and certain exemptions on border clearance procedures are applied.⁵² A broader threshold generates economic benefits by focusing public revenue collection on more efficient revenue sources, facilitating trade (including digital trade) by driving down the costs of imports and exports and accelerating the delivery of imports.⁵³ Past research shows that a de minimis threshold of US\$200 is optimal and could generate over US\$30 billion in economic benefits for all 21 APEC members⁵⁴, but the de minimis threshold remains lower in several countries today. Raising custom thresholds to US\$200 could create significant potential benefits for APAC-11 countries, with Japan benefitting US\$440 million annually, and India and Malaysia benefitting US\$302 million and US\$160 million, respectively (Exhibit 11).

EXHIBIT 11

Raising custom thresholds could create significant benefits for the APAC-11 countries



52. Janio (2019), "What is De Minimis Value?". Available at: <https://janio.asia/articles/what-is-de-minimis-value/> and Trade Facilitation Implementation Guide, "De minimis". Available at: <https://tfiq.unece.org/contents/de-minimis.htm>

53. Stephen Holloway and Jeffrey Rae (March 2012), "De minimis thresholds in APEC", World Customs Journal, Vol.6 # 1. Available at: [https://worldcustomsjournal.org/Archives/Volume%206%2C%20Number%201%20\(Mar%202012\)/04%20Holloway_Rae.pdf](https://worldcustomsjournal.org/Archives/Volume%206%2C%20Number%201%20(Mar%202012)/04%20Holloway_Rae.pdf)

54. Stephen Holloway and Jeffrey Rae (March 2012), "De minimis thresholds in APEC", World Customs Journal, Vol.6 # 1. Available at: [https://worldcustomsjournal.org/Archives/Volume%206%2C%20Number%201%20\(Mar%202012\)/04%20Holloway_Rae.pdf](https://worldcustomsjournal.org/Archives/Volume%206%2C%20Number%201%20(Mar%202012)/04%20Holloway_Rae.pdf)

2. COMPETITION

For businesses to optimize their gains from the digital economy and be competitive, they need access to a wide range of local and imported digital technologies at an affordable cost. Barriers to procuring digitally enabled services (e.g., restrictions on access to international digital service providers) could impact the costs of accessing vital business functions, such as cloud computing, communication, or business management solutions. APAC-11 has made some progress in ensuring a competitive environment for businesses, with countries such as Australia and Singapore being signatories to the World Trade Organization Agreement on Government Procurement that prohibits it from giving preferential treatment to domestic goods, services, and suppliers⁵⁵, as well as countries such as Malaysia with clear regulations established allowing local organizations to easily access international digital service providers without restrictions.⁵⁶ While efforts have been committed to encourage fair competition, various gaps in the competition enabler hinder businesses and consumers from participating in the digital economy, including:

- **Stringent local sourcing requirements and limited foreign business participation in open government procurement.** While the intention is to enhance the competitiveness of local firms, local sourcing requirements put restrictions on foreign businesses from participating in open government tenders and could instead serve to undermine long-term domestic competitiveness. Such protectionist measures could increase the vulnerability of supply chains, encourage complacency and anti-competitive behavior among local businesses, and increase inflationary pressure on the prices of goods and services (since inputs

would be less cost-efficient).⁵⁷ Additionally, such foreign businesses are often a crucial part of the domestic technology ecosystem — partnering with local software vendors and systems integrators to service public sector tenders. For example, AWS has over 2,200 local partners spread across the APAC-11 countries.⁵⁸

- **Regulations lagging the business landscape.** Regulations might not recognize the latest developments in the business landscape, leading to an unequal playing field. For instance, legacy-based software licensing terms by cloud vendors leads to costly vendor lock-in through ambiguous licensing terms, restrict customer choice, and hinder business' journey to the cloud. In addition, ambiguous licensing terms may incur greater costs on customers. If under-licensing is discovered, vendors may impose penalties to customers. On the other hand, if any over-licensing such as when too many licenses had been acquired is uncovered, no refund is made to customers. Furthermore, with restrictive licensing terms, this limits the number of cloud options available to customers and impedes them from switching from one provider to another by locking them in to their directory solution.⁵⁹
- **Restricted access to international digital service providers.** Restrictions on access to international digital service providers could increase costs for businesses and slow down technological advancements.⁶⁰ For instance, South Korea's Cloud Security Assurance Program (CSAP) results in *de facto* restrictions for public sector agencies and some businesses from engaging the services of international digital service providers.⁶¹ Only local

data centers can be used for many cloud services in the country and cloud service providers are required to obtain a CSAP certification

when providing cloud services to public agencies in South Korea.⁶²

3. CAPABILITY

The capability enabler includes efforts to equip workers and businesses with the required capabilities to thrive in the digital economy. APAC-11 has focused efforts on enhancing the digital capabilities of workers and businesses in recent years. Countries such as India, Thailand, and Malaysia have a clear digital transformation strategy in place, with a dedicated government agency to ensure that the objectives of their strategies are met.⁶³ However, despite existing



efforts, there are some gaps in the enabler identified across the APAC-11 that continue to make it difficult to participate in the digital economy:

- **Limited access to digital skills.** According to a 2021 AlphaBeta study, close to 150 million workers in six APAC countries (Australia, India, Indonesia, Japan, Singapore, and South Korea) apply digital skills in their jobs today.⁶⁴ To keep pace with technological change, workers must continuously acquire new digital and cloud skills, with cloud architecture design and software operations support being the region's most in-demand.⁶⁵ Such capabilities vary widely among countries, however, with 48% of Singapore's workforce possessing cloud computing skills, while only 17% of Indonesians do.⁶⁶ Additionally, low awareness of training options is the top barrier faced by employers and workers in Japan, South Korea, and Indonesia, while time constraints are the biggest issue for workers in Australia, Singapore and India.⁶⁷
- **Barriers faced by MSMEs when exporting online.** MSMEs account for the majority of businesses worldwide and are important contributors to job creation and economic growth. Globally, they represent 90% of businesses and over 50% of employment.⁶⁸ However, many MSMEs face barriers to exporting overseas. A survey conducted in 2020 by AlphaBeta has shown that MSMEs in Singapore, Thailand, and Vietnam perceive the high costs of cross-border logistics,

55. Sources include United States Trade Representative (2020), 2020 National Trade Estimates Report on Foreign Trade Barriers. Available at: https://ustr.gov/sites/default/files/2020_National_Trade_Estimate_Report.pdf; and Ministry of Finance Singapore (2020), A Guide for Suppliers. Available at: https://www.gebiz.gov.sg/docs/Supplier_Guide_Summarised.pdf

56. Malaysian Communications and Multimedia Commission (2021), Cloud Service Regulation Introduced to Increase Accountability for User Data Security and Sustainability of Services. Available at: https://www.mcmc.gov.my/skmmgovmy/media/General/pdf2/ADVISORY_NOTICE_CLOUD-SERVICE-REGULATION.pdf

57. Ettmayr, C., & Lloyd, H. (2017). Local content requirements and the impact on the South African renewable energy sector: A survey-based analysis. *South African journal of economic and management sciences*, 20(1), 1-11. Available at: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S2222-34362017000100036&::text=Local%20content%20policy%20disadvantages,a%20form%20of%20protectionist%20measure; and EU Central Bank. (2019). "The economic implications of rising protectionism: a euro area and global perspective". Available at: https://www.ecb.europa.eu/pub/economic-bulletin/articles/2019/html/ecb.ebart201903_01-e589a502e5.en.html

58. AWS (2022), "Engage with AWS Partners". Available at: <https://partners.amazonaws.com/>

59. FairSoftware.Cloud (2022), "Principles of Fair Software Licensing for Cloud Customers". Available at: <https://www.fairsoftware.cloud/principles/>

60. Countries impose restrictions on international digital service providers for reasons such as national security concerns and the protection of domestic players. These concerns are addressed in Chapter 3.

61. BSA (2021), Re: Request for Comments To Compile the National Trade Estimate Report on Foreign Trade Barriers. Available at: <https://www.bsa.org/files/policy-filings/10262021ntesub.pdf>

62. BSA (2021), Re: Request for Comments To Compile the National Trade Estimate Report on Foreign Trade Barriers. Available at: <https://www.bsa.org/files/policy-filings/10262021ntesub.pdf>

63. Sources include Digital India (n.d.), "Vision of Digital India". Available at: <https://www.digitindia.gov.in/content/vision-and-vision-areas>; Digital India Corporation (n.d.), "Organisation Profile". Available at: <https://dic.gov.in/index.php/about/organisations/profile>; Royal Thai Embassy (n.d.), "What is Thailand 4.0". Available at: <https://thaiembdc.org/thailand-4-0-2/>; Digital Government Development Agency (2020), "Vision/ Roles of the DGA". Available at: <https://www.dga.or.th/en/about-us/vision/>; Malaysia Digital Economy Corporation (n.d.), "Who we are". Available at: <https://mdec.my/about-mdec/who-we-are/>; and MDEC (n.d.), "MDEC Moves Forward with 'Digital Investments Future5' Strategy". Available at: <https://mdec.my/news/mdec-moves-forward-with-digital-investments-future5-strategy/>

64. AlphaBeta (2021), Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches. Available at: <https://alphabeta.com/our-research/unlocking-apacs-digital-potential-changing-digital-skill-needs-and-policy-approaches/>

65. AlphaBeta (2021), Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches. Available at: <https://alphabeta.com/our-research/unlocking-apacs-digital-potential-changing-digital-skill-needs-and-policy-approaches/>

66. AlphaBeta (2021), Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches. Available at: <https://alphabeta.com/our-research/unlocking-apacs-digital-potential-changing-digital-skill-needs-and-policy-approaches/>

67. AlphaBeta (2021), Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches. Available at: <https://alphabeta.com/our-research/unlocking-apacs-digital-potential-changing-digital-skill-needs-and-policy-approaches/>

68. World Bank, "Small and Medium Enterprises (SMEs) Finance: Improving SMEs' access to finance and finding innovative solutions to unlock sources of capital". Available at: <https://www.worldbank.org/en/topic/smefinance>

stringent consumer protection laws in foreign countries, and high customs duties charged on online foreign trades to be key constraints on their e-commerce export efforts.⁶⁹

- **Lack of a clear digital transformation strategy.** Without a clear digital transformation strategy, it will be challenging for countries to digitize their industries and expand their knowledge-based economy. To steer the ecosystem towards the desired direction, countries require 1) a clear digitization strategy, and 2) dedicated agencies to roll out the plan with accountability residing at senior levels of government. For instance, Japan recently established a clear digitization strategy and central agency to drive the efforts. In the past, each ministry, agency, and local government has been promoting digitization separately, resulting in large-scale inefficiencies where 1,700 local governments procure and manage separate systems.⁷⁰
- **Local enterprises without access to cloud computing.** Across the APAC-11, there is a wide variance in access to cloud computing, with more than 60% of enterprises in Japan and Singapore using cloud services and less than 10% of Filipino and Pakistani enterprises using cloud services.⁷¹ In the Philippines, there are several obstacles faced by businesses, particularly MSMEs in their digitalization efforts. Despite government education and upskilling policies like the the “National Technical Skills Development Plan (NTESDP) 2018–2022” in the Philippines, corporate digital adoption has remained low. Based on a 2020 MSME survey conducted by the country’s Department of Trade and Industry (DTI), over 50% of businesses did not have any web presence.⁷² However, it is important to note the increase in digital adoption since the pandemic struck. By the first quarter of 2022, around 71%

of businesses in the Philippines have started or increased their use of digital platforms.⁷³

- **Inflexible regulations hindering the facilitation of evolving technologies.** Regulatory flexibility is important given how quickly technologies evolve. Without flexible regulations in place, it will reduce innovators’ access to regulatory expertise and tools to test their new services, and deter them from testing innovative propositions in the market with consumers.⁷⁴ Among the APAC-11, while most countries have launched regulatory sandboxes in one of the sectors, Vietnam is still developing its first regulatory sandbox in the finance sector.⁷⁵
- **Absence of cloud-first government policies.** Cloud-first government policies are crucial to a country’s digital transformation plans.⁷⁶ By adopting cloud computing technologies, the government can benefit considerably in productivity gains and cost savings from their Information and Communications Technology (ICT) budgets. In addition, such efforts will likely encourage industry players to also follow suit, accelerating the overall country’s digital transformation efforts. Some APAC-11 members such as Indonesia, however, have yet to develop cloud-first policies.
- **IP protection laws that disincentivize business.** IP protection laws are important as they protect the interests of businesses and consumers while spurring economic and innovation activities. In some countries, policies are disincentivizing businesses from investing in IP and innovation. For instance, in some cases, there are policies mandating that government bodies get access to non-personal data systems, discouraging businesses from investing in such systems.

69. Sources include Digital News Asia (2021), “Amazon releases report on e-commerce export opportunities for Singapore MSMEs”. Available at: <https://www.digitalnewsasia.com/business/amazon-releases-report-e-commerce-export-opportunities-singapore-msmes>; TQPR (2021), “Thailand’s e-commerce market is poised for double-digit growth based on Amazon commissioned report on export opportunities for Thailand SMEs”. Available at: <https://tqpr.com/thailands-e-commerce-market-is-poised-for-double-digit-growth-based-on-amazon-commissioned-report-on-export-opportunities-for-thailand-smes/>; and VnEconomy (2022), “Vietnam holds potential in exports from e-commerce”. Available at: <https://en.vneconomy.vn/vietnam-holds-potential-in-exports-from-e-commerce.htm>

70. Digital Agency (2021), “What is the Digital Agency?” Available at: <https://www.digital.go.jp/en/>

71. OECD (2020), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

72. Department of Trade and Industry (2021), “Understanding e-commerce in the Philippines.” Available at: https://ecommerce.dti.gov.ph/modali/baseline_survey.html

73. World Bank (2022), Strengthening the Digital Economy to Boost Domestic Recovery. Available at: <https://thedocs.worldbank.org/en/doc/d92d769b42180bed2bb65428c683df2f-0070062022/original/World-Bank-Philippines-Economic-Update-June-2022.pdf>

74. Financial Conduct Authority, “Regulatory Sandboxes.” Available at: <https://www.fca.org.uk/firms/innovation/regulatory-sandbox>

75. Global Government Fintech (2021), “Vietnam progresses fintech sandbox”. Available at: <https://www.globalgovernmentfintech.com/vietnam-progresses-fintech-sandbox/>

76. OECD (2017), OECD Digital Economy Outlook 2017. Available at: <https://www.oecd.org/internet/oecd-digital-economy-outlook-2017-9789264276284-en.htm>

4. INFRASTRUCTURE

The infrastructure enabler includes initiatives to improve digital connectivity and cloud services adoption, as well as facilitate robust cybersecurity systems in the country. This involves improving country-wide broadband access and making this access more affordable to the masses, as well as greater investments in cybersecurity infrastructure, regulations, processes, and talents. Countries such as Singapore, South Korea, and Japan have well-developed digital infrastructure, with more than 90% of their populations having quality and affordable access to the Internet, and have fared well on cybersecurity regulations and partnerships.⁷⁷ However, some gaps need to be addressed in the APAC-11 for it to attempt to reach its full potential in the digital economy:

- **Limited broadband access, especially in rural areas.** While network coverage across APAC-11 has increased, it remains a key issue in many APAC-11 countries, with wide discrepancies in Internet access even within the countries. In Pakistan, for instance, the majority of the country’s Internet infrastructure exists in urban areas⁷⁸, creating a vast urban-rural digital divide. A key obstacle has been the lack of financial incentives for private companies to invest in rural, remote areas that are deemed less profitable.⁷⁹
- **Expensive broadband services.** Access and affordability of broadband services should be core focal points for governments. In several APAC-11 countries, broadband access continues to be costly and unattainable for a mass majority of people. In the “2021 Digital Quality of Life Index”, the Philippines was ranked 72nd out of 110 countries in terms of Internet

affordability.⁸⁰ Contributing factors include the large scale of investment required to expand coverage, the lack of competition (two companies dominate the country’s telecommunications landscape), strict limits on foreign ownership, bureaucratic red tape around permits and outdated regulatory laws.⁸¹

- **Lack of robust cybersecurity frameworks.** Only the most robust cybersecurity frameworks and policies can ensure that digital technologies are adopted securely so that businesses and consumers are effectively protected against cybercrimes and threats. There is much scope for the APAC-11 countries to strengthen and align their cybersecurity policy frameworks to global standards and best practices. According to the ITU, legal and regulatory frameworks should include legislation that 1) identifies what constitutes illicit cyber activities as well as a set of tools to investigate, prosecute and enforce such legislation; 2) establishes cybersecurity baselines and compliance mechanisms for a set of national stakeholders; and 3) establishes procedures that ensure consistency with international obligations.⁸² To maximize the effectiveness of these frameworks, risk-based approaches could be balanced against compliance-based approaches.⁸³ According to the ITU’s “Global Cybersecurity Index”, Pakistan is ranked low on cybersecurity law. Although Pakistan has a cyber law in place, the “Prevention of Electronic Crime Act” (PECA), its implementation has not been optimal.⁸⁴ For instance, although the PECA stipulates the need for a clear response mechanism in the face of cyber-attacks, this has yet to be implemented.⁸⁵

77. Sources include World Bank (2020), “Individuals using the Internet (% of population)”. Available at: <https://data.worldbank.org/indicator/IT.NET.USER.ZS>; Economist Impact (2022), “The Inclusive Internet Index”. Available at: <https://impact.economist.com/projects/inclusive-internet-index/>; and International Telecommunication Union (2020), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>

78. AlphaBeta (2021), Unlocking Pakistan’s digital potential: The economic opportunities of digital transformation and Google’s contribution. Available at: <https://alphabeta.com/wp-content/uploads/2021/10/pakistan-digital-transformation.pdf>

79. The Diplomat (2020), “Pakistan’s Great Digital Divide”. Available at: <https://thediplomat.com/2020/07/pakistans-great-digital-divide/>

80. Surfshark (2021), “Digital Quality of Life Index 2021”. Available at: <https://surfshark.com/dql2021/>

81. Vice (2021), “Why Internet Speeds in the Philippines Are So Slow”. Available at: <https://www.vice.com/en/article/n7v3m/why-internet-speeds-philippines-slow-laws> and World Bank (2020), Philippines Digital Economy Report 2020 : A Better Normal Under COVID-19 – Digitalizing the Philippine Economy Now. Available at: <https://openknowledge.worldbank.org/handle/10986/34606>

82. ITU (2020), Global Cybersecurity Index. Available at: https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf

83. CIO (2021), The big debate: control compliance vs. risk management. Available at: <https://www.cio.com/article/191367/the-big-debate-control-compliance-vs-risk-management.html>

84. The Daily Swig (2021), “Pakistan government approves new cybersecurity policy, cybercrime agency”. Available at: <https://portswigger.net/daily-swig/pakistan-government-approves-new-cybersecurity-policy-cybercrime-agency>

85. The Daily Swig (2021), “Pakistan government approves new cybersecurity policy, cybercrime agency”. Available at: <https://portswigger.net/daily-swig/pakistan-government-approves-new-cybersecurity-policy-cybercrime-agency>

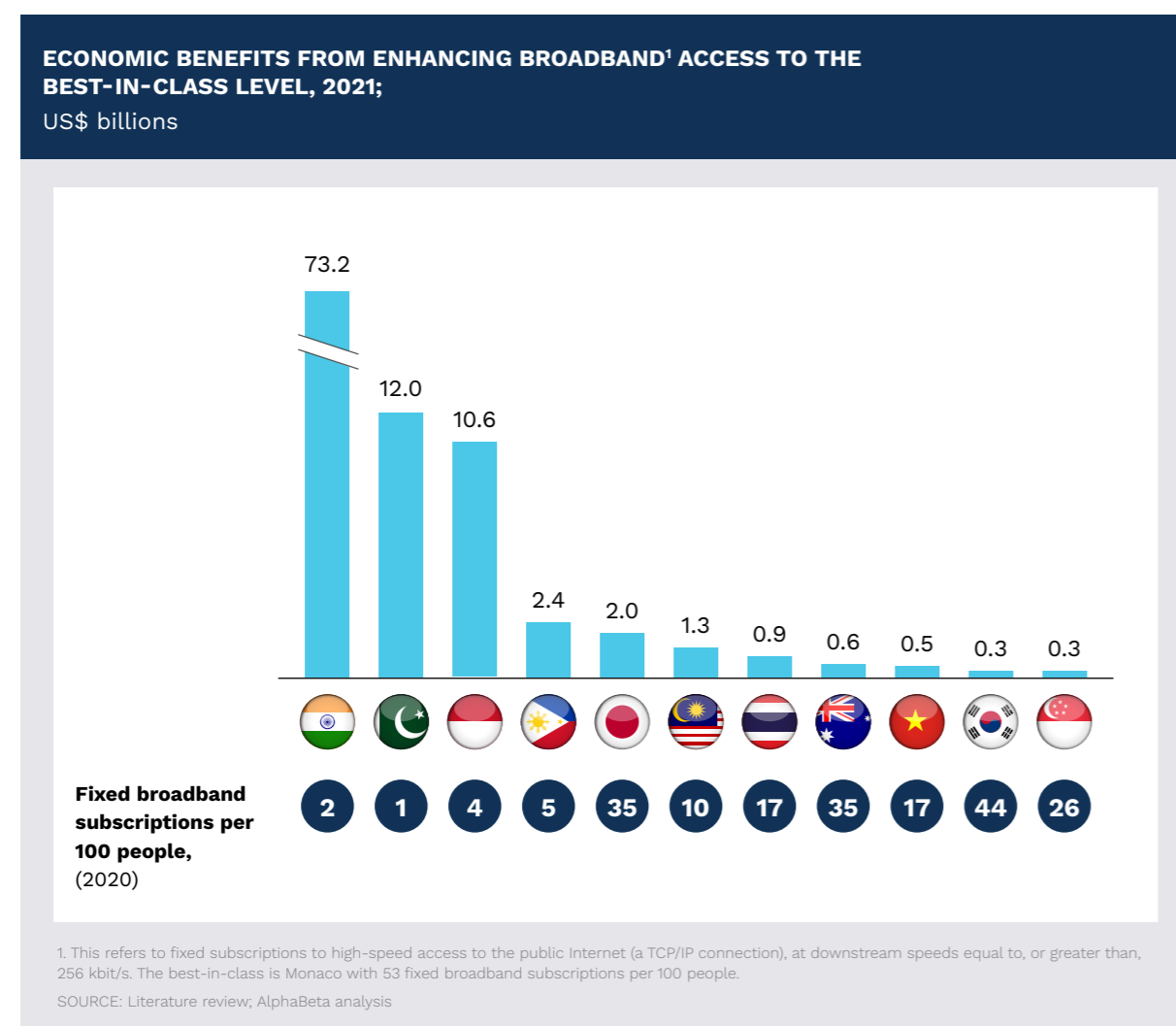
BOX 7: STATE OF BROADBAND SERVICES IN THE APAC-11 COUNTRIES

A study by the International Telecommunication Union (ITU) found that every percent increase in fixed broadband penetration yields a 0.14% increase in GDP growth for high-income economies and 0.05% in middle-income economies.⁸⁶ When applying these findings to the APAC-11 countries, they would collectively enjoy growth of over US\$103 billion in GDP if every country were to reach the global best practice in fixed broadband penetration rate (Exhibit 12).⁸⁷

Broadband access and affordability still vary significantly across the APAC-11, however, and policymakers ought to develop more targeted initiatives that move the needle towards universal

EXHIBIT 12

Enhancing broadband access could deliver a significant economic upside



86. International Telecommunications Union (2018), The economic contribution of broadband, digitization, and ICT regulation. Available at: https://www.itu.int/dms_pub/itu-d/obj/pref/D-PREF-EFBDR-2018-PDF-E.pdf. Other reports have also confirmed the positive relationship between fixed broadband penetration and economic growth. See: Tony Blair Institute for Global Change (2021), The Progressive Case for Universal Internet Access: How to Close the Digital Divide by 2030. Available at: <https://institute.global/policy/progressive-case-universal-internet-access-how-close-digital-divide-2030>; ITU (2020), How broadband, digitization and ICT regulation impact the global economy. Available at: <https://www.itu.int/en/myitu/Publications/2020/11/20/09/13/Global-econometric-modelling>; Brookings (2021), "The benefits and costs of broadband expansion". Available at: <https://www.brookings.edu/blog/up-front/2021/08/18/the-benefits-and-costs-of-broadband-expansion/>

87. In the ITU study, researchers found that on average across countries, an increase of 1% in fixed broadband penetration yields an increase of 0.08% in GDP. To ensure robustness, our analysis used this finding as it is statistically significant.

and affordable broadband access. The "Inclusive Internet Index", released by the Economist Intelligence Unit (EIU), scores 120 countries against a set of "infrastructure" metrics such as network availability, coverage, access to the Internet or mobile connectivity.⁸⁸ Drawing from the previous example, despite nearly 70% of Pakistan's population residing in rural areas, almost 90% of the country's ICT-related infrastructure is installed in urban areas.⁸⁹

Moreover, broadband costs remain high in many of the APAC-11 countries (Exhibit 13). In the Philippines and Pakistan, the cost of monthly broadband Internet access costs roughly 13% of the average monthly salary, making it difficult for most people, especially rural dwellers, to afford this access.⁹⁰

EXHIBIT 13

Internet access and affordability vary across the APAC-11

Country	Broadband Internet access		Mobile data access		Internet penetration
	Cost ¹ (US\$ per month)	Affordability (% of monthly net salary)	Cost ² (US\$ per 1GB per month)	Affordability (% of monthly net salary)	Percent of population
	21.08	1.0%	12.55	0.57%	97%
	31.63	0.7%	0.61	0.01%	92%
	35.05	1.4%	3.85	0.16%	90%
	53.5	1.3%	0.57	0.01%	90%
	26.58	3.1%	0.45	0.05%	90%
	17.49	3.5%	0.38	0.07%	78%
	10.67	2.4%	0.61	0.14%	70%
	31.44	9.3%	0.46	0.14%	54%
	39.19	13.4%	0.52	0.18%	50%
	9.35	1.3%	0.17	0.02%	43%
	21.22	13.6%	0.36	0.23%	25%

1. Average monthly costs for 60mpbs cable broadband internet access

2. Average monthly costs for 1GB of mobile data

NOTE: Data in the table is based on latest available figures

SOURCE: Cable.co.uk; Numbeo; World Bank

88. The Economist Intelligence Unit (2021), The Inclusive Internet Index. Available at: <https://theinclusiveinternet.eiu.com/about>

89. AlphaBeta (2021), Unlocking Pakistan's digital potential: The economic opportunities of digital transformation and Google's contribution. Available at: <https://alphabeta.com/wp-content/uploads/2021/10/pakistan-digital-transformation.pdf>

90. Estimate of monthly salaries in the APAC-11 is net of taxes.



- Need for a comprehensive organizational setup withing the government.** There need to be adequate organizational measures – referring to governance and coordination mechanisms between stakeholders – to govern and coordinate cybersecurity strategies within countries. The lack of adequate organizational measures can result in a lack of clear responsibilities and accountability in the national cybersecurity governance, thus preventing effective intra-government and inter-sector coordination.⁹¹
- Inadequate capacity development in cybersecurity.** Capacity development such as public awareness campaigns and cybersecurity training is necessary to support the processes, skills and resources of government agencies, businesses, and Internet users. Of the APAC-11 countries, the Philippines fares relatively poorly on cybersecurity performance, particularly on capacity development.⁹² While the country's Department of Information, Communications, and Technology rolled out the "National Cybersecurity Plan 2022" in 2017 in view of increasing the security and resilience of critical data infrastructure, the country remains extremely vulnerable to cyber-attacks and other incidents.⁹³
- Limited international cybersecurity partnerships.** As cybersecurity risks are transboundary, collaboration among global stakeholders is crucial to the mitigation of these risks. Bilateral and multilateral cybersecurity agreements are pivotal to safe online practices and international collaboration on cybersecurity and standardized data protection and audit requirements across jurisdictions would be critical.

91. International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>

92. International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>

93. International Trade Administration (n.d.), "Philippine Cybersecurity". Available at: <https://www.trade.gov/market-intelligence/philippine-cybersecurity>

“ A report estimated that breaching a MSP with 600 MSME customers could potentially lead to economic losses of about US\$80 billion, exceeding the impacts of natural disasters such as Hurricane Sandy (approximately US\$65 billion). ”

BOX 8: CYBERCRIMES MAY RESULT IN SIGNIFICANT ECONOMIC LOSSES OF UP TO 0.5% OF GDP

Research has indicated that economic losses due to cyber incidents could be significant.⁹⁴ The estimated GDP loss due to cybercrimes can be up to 0.5% of GDP in high-income countries – the more likely targets of cybercrimes.⁹⁵ For the APAC-11, this could amount to losses of approximately US\$54 billion.⁹⁶ For instance, MSMEs often outsource IT functions to local or remotely-managed service providers (MSPs), increasing their reliance on third parties. MSPs are not always adequately protected, opening the risks of malware infiltrating their customers' backend systems.⁹⁷ A report estimated that breaching a MSP with 600 MSME customers could potentially lead to economic losses of about US\$80 billion, exceeding the impacts of natural disasters such as Hurricane Sandy (approximately US\$65 billion).⁹⁸ Malicious actors could also breach critical infrastructure, such as electric utilities, which are typically not prepared against cybersecurity risks, often relying on traditional on-premise infrastructure, ensuring robust cybersecurity systems are therefore of utmost urgency.

94. FDD (2021), The Economic Costs of Cyber Risk. Available at: <https://www.fdd.org/analysis/2021/06/28/the-economic-costs-of-cyber-risk/>

95. CSIS and McAfee (2018), Economic Impact of Cybercrime – No Slowing Down. Available at: <https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/economic-impact-cybercrime.pdf>

96. This is an AlphaBeta estimate based on the assumption that the estimated GDP loss due to cybercrimes is up to 0.5% of GDP for high-income countries. Source includes CSIS and McAfee (2018), Economic Impact of Cybercrime – No Slowing Down. Available at: <https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/economic-impact-cybercrime.pdf>

97. Crowd Strike (2021), "How to Avoid Being Impacted by a Managed Service Provider (MSP) Breach". Available at: <https://www.crowdstrike.com/blog/how-to-avoid-being-a-victim-of-a-msp-breach/> and GovTech (2021), "Locking in COVID-19 digitalisation gains". Available at: <https://www.tech.gov.sg/media/technews/locking-in-covid19-digitalisation-gains>

98. FDD (2021), The Economic Costs of Cyber Risk. Available at: <https://www.fdd.org/analysis/2021/06/28/the-economic-costs-of-cyber-risk/>

2.3 RECOMMENDATIONS FOR THE APAC-11

CAPTURING THE UPSIDE: THE “DIGITAL PROSPERITY” APPROACH

Traditional approaches are not fit for purpose to capture the potential upside of the digital economy. Two diametrically opposed perspectives have dominated, each differing in openness and connectivity to the rest of the world. On one end, “digital isolationism” seeks to constrain an open digital economy so local enterprises can better leverage their domestic competitive advantage. Countries subscribing to “digital isolationism” also believe that these restrictions help safeguard privacy and ensure data security, which is a misconstrued notion. In fact, cybersecurity vulnerabilities could be exacerbated by cross-border data flows restrictions, while digital trade is limited by smaller-scale cloud providers (thus potentially impacting their ability to ensure appropriate investment in data safeguards) and by concentrating data in few locations (as opposed to maintaining redundant datasets at multiple data centers spread across countries). On the other side, the “digital globalism” approach focuses on creating an open digital economy with minimal impediments to cross-border data flows and investment — though it may possibly limit assurances for local players. In many of the APAC-11 countries, some segments of society are not able to access digital technologies due to reasons including limited access to digital infrastructure and services, as well as insufficient digital skills to operate digital technologies amongst their populations.⁹⁹ This indicates that even the openness of the “digital globalism” approach might not be enough to capture the full potential of the

digital economy and certain segments will invariably still miss out. In reality, the debate between “digital isolationism” and “digital globalism” approaches is too narrow given today’s fast-changing landscape.

Most countries fall somewhere within the spectrum of two extremes of “digital isolationism” and “digital globalism”, but these approaches to connecting and digitizing a country present a false choice.¹⁰⁰ What if there is a new perspective — a third option — that harnesses the strengths of both approaches? Governments need to strike a balance between developing their country’s capabilities, providing access to the latest digital (local and international) technologies, and placing adequate and appropriate safeguards around data flows. We propose a new perspective — a third option — that is most likely to deliver the most potential upside: the “**digital prosperity**” approach, which combines the benefits of supportive regulations under “digital globalism” with the focus on building domestic capabilities under “digital isolationism” (Exhibit 14).

“Digital prosperity” focuses on creating an open digital economy with minimal impediments to cross-border data flows, while building up the local industry and ensuring adequate and appropriate data management safeguards. This will enable businesses and consumers to access the latest digital products and services, all while striving to protect national security and local citizens.¹⁰¹

99. G20 Insights (2020), “Digital infrastructure: Overcoming Digital Divide in Emerging Economies”. Available at: https://www.g20-insights.org/policy_briefs/digital-infrastructure-overcoming-digital-divide-emerging-economies/

100. A literature review of the issue regarding digital openness and connectivity highlights that it relates to the capacity for digital self-determination by states, companies, or individuals. It focuses on the control over data, infrastructure, and software that are created and relied on to operate in the digital world. The current literature is largely dominated by proponents of “digital isolationism”, which is a state-centered narrative. A disparity also exists, where arguments against digital openness and connectivity are driven by security-politics narrative, ignoring the socio-economic perspective. There seems to also be a misunderstanding, where governments assume that there is only one alternative to “digital isolationism”: “digital globalism”, which would erode their national sovereignty and pose security risks.

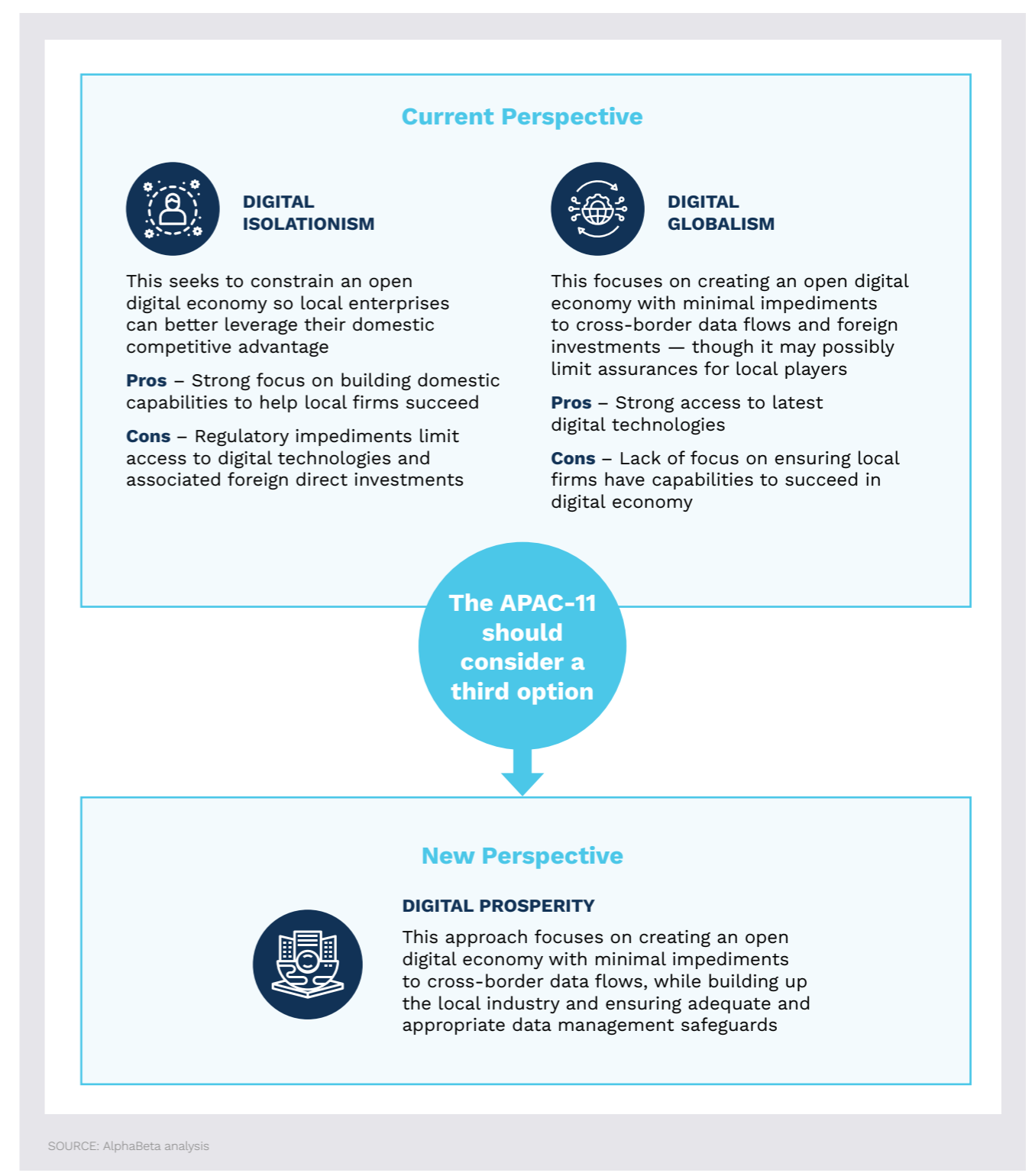
101. In this report, we are proposing a new term “digital prosperity” instead of “digital sovereignty” as there is no “digital sovereignty” definition at present that considers all the domestic and international concerns. There are, however, existing definitions of “digital sovereignty”, which have a clear objective – to safeguard national and citizen interests. Part of what makes defining “digital sovereignty” difficult is the varying objectives and stakeholders involved. A study by IDC has defined “digital sovereignty” as the capacity for digital self-determination by states, companies, or individuals. It focuses on the control over data, infrastructure, and software that are created and relied on to operate in the digital world. Additionally, a study by researchers from the Berlin Social Science Center illuminates three different interpretations. The most prominent one is from the government’s perspective, relating to state autonomy and national security. “Digital sovereignty” is interpreted as the “geographical restriction of sovereignty to a specific territory and states’ efforts in ensuring the security of digital infrastructure and their authority regarding digital communication matters pertaining to their territories and citizens”. The second point of view is concerned with the autonomy of the national economy in relation to foreign technology and service providers. Similar to the first, “digital sovereignty” is a matter of “economic self-determination”. The third interpretation emphasizes the importance of the autonomy of citizens, where sovereignty in the digital space means “the ability of individuals to take actions and decisions in a conscious, deliberate and independent manner”. This study therefore provides a more nuanced interpretation of the issue and coins a new terms “digital prosperity”, while still prioritizing the main goal of providing protection and support for citizens. Sources include IDC (2022), Trusted Cloud: Overcoming the Tension Between Data Sovereignty and Accelerated Digital Transformation. Available at: https://dl.awsstatic.com/whitepapers/Whitepaper_Overcoming_the_Tension_Between_Data_Sovereignty_and_Accelerated_Digital_Transformation_2022.pdf; and Pohle and Thiel (2020), Digital Sovereignty. Available at: <https://policyreview.info/concepts/digital-sovereignty>

Based on the “digital prosperity” approach, we outline some best practices that the APAC-11 can consider applying to capture the digital economy opportunity. Every country in the APAC-11 should be understood within its own context and there are many factors such as geopolitics and the nature of economy that are at play, affecting a country’s progress towards capturing

the benefits of the digital economy. This report presents the facts about the APAC-11 and provides key recommendations for each country depending on its current state of the digital economy. As indicated in Table 1, the relevance of these recommendations varies across the APAC-11 countries, and details of these recommendations can be found in Appendix A4.

EXHIBIT 14

The “digital isolationism” and “digital globalism” approaches are not the only choices and countries should consider the “digital prosperity” approach



SOURCE: AlphaBeta analysis

TABLE 1
BEST PRACTICES RELATED TO THE FOUR ENABLERS

ENABLERS AND PARAMETERS	APAC-11 COUNTRIES WHERE THIS ISSUE IS MOST CRUCIAL ¹⁰²	BEST PRACTICE EXAMPLE ¹⁰³	RECOMMENDATION ¹⁰⁴
POLICY			
Appropriate data governance frameworks	Thailand, India ¹⁰⁵ , Indonesia ¹⁰⁶	United Kingdom ¹⁰⁷	Establish risk-based and accountability-driven data governance frameworks
Minimal data localization restrictions	Pakistan, Vietnam	Japan ¹⁰⁸	Ensure clarity of data flow requirements with minimal localization restrictions
Clarity on notification and bases for processing cross-border data (e.g., consent; authority approval)	Indonesia	Australia ¹⁰⁹	Standardize and recognize a variety of mechanisms for obtaining consent for data transfer
Interoperability of cross-border frameworks	India, Pakistan	Regulations based on international standards, such as the UN Personal Data Protection and Privacy Principles ¹¹⁰ , the OECD Privacy Framework ¹¹¹ or the APEC Cross-Border Privacy Rules (CBPR) ¹¹²	Promote convergence and interoperability in privacy laws through agreements

102. This refers to countries with a weak scoring based on the assessment parameters in Appendix A1.

103. More information can be found in Appendix A4.

104. More information can be found in Appendix A4.

105. Currently, India does not have a comprehensive and dedicated data governance framework. However, there are governance rules located in other regulations such as the Information Technology Act, 2000 and the Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules 2011 (SPDI Rules). Sources include Inventus Law, "Introduction to Data Privacy Laws in India". Available at: <https://www.inventuslaw.com/introduction-to-data-privacy-laws-in-india/>; Data Guidance (2021), "India - Data Protection Overview". Available at: [https://www.dataguidance.com/notes/india-data-protection-overview#:~:text=Under%20the%20SPDI%20Rules%2C%20sensitive,be%20necessary%20for%20such%20purpose.,and%20Salesforce%20and%20Access%20Partnership%20\(2021\),Data%20Beyond%20Borders%202.0.](https://www.dataguidance.com/notes/india-data-protection-overview#:~:text=Under%20the%20SPDI%20Rules%2C%20sensitive,be%20necessary%20for%20such%20purpose.,and%20Salesforce%20and%20Access%20Partnership%20(2021),Data%20Beyond%20Borders%202.0.) Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

106. Do note that Indonesia has passed the data protection bill in September 2022. Reuters (2022), "Indonesia parliament passes long-awaited data protection bill". Available at: <https://www.reuters.com/world/asia-pacific/indonesia-parliament-passes-long-awaited-data-protection-bill-2022-09-20/>

107. Gov.uk (n.d.), "Public sector use of the public cloud". Available at: <https://www.gov.uk/guidance/public-sector-use-of-the-public-cloud#make-a-risk-based-decision>

108. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0. Available at: <https://www.salesforce.com/world/asia-pacific/indonesia-parliament-passes-long-awaited-data-protection-bill-2022-09-20/>

109. ABLI (2020), Comparative Review of Data Transfer Laws and Regulations in Asia. Available at: <https://app.glueup.com/resources/protected/organization/895/event/29824/9209bc06-f8e0-4aff-bc53-1f4cc8912d0d.PDF>

110. United Nations (2018), PERSONAL DATA PROTECTION AND PRIVACY PRINCIPLES. Available at: <https://archives.un.org/sites/archives.un.org/files/un-principles-on-personal-data-protection-privacy-hlcm-2018.pdf>

111. OECD (2013), THE OECD PRIVACY FRAMEWORK. Available at: https://www.oecd.org/sti/economy/oecd_privacy_framework.pdf

112. IAPP (2015), APEC PRIVACY FRAMEWORK (2015). Available at: https://iapp.org/media/pdf/resource_center/APEC_Privacy_Framework.pdf and CBPRs (2022), "About CBPRs". Available at: <http://cbprs.org/>

TABLE 1 (CONT'D)
BEST PRACTICES RELATED TO THE FOUR ENABLERS

ENABLERS AND PARAMETERS	APAC-11 COUNTRIES WHERE THIS ISSUE IS MOST CRUCIAL ¹⁰²	BEST PRACTICE EXAMPLE ¹⁰³	RECOMMENDATION ¹⁰⁴
POLICY			
Guidelines on public authority access to data locally	Japan, Malaysia, Pakistan, Thailand, Vietnam	Canada ¹¹³	Ensure clear guidelines on the limits of public authority access to data of crucial public interest
Guidelines on public authority access to cross-border data	Pakistan	Australia, Singapore, Malaysia ¹¹⁴	Establish Mutual Legal Assistance Treaties and international agreements for sharing data for law enforcement cooperation
Minimization of administrative and fiscal barriers for digital exports	Japan, India, Indonesia, Pakistan, Thailand, Vietnam	Australia ¹¹⁵	Move to at least US\$200 de minimis threshold
Interoperable digital payment regulations and supportive digital payment initiatives	Malaysia, Pakistan, South Korea	India ¹¹⁶	Develop supportive digital payment regulations and initiatives
Absence of local registration requirements and minimal limitations on foreign ownership and investment	Australia ¹¹⁷ , India, Japan, Thailand, Vietnam	Indonesia ¹¹⁸	Ensure ease of doing business by streamlining processes and removing restrictive requirements such as limitations on foreign ownership

113. Government of Canada (2021), "Canada's Privacy Act". Available at: <https://www.justice.gc.ca/eng/csj-sjc/pa-lprp/pa-lprp.html>. The Privacy Act protects the personal information of Canadians in the hands of the federal government.

114. Sources include BSA (2018), Country Report: Australia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Australia.pdf; BSA (2018), Country Report: Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and BSA (2018), Country Report: Malaysia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf

115. Sources include Global Express Association (2021), Overview of de minimis value regimes world wide. Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf; and DHL (2019), "What Changes to the De Minimis Value Threshold Could Mean for Your Business". Available at: <https://goqlobal.dhl-usa.com/blog/shipping/what-changes-to-the-de-minimis-value-threshold-could-mean-for-your-business/#~:text=The%20History,format%20entry%20or%20payment%20requirements.>

116. Sources include Ministry of Electronics & Information Technology (2021), "Digital economy & Digital Payment Division (DEPD)". Available at: <https://www.meity.gov.in/digidhan>

117. Although foreign investment is actively encouraged, government authorization is required for certain types of investments, depending on the type of investor, type of investment of other foreign investors, industry sector, value of the proposed investment, and nature of the proposal. Sources include Clifford Chance (2017), "Foreign Investment Regulation in Australia". Available at: <https://financialmarketstoolkit.cliffordchance.com/content/dam/cliffordchance/briefings/2017/08/foreign-investment-regulation-in-australia.pdf>

118. UNCTAD (2020), "Omnibus Law' on job creation has been enacted". Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3567/indonesia-omnibus-law-on-job-creation-has-been-enacted>

TABLE 1 (CONT'D)

BEST PRACTICES RELATED TO THE FOUR ENABLERS

ENABLERS AND PARAMETERS	APAC-11 COUNTRIES WHERE THIS ISSUE IS MOST CRUCIAL ¹⁰²	BEST PRACTICE EXAMPLE ¹⁰³	RECOMMENDATION ¹⁰⁴
COMPETITION			
Absence of local sourcing requirements	India, Indonesia, South Korea, Vietnam	Singapore ¹¹⁹	Democratize sourcing process and ensure no protectionist policies against foreign suppliers
Open government procurement	NA (note: while all focus countries do allow foreign enterprises to participate in public projects, there are specific restrictions such as national certifications and the use of only government private cloud. These create de-facto restrictions and can be found in South Korea and Vietnam)	United Kingdom ¹²⁰	Remove public procurement restrictions on foreign firms
Competitive business environment with fair software licensing principles	This issue is critical in all focus countries	Europe ¹²¹	Adopt fair software licensing principles in legislation
Access to international digital service providers	The Philippines, South Korea, Thailand, Vietnam	Malaysia ¹²²	Allow local organizations to access international digital service providers

119. Sources include Jones D. (2002), PROCUREMENT PRACTICES IN THE SINGAPORE CIVIL SERVICE: BALANCING CONTROL AND DELEGATION, Available at: <http://www.ipa.org/jopp/download/vol2/issue-1/Jones.pdf>; and Ministry of Finance (2020), A Guide for Suppliers. Available at: https://www.qebiz.gov.sg/docs/Supplier_Guide_Detailed.pdf

120. GOV.UK (2022), "Public procurement policy". Available at: <https://www.gov.uk/guidance/public-sector-procurement-policy>

121. FairSoftware.Cloud (2022). "Principles of Fair Software Licensing for Cloud Customers." Available at: <https://www.fairsoftware.cloud/principles/>

122. Malaysian Communications and Multimedia Commission (2021), Cloud Service Regulation Introduced to Increase Accountability for User Data Security and Sustainability of Services. Available at: https://www.mcmc.gov.my/skmmgovmy/media/General/pdf2/ADVISORY_NOTICE_CLOUD-SERVICE-REGULATION.pdf

TABLE 1 (CONT'D)

BEST PRACTICES RELATED TO THE FOUR ENABLERS

ENABLERS AND PARAMETERS	APAC-11 COUNTRIES WHERE THIS ISSUE IS MOST CRUCIAL ¹⁰²	BEST PRACTICE EXAMPLE ¹⁰³	RECOMMENDATION ¹⁰⁴
CAPABILITY			
Access to digital skills	Indonesia, Pakistan, the Philippines	Singapore ¹²³	Increase curriculum responsiveness, incorporate technology in the classroom, introduce digital bootcamps, and create sector-specific skilling roadmaps
MSME digital adoption and exporting	Pakistan	Australia ¹²⁴	Provide support to help MSMEs adopt digital technologies and engage in international trade
Clear digital transformation strategy	NA (all focus countries have either a national strategy or a dedicated agency to drive actions)	Singapore ¹²⁵	Ensure clear plan, roadmap, or national strategy with dedicated agencies to drive actions
Access to cloud computing among local enterprises	India, Indonesia, Pakistan, the Philippines, Vietnam	Climate Neutral Data Center Pact in Europe ¹²⁶	Enable local enterprises to access affordable hyperscale cloud services, through a strong enabling environment (including on sustainability concerns)
Flexible regulations to accommodate evolving technologies	NA (all focus countries have implemented or are planning to implement sandboxes)	Singapore ¹²⁷	Establish regular interactions with the industry and innovative approaches
Cloud-first government policy	Indonesia	Philippines ¹²⁸	Adopt widespread usage of cloud throughout the public sector
Strong IP protection	India, Indonesia, Pakistan, the Philippines, Thailand	Singapore ¹²⁹	Ensure protection of commercially-sensitive data or proprietary information, or adequate safeguards if disclosures are required

123. Ministry of Trade and Industry, Singapore (2017), Media factsheet- Industry Transformation Maps. Available at: <https://www.mti.gov.sg/-/media/MTI/ITM/General/Fact-sheet-on-Industry-Transformation-Maps---revised-as-of-31-Mar-17.pdf>

124. ConnectPlus (n.d.), "eCommerce Accelerator Program (eCAP)". Available at: <https://connectplus.sa.gov.au/programs/e-commerce-accelerator-program-ecap>

125. Ministry of Trade and Industry, Singapore (2017), Media factsheet- Industry Transformation Maps. Available at: <https://www.mti.gov.sg/-/media/MTI/ITM/General/Fact-sheet-on-Industry-Transformation-Maps---revised-as-of-31-Mar-17.pdf>

126. Climate Neutral Data Centre (2020), "Climate Neutral Data Centre Pact". Available at: <https://www.climate-neutral-datacentre.net/>

127. Sources include Monetary Authority of Singapore (n.d.), "Overview of Regulatory Sandbox". Available at: <https://www.mas.gov.sg/development/fintech/regulatory-sandbox>; and Monetary Authority of Singapore (2021), FAQs ON MAS FINTECH REGULATORY SANDBOX FRAMEWORK. Available at: <https://www.mas.gov.sg/-/media/MAS-Media-Library/development/Regulatory-Sandbox/FAQsNov2021.pdf?la=en&hash=075D18DC2B19BD6BCB5A98D1B974666736F87553>

128. Department of Trade and Industry (2020), "DICT Releases Amended Cloud First Policy for Gov't Transition to "New Normal"". Available at: <https://dict.gov.ph/dict-releases-amended-cloud-first-policy-for-govt-transition-to-new-normal/>

129. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; and Intellectual Property Office of Singapore (n.d.), "Singapore's Global Innovation Ranking". Available at: <https://www.ipos.gov.sg/resources/singapore-ip-ranking>

TABLE 1 (CONT'D)

BEST PRACTICES RELATED TO THE FOUR ENABLERS

ENABLERS AND PARAMETERS	APAC-11 COUNTRIES WHERE THIS ISSUE IS MOST CRUCIAL ¹⁰²	BEST PRACTICE EXAMPLE ¹⁰³	RECOMMENDATION ¹⁰⁴
INFRASTRUCTURE			
Broadband access	Pakistan, the Philippines, Vietnam	South Korea ¹³⁰	Extend access to digital infrastructure, especially in rural areas
Affordable broadband costs	The Philippines	South Korea ¹³¹	Provide subsidized access to the Internet for marginalized groups; promote infrastructure sharing; ensure a strong competitive environment for the provision of wireless and broadband services
Robust and relevant cybercrime and cybersecurity policy frameworks	Pakistan	Singapore ¹³²	Implement legal and regulatory frameworks, establish legal processes to enforce and investigate
Comprehensive organizational setup within the government	Pakistan, the Philippines	Malaysia ¹³³	Ensure dedicated agencies to govern and coordinate efforts
Adequate capacity development	The Philippines	Singapore ¹³⁴	Introduce measures to enhance processes, skills, and resources
Strong international partnerships	Pakistan	Japan, India ¹³⁵	Foster bilateral and multilateral cybersecurity agreements

130. Jung, M. C., Park, S., & Lee, J. Y. (2014). Information network villages: A community-focused digital divide reduction policy in rural Korea. *Journal of Telecommunications and the Digital Economy*, 2(1), 21-1. Available at: <https://search.informit.org/doi/abs/10.3316/INFORMIT187401608549583>

131. Public Knowledge (2017), "Why Does South Korea Have Faster Internet for a Cheaper Price Tag?". Available at: <https://publicknowledge.org/why-does-south-korea-have-faster-internet-for-a-cheaper-price-tag/>

132. Sources include BSA (2018), Country Report Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and Personal Data Protection Commission Singapore (2017), Guide to Securing Personal Data in Electronic Medium, Available at: <https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Other-Guides/guidetosecuringpersonaldatainelectronicmedium0903178d4749c8844062038829ff0000d98b0f.pdf>

133. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; and National Cyber Security Agency (n.d.), "NACSA | National Cyber Security Agency". Available at: <https://www.nacsa.gov.my/>

134. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; Cyber Security Awareness Alliance (2021), "Better Cyber Safe Than Sorry". Available at: <https://www.csa.gov.sg/qosafeonline/qa-safe-for-me/homeinternetusers/bettercybersafethansorry>; and Cyber Security Agency of Singapore (n.d.), "CSA Cybersecurity Co-Innovation and Development Fund (CCDF)". Available at: <https://www.csa.gov.sg/programmes/co-innovation-development-fund>

135. Sources include Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>; and The Diplomat (2021), "India-Japan Cyber Cooperation: From Strength to Strength". Available at: <https://thediplomat.com/2021/01/india-japan-cyber-cooperation-from-strength-to-strength/>



Appendix: Detailed Approach

This document provides a detailed methodology on the assumptions and sources of information used in the AlphaBeta research for the following countries:

Australia
India
Indonesia
Japan





Malaysia
Pakistan
Philippines
Singapore

South Korea
Thailand
Vietnam

A1: DIGITAL CONNECTIVITY INDEX

A comprehensive literature review of global industry reports and macroeconomic data was conducted to identify international best practices crucial for economies to become global leaders of the digital economy. This analysis has shown that four key enablers are crucial to establishing a well-functioning digital economy, and together they make up AlphaBeta's Digital Connectivity Index. A total of 26 parameters were analyzed as part of the index, and these are instrumental in allowing countries to capture their full digital economy potential (Exhibit A1).

EXHIBIT A1
26 parameters across the 4 enablers are instrumental to a well-functioning digital economy

Digital economy enablers		
 <p>Policy</p>	<ol style="list-style-type: none"> Appropriate data governance frameworks Minimal data localization restrictions Clarity on notification and bases for processing cross-border data (e.g., consent; authority approval) Interoperability of cross-border frameworks Guidelines on public authority access to data locally 	<ol style="list-style-type: none"> Guidelines on public authority access to cross-border data Minimization of administrative and fiscal barriers for digital exports Interoperability of digital payment regulations and supportive digital payment initiatives Absence of local registration requirements and minimal limitations on foreign ownership and investment
 <p>Competition</p>	<ol style="list-style-type: none"> Absence of local sourcing requirements Open government procurement 	<ol style="list-style-type: none"> Competitive businesses environment with fair software licensing principles Access to international digital service providers
 <p>Capability</p>	<ol style="list-style-type: none"> Access to digital skills Micro, small and medium sized enterprises (MSME) digital adoption and exporting Clear digital transformation strategy Access to cloud computing among local enterprises 	<ol style="list-style-type: none"> Flexible regulations to accommodate evolving technologies Cloud-first government policy Strong intellectual property (IP) protection
 <p>Infrastructure</p>	<ol style="list-style-type: none"> Broadband access Affordable broadband costs Robust and relevant cybercrime and cybersecurity policy frameworks 	<ol style="list-style-type: none"> Comprehensive organizational setup within the government Adequate capacity development Strong international partnerships

SOURCE: Literature review; AlphaBeta analysis

1. POLICY

There are nine important parameters assessed under the policy enabler:

- Appropriate data governance frameworks.** The presence of clear data governance and classification frameworks removes ambiguity and enables data flows. Government agencies could then apply consistent sensitivity classification to the data and facilitate data sharing. There is also a need to ensure that the appropriate data governance framework is used.¹³⁶ For instance, enterprise data will be categorized differently from personal data. However, this data governance framework should not impose onerous requirements such as having excessive special categories. One possible option which could add some flexibility is to adopt a risk-based and accountability-driven approach that allows organizations to identify hazards and risk factors within their data and apply the necessary measures based on defined data governance guidelines. For example, in Australia, a principles-based approach is taken to govern data in the public sector.¹³⁷ Instead of simply applying an over-arching data governance framework on data, the data will be separated into different environments based on its level of sensitivity and value.¹³⁸ Security guidance on the adequate amount of controls, level of mitigations required, and accepted risks will be applied, allowing users to make risk-based decisions on their data.¹³⁹ This allows for more flexibility as appropriate controls are applied to different data, and no overly-restrictive controls are imposed unnecessarily. In its 2021 data sharing white paper, the Australian Computer Society considers the evolving nature of datasets throughout their life cycle and suggests simplified control frameworks for securely sharing that data at each stage, without compromising the right

to privacy.¹⁴⁰

- Minimal data localization restrictions.** Several countries place restrictions on which data is allowed to move across borders, and in some cases, there is insufficient clarity on which data this pertains to. Among the focus countries, Japan is a leader in enabling cross-border data flows. The Act on the Protection of Personal Information (APPI) provides clarity on data transfer provisions and mechanisms with limited restrictions.¹⁴¹ However, many of the restrictions are more pervasive and less clear on their coverage in other countries. For example, Indonesia issued GR71 in 2019, which restricts the storage and processing of public sector data in Indonesia. While there has been an increasing number of data localization requirements developed by governments globally stemming from national security and data privacy concerns, it is crucial to highlight that cross-border data flows can still achieve data sovereignty aims.¹⁴² As restrictions on cross-border flows are largely driven by concerns about data security, as long as equivalent standards of data protection are in place between countries, countries should instead push for cross-border data transfers while achieving their data sovereignty aims.
- Clarity on notification and bases for processing cross-border data (e.g., consent; authority approval).** Consent of the data owners is central to overseas data transfers; however, there are key differences in how consent requirements are structured across countries.¹⁴³ For example, opt-in consent is not mandatory for cross-border data transfers in Australia in all circumstances, but the individual must provide informed consent. In South Korea, opt-in consent is required. Other countries go further (e.g., China,

136. Netwrix (2020), "Data Classification: What It Is and How to Implement It". Available at: <https://blog.netwrix.com/2020/09/02/data-classification/>

137. Australian Government Digital Transformation Agency (2021), Secure Cloud Strategy. Available at: <https://www.dta.gov.au/sites/default/files/2021-10/DTA%20Secure%20Cloud%20Strategy%20-%20October%202021%20v3%20%28update%29.pdf>

138. Australian Government Digital Transformation Agency (2021), Secure Cloud Strategy. Available at: <https://www.dta.gov.au/sites/default/files/2021-10/DTA%20Secure%20Cloud%20Strategy%20-%20October%202021%20v3%20%28update%29.pdf>

139. Australian Government Digital Transformation Agency (2021), Secure Cloud Strategy. Available at: <https://www.dta.gov.au/sites/default/files/2021-10/DTA%20Secure%20Cloud%20Strategy%20-%20October%202021%20v3%20%28update%29.pdf>

140. Australian Computer Society (2021), Sharing Data in Trusted Frameworks. Available at: <https://www.acs.org.au/insightsandpublications/reports-publications/sharing-data-in-trusted-frameworks.html>

141. Joshua P. Meltzer and Peter Lovelock (2018), Regulating for a digital economy: Understanding the importance of cross-border data flows in Asia. Available at: https://www.brookings.edu/wp-content/uploads/2018/03/digital-economy_meltzer_lovelock_working-paper.pdf

142. GSMA (2018), Cross-Border Data Flows Realising benefits and removing barriers. Available at: https://www.gsma.com/publicpolicy/wp-content/uploads/2018/09/GSMA-Cross-Border-Data-Flows-Realising-benefits-and-removing-barriers_Sept-2018.pdf

143. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0. Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

Indonesia) and require other conditions such as approval by public authorities. For example, under current Indonesian regulations (which are currently subject to a proposed amendment), an ESO must obtain the written consent of the personal data owner before transferring the data and must also report and consult with the Ministry of Communications and Informatics (MOCI) to get their approval.¹⁴⁴

- **Interoperability of cross-border frameworks.** Multilateral agreements can be beneficial for facilitating cross-border transactions by enhancing consumer trust and ensuring the interoperability of regulatory frameworks across jurisdictions. This reduces regulatory compliance costs for businesses operating in the participating countries as they gain a better understanding of the regulations across borders. Across the region, there have been efforts to foster greater interoperability of frameworks, such as through the Singapore-Chile-New Zealand Digital Economy Partnership Agreement (DEPA). To further enhance interoperability and trust, countries can align to international frameworks that specify controls to protect data such as the APEC Cross Border Data Privacy Rules (CBPR) and the ASEAN Model Contractual Clauses on Cross Border Data Flows (MCCs).¹⁴⁵
- **Guidelines on public authority access to local data.** Clear guidelines are needed on the ability of public authorities to be able to have access to data. However, in some cases, the potential powers of authorities are concerning. In Indonesia for example, under GR71 and Regulation 5, Indonesian regulators have the authority to request a private ESO (including foreign private ESOs) to grant the MOCI access to the ESO's electronic systems and electronic data which relate to Indonesian citizens or legal entities.¹⁴⁶

- **Guidelines on public authority access to cross-border data.** To further enhance international law enforcement efforts, countries have also signed MLATs and international agreements to facilitate cross-border information and data sharing. MLATs are agreements between countries to gather and exchange to enforce public or criminal laws. An example of this is Singapore, where the country is a party to numerous MLATs and other international agreements both directly and through regional agreements such as the ASEAN Treaty on Mutual Legal Assistance in Criminal Matters.¹⁴⁷ These agreements allowed the Singapore Government to gather intelligence and certified documents that would otherwise be difficult to obtain without the cooperation of the other country.
- **Minimization of administrative and fiscal barriers for digital exports.** Some countries have adopted complicated administrative processes and burdensome document requirements for international trade in goods that can serve as an additional barrier to e-commerce. Low customs thresholds applied to goods can also impose significant administrative costs.
- **Interoperable digital payment regulations and supportive digital payment initiatives.** Having digital payment options is crucial for encouraging cross-border exports, without which cross-border digital trade will be almost impossible. Such efforts will be very beneficial for businesses participating in cross-border trade activities. There are opportunities to facilitate cross-border digital payments, such as promoting interoperability through internationally accepted standards and engaging with organizations like the Global Financial Innovation Network

(GfiN) which works with regulators on cross-border payments.¹⁴⁸

- **Absence of local registration requirements and minimal limitations on foreign ownership and investment.** Some countries are requiring exporting firms to create a local establishment to serve the market. Restrictions could also come in the form of policies on foreign ownership and investment. Studies have shown that such

2. COMPETITION

There are four important parameters assessed under the competition enabler:

- **Absence of local sourcing requirements.** Some countries are mandating that businesses can only acquire services from local vendors which could restrict access to the latest digital technologies. By imposing local sourcing requirements, it will result in negative impacts on the economy as such measures encourage anti-competitive behaviors amongst businesses and increase the prices of goods and services.¹⁵⁰
- **Open government procurement.** In countries such as Malaysia, the Philippines, South Korea, Thailand, and Vietnam, there is a preference for domestic goods and services through a range of measures such as price preferences for bids from local enterprises and requirements on local staff in the enterprises.¹⁵¹ Such measures will be detrimental to the development of the digital economy as it results in inefficient outcomes for consumers and businesses through higher consumer prices and misallocation of resources.¹⁵²
- **Competitive business environment with fair software licensing principles.** A competitive

restrictions are likely to have significant negative impacts on the digital economy, as they will hamper spill-over effects in terms of knowledge transfers and foreign direct investment, as well as reduce the pace of adoption of foreign technologies by domestic businesses.¹⁴⁹ Therefore, it is crucial for countries to reduce these establishment restrictions to facilitate economic growth.

business environment is critical to ensure that consumers can access a range of digital products and services easily and affordably. The government could consider strengthening efforts to promote and adopt industry-led fair software licensing terms which outline best practices for software licensing for cloud customers, to ensure that the emerging digital economy remains competitive and fair.¹⁵³

- **Access to international digital service providers.** The presence of explicit regulations allowing local organizations to access international digital service providers helps to reduce ambiguity and provides opportunities to seek the most cost effective and advanced technology options. It will also spur competition and increase foreign direct investment, increasing the performance of the local industry and lowering prices.¹⁵⁴ For instance, cloud service regulations in Malaysia which took effect in January 2022 explicitly indicate that there are no foreign shareholding restrictions on cloud service providers in applying for an Application Service Provider license to provide such services to end users.¹⁵⁵ However, regulations that prevent the local industry from accessing international digital service providers could hinder digital adoption.

148. World Economic Forum (2020), "4 key steps to support cross-border payments and digital trade growth".

Available at: <https://www.weforum.org/agenda/2020/06/action-on-cross-border-payments-will-support-digital-trade-growth/>

149. ECIPE (2018), Digital Trade Restrictiveness Index. Available at: https://ecipe.org/wp-content/uploads/2018/05/DTRI_FINAL.pdf

150. Ettmayr, C., & Lloyd, H. (2017). Local content requirements and the impact on the South African renewable energy sector: A survey-based analysis. South African journal of economic and management sciences, 20(1), 1-11. Available at: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S2222-34362017000100036#-text=Local%20content%20policy%20disadvantages,a%20form%20of%20protectionist%20measure.

151. Djaqhe LLC (2017), "EU Highlights Foreign Procurement Barriers". Available at: <https://trade.djaqhe.com/?p=4162>

152. Ettmayr, C., & Lloyd, H. (2017). Local content requirements and the impact on the South African renewable energy sector: A survey-based analysis. South African journal of economic and management sciences, 20(1), 1-11. Available at: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S2222-34362017000100036#-text=Local%20content%20policy%20disadvantages,a%20form%20of%20protectionist%20measure.

153. FairSoftware.Cloud (2021), "Principles of Fair Software Licensing". Available at: <https://www.fairsoftware.cloud/resources/>

154. Sources include IBEF (2022), "Foreign Direct Investment (FDI)". Available at: <https://www.ibef.org/economy/foreign-direct-investment>; and Mondal, S., & Pant, M. (2014). FDI and firm competitiveness: Evidence from Indian manufacturing. Economic and Political Weekly, 56-64. Available at: <https://www.freit.org/WorkingPapers/Papers/FirmLevelProductivity/FREIT524.pdf>

155. Malaysian Communications and Multimedia Commission (2021), Cloud Service Regulation Introduced to Increase Accountability for User Data Security and Sustainability of Services. Available at: https://www.mcmc.gov.my/skmmgovmy/media/General/pdf2/ADVISORY_NOTICE_CLOUD-SERVICE-REGULATION.pdf

144. Herbert Smith Freehill (2021), Cross-border data transfers- an Indonesian law update.

Available at: <https://www.lexology.com/library/detail.aspx?g=c93c325c-65ab-4b9d-8ad4-7cadabcb6287>

145. Personal Data Protection Commission Singapore (2021), "ASEAN Data Management Framework and Model Contractual Clauses on Cross Border Data Flows".

Available at: <https://www.pdpc.gov.sg/help-and-resources/2021/01/asean-data-management-framework-and-model-contractual-clauses-on-cross-border-data-flows>

146. Herbert Smith Freehill (2021), Cross-border data transfers- an Indonesian law update.

Available at: <https://www.lexology.com/library/detail.aspx?g=c93c325c-65ab-4b9d-8ad4-7cadabcb6287>

147. BSA (2018), Country Report: Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf

3. CAPABILITY

Seven important parameters are assessed under the capability enabler:

- **Access to digital skills.** Increasing access involves creating a workforce with the capabilities required to be successful in the cloud-enabled economy through various initiatives, such as embedding technology in the classroom, and creating sector-specific skilling roadmaps. Based on a recent survey by AlphaBeta, 73% of employers in South Korea report that investments in digital skills training for their workers have allowed their organizations to achieve digital transformation goals more quickly as workers become more acquainted with the latest technologies.¹⁵⁶
- **MSME digital adoption and exporting.** MSMEs account for more than 90% of businesses in the region and serve as important contributors to job creation and economic growth. Helping MSMEs capture that potential requires a focused approach to build their capabilities and shift their behavior. Many MSMEs face barriers to exporting overseas. An AlphaBeta study on e-commerce exports in the APAC region has shown that MSMEs in Singapore, Thailand, and Vietnam perceive the high costs of cross-border logistics, stringent consumer protection laws in foreign countries, and high customs duties charged on online foreign trades to be key constraints on their e-commerce export efforts, with more than 80% of MSMEs continuing to face challenges in these areas despite government policies developed.¹⁵⁷
- **Clear digital transformation strategy.** Governments should create a clear digitization plan that will require active involvement by government and industry stakeholders. The plan could also

include sector-specific roadmaps to support specific objectives and goals. For instance, under its “Industry Transformation Programme”, Singapore launched “Industry Transformation Maps” (ITMs) for 23 industries in 2016 to address issues within each industry and deepen partnerships between government, industries, trade associations, and chambers, as well as individual firms.¹⁵⁸

- **Access to cloud computing among local enterprises.** This can be done through supportive government actions such as clear data privacy policies to facilitate cross-border data flows as well as policies that create a competitive environment for establishing hyperscale data centers (HDCs) as HDCs can deliver lower costs and generate higher computing power. This includes easy access to local and foreign talent, large-scale availability of renewable electricity, and competitively priced land. The second is creating a competitive environment for establishing HDCs.
- **Flexible regulations to accommodate evolving technologies.** Governments could explore innovative regulations and regular engagements with the private sector to facilitate new ideas. For instance, regulation should be framed in a technology-agnostic manner, focusing rather on the uses and objectives of technologies than the technologies themselves, sometimes referred to as “outcome-based” regulation.¹⁵⁹ “Regulatory sandboxes” have often been used by governments as means to introduce and test new technologies, and recently, Singapore has used it to support the introduction of autonomous vehicles in the country.¹⁶⁰

156. Amazon Web Services and AlphaBeta (2021), Building Skills for the Changing Workforce: AWS Global Digital Skills Study. Available at: <https://alphabeta.com/wp-content/uploads/2021/11/building-skills-for-the-changing-workforce.pdf>

157. Sources include Digital News Asia (2021), “Amazon releases report on e-commerce export opportunities for Singapore MSMEs”. Available at: <https://www.digitalnewsasia.com/business/amazon-releases-report-e-commerce-export-opportunities-singapore-msmes>; TQPR (2021), “Thailand’s e-commerce market is poised for double-digit growth based on Amazon commissioned report on export opportunities for Thailand SMEs”. Available at: <https://tqpr.com/thailands-e-commerce-market-is-poised-for-double-digit-growth-based-on-amazon-commissioned-report-on-export-opportunities-for-thailand-smes/>; and VnEconomy (2022), “Vietnam holds potential in exports from e-commerce”. Available at: <https://en.vneconomy.vn/vietnam-holds-potential-in-exports-from-e-commerce.htm>

158. Ministry of Trade and Industry, Singapore (2017), Media factsheet- Industry Transformation Maps. Available at: <https://www.mti.gov.sg/-/media/MTI/ITM/General/Fact-sheet-on-Industry-Transformation-Maps---revised-as-of-31-Mar-17.pdf>

159. Deloitte (2018), “The future of regulation: Principles for regulating emerging technologies”, Deloitte Insights. Available at: <https://www2.deloitte.com/us/en/insights/industry/public-sector/future-of-regulation/regulating-emerging-technology.html>

160. Sources include Financial Conduct Authority, “Regulatory Sandboxes.” Available at: <https://www.fca.org.uk/firms/innovation/regulatory-sandbox>; and Govinsider (2019), “We can be “bolder” on tech regulation, says Singapore’s Puthuchery.” Available at: <https://govinsiderasia.com/connected-gov/we-can-be-bolder-on-tech-regulation-says-singapores-puthuchery/>

- **Cloud-first government policy.** Governments should develop cloud-first government policies given that the cloud is central to governments’ digital transformation.¹⁶¹ Adopting cloud computing technologies across the government can lead to significant efficiency gains and cost savings for governments’ ICT budgets. It will likely set an example for the private sector to follow suit in terms of cloud adoption, which will help accelerate the country’s overall digital transformation. An example is the Philippine “Cloud First Policy” which promotes cloud computing as the preferred technology for government administration and the delivery of government services.¹⁶²
- **Strong IP protection.** Governments should ensure strong IP protection to minimize the unnecessary disclosure of commercially-sensitive information,

understand the implications of non-personal data sharing regulations, and provide clarity on the definitions and safeguards if they introduce such policies. For example, to strengthen Singapore’s innovation ecosystem, a national strategy, Singapore IP Strategy (SIPS) 2030, was developed by the Intellectual Property Office of Singapore (IPOS) to strengthen Singapore’s position as a global hub for intangible assets (AI) and IP.¹⁶³ This is done by actively reviewing policies to support emerging digital areas such as AI and big data, facilitating regional interoperability of IP systems, and growing local capabilities through working with law schools and professional training providers.¹⁶⁴ Such efforts provide clear guidelines for businesses looking to innovate and allow the country to further advance to become an innovation-driven economy.

4. INFRASTRUCTURE

Six important parameters are assessed under the infrastructure enabler:

- **Broadband access.** Access to broadband services is key to developing a country’s digital economy. Research has shown that improving broadband access will result in economic growth in both high-income and middle-income economies.¹⁶⁵ Given the weak broadband access in some of the APAC-11 countries such as Pakistan, it is imperative that governments ramp up investments to improve their digital infrastructure, especially in areas with little commercial viability. Governments can also explore collaboration with the private sector. This can be done by establishing a symbiotic arrangement, where private companies are encouraged

to undertake the building of infrastructure while the government focuses on increasing Internet adoption.¹⁶⁶

- **Affordable broadband costs.** Apart from access to digital infrastructure, affordability must also be emphasized to facilitate adoption. Governments can provide tax incentives, such as for telecommunication and technology firms, to provide affordable access to the Internet and digital device for rural communities.¹⁶⁷ Infrastructure sharing policies that allowed mobile operators to share the cost of a country’s infrastructure network can further help ensure fair competition by reducing the barriers to entry for new Internet service providers.¹⁶⁸ Countries will have to ensure that infrastructure initiatives

161. OECD (2017), OECD Digital Economy Outlook 2017. Available at: <https://www.oecd.org/internet/oecd-digital-economy-outlook-2017-9789264276284-en.htm>

162. Department of Trade and Industry (2020), “DICT Releases Amended Cloud First Policy for Gov’t Transition to “New Normal””. Available at: <https://dict.gov.ph/dict-releases-amended-cloud-first-policy-for-govt-transition-to-new-normal/>

163. Intellectual Property Office of Singapore (2021), Singapore IP Strategy 2030 Report. Available at: <https://www.ipos.gov.sg/docs/default-source/default-document-library/singapore-ip-strategy-report-2030-18may2021.pdf>

164. Intellectual Property Office of Singapore (2021), Singapore IP Strategy 2030 Report. Available at: <https://www.ipos.gov.sg/docs/default-source/default-document-library/singapore-ip-strategy-report-2030-18may2021.pdf>

165. International Telecommunications Union (2018), The economic contribution of broadband, digitization, and ICT regulation. Available at: https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF-BDR-2018-PDF-E.pdf Other reports have also confirmed the positive relationship between fixed broadband penetration and economic growth. See: Tony Blair Institute for Global Change (2021), The Progressive Case for Universal Internet Access: How to Close the Digital Divide by 2030. Available at: <https://institute.global/policy/progressive-case-universal-internet-access-how-close-digital-divide-2030>; ITU (2020), How broadband, digitization and ICT regulation impact the global economy. Available at: <https://www.itu.int/en/ITU/Publications/2020/11/20/09/13/Global-econometric-modelling>; Brookings (2021), “The benefits and costs of broadband expansion”. Available at: <https://www.brookings.edu/blog/up-front/2021/08/18/the-benefits-and-costs-of-broadband-expansion/>

166. Telecom Review (2016), “South Korea tops ICT development, internet speed & LTE coverage”. Available at: <https://www.telecomreviewasia.com/index.php/news/featured-articles/52-south-korea-tops-ict-development-internet-speed-lte-coverage>

167. World Economic Forum (2021), “This project wants to bring broadband — and hope — to rural India.” Available at: <https://www.weforum.org/agenda/2021/02/digital-divide-rural-india-internet-access-microsoft/>

168. Electronic Frontier Foundation (2020), “Why Is South Korea a Global Broadband Leader?”. Available at: <https://www.eff.org/deeplinks/2020/02/why-south-korea-global-broadband-leader>

focus on underserved areas to ensure inclusive and affordable access to the Internet.

- Robust and relevant cybercrime and cybersecurity policy frameworks.** Legal and regulatory frameworks are needed to ensure there is clarity in key issues such as the definition of illicit activities in cyberspace, available legal processes to enforce and investigate, and compliance measures for stakeholders. Similarly, cybersecurity policies should risk-based and focused on critical systems and infrastructure. In Singapore, rather than taking a broad approach to regulating cybersecurity, only the owners of Critical Information Infrastructure (CII), referring to specific computer systems in critical sectors such as financial services, have specific obligations placed on them including being required to conduct a cybersecurity audit at least once every two years.¹⁶⁹
- Comprehensive organizational setup within the government.** Comprehensive organizational measures are fundamental to the successful governing, organization, championing, and coordination of national cybersecurity strategies. This may include dedicated agencies to oversee the implementation and revision of cybersecurity policies as well as the proper assignment of specific roles and responsibilities to the relevant entities. For example, the Australian Government established the Australian Cyber Security Centre (ACSC) in 2014, which forms part of the Australian Signals Directorate and combines cyber capabilities from a variety of Australian cybersecurity expert bodies. It is responsible for leading-the nation's operational response to cybersecurity incidents, coordinating cybersecurity resources and operations, and investigating cyber threats, among other responsibilities.¹⁷⁰

- Adequate capacity development.** Capacity development is necessary to enhance the capabilities of government agencies, businesses, and consumers, allowing them to better understand the risks of cyber threats. For instance, public awareness campaigns on the risks of cyber incidents, sector-specific training for cybersecurity professionals, and funding for skills upgrading will help to ensure that stakeholders are better equipped to deal with future cyber threats. In addition, governments can consider establishing Computer Incident Response Teams (CIRTs) and Computer Emergency Response Teams (CERTs) that react to threats and build resilience through cyber drills and cybersecurity advisories. These capabilities will allow countries to be better prepared to manage cybersecurity breaches and build resilience through frequent cyber drills. An example of cybersecurity technical institutions established can be seen in India, where institutions are created to collect information, detect, alert users, and handle cyber incidents such as botnet infections and data compromises.¹⁷¹ The Indian Computer Emergency Response Team (CERT-IN) is the national incident response center for major computer and digital-related security incidents in the country.¹⁷²
- Strong international partnerships.** Cybersecurity risks are transboundary issues, and collaboration among stakeholders is necessary to mitigate these risks. A potential way for countries to foster strong international partnerships is through bilateral and multilateral cybersecurity agreements and international conferences. For example, in 2020, India and Japan finalized a cybersecurity agreement to enhance cooperation in capacity building and research.¹⁷³ There could also be greater cooperation between the public and private sectors to provide training and improve cybersecurity processes.

169. Singapore Statutes Online (2018), "Cybersecurity Act 2018". Available at: <https://sso.agc.gov.sg/Acts-Supp/9-2018/>
 170. Australian Government (2021), "Australian Cyber Security Centre". Available at: <https://www.cyber.gov.au/>
 171. A botnet infection is a collection of Internet-connected devices, which may include personal computers (PCs), servers, mobile devices and IoT devices, that are infected and controlled by a common type of malware. Tech Target, "Botnet". Available at: <https://searchsecurity.techtarget.com/definition/botnet>
 172. CERT-IN (2020), "What we do." Available at: <https://cert-in.org.in/>
 173. Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>

A2. ASSESSING THE PARAMETERS UNDER THE FOUR ENABLERS

A total of 26 parameters are assessed under the four broad enablers – policy, competition, capability, and infrastructure. This will inform the Digital Connectivity Index used to determine the extent of openness of the focus countries. Table A1 provides an overview of the parameters and the assessment matrix.

TABLE A1

ENABLERS AND PARAMETERS	SOURCE	ASSESSMENT		
		STRONG	MODERATE	WEAK
POLICY				
Appropriate data governance frameworks	Literature review	Risk-based and accountability-driven approaches to data governance	Data governance frameworks that allow for some degree of flexibility but fail to acknowledge business-driven risk management approaches (e.g., frameworks that do not prescribe data types to risk categories strictly but impose onerous requirements to move to a lower risk classification, resulting in over-classification)	Onerous and inflexible data governance frameworks without consideration of specific business needs; or no data governance frameworks
Minimal data localization restrictions	Literature review	Minimal or no data localization requirements	Sector-specific data localization requirements	Overarching data localization requirements
Clarity on notification and bases for processing cross-border data (e.g., consent; authority approval)	Literature review	Framework considers multiple bases for processing data; no written consent-only required	Consent-only frameworks	Public authority approval also required
Interoperability of cross-border frameworks	Literature review	Bilateral and multilateral commitments	Some commitments	No commitments

TABLE A1 (CONT'D)

ENABLERS AND PARAMETERS	SOURCE	ASSESSMENT		
		STRONG	MODERATE	WEAK
POLICY				
Guidelines on public authority access to local data	2018 BSA Global Cloud Computing Scorecard; Literature review	Clear guidelines limiting public authority access to a select number of justifiable reasons	Guidelines on authority access	Unclear or no restrictions on public authority access
Guidelines on public authority access to cross-border data	2018 BSA Global Cloud Computing Scorecard; Literature review	Many MLATs and international agreements for sharing data for law enforcement cooperation	Few MLATs and international agreements for sharing data for law enforcement cooperation	No MLATs and international agreements for sharing data for law enforcement cooperation
Minimization of administrative and fiscal barriers for digital exports (e.g., software)	De minimis thresholds	Equal or greater to US\$200	US\$100–US\$200	Less than US\$100
Interoperable digital payment regulations and supportive digital payment initiatives	eTrade Alliance — payment regulations and digital regulations on online transaction indices (score upon 11)	>7.5	7 or 7.5	<7
Absence of local registration requirement (e.g., registration of cloud service providers) and minimal limitations on foreign ownership and investment	ECIPE Digital Trade Restrictiveness Index; Literature review	Minimal limitations on foreign ownership and investment (Rank 41–65)	Moderate limitations on foreign ownership and investment (Rank 11–40)	Significant restrictions on foreign ownership and investment (Rank 1–10)

TABLE A1 (CONT'D)

ENABLERS AND PARAMETERS	SOURCE	ASSESSMENT		
		STRONG	MODERATE	WEAK
COMPETITION				
Absence of local sourcing requirements (e.g., local content requirements)	Literature review	No requirements	Required in some instances	Required
Open government procurement	Literature review	Both local and foreign enterprises allowed in all situations	Local enterprises required in some instances, or explicit preferences for local enterprises	Only local enterprises allowed
Competitive business environment with fair software licensing principles	Literature review	Clear laws governing software licensing have been established in alignment with the ten Principles of Fair Software Licensing launched by CISPE and Cigref	Action has been taken to draft new laws in alignment with the ten Principles of Fair Software Licensing launched by CISPE and Cigref	Limited or no action has been taken in the direction of fair software licensing
Access to international digital service providers	Literature review	Presence of explicit regulations allowing access by local organizations to international digital service providers	Lack of clarity in whether regulations allow for access by local organizations to international digital service providers	Regulations that prevent local industry from accessing international digital service providers

TABLE A1 (CONT'D)

ENABLERS AND PARAMETERS	SOURCE	ASSESSMENT		
		STRONG	MODERATE	WEAK
CAPABILITY				
Access to digital skills	IMD World Digital Competitiveness Ranking — knowledge factor (out of 64 economies)	25 and below	Between 25 and 60	60 and above
MSME digital adoption and exporting	eTrade Alliance — MSME capacity building and export promotion for ecommerce, ecommerce diagnostic and strategy, and trade facilitation for ecommerce indices (score upon 30)	12.5 and above	Between 10 and 12.5	10 and below
Clear digital transformation strategy	Literature review	Clear strategy with dedicated government agency	Either strategy or dedicated government agency	No strategy and no dedicated government agency
Access to cloud computing among local enterprises	Asia Cloud Computing Association (ACCA) Cloud Readiness Index (score upon 100)	>70	60–70	<60
Flexible regulations to accommodate evolving technologies	Literature review	Regular interactions with the industry and innovative approaches (e.g., sandboxes)	Some flexibility in policymaking	Top-down approach to policymaking
Cloud-first government policy	Literature review	Cloud first policy throughout the government	Some usage across departments	Limited or no implementation of policy
Strong IP protection	International IP Index 2021 (Trade Secrets, Related Rights, and Limitations)	High availability of civil remedies and criminal sanctions in relation to the misappropriation or improper acquisition, use, or disclosure of trade secrets (Score >75)	Moderate civil remedies and criminal sanctions in relation to the misappropriation or improper acquisition, use, or disclosure of trade secrets (Score 40–75)	Limited civil remedies and criminal sanctions in relation to the misappropriation or improper acquisition, use, or disclosure of trade secrets (Score <40)

TABLE A1 (CONT'D)

ENABLERS AND PARAMETERS	SOURCE	ASSESSMENT		
		STRONG	MODERATE	WEAK
INFRASTRUCTURE				
Broadband access	eTrade Alliance — Digital Infrastructure Index (score upon 9.9)	>8	7–8	<7
Affordable broadband cost	Alliance For Affordable Internet Affordable Driver Index (score upon 100)	>80	60–80	<60
Robust and relevant cybercrime and cybersecurity frameworks	ITU Global Cybersecurity Index (Score upon 20) Legal Measures	>19	16–19	<16
Comprehensive organizational setup within the government	ITU Global Cybersecurity Index (Score upon 20) Organizational Measures	>18	13–18	<13
Adequate capacity development	ITU Global Cybersecurity Index (Score upon 20) Capacity Development	20	13–19	<13
Strong international partnerships	ITU Global Cybersecurity Index (Score upon 20) Cooperative Measures	20	13–19	<13

A3. COUNTRY DEEP DIVES

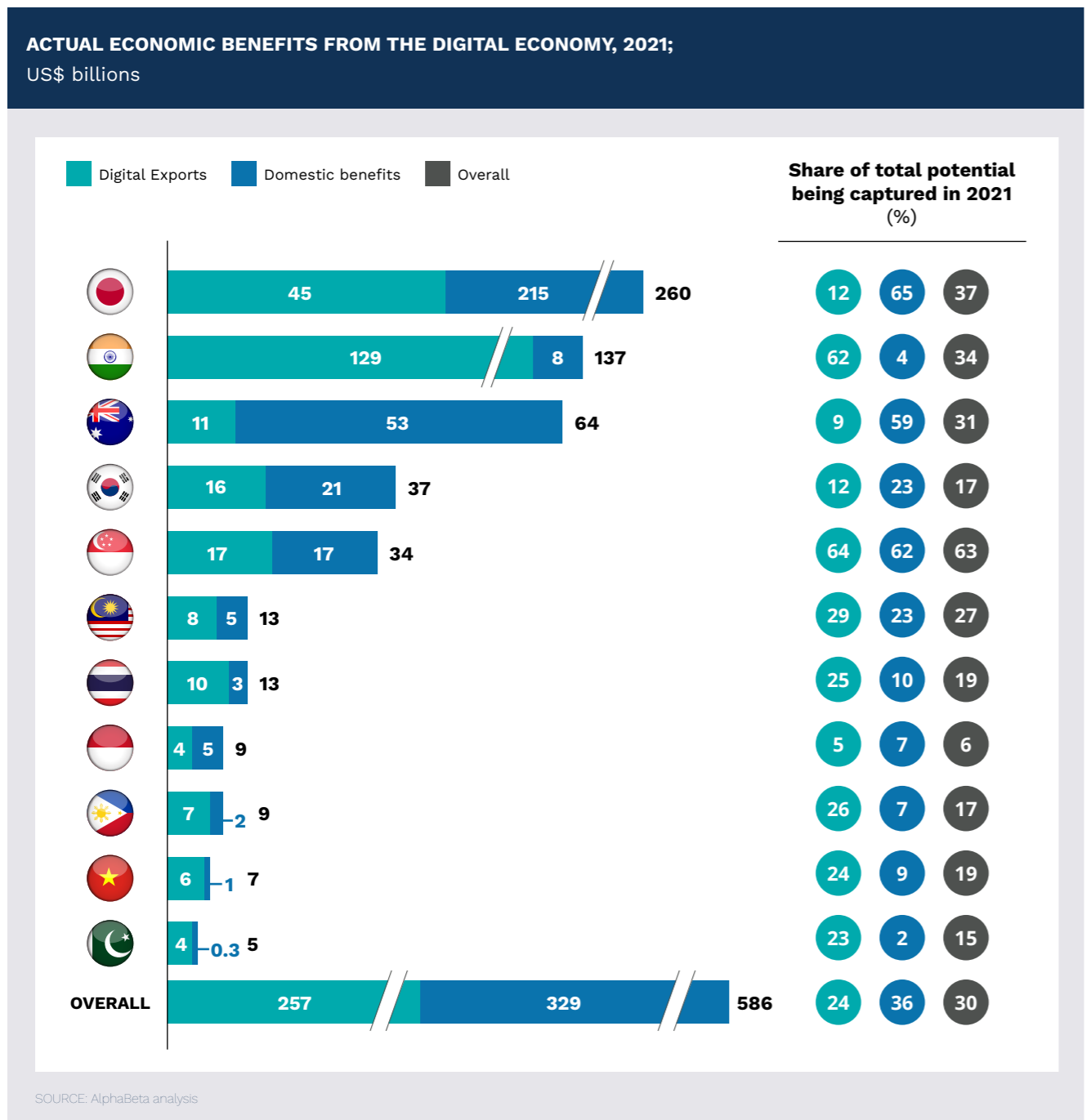
APAC-11

As of 2021, APAC-11 captured significant economic benefits from digital technologies — both domestic and exports-related. The total value is US\$586 billion (Exhibit A2). However, while significant, this is still only 30% of the potential benefits.



EXHIBIT A2

The APAC-11 are only capturing a small share of the total digital economy benefits in 2021



SOURCE: AlphaBeta analysis

AUSTRALIA

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

Australia enjoys a thriving domestic digital economy, capturing US\$53 billion or a substantial 59% of its potential domestic digital economy value in 2021.¹⁷⁴ Its digital trade activities have also grown considerably in recent years, generating US\$11 billion or 9% of its potential digital trade value in 2021.¹⁷⁵ Australia has strong ambitions to be a top digital economy and society by 2030.¹⁷⁶ Still, its digital economy has yet to realize its full potential and would benefit from adopting the “digital prosperity” approach moving forward.

- Domestic benefits.** Australia’s successful domestic digital economy can be attributed to several key factors. Australia has achieved high levels of digitization today – over 98% of its businesses have Internet access, and over 60% have adopted cloud services.¹⁷⁷ Federal and state governments have also released various policies and initiatives to support the development of their digital economies. Most prominently, in 2021, the Australian Government launched the “Digital Economy Strategy”, which outlines government actions to grow the country as a leading digital economy by 2030, building on its investments in infrastructure, skills, cybersecurity, regulations, and digital trade.¹⁷⁸

- Digital trade benefits.** The Australian government has released policies such as its “Digital Trade Strategy”, to provide a framework for the country to achieve greater economic growth

by creating an enabling environment for digital trade.¹⁷⁹ Such efforts have allowed the country to rapidly develop its digital trade capabilities. Yet, a stronger focus on developing its ICT sector and its digitally-enabled services exports in particular would be beneficial. Australia’s ICT sector is relatively small, currently, contributing only 2.3% of GDP in 2021.¹⁸⁰ Additionally, service exports in Australia are largely travel-driven, such as education-related travel services and personal travel services, rather than telecommunication and ICT-related services.¹⁸¹ This shows the immense potential of Australia’s digitally-enabled services exports, and the country can capture a larger share of its digital economy benefits if the “digital prosperity” approach is adopted going forward. Separately, Australian e-commerce exports are flourishing, with a considerable 63% of businesses engaged in e-commerce activities, the highest among the APAC-11 countries.¹⁸² This could be due to its strong logistics infrastructure (ranked 19th out of 167 countries in the World Bank’s Logistics Performance Index¹⁸³) and its high financial inclusion (with 60% of its population owning a credit card in 2020¹⁸⁴). Taken together, digital services and e-commerce exports in Australia represent only 9% of the potential digital trade value in 2021.

Under the business-as-usual (BAU) scenario where existing cloud service adoption rates are maintained, Australia’s digital economy is expected to grow at 3.9% per year from US\$63.5 billion in 2021 to US\$89.5 billion in 2030.¹⁸⁵ Of the total expected digital economy benefit for Australia in 2030, a considerable 78% comes

174. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

175. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

176. Australian Government Department of Foreign Affairs and Trade (2022), “Digital Trade Strategy”. Available at: <https://www.dfat.gov.au/trade/services-and-digital-trade/e-commerce-and-digital-trade/digital-trade-strategy>

177. Sources include OECD (2021), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

178. Australian Government (2021), “Australia’s Digital Economy Strategy launched”. Available at: <https://www.globalaustralia.gov.au/about-us/news-and-resources/australias-digital-economy-strategy-launched#~:text=The%20Australian%20Government%20is%20investing,the%202021%20Digital%20Economy%20Strategy.>

179. Australian Government Department of Foreign Affairs and Trade (2022), “Digital Trade Strategy”. Available at: <https://www.dfat.gov.au/trade/services-and-digital-trade/e-commerce-and-digital-trade/digital-trade-strategy>

180. ABS (2021), “Australian System of National Accounts”. Available at: <https://www.abs.gov.au/statistics/economy/national-accounts/australian-system-national-accounts/latest-release#data-download>

181. DFAT (2020), Australia’s Top 25 Exports, Goods & Services (a). Available at: <https://www.dfat.gov.au/sites/default/files/australias-goods-services-by-top-25-exports-2019-20.pdf>

182. OECD (2021), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

183. The World Bank Logistics Performance Index (LPI) measures countries’ performance on six key dimensions: (i) efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs; (ii) quality of trade and transport related infrastructure; (iii) ease of arranging competitively priced shipments; (iv) competence and quality of logistics services; (v) ability to track and trace consignments; (vi) timeliness of shipments in reaching destination within the expected delivery time. A total of 167 countries were analyzed in this index. Source: World Bank (2018), International LPI. Available at: <https://lpi.worldbank.org/international>

184. PPRO (2020), PPRO Payments & E-Commerce Report: Asia Pacific. Available at: <https://www.ppro.com/e-book/ppro-payments-e-commerce-report-asia-pacific/>

185. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.



from domestic benefits such as cost savings and productivity gains.¹⁸⁶ Under the accelerated scenario, this economic benefit is expected to increase by approximately three times to be valued at US\$274.6 billion in 2030, of which, a significant 50% stems from digitally-enabled services exports.¹⁸⁷

SPECIFIC RECOMMENDATIONS UNDER THE “DIGITAL PROSPERITY” APPROACH (NOT EXHAUSTIVE)

The country could focus on the following policies to successfully unlock its digital economy potential:

- **Provide greater clarity of cross-border data transfer requirements, with minimal localization restrictions.** Currently, Australia’s MyHealth Records Act 2012 s77 prohibits the taking or processing of health records outside Australia, except if no personal or identifying information is included.¹⁸⁸

While Australia’s regulations are enforced to better manage data security and privacy concerns, it is crucial to highlight that cross-border data flows can still achieve data sovereignty aims.¹⁸⁹ As long as equivalent standards of data protection are implemented across countries, Australia should instead push for cross-border data transfers while achieving its data sovereignty aims.

- **Adopt fair software licensing principles in legislation.** Australia has not formerly supported fair software licensing principles, a movement that is largely limited to European industry bodies and governments today.¹⁹⁰ These principles outline the best practices of software licensing for cloud customers such as the avoidance of customer lock-in through interoperable directory software and allowing customers to run their “on-premises” software on the cloud.¹⁹¹

186. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

187. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

188. Thomson Reuters Practical Law (2022), Data Localization Laws: Australia. Available at: [https://content.nextwestlaw.com/practical-law/document/13c5915b7323f11eaadfea82903531a62/Data-Localization-Laws-Australia?viewType=FullText&transitionType=Default&contextData=\(sc.Default\)](https://content.nextwestlaw.com/practical-law/document/13c5915b7323f11eaadfea82903531a62/Data-Localization-Laws-Australia?viewType=FullText&transitionType=Default&contextData=(sc.Default))

189. GSMA (2018), Cross-Border Data Flows Realising benefits and removing barriers. Available at: https://www.gsma.com/publicpolicy/wp-content/uploads/2018/09/GSMA-Cross-Border-Data-Flows-Realising-benefits-and-removing-barriers_Sept-2018.pdf

190. FairSoftware.Cloud (2022), “Principles of Fair Software Licensing for Cloud Customers”. Available at: <https://www.fairsoftware.cloud/principles/>

191. FairSoftware.Cloud (2022), “Principles of Fair Software Licensing for Cloud Customers”. Available at: <https://www.fairsoftware.cloud/principles/>

INDIA

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

India’s digital economy has grown considerably over the years, enabling the country to capture US\$129 billion from digital trade (or a substantial 62% of the potential digital trade value) in 2021.¹⁹² Additionally, due to digital developments

in the country, India is able to capture US\$8 billion from its domestic digital economy (or 4% of the potential domestic digital economy value) in 2021.¹⁹³ While these values are significant, India has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the “digital prosperity” approach moving forward.¹⁹⁴



- **Domestic benefits.** India has displayed strong economic resilience despite the COVID-19 pandemic, and its focus on the digital economy through its policies and regulations is expected to help the country recover quickly from the pandemic and be on course to be one of the fastest-growing economies globally. For instance, the government launched the “Make in India” initiative to transform India into a global design and manufacturing hub from an import-centric consumer market, and this complements the “Digital India” initiative developed that aims to transform India into a digitally empowered economy.¹⁹⁵ These initiatives allow the country to quickly develop domestic design and manufacturing capabilities through the use of advanced digital technologies. However, more can be done to further facilitate growth in the digital economy to allow India to capture a larger share of its potential domestic benefits. Initiatives to boost its digital access among its population and cloud service adoption rates among businesses will be beneficial given its relatively weak state today.¹⁹⁶ The number of Internet users in India has grown significantly in recent years, increasing from 384 million users in 2017 to 692 million users in

192. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5. Our estimate is different from estimates of India’s IT-BPM sector due to the difference in scope of analysis. India’s IT-BPM sector includes sub-sectors such as IT Services, Business Process Management, Software Products, and Engineering Research and Development. On the other hand, our study focuses on the export of digitally-enabled goods (i.e., B2C e-commerce exports beyond IT products to include sports, medical, and fashion products) and digitally-enabled services (i.e., telecommunications, computer programming, consultancy and related activities and information service activities). Key components that are excluded in our analysis but included in the IT-BPM sector include some components of the Banking, Financial services and Insurance component of IT services, as well as some components of BPM services (e.g., Financial & Accounting Management, Human Resource Administration, Management of Supply chain). However, our analysis also included components excluded from the IT-BPM sector export revenue estimate (US\$149 billion in 2021). This includes hardware exports, e-commerce exports, and indirect digital services (embedded in other exports). Indirect digital services refer to how imported digital services are utilized and contribute to the production of other goods and services that are later exported. It pertains to exports of all goods and services (other than digital services) that are made possible by importing digital services. Examples include telecommunication services such as imported email, video conferencing, digital file sharing, and VOIP services that get used by a mining company when exporting overseas.

193. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

194. Note that the economic benefits derived are not directly comparable to the IT-BPM sector of India. This is largely driven by the differences in coverage in both estimates. The IT-BPM sector revenues include revenue from businesses in the following subsectors: IT services, Software & Engineering services, BPM services, and Hardware services. On the other hand, this report’s analysis focuses on the additional domestic benefits for the country from increased digital/ cloud adoption through productivity gains and cost savings, as well as digital export benefits through revenue boosts for exporting businesses.

195. Sources include Ministry of Electronics & Information Technology, Government of India, “Digital India”. Available at: <https://www.digitalindia.gov.in/> and Inc42 (2020), “#StartupIndia: How ‘Digital India’ And ‘Make In India’ Power India’s Tech Juggernaut”. Available at: <https://inc42.com/features/startupindia-how-digital-india-and-make-in-india-power-indias-tech-juggernaut/#-text=While%20Make%20In%20India%20was%20education%20to%20commerce%20and%20governance>.

196. This is an insight derived when comparing the cloud service adoption rates and digital access of India with the other APAC-11 economies. Sources include World Economic Forum (2020), “These are the countries where internet access is lowest”. Available at: <https://www.weforum.org/agenda/2020/08/internet-users-usage-countries-change-demographics/>; Afaqs! (2022), “Rural India Takes Driving Seat in India’s Internet Usage Growth: IMAI KANTAR Report”. Available at: <https://www.afaqs.com/news/mktg/rural-india-takes-driving-seat-in-indias-internet-usage-growth-imai-kantar-report>; and OECD (2021), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

2021, driven by factors such as the availability of affordable mobile data plans.¹⁹⁷ Its public cloud market has also expanded considerably to be valued at US\$5.6 billion in 2021.¹⁹⁸ While this is no easy feat, greater efforts to improve Internet penetration rates, especially in rural India where digital access is relatively low, will be beneficial for the country.¹⁹⁹ Cloud service adoption amongst businesses can also be further enhanced by tackling some of the key barriers faced by businesses, particularly MSMEs. Some of the barriers highlighted by businesses include the high costs of cloud migration, the lack of strategic direction and understanding of how the benefits and risks of new technologies apply to the organization, and the lack of required technology skillsets to manage the new cloud infrastructure.²⁰⁰ By tackling these barriers, India will be able to capture a larger share of its full potential domestic benefits.

- **Digital trade benefits.** The significant share of digital trade benefits captured by India is largely driven by digitally-enabled services exports. India's Information Technology Business Process Management (IT-BPM) industry contributed 7.4% of the country's GDP in Financial Year (FY) 2022, with the size of the industry doubling over the last decade, making India a world leader in this industry.²⁰¹ In comparison, the potential of e-commerce exports in India is largely left untapped, and more can be done to further boost its digital trade activities by developing its digital infrastructure further. In recent years,

India has rapidly developed its digital payment infrastructure and is attempting to create an enabling digital trade environment for businesses. Digital transactions have also continued to increase in the country. Today, a substantial 40% of all transactions in India are conducted digitally.²⁰² In 2020, a total of 25.4 billion digital payment transactions have taken place, and this is significant, representing 1.6 and 21 times the number of transactions observed in China and United States, respectively.²⁰³ While these trends are encouraging, with the rise of digital payments, gaps in existing infrastructure such as technical glitches have resulted in authentication failures and payment delays in the country.²⁰⁴ To tackle this, the Reserve Bank of India has launched a framework for facilitating small value digital payments in offline mode, allowing individuals living in semi-urban and rural areas in India with no or poor Internet access to access digital payments.²⁰⁵ However, more can be done to further address these challenges, allowing India to fully capture the full potential benefits of digital trade.

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of India's digital economy is expected to grow at 6.9% per year from US\$137.1 billion in 2021 to US\$249.1 billion in 2030.²⁰⁶ The economic benefit estimated under the BAU scenario in 2030 is largely from digitally-enabled services exports.²⁰⁷ Under the accelerated scenario, this economic

197. Afaqs! (2022), "Rural India Takes Driving Seat in India's Internet Usage Growth: IAMAI KANTAR Report". Available at: <https://www.afaqs.com/news/mktg/rural-india-takes-driving-seat-in-indias-internet-usage-growth-iamai-kantar-report> and Hindustan Times (2022), "India has 5th lowest mobile data prices in the world. Check Pak, Sri Lanka rates". Available at: <https://www.hindustantimes.com/technology/india-has-5th-lowest-mobile-data-prices-in-the-world-check-pak-sri-lanka-rates-101658920262973.html>

198. This is relatively low in comparison with the other APAC-11 economies. Please refer to Appendix A5 for the detailed methodology on how the cloud service adoption rates for businesses in this study were calculated. Sources include NASSCOM (2022), Future of cloud and its economic impact. Available at: <https://community.nasscom.in/communities/cloud-computing/future-cloud-and-its-economic-impact-opportunity-india>; and OECD (2021), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

199. Afaqs! (2022), "Rural India Takes Driving Seat in India's Internet Usage Growth: IAMAI KANTAR Report". Available at: <https://www.afaqs.com/news/mktg/rural-india-takes-driving-seat-in-indias-internet-usage-growth-iamai-kantar-report>

200. Sources include BCG (2021), The Future of Cloud in Asia Pacific. Available at: <https://web-assets.bcg.com/17/91/e6cd678e4256b635b0c4c29ad127/the-future-of-cloud-in-asia-pacific.pdf>; and *BusinessToday* (2022), "Cloud Computing: Benefits and challenges to SMBs in India". Available at: <https://www.businesstoday.in/opinion/columns/story/cloud-computing-benefits-and-challenges-to-smb-in-india-335986-2022-06-01>

201. Invest India (2022), IT & BPM. Available at <https://www.investindia.gov.in/sector/it-bpm>; *BusinessToday* (2022), "Economic Survey 2022: IT services sector grows by 2.1% to clock \$178 bn revenue in 2020-21". Available at: <https://www.businessexhibit.in/latest/economy/story/economic-survey-2022-it-services-sector-grows-by-21-to-clock-178-bn-revenue-in-2020-21-320984-2022-01-31>; and India Brand Equity Foundation [IBEF] (2020), IT & BPM. Available at: <https://www.ibef.org/download/IT-and-BPM-November-2020.pdf>

202. Boston Consulting Group and PhonePe (2022), Digital Payments in India: A US\$10 Trillion Opportunity. Available at: <https://web-assets.bcg.com/be/3c/5bd90af6416a80b4496969ec0d1b/future-of-digital-payments-in-india.pdf>

203. Live Mint (2021), "India ahead of US, China in...: One of India's youngest billionaire retweets IT Minister's post". Available at: <https://www.livemint.com/industry/banking/india-ahead-of-us-china-in-vijay-shekhhar-sharma-retweets-it-minister-ashwini-vajshnaw-post-11627637545546.html>

204. The Print (2020), "Glitches, poor coverage: India's digital payment failing labourers when they need it most". Available at: <https://theprint.in/opinion/glitches-poor-coverage-indias-digital-payment-failing-labourers-when-they-need-it-most/434444/>; PWC (2021), "What lies ahead in digital payments trends for 2021". Available at: <https://www.pwc.in/industries/financial-services/fintech/dp/what-lies-ahead-in-digital-payments-trends-for-2021.html>

205. The National Law Review (2022), "No Internet? No Problem, As Indian Regulator Enables Offline Digital Payments". Available at: <https://www.natlawreview.com/article/no-internet-no-problem-indian-regulator-enables-offline-digital-payments>

206. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

207. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

benefit is expected to grow further to be valued at US\$871.2 billion in 2030.²⁰⁸ Under the accelerated scenario, a considerable 58% of economic benefit will be gained from domestic benefits of the digital economy instead.²⁰⁹

SPECIFIC RECOMMENDATIONS UNDER THE "DIGITAL PROSPERITY" APPROACH (NOT EXHAUSTIVE)

More supportive policies can be implemented to help India achieve its digital economy objectives. India should focus on the following actions to successfully unlock its full potential:

- **Promote convergence and interoperability in privacy laws through agreements.** The country has refrained from signing onto the Osaka Track, a framework promoting cross-border data flows with enhanced protections for signatories.²¹⁰

INDONESIA

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

Indonesia's digital economy has grown considerably over the years, enabling the country to capture US\$5 billion from its domestic digital economy (or 7% of the potential domestic digital economy value) in 2021.²¹³ Furthermore, due to digital developments in the country, Indonesia is able to capture US\$4 billion from digital exports (or 5%

To accelerate growth in the digital economy, the government can adopt a consultative approach to policymaking by participating in discussions on interoperable cross-border data flows frameworks and adhering to international agreements.

- **Move to at least US\$200 de minimis threshold.** While India is a signatory to the World Trade Organization (WTO) Information Technology Agreement where trading of IT products amongst participating economies will not be subjected to taxes, non-IT products will still be subject to taxes.²¹¹ Therefore, India should review its current de minimis threshold which is at US\$4 and imposes significant administrative and compliance costs to businesses engaged in international trade activities.²¹²

of the potential digital trade value) in 2021.²¹⁴ While the country's digital progress is commendable, Indonesia has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the "digital prosperity" approach moving forward.

- **Domestic benefits.** Indonesia With 274 million people in Indonesia, the country has the fourth largest number of Internet users globally with

208. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the "best-in-class" country.

209. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

210. The Indian Express (2022), "G-20 Osaka summit: India refuses to sign declaration on free flow of data across borders". Available at: <https://indianexpress.com/article/india/g-20-osaka-summit-narendra-mod-india-declaration-on-free-flow-of-data-across-borders-shinzo-abe-5805846/>

211. World Trade Organization (2022), "Information Technology Agreement". Available at: https://www.wto.org/english/tratop_e/inftec_e/inftec_e.htm

212. Global Express Association (2021), "Countries and Territories". Available at: <https://global-express.org/index.php?id=422>

213. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

214. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

JAPAN

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

Japan's digital economy does well domestically, capturing US\$215 billion or a substantial 65% of its potential domestic digital economy value in 2021.²³⁵ Digital trade activities in the country have also grown considerably in recent years, allowing it to capture US\$45 billion or 12% of its potential digital trade value in 2021.²³⁶ While these values are significant, Japan has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the "digital prosperity" approach moving forward.

- **Domestic benefits.** The significant share of potential domestic benefits captured is driven by the high digital adoption rate amongst businesses and consumers in Japan. Japan has achieved high levels of digitization, with over 90% of its population having access to the Internet.²³⁷ In addition, Japan has one of the largest shares of companies with a web presence globally, at 96%.²³⁸ This high level of digitization is mirrored by its ICT spending – with an estimated US\$250 billion spent by enterprises. Japan has also shown significant uptake of advanced technologies such as cloud services, with an estimated cloud penetration rate of over 65% in 2021.²³⁹ To capture a larger share of its domestic digital economy benefits, greater efforts to encourage businesses to further leverage digital tools such as the cloud will be very beneficial for the country.
- **Digital trade benefits.** The e-commerce industry in Japan has been growing at a substantial annual growth rate of 20% since 2019, accelerated by the

COVID-19 pandemic.²⁴⁰ This is strongly supported by the government's active participation in multilateral and bilateral trade agreements such as the "U.S.-Japan Digital Trade Agreement", which establishes enforceable rules that will support digitally-enabled suppliers in their growth and internationalization efforts.²⁴¹ However, while digital adoption and domestic e-commerce activity are high in the country, Japan has been lagging in its export activity due to its domestically-driven economy and relatively small export reliance.²⁴² Japan's exports contribute a relatively small share of 16% to GDP, second only to Pakistan at 10% out of the APAC-11.²⁴³ With a shrinking domestic market, the Japanese government and businesses should start adopting an export-oriented approach to better leverage the digital wave and address the growing demand from international customers. There are several areas that could hinder progress in digital trade. First, the recently passed economic security bill imposes tighter oversight of Japanese firms in several sectors including the ICT sector as it allows the government to intervene in local companies' transactions with foreign companies.²⁴⁴ There is also a persistent concern that the Japanese government may develop "Galapagos" security standards on the cloud that could harm competition and create long-term obstacles to Japan's export growth.²⁴⁵ Such protectionist initiatives may hinder local firms from participating in digital export activities. While cloud adoption rates are substantial today; Japan must continue to encourage cloud adoption in the country to boost its economic resilience over the next decade. To better facilitate digitally-enabled

services exports, greater efforts by businesses to leverage digital tools and develop more high value-add services and products from the cloud (regardless of where these cloud providers are from) will be beneficial. For instance, global-scale cloud computing platforms are found to provide high processing power, storage, and networking services at competitive prices.²⁴⁶ Another area Japan can focus on is enhancing efforts in education and skilling. While Japan has strengths in computing power and digital connectivity, it lags behind its high-income peers in terms of ICT talent. Past studies found that this is driven by an aging workforce, reliance on outsourced IT capabilities, and limited incentives for digital skill upgrading due to Japan's culture of lifelong employment.²⁴⁷ By tackling these challenges, Japan will be well poised to capture a larger share of the full digital economy potential.

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of Japan's digital economy is expected to grow at 3.6% per year from US\$260 billion in 2021 to US\$358 billion in 2030.²⁴⁸ Under the accelerated scenario in 2030, this economic benefit is expected to increase by approximately three times to be valued at US\$866.8 billion.²⁴⁹ Under both scenarios in 2030, much of the expected economic benefit in Japan comes from domestic benefits of the digital economy, followed by digitally-enabled services exports and digital goods exports.²⁵⁰

SPECIFIC RECOMMENDATIONS UNDER THE "DIGITAL PROSPERITY" APPROACH (NOT EXHAUSTIVE)

The country does well in most areas, but it can focus on the following policies to successfully unlock its digital economy potential:

- **Move to at least US\$200 de minimis threshold.** Current de minimis thresholds of Japan is at US\$88, which imposes significant administrative and compliance costs on businesses engaged in international trade activities.²⁵¹
- **Ensure ease of doing business by streamlining processes and removing restrictive requirements such as limitations on foreign ownership.** In Japan, there is a limit on shares of the incumbent telecommunication operator that can be acquired by foreigners.²⁵² Japan is also limiting foreign ownership of firms in sectors including the tech and telecommunication sectors. Foreign investors are required to gain approval from the government if they intend to purchase Japanese companies operating within those industries. Such local registration requirements for businesses and limitations on foreign ownership and investment should be removed to facilitate international trade and investment. Furthermore, as the country aims to promote a bustling start-up ecosystem with several programs in place to attract international startups to the country, it is instrumental that Japan eases its foreign ownership requirements.²⁵³
- **Increase curriculum responsiveness, incorporate technology in the classroom, introduce digital bootcamps, and create sector-specific skilling roadmaps.** A proactive approach to digital skilling needs to be focused on as the country is facing a digital skills shortage. Japan is expected to have a shortage of 6.4 million workers and 450,000 IT professionals by 2030 according to a recent study conducted by Persol Research and Consulting and Chuo University.²⁵⁴

235. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

236. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

237. World Bank (2020), "Individuals using the Internet (% of population)". Available at: <https://data.worldbank.org/indicator/IT.NET.USER.ZS>

238. OECD (2020), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

239. OECD (2021), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

240. Sources include Ministry of Economy, Trade and Industry (2021), "Results of FY2020 E-Commerce Market Survey Compiled". Available at: https://www.meti.go.jp/english/press/2021/0730_002.html; Ministry of Economy, Trade and Industry (2020), "Results of FY2019 E-Commerce Market Survey Compiled". Available at: https://www.meti.go.jp/english/press/2020/0722_005.html; and Nikkei Asia (2022), "Consumer e-commerce hits a brick wall in Japan". Available at: <https://asia.nikkei.com/Spotlight/Datawatch/Consumer-e-commerce-hits-a-brick-wall-in-Japan>

241. Office of the United States Trade Representative (2019), "Face Sheet on U.S.-Japan Digital Trade Agreement". Available at: <https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2019/october/fact-sheet-us-japan-digital-trade-agreement>

242. EIU (2019), "Domestic demand drives growth acceleration". Available at: <http://country.eiu.com/article.aspx?articleid=848323068&Country=Japan&topic=Economy&subtopic=Forecast&subsubtopic=Economic+growth>

243. World Bank (2020), "Exports of goods and services (% of GDP)". Available at: <https://data.worldbank.org/indicator/NE.EXP.GNFS.ZS>

244. Reuters (2022), "Japan passes economic security bill to guard sensitive technology". Available at: <https://www.reuters.com/world/asia-pacific/japan-passes-economic-security-bill-guard-sensitive-technology-2022-05-11/>

245. Bespoke or heterogeneous standards reduce compatibility with broader cloud service ecosystems, raise costs, and reduce the range of available services, all while raising the risks of vendor lock-in and dampening competition. American Chamber of Commerce in Japan (2022), "Ensure a Level Playing Field in Cloud Services in Order to Promote Economic Security and Economic Growth". Available at: <https://static1.squarespace.com/static/5eb491d611335c743fef24ce/t/62b0332bdb7c7f170e5ef8e7/1655714603900/2211+Cloud+Services+%28ESTF%29.pdf>

246. Carnegie Endowment for International Peace (2022), "How Silicon Valley Can Drive Closer U.S.-Japan Collaboration". Available at: <https://carnegieendowment.org/2022/03/09/how-silicon-valley-can-drive-closer-u-s-japan-collaboration-pub-86601>

247. AlphaBeta (2021), "Unlocking APAC's digital potential: changing digital skill needs and policy approaches". Available at: <https://aws.amazon.com/blogs/publicsector/new-report-asia-pacific-workforce-applying-digital-skills-increase-five-fold-2025/>

248. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

249. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the "best-in-class" country.

250. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

251. Global Express Association (2021), "Overview of de minimis value regimes world wide". Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf

252. Sources include Business Times (2020), "Japan to limit foreign ownership in 12 sectors: sources". Available at: <https://www.businesstimes.com.sg/government-economy/japan-to-limit-foreign-ownership-in-12-sectors-sources>; and ECIPE (2018), "Digital Trade Restrictiveness Index". Available at: https://ecipe.org/wp-content/uploads/2018/05/DTRI_FINAL.pdf

253. Sources include Office of Policy Planning and Coordination on Territory and Sovereignty (2022), "Grand Design and Action Plan for a New Form of Capitalism". Available at: https://www.cpas.go.jp/jp/seisaku/atarashii_sihonsyugi/pdf/ap2022en.pdf; and Tech In Asia (2021), "500 Global's Japan initiative invites startups worldwide for landing pad program". Available at: <https://www.techinasia.com/500-globals-japan-initiative-invites-global-startups-launch-pad-program>

254. Microsoft (2022), "How skilling is fueling Japan's digital transformation". Available at: <https://news.microsoft.com/apac/2022/02/18/skilling-for-japans-digital-transformation/>

MALAYSIA

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

Malaysia's digital economy has grown considerably over the years, enabling the country to capture US\$5 billion from its domestic digital economy (or 23% of the potential domestic digital economy value) in 2021.²⁵⁵ Furthermore, due to digital developments in the country, Malaysia is able to capture a sizeable US\$8 billion from digital exports (or 29% of the potential digital trade value) in 2021.²⁵⁶ While the country's digital progress is commendable, Malaysia has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the "digital prosperity" approach moving forward.

- **Domestic benefits.** Malaysia is able to capture a moderate share of its potential benefits domestically for several reasons. Firstly, Malaysia has achieved widespread Internet penetration, with 90% of its population having access to the Internet.²⁵⁷ Secondly, in terms of cloud service adoption, over 20% of enterprises are estimated to have adopted cloud services in 2021.²⁵⁸ Thirdly, labor productivity of Malaysian workers is moderately high at US\$5,600 per worker, and this resulted in considerable productivity gains benefitted in 2021.²⁵⁹ In turn, it is estimated that Malaysia has gained a moderate share of domestic benefits, capturing 23% of such benefits.
- **Digital trade benefits.** With the availability of digital and logistics infrastructure (ranked 35th in World Bank's Logistics Performance Index²⁶⁰) and supportive government policies and

initiatives developed, Malaysian businesses are able to capture almost one-third of their potential digital trade benefits, with most of the gains from e-commerce exports. As part of the government's plan to support the digital economy, e-commerce initiatives such as the "National E-commerce Strategic Roadmap" was developed in 2016 to accelerate the adoption of e-procurement by businesses, address non-tariff barriers such as e-fulfilment and consumer protection issues, and boost cross-border e-commerce amongst sellers.²⁶¹ However, despite existing efforts, its enterprises, particularly MSMEs, are behind in digital adoption. The World Bank highlights that MSMEs in Malaysia lag larger enterprises in digital adoption. There are also fewer businesses with a web presence relative to other countries with a similar per capita income.²⁶² In terms of digitally-enabled services exports, Malaysia is capturing only a moderate amount of its potential despite having relatively strong ICT talent, ranking 22nd out of 64 countries in the IMD World Digital Competitiveness Ranking.²⁶³ Greater efforts to improve digital adoption rates amongst MSMEs as well as to promote services exports in the country will be beneficial, allowing the country to capture a larger share of the potential digital economy value from digital trade.

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of Malaysia's digital economy is expected to grow at 5.5% per year from US\$12.5 billion in 2021 to US\$20.3 billion in 2030.²⁶⁴ Under the BAU

255. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

256. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

257. World Bank (2020), "Individuals using the Internet (% of population)". Available at: <https://data.worldbank.org/indicator/IT.NET.USER.ZS>

258. OECD (2021), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

259. Department of Statistics Malaysia (2022), LABOUR PRODUCTIVITY OF SECOND QUARTER 2022.

Available at: <https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=Y3BuZWdWRThcTRWRZsU0ZTbld5UT09>

260. The World Bank Logistics Performance Index (LPI) measures countries' performance on six key dimensions: (i) efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs; (ii) quality of trade and transport related infrastructure; (iii) ease of arranging competitively priced shipments; (iv) competence and quality of logistics services; (v) ability to track and trace consignments; (vi) timeliness of shipments in reaching destination within the expected delivery time. A total of 167 countries were analyzed in this index. Source: World Bank (2018), International LPI. Available at: <https://lpi.worldbank.org/international>

261. Malaysia Digital Economy Corporation (2016), "National E-commerce Strategic Roadmap".

Available at: <https://mdec.my/about-malaysia/government-policies/national-e-commerce-strategic-roadmap/>

262. TechWire Asia (2021), "SMEs in Malaysia still lag in digital adoption – World Bank".

Available at: <https://techwireasia.com/2021/06/smes-in-malaysia-still-lag-in-digital-adoption-world-bank/>

263. IMD (2021), IMD World Digital Competitiveness Ranking 2021. Available at: https://www.imd.org/globalassets/wcc/docs/release-2021/digital_2021.pdf

264. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

scenario in 2030, most of the digital economy benefit comes from the domestic benefits of the digital economy.²⁶⁵ Under the accelerated scenario, this economic benefit is expected to grow at 23.7% per year from 2021 to be valued at US\$85 billion in 2030.²⁶⁶ Under the accelerated scenario in 2030, a considerable share of the economic benefit in Malaysia is from digitally-enabled services exports, followed by domestic digital economy benefits.²⁶⁷

SPECIFIC RECOMMENDATIONS UNDER THE "DIGITAL PROSPERITY" APPROACH (NOT EXHAUSTIVE)

Malaysia does well in some areas, but it can focus on the following policies to successfully unlock its digital economy potential:

- **Ensure clear guidelines on the limits of public authority access to data of crucial public**

PAKISTAN

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

Pakistan's digital economy has grown considerably over the years, enabling the country to capture US\$0.3 billion from its domestic digital economy (or 2% of the potential domestic digital economy value) in 2021.²⁷¹ Furthermore, due to digital developments, Pakistan is able to capture US\$4 billion from digital exports (or 23% of the potential digital trade value) in 2021.²⁷² While these benefits do not appear significant in absolute terms, the country's digital economy has made significant progress over the past decade which is no easy feat. Greater growth can be enabled

interest. Under The Digital Signature Act 1997 in Malaysia, authorized officers have the authority to access documents and computerized data when there is reasonable cause to believe that an offense under the Digital Signature Act is committed.²⁶⁸ This regulation serves as de facto mandates for the use of security technology by law enforcement officers in certain situations.²⁶⁹

- **Ensure protection of commercially-sensitive data or proprietary information, or adequate safeguards if disclosures are required.** Digital innovation is adversely impacted by weak IP enforcement in Malaysia with the country being among the top provenance economies for counterfeit and pirated goods traded worldwide and has moved up in the top ten provenance economies of counterfeit imports into the European Union (EU).²⁷⁰

moving forward if Pakistan starts adopting the "digital prosperity" approach.

- **Domestic benefits.** In recent years, the Pakistani government has shifted its focus towards digitalization and many government agencies are striving to facilitate digital transformation amongst businesses and consumers in the country. However, despite current efforts, Pakistan is only capturing a limited share of potential benefits from digitally-enabled services exports. More can be done to improve its digital adoption rates by businesses and consumers, allowing the country to reap the benefits of the digital economy. Pakistan is currently home to the third-largest

265. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

266. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the "best-in-class" country.

267. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

268. Sources include Malaysian Communications and Multimedia Commission (2022), "Digital Signature". Available at: <https://www.mcmc.gov.my/en/sectors/digital-signature#~:text=The%20Digital%20Signature%20Act%201997,through%20certificates%20issued%20by%20licensed>; Malaysian Communications and Multimedia Commission (2022), "Digital Signature Act 1997 [Act 562]". Available at: <https://www.mcmc.gov.my/en/sectors/digital-signature/digital-signature-act-1997>; and BSA (2018), Country Report: Malaysia. Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf

269. Sources include Malaysian Communications and Multimedia Commission (2022), "Digital Signature". Available at: <https://www.mcmc.gov.my/en/sectors/digital-signature#~:text=The%20Digital%20Signature%20Act%201997,through%20certificates%20issued%20by%20licensed>; Malaysian Communications and Multimedia Commission (2022), "Digital Signature Act 1997 [Act 562]". Available at: <https://www.mcmc.gov.my/en/sectors/digital-signature/digital-signature-act-1997>; and BSA (2018), Country Report: Malaysia. Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf

270. European Commission (2021), Report on the protection and enforcement of intellectual property rights in third countries.

Available at: https://trade.ec.europa.eu/doclib/docs/2021/april/tradoc_159553.pdf

271. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

272. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

population that is disconnected from the Internet, with over 140 million people without Internet access.²⁷³ Consequently, the lack of basic digitization impedes cloud service adoption and the country's ability to fully capture the large opportunity available from the digital economy. Pakistan is estimated to have the lowest cloud service adoption rate among the APAC-11, with around less than 5% of its businesses adopting cloud.²⁷⁴ Relatively nascent in its digitization journey, Pakistan has large potential gains if it can successfully shift towards an open digital economy through flexible regulations and building the requisite infrastructure and skills in the country.

- **Digital trade benefits.** In 2021, the government has launched an e-commerce initiative under the “Digital Pakistan” policy which aims to facilitate the holistic growth of e-commerce in the country.²⁷⁵ It provides guidelines on key components to promote e-commerce including the regulatory environment, financial inclusion, and digitization through payment infrastructure, ICT infrastructure, logistics, and engagement in multilateral negotiations.²⁷⁶ However, despite existing initiatives, e-commerce export activity remains weak due to its poor logistics infrastructure (ranking 95th out of 167 countries in the World Bank's Logistics Performance Index.²⁷⁷), weak financial inclusion (low credit card penetration rate of 1%.²⁷⁸), and underdeveloped digital payment infrastructure such as payment gateways. Payment gateways such as PayPal are crucial in facilitating digital payments across

borders, however, this service is not available in Pakistan currently due to the high costs of entry, money laundering issues, and clearance complications, further stifling growth in the industry.²⁷⁹ Similarly, while several government policies have been implemented to develop the ICT sector, it remains relatively underdeveloped. The ICT sector represents around 1% of GDP in 2021, the lowest out of APAC-11, while ICT services exports is valued at US\$2.45 billion in 2021, one of the lowest out of APAC-11.²⁸⁰ However, it is important to note that while digitally-enabled services exports are still at the nascent stage, this area has been increasing rapidly with the ICT services export share out of total services exports grown by around 80% from 2005 to 2018.²⁸¹

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of Pakistan's digital economy is expected to grow at 2.4% per year from US\$4.7 billion in 2021 to US\$5.8 billion in 2030.²⁸² Under the BAU scenario in 2030, most of the expected digital economy benefit stems from domestic digital economy benefits.²⁸³ Under the accelerated scenario, this economic benefit is expected to increase by approximately ten times to be valued at US\$48.9 billion in 2030.²⁸⁴ Under the accelerated scenario in 2030, most of the expected economic benefit in Pakistan is from digitally-enabled services exports, followed by domestic benefits of the digital economy and e-commerce exports.²⁸⁵

273. World Economic Forum (2020), “These are the countries where internet access is lowest”.

Available at: <https://www.weforum.org/agenda/2020/08/internet-users-usage-countries-change-demographics/>

274. OECD (2021), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

275. Government of Pakistan (2019), e-Commerce Policy of Pakistan.

Available at: https://www.commerce.gov.pk/wp-content/uploads/2019/11/e-Commerce_Policy_of_Pakistan_Web.pdf

276. Government of Pakistan (2019), e-Commerce Policy of Pakistan.

Available at: https://www.commerce.gov.pk/wp-content/uploads/2019/11/e-Commerce_Policy_of_Pakistan_Web.pdf

277. The World Bank Logistics Performance Index (LPI) measures countries' performance on six key dimensions: (i) efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs; (ii) quality of trade and transport related infrastructure; (iii) ease of arranging competitively priced shipments; (iv) competence and quality of logistics services; (v) ability to track and trace consignments; (vi) timeliness of shipments in reaching destination within the expected delivery time. A total of 167 countries were analyzed in this index. Source: World Bank (2018), International LPI. Available at: <https://lpi.worldbank.org/international>

278. PPRO (2022), “Pakistan”. Available at: <https://www.ppro.com/countries/pakistan/>

279. Javed, Asif (2020). “Prospects and Problems for E-commerce in Pakistan.” Asian Journal of Economics, Finance and Management (2020): 131-139.

Available at: https://www.researchgate.net/publication/346812786_Prospects_and_Problems_for_E-commerce_in_Pakistan

280. Sources include Invest Pakistan (2022), Sector Profile Tech (IT and IT enabled Services). Available at: https://invest.gov.pk/sites/default/files/inline-files/ITpdf_P@SHA (2021), “Exports of Telecom, Computer & Information Services”. Available at: <https://www.psha.org.pk/knowledge-center/industry-stats/>; and World Bank (2021), “ICT service exports (BoP, current US\$)”. Available at: <https://data.worldbank.org/indicator/BX.GSR.CCIS.CD>

281. World Bank (2020), Pakistan: Economic Policy for Export Competitiveness. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/33880/Digital-Pakistan-Economic-Policy-for-Export-Competitiveness-A-Business-and-Trade-Assessment.pdf?sequence=1&isAllowed=y>

282. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

283. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

284. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the “best-in-class” country.

285. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

SPECIFIC RECOMMENDATIONS UNDER THE “DIGITAL PROSPERITY” APPROACH (NOT EXHAUSTIVE)

More supportive policies can be implemented to help Pakistan achieve its digital economy objectives. As a result, Pakistan should focus on developing the following policies to successfully unlock its full digital economy potential:

- **Move to at least US\$200 de minimis threshold.** Current de minimis thresholds of Pakistan is US\$10, which imposes significant administrative costs on businesses, making it difficult for them to engage in international trade.²⁸⁶
- **Increase curriculum responsiveness, incorporate technology in the classroom, introduce digital bootcamps, and create sector-specific skilling roadmaps.** Pakistan's population faces challenges in obtaining basic digital access with only one million of 70 million children having regular access to digital devices and bandwidth, impeding their

ability to gain access to virtual learning.²⁸⁷ Challenges related to the availability of digital skills significantly impede Pakistan's ability to benefit from a digital economy — the country was ranked 116th of 120 countries in digital literacy, i.e., the level of education and preparedness to use the Internet.²⁸⁸

- **Promote convergence and interoperability in privacy laws through agreements.** Pakistan is not part of any multilateral agreements related to cross-border data flows and privacy frameworks such as the APEC CBPR and the CPTPP today.²⁸⁹ These agreements can be beneficial for facilitating cross-border transactions as it enhances consumer trust while ensuring the interoperability of regulatory frameworks across jurisdictions. Through these agreements, Pakistan will be able to align with international frameworks that specify controls to protect data.

PHILIPPINES

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

The digital economy in the Philippines has grown considerably over the years, enabling the country to capture US\$2 billion from its domestic digital economy (or 7% of the potential domestic digital economy value) in 2021.²⁹⁰ Furthermore, due to digital developments in the country, the Philippines is able to capture US\$7 billion from digital exports (or 26% of the potential digital trade value) in 2021.²⁹¹ While these values are significant, the Philippines has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the “digital prosperity” approach moving forward.



- **Domestic benefits.** The pace of digitalization in the Philippines has accelerated considerably, particularly driven by the COVID-19 pandemic. The share of new Internet users was 20% in the country in 2021, the highest among all Southeast Asian countries.²⁹² By the first quarter of 2022, around 71% of businesses in the Philippines have started

286. Global Express Association (2021), Overview of de minimis value regimes world wide.

Available at: https://global-express.org/assets/files/GEA%20de%20minimis%20Country%20information_4%20November%202021.pdf

287. BBC (2020), “The coronavirus effect on Pakistan's digital divide”.

Available at: <https://www.bbc.com/worklife/article/20200713-the-coronavirus-effect-on-pakistans-digital-divide>

288. Economic Intelligence Unit [EIU] (2021), The Inclusive Internet Index. Available at: <https://theinclusiveinternet.eiu.com/explore/countries/performance>

289. Sources include DFAT (n.d.), “Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)”. Available at: <https://www.dfat.gov.au/trade/agreements/in-force/cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership>; and APEC (2021), “What is the Cross-Border Privacy Rules System”. Available at: <https://www.apec.org/about-us/about-apec/fact-sheets/what-is-the-cross-border-privacy-rules-system>

290. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

291. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

292. World Bank (2022), Strengthening the Digital Economy to Boost Domestic Recovery.

Available at: <https://thedocs.worldbank.org/en/doc/d92d769b42180bed2bb65428c683df2f-0070062022/original/World-Bank-Philippines-Economic-Update-June-2022.pdf>

or increased their use of digital platforms since the pandemic struck.²⁹³ Additionally, the government has also implemented various digital initiatives such as the “National Artificial Intelligence (AI) Strategy” to accelerate digital adoption in the country.²⁹⁴ Through this strategy, the Philippines hopes to establish itself as an AI Centre for Excellence in the region, with a strong pool of digital talent and a vibrant innovation and entrepreneurship ecosystem.²⁹⁵ While significant progress has been made thus far, more can be done to further facilitate digital adoption amongst its domestic population and economy. There is still a significant runway to drive the uptake of the latest digital technologies — for instance, the adoption of cloud services in the Philippines is estimated to be small (less than 10%).²⁹⁶ In the Philippines, according to MSMEs, an inadequate understanding of the benefits of digitization, where businesses indicate that they “don’t know where to start”, and the lack of sufficient management commitment are the two top challenges to digital transformation.²⁹⁷ Tackling these challenges will be instrumental in allowing the country to capture the full potential domestic benefits of the digital economy.

- **Digital trade benefits.** The Philippines is one of the global leaders in providing IT-BPM services, with the sector contributing revenues of close to US\$30 billion in 2021.²⁹⁸ Having competitive advantages such as English proficiency skills and well-regarded service orientation mindset, the Philippines is the top destination for voice-related IT-BPM services and is rapidly expanding to offer related

IT services.²⁹⁹ The country has also developed initiatives such as the “Bangko Sentral ng Pilipinas (BSP) Digital Payments Transformation Roadmap 2020-2023” to establish an efficient, inclusive, and secure digital payments ecosystem that supports the needs of individuals and firms.³⁰⁰ Through this roadmap, the government is focusing on digitalizing payment streams to accelerate digital payment adoption rates, enhancing digital finance infrastructure, as well as promoting responsible innovations through a governance framework that covers digitization policies and standards.³⁰¹ Digital payments is critical in facilitating digital trade, especially for trading activities occurring across borders. However, despite existing efforts, the country is not reaching its full potential due to its relatively poor e-commerce export performance. Even though e-commerce market sales in the Philippines is estimated to be US\$17 billion in 2021, largely contributed by 73 million online active users, cross-border e-commerce is relatively underdeveloped in the country.³⁰² This is a result of the digital and logistics infrastructure gap, making it difficult for domestic sellers to expand into international markets. In terms of digital infrastructure, the Philippines ranked 68th out of the 120 economies in the 2021 Inclusive Internet Index conducted by the EIU³⁰³, and in terms of logistics infrastructure, it ranked 60th out of 167 countries in the World Bank’s Logistics Performance Index.³⁰⁴ The country will be able to capture a larger share of its digital trade benefits if it addresses these barriers faced by exporting businesses moving forward.

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of the digital economy in the Philippines is expected to grow at 8.5% per year from US\$8.8 billion in 2021 to US\$18.3 billion in 2030.³⁰⁵ Under the BAU scenario in 2030, most of the expected digital economy benefit is from digitally-enabled services exports (with 81% of its total economic benefit).³⁰⁶ Under the accelerated scenario, this economic benefit is expected to grow at 29.9% per annum to be valued at US\$93 billion in 2030.³⁰⁷ Under both scenarios in 2030, much of the economic benefit to be gained is from the domestic benefits of the digital economy.³⁰⁸ Under the accelerated scenario in 2030, most of the estimated benefit expected in the Philippines stems from digitally services exports and domestic digital economy benefits, which make up 46% and 47% of the total economic benefit respectively.³⁰⁹ Recent amendments to the regulations, such as the Public Service Act and Foreign Investment Act, will help the Philippines remove barriers to achieve the potential economic benefit in 2030.³¹⁰

SPECIFIC RECOMMENDATIONS UNDER THE “DIGITAL PROSPERITY” APPROACH (NOT EXHAUSTIVE)

The Philippines can focus on developing the following policies to successfully unlock its full digital economy potential:

- **Enable local enterprises to access affordable hyperscale cloud services, through a strong**

enabling environment (including on sustainability concerns). Only 11% of enterprises in the Philippines are using cloud services in 2021.³¹¹ The relatively slow Internet broadband speed and relatively high costs of electricity in the Philippines as compared to most of the other APAC-11 are possible reasons for the slow development of cloud services in the country.³¹²

- **Extend access to digital infrastructure, especially rural areas.** Currently, only 47% of the Filipino population has access to broadband services.³¹³ Updates to relevant regulations are actions in the right direction. For instance, Executive Order 127 liberalized access to satellite services and amendments to the Public Service Act allowed 100% foreign ownership of certain services including telecommunications.³¹⁴ These changes create opportunities for telecommunication companies to provide better connectivity nationwide.
- **Adopt fair software licensing principles in legislation.** The Philippines has not formerly supported the fair software licensing principles, a movement that is largely limited to European industry bodies and governments today.³¹⁵ These principles outline the best practices of software licensing for cloud customers such as the avoidance of customer lock-in through interoperable directory software and allowing customers to run their “on-premises” software on the cloud.³¹⁶

293. World Bank (2022), Strengthening the Digital Economy to Boost Domestic Recovery.

Available at: <https://thedocs.worldbank.org/en/doc/d92d769b42180bed2bb65428c683df2f-0070062022/original/World-Bank-Philippines-Economic-Update-June-2022.pdf>

294. Department of Trade and Industry (2020), The National Artificial Intelligence (AI) Strategy for the Philippines.

Available at: <https://innovate.dti.gov.ph/wp-content/uploads/2020/07/AI-Roadmap-Usec-Aldaba.pdf>

295. Department of Trade and Industry (2020), The National Artificial Intelligence (AI) Strategy for the Philippines.

Available at: <https://innovate.dti.gov.ph/wp-content/uploads/2020/07/AI-Roadmap-Usec-Aldaba.pdf>

296. OECD (2021), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/index.aspx?DataSetCode=ICT_BUS

297. CISCO and IDC (2020), 2020 Asia Pacific SMB Digital Maturity Study.

Available at: https://www.cisco.com/c/dam/global/en_sg/solutions/small-business/pdfs/ebookciscosmbdigitalmaturityi5-with-markets.pdf

298. Inquirer.net (2021), “IT-BPO sector sees 10% revenue growth in ‘22”. Available at: <https://business.inquirer.net/360096/it-bpo-sector-sees-10-revenue-growth-in-22>

299. Board of Investments Philippines (2018), Accelerate PH Future-Ready Roadmap 2022.

Available at: https://boi.gov.ph/wp-content/uploads/2018/03/Executive-Summary-Accelerate-PH-Future-Ready-Roadmap-2022_with-corrections.pdf

300. Bangko Sentral ng Pilipinas (2019), BSP Digital Payments Transformation Roadmap 2020-2023.

Available at: https://www.bsp.gov.ph/Media_And_Research/Primers%20Faqs/Digital%20Payments%20Transformation%20Roadmap%20Report.pdf

301. Bangko Sentral ng Pilipinas (2019), BSP Digital Payments Transformation Roadmap 2020-2023.

Available at: https://www.bsp.gov.ph/Media_And_Research/Primers%20Faqs/Digital%20Payments%20Transformation%20Roadmap%20Report.pdf

302. International Trade Administration (2022), “Philippines - Country Commercial Guide”.

Available at: <https://www.trade.gov/country-commercial-guides/philippines-ecommerce>

303. The Economist Intelligence Unit (2021), The Inclusive Internet Index. Available at: <https://theinclusiveinternet.eiu.com/>

304. The World Bank Logistics Performance Index (LPI) measures countries’ performance on six key dimensions: (i) efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs; (ii) quality of trade and transport related infrastructure; (iii) ease of arranging competitively priced shipments; (iv) competence and quality of logistics services; (v) ability to track and trace consignments; (vi) timeliness of shipments in reaching destination within the expected delivery time. A total of 167 countries were analyzed in this index. Source: World Bank (2018), International LPI. Available at: <https://lpi.worldbank.org/international>

305. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

306. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

307. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the “best-in-class” country.

308. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

309. This estimate is derived from AlphaBeta’s analysis, and the detailed methodology can be found in Appendix A5.

310. Baker McKenzie (2022), “Philippines: Amendment allowing full foreign ownership of telcos signed by President Rodrigo Duterte”. Available at: <https://www.globalcompliancenews.com/2022/04/18/philippines-amendment-allowing-full-foreign-ownership-of-telcos-signed-by-president-rodrido-duterte010422/> and UNCTAD (2022), “Amends Foreign Investments Act to woo foreign investment”. Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3831/philippines-amends-foreign-investments-act-to-woo-foreign-investment>

311. See Appendix A5.

312. w.media (2022), “Philippines Data Centre Investments Doubling to Over P35 Billion in Five Years: Colliers Philippines”.

Available at: <https://w.media/philippines-data-centre-investments-doubling-to-over-p35-billion-in-five-years-colliers/>

313. World Bank (2020), “Individuals using the Internet (% of population)”. Available at: <https://data.worldbank.org/indicator/IT.NET.USER.ZS>

314. Baker McKenzie (2022), “Philippines: Amendment allowing full foreign ownership of telcos signed by President Rodrigo Duterte”. Available at: <https://www.globalcompliancenews.com/2022/04/18/philippines-amendment-allowing-full-foreign-ownership-of-telcos-signed-by-president-rodrido-duterte010422/> and Philippine News Agency (2021), “Duterte signs EO allowing inclusive access to satellite services”. Available at: <https://www.pna.gov.ph/articles/1133356>

315. FairSoftware.Cloud (2022), “Principles of Fair Software Licensing for Cloud Customers”. Available at: <https://www.fairsoftware.cloud/principles/>

316. FairSoftware.Cloud (2022), “Principles of Fair Software Licensing for Cloud Customers”. Available at: <https://www.fairsoftware.cloud/principles/>

SINGAPORE

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

Singapore's digital economy does well domestically, capturing US\$17 billion or a substantial 62% of its potential domestic digital economy value in 2021.³¹⁷ Digital trade activities in the country have also grown considerably in recent years, allowing it to capture US\$17 billion or 64% of its potential digital trade value in 2021.³¹⁸ Among the APAC-11 countries, Singapore has captured the largest share of its total potential digital economy benefits (63%). With limited natural resources and a small geographic area, Singapore relies on an open economy and access to global markets to maintain its attractiveness and competitiveness.³¹⁹

- **Domestic benefits.** The country has also achieved high levels of digitization, with over 95% of enterprises using the Internet for business activities and 85% adopting e-payments.³²⁰ Additionally, it is estimated that Singapore has achieved relatively widespread cloud service adoption among the APAC-11, with over 60% of enterprises on the cloud, and has captured a significant share of its potential digital economy value in 2020.³²¹
- **Digital trade benefits.** To support the digital economy, Singapore has developed policies to support digital trade, such as negotiating digital economy and partnership agreements with Chile, New Zealand, Australia, and South Korea.³²² The country is a leader in digitally-enabled services, with the ICT sector representing 5.6% of GDP in 2021, comparable with Japan

and South Korea's contribution at 4.9% and 4.8% respectively.³²³ Its telecommunications, computer and information services export contributed 8.2% of total services exports. Regarding e-commerce exports, the e-commerce industry in Singapore has been growing rapidly in recent years, and this trend is expected to continue, with the gross merchandise value (GMV) of e-commerce products increasing 45% from US\$5 billion in 2020 to US\$7 billion in 2021.³²⁴ Singapore has plans to become the e-commerce hub for Southeast Asia and to do that, the government is investing in two 5th generation (5G) networks in the city-state and has partnered with technology companies to build digital skills among the populace.³²⁵ Therefore, a significant 64% of the potential digital trade value is captured by Singapore in 2021.

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of Singapore's digital economy is expected to grow at 4.1% per year from US\$33.9 billion in 2021 to US\$48.7 billion in 2030.³²⁶ Under the accelerated scenario, this economic benefit is expected to grow at 9.4% per annum to be valued at US\$76.3 billion in 2030.³²⁷ Under both scenarios in 2030, much of the economic benefit to be gained is from the domestic benefits of the digital economy.³²⁸

SPECIFIC RECOMMENDATIONS UNDER THE "DIGITAL PROSPERITY" APPROACH (NOT EXHAUSTIVE)

Singapore does well in most areas, but it can focus on the following policies to successfully unlock its digital economy potential:

- **Establish risk-based and accountability-driven data governance frameworks.** In 2018, the Singapore Government launched the Information Sensitivity Framework (ISF) to standardize the protection of sensitive data. Public agencies are then able to apply consistent sensitivity categorizations to data, which aids inter-agency data sharing and data analytics as well.³²⁹ However, this framework does not take a business-driven risk management approach to data governance, as it prescribes data types to risk categories strictly, and could potentially result in over-classification of data.
- **Adopt fair software licensing principles in legislation.** Singapore has not formerly supported fair software licensing principles, a movement that is largely limited to European industry bodies and governments today.³³⁰ These principles outline the best practices of software licensing for cloud customers such as the avoidance of customer lock-in through interoperable directory software and allowing customers to run their "on-premises" software on the cloud.³³¹

SOUTH KOREA

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

South Korea's digital economy does well domestically, capturing US\$21 billion or a sizeable 23% of its potential domestic digital economy value in 2021.³³² Digital trade activities in the country have also grown considerably in recent years, allowing it to capture US\$16 billion or 12% of its potential digital trade value in 2021.³³³ While these values are significant, South Korea has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the "digital prosperity" approach moving forward.

- **Domestic benefits.** South Korea is able to capture a considerable share of its potential domestic benefits due to its relatively high digital adoption rates amongst businesses and consumers. South Korea has seen significant levels of digitization, with the highest levels

of Internet penetration among individuals in the APAC-11 countries at 97%, and almost all businesses have a broadband connection.³³⁴ Over 20% of enterprises in South Korea have adopted cloud services in 2020.³³⁵ Among large enterprises with over 250 employees, a significant 47% of businesses have adopted cloud services, while cloud service adoption drops to 23% for smaller firms.³³⁶

- **Digital trade benefits.** South Korean businesses are benefitting considerably from e-commerce exports and capture a substantial 46% of the total potential e-commerce value in 2021. This is largely driven by its large manufacturing base (with the manufacturing sector representing 25% of GDP in 2021³³⁷), strong logistics infrastructure (ranked 23rd out of 167 countries in the World Bank's Logistics Performance Index³³⁸), as well as its favorable regulatory environment through initiatives such

317. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

318. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

319. Channel News Asia (2021), "Singapore will remain an open economy, approach 'has not and will not change': Ong Ye Kung". Available at: <https://www.channelnewsasia.com/singapore/singapore-open-economic-approach-will-not-change-ong-ye-kung-2125466>

320. Infocomm Media Development Authority (2020), "Enterprise". Available at: <https://www.imda.gov.sg/infocomm-media-landscape/research-and-statistics/Enterprise>

321. OECD (2020), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

322. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0.

Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

323. Sources include Singapore Statistics (2021), "Singapore Economy". Available at: <https://www.singstat.gov.sg/modules/infographics/economy>; Statistics Japan (2022), JAPAN STATISTICAL YEARBOOK 2022. Available at: <https://www.stat.go.jp/english/data/nenkan/71nenkan/index.html>; and Statistics Korea (2021), "GDP at current prices". Available at: <http://kostat.go.kr/portal/eng/resources/2/1/1/index.action?bmode=view&pageCode=ENG1MF02>

324. Google, Temasek, and Bain & Company (2021), e-Economy SEA 2021. Available at: https://www.bain.com/globalassets/noindex/2021/e_economy_sea_2021_report.pdf

325. PPRO (2021), Asia Pacific Payments and e-commerce report. Available at: <https://www.ppro.com/e-book/ppro-payments-e-commerce-report-asia-pacific/>

326. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

327. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the "best-in-class" country.

328. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

329. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0.

Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

330. FairSoftware.Cloud (2022), "Principles of Fair Software Licensing for Cloud Customers". Available at: <https://www.fairsoftware.cloud/principles/>

331. FairSoftware.Cloud (2022), "Principles of Fair Software Licensing for Cloud Customers". Available at: <https://www.fairsoftware.cloud/principles/>

332. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

333. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

334. World Bank (2020), "Individuals using the Internet (% of population)". Available at: <https://data.worldbank.org/indicator/IT.NET.USER.ZS> and OECD (2020), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

335. OECD (2020), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

336. OECD (2020), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

337. World Bank (2021), "Manufacturing, value added (% of GDP)". Available at: <https://data.worldbank.org/indicator/NV.IND.MANF.ZS>

338. The World Bank Logistics Performance Index (LPI) measures countries' performance on six key dimensions: (i) efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs; (ii) quality of trade and transport related infrastructure; (iii) ease of arranging competitively priced shipments; (iv) competence and quality of logistics services; (v) ability to track and trace consignments; (vi) timeliness of shipments in reaching destination within the expected delivery time. A total of 167 countries were analysed in this index. Source: World Bank (2018), International LPI. Available at: <https://lpi.worldbank.org/international>



as the provision of overseas logistics advisory support and facilities, as well as e-payment incentives.³³⁹ However, more can be done to facilitate the digitally-enabled services export component to further leverage its strong and reliable digital infrastructure and high levels of digitization.³⁴⁰ The value of ICT services exports is moderately low in South Korea, and the country focuses on exporting IP, business, transport, and travel services instead.³⁴¹

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of South Korea's digital economy is expected to grow at 3.8% per year from US\$36.9 billion in 2021 to US\$51.6 billion in 2030.³⁴² Under the BAU scenario in 2030, most of the expected digital economy benefit is from domestic benefits of the digital economy.³⁴³ Under the accelerated scenario, this economic benefit is expected to increase around eight times to be valued at US\$302.2 billion in 2030.³⁴⁴ Under the accelerated scenario in 2030, most of the expected digital economy benefit in South Korea is from digitally-enabled services exports (such as cloud

computing solutions) followed by domestic benefits of the digital economy and e-commerce exports.³⁴⁵

SPECIFIC RECOMMENDATIONS UNDER THE “DIGITAL PROSPERITY” APPROACH (NOT EXHAUSTIVE)

South Korea does well in most areas, but it can focus on the following policies to successfully unlock its digital economy potential:

- **Democratize sourcing process and ensure no protectionist policies against foreign suppliers.** South Korea has several local sourcing mandates in place, especially in the telecommunications sector.³⁴⁶ For instance, South Korean regulators prohibit foreign satellite service providers from selling services such as transmission capacity directly to end consumers without going through a local company.³⁴⁷ There could be a review to ensure a level playing field for all suppliers.
- **Allow public organizations to access international digital services, in accordance to internationally accepted standards.** South Korea has adopted rules that significantly restrict public organizations to adopt global cloud services. The Cloud Security Assurance Program (CSAP) certification is a precondition to adopting global cloud services and recognizes only that physical separation of public data and related information systems which does not meet international standards.³⁴⁸ As a result of the requirements, domestic administrative institutions are unable to use state-of-the-art services in areas such as Artificial Intelligence (AI) and data analysis, and domestic MSMEs that use global cloud services for overseas expansion are also unable to provide services to administrative institutions due to this constraint.

339. Sources include International Monetary Fund (2021), TECHNICAL NOTE— TECHNOLOGICAL CHANGE, LEGAL FRAMEWORKS, AND IMPLICATIONS FOR FINANCIAL STABILITY. Available at: <https://www.imf.org/-/media/Files/Publications/CR/2020/English/TKOREA2020007ashx>; and Cosmetics Design-Asia (2021), “Helping hand: Korea announces measures to increase logistic support for SMEs under export pressure”. Available at: <https://www.cosmeticsdesign-asia.com/Article/2021/07/28/South-Korea-announces-measures-to-increase-logistic-support-for-SMEs-under-export-pressure#>

340. Sources include World Bank (2020), “Individuals using the Internet (% of population)”. Available at: <https://data.worldbank.org/indicator/IT.NET.USER.ZS>; OECD (2020), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS; and The Economist Intelligence Unit (2021), The Inclusive Internet Index. Available at: <https://theinclusiveinternet.eiu.com/>

341. OEC (2018), “South Korea.” Available at: <https://oec.world/en/profile/country/kor>

342. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

343. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

344. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the “best-in-class” country.

345. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

346. United States Trade Representative (2022), 2022 National Trade Estimates Report on Foreign Trade Barriers. Available at: <https://ustr.gov/sites/default/files/2022%20National%20Trade%20Estimate%20Report%20on%20Foreign%20Trade%20Barriers.pdf>

347. United States Trade Representative (2022), 2022 National Trade Estimates Report on Foreign Trade Barriers. Available at: <https://ustr.gov/sites/default/files/2022%20National%20Trade%20Estimate%20Report%20on%20Foreign%20Trade%20Barriers.pdf>

348. United States Trade Representative (2022), 2022 National Trade Estimates Report on Foreign Trade Barriers. Available at: <https://ustr.gov/sites/default/files/2022%20National%20Trade%20Estimate%20Report%20on%20Foreign%20Trade%20Barriers.pdf>

THAILAND

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

The digital economy in Thailand has grown considerably over the years, enabling the country to capture US\$3 billion from its domestic digital economy (or 10% of the potential domestic digital economy value) in 2021.³⁴⁹ Furthermore, due to digital developments in the country, Thailand is able to capture US\$10 billion from digital exports (or a sizeable 25% of the potential digital trade value) in 2021.³⁵⁰ While these values are significant, Thailand has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the “digital prosperity” approach moving forward.

- **Domestic benefits.** In recent years, the Thai Government has been increasing efforts to promote the digital economy, and has launched “Thailand 4.0” in 2018 to transform the economy, driven by innovation and technology.³⁵¹ However, there are still gaps in the uptake of digital technologies — the cloud service adoption rate is estimated to be over 10% among Thai businesses.³⁵² Additionally, labor productivity for Thai workers is relatively low at US\$5.3 per hour, less than most of the APAC-11.³⁵³ With the adoption of cloud services, labor productivity can increase considerably with time savings estimated to be two to three hours a week per employee according to a recent study.³⁵⁴ As a result, there is still a huge potential left untapped in Thailand.
- **Digital trade benefits.** Thailand is able to benefit from its sizeable e-commerce exports,

especially in recent years. As a result of the pandemic, there has been a sharp increase in demand for consumer electronics, and much of this is manufactured in Thailand where electronics make up 16% of total exports in the country.³⁵⁵ In addition, the strong growth in e-commerce exports can be attributed to the moderately strong logistics infrastructure in Thailand (ranked 32nd out of 167 countries in the World Bank's Logistics Performance Index³⁵⁶) and the high share of banked population (i.e., share of population that owns a bank account) at 94%.³⁵⁷ However, more focus has to be placed on MSMEs that are planning to export to further encourage digital trade activities. A study conducted by AlphaBeta on stimulating e-commerce in Asia has shown that MSMEs in Thailand face challenges in e-commerce export efforts, particularly in terms of the costs of cross-border logistics, stringent consumer protection laws in foreign countries, and high customs duties charged on online foreign trades. In terms of digitally-enabled services exports, more can be done to allow Thailand to capture its full potential. This is contributed by challenges related to the availability of digital talent in the country – Thailand ranked 42nd out of 64 countries in IMD's World Digital Competitiveness ranking.³⁵⁸ Furthermore, Thailand's economy is driven by more labor-intensive sectors such as manufacturing, and its services sector is mainly focused on tourism-related activities instead of telecommunications and ICT services.³⁵⁹ Addressing these barriers would allow Thailand to increase its share of digital trade benefits in the digital economy.

349. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

350. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

351. Royal Thai Embassy (2017), “Thailand 4.0”. Available at: <https://thaiembdc.org/thailand-4-0-2/>

352. OECD (2021), “ICT Access and Usage by Businesses”. Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

353. Sources include National Statistical Office (n.d.), “10 National Accounts Branch”. Available at: <http://statbbi.nso.go.th/staticreport/page/sector/en/10.aspx>; and Department of Statistics Malaysia (2022), LABOUR PRODUCTIVITY OF SECOND QUARTER 2022. Available at: <https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=Y3BuZWdWRThcTRWRZsU0ZtblsU09>

354. Deloitte (2018), Economic and social impacts of Google Cloud. Available at: https://www2.deloitte.com/content/dam/Deloitte/es/Documents/tecnologia/Deloitte_ES_tecnologia_economic-and-social-impacts-of-google-cloud.pdf

355. Bank of Thailand (2021), “EC_XT_009_S2 Total Value and Quantity of Exports Classified by Product Group (US\$)”. Available at: https://www.bot.or.th/App/BTWS_STAT/statistics/BOTWEBSTAT.aspx?reportID=748&language=ENG

356. The World Bank Logistics Performance Index (LPI) measures countries' performance on six key dimensions: (i) efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs; (ii) quality of trade and transport related infrastructure; (iii) ease of arranging competitively priced shipments; (iv) competence and quality of logistics services; (v) ability to track and trace consignments; (vi) timeliness of shipments in reaching destination within the expected delivery time. A total of 167 countries were analyzed in this index. Source: World Bank (2018), International LPI. Available at: <https://lpi.worldbank.org/international>

357. PPRO (2020), PPRO Payments & E-Commerce Report: Asia Pacific. Available at: <https://www.ppro.com/insight/ppro-payments-e-commerce-report-asia-pacific/>

358. IMD (2021), IMD World Digital Competitiveness Ranking 2021. Available at: https://www.imd.org/globalassets/wcc/docs/release-2021/digital_2021.pdf

359. OECD (2020), MAKING THAILAND'S SERVICES SECTOR MORE COMPETITIVE THROUGH INTERNATIONAL TRADE. Available at: [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP\(2020\)50&docLanguage=en](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP(2020)50&docLanguage=en)

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic benefit of Thailand's digital economy is expected to grow at 5.2% per year from US\$12.4 billion in 2021 to US\$19.6 billion in 2030.³⁶⁰ Under the accelerated scenario, this economic benefit is expected to increase sevenfold to be valued at US\$91.7 billion in 2030.³⁶¹ Under both scenarios in 2030, much of the expected economic benefit in Thailand stems from digitally-enabled services exports.³⁶²

SPECIFIC RECOMMENDATIONS UNDER THE "DIGITAL PROSPERITY" APPROACH (NOT EXHAUSTIVE)

Thailand should focus on developing the following policies to successfully unlock its full digital economy potential:

- **Ensure clear guidelines on the limits of public authority access to data of crucial public interest.** Thailand's Section 18(7) allows public authorities to access encrypted data for a broad range of offenses beyond cybercrimes.³⁶³ There is uncertainty on the implementation of the law and specific references on requiring "backdoor" access by law enforcement authorities were mentioned during the law proposal debate.³⁶⁴
- **Move to at least US\$200 de minimis threshold.** Current de minimis thresholds of Thailand is US\$47, which serves as a significant cost barriers to businesses.³⁶⁵
- **Increase curriculum responsiveness, incorporate technology in the classroom, introduce digital bootcamps, and create sector-specific skilling roadmaps.** The country is facing a shortage of digitally-skilled talent. Despite existing government training and re-skilling initiatives developed



to increase digital competencies and equip students with work-ready skills and qualifications, the digital skills gap continues to exist in Thailand with approximately 90% of ICT graduates not being able to meet the basic qualifications for companies.³⁶⁶

360. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

361. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the "best-in-class" country.

362. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

363. Freedom House (2021), "Freedom on the Net 2021". Available at: <https://freedomhouse.org/country/thailand/freedom-net/2021>

364. Freedom House (2021), "Freedom on the Net 2021". Available at: <https://freedomhouse.org/country/thailand/freedom-net/2021>

365. Global Express Association (2021), Overview of de minimis value regimes world wide.

Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf

366. Sources include AlphaBeta (2021), Unlocking Thailand's Digital Potential: The Economic Opportunities of Digital Transformation and Google's Contribution. Available at: <https://alphabeta.com/wp-content/uploads/2021/11/unlocking-thailands-digital-potential-en.pdf>; and World Bank (2018), Preparing ICT Skills for Digital Economy: Indonesia within the ASEAN context. Available at: https://blogs.worldbank.org/sites/default/files/preparing_ict_skills_for_digital_economy-revised_7mar2018.pdf

VIETNAM

POTENTIAL AND ACTUAL ECONOMIC BENEFITS FROM THE DIGITAL ECONOMY

The digital economy in Vietnam has grown considerably over the years, enabling the country to capture US\$1 billion from its domestic digital economy (or 9% of the potential domestic digital economy value) in 2021.³⁶⁷ Furthermore, due to digital developments in the country, Vietnam is able to capture US\$6 billion from digital exports (or a sizeable 24% of the potential digital trade value) in 2021.³⁶⁸ While these values are significant, Vietnam has yet to realize its full digital economy potential and greater growth can be enabled if the country adopts the "digital prosperity" approach moving forward.

- **Domestic benefits.** Vietnam is expected to be one of the fastest-growing Internet economies in the next decade.³⁶⁹ Since early 2021, Vietnam has added 8 million digital consumers, of which a large majority intend to continue using online services in the future.³⁷⁰ Currently, 77% of its rural population has access to the Internet, and 45% of rural users use online search engines to find information on products, as compared to traditional media at 24%.³⁷¹ To allow the country to further capture a larger share of its domestic digital economy benefits, a larger focus should be placed on improving the uptake of more advanced digital technologies and increasing cloud service adoption rates amongst businesses. Presently, cloud service penetration rates are currently low, with approximately 10% of businesses adopting cloud services.³⁷² Addressing these barriers would allow Vietnam to increase its share of domestic benefits in the digital economy.

- **Digital trade benefits.** Vietnam benefits considerably from digital trade today and this is largely due to its strong e-commerce export activities. Vietnam has a moderately large manufacturing sector that produces many e-commerce-relevant goods and a strong presence of export-focused manufacturing firms locally.³⁷³ Electronics, fashion items, toys, and furniture are some of the goods manufactured domestically, and they represent some of the fastest-growing sub-sectors in the e-commerce industry in Vietnam.³⁷⁴ However, while businesses are increasingly exporting via e-commerce, ongoing research by AlphaBeta also highlights that Vietnamese MSMEs face regulatory barriers in cross-border e-commerce, relating to the regulatory burden of customs clearance and other exporting regulations which may stifle export activity. Greater efforts to tackle these issues will further facilitate growth in digital exports. In comparison to e-commerce exports, digitally-enabled services exports are largely left untapped in Vietnam. This is largely due to its IT workforce shortage and its stronger service export focus on wholesale and retail, finance, banking and insurance, and transportation services.³⁷⁵ Vietnam's digitally-skilled workforce shortage is expected to increase by more than seven times to reach 150,000 workers by 2022, and this is a result of the mismatch of skills between industry requirements and skills learned in educational institutes.³⁷⁶ Tackling these barriers will be critical in allowing the country to capture its full digital trade potential.

Under the BAU scenario where existing cloud service adoption rates are maintained, the economic

367. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

368. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

369. Bain & Company (2021), e-Conomy SEA 2021. Available at: https://www.bain.com/globalassets/noindex/2021/e_conomy_sea_2021_report.pdf

370. Bain & Company (2021), e-Conomy SEA 2021. Available at: https://www.bain.com/globalassets/noindex/2021/e_conomy_sea_2021_report.pdf

371. Ministry of Information and Communications of the Socialist Republic of Vietnam (2020), "Vietnam's internet economy growth ranks second in Asia: report". Available at: <https://english.mic.gov.vn/Pages/TinTuc/tinchitiet.aspx?intucid=145349>

372. OECD (2021), "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS

373. Sources include World Bank (2020), "Manufacturing, value added (% of GDP)". Available at: <https://data.worldbank.org/indicator/NV.IND.MANF.ZS>; and General Statistics Office (2022), "EXPORTS AND IMPORTS VALUE BY MONTHS OF 2021". Available at: <https://www.gso.gov.vn/en/data-and-statistics/2021/03/exports-and-imports-value-by-months-of-2021/>

374. Vietnam Briefing (2020), "Why You Should Invest in Vietnam's E-commerce Industry".

Available at: <https://www.vietnam-briefing.com/news/why-you-should-invest-vietnams-e-commerce-industry.html/>

375. Statista (2021), "GDP contribution of the services sector in Vietnam from 2011 to 2021". Available at: <https://www.statista.com/statistics/1028010/vietnam-gdp-contribution-of-services-sector/#-text=The%20service%20sector%20consists%20of%20and%20accommodation%20and%20catering%20services>

376. Vietnam News (2021), "Viet Nam faces IT workforce shortage". Available at: <https://vietnamnews.vn/economy/1072584/viet-nam-faces-it-workforce-shortage.html>

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APPENDIX: DETAILED APPROACH

benefit of Vietnam's digital economy is expected to grow at 8.0% per year from US\$7.5 billion in 2021 to US\$15 billion in 2030.³⁷⁷ Under the BAU scenario in 2030, most of the digital economy benefit is from digital good exports.³⁷⁸ Under the accelerated scenario, this economic benefit is expected to grow at 32% per year to be valued at US\$91 billion in 2030.³⁷⁹ Under the accelerated scenario in 2030, most of the economic benefit is from digitally-enabled services exports, followed by domestic benefits of the digital economy and digital good exports.³⁸⁰

SPECIFIC RECOMMENDATIONS UNDER THE "DIGITAL PROSPERITY" APPROACH (NOT EXHAUSTIVE)

Vietnam should focus on developing the following policies to successfully unlock its full digital economy potential: Vietnam should focus on developing the following policies to successfully unlock its full digital economy potential:

- **Ensure clarity of data flow requirements with minimal localization restrictions.** Vietnam's Cybersecurity Law and its accompanying implementing decree (Decree 53) requires "user data" — a broad category of data that includes personal information, IP Addresses, and credit card information – of all domestic entities and some foreign entities to be stored locally as specified by the government.³⁸¹ These guidelines raise significant market access concerns for foreign service providers and create significant frictions for the growth of the domestic digital economy.³⁸²
- **Move to at least US\$200 de minimis threshold.** Current de minimis thresholds of Vietnam is

US\$40, which serves as a significant cost barrier to businesses.³⁸³

- **Reduce or remove restrictions on foreign participation in the e-commerce sector.** The government currently requires foreign firms or traders to be registered with the Ministry of Industry and Trade to provide e-commerce services in Vietnam and establish local representative offices.³⁸⁴ They must also submit product quality reports and update the Ministry on their operations annually.³⁸⁵ Such measures increase the bureaucratic challenges and compliance costs for foreign operators in Vietnam and negatively affect the growth of the e-commerce industry.³⁸⁶

377. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

378. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

379. The total economic benefit includes both digital economy domestic benefits as well as digital trade benefits. Under the accelerated scenario, for the domestic economy benefits, we assumed that there is full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy. For digital trade benefits, we assumed that the country would match the same share of digital exports (as a percent of GDP) as the "best-in-class" country.

380. This estimate is derived from AlphaBeta's analysis, and the detailed methodology can be found in Appendix A5.

381. Sources include Rouse (2022), "Vietnam: Cybersecurity Law Decree Issued". Available at: <https://rouse.com/insights/news/2022/vietnam-cybersecurity-law-decree-issued>; Data Guidance (2021), "Vietnam - Data Protection Overview". Available at: <https://www.dataguidance.com/notes/vietnam-data-protection-overview> and Linklaters (2020), "Data Protected - Vietnam". Available at: <https://www.linklaters.com/en/insights/data-protected/data-protected---vietnam>

382. Data Guidance (2021), "Vietnam - Data Protection Overview". Available at: <https://www.dataguidance.com/notes/vietnam-data-protection-overview> and Linklaters (2020), "Data Protected - Vietnam". Available at: <https://www.linklaters.com/en/insights/data-protected/data-protected---vietnam>

383. Global Express Association (2021), Overview of de minimis value regimes world wide. Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf

384. Baker McKenzie (2021), Vietnam: Updated regulations affecting e-commerce platforms. Available at: https://insightplus.bakermckenzie.com/bm/attachment_dwaction?attkey=FRbANeucS95NMLRN47z%2BeeOgEFCt8EGQJswJiCH2WAUTeh6%2BAJHrovZ7%2Bt4lB8l&nav=FRbANeucS95NMLRN47z%2BeeOgEFCt8EGQJswJiCH2WAUTeh6%2BAJHrovZ7%2Bt4lB8l&fromContentView=1

385. VietnamNet (2022), "Foreign e-commerce platforms in Vietnam must be registered". Available at: <https://vietnamnet.vn/en/sci-tech-environment/foreign-e-commerce-platforms-in-vietnam-must-be-registered-814890.html>

386. VietnamNet (2022), "Foreign e-commerce platforms in Vietnam must be registered". Available at: <https://vietnamnet.vn/en/sci-tech-environment/foreign-e-commerce-platforms-in-vietnam-must-be-registered-814890.html>

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APPENDIX: DETAILED APPROACH

A4. EXAMPLES OF BEST PRACTICE POLICIES

TABLE A2

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
Appropriate data governance frameworks	Establish risk-based and accountability-driven data governance frameworks	United Kingdom (UK) With appropriate safeguards in place, the UK government has started entrusting sensitive data to public cloud systems. ³⁸⁷ The state also shares responsibility with cloud services. ³⁸⁸ To maximize the benefits of cloud usage, proper planning, management, and execution will be appropriate for most government information and services. ³⁸⁹ Having said that, each party needs to make its own risk assessments based on its specific systems or data.
Minimal data localization restrictions	Ensure clarity of data flow requirements with minimal localization restrictions	Japan With the G20 Presidency in 2019, Japan advocated for cross-border data flows with the concept of "Data Free Flow with Trust" and launched the Osaka Track, an international framework that promotes inter-government cooperation to enhance openness and trust in cross-border data flows. ³⁹⁰ Such commitments to free data flow are also evident in its participation in the "Comprehensive and Progressive Agreement for Trans-Pacific Partnership" (CPTPP) and the "US-Japan digital trade agreement". ³⁹¹
Clarity on notification and bases for processing cross-border data (e.g., consent; authority approval)	Standardize and recognize a variety of mechanisms for obtaining consent for data transfer	Australia Australia has four key elements of consent, namely (i) the individual is adequately informed before giving consent; (ii) the individual gives consent voluntarily; (iii) the consent is current and specific; and (iv) the individual has the capacity to understand and communicate their consent. ³⁹² Opt-in consent is not required in Australia. It is an optional requirement that may be waived exceptionally if it serves as one among several legal bases for transfers. ³⁹³ Based on the Australian Privacy Principles (APP) guidelines, organizations have an obligation to inform the individual that the same degree of protection provided under the Privacy Act will no longer apply after the data has been transferred and will need to advise individuals on the potential consequences of their consent being withdrawn. ³⁹⁴ The accountability principle in APP 8.1 does not apply where the individual consents to the cross-border disclosure after the entity informs the individual that APP 8.1 will no longer apply. ³⁹⁵

387. Gov.uk (n.d.), "Public sector use of the public cloud". Available at: <https://www.gov.uk/guidance/public-sector-use-of-the-public-cloud#make-a-risk-based-decision>

388. Gov.uk (n.d.), "Public sector use of the public cloud". Available at: <https://www.gov.uk/guidance/public-sector-use-of-the-public-cloud#make-a-risk-based-decision>

389. Gov.uk (n.d.), "Public sector use of the public cloud". Available at: <https://www.gov.uk/guidance/public-sector-use-of-the-public-cloud#make-a-risk-based-decision>

390. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0. Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

391. Salesforce and Access Partnership (2021), Data Beyond Borders 2.0. Available at: https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/data-beyond-borders-2.pdf

392. ABLI (2020), Comparative Review of Data Transfer Laws and Regulations in Asia. Available at: <https://app.gluup.com/resources/protected/organization/895/event/29824/9209bc06-f8e0-4aff-bc53-1f4cc8912d0d.PDF>

393. ABLI (2020), Comparative Review of Data Transfer Laws and Regulations in Asia. Available at: <https://app.gluup.com/resources/protected/organization/895/event/29824/9209bc06-f8e0-4aff-bc53-1f4cc8912d0d.PDF>

394. ABLI (2020), Comparative Review of Data Transfer Laws and Regulations in Asia. Available at: <https://app.gluup.com/resources/protected/organization/895/event/29824/9209bc06-f8e0-4aff-bc53-1f4cc8912d0d.PDF>

395. ABLI (2020), Comparative Review of Data Transfer Laws and Regulations in Asia. Available at: <https://app.gluup.com/resources/protected/organization/895/event/29824/9209bc06-f8e0-4aff-bc53-1f4cc8912d0d.PDF>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
POLICY		
Interoperability of cross-border frameworks	Promote convergence and interoperability in privacy laws through agreements	Regulations based on international standards, such as the “APEC Privacy Framework” The APEC Framework, published by the Asia-Pacific Economic Cooperation, aims to protect privacy within and beyond economies and to enable regional transfers of personal information to benefit consumers, businesses, and governments. ³⁹⁶ This framework is used as a basis for the “APEC Cross-Border Privacy Rules” (CBPR) system. The Framework is geared to promote electronic commerce throughout APAC, is consistent with the core values of the OECD’s “Guidelines on the Protection of Privacy and Trans-Border Flows of Personal Data” (OECD Guidelines) and reaffirms the value of privacy to individuals and to the information society. ³⁹⁷ There are nine privacy principles at the heart of the OECD: preventing harm, integrity of personal information, notice, security safeguards, collection limitations, access and correction, uses of personal information, accountability, and choice. ³⁹⁸
Guidelines on public authority access to data locally	Ensure clear guidelines on the limits of public authority access to data of crucial public interest	Canada Canada’s “Privacy Act” contains a set of rules for the Government’s treatment of personal information. ³⁹⁹ It sets out the basic framework for how federal institutions collect, use, retain and disclose people’s personal information. ⁴⁰⁰ For instance, a government institution may only collect personal information that is directly related to one of their ongoing programs or activities, and if the information is used to make a decision that would directly affect an individual, it should be accurate, retained for a specific period and collected directly from the individual (subject to exceptions). ⁴⁰¹
Guidelines on public authority access to cross-border data	Establish Mutual Legal Assistance Treaties and international agreements for law enforcement cooperation	Australia, Singapore, Malaysia Mutual Legal Assistance Treaties (MLATs) are agreements between countries that allow the gathering and exchanging of information to enforce public or criminal laws. ⁴⁰² Australia, Singapore, and Malaysia partake in numerous MLATs, for instance. ⁴⁰³ Additionally, Singapore and Malaysia are also part of other international agreements both directly and through regional agreements such as the ASEAN “Treaty on Mutual Legal Assistance in Criminal Matters” ⁴⁰⁴ , which allow governments to gather intelligence and certified documents that would otherwise be difficult to obtain without the cooperation of the other country. ⁴⁰⁵

396. IAPP (2015), APEC PRIVACY FRAMEWORK (2015). Available at: https://iapp.org/media/pdf/resource_center/APEC_Privacy_Framework.pdf397. IAPP (2015), APEC PRIVACY FRAMEWORK (2015). Available at: https://iapp.org/media/pdf/resource_center/APEC_Privacy_Framework.pdf398. IAPP (2015), APEC PRIVACY FRAMEWORK (2015). Available at: https://iapp.org/media/pdf/resource_center/APEC_Privacy_Framework.pdf399. Government of Canada (2021), “Canada’s Privacy Act”. Available at: <https://www.justice.gc.ca/eng/csj-sjc/pa-lprp/pa-lprp.html>. The Privacy Act protects the personal information of Canadians in the hands of the federal government.400. Government of Canada (2021), “Canada’s Privacy Act”. Available at: <https://www.justice.gc.ca/eng/csj-sjc/pa-lprp/pa-lprp.html>. The Privacy Act protects the personal information of Canadians in the hands of the federal government.401. Government of Canada (2021), “Canada’s Privacy Act”. Available at: <https://www.justice.gc.ca/eng/csj-sjc/pa-lprp/pa-lprp.html>. The Privacy Act protects the personal information of Canadians in the hands of the federal government.402. Sources include BSA (2018), Country Report: Australia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Australia.pdf; BSA (2018), Country Report: Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and BSA (2018), Country Report: Malaysia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf403. Sources include BSA (2018), Country Report: Australia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Australia.pdf; BSA (2018), Country Report: Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and BSA (2018), Country Report: Malaysia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf404. BSA (2018), Country Report: Singapore. Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf405. Sources include BSA (2018), Country Report: Australia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Australia.pdf; BSA (2018), Country Report: Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and BSA (2018), Country Report: Malaysia, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Malaysia.pdf

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
POLICY		
Minimization of administrative and fiscal barriers for digital exports	Move to at least US\$200 de minimis threshold	Australia Australia’s de minimis threshold is approximately US\$750 (AU\$1,000), the highest of the APAC-11 countries. ⁴⁰⁶ This rule applies to the value of non-originating materials that can be shipped into the destination country before duties and taxes are assessed. ⁴⁰⁷ In short, shipments qualifying for expedited border clearance (i.e., that are not taxed) are not delayed by various entry or payment requirements. ⁴⁰⁸
Interoperable digital payment regulations and supportive digital payment initiatives	Develop supportive digital payment regulations and initiatives	India The “Digital India” program is one of the Government of India’s key flagship programs with the vision to transform India into a digitally empowered society and knowledge economy. ⁴⁰⁹ “Faceless, Paperless, Cashless” is one of Digital India’s core goals. Digital payment is a top priority for the government, with the intention to bring the whole country under the formal fold of digital payment services. ⁴¹⁰ The Ministry of Electronics & Information Technology (MeitY), which has been entrusted with the responsibility of leading “Promotion of Digital Transactions including Digital Payments”, is working on various approaches, including ideation with multiple stakeholders including banks, central ministries/departments, and states, to create a fully digital payments-enabled country. ⁴¹¹
Absence of local registration requirements and minimal limitations on foreign ownership and investment	Ensure ease of doing business by streamlining processes and removing restrictive requirements such as limitations on foreign ownership	Indonesia In November 2020, Indonesia enacted the “Omnibus Law” which aims to attract investment, create new jobs, and stimulate the economy. ⁴¹² This is done by simplifying the licensing process and harmonizing various laws and regulations and making policy decisions faster for the central government to respond to global or other changes or challenges. ⁴¹³ The Omnibus Law has resulted in the amendments of 75 existing laws and will require the central government to issue more than 30 government and other implementing regulations. ⁴¹⁴ Some of the key amendments include: focusing on increasing the ease of doing business by simplifying licensing processes, simplifying land acquisition processes, formalizing economic zones, and providing incentives to free-trade zones; introducing a new concept of risk-based businesses where activities are categorized into low, medium and risks where only the latter two require certification; democratizing capital investments, limiting only activities specific for governments; removing requirements and restrictions for foreign investments. ⁴¹⁵

406. Sources include Global Express Association (2021), Overview of de minimis value regimes world wide. Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf; and DHL (2019), “What Changes to the De Minimis Value Threshold Could Mean for Your Business”. Available at: <https://goqglobal.dhl-usa.com/blog/shipping/what-changes-to-the-de-minimis-value-threshold-could-mean-for-your-business/#~:text=The%20History,formal%20entry%20or%20payment%20requirements>.407. Sources include Global Express Association (2021), Overview of de minimis value regimes world wide. Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf; and DHL (2019), “What Changes to the De Minimis Value Threshold Could Mean for Your Business”. Available at: <https://goqglobal.dhl-usa.com/blog/shipping/what-changes-to-the-de-minimis-value-threshold-could-mean-for-your-business/#~:text=The%20History,formal%20entry%20or%20payment%20requirements>.408. Sources include Global Express Association (2021), Overview of de minimis value regimes world wide. Available at: https://global-express.org/assets/files/GEA%20De%20Minimis%20Country%20Information_4%20November%202021.pdf; and DHL (2019), “What Changes to the De Minimis Value Threshold Could Mean for Your Business”. Available at: <https://goqglobal.dhl-usa.com/blog/shipping/what-changes-to-the-de-minimis-value-threshold-could-mean-for-your-business/#~:text=The%20History,formal%20entry%20or%20payment%20requirements>.409. Ministry of Electronics & Information Technology (2021), “Digital economy & Digital Payment Division (DEDPD).” Available at: <https://www.meity.gov.in/digidhan>410. Ministry of Electronics & Information Technology (2021), “Digital economy & Digital Payment Division (DEDPD).” Available at: <https://www.meity.gov.in/digidhan>411. Ministry of Electronics & Information Technology (2021), “Digital economy & Digital Payment Division (DEDPD).” Available at: <https://www.meity.gov.in/digidhan>412. UNCTAD (2020), “‘Omnibus Law’ on job creation has been enacted.” Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3567/indonesia-omnibus-law-on-job-creation-has-been-enacted>413. UNCTAD (2020), “‘Omnibus Law’ on job creation has been enacted.” Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3567/indonesia-omnibus-law-on-job-creation-has-been-enacted>414. UNCTAD (2020), “‘Omnibus Law’ on job creation has been enacted.” Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3567/indonesia-omnibus-law-on-job-creation-has-been-enacted>415. UNCTAD (2020), “‘Omnibus Law’ on job creation has been enacted.” Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/3567/indonesia-omnibus-law-on-job-creation-has-been-enacted>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
COMPETITION		
Absence of local sourcing requirements	Democratize sourcing process and ensure no protectionist policies against foreign suppliers	<p>Singapore</p> <p>There is no requirement for foreign suppliers to include any domestic component in the products or services to be procured in public procurement processes.⁴¹⁶ The policy of embracing competition extends to foreign suppliers, thus minimizing protectionism in the public procurement sector.⁴¹⁷ As a result, there is no discrimination, even indirectly, against foreign companies (including locally-based companies that have foreign affiliation or ownership as well as those supplying goods and services that are originally produced in another country).⁴¹⁸ Similarly, there is no requirement on foreign suppliers to include any domestic component in the products or services to be procured. This allows greater access to new technology from abroad, which in turn open up new markets and sources of revenue, as well as spur innovation domestically.⁴¹⁹</p>
Open government procurement	Remove public procurement restrictions on foreign firms	<p>United Kingdom</p> <p>The United Kingdom commits to the World Trade Organization's "Agreement on Public Procurement" (GPA), which was designed to create better opportunities for foreign companies in the signees' respective countries.⁴²⁰ Countries who join the GPA are expected to take measures towards fair and equal treatment of suppliers, irrespective of whether they are a domestically based company or based in one of the other signees' countries.⁴²¹ Public procurement in the UK also follows the EU Treaty principles of non-discrimination, free movement of goods and freedom to provide services.⁴²²</p>
Competitive business environment with fair software licensing principles	Adopt fair software licensing principles in legislation	<p>Ten Principles of Fair Software Licensing developed by European industry bodies</p> <p>The Ten Principles of Fair Software Licensing have been developed by the Cloud Infrastructure Services Providers in Europe (CISPE) industry body and Cigref, a network of major French companies and public administrations.⁴²³ The principles call for clear and intelligible software licensing terms and the avoidance of customer lock-in through interoperable directory software amongst other areas.⁴²⁴ The principles outline the best practices of software licensing for cloud customers and ensure that the emerging digital economies remain competitive and fair.⁴²⁵</p>

416. Sources include Jones D. (2002), PROCUREMENT PRACTICES IN THE SINGAPORE CIVIL SERVICE: BALANCING CONTROL AND DELEGATION, Available at: <http://www.ipa.org/jopp/download/vol2/issue-1/Jones.pdf>; and Ministry of Finance (2020), A Guide for Suppliers. Available at: https://www.qebiz.gov.sg/docs/Supplier_Guide_Detailed.pdf

417. Sources include Jones D. (2002), PROCUREMENT PRACTICES IN THE SINGAPORE CIVIL SERVICE: BALANCING CONTROL AND DELEGATION, Available at: <http://www.ipa.org/jopp/download/vol2/issue-1/Jones.pdf>; and Ministry of Finance (2020), A Guide for Suppliers. Available at: https://www.qebiz.gov.sg/docs/Supplier_Guide_Detailed.pdf

418. Sources include Jones D. (2002), PROCUREMENT PRACTICES IN THE SINGAPORE CIVIL SERVICE: BALANCING CONTROL AND DELEGATION, Available at: <http://www.ipa.org/jopp/download/vol2/issue-1/Jones.pdf>; and Ministry of Finance (2020), A Guide for Suppliers. Available at: https://www.qebiz.gov.sg/docs/Supplier_Guide_Detailed.pdf

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421. GOV.UK (2022), "Public procurement policy". Available at: <https://www.gov.uk/guidance/public-sector-procurement-policy> and World Trade Organization (2020), "UK and Switzerland confirm participation in revised government procurement pact". Available at: https://www.wto.org/english/news_e/news20_e/gpro_02dec20_e.htm

422. GOV.UK (2022), "Public procurement policy". Available at: <https://www.gov.uk/guidance/public-sector-procurement-policy> and World Trade Organization (2020), "UK and Switzerland confirm participation in revised government procurement pact". Available at: https://www.wto.org/english/news_e/news20_e/gpro_02dec20_e.htm

423. FairSoftware.Cloud (2022). "Principles of Fair Software Licensing for Cloud Customers". Available at: <https://www.fairsoftware.cloud/principles/>

424. FairSoftware.Cloud (2022). "Principles of Fair Software Licensing for Cloud Customers". Available at: <https://www.fairsoftware.cloud/principles/>

425. FairSoftware.Cloud (2022). "Principles of Fair Software Licensing for Cloud Customers". Available at: <https://www.fairsoftware.cloud/principles/>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
COMPETITION		
Access to international digital service providers	Allow local organizations to access international digital service providers	<p>Malaysia</p> <p>Cloud service regulations in Malaysia that came into effect in April 2022 explicitly indicate that there are no restrictions on foreign ownership for cloud service providers in applying for an Application Service Provider license to provide such services to end users.⁴²⁶ The Application Service Provider license, renewable annually, facilitates a quick registration, does not restrict foreign shareholding, and allows for a zero-rated Universal Service Provision (USP) fund fee – a program by the Malaysian government to channel private sector investment to promote internet access for rural areas – specific for this cloud service.⁴²⁷</p>
CAPABILITY		
Access to digital skills	Increase curriculum responsiveness, incorporate technology in the classroom, introduce digital bootcamps, and create sector-specific skilling roadmaps	<p>Singapore</p> <p>To achieve maximum synergies in industry transformation over the next few years, the Government announced the US\$3.4 billion (S\$4.5 billion) "Industry Transformation Programme" in 2016, which provides a roadmap for the country's strategy for the next five years.⁴²⁸ The program integrates different restructuring efforts, taking a targeted and industry-focused approach to address issues and deepen partnerships between Government, firms, industries, trade associations and chambers. Under the program, "Industry Transformation Maps" (ITMs) have been developed for 23 industries under six clusters.⁴²⁹ For tight coordination and accountability, one Government agency will assume overall responsibility for each ITM, and coordinate among agencies and with the tripartite partners.⁴³⁰ In developing these ITMs, the Government will examine deeply the industry landscape, the future trends and needs to set out a suite of initiatives to systematically raise productivity, develop skills, drive innovation, and promote internationalization, so as to catalyze transformation and achieve the stated vision of each industry. These will be refined over time to ensure relevancy.⁴³¹</p>

426. Sources include ASEAN Briefing (2022), "Malaysia Imposes Licensing Requirements for Cloud Service Providers." Available at: <https://www.aseanbriefing.com/news/malaysia-imposes-licensing-requirements-for-cloud-service-providers/>; Malaysian Communications and Multimedia Commission (2021), Cloud Service Regulation Introduced to Increase Accountability for User Data Security and Sustainability of Services. Available at: https://www.mcmc.gov.my/skmmgovmy/media/General/pdf2/ADVISORY_NOTICE_CLOUD-SERVICE-REGULATION.pdf

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TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
CAPABILITY		
MSME digital adoption and exporting	Provide support to help MSMEs adopt digital technologies and engage in international trade	<p>Australia</p> <p>The South Australian government's "eCommerce Accelerator Program" (eCAP) supports MSMEs interested in selling their goods or services digitally and globally.⁴³² eCap has three funding categories, from which sellers who are new to e-commerce will be able to access funds with no upfront investments required, while sellers with more advanced e-commerce capabilities will be provided one-to-one matched funding from the government.⁴³³ Grants of up to AU\$5,000 (US\$3,600) will be provided to new e-commerce sellers to enable them to build their e-commerce capabilities, and these can be used to spend on professional training and advisory services the upfront costs required to develop their cross-border e-commerce presence in order to expand into their target countries.⁴³⁴ This significantly reduces the cost barriers faced by new sellers and provides them with a strong impetus to embark on their e-commerce export journey.</p>
Clear digital transformation strategy	Ensure clear plan, roadmap, or national strategy with dedicated agencies to drive actions	<p>Singapore</p> <p>As highlighted above, the Singapore Government announced the "Industry Transformation Programme" and "Industry Transformation Maps" (ITMs), covering 23 industries under six clusters including the ICT and Media industry and the Electronics industry.⁴³⁵ In 2021, the government announced a refresh to the ITMs for the next five years, which aims to update strategies to address the challenges and seize new opportunities from the COVID-19 pandemic. Each ITM consists of a growth and competitiveness plan, supported by four pillars:⁴³⁶</p> <ol style="list-style-type: none"> 1. Productivity: Strategies to support companies especially our Small and Medium Enterprises (SMEs) to move to higher value-added (VA) activities and raise operational efficiency 2. Jobs and Skills: Investing in our people, to equip them with deep skills to support the shift to greater value creation 3. Innovation: Strategies to leverage R&D to develop new products and services 4. Trade and Internationalization: Supporting companies in expanding to overseas markets

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433. Department of Trade and Investment, South Australia, Australia (2022), "eCommerce Accelerator Program (eCAP)". Available at: <https://connectplus.sa.gov.au/programs/ecommerce-accelerator-program-ecap>

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436. Sources include Ministry of Trade and Industry, Singapore (2017), Media factsheet- Industry Transformation Maps. Available at: <https://www.mti.gov.sg/-/media/MTI/ITM/General/Fact-sheet-on-Industry-Transformation-Maps---revised-as-of-31-Mar-17.pdf>; The Straits Times (2021), "Industry Transformation Maps to be refreshed, strengthened over the next 5 years: DMP Heng." Available at: <https://www.straitstimes.com/singapore/politics/industry-transformation-maps-to-be-refreshed-and-strengthened-over-the-next-five>; Maritime Fairtrade (2022), "Singapore Launches Sea Transport Industry Transformation Map 2025 to Achieve Vision as Global Maritime Hub." Available at: <https://maritimefairtrade.org/singapore-launches-sea-transport-industry-transformation-map-2025-to-achieve-vision-as-global-maritime-hub%E2%80%9C>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
CAPABILITY		
Access to cloud computing among local enterprises	Enable local enterprises to access affordable hyperscale cloud services, through a strong enabling environment (including on sustainability concerns)	<p>Climate Neutral Data Center Pact in Europe</p> <p>Data center operators and trade associations are committed to the European Green Deal, achieving the ambitious greenhouse gas reductions of the climate law, and leveraging technology and digitalization to achieve the goal of making Europe climate neutral by 2050.⁴³⁷ To ensure data centers are an integral part of the sustainable future of Europe, data center operators and trade associations have agreed to take the following actions to make data centers climate neutral by 2030: 1) Increase energy efficiency; 2) Use of clean energy; 3) Set an annual target for water usage effectiveness (WUE); 4) Create a circular energy system; and 5) Run on a circular economy.⁴³⁹</p>
Flexible regulations to accommodate evolving technologies	Establish regular interactions with the industry and innovative approaches	<p>Singapore</p> <p>The Monetary Authority of Singapore (MAS) aims to transform Singapore into a smart financial center by encouraging the adoption of innovative and safe technology in the financial sector, so as to (a) increase efficiency; (b) manage risks better; (c) create new opportunities; or (d) improve people's lives.⁴³⁹ To this end, MAS launched the FinTech Regulatory Sandbox in 2016 to encourage and enable experimentation of technology innovation in financial services, within a well-defined space and duration where MAS will provide the requisite regulatory support.⁴⁴⁰ "Sandbox Plus", which came into effect on 1 January 2022, introduced three enhancements to the Sandbox.⁴⁴¹ It aims to further catalyze financial innovation and FinTech adoption, by providing more effective one-stop assistance in areas of regulatory support and financial grant.⁴⁴²</p>
Cloud-first government policy	Adopt widespread usage of cloud throughout the public sector	<p>Philippines</p> <p>Philippine's "Cloud First Policy" promotes cloud computing as the preferred technology for government administration and the delivery of government services.⁴⁴³ The Cloud First Policy covers all departments, bureaus, offices, and agencies of the Executive Branch, Government Owned and/or Controlled Corporations (GOCCs), State Universities and Colleges (SUCs), Local Government Units (LGUs) and all cloud service providers and private entities rendering services to the government. Meanwhile, the Congress, the Judiciary, the Independent Constitutional Commissions, and the Office of the Ombudsman are encouraged to adopt the Cloud First Policy.⁴⁴⁴</p>

437. Climate Neutral Data Centre (2020), "Climate Neutral Data Centre Pact". Available at: <https://www.climateneutraldatacentre.net/>

438. Climate Neutral Data Centre (2020), "Climate Neutral Data Centre Pact". Available at: <https://www.climateneutraldatacentre.net/>

439. Sources include Monetary Authority of Singapore (n.d.), "Overview of Regulatory Sandbox". Available at: <https://www.mas.gov.sg/development/fintech/regulatory-sandbox>; and Monetary Authority of Singapore (2021), FAQs ON MAS FINTECH REGULATORY SANDBOX FRAMEWORK. Available at: <https://www.mas.gov.sg/-/media/MAS-Media-Library/development/Regulatory-Sandbox/FAQsNov2021.pdf?la=en&hash=075D18DC2B19BD6BCB5A98D1B974666736F87553>

440. Sources include Monetary Authority of Singapore (n.d.), "Overview of Regulatory Sandbox". Available at: <https://www.mas.gov.sg/development/fintech/regulatory-sandbox>; and Monetary Authority of Singapore (2021), FAQs ON MAS FINTECH REGULATORY SANDBOX FRAMEWORK. Available at: <https://www.mas.gov.sg/-/media/MAS-Media-Library/development/Regulatory-Sandbox/FAQsNov2021.pdf?la=en&hash=075D18DC2B19BD6BCB5A98D1B974666736F87553>

441. Sources include Monetary Authority of Singapore (n.d.), "Overview of Regulatory Sandbox". Available at: <https://www.mas.gov.sg/development/fintech/regulatory-sandbox>; and Monetary Authority of Singapore (2021), FAQs ON MAS FINTECH REGULATORY SANDBOX FRAMEWORK. Available at: <https://www.mas.gov.sg/-/media/MAS-Media-Library/development/Regulatory-Sandbox/FAQsNov2021.pdf?la=en&hash=075D18DC2B19BD6BCB5A98D1B974666736F87553>

442. Sources include Monetary Authority of Singapore (n.d.), "Overview of Regulatory Sandbox". Available at: <https://www.mas.gov.sg/development/fintech/regulatory-sandbox>; and Monetary Authority of Singapore (2021), FAQs ON MAS FINTECH REGULATORY SANDBOX FRAMEWORK. Available at: <https://www.mas.gov.sg/-/media/MAS-Media-Library/development/Regulatory-Sandbox/FAQsNov2021.pdf?la=en&hash=075D18DC2B19BD6BCB5A98D1B974666736F87553>

443. Department of Trade and Industry (2020), "DICT Releases Amended Cloud First Policy for Gov't Transition to "New Normal!"". Available at: <https://dict.gov.ph/dict-releases-amended-cloud-first-policy-for-govt-transition-to-new-normal/>

444. Department of Trade and Industry (2020), "DICT Releases Amended Cloud First Policy for Gov't Transition to "New Normal!"". Available at: <https://dict.gov.ph/dict-releases-amended-cloud-first-policy-for-govt-transition-to-new-normal/>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
CAPABILITY		
Strong IP protection	Ensure protection of commercially-sensitive data or proprietary information, or adequate safeguards if disclosures are required	<p>Singapore</p> <p>Singapore has done well in the 'comprehensive organizational setup' component under the "ITU Global Cybersecurity Index" (upon 20).⁴⁴⁵ As a global leader in patent protection and online copyright enforcement, Singapore has an advanced national IP framework and efforts to accelerate research, patent examination, and grants.⁴⁴⁶ On top of its already existing IP framework, Singapore also has a national strategy called the Singapore IP Strategy (SIPS) 2030, which aims to support enterprises and the wider innovation community through three action areas: (1) supporting international activities by maintaining strong IP regime and being a hub for international IP dispute resolution, (2) growing local enterprises by developing a credible IP valuation ecosystem, and (3) building a high-calibre workforce.⁴⁴⁷</p>
INFRASTRUCTURE		
Broadband access	Extend access to digital infrastructure, especially rural areas	<p>South Korea</p> <p>In 2001, South Korea's Ministry of Security and Public Administration (MOSPA, former Ministry of Public Administration and Security) launched the "Information Network Village" (INVIL) program starting with 21 INVILs.⁴⁴⁸ The program aimed to narrow the digital gap between urban and rural areas by equipping rural citizens with the necessary skills to thrive in the online environment. Then, the project focused mainly on investing in infrastructure, setting up the INVIL Centers, distributing computers to rural households and designing INVIL websites.⁴⁴⁹ As of 2013, 361 out of 394 INVILs funded by the government were active and the majority of the villages — 68% — were launched in the first five years of the program, indicating a successful policy framework from the get-go.⁴⁵⁰</p>

445. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; and Intellectual Property Office of Singapore (n.d.), "Singapore's Global Innovation Ranking". Available at: <https://www.ipos.gov.sg/resources/singapore-ip-ranking>; IPSOS (n.d.), "Singapore IP Strategy 2030." Available at: <https://www.ipos.gov.sg/manage-ip/singapore-ip-strategy-2030>

446. International Trade Administration U.S. Department of Commerce (2021), "Singapore – Country Commercial Guide: Protecting Intellectual Property." Available at: <https://www.trade.gov/country-commercial-guides/singapore-protecting-intellectual-property#~:text=The%20index%20noted%20that%20Singapore's,protection%20and%20online%20copyright%20enforcement.>

447. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; and Intellectual Property Office of Singapore (n.d.), "Singapore's Global Innovation Ranking". Available at: <https://www.ipos.gov.sg/resources/singapore-ip-ranking>; IPSOS (n.d.), "Singapore IP Strategy 2030." Available at: <https://www.ipos.gov.sg/manage-ip/singapore-ip-strategy-2030>

448. Jung, M. C., Park, S., & Lee, J. Y. (2014). Information network villages: A community-focused digital divide reduction policy in rural Korea. *Journal of Telecommunications and the Digital Economy*, 2(1), 21-1. Available at: <https://search.informit.org/doi/abs/10.3316/INFORMIT187401608549583>

449. Jung, M. C., Park, S., & Lee, J. Y. (2014). Information network villages: A community-focused digital divide reduction policy in rural Korea. *Journal of Telecommunications and the Digital Economy*, 2(1), 21-1. Available at: <https://search.informit.org/doi/abs/10.3316/INFORMIT187401608549583>

450. Jung, M. C., Park, S., & Lee, J. Y. (2014). Information network villages: A community-focused digital divide reduction policy in rural Korea. *Journal of Telecommunications and the Digital Economy*, 2(1), 21-1. Available at: <https://search.informit.org/doi/abs/10.3316/INFORMIT187401608549583>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
INFRASTRUCTURE		
Affordable broadband costs	Provide subsidized access to the Internet for marginalized groups; promote infrastructure sharing; ensure a strong competitive environment for the provision of wireless and broadband services	<p>South Korea</p> <p>Laws and regulations were established early on for efficient informatization, including the "Act on the Expansion and Promotion of the Use of Information and Communications Network" (1987), the "Framework Act on Information Promotion" (1995), and the "Electronic Government Act" (2001). The government has also subsidized low-income and traditionally unconnected people to help them acquire computers and connect to high-speed Internet.⁴⁵¹</p> <p>Separately, the private sector has played an important role in the provision of fast, affordable internet in Korea. In cooperation with the government, companies helped take care of a portion of the structural work. In 2003, the South Korean Information and Telecommunication Ministry reached an agreement with the nation's leading carriers to jointly invest US\$2.1 billion into the nation's multimedia network.⁴⁵² The deal between the government and private entities guaranteed a US\$1.2 billion investment from these carriers over the next seven years.⁴⁵³ The Government has embraced infrastructure-sharing as a way to incentivize new companies to compete in the broadband market.⁴⁵⁴ As such, the Government and businesses have had a symbiotic relationship towards achieving the same goal.</p>
Robust and relevant cybercrime and cybersecurity policy frameworks	Implement legal and regulatory frameworks, establish legal processes to enforce and investigate	<p>Singapore</p> <p>The privacy legislation contains broad security requirements, as well as some sector-specific rules (i.e., in the financial services sector).⁴⁵⁵ The security requirements in the privacy legislation are the subject of regular enforcement actions.⁴⁵⁶ Additional guidance on compliance has been published by the Personal Data Protection Commission (PDPC), including the "Guide to Securing Personal Data in Electronic Medium", which seeks to provide: 1) information on common topics related to the security and protection of personal data stored in electronic medium (or "electronic personal data") and 2) good practices that organizations should undertake to protect electronic personal data as well as enhanced practices that organizations may consider adopting to further improve the protection of electronic personal data.⁴⁵⁷</p>

451. Public Knowledge (2017), "Why Does South Korea Have Faster Internet for a Cheaper Price Tag?". Available at: <https://publicknowledge.org/why-does-south-korea-have-faster-internet-for-a-cheaper-price-tag/>

452. Public Knowledge (2017), "Why Does South Korea Have Faster Internet for a Cheaper Price Tag?". Available at: <https://publicknowledge.org/why-does-south-korea-have-faster-internet-for-a-cheaper-price-tag/>

453. Public Knowledge (2017), "Why Does South Korea Have Faster Internet for a Cheaper Price Tag?". Available at: <https://publicknowledge.org/why-does-south-korea-have-faster-internet-for-a-cheaper-price-tag/>

454. Public Knowledge (2017), "Why Does South Korea Have Faster Internet for a Cheaper Price Tag?". Available at: <https://publicknowledge.org/why-does-south-korea-have-faster-internet-for-a-cheaper-price-tag/>

455. Sources include BSA (2018), Country Report Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and Personal Data Protection Commission Singapore (2017), Guide to Securing Personal Data in Electronic Medium, Available at: <https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Other-Guides/guidetosecuringpersonaldatainelectronicmedium0903178d4749c8844062038829ff0000d98b0f.pdf>

456. Sources include BSA (2018), Country Report Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and Personal Data Protection Commission Singapore (2017), Guide to Securing Personal Data in Electronic Medium, Available at: <https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Other-Guides/guidetosecuringpersonaldatainelectronicmedium0903178d4749c8844062038829ff0000d98b0f.pdf>

457. Sources include BSA (2018), Country Report Singapore, Available at: https://cloudscorecard.bsa.org/2018/pdf/country_reports/2018_Country_Report_Singapore.pdf; and Personal Data Protection Commission Singapore (2017), Guide to Securing Personal Data in Electronic Medium, Available at: <https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Other-Guides/guidetosecuringpersonaldatainelectronicmedium0903178d4749c8844062038829ff0000d98b0f.pdf>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
INFRASTRUCTURE		
Comprehensive organizational setup within the government	Ensure dedicated agencies to govern and coordinate efforts	<p>Malaysia</p> <p>The National Cyber Security Agency (NACSA), established in February 2017 as the national lead agency for cybersecurity matters, is responsible for securing and strengthening Malaysia's resilience in facing the threats of cyber-attacks, by coordinating and consolidating the nation's best experts and resources in the field of cybersecurity.⁴⁵⁸ NACSA is committed to developing and implementing national-level cybersecurity policies and strategies, protecting Critical National Information Infrastructures (CNII), undertaking strategic measures in countering cyber threats, spearheading cybersecurity awareness, acculturation and capacity-building programs, formulating strategic approach toward combatting cybercrimes, advising on organizational cyber risk management, developing and optimizing shared resources among agencies, and fostering constructive regional and global networks among entities with shared interests in cybersecurity.⁴⁵⁹</p>
Adequate capacity development	Introduce measures to enhance processes, skills, and resources	<p>Singapore</p> <p>Along with Australia, Japan, Korea, Malaysia, and India, Singapore scored the highest in terms of adequate capacity development with a full score of 20 together (According to the ITU "Global Cybersecurity Index").⁴⁶⁰</p> <p>One of its cybersecurity initiatives, amongst many, includes the Cybersecurity Co-Innovation and Development Fund (CCDF), which aims to analyze the development of innovative cybersecurity solutions to meet national cybersecurity and strategic needs, with the potential for commercial application.⁴⁶¹ The program encourages collaborations between cybersecurity companies and end-users by facilitating the matching of industry proposals to end-user challenges and supporting the co-development of innovative cybersecurity solutions in Singapore. Awarded companies will receive funding support of up to US\$750,000 (\$1,000,000) for up to 24 months.⁴⁶²</p>

458. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; and National Cyber Security Agency (n.d.), "NACSA | National Cyber Security Agency". Available at: <https://www.nacsa.gov.my/>

459. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; and National Cyber Security Agency (n.d.), "NACSA | National Cyber Security Agency". Available at: <https://www.nacsa.gov.my/>

460. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; Cyber Security Awareness Alliance (2021), "Better Cyber Safe Than Sorry". Available at: <https://www.csa.gov.sg/gosafeonline/go-safe-for-me/homeinternetusers/bettercybersafethansorry>; and Cyber Security Agency of Singapore (n.d.), "CSA Cybersecurity Co-Innovation and Development Fund (CCDF)". Available at: <https://www.csa.gov.sg/programmes/co-innovation-development-fund>

461. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; Cyber Security Awareness Alliance (2021), "Better Cyber Safe Than Sorry". Available at: <https://www.csa.gov.sg/gosafeonline/go-safe-for-me/homeinternetusers/bettercybersafethansorry>; and Cyber Security Agency of Singapore (n.d.), "CSA Cybersecurity Co-Innovation and Development Fund (CCDF)". Available at: <https://www.csa.gov.sg/programmes/co-innovation-development-fund>

462. Sources include International Telecommunication Union (ITU), Global Cybersecurity Index 2020. Available at: <https://www.itu.int/epublications/publication/global-cybersecurity-index-2020/en/>; Cyber Security Awareness Alliance (2021), "Better Cyber Safe Than Sorry". Available at: <https://www.csa.gov.sg/gosafeonline/go-safe-for-me/homeinternetusers/bettercybersafethansorry>; and Cyber Security Agency of Singapore (n.d.), "CSA Cybersecurity Co-Innovation and Development Fund (CCDF)". Available at: <https://www.csa.gov.sg/programmes/co-innovation-development-fund>

TABLE A2 (CONT'D)

ENABLERS AND PARAMETERS	RECOMMENDATIONS	BEST PRACTICE EXAMPLE
INFRASTRUCTURE		
Strong international partnerships	Foster bilateral and multilateral cybersecurity agreements	<p>Japan, India</p> <p>Japan and India finalized a cybersecurity pact in 2020 to develop robust and resilient digital and cyber systems.⁴⁶³ The agreement promotes cooperation in capacity building, research and development, security, and resilience in the areas of Critical Information Infrastructure, 5G, Internet of Things (IoT), AI, among others.⁴⁶⁴ The two countries have also stepped up the cooperation on ICT and cybersecurity to enhance joint efforts around 5G technology, as well as the security of information infrastructure.⁴⁶⁵ In the latest development, the two countries have reached an agreement on ICT cooperation and signed a Memorandum of Understanding (MoU) in 2021.⁴⁶⁶ The India-Japan cyber dialogue is on an upward trajectory following the two countries agreeing to beef up cooperation toward the security of critical digital infrastructure, share information on recent cyberattack incidents and responses, and formulate supply chain risk mitigation strategies.⁴⁶⁷</p>

A5. METHODOLOGIES TO SIZE THE ECONOMIC VALUE OF THE DOMESTIC DIGITAL ECONOMY AND DIGITAL EXPORTS

SIZING THE ECONOMIC VALUE OF THE DIGITAL ECONOMY DOMESTICALLY

Domestically, the benefits to firms from the digital economy are through ready access to digital technologies that can help lower costs (relate to data storage) and enable them to utilize higher productivity applications (e.g., big data, shared services, etc.). A three-step methodology was used to understand the economic value created by the digital economy to domestic sectors in 2021 and 2030.

First, the current levels of digital openness were determined using the level of cloud service adoption as a proxy.⁴⁶⁸ Cloud service adoption was used as a proxy for digital technologies as it enables the use of a range of different technologies which require large data, collaboration, and security. Next, the benefits for businesses and the domestic economy were assessed using relevant statistics such

463. Sources include Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>; and The Diplomat (2021), "India-Japan Cyber Cooperation: From Strength to Strength". Available at: <https://thediplomat.com/2021/01/india-japan-cyber-cooperation-from-strength-to-strength/>

464. Sources include Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>; and The Diplomat (2021), "India-Japan Cyber Cooperation: From Strength to Strength". Available at: <https://thediplomat.com/2021/01/india-japan-cyber-cooperation-from-strength-to-strength/>

465. Sources include Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>; and The Diplomat (2021), "India-Japan Cyber Cooperation: From Strength to Strength". Available at: <https://thediplomat.com/2021/01/india-japan-cyber-cooperation-from-strength-to-strength/>

466. Sources include Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>; and The Diplomat (2021), "India-Japan Cyber Cooperation: From Strength to Strength". Available at: <https://thediplomat.com/2021/01/india-japan-cyber-cooperation-from-strength-to-strength/>

467. Sources include Live Mint (2020), "India, Japan finalize cybersecurity pact". Available at: <https://www.livemint.com/news/world/india-japan-finalize-cyber-security-pact-11602066872761.html>; and The Diplomat (2021), "India-Japan Cyber Cooperation: From Strength to Strength". Available at: <https://thediplomat.com/2021/01/india-japan-cyber-cooperation-from-strength-to-strength/>

468. Data is available from the OECD for some of the focus countries (Australia, Japan, South Korea). For other countries, estimates from the Global Innovation Index (specifically the ICT Use Index) were used to derive this information. The Global Innovation Index, published by the World Intellectual Property Organization (WIPO) and the Portulans Institute, provides a rigorous statistical benchmark to measure the innovation ecosystems in countries. One of its components is the ICT Use Index that considers three factors: Percentage of individuals using the Internet; Fixed broadband Internet subscriptions, and Active mobile broadband subscriptions. The ICT Use Index serves as a proxy in this analysis. Based on the OECD data, a proxy country was identified for each of the focus countries based on the GDP per capita and the availability of recent data (after 2018). In the absence of country data, India, Indonesia, Pakistan, the Philippines, Thailand, and Vietnam referenced Turkey's cloud service adoption rates, while Singapore and Malaysia referenced Japan's and Poland's data, respectively. Sources include OECD, "ICT Access and Usage by Businesses". Available at: https://stats.oecd.org/Index.aspx?DataSetCode=ICT_BUS; and Global Innovation Index (2021), "Analysis". Available at: <https://www.globalinnovationindex.org/analysis-indicator>

as the number of businesses and employees and average labor productivity, as well as case studies to understand the cost and productivity-enhancing benefits achievable through the current and hypothetical full adoption of digital technologies for businesses (proxied by cloud service adoption).⁴⁶⁹

Two scenarios were estimated for each country:

- **Business-as-usual.** This looks at the current value in 2021 based on the existing cloud service adoption rate and the likely growth in economic benefits in 2030 assuming the same adoption rate.
- **Accelerated.** This looks at the full potential value in 2021 and 2030, based on an assumption that we could see full adoption of cloud-based services among businesses (i.e., 100% of businesses using cloud services) in the economy.

Finally, the impact of policies on the digital economy was assessed by assuming that if all individual policies were at “best practice” levels (e.g., digital skilling approaches, regulatory settings, etc.) then the economy would derive the value under the “digital prosperity” scenario. For some policies, this research attempted to understand their impacts through established case studies.

-sizing the value of digital exports

To estimate the economic value domestic firms gain from overseas markets through digital trade, this analysis focuses on sizing the value of digital exports. Three categories of digital exports were sized in this analysis:⁴⁷⁰

- **Digitally-enabled goods.** These refer to trade in goods enabled by the Internet — i.e., e-commerce.



- **Digitally-enabled services.** These refer to services provided by digital technologies. This is a large category because most services currently have adopted digital technologies and are selling e-services to varying degrees. This includes the export of data processing and online software consultancy services. It also includes other direct e-service exports such as online booking and electronic banking;

469. Examples of sources include KPMG (2015), Cloud Economics: Making the Business Case for Cloud. Available at: <https://assets.kpmg/content/dam/kpmg/pdf/2015/11/cloud-economics.pdf> and Deloitte (2018), Public Cloud Business Users Survey. Available at: https://www2.deloitte.com/content/dam/Deloitte/es/Documents/tecnologia/Deloitte_ES_tecnologia_economic-and-social-impacts-of-google-cloud.pdf. For instance, KPMG's report highlighted that cloud could save organizations between 10% to 20% of their annual cloud budget.

470. “Digital infrastructure goods” are excluded from the scope of analysis as this category is considered an enabler of digital trade, rather than digital trade itself.

however, these categories are currently not able to be measured due to data unavailability.

- **Indirect digital services (embedded in other exports).** These refer to the contribution of imported digital services in the production of other export goods and services. This is distinct from point (ii) above as it does not pertain to the exports of digital services, but rather the exports of all goods and services (other than digital services) that are made possible by importing digital services. Examples include telecommunication services such as imported email, video conferencing, digital file sharing, and VOIP services that get used by a mining company when exporting overseas.

Digitally-enabled goods

The value of this component is estimated using a “bottom-up” approach. The analysis focuses on business-to-consumer (B2C) e-commerce exports, as this is the main component of digitally-enabled goods. The approach employed four major data points: A) the average export revenue of products that are typically sold via e-commerce per firm; B) the share of firms engaged in e-commerce; C) the share of firms engaged in e-commerce that export; and D) the number of firms engaged in B2C e-commerce (proxied based on the number of firms in the retail and wholesale trade sector).

Digitally-enabled services

As current export statistics do not distinguish between digitally-enabled and non-digitally-enabled exports, we limit our scope of analysis to sectors that are likely to have a large share of exports being digitally-enabled. This includes the direct exports of digital infrastructure services. This relates to the export of digital services such as VOIP, email,

or cloud computing solutions. Telecommunications and computer-related services (e.g., programming, data processing, and web portal services) were used as proxies as they are likely to be data-heavy, and require flexibility in scaling and assumed to be cloud-driven to some extent.⁴⁷¹ Data is sourced from the OECD-WTO Trade in Value-Added (TiVA) database.⁴⁷²

Indirect digital services

Indirect digital services refer to how imported digital services are utilized and contribute to the production of other goods and services that are later exported. This analysis is conducted based on data from the OECD TiVA database.⁴⁷³ As with the domestic benefits, two scenarios are estimated for the exports of digitally-enabled goods and services:

- **Business-as-usual.** This looks at the current value in 2021 and the likely growth in digital trade to 2030 based on historical digital trade growth rates and forecasted GDP growth rates. To estimate the value of digital exports under this scenario, the 3-year CAGR of gross exports for each component (digitally-enabled goods, digitally-enabled services, and indirect digital services) was calculated from the historical data on gross exports. The 3-year historical CAGR of gross exports for each component was used to estimate the value of digital exports up to 2024, after which the forecasted GDP growth rate from IMF was applied.
- **Accelerated adoption.** This looks at the full potential value in 2021 and 2030, based on an assumption that we could see the country matching the same share of digital exports (as a percent of GDP) as the “best-in-class” country. This share was then multiplied by the GDP of each country.

471. Although telecommunications services traditionally do not require cloud computing technologies, to satisfy upcoming customer demands, companies in the sector need to be dynamic, flexible, and scalable, which is possible to achieve with the cloud. Particularly, for companies to be able to deliver 5G services, adoption of the cloud is critical. This follows the approach taken by UNESCAP (2016), Internal trade in a digital age. Available at: <https://www.unescap.org/sites/default/files/optir-2016-ch7.pdf>

472. From the TiVA database, historical data on gross exports is obtained for the two relevant industries: (i) telecommunications and (ii) IT and other information services. Forecasts were calculated based on the historical compound annual growth rates (CAGR) of the gross exports for each industry and the IMF forecasted GDP growth rate. Source includes OECD, “Trade in Value Added (TiVA)”. Available at: <https://stats.oecd.org/index.aspx?queryid=75537>. Data was used for the following industries: ‘C64: Post and Telecommunications’ and ‘C72: Computer and related activities’ (Numbers refer to the International Standard Industrial Classification of All Economic Activities (ISIC) 3rd revision).

473. The TiVA database provides data on the contributions of value added by imports - broken down by source country and source industry - to gross exports - broken down by exporting country and exporting industry. This data allows us to compute the indirect value-added impact that imports in the relevant industries have on the gross exports of the focus countries. However, some double-counting will occur as some of the value of direct exports of these industries (i.e., telecommunications and computer-related services) calculated in the component “Digitally-enabled services”, will originate from imports in those industries. To avoid this, the indirect value-added sourced from imports in the telecommunications and computer-related services on exports was removed.



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