

8

THEME CHAPTER

Making Digital Platforms Work for Asia and the Pacific

Introduction

The last decade has seen the rise of digital platforms as a primary mechanism for organizing a vast set of human activities, including economic, sociocultural, and political interactions (Kenney and Zysman 2016). Access to digital technology gives individuals and households greater convenience and wider choices, triggering changes in purchasing and consumption behavior. Digital platforms help micro, small, and medium-sized enterprises (MSMEs) conduct their online business, and afford them global reach.

Platforms have been transformative, drastically challenging traditional business models. Digital platform-enabled companies have radically reduced the market shares of traditionally dominant firms and generated modern forms of employment like cloud work, “gig” work or local on-demand work, and informal entrepreneurial work.

Platforms have enabled consumers to become goods and services providers. Traditionally, household production was limited to a few industries, such as agriculture, household services, and real estate. But, as a result of the rise of platforms, households have also become providers of transportation services, food and accommodation, and culture and recreational services, earning income on the side.

By combining data and algorithm, digital platforms can also help address market failure and inefficiencies often associated with the provision of

social services such as health, education, water, and sanitation. Usually, asymmetric information is the cause of high delivery costs and low access, and digital technology can bridge this information gap.

However, as with any technology or innovation, the platform economy has desirable and undesirable consequences. It raises issues on competition, data privacy, social and labor protection for platform workers, safety and security for customers, and taxation for the government—all of which require a reevaluation of existing laws and regulations. It may also amplify existing development challenges including inequalities.

The challenge for governments and society more broadly is to harness the potential benefits from digital platforms while minimizing their potential costs.

Rise of Digital Platforms in Asia⁷⁸

Understanding Digital Platforms and the Platform Economy

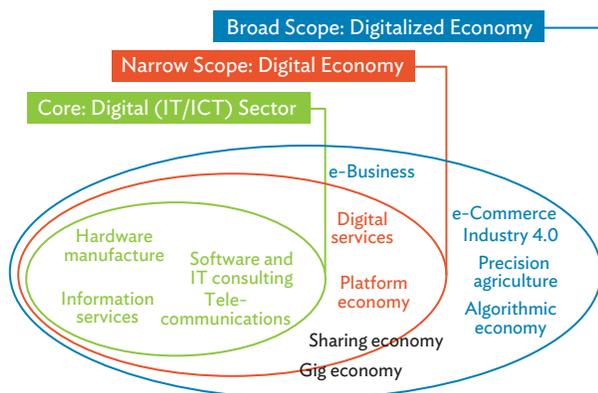
Economies are undergoing digitalization. This transformation is largely due to the evolution and growing use of information and communication technology (ICT) such as electronic tools, systems, devices, audiovisuals, and storage that generate, store, or process data. Digitalization may also be viewed as the “incorporation of data and the internet into production processes and products, new forms of household and government consumption, fixed-capital formation,

⁷⁸ Asia refers to the 49 members of the Asian Development Bank (ADB) within Asia and the Pacific, which includes Japan and Oceania (Australia and New Zealand) in addition to the 46 developing Asian economies.

cross-border flows, and finance” (IMF 2018). Although the pace of digitalization varies among countries, these trends in transformation are reflected in the massive growth of digital data that provide business intelligence and opportunities for development policy (Albert et al. 2019; Martinez and Albert 2018).

The digital economy has core, narrow, and broad scopes. Following Bukht and Heeks (2017), the core and narrow scopes relate to the ICT-producing sector; they comprise various digital services (e.g., business processing outsourcing services) as well as platform economy services such as Facebook and Google (Figure 8.1). The broad scope includes the use of digital technologies for activities such as e-commerce, automation, and artificial intelligence, as well as the sharing and gig economies.

Figure 8.1: Three Dimensions of Digital Transactions



IT = information technology, ICT = information and communication technology.
Source: Bukht and Heeks (2017).

The digital economy can also be defined by the nature of digital transactions. Fortanier and Matei (2017) suggested the following possible criteria for distinguishing digital transactions: (i) the nature of the transaction—if it is digitally ordered, enabled or

delivered; (ii) the transacted product—goods, services or data; and (iii) the partners or actors involved in the transaction—consumer, business, or government. Thus, a working definition of digital transactions, though not equivalent to the Organisation for Economic Co-operation and Development (OECD) definition of e-commerce,⁷⁹ includes those that are digitally ordered, digitally delivered, or platform-enabled.

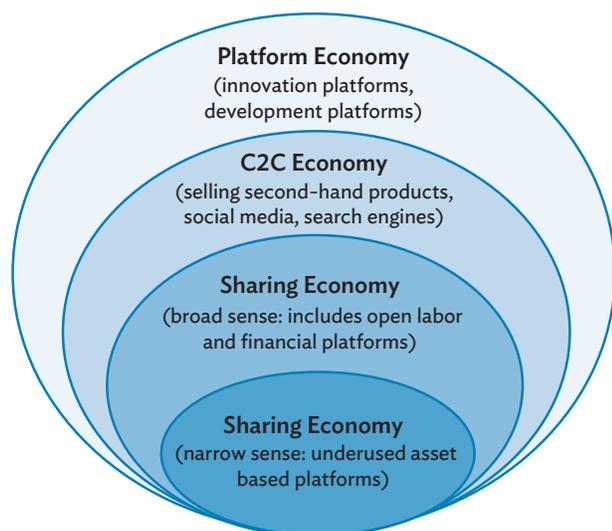
Quite often the platform economy (which pertains to activities in business, politics, and social interaction powered by platforms as described in Kenney and Zysman 2016, for instance) is not separated from the wider digital (also called internet) economy, which involves anything powered by digital technologies (Bukht and Heeks 2017), or other new economy models. The latter include the sharing economy, which focuses on the sharing of underutilized assets such as accommodations and rides (Botsman and Rogers 2010; Sundararajan 2016; Cheng, Fu, and de Vreede 2018) and the gig economy, which pertains to labor participation and income generation through “gigs,” i.e., single projects or tasks for which a worker is hired, as noted by Friedman (2014) and Berg et al. (2018).

There are no widely accepted standard definitions of the digital sector, the platform economy, and other new economy models. The sharing economy could have a broad definition to include the supply of work for small jobs in open labor platforms as well as crowd funding in financial platforms, or a narrow definition (Eurostat 2018) to include only the supply of underused assets (Figure 8.2).

Digital platforms are digital matchmakers.

They provide a mechanism for consumers and suppliers to exchange information, match demands, and pay and receive and deliver goods and services. Platforms differ in their role and in the “products” they “exchange” (Table 8.1).

⁷⁹ According to OECD (2011), an e-commerce transaction is “the sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing of orders. The goods or services are ordered by those methods, but the payment and the ultimate delivery of the goods or services do not have to be conducted online. An e-commerce transaction can be between enterprises, households, individuals, governments, and other public or private organizations. To be included are orders made over the web, extranet or electronic data interchange. The type is defined by the method of placing the order. To be excluded are orders made by telephone calls, fax or manually typed e-mail.”

Figure 8.2: Various Senses of the Platform Economy


C2C = customer-to-customer.

Source: Heerschap, Pouw, and Atmé (2018).

Key Characteristics

Most digital platforms generally exhibit three basic characteristics: They (i) are mediated through technology; (ii) link user groups; and (iii) allow these groups to perform particular things (Koskinen, Bonina, and Eaton 2019). The major strength of a platform is its ability to mediate peer-to-peer services while eliminating intermediaries or trade barriers using a digital mode to facilitate transactions in goods, services, or data. The digital infrastructure in a platform increases the ease and speed of interactions, transforms transactions from local to global, enlarges the choice possibilities, lowers the transaction costs of interactions, and provides benefit to users and the platform itself (Heerschap, Pouw, and Atmé 2018). While in many cases platform companies do not own the means of production, they create the means of

Table 8.1: Selected Definitions of the Digital Platform

Source	Definitions
Heerschap, Pouw, and Atmé (2018)	A digital service based on a technological, sociocultural, and economic infrastructure for the facilitation and organization of online social (interactions) and economic (transactions) traffic between two or more distinct but interdependent groups of providers and users, with data as fuel (citing van Dijck, Poell, and De Waal 2016; OECD 2018a). Providers and users can be both individuals and businesses as well as science organizations and government.
Kenney and Zysman (2016)	A set of online digital arrangements whose algorithms serve to organize and structure economic and social activity; a set of shared techniques, technologies, and interfaces that are open to a broad set of users who can build what they want on a stable substrate; a set of digital frameworks for social and marketplace interactions. Catalyst that allows value to be created through interactions between various groups of market participants.
Koh and Fichman (2014)	Two-sided networks ... that facilitate interactions between distinct but interdependent groups of users, such as buyers and suppliers.
Langley and Leyshon (2017)	A distinct mode of socio-technical intermediary and business arrangement that is incorporated into wider processes of capitalization. Intermediaries between two or more groups of participants with interdependent demands, ..., (with a) ... main market function ... typically described as the facilitation of interactions and transactions between producers of goods on one side and buyers or users on the other.
OECD (2019a)	Digital services that facilitate interactions between two or more distinct but interdependent sets of users (whether firms or individuals) who interact through the service via the internet.
Pagani (2013)	Multisided platform ... exists wherever a company brings together two or more distinct groups of customers (sides) that need each other in some way, and where the company builds an infrastructure (platform) that creates value by reducing distribution, transaction, and search costs incurred when these groups interact.
Tan et al. (2015)	A commercial network of suppliers, producers, intermediaries, customers ... and producers of complementary products and services termed "complementors" ... that are held together through formal contracting and/or mutual dependency.
WEF (2017a)	Technology-enabled business models that create value by facilitating exchanges and interactions.

Note: The definitions were taken directly from the sources indicated.

Source: Albert (2020).

connection between suppliers and consumers. Two-sided platforms, such as ride-hailing platforms, link two diverse types of participants more readily and enable them to gain through trade or other interaction (Evans and Schmalensee 2007). Multisided platforms, like Facebook, bring together more than two types of participants (Evans 2018), such as users, advertisers, third-party game or content developers, and affiliated third-party sites.

Network effects distinguish platforms from other business models and are one of the main drivers of value creation in the platform economy (Evans 2016).

The value and size of a platform rises with its repeated and broader use. Network effects may either be direct (where more users attract more users on the same side of the platform) or indirect (where more users on one side of the platform attract more users on the other side). As participants increase in number, the likelihood that platforms expand the services offered also rises, creating greater value to patrons.

At least three distinct but interdependent actors, namely, sellers or providers (supply side), buyers or clients (demand side), and the platform (intermediary) itself, are always active within the platform ecosystem. The providers offer goods (e.g., Shopee and Lazada), skills or services (e.g., MyKuya, Grab, and Netflix), and/or information (e.g., Google and Facebook) that can be delivered either physically or digitally to (potential) users. The platform itself is another actor in the ecosystem, as it supports price discovery and transactions between the provider and client, could process payments between buyers and sellers, and sometimes is used to distribute the product. Advertisers, which subsidize the value of the attention in the platform, constitute a fourth set of actors. This distributed network of people is the social infrastructure of platforms, and the set of economic and social activities encouraged is referred to as the platform economy.

Some platforms involve switching costs. There are some cases where users cannot easily transfer to other platforms. When investments, such as time and effort, are tied not only to a particular platform but to an entire ecosystem of linked platforms, users are less

willing to switch. Positive network effects, economies of scale and scope, especially for first-mover advantages and significant switching costs, can entrench the market positions of the platform giants, and so stifle competition.

Platform-enabled companies, like other firms, gather and generate data. Platforms can use big data to build detailed profiles of their providers and clients which can then be sold as commodities. Most platforms use these digital footprints only to improve their own services, but others can leverage data (usage trends and user demographics) for their growth strategies to maximize value creation (by way of targeted content and advertising, attracting users and increasing platform use, or developing new services). However, this data capture has given rise to monopolistic market power as well as privacy and security issues.

Platform companies can scale faster and at lower cost than traditional firms (World Bank 2019). Since in many cases platforms do not incur the costs of production, they can scale up as fast as they can add partners. The Chinese multinational company Alibaba, which specializes in e-commerce, retail, the internet, and technology, reached 1 million platform users in 2 years and accumulated more than 9 million online merchants and garnered annual sales of \$700 billion in 15 years. In contrast, IKEA, the Swedish multinational group that designs and sells ready-to-assemble furniture, kitchen appliances, and home accessories, took more than 7 decades to generate global annual sales of \$42 billion.

Typology of Platforms and Measurement Challenges

There are many typologies used in discussing platforms, based on the type of interactions, roles, overall scope and structure, participation strategies or profit motive (Table 8.2). Nevertheless, it is difficult to have categories that are mutually exclusive, as some platforms, especially superplatforms, have features from several categories. Furthermore, functional typologies get archaic as platforms evolve quickly, necessitating periodic adjustments in the typologies.

Table 8.2: Examples of Platform Typologies

Defining Feature	Examples
Type of interaction	Matchmaking platforms; external exchange platforms like classified ad websites and product marketplaces; and maker platforms
Role in the ecosystem	Platforms supporting other platforms, transaction platforms, innovation platforms, integration platforms, and investment platforms
Overall scope and structure	Superplatforms (e.g., WeChat and Facebook), platform constellations (e.g., Google's main platforms), and stand-alone platforms
Revenue source	Subscription platforms (e.g., Netflix or Spotify), advertising-based platforms (e.g., YouTube or Facebook); and pay-to-access platforms such as those for content or app developers (e.g., iPhone or Android app stores)
Factor of production being harnessed	Capital platforms (e.g., Airbnb), labor platforms (e.g., CrowdFlowers and Microworkers), and hybrid platforms like transportation platforms that tap drivers and cars (e.g., Grab)

Sources: Ardolino, Saccani, and Perona (2016); Evans and Gawer (2016); Kenny and Zysman (2016); OECD (2019a); and van Gorp and Batura (2015).

A number of measurement challenges hamper giving a clear and integrated portrait of the role, nature, and size of the digital platform economy:

- Digital platforms (and providers) may not be physically located in the same country of either the buyer or seller, thus their economic transactions are not directly captured in local economic statistics.
- There is no specific economic activity code for platforms. Digital platforms could be active in several sectors, making it difficult to fit them into current statistical classifications. For instance, while the Philippine Standard Industrial Classification (PSIC) includes a sub-class code [47913] for “retail sale via internet,” there is no comparable sub-class code for digital platforms beneath specific services sectors (PSA n.d.). For now, the provisional guidance is that digital intermediation platforms should be classified according to the activity they intermediate (if they intermediate services) and to ISIC 47.91 (Retail sale via mail order houses or via internet) if they intermediate sales and purchases of goods (OECD, WTO, and IMF 2019).
- Transactions are not always financial. In social media platforms, transactions are about data and information, the valuation of which can be challenging. Revenue and employment are also

difficult to trace, and so likely are underestimated in traditional surveys, since platforms spread supply across small-scale nonprofessional providers. Many digital platforms also do not publish their accounts or disaggregate these data across country boundaries.

The economic activities of digital platforms are not fully captured in the current economic statistics framework.

The economic activities of digital platforms are already partly captured in the national accounts. However, a distinction has to be made between market and nonmarket transactions since only market transactions are valued in national accounts. For example, even as the trading of second-hand goods involves a replacement value for the economy, this is not part of national accounts valuation. Annex 8a enumerates a list of indicators needed to measure the digital platform economy appropriately.

There is valid criticism that the gross domestic product (GDP) does not accurately capture the benefits received from unpriced goods, such as data and knowledge, resulting from increasing digitalization. Income from household production in the platform economy is not operationally accounted for. The International Telecommunication Union (ITU) warns that “current measurement efforts do not always reflect the socioeconomic impact of the digital transformation or the upstream and downstream consequences on the economy as a whole as opposed to just the digital share.”

International organizations such as the United Nations Conference on Trade and Development (UNCTAD), the International Monetary Fund (IMF), and the OECD have set up work programs to advance the statistical and conceptual frameworks that will help national statistical offices to measure the digital economy in a consistent manner. This work involves defining the digital economy and other new economy models, and testing ways to capture the associated welfare benefits in the System of National Accounts (European Commission et al. 2009). These international organizations have also organized knowledge activities to look at various measurement issues. Dedicated surveys should possibly be coordinated at regional levels by international organizations for developing economies to address these measurement challenges.

Contribution to Growth and Development

Key Technologies Critical to Growth of Digital Platforms and the Digital Economy

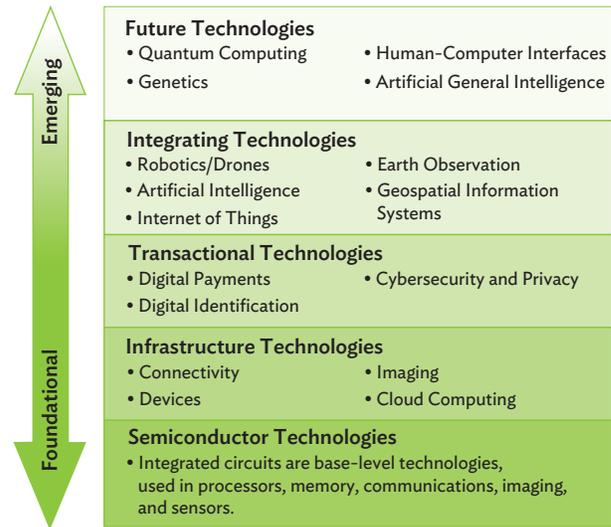
Digital platforms are the driving force of future economic growth, and they rely on a few enabling technologies. Investments in these key technologies and effective design of regulations and policy are critical drivers of success.

As noted by Abell (2020), the key technologies that are driving the digital economy (based on digital platforms) can be categorized into five groups (Figure 8.3): (i) *semiconductor* technologies, (ii) *infrastructure* technologies, (iii) *transactional* technologies, (iv) *integrating* technologies, and (v) *future* technologies. All are evolving rapidly, so development planning needs to look far into the future.⁸⁰

Size of the Market

The combined value of digital platform companies in 2017—those with a market capitalization of over \$100 million—was estimated at more than \$7 trillion, or 20% of global GDP (UNCTAD 2019a). In 2019,

Figure 8.3: Technologies Shaping the Digital Platform



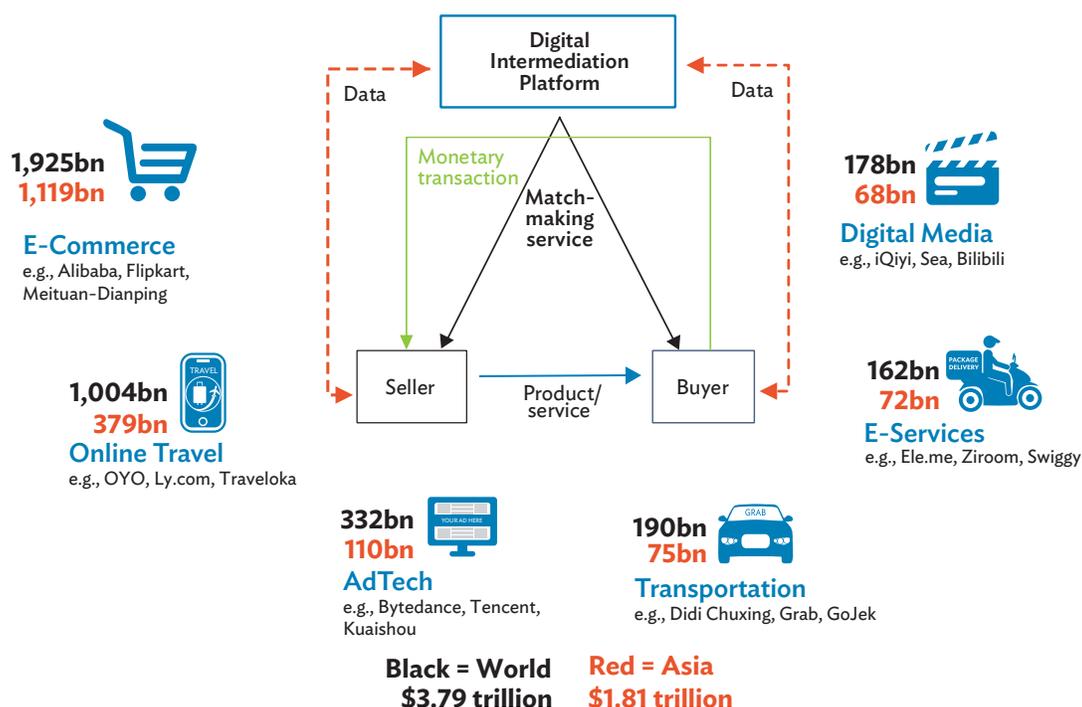
Source: Abell (2020).

seven out of the eight largest companies in the world are platform companies—Apple, Microsoft, Alphabet, Amazon, Facebook, Alibaba, and Tencent. Based on Statista data (Statista 2020a, 2020b) and covering the six major sectors, business-to-consumer (B2C) digital platform revenues reached \$3.8 trillion in 2019 equivalent to 4.4% of global GDP (Figure 8.4). E-commerce accounted for over half of these revenues (more than \$1.9 trillion globally) of which \$1.1 trillion were generated in Asia.

By geographic location, Asia accounts for about 48% of total sales revenue or \$1.8 trillion, equivalent to 6% of its regional GDP.⁸¹ Within Asia, 68% or \$1.2 trillion in revenues are generated in the People's Republic of China (PRC), which is equivalent to 8.8% of the latter's GDP. On a per capita basis, the United States (US) leads with spending of about \$2,542 on digital platforms, while it is only \$432 in Asia (Table 8.3). However, Asia outpaced the digital platform revenue growth in other economies in 2018–2019, growing by over 16% on the strength of turnover in the developing economies in the region (Table 8.4).

⁸⁰ Annex 8b provides details on technologies that are critical to digital platform growth.

⁸¹ For the market overview, six major digital platform subsectors were used in compiling the sales revenue figures: e-commerce, online travel, AdTech, transportation, e-services, and digital media.

Figure 8.4: Digital Platform Revenues—World and Asia, 2019 (\$)


bn = billion, tn = trillion.

Note: Asia refers to Asia and the Pacific, which comprises the 49 ADB regional member economies where data are available.

Sources: ADB calculations using data from Statista (2020a, 2020b); and Organisation for Economic Co-operation and Development, World Trade Organization, and International Monetary Fund (2019).

Table 8.3: Digital Revenue by Region, 2019 (\$ million)

Sector	World	Asia	Dev Asia (ex-PRC)	PRC	ANZ + Japan	Euro Area	US	ROW
Digital Media	177.5	67.6	13.8	35.0	18.9	17.3	57.6	35.0
E-Commerce	1,924.9	1,119.2	143.3	862.6	113.3	196.0	343.1	266.5
E-Services	161.8	71.7	16.3	47.0	8.4	15.0	42.8	32.3
Online Travel	1,003.8	379.5	127.8	179.8	71.9	173.5	199.1	251.8
AdTech	331.7	110.4	15.4	71.4	23.6	29.2	129.9	62.2
Transportation	190.3	75.4	19.8	48.8	6.8	14.2	64.2	36.5
Total	3,790.0	1,823.7	336.3	1,244.6	242.8	445.3	836.7	684.3
% of GDP	4.4%	6.1%	3.7%	8.8%	3.6%	3.3%	3.9%	3.3%
Per capita spend	513.9	432.3	121.1	863.6	1,547.6	1,308.2	2,542.5	275.1

ANZ+Japan = Australia, New Zealand, and Japan; Dev Asia = developing Asia; GDP = gross domestic product; PRC = People's Republic of China; ROW = rest of the world; US = United States.

Notes: Dev Asia includes Armenia; Azerbaijan; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Kazakhstan; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Mongolia; Myanmar; Nepal; Pakistan; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Turkmenistan; Uzbekistan; and Viet Nam. Euro area includes Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. Asia includes Dev Asia and ANZ+Japan.

Sources: ADB calculations using data from Statista (2020a, 2020b) and World Bank. World Development Indicators. <https://databank.worldbank.org/source/worlddevelopment-indicators> (accessed July 2020).

Table 8.4: Growth of Digital Revenue, 2019 (% by sector)

	World	Asia	Dev Asia (ex-PRC)	PRC	ANZ + Japan	US	Euro Area	ROW
Digital Media	6.3	7.1	11.0	8.8	1.6	5.3	5.6	6.8
E-Commerce	16.4	19.6	28.3	19.7	9.7	11.0	10.4	14.8
E-Services	16.0	18.8	22.8	18.7	12.3	10.0	15.5	18.3
Online Travel	7.2	9.1	10.2	10.7	3.3	6.0	5.6	6.6
AdTech	14.4	14.3	15.4	16.2	8.5	15.6	11.9	13.3
Transportation	8.0	12.4	12.4	13.6	4.7	4.3	6.9	6.6
Total	12.7	16.1	18.3	17.5	6.9	9.5	8.4	10.8

ANZ+Japan = Australia, New Zealand, and Japan; Dev Asia = developing Asia; PRC = People's Republic of China; ROW = rest of the world; US = United States.

Notes: Dev Asia includes Armenia; Azerbaijan; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Kazakhstan; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Mongolia; Myanmar; Nepal; Pakistan; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Turkmenistan; Uzbekistan; and Viet Nam. Euro area includes Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. Asia includes Dev Asia and ANZ+Japan.

Source: ADB calculations using data from Statista (2020a, 2020b).

Table 8.5: Digital Revenue, 2019 (% share of region in segment)

Sector	Asia	Dev Asia (ex-PRC)	PRC	ANZ + Japan	Euro Area	US	ROW
Digital Media	38.1	7.8	19.7	10.6	9.7	32.4	19.7
E-Commerce	58.1	7.4	44.8	5.9	10.2	17.8	13.8
E-Services	44.3	10.1	29.1	5.2	9.3	26.5	20.0
Online Travel	37.8	12.7	17.9	7.2	17.3	19.8	25.1
AdTech	33.3	4.6	21.5	7.1	8.8	39.2	18.7
Transportation	39.6	10.4	25.6	3.6	7.5	33.8	19.2
Total	48.1	8.9	32.8	6.4	11.7	22.1	18.1

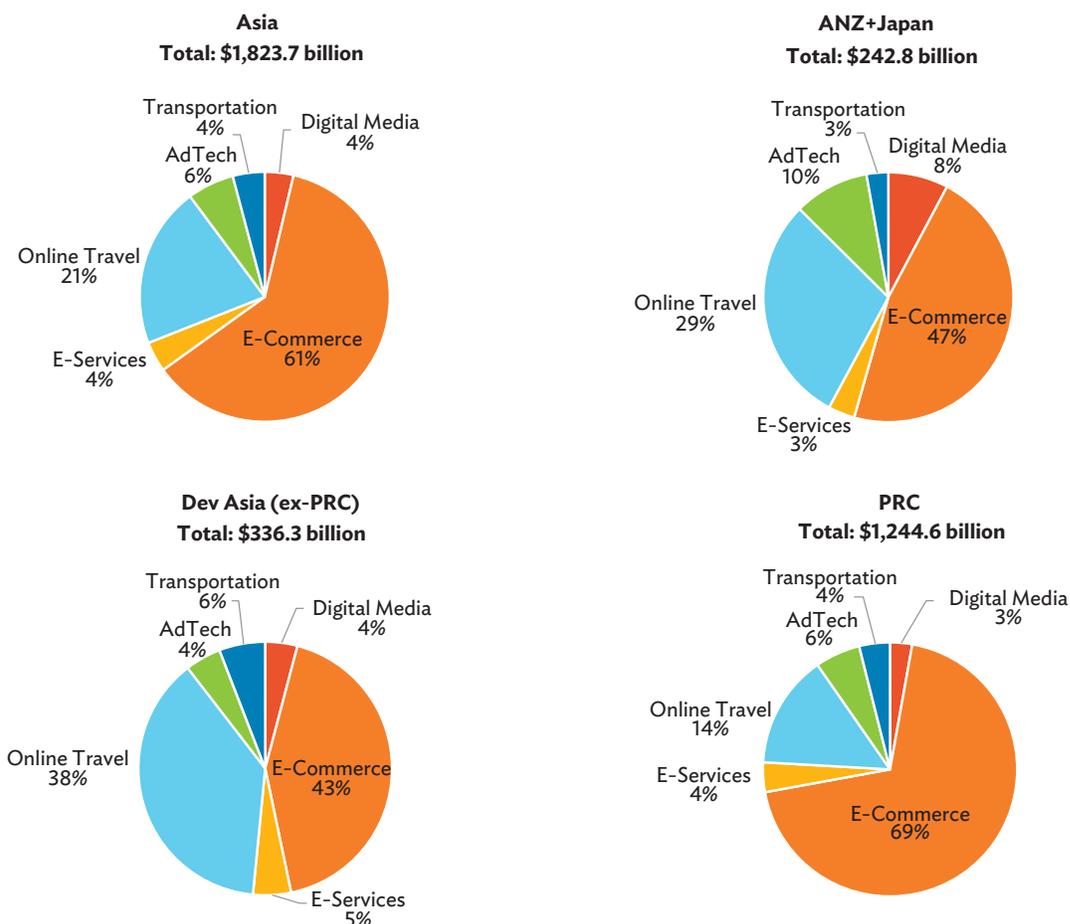
ANZ+Japan = Australia, New Zealand, and Japan; Dev Asia = developing Asia; PRC = People's Republic of China; ROW = rest of the world; US = United States.

Notes: Dev Asia includes Armenia; Azerbaijan; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Kazakhstan; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Mongolia; Myanmar; Nepal; Pakistan; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Turkmenistan; Uzbekistan; and Viet Nam. Euro area includes Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. Asia includes Dev Asia and ANZ+Japan.

Source: ADB calculations using data from Statista (2020a, 2020b).

Asia leads in generating digital revenues in all sectors, except in advertising technology (which includes Google and Facebook) where the US dominates (Table 8.5). In e-commerce, Asia accounts for over 58% of total sales revenue. The PRC is the most active country in the region, accounting for over 44.8% of the sales in e-commerce, 29.1% of the sales in e-services, and a quarter of the sales in transportation. The market in developing Asia

(excluding the PRC) is also vibrant; its shares in all sectors except digital media and advertising technology are higher than those of Australia, New Zealand, and Japan (ANZ+Japan). By segment, e-commerce and digital travel dominate (Figure 8.5). In Asia, e-commerce generated over 61% of the digital platform revenues while digital travel generated roughly 21%.

Figure 8.5: Digital Revenue in Asia, 2019 (% by Sector)


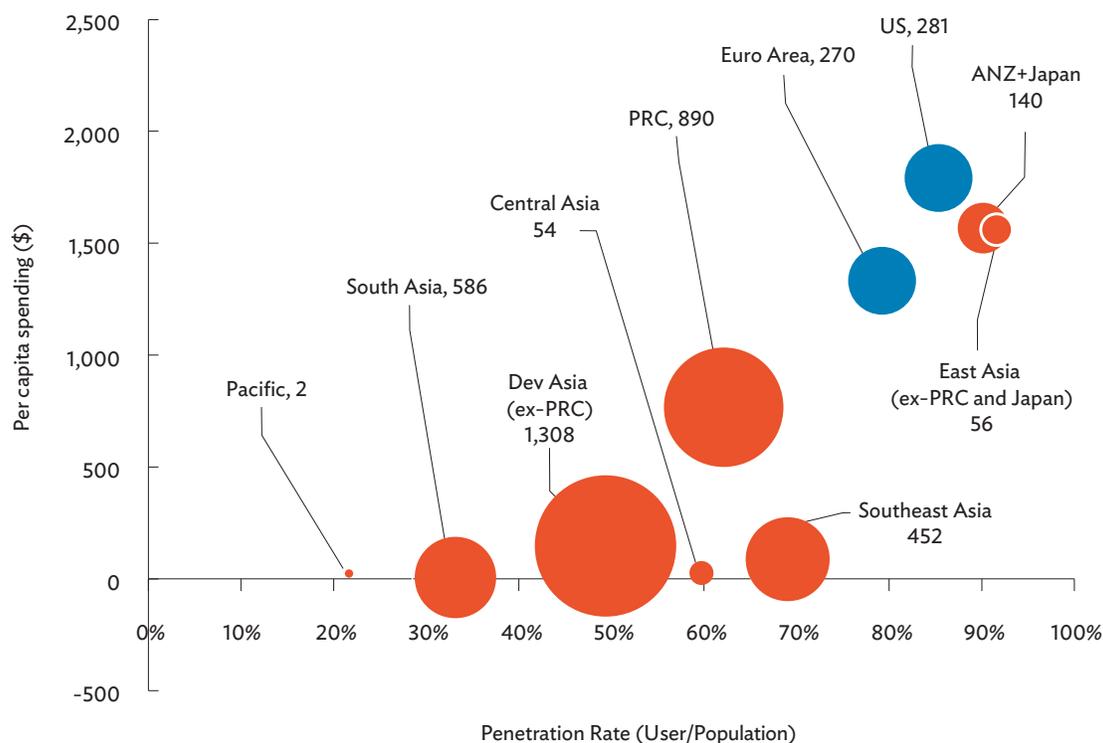
ANZ+Japan = Australia, New Zealand, and Japan; Dev Asia = developing Asia; PRC = People's Republic of China.

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Sources: ADB calculations using data from Statista (2020a, 2020b).

Another indicator of digital platforms is the growing number of users (Table 8.6). It is estimated that AdTech-exposed internet users (who include those using social media apps such as Facebook and Google) are about 4.1 billion, of which more than half are in Asia. E-commerce user accounts number close to 3.2 billion, of which about 60% are in Asia. Meanwhile, accounts in digital media that include Spotify, Netflix, e-services, and online travel and transportation register more than 1.4 billion, about 775 million are in Asia. In terms of penetration rate and per capita spending, however, developing Asia still trails the developed economies (Figure 8.6).

Within the region, the PRC is the biggest market for digital platforms. The PRC accounts for about \$1.2 trillion in revenue or 68.2% of Asia's total in 2019. The amount also represents roughly 8.8% of the PRC's GDP. Digital platform activity is similarly vibrant in the other East Asian economies. Revenues in East Asia (excluding the PRC and Japan) surpassed \$290 billion in 2019 or about 4% of the combined GDP. South Asia follows, with a market size of about \$130.4 billion in 2019, equivalent to 3.6% of its GDP (Table 8.7).

Figure 8.6: Digital Market Users, 2019 (million)

ANZ+JPN = Australia, New Zealand, and Japan; Dev Asia = developing Asia; PRC = People's Republic of China; US = United States.

Notes: Dev Asia includes Central Asia, East Asia ex-Japan, South Asia, Southeast Asia and the Pacific. Central Asia includes Armenia, Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan. East Asia includes Hong Kong, China; Mongolia; Japan; the PRC; and the Republic of Korea. South Asia includes Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. Southeast Asia includes Brunei Darussalam, Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam. Pacific includes Fiji, Papua New Guinea, and Timor-Leste. Euro area includes Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. Users refer to the AdTech-exposed internet users.

Sources: ADB calculations using data from Statista (2020a, 2020b) and World Bank World Development Indicators. <https://databank.worldbank.org/source/worlddevelopment-indicators> (accessed July 2020).

Table 8.6: Total Users in 2019 and Growth Rate in 2018–2019

Sector	World		Asia	
	Number (million)	Growth Rate (%)	Number (million)	Growth Rate (%)
Digital Media	1,438.3	6.1%	774.8	6.5%
E-Commerce	3,170.8	15.4%	1,876.4	17.9%
E-Services	815.4	12.1%	463.6	13.6%
Online Travel	987.6	2.5%	540.4	2.8%
Transportation	632.6	2.8%	403.9	3.2%
AdTech-exposed internet users	4,119.5	9.2%	2,338.0	11.9%

Notes: Users (except in AdTech) refer to the number of accounts that made at least one purchase in the last 12 months. Asia includes Armenia; Australia; Azerbaijan; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Japan; Kazakhstan; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Mongolia; Myanmar; Nepal; New Zealand; Pakistan; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Turkmenistan; Uzbekistan; and Viet Nam.

Sources: ADB calculations using data from Statista (2020a, 2020b).

Table 8.7: Digital Revenue by Asian Subregion, 2019 (\$ billion)

Sector	ANZ+Japan	PRC	East Asia (ex-PRC and Japan)	Southeast Asia	Central Asia	South Asia	Pacific	Asia
Digital Media	2.3	35.0	22.4	4.2	0.4	3.4	0.02	67.6
E-Commerce	25.2	862.6	153.9	37.8	1.9	37.7	0.11	1,119.2
E-Services	3.4	47.0	8.7	3.3	0.1	9.1	0.004	71.7
Online Travel	20.3	179.8	76.4	32.5	2.6	67.8	0.06	379.5
AdTech	8.2	71.4	21.9	4.4	1.0	3.3	0.07	110.4
Transportation	3.4	48.8	7.4	6.5	0.3	9.1	0.01	75.4
Total	62.6	1,244.6	290.6	88.8	6.4	130.4	0.28	1,823.7
% of GDP	4.0%	8.8%	4.1%	2.9%	1.7%	3.6%	0.9%	6.1%
Per capita spend	2,086.0	863.6	1,540.3	134.4	70.9	72.6	25.6	247.3

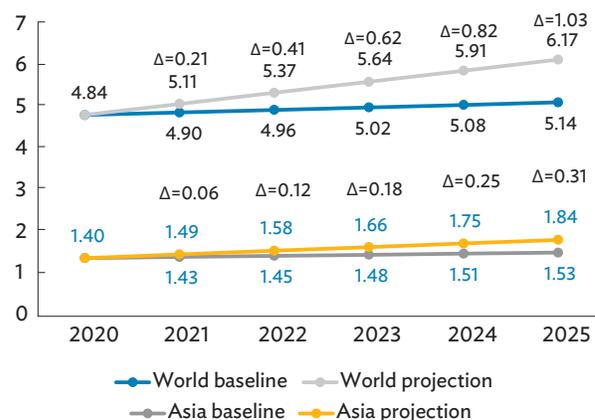
ANZ+Japan = Australia, New Zealand, and Japan; GDP = gross domestic product; PRC = People's Republic of China.

Notes: Asia includes Armenia; Australia; Azerbaijan; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Japan; Kazakhstan; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Mongolia; Myanmar; Nepal; New Zealand; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Turkmenistan; Uzbekistan; and Viet Nam.

Sources: ADB calculations using data from Statista (2020a, 2020b) and World Bank World Development Indicators. <https://databank.worldbank.org/source/worlddevelopment-indicators> (accessed July 2020).

Macroeconomic Impact of Digitalization in Asia: Estimating Potential Future Growth

The digital economy in Asia is expected to grow further, providing opportunities to bolster economic growth, build business, create jobs, and address socioeconomic challenges. To estimate the macroeconomic benefits of increased usage of digital technology, a scenario that leads to a 20% increase from the baseline by 2025 is analyzed (Figure 8.7). This scenario represents the digital transformation that has occurred during the coronavirus disease (COVID-19) outbreak as evident from the shift to work from home, online education, tele-health, e-commerce, and reliance on digital media. The digital transformation scenario is implemented by increasing investment in the digital sector which in turn contributes to higher output of sectors that use digital inputs more intensively and raises the overall productivity in the economy. Overall, the size of the global digital sector is expected to increase by an average of roughly \$617 billion annually from baseline levels, or \$3.1 trillion in total from 2021 to 2025, while the digital sector in Asia is modeled to rise by about \$184 billion annually from baselines, or about \$919 billion in 5 years. Box 8.1 provides the details of the simulation exercise.

Figure 8.7: Size of the Digital Sector in Asia and the World, 2021–2025 (\$ trillion)


Notes: The calculations are based on the Global Trade Analysis Project (GTAP) database. Asia refers to Asia and the Pacific and, in this case, it includes economies that are not ADB members due to the aggregation of the Pacific subregion in GTAP. Numbers may not sum precisely because of rounding. The detailed table is in Annex 8c.

Source: Narayanan and Villafuerte (2020).

The simulation results show that increased digitalization will have tremendous impact on growth, export, and employment. Globally, if the digital sector expands such that its size is 20% higher than the baseline by 2025, global GDP will increase by about \$4.3 trillion per year (5.4% of the baseline 2020 GDP), or by \$21.4 trillion in 5 years. More than 40% of this increase in global output will be accounted for by Asia, where output will increase

Box 8.1: Simulating the Benefits of Digital Sector Expansion

For this exercise, a recursive–dynamic GDyn model developed by Ianchovichina and Walmsley (2012) was employed. This dynamic computable general equilibrium model combines aspects of capital accumulation, financial assets and associated income flows, and investment theory. The model also takes a disequilibrium approach to modeling capital mobility, allowing short- and medium-term variances in the rates of return across regions (implying imperfect capital mobility). In the long term, these different rates can be eliminated to achieve perfect capital mobility across regions. Financial assets (equity for physical capital) are treated in this model only to represent international capital mobility with no leaks in foreign accounts, rather than to show the real finance sector. Adaptive expectations in investment are assumed, and as the expected rates of return fall over time, the expected and actual net rates of return within and across regions converge in the long term.

The simulation draws from Global Trade Analysis Project (GTAP) 10A database with a reference year of 2014 (Carrico, Corong, and van der Mensbrugghe 2020), which are updated to 2019 using World Bank macro data sets and the Asian Development Bank (ADB) Multi-Region Input–Output (MRIO) database. The results from the long containment scenario of a previous ADB study on global economic impact of the coronavirus disease (COVID-19) were employed to capture this as part of the 2020 baseline. Moreover, many of the parameters used in the simulation are based on Golub and McDougall (2006).

Source: Narayanan and Villafuerte (2020).

Beyond 2020, the baseline is developed for macro variables, particularly gross domestic product (GDP) and population. This is based on projections by organizations such as the Organisation for Economic Co-operation and Development (OECD), the World Bank, the International Monetary Fund (IMF), and the United Nations (UN), which are further revised and collated in the Shared Socioeconomic Pathways data set by the International Institute for Applied Systems Analysis (Riahi et al. 2017). The exact details of the methods employed are documented in Moss et al. (2010); Arnell, van Vuuren, and Isaac (2011); van Vuuren et al. (2012); and Kriegler et al. (2012). In general, GDP projections come from IMF, the UN, and the World Bank, while the population and labor force growth projections come from the UN and the International Labour Organization. From a multitude of scenarios in the Shared Socioeconomic Pathways data set, capturing different levels of interactions between sustainability and growth, a balanced projection was chosen for this exercise. It represents the middle path based on OECD methodology.

After the baseline is developed, the policy simulation is defined, which is primarily the expansion of the digital sector in all countries by 20% from the baseline by 2025. In addition, it is assumed that the total factor productivity grows by 1% per year in all sectors, due to the use of digital platforms across all parts of the economy. Before doing this, the communication sector in GTAP is split into the digital platform sector and other communication sector, using several global and national datasets and literature.

by more than \$1.7 trillion annually (6.1% of its 2020 baseline GDP), or more than \$8.6 trillion over the 5 years (Table 8.8).

Broadly, the increase in GDP comes from the expansion of the digital sector and the corresponding improvement in productivity. Roughly about a third of the GDP increase accrues from the increased size of the digital sector while productivity enhancement accounts for the rest.

Similarly, global trade is projected to add close to \$2.4 trillion per year to the baseline levels from 2021 to 2025 (5.5% of the baseline total trade in 2020) (Figure 8.8a). This translates to over \$11.8 trillion in additional trade value in the 5-year period to 2025. About 43% of the increase in trade will be recorded in Asia, whose cross-border transactions are estimated to increase by

more than \$1 trillion annually (6.8% of their regional trade in 2020). With this, the region's total 5-year trade gains are set to breach \$5 trillion.

Global employment will also rise by almost 140 million jobs every year (5.0% of the baseline global employment in 2020) (Figure 8.8b). With this rate of expansion, the cumulative job generation will reach roughly 698 million by the end of 2025. Employment in Asia is projected to increase by more than 65 million annually from the baseline levels (3.9% of the 2020 baseline employment). The increases sum to over 327 million jobs over 5 years.

The estimated impact of this digital expansion is not the same across all subregions. The most notable winner is the Pacific, where the increased size of the digital sector

Table 8.8: GDP Impact from Greater Usage of Digital Inputs, 2021–2025

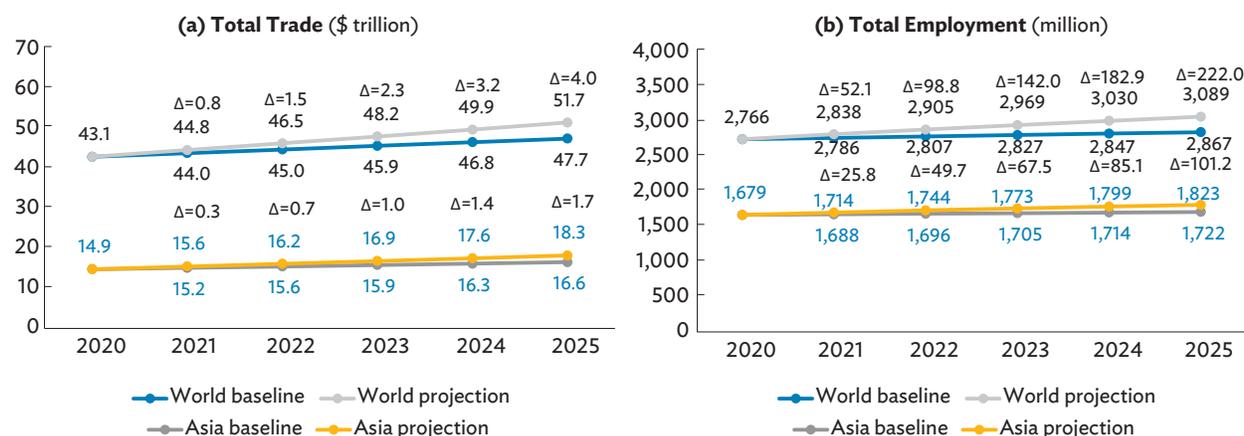
Economy	Gains from Same Year Baselines (\$ billion)						
	2021	2022	2023	2024	2025	Total	Average
World	1,532.6	2,950.4	4,311.0	5,646.0	6,974.4	21,414.4	4,282.9
Asia	606.5	1,180.2	1,738.0	2,287.6	2,832.9	8,645.0	1,729.0
Australia and New Zealand	35.1	62.9	86.7	108.1	127.9	420.7	84.1
Central Asia	13.0	27.8	44.3	62.6	82.5	230.3	46.1
East Asia ex-PRC and Japan	50.5	95.4	137.0	176.5	214.7	674.0	134.8
PRC	183.2	338.8	470.6	580.2	667.9	2,240.7	448.1
Japan	137.1	268.8	398.9	529.5	662.1	1,996.4	399.3
Southeast Asia	88.9	181.8	280.2	385.1	496.9	1,432.9	286.6
South Asia	91.4	192.9	304.8	427.1	559.4	1,575.6	315.1
Pacific	7.2	11.8	15.4	18.6	21.5	74.4	14.9
G2	565.5	1,048.3	1,479.1	1,875.7	2,249.4	7,217.9	1,443.6
United States	232.1	422.5	586.1	730.8	862.0	2,833.5	566.7
EU-28	333.4	625.8	893.0	1,144.8	1,387.4	4,384.4	876.9
Rest of the World	360.6	721.9	1,094.0	1,482.7	1,892.2	5,551.4	1,110.3

Economy	Gains as Proportion of 2020 Baseline GDP (%)						
	2021	2022	2023	2024	2025	Total	Average
World	1.9	3.7	5.5	7.2	8.8	27.1	5.4
Asia	2.1	4.1	6.1	8.0	9.9	30.3	6.1
Australia and New Zealand	2.5	4.4	6.1	7.6	8.9	29.4	5.9
Central Asia	3.2	6.9	11.1	15.7	20.6	57.6	11.5
East Asia ex-PRC and Japan	2.2	4.2	6.0	7.7	9.4	29.4	5.9
PRC	1.5	2.9	4.0	4.9	5.6	18.9	3.8
Japan	2.7	5.3	7.9	10.5	13.1	39.5	7.9
Southeast Asia	2.6	5.4	8.3	11.3	14.6	42.2	8.4
South Asia	2.2	4.7	7.5	10.5	13.8	38.7	7.7
Pacific	13.0	21.2	27.8	33.5	38.7	134.2	26.8
G2	1.7	3.2	4.5	5.7	6.8	21.9	4.4
United States	1.4	2.5	3.5	4.3	5.1	16.7	3.3
EU-28	2.1	3.9	5.6	7.1	8.6	27.3	5.5
Rest of the World	2.1	4.2	6.3	8.5	10.9	31.9	6.4

EU = European Union, GDP = gross domestic product, PRC = People's Republic of China.

Notes: The calculations are based on the Global Trade Analysis Project database. The Pacific subregion includes economies that are not ADB members. This is due to the aggregation of the Pacific subregion in project data.

Source: Narayanan and Villafuerte (2020).

Figure 8.8: Total Trade and Employment Impact from Greater Usage of Digital Inputs


Notes: The calculations are based on the Global Trade Analysis Project (GTAP) database. Asia refers to Asia and the Pacific and, in this case, it includes economies that are not ADB members due to the aggregation of the Pacific subregion in GTAP. The numbers do not necessarily sum up because of rounding. The detailed tables are in Annex 8c.

Source: Narayanan and Villafuerte (2020).

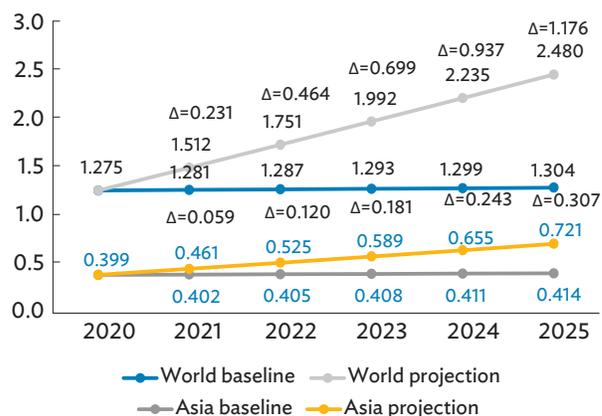
will contribute to an average annual gain of 26.8% in GDP, 15.6% in trade, and 26.1% in employment from 2021 to 2025, compared with the respective 2020 baseline levels. Next is Central Asia, whose annual gains run to an average of 11.5% in GDP, 7.7% in trade, and 7.1% in employment relative to the 2020 baseline levels during the same period. Southeast Asia follows with average annual gains of 8.4% in GDP, 8.0% in trade, and 6.2% in employment relative to the 2020 baselines, also for the same period. The stronger output, trade, and employment responses in these subregions reflect the important role that digital connectivity plays in handling geographic challenges. It also shows the stronger productivity boost and larger return on investment in the digital sector for economies with nil or nascent digital presence. Another reason behind the stronger impact is the increased importance of digital-enabled trade in services as well as the heightened role of services in the internal and external flow of goods.

Key Policy Support to Realize Potential Gains

To realize potential gains from the digital economy, however, critical policy support and reforms are needed on multiple fronts. First, investments in the digital sector will have to increase dramatically to carry out this projected expansion in the digital sector output. Globally, investment in the digital sector in the next 5 years to 2025 needs to increase by an average of \$701 billion annually or by \$3.5 trillion in total over the 5-year period (Figure 8.9). For Asia, additional investment equivalent to around \$182 billion yearly or \$910 billion will be needed over the 5-year span. These additional investments are needed to deliver affordable mobile and broadband services and expand internet access and coverage.

Another key reform area is to improve trade and logistics processes and infrastructure to address existing barriers to the delivery of goods. Presently, the gap in the Logistics Performance Index between the best and worst-connected countries remains wide. Enhancing the application of digital technology to automate customs clearance and border procedures is important along with broadening the access to a safe and secure digital financial services and payment systems and options. Investing in training for digital skills and literacy by providing access to ICT devices and online teaching platforms is critical.

Figure 8.9: Investment Requirement, 2021–2025 (\$ trillion)



Notes: The calculations are based on the Global Trade Analysis Project (GTAP) database. Asia refers to Asia and the Pacific and, in this case, it includes economies that are non-ADB members due to the aggregation of the Pacific subregion in GTAP. Numbers may not sum precisely because of rounding. The detailed tables are in Annex 8c.

Source: Narayanan and Villafuerte (2020).

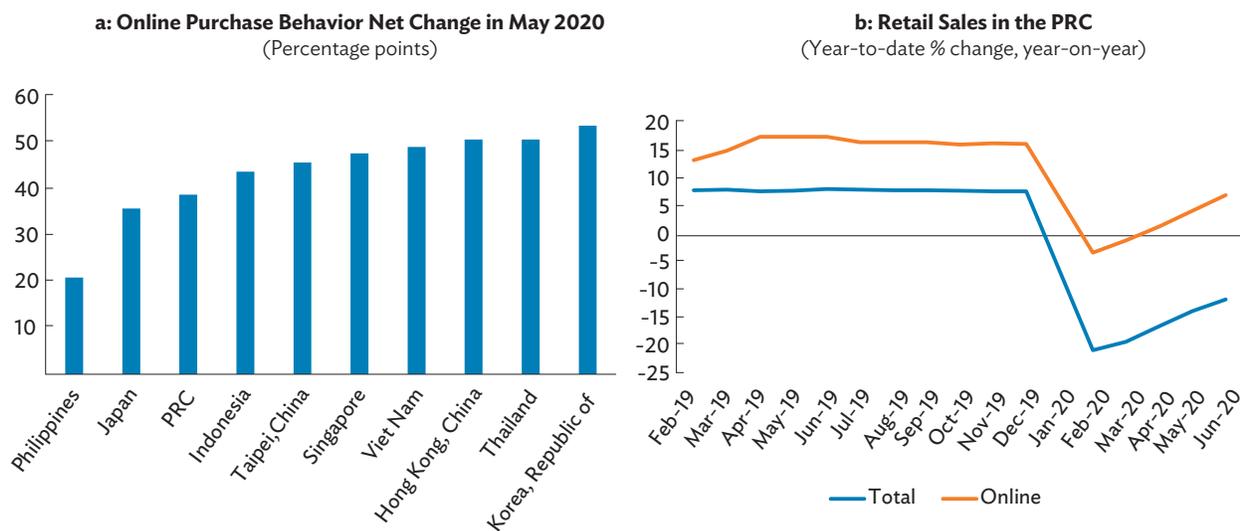
It is important to create a smart, robust, and transparent regulatory system to protect personal data, prevent illegal activities, and strengthen cybersecurity.

Usage of Digital Platforms during the COVID-19 Pandemic

The COVID-19 pandemic has accelerated the adoption and usage of digital technologies while also highlighting the need to bridge the digital divide and enhance cybersecurity. The shift is most evident in activities that used to rely on human-to-human contact such as entertainment, shopping, dining, social interaction, and work. With the pandemic, many companies and consumers have shifted their businesses and services from offline to online (Figure 8.10).

E-commerce has expanded. E-commerce platforms have emerged with the closure of enterprises, such as grocery stores, owing to regulations and general consumer aversion to close contact. In a survey by Rakuten Insight Surveys (Rakuten Insight 2020), more respondents indicated higher online purchases during the pandemic (Figure 8.10a). Online retail dipped in the PRC (Figure 8.10b) at the start of the pandemic in January 2020, but picked up by February when the quarantine restrictions were put in place.

Figure 8.10: COVID-19-Related Changes in Asian Consumer Behavior and Retail Sales in the PRC



COVID-19 = coronavirus disease, PRC = People's Republic of China.

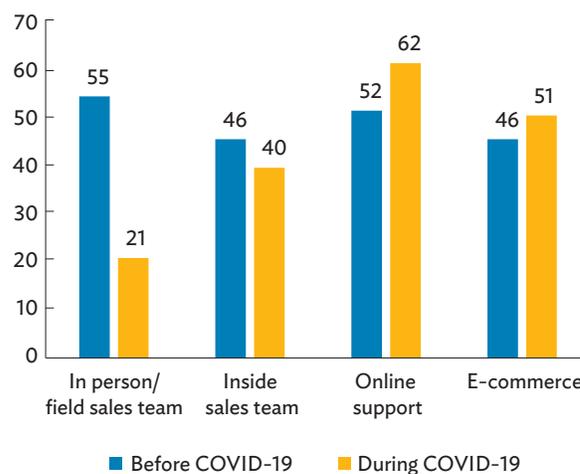
Note: The online purchase behavior net change data refer to the difference in the proportion of survey respondents that indicated they increased online purchases and those that say that online purchase has decreased.

Sources: ADB calculations using data from the Government of the People's Republic of China, National Bureau of Statistics. <https://data.stats.gov.cn/english/?cn=A01> (accessed July 2020); and Rakuten Insight (2020). In Statista—The Statistics Portal. <http://statista.com> (accessed August 2020).

Accordingly, those in the business-to-business (B2B) segment implemented a shift from in-person interactions to remote sales (Figure 8.11). The Indonesian government teamed up with e-commerce platform Lazada to assist in transitioning 2 million MSMEs to the digital economy in order to provide small firms alternative streams of income to cope with the ongoing stress (Government of Indonesia, Ministry of Cooperatives and Small and Medium Enterprises 2020). Indonesia has over 60 million MSMEs, but only 13% of these businesses have online presence.

Telecommuting has spread while digital health and education gained traction. The disruption in traditional work arrangements has increased the usage of platforms for telecommuting, videoconferencing, and instant messaging. For instance, Zoom, a videoconferencing platform, has posted extraordinary growth in usage during the pandemic, with daily meeting participants surpassing 300 million in April 2020, up from 10 million in December 2019 (Zoom 2020).

Figure 8.11: Adjustments of B2B Companies during COVID-19 (% of respondents)



B2B = business-to-business, COVID-19 = coronavirus disease.

Notes: The questions were “In what ways were your company’s product or service sold before COVID-19?” and “Now today, in what ways are your company’s product or service sold during COVID-19?” The survey period is from 20 to 28 April 2020.

Source: Ray et al. (2020) using McKinsey. 2020. McKinsey B2B Decision-Maker Pulse Survey No. 2. April.

The adoption of digital health services also accelerated in the region with governments and other agencies capitalizing on increased mobile phone penetration to improve their COVID-19 responses through increased health sector meetings, more efficient contact tracing apps (e.g., TracerTogether and Go.Data), and tele-consultations with medical professionals (e.g., PingAn Good Doctor and MyDoc).

On the education front, online (or at least blended) learning through platforms has become the common strategy to mitigate the impact of school closures on more than 1.5 billion affected learners globally based on estimates in late April 2020, which comprise over 90% of the world's student population (UNESCO 2020a, UNICEF 2020). Countries have partnered with telecommunications companies to increase bandwidth, with television and radio channels serving as alternatives to reach those without mobile phones and computers and with limited access to the internet. While promising, digital platform-enabled education poses problems for the vulnerable and disadvantaged communities, who have limited access to digital education modalities.

Patronage of recreation and digital payments services has risen markedly. The lockdown orders have driven digital media consumption as well. As reported by Media Partners Asia (2020), online video streaming weekly consumption in four Southeast Asian countries reached 58 billion minutes in the second quarter, compared with 36.4 billion minutes in first quarter of 2020. Netflix registered a 38.6% increase in paid subscribers in Asia from the end of 2019 based on the data obtained from the company's June 2020 quarterly report filed at the US Securities and Exchange Commission (Netflix 2020).

The establishment of digital payment platforms early on encouraged the transition from offline to online transactions, and their use will continue to rise. In the Philippines, the leading mobile wallet company GCash, reportedly saw a 700% year-on-year increase in transaction volume for the month of May (Globe Telecom, Inc. 2020) and its registered users doubled in number during the first half of 2020 (based on interview with Ron Testa, Vice President of Strategy, GCash in July 2020). The adoption of digital payments by the public sector has also been beneficial in delivering aid and related services in times of health crisis like COVID-19 as elaborated in the subsequent subsection on this topic.

Benefits and Opportunities from Digital Platforms

Sustainable Development Goal Agenda: Digital Platforms Can Help Leave No One Behind

Digital platforms can contribute to the achievement of the 2030 Agenda for Sustainable Development which builds on the principle of “leaving no one behind.” Inclusive credit and finance programs, agriculture extension initiatives, educational opportunities, health projects, and efforts to grow MSMEs are now enabled by digital platforms creating vast opportunities for the promotion of sustainable and inclusive growth within the region. Digital platforms can support development efforts by helping remove market frictions caused by insufficient information, weak institutions, and poor infrastructure (Koskinen, Bonina, and Eaton 2019). For instance, the convenience afforded by digital platforms in ease of use and speed of scaling up have allowed governments to extend the reach of economic support more quickly to the unbanked, the women and children, and the poor especially in the rural and geographically isolated and disadvantaged areas. By 2020, over a billion people will be served by platforms in Asia alone, suggesting, as elaborated in Box 8.2, that they can be powerful tools in the fight to end poverty and promote social inclusion (The Asia Foundation 2017).

While more local small businesses are able to participate in e-commerce, they need better digital infrastructure, marketing support, skilled labor, and protection from unfair competition from digital market giant platforms. Moreover, as more women are empowered to join the digital economy due to the flexibility it offers, there is a need to assure them social protection like health insurance and old-age pension, skills training, and security from unscrupulous contractual work terms. Likewise, as more young people are engaged in short-term, intermittent, or nonstandard work arrangements, job and income security become pressing concerns, including the erosion of social insurance contribution base that may weaken existing social protection schemes, endangering future entitlements,

Box 8.2: How Platforms Help Achieve Sustainable Development Goals

Platforms can help local entrepreneurs launch their ideas on the global stage. Online platforms give small and medium-sized enterprises global reach, enabling access to customers at a fraction of the cost, effort, and difficulties of traditional sales and marketing channels. As a result, platforms help small businesses become global faster; diversifying sales to a broader customer base.

Platforms can help where the state may face a range of obstacles. Online platforms have the potential to quickly fill the gap and provide services and solutions when state mechanisms are unavailable. For example:

- In unserved rural areas, conduct online consults with professional physicians.
- Giving unbanked populations the ability to open a payments account and store value securely through a mobile payments bank.
- Where there is a lack of local educational institutions, a mobile device can be used to access the curriculum, coursework, and lectures from other sources.

Source: The Asia Foundation (2017).

Platforms can help overcome the “last mile” challenge.

Underserved communities in the developing world are typically isolated geographically, are unbanked, or lack access to information. These “last mile” challenges reduce the impact of even the smartest, most well-funded development initiatives. Using online platforms, new mechanisms for delivering products and services to vulnerable communities at a low cost and at scale can be made available.

Platforms can help development assistance go further. Platforms can augment traditional development initiatives with new capabilities that offset shrinking aid allocations through the use of technologies. For example, cloud computing has made it much easier and cheaper for platform business to quickly expand capacity and meet demand for services. This helps keep operating costs low relative to their capacity to reach customers.

and increasing public finance strain because of social assistance especially during times of crises. Developing economies in Asia must harness resources to provide requisite digital infrastructure, responsive education and health systems, to prepare their populations to participate in and reap the benefits from the expansion of the digital market in the region. Regional cooperation should be pursued to tackle cross-border issues related to trade, e-commerce, labor regulations, and data use and privacy.

Digital Payments Enabling Financial Inclusion

State of Play

In 2019, digital payments accounted for 77% of the global fintech transaction value. This number is even higher in Asia at 86%. Up to 92% of the fintech users in

Asia are in digital payments (Statista 2020a). Fintech presents a unique opportunity to leapfrog for emerging economies, where traditional financial systems are rather underdeveloped.

Digital payment systems emerged with debit cards, credit cards and electronic fund transfers, and mobile wallets and e-money, among other mechanisms. Since higher volumes of payments of smaller value can now be implemented electronically, recordkeeping is facilitated and reliance on cash for smaller payments is reduced, increasing transparency and lowering transaction and carrying costs.

The rise of mobile money and fintech payment systems, in general, fosters financial inclusion of previously unbanked or underbanked individuals. For example, in Association of Southeast Asian Nations (ASEAN) economies, 41% of the users of fintech payments in 2018 are unbanked or underbanked. Unlike debit or

credit cards which typically require access to a financial account, e-money only necessitates a regular mobile phone and a SIM card in some cases—even without internet connections or a smartphone (Nachappa and Lathesh 2018). Moreover, fintech payments can create virtuous cycles with activities such as e-commerce, other fintech usage, and MSMEs.

Digital Payment Adoption and Use

The relative importance of card and e-money payments is significant and rising in emerging economies. Card and e-money are the dominant and rising cashless payment instruments in both emerging and developed economies, taking up around 70% and 60% of the total cashless payment volume based on data from 2014 to 2018 (Figure 8.12).

Global mobile money transactions have increased substantially in volume and value in recent years.

The rise in mobile money service that is not linked to a formal financial institution account is particularly evident in sub-Saharan Africa and South Asia as well as in East Asia and the Pacific (Figure 8.13). Disaggregation by use shows that airtime top-up comprised most of the activity in both East Asia and the Pacific, followed by

peer-to-peer transfers and cash-in/cash-out services. Mobile money is also revealed to be useful in facilitating remittances and bills payment. Indeed, the increasing provision of financial services to the population segments excluded by the traditional channels is vital in significantly advancing the agenda of financial inclusion in the coming years.

Public sector use of mobile payment has increased rapidly, especially in the distribution of cash assistance via digital systems during the COVID-19 pandemic. Prominent examples include the distribution of consumption coupons via Alipay and WeChat Pay in the PRC (Agur, Martinez Peria, and Rochon 2020), the PromptPay system in Thailand (Rutkowski et al. 2020), the “JAM (Jan Dhan–Aadhaar–Mobile) Trinity” system in India and “Bono COVID-19” in Chile (Prady 2020).

Digital G2P (government-to-person)/G2B (government-to-business) payments have the advantage of being more transparent, more timely, less costly, better at identifying intended beneficiaries through digital ID, and more accurate in targeting the most deserving recipients, particularly those who are unbanked or in the informal sector (Agur, Martinez Peria, and Rochon 2020; Una et al. 2020). The potential cost reduction in digital G2P transfer can be huge.

Figure 8.12: Relative Importance by Noncash Payment Instrument (average share in total cashless payments volume, %)

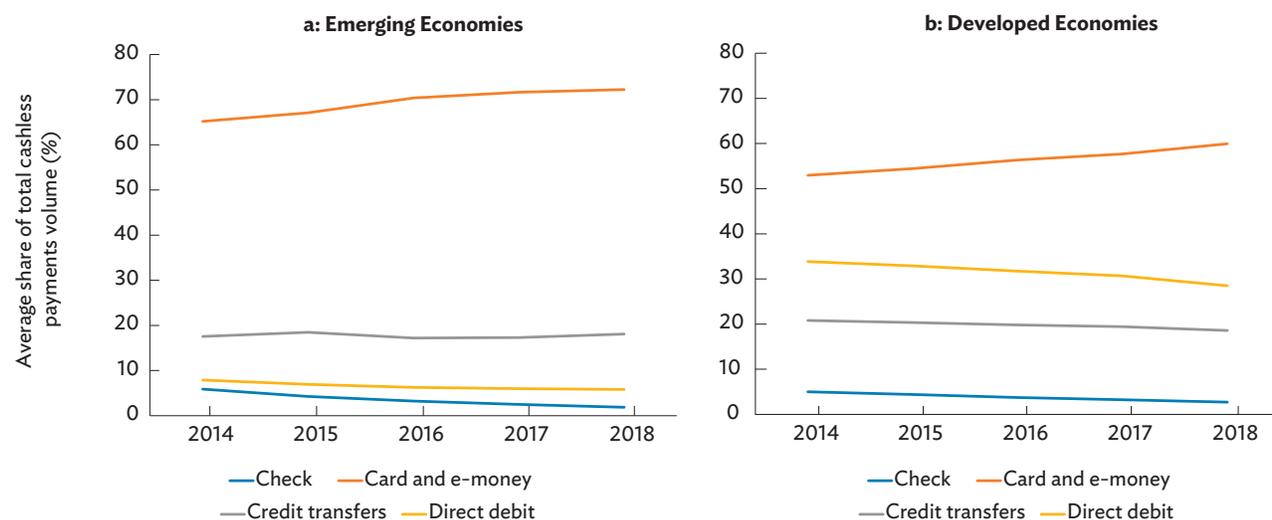
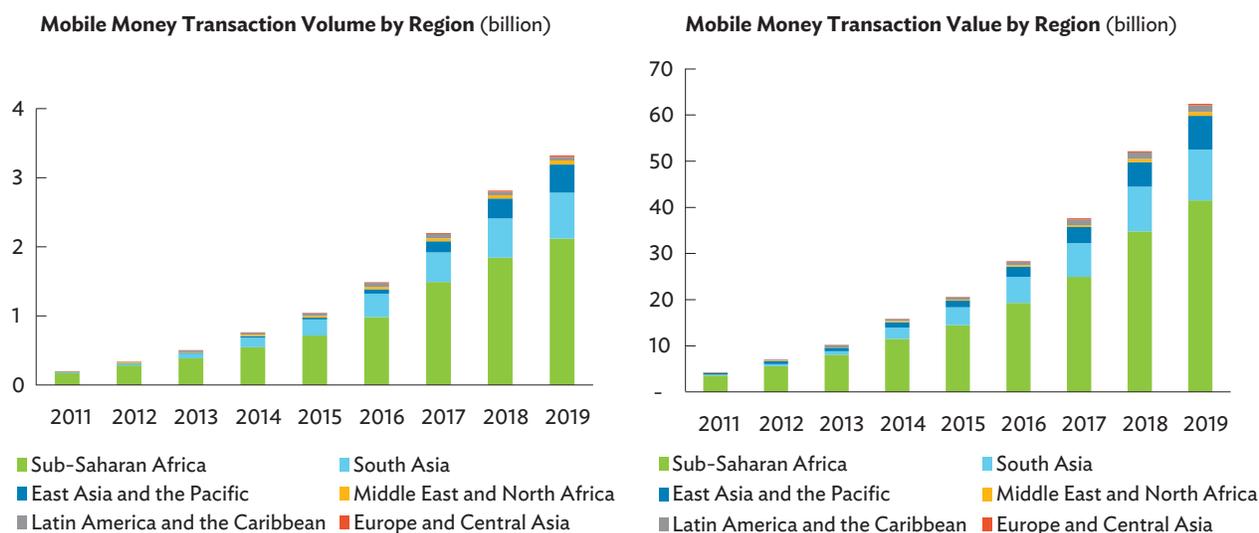


Figure 8.13: Trends in Mobile Money Transaction Volume and Value


Notes: The Global System for Mobile Communications Association (GSMA) database only considers mobile money services that are “available to the unbanked, e.g., people who do not have access to a formal account at a financial institution.” Therefore, fintech payment systems that need to be linked to a financial account or credit card (e.g., Alipay, Wechat Pay, Apple Pay, Google Pay) do not qualify as mobile money. The regional groups are defined by GSMA.

Source: GSMA Mobile Money Metrics Database. <https://www.gsma.com/mobilemoneymetrics/#global?y=2019?v=overview?g=global> (accessed June 2020).

For instance, during the Ebola crisis, Sierra Leone’s shift to mobile wallets to distribute payments to frontline workers is estimated to have resulted in savings of more than \$10 million (Bangura 2016).

Impact of FinTech Payments on E-commerce

Separately, a number of studies have posited that digital payment solutions tend to significantly bolster consumer spending—even for offline businesses. The introduction of the quick response (QR) code mobile wallet payment system in Singapore positively impacted sales of offline enterprises (Agarwal et al. 2019) due to its convenience of use.⁸² In India (Agarwal et al. 2020), digital payment options spurred consumer “overspending” when demonetization

happened in November 2016.⁸³ Xu, Ghose, and Xiao (2019) observed the same phenomenon in the PRC, where the adoption of the Alipay payment facility was associated with a significant increase in transaction frequency and value.⁸⁴

These key observations reinforce findings of studies on the consumption effect of innovation in payment options (Soman 2001). Two policy issues arise from these findings. First, as pointed out by Agarwal et al. (2020), policy makers should consider the way digital tools shape consumer saving and spending behavior as economies pursue the agenda of going cashless in the coming years.⁸⁵ Second, the results emphasize the importance of access to reliable digital payment solutions in facilitating enterprise growth, even those in traditional brick-and-mortar setup.

⁸² The database has information on consumers’ location, amount, time, and manner of spending as well as the nature of the receiving merchant. The analysis also focused on the sales of offline businesses that are charged on credit and debit cards of the consumers. Difference-in-difference estimation was employed to quantify the impact of the shock. It was also shown that the use of mobile payment in the country has surpassed ATMs in both amount and count of transactions before the end of 2017 despite the stable trend of the latter.

⁸³ Difference-in-difference estimation was employed to quantify the impact of the shock.

⁸⁴ The study also employed difference-in-difference estimation to quantify the impact of the shock.

⁸⁵ Agarwal et al. (2020) noted that producing cash entails costs related to manufacturing, safeguarding, collecting, and circulating the instruments as well as costs to contain illegal activity and tax evasion.

Huang (2020) has likewise established the beneficial impact of fintech payments on e-commerce activity (Box 8.3). The results are an affirmation of the importance of reliable digital infrastructure, especially in financial intermediation, in order to foster growth in the platform economy.

FinTech Solutions for Remittances, Taxation, and the Informal Economy

Apart from e-commerce, remittance transfer is another service that benefits from the developments in payment mechanisms. Domestic remittance by mobile phone

Box 8.3: Exploring the Link between FinTech and E-commerce

The key results of Huang (2020) validate the strength of association between e-commerce and fintech payments. The study capitalized on the Alipay data in the PKU Digital Financial Inclusion Index of the People's Republic of China (PKU-DFIIC) data set covering 31 provinces from 2011 to 2018 (Institute of Digital Finance-Peking University 2019). Alipay, which was launched in 2004, is currently the dominant player in the payments space in the People's Republic of China. It has over 1.2 billion users (Klein 2020) and has a market share of about 55.4% in the first quarter of 2020 according to iResearch (2020).

Following the box table, the results of the empirical exercise show that a 1% increase in the payment index

in the previous period is associated with at least 0.67% increase in e-commerce sales. The payment index is a composite of three elements—the number of payments per capita, amount of payments per capita, and proportion of the number of high frequency active users (that is defined as 50 times or more each year) to number of users with at least one frequency each year. Moreover, the estimates are derived after controlling for income, urbanization, age segmentation, and broadband users as well as for time and location fixed effects. As can be gleaned from the results, income and urbanization (i.e., a lower share of rural population), and broadband subscription are also significantly positively associated with e-commerce development.

FinTech Payment and E-commerce: Case of the PRC

Dependent Variable: Log of E-commerce Sales	(1)	(2)	(3)
Log of payment index	1.756*** (0.300)	0.316** (0.141)	0.900* (0.522)
Log of GDP per capita	0.350 (0.265)	0.336 (0.251)	0.560** (0.279)
Share of rural population	-2.489*** (0.746)	-3.464*** (0.695)	-2.901*** (0.798)
Share of population aged 65+	0.883 (2.396)	-2.511 (2.885)	-2.404 (3.297)
Log of broadband subscribers	0.799*** (0.0558)	0.738*** (0.0647)	0.781*** (0.0749)
Constant	-5.189 (3.055)	3.598 (2.658)	-2.393 (3.580)
Time fixed effects	Yes	No	No
Region fixed effects	No	Yes	No
Region-time fixed effects	No	No	Yes
Observations	186	186	186
R-squared	0.848	0.878	0.893

GDP = gross domestic product, PRC = People's Republic of China.

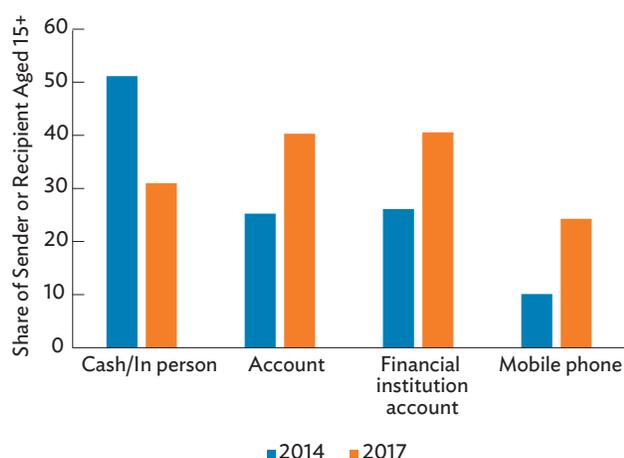
Notes: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Source: Huang (2020).

Source: Huang (2020).

has risen considerably between 2014 and 2017 (Figure 8.14). In contrast, cash/in-person transfers dropped from a cross-country average of 50% in 2014 to 30% in 2017. The convenience brought by digital transfers of income increases the welfare of migrant workers and their families. This is particularly crucial in developing countries with a considerable number of nationals working overseas, and in increasing opportunities in rural areas.

Figure 8.14: Payment Methods for Domestic Remittances Transfers (%)



Notes: The data refer to the proportion of population aged 15+ who have sent or received domestic remittances by type of modality. The total number of countries with data is 110 in 2014 and 109 in 2017.

Source: Huang (2020) using World Bank, Global Findex Database. <https://globalfindex.worldbank.org/> (accessed July 2020).

Furthermore, fintech payments can play a role in curbing tax avoidance and in reducing informality. Digital payment promotes electronic recordkeeping, which reduces tax evasion, fraud, and money laundering. Digital payment also helps with tax collection and refunds, which incentivizes tax filing. Digital payment reaches the recipient directly, which can curb unauthorized deductions in the distribution of wages or government transfers. More importantly, mobile money services have the capacity to serve the unbanked. The absence of associated fees for merchants, as noted by Klein (2020), likewise encourages smaller merchants to accept fintech payments in place of cash. However, safeguards must be established to prevent potential money laundering and tax avoidance due to underreporting and noncapture of fintech transactions.

Challenges and Risks

As payment systems embrace new digital technologies to deliver more efficient and socially beneficial solutions, there are also risks and challenges that need to be addressed.

The divide in access to digital payments is a crucial policy challenge.

With fintech payments, carrying and transaction costs fall, and real-time settlement raises efficiency, particularly for liquidity-constrained firms and households. While these benefits extend to many unbanked individuals, the less tech-savvy and those who lack access to the relevant device or digital infrastructure may be excluded from taking advantage of the efficiency and convenience brought by fintech payments. Lack of financial literacy may also put consumers and businesses at risk due to the unfamiliarity to new fintech payment systems. Since most of these groups are also more socially deprived, this “payment divide” can exacerbate existing social disparities.

Transparency is equally essential. Digitalized payment options can help enhance electronic recordkeeping, contributing to efficient tax collection, reduction of the informal economy, as well as the detection of illegal activities such as fraud, money laundering, and corruption if properly designed. With the advent of blockchain technologies, the irrevocability of electronic records can be further strengthened.

The use of digitalized payment options generates huge amount of data which can be analyzed to predict customer behaviors to enhance business growth. Governments can leverage these data to better identify cash assistance beneficiaries and assist in crime detection. Unbanked individuals can have access to credits as their transaction and credit histories are now verifiable. However, unrestricted use of personal data could imperil consumer privacy and rights.

Security is key to building trust. Electronic recordkeeping protects consumers and fosters trust. While advanced technology for privacy and security in digital payment options provides additional layers of safety, they face other vulnerabilities such as network

disruptions. A diversified set of payment methods promotes resilience as they can back up each other in case of temporary disruption. New forms of illegal activities may arise as the digital economy pervades—criminals can steal devices, identity, information, and assets in e-wallets. Although greater transparency improves the detection of fraud, money laundering, and corruption, cross-border transactions may also open the way for cross-border crimes and money laundering.

Network effects can dampen competition. Digital payment platforms can leverage their customer data, broad user base, multipurpose nature (BIS 2020), and associated networks to encourage the adoption of other fintech services such as e-saving, credit payment, credit scoring, peer-to-peer lending, and wealth management, thereby expanding their businesses. These unique characteristics could create excessive market power for digital platform companies.

Policy Recommendations

Policies can be broadly categorized to fulfill the following goals: (i) close existing loopholes of the regulatory system to reflect key changes of digitalization; (ii) expand access, particularly to the more socially disadvantaged groups; and (iii) promote regional cooperation. Governments and central banks are also encouraged to utilize digital technology in their own business practices.

Digital payments and the rise of the digital economy introduce unprecedented types of risks, including but not limited to data privacy breach, violation of consumer rights, cybersecurity, identity theft, and anticompetitive practices. Regulatory systems should keep up with developments in the fintech industry and bridge the existing gaps.

Encourage interoperability among platforms.

Since technology can be widely applicable, many fintech payment providers mix a variety of services such as e-saving, wealth management, peer-to-peer lending, online shopping, ride hailing, social networks and food delivery. These “super apps” greatly increase

convenience, but without regulation they may induce excessive market power and eventually harm consumer welfare and innovation. Encouraging interoperability among platforms is a way to reduce switching costs and maintain sufficient competition.

Provide relevant devices and connectivity, promote digital ID/digital KYC (Know-Your-Customers) mechanisms, and foster technological/financial literacy, especially to the more socially disadvantaged groups. To mitigate the “payment divide,” governments should address obstacles to participation and provide relevant devices and connectivity to those who cannot afford/reside remotely; promote digital ID/digital KYC mechanisms to expand access, particularly those without an official ID; and improve technological and financial literacy through education programs for those who lack knowledge, especially for the elderly and the less literate. However, the more traditional payment options, especially cash and mobile money cash-in/cash-out services, should continue to be made available to serve those who cannot yet cross the “payment divide.”

Promote regional cooperation to standardize industry practices, address cross-border cybercrimes, and integrate payment systems.

Digital payment platforms and fintech payment options can enable cross-border transactions through lower transaction costs, faster settlement, and greater convenience. Governments should collaborate at the regional level and promote payment systems integration as this can also help in dealing with cross-border cybercrimes. Standardization of industry practices is a crucial first step in payment systems integration. In February 2020, the G20 recognized the importance of enhancing cross-border payments and planned a three-stage process to address this pressing need.

Introduce digital G2P/G2B/P2G/B2G payments and central bank digital currencies to promote the use of digital tools and fintech innovations in their own business models. The digitalization of government-related payments improves resilience and financial inclusion, especially in crisis times. Agur, Martinez Peria, and Rochon (2020) point out that central bank

digital currencies can be used to track transactions and consumption behaviors to achieve a more efficient distribution of emergency funds. They can also fill the lack of scrutiny in cryptocurrencies and excessive market power of Big Tech (Sender 2020). Moreover, as a form of public digital currency, it is far easier to coordinate cross-border payments using central bank digital currencies than private platforms. Nevertheless, the risk of disintermediation, extended role of the central bank in the financial system, changing implications for monetary policies, counterfeiting, accessibility of the less tech-savvy individuals should all be taken into consideration.

Expanding Cross-Border Trade through E-commerce

State of Play

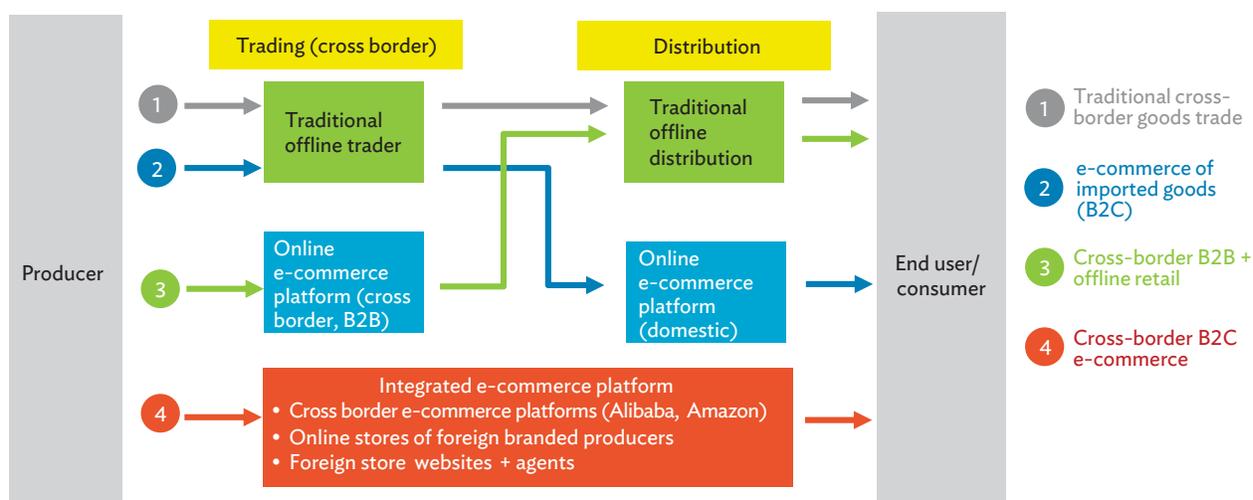
E-commerce continues to expand globally, modifying business models and amplifying the service industries. Enterprise participation in digital platforms is arguably underpinned by the positive externalities through network effects (Kinda 2019). Global e-commerce sales to businesses and consumers are estimated to have

breached \$25 trillion in 2018, or about 30% of GDP of the countries included in the assessment (UNCTAD 2020a). The B2B segment accounts for about 83% of the sales, according to the report, and the rest by B2C sales.⁸⁶

The deepening penetration of e-commerce is particularly important in Asia and the Pacific. The data of UNCTAD show that Japan, the PRC, and the Republic of Korea land in the top five economies by total e-commerce sales, led by the United States. The presence of Asian economies is strong in both B2B and B2C segments. In a separate report, Asia and the Pacific was estimated to account for the largest share—about 44%—in the global B2C e-commerce turnover in 2019 (Ecommerce Foundation 2019).

The role of digital platforms in e-commerce, particularly in moving goods across national borders cannot be overlooked. E-commerce transforms trade in at least three ways: (i) making the flow of information and products across borders more cost-efficient, (ii) faster flow of funds through e-payment systems with built-in validation mechanisms, and (iii) increasing the traffic of parcelized cross-border shipments (Figure 8.15).

Figure 8.15: E-commerce and Cross-Border Trade Linkages



B2B = business-to-business, B2C = business-to-customer, C2C = customer-to-customer.

Source: Ali Research and Accenture (2016).

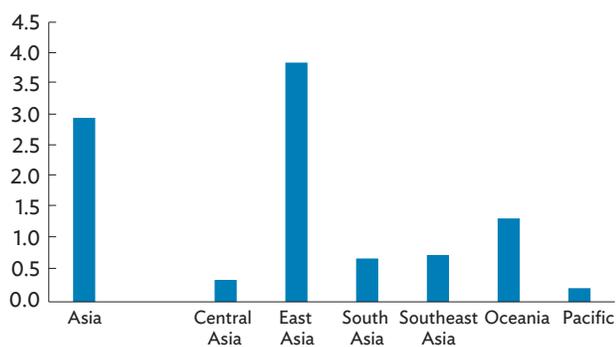
⁸⁶ There is no mention of the business-to-government segment in UNCTAD (2020a).

E-commerce Trends and Patterns

Growth in internet retailing has been robust across Asian economies. Growth has accelerated in recent years in a number of Asian countries. Notably, the share of foreign retailing sales has grown at a faster pace across geographic clusters in the past few years. Compounded annualized growth is highest in Pakistan, while the share of foreign internet retailing in Uzbekistan tops the region. The range of internet retailing sales-to-GDP ratios in 2018 remains wide, i.e., between 20% and less than 0.02%.

Digital e-commerce platforms are important as conduits of digital retailing, and internet retailing is positively influencing cross-border consumer goods trade. The total e-commerce platform revenue in Asia is about 3% of GDP in 2017 and 2018 (Figure 8.16), with East Asia showing the highest ratio at close to 4%. The ratios are highly dispersed across countries, i.e., between 5% and less than 0.04% in Turkmenistan. Empirical estimation further shows that the progress in e-commerce is significantly positively associated with consumer goods trade between trading economies—a relationship that appears to strengthen in recent years (Box 8.4).

Figure 8.16: E-commerce Platform Revenues, 2017–2018
(% of GDP)



GDP = gross domestic product.

Note: Asia includes Armenia; Australia; Azerbaijan; Bhutan; Brunei Darussalam; Cambodia; Fiji; Georgia; Hong Kong, China; India; Indonesia; Japan; Kazakhstan; the Kyrgyz Republic; the Lao People's Democratic Republic; Malaysia; Mongolia; Myanmar; Nepal; New Zealand; Pakistan; Papua New Guinea; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Sri Lanka; Tajikistan; Thailand; Timor-Leste; Turkmenistan; Uzbekistan; and Viet Nam.

Sources: ADB calculations using data from Statista (2020a, 2020b) and World Bank. World Development Indicators. <https://databank.worldbank.org/source/worlddevelopment-indicators> (accessed July 2020).

Policy Implications and Recommendations

The Asian Development Bank (ADB) and United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2018) have highlighted a number of crucial policy issues, such as digitalization and e-commerce-induced trade, which need to be studied to help economies foster e-commerce. The report emphasized the need to roll out official statistics for monitoring and analysis, harmonize pertinent laws and standards including income taxation, improve quality and access to ICT infrastructure including e-payments systems, attract foreign players looking to benefit from technology transfer, and promote development of locals' ICT skills. It also pointed to needs to enact requisite regulations on intellectual property, consumer protection, data protection, and cybersecurity, among others.

Cross-border e-commerce transactions highlight three important policy areas: (i) trade taxation, competition, and customs administration issues; (ii) the role of multilateral initiatives and trade agreements in ironing out policy disconnects; and (iii) the responsiveness of free trade zone (FTZ) or economic processing zone (EPZ) strategies given the increasing role of platforms and other digital media in trade.

Addressing trade taxation, competitiveness, and customs administration issues is a fundamental concern for many economies in the region.

Parcelization of orders has allowed overseas e-commerce suppliers to benefit from customs duties exemptions subject to countries' de minimis rules. The principle of de minimis is to avoid spending more on tax collection than what can be collected. In a meeting of the Asia-Pacific Economic Cooperation (APEC) in 2011, a de minimis threshold of \$100 was endorsed but has not gained much traction. After the World Trade Organization (WTO) formally adopted its Work Programme on Electronic Commerce in 1998, members have extended a moratorium on imposing customs duties on electronic transmissions, and discussions on further extensions have intensified as some WTO members are concerned about its implications for government revenue (WTO 1998a, 1998b).

Box 8.4: E-commerce and Bilateral Consumer Goods Trade

Poisson pseudo maximum likelihood estimations of gravity-model equations reveal that combined internet retailing activity of trading economies is positively and significantly associated with their bilateral consumer goods trade (box table, column 1). Subsample inspection (2012–2016) suggests that the influence of internet retailing e-commerce sales on cross-border trade of consumer goods has risen in recent years (box table, column 2), i.e., the parameter value rises from 0.148 to 0.165. These estimates are aligned with the results using Heckman, gamma Poisson maximum likelihood and ordinary least squares.

Estimation using the bilateral e-commerce platform revenues yields the same story (box table, column 3). This finding holds across subregions in Asia, though the sensitivity of consumer goods trade to e-commerce

platforms is marginally higher in East Asia and Southeast Asia. Estimates using regional subsets show that trade with regional partners is more sensitive to e-commerce platform development than trade with partners outside Asia (box table, column 4). This is indicative of the maturity of intraregional e-commerce ties relative to outside the region. It is seemingly not the case in Europe, Africa, and the Americas.

The exercise made use of the internet retailing data compiled by Euromonitor International (Retailing Industry Edition 2019) from 2006 to 2018, which cover 19 economies in Asia. E-commerce platform revenues data, on the other hand, cover 150 economies, of which 34 are from the region, from 2017 to 2018.

Bilateral E-commerce Indicators and Consumer Goods Trade—Asia

Dependent Variable: Bilateral Consumer Goods Exports				
	(1)	(2)	(3)	(4)
Period:	2006–2018	2012–2018	2017–2018	2017–2018
Partner:	Asian economies	Asian economies	All economies	Asian economies
Distance	-0.659 *** (0.1046)	-0.632 *** (0.1169)	-0.737 *** (0.1084)	-0.639 *** (0.0849)
Common colonial ties	-0.042 (0.1879)	-0.011 (0.1935)	0.543 *** (0.1806)	0.369 ** (0.1786)
Common language	0.604 *** (0.1492)	0.594 *** (0.1541)	-0.073 (0.1353)	0.194 (0.1568)
Contiguity	0.508 *** (0.142)	0.466 *** (0.1545)	0.162 (0.1492)	0.381 *** (0.1395)
E-commerce ^a	0.148 ** (0.0575)	0.165 ** (0.0644)		
E-commerce platform			0.147 *** (0.0513)	0.224 *** (0.0669)
Constant	24.759	24.215	24.972	21.323
Fixed effects:				
Exporter-Year	Yes	Yes	Yes	Yes
Importer-Year	Yes	Yes	Yes	Yes
Cluster exporter-importer	Yes	Yes	Yes	Yes
Total Observations	1,977	1,239	6,453	1,552
Pseudo R-squared	0.9612	0.9586	0.954	0.9477

^a Refers to internet retailing.

Notes: The numbers in parentheses are the standard errors. *** p < 0.01, ** p < 0.05, * p < 0.10.

Source: Jacildo (2020) using data from Centre d'Etudes Prospectives et d'Informations Internationales (the French Research Center in International Economics) Geography Database. <http://www.cepii.fr/CEPII/en/cepii/cepii.asp> (accessed April 2020); Euromonitor International. Retailing Industry Edition 2019; and Statista (2020a, 2020b).

Table 8.9: Customs Administration Challenges Related to Cross-Border E-commerce

Trade Facilitation and Security	Fair and Efficient Collection of Duties and Taxes	Protection of Society–Criminal Exploitation of E-commerce
Ensuring speed and efficiency in the clearance process for an increasing volume of transactions	Identifying abuse or misuse of de minimis for illicit trade purposes (splitting of consignments and/or undervaluation)	Setting up a specialized unit to trawl the web for information which might be of use in preventing, detecting, investigating, and prosecuting a customs-related offense (drug trafficking/counterfeited and pirated goods/illicit financial flows/money laundering)
Managing change from a few large/bulk shipments into a large number of low-value and small shipments	Ensuring compliance with classification and origin rules	Enhancing international cooperation and ensuring that agreements on mutual legal assistance are in place to allow for investigations or prosecutions when websites are hosted outside a national territory
Managing risks posed by limited knowledge on importers and the e-commerce supply chain (new class of sellers and buyers/occasional shippers and buyers)	Integration of e-commerce versus traditional trade	Making the most of existing technologies, especially those related to data analysis
Ensuring data quality (accuracy and adequacy of the data received)		
Defining the role and responsibility (liability) of e-commerce operators to assist governments (e-vendors/ intermediaries)		

Source: World Customs Organization. <http://www.wcoomd.org/en/topics/facilitation/activities-and-programmes/ecommerce.aspx?p=1> (accessed August 2020).

Terzi (2011) noted that digital innovations, like the internet, open markets that were previously closed, which is construed as another form of trade liberalization. It is argued that keeping the de minimis thresholds lessens trade friction, facilitates trade flows, and generates substantial net economic benefits (Holloway and Rae 2012, International Chamber of Commerce 2015). On the other hand, the thresholds have become the regulatory gateway for the influx of relatively cheaper products that compete with domestic firms. In this sense, e-commerce also tends to magnify comparative advantages in international trade for certain goods. To this end, Indonesia lowered its threshold to \$3 from \$75 effective in January 2020 (Indonesia Ministry of Finance 2019) with the intent of creating a fair tax treatment and protect domestic small and medium-sized industries, amid clamor from local business associations.

In the absence of appropriate policies, economies unable to produce goods competitive in the e-commerce market may render local players largely confined to the distribution segment of the cross-border supply

chain. Thus, interventions should go beyond supporting local players and providing digital infrastructure. It is necessary for countries to have a clear road map on the kind of enterprises that they intend to nurture in the e-commerce space and the manner in which they will be supported.

The World Customs Organization (WCO) compartmentalized the cross-border e-commerce customs administration into three clusters: trade facilitation and security, fairness and efficiency in tax collection, and protection against criminal exploitation of e-commerce (Table 8.9). The first cluster covers policy adjustments to the cross-border trade landscape to promote an efficient trading process and to ensure that information is transmitted timely, and the data are credible. The second cluster is about spotting mechanisms that abuse the systems' rules on parcelized goods and ensuring compliance with other rules (e.g., rules of origin classification and valuation rules). The third cluster concerns the possible ways to prevent, detect, and prosecute customs-related legal offenses in the digital space.

It is crucial to leverage multilateral initiatives and trade agreements in promoting regulatory catch-up.

One area that can be addressed by these trade initiatives and agreements is the easing up of information exchange among all parties involved in e-commerce transactions. This mainly involves still underdeveloped linkages between customs offices (WCO 2017), as well as linkages between producers or sellers, postal authorities, customs offices, and buyers.

At the global level, the WTO is leading the policy dialogues and the framing of multilateral accords which are essential in harmonizing the policy actions of different countries. The WTO Work Programme on Electronic Commerce sets to “to examine all trade-related issues relating to global electronic commerce” (WTO 1998a). Notably, a number of WTO members have signed the Joint Statement Initiative (JSI) on e-commerce in 2017 and started negotiating trade-related aspects of e-commerce thereafter (Ismael 2020). The issuance of the JSI is in line with the view of forging a plurilateral agreement based on existing WTO agreements and frameworks.

The WCO created a Working Group on E-Commerce to lay out the framework of standards on cross-border e-commerce and their implementation (WCO 2018a) to establish a robust and transparently governed e-commerce global supply chain covering primarily B2C and customer-to-customer (C2C) transactions but could include business-to-business transactions as well. It specifically targets to harmonize risk assessment procedures, revenue collection, and border cooperation. The WCO also published in 2018 a set of guidelines to update specific rules in both customs and trade on expediting the clearance of low-value and small e-commerce shipments and parcels (WCO 2018b). What these frameworks need are rules and regulations covering the supply chain in every jurisdiction to strengthen cross-border governance. The deepening of automation in customs procedures through national single windows and the progress in creating integrated national single windows (e.g., ASEAN single window) can be leveraged to pursue the objectives in these frameworks.

Lopez-Gonzalez and Ferencz (2018) likewise highlighted the increasing importance and usage of regional trade agreements. E-commerce-related provisions in regional trade agreements typically cover promotion of the e-commerce activity, cooperation activities and the moratorium on customs duties, and the domestic legal framework, including electronic authentication, consumer protection, personal information protection, and paperless trading (Monteiro and Teh 2017). One key challenge is to ensure that overlapping regional trade agreements do not exacerbate the “spaghetti or noodle bowl effect” resulting in unintended implementation frictions such as many rules of origin that affect the cost of trading.

The rapid developments in the digital space call for a timely review of FTZ and EPZ strategies. The FTZ or EPZ strategies are valuable in facilitating compliance to trade rules and in helping customs authorities address the challenges they face. The PRC has taken a lead in this area by establishing in 2015 the first cross-border e-commerce comprehensive pilot zones; there are now 105 zones spread over four regions in the country (Zhang 2020). The objectives of these zones include building brands, propagating a comprehensive cross-border e-commerce development, stabilizing capital flows related to trade, raising the quality of digitally-enabled trade, and holistically addressing pertinent security concerns. Likewise, preferential tax treatments like value-added tax exemption, consumption tax on retail exports exemption, and corporate income tax reduction are offered in the pilot zones.

Malaysia is another early mover in the region and it could serve as a good benchmark case for other countries. The government launched a digital free trade zone (DFTZ) in 2017 that was designed to strengthen the participation of local enterprises in cross-border e-commerce activities (Malaysia External Trade Development Corporation n.d.). One notable recent initiative of the zone is to take part in the Alibaba Group-led electronic World Trade Platform (eWTP) (Yean 2018). Malaysia's hub is the first eWTP pilot project outside of the PRC (eWTP n.d.). eWTP is deemed to be a step toward establishing the

digital version of the Silk Road, designed to complement the Belt and Road Initiative.⁸⁷

Promoting Sustainable Tourism through Online Travel

State of Play

Digital platforms operate and facilitate travel and tourism through two segments, eight subcategories, and two primary ways of servicing. The first segment is through “direct bookings” where consumers purchase travel products directly from the supplier, website, or mobile application. The second segment is through indirect channels known as online travel agencies (OTAs), which are web-based marketplaces that give consumers the ability to research, compare, review, and book travel products and services from multiple suppliers simultaneously (Expedia Group 2019).⁸⁸ Another segment uses third-party travel metasearch engines and travel review sites which can also display the various travel products across multiple suppliers, including OTAs, offering consumers a wide scope for comparing numerous attributes (Little Hotelier 2020). Table 8.10 lists some of the OTAs and the more popular global travel metasearch engines.

The history of online travel started in 1985 when American Airlines launched the first consumer-facing booking platform, called eAAsySabre, to book airline tickets (Schaal 2016). In 1996, Microsoft launched Expedia Travel Services in the United States, followed by European counterpart Priceline in 1997 (Barthel and Perret 2015). Since then, online travel has grown substantially. The total global revenue is estimated to be about \$570.3 billion in 2017 and is projected to almost double to \$1,134.6 billion by 2023, suggesting a compounded annual growth rate (CAGR) of 13.2% (Market Research Future 2019). Already, online travel accounts for nearly 50% of total global bookings, and is expected to continue growing at a rate faster than the overall travel market (Businesswire 2019). The impact of online travel on local business and employment is

Table 8.10: Major Global OTAs and Travel Metasearch Companies

Major Global OTAs	Major Global Travel Metasearch Companies
Airbnb	Google Hotel Ads
Agoda	HotelCombined
Booking	Kayak
Expedia	SkyScanner
Orbitz	Tripadvisor
Priceline	Trivago
Hotels	Wego
HRS	
Travelocity	
Trip.com (formerly Ctrip)	

HRS = Hotel Reservation System, OTA = online travel agency.

Source: ADB and United Nations World Tourism Organization (forthcoming).

huge. For example, the Tripadvisor site and app are used to browse around 8.8 million accommodations, restaurants, experiences, airlines and cruises” (Tripadvisor 2020). The Expedia Group states that it has a supply of 1 million hotel properties, 500 airlines, 35,000 activities, 175 rental car companies, dozens of cruise lines, and 1.8 million listings on HomeAway (Expedia Group 2019).

The Asian Market

Asia is now the world’s largest regional travel market. In 2018, the total gross travel market in the region was valued at \$418.1 billion (Phocuswright 2019). About 44% of this, equivalent to roughly \$182.2 billion, is accounted for by online travel. The share is forecast to grow beyond 50% by 2021 at an impressive CAGR of 15.9% to 2023 (Market Research Future 2019).

In addition to the major global players, numerous local and regional domestic booking platforms and players have captured traveler demand. In the PRC, the Trip.com Group Limited generated approximately \$105 billion in gross merchandise value in 2018 for Chinese consumers

⁸⁷ As of this writing, the eWTP has at least six partner countries in at least three continents (eWTP n.d.).

⁸⁸ The travel and tourism subcategories are holiday packages, flights, hotels, vacation rentals, tours, activities, ride-hailing, trains and buses, and car rentals.

alone. The company has, among other assets, more than 1.4 million hotel and hostel properties and 1.2 million vacation rental properties around the world; more than 2 million global air routes; and vacation packages, guided tours, and in-destination services including insurance, visa services, attraction tickets, and local activities, covering over 3,000 destinations in more than 160 countries and territories (Trip.com Group n.d.).

The importance of tourism for many economies in developing Asia cannot be overstated. Combined international and domestic tourism totals exceed 10% of GDP in most destinations across the region, while in some developing destinations such as Palau and Maldives, international receipts alone account for upwards of 40% of GDP (Abiad et al. 2020).

The success of digital travel platforms in Asia is tied both to tourism's healthy global growth generally pre-COVID-19 pandemic, as well as a strong enabling environment in the region. Globally, the UN World Tourism Organisation (UNWTO) reports 1.5 billion international tourist arrivals were recorded in 2019, a 4% increase on the previous year, while also forecasting 4% growth for 2020 pre-COVID-19 (UNWTO 2020).

The World Travel and Tourism Council (WTTC) reports that Asia is the top-performing market worldwide, with an impressive growth rate of 5.5% for 5 consecutive years. Regional travel and tourism generated \$2,971 billion, or 9.8% of the region's GDP, with international visitor spending reaching \$548 billion, or 6.6% of the region's total exports (WTTC 2020a).

Impact of COVID-19 on Travel and Tourism

The COVID-19 pandemic has also put the global travel industry into a "fight for survival" mode due to the widespread and continued application of border control and quarantine measures.

Wong (2020), using the data of travel industry insights company ForwardKeys, reported that the international travel net bookings (i.e. bookings net of cancellations) on flights departing from Asia have declined sharply between February and August 2020. While the rate of

decline has eased in recent months, the latest available data show a dip of over 104%. Meanwhile, hotel analytics company, STR, in a year-on-year comparison between July 2020 and July 2019, reported hotel occupancy down 36.5% to 46.3% (STR, Inc. 2020).

In light of the circumstances, it is reported that online travel companies stand to lose at least \$11.5 billion in 2020 in missed bookings, potentially reaching \$20 billion given a prolonged containment period (Borko 2020). This has resulted in many online travel players laying off and furloughing thousands of staff in the region and around the world, as they try to withstand the economic impacts.

Globally, over 100 million tourism jobs are at risk with projected revenue losses of \$2.9 trillion in 2020, with Asia to be the most heavily affected (Table 8.11). The baseline scenario for the region is currently 69.3 million jobs at risk and a loss of nearly \$1.14 trillion in revenues, while the worst case scenario stands at 115 million jobs at risk and a loss of approximately \$1.89 trillion (WTTC 2020b). Thus, the online travel industry is severely impacted by COVID-19, with no clear end in sight yet.

Table 8.11: Impact Scenarios of COVID-19 on Asian Tourism

Scenario	Jobs (million)	GDP (\$ billion)	Arrivals	
			Domestic	International
Best case	-59.7	-980	-40%	-23%
Baseline	-69.3	-1,137	-48%	-27%
Worst case	-115.0	1,888	67%	-55%

COVID-19 = coronavirus disease, GDP = gross domestic product.

Source: WTTC (2020b).

Challenges and Priorities of the Online Travel and Tourism Industry

The online travel market has features that pose several challenges in advancing online travel and tourism industry in the region as highlighted by the ADB and UNWTO (forthcoming). The first one is the intense competition among online travel platforms for market share. This has caused many closures for small local players not able to compete. However, this has also given rise to a strong trend

of innovation in the services offered. For example in 2018 and 2019, the industry saw several prominent OTAs and travel metasearch sites begin to diversify their product bases and brand positioning away from hotel and accommodations bookings to include more food, activities, and rides—all three forecast to play a significant role in how such companies deepen their competitive advantage into the future (Schaal 2019).

The second challenge is the competition threats posed by super apps to local players. For example, Google and Amazon are forecast to continue deepening their move into the online travel space. Given their enormous consumer data and insights, reputations for innovation, cash reserves, efficient consumer technology systems, and upstream booking funnel ownership (in the case of Google), both represent a major disruptive threat to online travel providers of all types. The regional super apps, such as WeChat, Line, Gojek, Grab, Meituan Dianping, are already well-entrenched in their markets and can potentially compete with the other global brands. But, unless they can increase their partnerships and not compete with local players, superapps will disrupt local business and fragmentize the local supply chains for travel and tourism.

There is also rising concern within the industry in terms of policy changes related to digital taxation and data localization. For individual countries, the problem is how and when to capture taxes from the revenues being made by offshore online travel providers. Another concern is how to effectively combat the monopoly advantage of technology giants who collect, process, and control data giving them unfair advantage over local business players and governments.

While managing the impact of COVID-19 remains the utmost priority for the industry, there are several strategies that can help the industry survive and hasten the prospects for a safe reopening. Government could work with the industry to deliver integrated technical innovations such as digital health passports, digitized testing certifications, and contact tracing, among others. The travel industry and platforms have existing technical hardware and software, and technical expertise at their disposal for this purpose.

Another strategy to stimulate the local travel and tourism market is to support domestic travel, while international border closures remain in effect. Online travel platforms are well-placed to help drive domestic tourism and also promote key local destinations. In this regard, Thailand is a great early example. The Tourism Authority of Thailand partnered with Agoda beginning in 2018 on a multifaceted campaign to drive more domestic travelers to key destinations (Agoda 2018). More importantly, governments can also encourage individuals and MSMEs to go online and partner with OTAs to provide their services and goods domestically.

As Asia is an emerging global leader in both digitalization trends and travel industry growth, the outlook for online travel platforms in the region remains strong. However, this is contingent on the timely reopening of travel post COVID-19. Until then, regional governments should support online travel platforms to bolster their domestic tourism efforts while border closures remain in place, and further continue to address the general underlying policy and regulatory issues related to online travel that existed before the pandemic, such as taxation and data control.

Broadening Opportunities for Decent Work through Labor Platforms

State of Play

Platforms have created new jobs, such as crowdworkers, drivers of ride-hailing apps, and riders of food delivery services. While some of these jobs are not new, the modalities of matching workers to jobs through platforms is new, including payment schemes and value accumulation in platforms.

Digital technologies have helped offshore outsourcing evolve into a work arrangement mediated by digital platforms. These platforms bring together markets in the fastest, most efficient, and most convenient ways. Firms now have access to a pool of diverse and geographically dispersed human resources while individuals now face economic opportunities that are not available in the local labor market.

One of the defining features of online work (used interchangeably with platform work hereafter) is the flexibility in the labor markets. Firms can choose from a number of workers to finish short-term tasks at a relatively low cost (firm-driven flexibility) and at the same time, allow workers to achieve work-life balance (worker-driven flexibility) (Hunt and Samman 2019). This flexibility is an important selling pitch to most women due to the realities of care economy and housework, and these labor platforms can help achieve Sustainable Development Goal (SDG) targets on women empowerment and gender equality (targets 5.b, 5.c, 5.5), and on the eradication of poverty (target 1.1).

There are concerns on skills development, job security, and safety nets. Online workers do not have security benefits and protection entitlements because they are classified as contractors or self-employed (Forde et al. 2017; Hunt, Samman and Mansour-Ille 2017). As the young population may be naturally drawn to platform work, there could be erosion of contribution base, leading to problematic gaps in social protection coverage. Critical issues such as the lack of collective representation (Berg 2018; Graham, Hjorth and Lehdonvirta 2017), duration of employment (Barnes, Green, and de Hoyos 2015; Graham et al. 2017), and the types of skills developed in platform engagements (Barnes, Green, and de Hoyos 2015; Forde et al. 2017) are relevant to young and productive workers. The lack of social protection is likely to exacerbate gender inequalities since women, who are responsible for care economy and housework, are more likely to engage in online work.

These serious concerns can outweigh the flexibility and monetary gains, raising the question of sustainability. Platforms are not mere facilitators that minimize job search costs but are legitimate avenues that broaden knowledge and improve workers' opportunity sets. However, in the absence of employer-employee relationships, contracting firms cannot be compelled to provide training and security benefits to workers. Workers learn skills on their own and contribute to social security fund on a voluntary basis if they want coverage. Given these, the overarching policy questions should focus on online work/platform work sustainability,

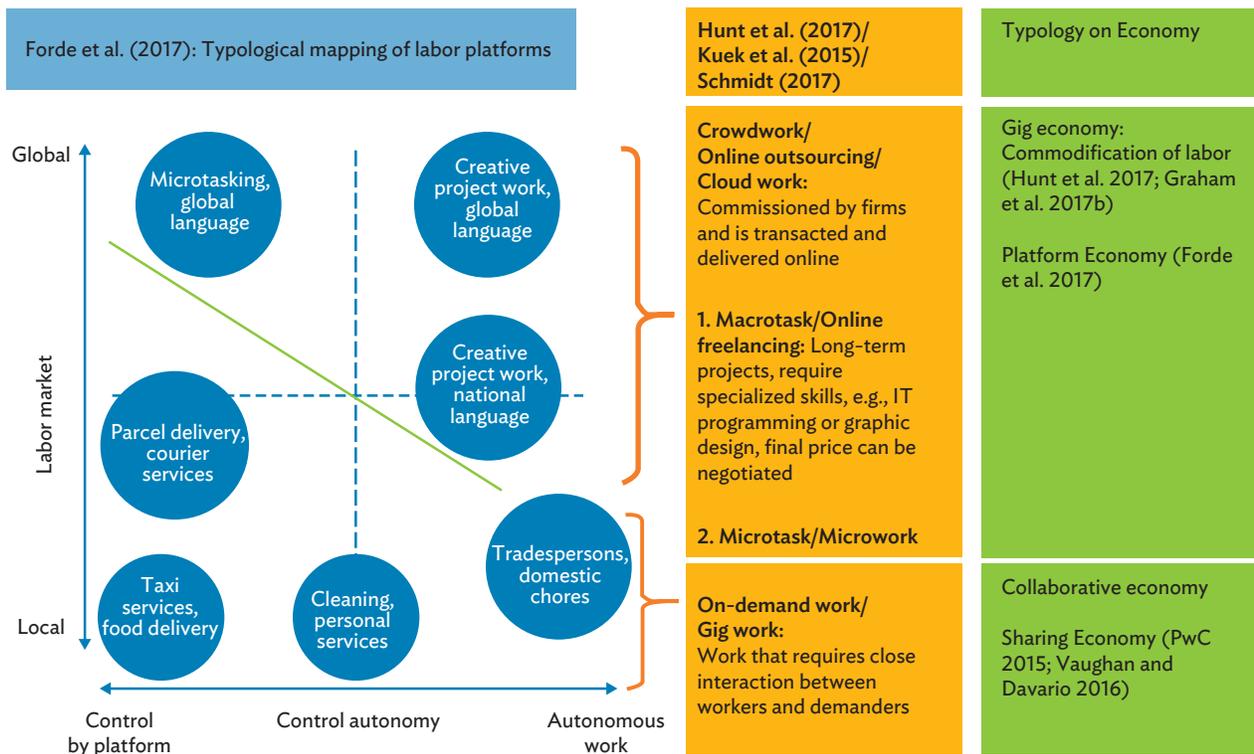
skills development, income, and social protection. Addressing these issues will help countries be on track in SDG targets on social protection (1.3, 1.a and 10.4), skills (4.4), and care economy (5.4).

Definition and Typologies

There is an apparent lack of consensus on taxonomy that classifies the broad range of economic activities mediated by platforms due to the complex dimensions that pertain to differences in skills, market structure and clients, and employment status. The typologies are based mostly on whether the worker output is delivered online and across borders or in the same location (Figure 8.17). For example, taxi services and food delivery are work that is highly controlled by platforms and serve the local market, while creative projects serve either the local or global market and give workers a higher degree of autonomy (Forde et al. 2017). Other studies like Hunt, Samman, and Mansour-Ille (2017) and Graham et al. (2017) classify these activities into either *crowdwork* that is transacted and delivered online or *on-demand* work that requires a close interaction between workers and demanders (e.g., food delivery, ride hailing services, and so on).

At least four popular terms are used in the literature to describe the platform economy: gig economy, platform economy, collaborative economy, and sharing economy. In the *gig economy*, workers take on sometimes low-paying precarious work as independent contractors without any guarantee of further employment. Graham et al. (2017) and Hunt, Samman and Mansour-Ille (2017) refer to the gig economy as the commodification of labor and the sharing/collaborative/platform economy as the commodification of assets. Used interchangeably with the *sharing economy*, the *collaborative economy* refers to the monetization of assets or the sharing of idle resources such as in Airbnb, Uber, and Lyft (PwC 2015), or the *on-demand economy* (Vaughan and Davario 2016). The *platform economy* is viewed in the context of platform-mediated jobs that can be delivered online or offline, a typology consistent with the crowdwork and on-demand work classifications.

Figure 8.17: Economic Activities and Terminology in Labor Platforms



Note: The diagram is based on Forde et al. (2017); Graham et al. (2017); Hunt, Samman, and Mansour-Ille (2017); Kuek et al. (2015); PwC (2015); Schmidt (2017); and Vaughan and Davario (2016).

Source: Bayudan-Dacuycuy et al. (2020a).

These distinctions are important as they determine how the platform operates, the situation of the independent contractor, the legal framework that applies, and potential regulatory measures (Schmidt 2017).

Online Work in Asia

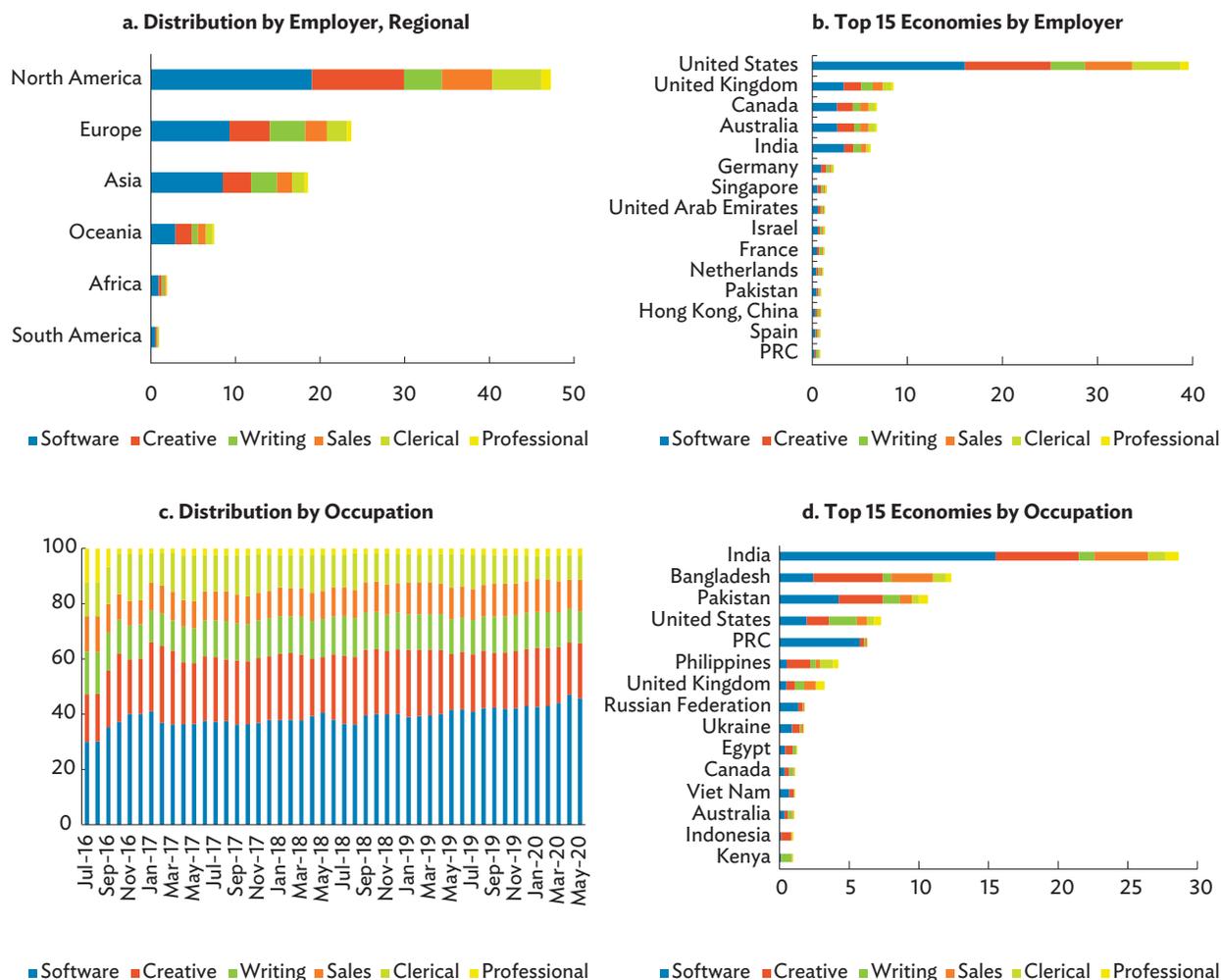
Online work is gaining traction globally and in Asia.

Data on nonstandard work arrangement are scarce, although national statistics offices in the United States and the United Kingdom have started to develop methodologies that integrate this work arrangement

into their labor force surveys (Hunt and Samman 2019). Based on the Online Labor Index (OLI) of Kässi and Lehdonvirta (2018), projects or tasks in online work have increased by 72% since it started compiling data in September 2016.⁸⁹ Data in 2019 show that projects were concentrated in North America (47%), followed by Europe (24%) and Asia (19%). Among the top 15 economies where projects are located, the US dominates the market with 40% share (Figure 8.18a). Five Asian economies—India; Singapore; Pakistan; Hong Kong, China; and the PRC—are included in the top 15 although their shares are way below that of the US (Figure 8.18b).

⁸⁹ The index measures the utilization of online labor platforms or those through which buyers and sellers of labor or services are delivered digitally, excluding platforms for local services such as Airbnb and Uber. The samples are limited to the largest English language platforms accounting for at least 70% of all traffic to online labor platforms (Kässi and Lehdonvirta 2018, and Oxford Internet Institute). OLI database is maintained by the Oxford Internet Institute and the University of Oxford.

Figure 8.18: Distribution of Online Work by Employer, Location, and Occupation (% of total)



PRC = People's Republic of China.

Sources: Kassi and Lehdonvirta (2018); and Oxford Internet Institute. The Online Labour Index Database. <https://ilabour.oii.ox.ac.uk/online-labour-index> (accessed May 2020).

The share of software development/technology has been rising to almost 50% of the global online work in 2020 while around 20% is in creative and multimedia (Figure 8.18). Initial evidence indicates that jobs related to software development/technology appear resilient while those related to creative and multimedia and sales/marketing support have decreased during the COVID-19 pandemic (see for example, Stephany et al. 2020).

The top three Asian countries that provide online workers—India, Bangladesh, and Pakistan (Figure 8.18)—combine for 52% of the global online workforce. The Philippines is a distant sixth. Majority of online work

are tasks related to software development/technology (led by the PRC and India) and creative/multimedia. This is consistent with the earlier models of offshore outsourcing that took advantage of the large pool of low-cost talents in Asian countries.

From 2017 to 2020, the share of workers in creative and multimedia has increased by 34% in Bangladesh and by 40% in Indonesia. To date, it accounts for around 59% of Bangladesh's online workforce and 74% in Indonesia's. In the Philippines, creative and multimedia online workers share the bulk of online employment (47%) while its share is 31% in Pakistan. At the global stage, the world

exports of creative goods⁹⁰ has grown in value from \$208 billion in 2002 to \$509 billion in 2015 while the trade in creative services⁹¹ in developed economies as a share of total export services has increased from 17.3% in 2011 to 18.9% in 2015 (UNCTAD 2018). In Asia, the creative industry is likely to flourish, as countries boast of a big pool of young, creative, and technology-savvy people.

Cross-country differences reflect comparative advantage and workers' bargaining power differs across economies.

There is a disparity in the distribution of online work reflecting how a country's comparative advantage is viewed by the global market. A large percentage of online workers in India, Pakistan, the PRC, the Russian Federation, Ukraine, and Viet Nam are in software development/technology, while a large fraction of workers in Bangladesh, Indonesia, and the Philippines perform creative and multimedia tasks. In the United Kingdom and the US, large portions of online workers are engaged in professional services or tasks that have high value added.

Although the Philippines has a large share of online workers in creative and multimedia, many are in jobs that have low value-added. Around 25% of online workers in the Philippines are into clerical and data services while such workers account for fewer than 10% in Bangladesh, India, Indonesia, and Pakistan. Only around 14% of Filipino online workers do tasks that are related to software development and technology, much lower compared with the proportion of such workers in India (59%), Pakistan (45%) and even Viet Nam (52%).

Initial evidence shows that crowdworkers in Northern America, Europe, and Central Asia earn more than those in Africa and Asia (see Berg et al. 2018) and that workers outside high-income industrialized nations could be poorly rewarded in online work (Beerepoot

and Lambregts 2014). Compensation and bargaining power may also be driven downward by the number of people seeking jobs. In one platform, evidence shows that the Philippines accounts for 12% of the global labor oversupply (Table 8.12).

Table 8.12: Labor Oversupply in One Major Platform
(number of workers)

Country	Potential Workforce	Successful Workers	Oversupply
Global	1,775,500	198,900	1,576,600
Philippines	221,100	32,800	188,300
Malaysia	11,900	500	11,400
Viet Nam	7,700	1,000	6,700
Kenya	21,700	1,500	20,200
Nigeria	7,000	200	6,800
South Africa	10,200	800	9,400

Source: Graham et al. (2017).

Lack of social protection in the platform economy is a growing concern.

Based on the 2015 International Labour Organization (ILO) Survey of Crowdworkers, around 60% were covered by health insurance but only around 35% had a pension plan (Berg et al. 2018). In a survey of five major platforms in 2017, Forde et al. (2017) found that only around 36% are subscribed into a personal pension plan while 70% could not access protections such as maternity, childcare, and housing benefits.

Despite this reality in platform work, there are certain segments of the population, e.g., the young and women, which may be naturally drawn to online work. Workers in developing countries are much younger (28 years) than those in developed economies (35 years). The young age composition of platform workers can impact the sustainability of existing social protection schemes jeopardizing the financing of future

⁹⁰ This consists of art crafts, audiovisuals, design, digital fabrication, new media, performing arts, publishing, and visual arts (UNCTAD 2018).

⁹¹ This consists of advertising, market research, and public opinion services; architectural, engineering, and other technical services; research and development services; personal, cultural, and recreational services; audiovisual and related services; and other personal, cultural, and recreational services (UNCTAD 2018).

entitlements especially in societies with an increasing elderly population.

In addition, more women will likely engage in platform work since it promises flexibility in performing nonmarket work or care work alongside gainful economic opportunities (see example of the Philippines in Box 8.5). This state of affairs can exacerbate gender gaps in social protection.

There are work practices in the online work market that are difficult to monitor and regulate. Price or rate underbidding could help individual workers land a job but could be disadvantageous to online workers as a group (Forde et al. 2017; Graham, Hjorth, and

Lehdonvirta 2017). Likewise, re-intermediation—where successful online workers take on work that they farm out to other less visible and less experienced online workers—can lead to exploitation. On the positive side, workers are able to perform “skills arbitrage,” in which workers are no longer confined to the local labor market and are able to get more for their talents (Graham, Hjorth, and Lehdonvirta 2017).

Local On-Demand Work

The most familiar forms of employment created through the platform economy are classified as gig work or local on-demand work. For example, in recent years, ride-

Box 8.5: Platform Work in the Philippines

Bayudan-Dacuycuy et al. (2020b) provide a closer look on the nature of platform work from the perspective of the workers. The Philippine Institute for Development Studies (PIDS) with the assistance of the Department of Information and Communications Technology conducted the “Online Survey of Market and Non-Market Work” from April to May 2020. The survey yielded 639 respondents with the following distribution: 35% of the respondents have neither platform nor non-platform work, 14% have platform work only, 42% have non-platform work only, and 9% have both platform and non-platform work. Platform work had been done by 40% of respondents during the survey month and/or the past 12 months, and about 65% of them are women. While the survey is based on nonrandom sampling and results hold true only for the sample, findings are consistent with the results of studies abroad that used representative surveys.

- There are segments of the population that may be naturally drawn to online work. Platform workers in the Philippines are young, which has implications on skill formation and human capital development since a quarter of Filipino online workers perform tasks that are at the lower end of the value chain.
- Work experience is essential in securing a job in platform work. Those who have no work experience have practically zero chance of securing online work. On the demand side, this suggests that firms use

experience as a signal of worker’s ability and output quality. On the supply side, this suggests that the accumulation of experience depends on the requisite hard skills such as information and communication technology skills, numeracy, and literacy, and soft skills such as negotiation, communication, and networking.

- Workers take advantage of economies of scope as they leverage skills and resources common across platform work and other economic activities. There are risks, however, of potential tradeoffs between output quality and work intensification which may result in physical and mental strain. Thus, it is vital to develop organizational, planning, and time management skills, as workers exploit the flexibility and autonomy in the platform.
- Women are more likely to engage in platform work than men, due to the flexibility that allows them to perform nonmarket work as well. This highlights the need for crafting policies to enhance the social protection of platform workers, without which will likely exacerbate gender inequalities.
- Factors associated with lower wage/hour include engagement in microtasks and the lack of investment in training courses. Constraints in investments in human capital and connectivity are also proximate factors of lower wage/hour.

Source: Bayudan-Dacuycuy et al. (2020b).

hailing digital platforms⁹² have provided an increasing driver-partner employment⁹³ to individuals who had no prior paid work.⁹⁴ In 2019, ride-hailing digital platform Grab had 2.8 million active drivers in all countries of operation, while Gojek in Indonesia and Ola Cabs in India each employed 1 million drivers (Table 8.13). However, the type of jobs created by such digital platforms can be categorized as informal work.

Over 9 million micro-entrepreneurs in the region have earned income using the Grab platform (Grab 2019). Small merchant partners experienced a 21% increase in revenues. In the Philippines, the company partnered with the Department of Agriculture to support farmers and agripreneurs by utilizing GrabExpress in delivering fresh produce and meats from the department's eKadiwa website. Grab, through GrabMart and GrabFood, also started a program in Malaysia with the Ministry of Rural Development to assist in marketing and increase revenues for rural entrepreneurs (Grab 2020).

A study in 2018 found that Gojek contributed about \$3 billion to the Indonesian economy, mostly from the partnership of GoFood and MSMEs which generated about \$1.57 billion revenues (Walandouw et al. 2019). While 86% of Go-ride, 71% of Go-car, and 91.5% of Go-Life partners have only high school diploma or lower, they earn higher than the average income in the nine areas surveyed. Go-Life consists of 70% female workers, 93% of MSME partners went on e-commerce because of partnership with Gojek, 93% had increased transaction volume, and 55% reported increased revenues.

In South Asia, Pathao in Bangladesh now has 50,000 motorbikes and a group of 500 workers in three urban communities and has added to its services bike sharing, and delivery of parcel and food (Ahmed et al. 2018). This kind of platform has opened the door for businesses and improved logistics and helped e-commerce in the country to grow (Chun, Kumar, Rahman 2019). Cheetay in Pakistan has over 300 partner restaurants and offers a digital tool for home-based food businesses' e-commerce to create employment opportunities (ProPakistani 2019).

Table 8.13: Delivery and Transport Services Online Platforms

Platform	Monthly Visits	Users (million)	Economies	Funding (\$ million)	Number of Employees	Drivers (million)
Uber	50,047,522	91 (2018)	63 economies including Bangladesh; Hong Kong, China; India; Japan; the Republic of Korea; Sri Lanka; Taipei, China	24,700	10,001+	3.9 (2018)
Grab	8,841,950	163 (2019)	Indonesia, Malaysia, the Philippines, Singapore, Thailand, Viet Nam	10,100	1,001–5,000	2.8 (2019)
Didi	642,717	550	Hong Kong, China; India; PRC; Taipei, China	21,200	5,001–10,000	31
Gojek	144,430	–	Indonesia, Singapore, Thailand, Viet Nam	4,800	5,001–10,000	1
Pathao	190,586	–	Bangladesh	12.8	1,001–5,000	–
Cheetay	58,381	–	Pakistan	9.8	501–1,000	–

PRC = People's Republic of China.

Sources: Crunchbase Database. <https://www.crunchbase.com>; DBS Group Research. 2019. Number of Active Drivers of Asia Pacific Ride-Sharing Companies as of 2019 (in millions). 27 May. In Statista—The Statistics Portal. <https://www.statista.com/statistics/1034777/apac-number-of-active-drivers-of-ride-sharing-companies/>; Didi. About Us—More Than a Journey: The World's Leading Transportation Platform. <https://www.didiglobal.com/about-didi/about-us>; and Uber. Company Info: Facts and Figures as of December 2018. <https://www.uber.com/en-PH/newsroom/cUberompany-info/> (all accessed August 2020).

⁹² Grab in Southeast Asia, Gojek in Indonesia, and Ola in India are some examples.

⁹³ Since its launch in 2012, Grab has diversified its services and recently integrated all its solutions in one mobile application. It has expanded to supplying other services such as food and express package deliveries, thereby tapping more idle labor.

⁹⁴ Reportedly, 21% of its total driver-partners in 2018–2019 had no prior employment (Grab 2019).

Policy Implications and Recommendations

Digital platforms offer new opportunities and channels to participate in the labor market and earn supplemental income. Nonetheless, the arrangements employed have raised some welfare concerns. For one, work contracts with limited social and employment protection are common in the platform setting. Younger and female members of the labor force are particularly susceptible to such arrangements since they are more inclined to participate in the flexible platform job market. Workers are likewise exposed to race-to-the-bottom wage determination while some of the jobs generated can be considered as informal.

Designing a social protection system that covers all workers is a necessity and a challenge. As more young people are engaged in short-term, intermittent, or nonstandard work arrangements, the erosion of a social insurance contribution base may exacerbate coverage gaps, weakening existing social protection schemes, endangering future entitlements, and increasing public finance strain because of social assistance to the unemployed and elderly, especially during times of crises. In addition, women are more likely to work in the platform for flexibility, which can exacerbate gendered inequalities in the current patterns of employment-based social protections. In the context of the future of work, there have been calls for social protection to be decoupled from employment or be replaced by a universal basic income.

However, decoupling social protection from employment will likely result in inadequate coverage and limited benefits since some workers may not be able to accumulate sufficient entitlements due to the nature of their work and income patterns, and in the weakening of the employers' responsibility toward their workers (Behrendt and Nguyen 2018). Other issues include the inadequate benefit levels to cover a decent standard of living and the potential crowding-out of other public services (Browne and Immervoll 2017).

While the exact types of social protection are being debated, there appears to be a consensus on the desirable characteristics of a social protection system, such as the following:

- **Universal and equal access** (ILO and OECD 2018; WEF 2018) and **flexibly designed** (Johal 2018): This will involve flexible eligibility definitions that will cover workers in any work arrangements and can be customized to accommodate the needs and preferences of workers.
- **Portable** (WEF 2018), **agile** (WEF 2017b), or **transferable** (ILO and OECD 2018): Following the general principle that the facility follows the worker rather than being bound to a specific employment, the system should seamlessly support workers' mobility and recognize that workers will move in response to local and global opportunities. One way of doing this is to explore a central entity that manages contribution and benefits of workers and provides a range of benefits even if they move from employer to employer or job to job (WEF 2017b). However, it should guard against delegating greater roles to private entities that may exacerbate the gaps in the provision of social protection (Behrendt and Nguyen 2018).
- **Integrated with allied services and programs** (Johal 2018): Social protection systems should have links with allied services and programs covering related risks. An example of a potential linkage is an unemployment insurance that not only provides minimum income while unemployed but also covers reskilling/upskilling and training cost to make it easier to move in between jobs.
- **Facilitated by technology:** The system should leverage on technology not only in facilitating enrollment and payments of contributions and benefits but also providing nudges through information campaigns that can reshape behavior and mindsets.

Creating skills and training systems is vital in fostering a suitable ecosystem. Just like other jobs, online work may be affected by adverse shocks. Online creatives and multimedia workers in Bangladesh, Indonesia, and the Philippines have experienced substantial downturn due to the ongoing COVID-19 pandemic. On one hand, these countries may want to invest in ICT skills and focus on training and education

systems in science, technology, engineering, and mathematics programs to capture some jobs in software development and technology. On the other hand, they can enhance their niche on the creative and multimedia sector. Thus, at the country level, there is a need to assess and match the skills of the workforce with the requisite skills of the target occupation and industries and create enabling environments for workers to prosper in platform work. For example, women should be provided skills training support that will allow them to continue to perform both platform and non-platform work. In this way, platform work can be an effective way to achieve Sustainable Development Goal 5 of women empowerment.

However, a much better emphasis of training would be on the creation of a sustainable ecosystem encompassing skills development programs and training support initiatives that are useful in any type of work setting, affording workers the ability to transition quickly between jobs or tasks. As a starting point, countries need to craft a competency framework and a national strategy for skills and human capital development.

Strengthening the underlying infrastructure is key to support the creative industry and the creative process outsourcing. At the national level, countries are aware that creative services will grow with the expansion of the ICT frontiers. Some Asian countries have shown big strides in innovation, an important ingredient for the creative economy to prosper. Among the Asian countries in the top 15 economies where platform work is outsourced, India and the Philippines belong to economies with innovation performance that exceeds expectations commensurate to their level of development. In terms of creative outputs, the Philippines ranks 63rd out of the 130 countries surveyed in the 2019 Global Innovation Index, and is 40th in the creative goods and services subindex. Meanwhile, Indonesia ranks 76th, Pakistan 104th, and Bangladesh 115th in the same index. Indonesia established the Creative Economy Agency to oversee development of the creative sectors, with the view of integrating these into Indonesia's economy. In 2017, the sector employed 15.9 million people and generated more than 7% of Indonesia's GDP (Jewell 2019).

Although the improvement in innovations in creative goods and services bodes well for Asian online workers, there are challenges that need to be addressed. These include slow connectivity, which hampers the efficient production of creative outputs in audiovisual arts and causes inefficient production of visual graphics. While this is a problem for all online work, this is more pronounced for the creative industry due to the bandwidth requirement necessary to execute the creative production.

Improving data collection and measurement is needed for proper regulation. As platform work becomes increasingly integrated into the spectrum of various work arrangements, crucial issues on regulation and taxation arise. While developed economies have started to develop methodologies to integrate this work arrangement in their labor force surveys, there are still outstanding challenges on data collection that need to be addressed. For instance, including a module on platform work as a rider to standard labor surveys may not be adequate to capture the scope and complexity of existing work arrangements in the platform (Abraham et al. 2019). Moreover, tracking down platform workers and enticing them to participate and truthfully disclose information are problems that need to be highlighted on their own but more so on the heels of the potential taxation of the online economy.

Including the platform economy as an area of cooperation and policy coordination among Asian economies has ample merits. Mounting a call to action or organizing a labor rights group can be a challenge to a geographically dispersed and anonymous pool of platform workers who likely view each other as competitors. Thus, the platform economy can be an area of cooperation among Asian nations to collectively address critical issues, to influence the narrative from competition to collaboration, and to influence workers' unfavorable practices such as underbidding and "race to the bottom" mentality, among other things. Currently, the power is skewed in favor of firms while most risks and costs are borne by workers. A starting point would be to include the platform economy in the national and regional agenda so that issues and challenges can be mapped to potential solutions. Agreeing to a wage floor,

for example, can help address the “race to the bottom” mentality. While putting a united front in the digital space is a challenge, sending a cohesive message has the potential to balance the fulcrum of power.

EdTech and Quality Education for All

State of Play

The global online education market has witnessed a rapid growth, powered by the onset of disruptive digital technologies. The technological revolution has brought viable virtual means of education and training as an alternative to traditional education delivery within the walls of institutions. The growth of the global EdTech industry has further fueled the expansion of online learning. Moving forward, as suggested by Jagannathan and Li (2020), a number of factors are expected to drive the adoption of online or digital learning:

- **The need to scale up affordable access to tertiary education.** As developing countries look to significantly scale up access to education, particularly for tertiary and adult learning, online education provides a viable alternative to the conventional brick and mortar universities.
- **The demand for flexible learning opportunities in new domains.** Traditional institutions are also increasingly embracing digital and blended learning as a way to offer more flexible and tailored education to students. Digital platforms play a critical role in offering knowledge and skills for trends such as the Fourth Industrial Revolution and to serve emerging industries for which mainstream institutions are not yet well equipped to offer courses.
- **The call to match the learning styles of millennials and next generation learners.** Digital platforms have become essential for the education of the millennials who are also termed “digital natives,” with a vastly different style of learning.
- **The ability to offer personalized and individualized learning.** Digital solutions help to personalize learning to suit individual needs while at

the same time accommodating more students within the learning platform. Student progress is tracked in real time, making adjustments in teaching methods and materials more efficient and appropriate.

Online Learning at the Time of COVID-19

The COVID-19 pandemic has also provided an impetus for online learning. The nationwide and localized closures of educational institutions implemented in more than 190 countries have affected over 1.5 billion learners at its peak (UNESCO 2020a, UNICEF 2020). Such unprecedented and sudden closure of educational institutions caused a dramatic shift to online learning, which became the main response to the widespread disruptions in schooling caused by the pandemic.

Moreover, post-pandemic, it is expected that digital platforms will redefine the balance between physical and virtual education; the role of private players will increase; and workforce styles will show greater reliance on digital and remote working as revealed by the results of the McKinsey Global Institute surveys (Lund et al. 2020). Indeed, the COVID-19 pandemic has created the opportunity for education to undergo a massive transformative shift to online learning. Students have turned to private EdTech platforms to support distance learning during the COVID-19 crisis (see Annex 8d).

EdTech can be at the center of strategies that aim to turn this health crisis into an opportunity to improve the quality and delivery of education. However, the switch to online strategies has also revealed major barriers and issues of inequity in access to devices and connectivity for students in poor and rural-based communities that must be addressed quickly.

While countries are preoccupied with responding to the crisis in the short term, it is important to consider strategies and solutions that not only provide immediate relief but also incorporate a vision for medium- to longer-term support to enable the recovery, revival, and improvement of education systems. ADB recommends that dealing with COVID-19 should go beyond the immediate crisis. Governments must initiate far-reaching

reforms to strengthen the resilience of education and training systems, and frame the actions to be taken in the form of three Rs—response, recovery, and rejuvenation (ADB 2021).

Barriers and Issues

The first barrier is an obvious one and well known—access to connectivity. Table 8.14 shows how poor connectivity limits the ability to roll out digital strategies that benefit all population groups. Within developing countries there is also disparity in access between urban and rural areas, between rich and the poor, and between men and women. Meanwhile, Table 8.15 draws attention to the need to consider home environment, including presence of digital devices and connectivity, in designing digital strategies for home education. And Figure 8.19 highlights the imperative to first improve information technology (IT) infrastructure and connectivity required in schools to roll out digital strategies in education.

With the onset of COVID-19, governments have tried to negotiate with telecom providers to extend connectivity free or heavily discounted for education purposes. While

Table 8.15: Connectivity for Home Learning

	Proportion of Households with Computer (%)	Proportion of Households with Internet Access at Home (%)	Year
Singapore	88.7	97.7	2018
United States	90.8	83.8	2018
Indonesia	20.1	66.2	2018
Georgia	62.1	69.5	2018
Azerbaijan	64.1	78.2	2018
Cambodia	15.0	40.0	2018
Viet Nam	32.9	47.1	2018
Philippines	23.4	39.1	2016
Bangladesh	5.6	37.6	2019
India	16.6	25.4	2018

Sources: International Telecommunication Unit (ITU). Country ICT Data. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>; and ITU. ICT Eye Database. <https://www.itu.int/net4/ITU-D/icteye/#/> (both accessed June 2020).

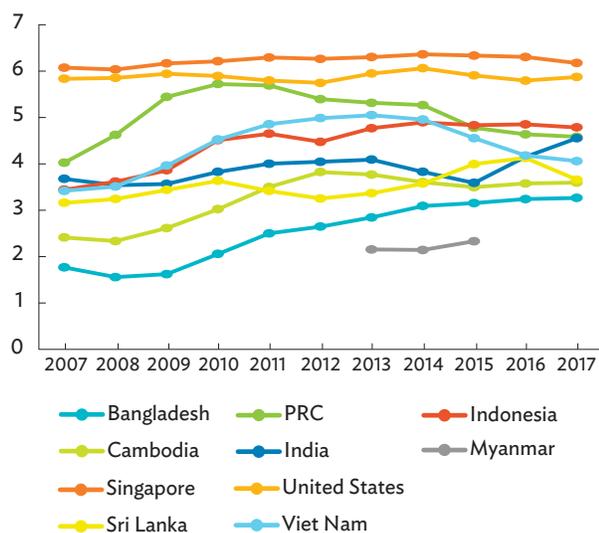
many private platforms offered their courses free during the COVID-19 pandemic, connectivity has been an issue. There are a number of collaborative efforts in the region. For instance, Azerbaijan implemented the Virtual School with Microsoft (CEE Multi-Country News Center 2020), while Georgia's Ministry of Education and the

Table 8.14: Access to Connectivity

Economy	Percentage of Individuals Using the Internet, 2017	Mobile-Broadband Subscriptions per 100 Inhabitants, 2016	Fixed-Broadband Subscriptions per 100 Inhabitants, 2018
Singapore	84.4	147.6	25.9
United States	87.3	126.7	35.6
Indonesia	32.3	33.9	3.3
PRC	54.3	68.8	28.5
Georgia	59.7	61.8	21.0
Azerbaijan	79.0	56.2	18.2
Cambodia	32.4	50.7	1.0
Viet Nam	58.1	46.9	13.6
Philippines	60.1	54.6	3.2
Sri Lanka	34.1	41.8	7.2
Bangladesh	15.0	27.9	6.3
India	34.5	16.4	1.3

PRC = People's Republic of China.

Sources: International Telecommunication Unit (ITU). Country ICT Data. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>; and ITU. ICT Eye Database. <https://www.itu.int/net4/ITU-D/icteye/#/> (both accessed June 2020).

Figure 8.19: Internet Access in Schools

PRC = People's Republic of China.

Notes: The data refer to weighted average scores across survey respondents in each economy. The survey question is: In your country, to what extent is the internet used in schools for learning purposes (1 = not at all, 7 = to a great extent)?

Source: World Economic Forum. The Global Competitiveness Index 2017–2018 Database. <https://reports.weforum.org/global-competitiveness-index-2017-2018/downloads/> (accessed August 2020).

First Channel of Georgia collaborated in creating a TV School (Government of Georgia, Ministry of Education and Science 2020).⁹⁵ Similarly in India, one of many examples is the partnership between the Zoho company and the government to provide a learning app where students and teachers could connect online—that is free to government schools (BusinessLine 2020).

Learning issues are a critical challenge. Technology alone cannot transform education unless it is targeted at redressing critical gaps that include lack of adequate teacher preparation, and inadequate use of student learning assessment data to improve teaching and learning. While governments were initially focused on providing computers and technology in schools, it has become apparent that students need access to connectivity, a conducive learning environment at home, and instructional support to effectively use technology to improve learning levels. This calls for schools to rethink curriculum design for digital skills. As a result

of growing options for digital learning, universities will redefine cost parameters of face-to-face and online education, acquiring license and capacities to offer fully online courses.

Special efforts to serve disadvantaged students need to be bolstered. Strategies for ensuring uninterrupted education during the COVID-19 crisis rely on using a variety of media not limited to the provision of technology and/or devices to close the digital divide. Azerbaijan, for example, employed a multimedia strategy to reach families with different technologies—most households have televisions, so lessons are streamed on national television channels (Dreesen et al. 2020). The PRC adopted flexible methods based on local e-readiness to encourage learning. Programming on satellite TV was used to accommodate regions without internet access while Guangdong province equipped 9,262 students with tablets (Zhang et al. 2020). In Viet Nam, a variety of media were used to reach students including digital website or apps, TV programs, radio programs, and paper-based take-home packages (Dreesen et al. 2020). To serve children without technological resources, teachers and volunteers walked or drove long distances to deliver paper material and assignments to the village heads who then distributed them to students (Flowers 2020). UNICEF likewise distributed “Pad and Puck” packages, i.e., tablets and Wi-Fi in the country (Dreesen et al. 2020).

Despite massive efforts of governments to extend digital learning, some students continue to face learning barriers that disproportionately affect rural and low-income students and minority groups. In the PRC, for example, 2% of students still have no access to online live teaching and some children have to walk for hours to find stable network signals (Zhang et al. 2020). There is also a need for multilingual content for ethnic minorities, curriculum designed for children with disabilities, and development of teacher skills in rural areas (UNESCO 2020b). In Indonesia, issues include poor network streaming, mobile data quota limits, network reception where students live, and bandwidth and server capacity (Yamin 2020).

⁹⁵ The Government of Georgia, Ministry of Education and Science (2020) also noted that Georgia is considered one of the best examples of distance learning according to the OECD report (Reimers and Schleicher 2020).

EdTech: Conclusions and Recommendations

It is clear from trends that digital platforms have great promise, and that technology will influence all aspects of education and training, career coaching, job matching, and employment services. The implication is that adequate investments in EdTech must be made in a way that equalizes opportunities. Unless access to connectivity and devices is equalized, EdTech cannot live out its potential. However, while technology is necessary, it is not a sufficient condition for success in ensuring achievement of learning objectives.

There is a need to develop instructional designs and approaches that are better suited for digital platforms. Appropriate digital solutions for K-12, technical and vocational education and training (TVET), and higher education need to be nuanced to the specific curriculum goals. Digital platforms for skills need to consider how hands-on-training will be handled. Support will also be needed for the development of basic and foundational digital skills covering all sections of the population. Developing member countries (DMCs) need to develop cost-effective solutions to move to the advanced EdTech frontier to embrace technologies such as augmented reality, virtual reality, and machine learning, given budget constraints.

Governments would need to keep up with the rapidly changing nature of new technologies. To take advantage of and foster growth in private enterprises, arrangements for “technology as a service” can be made where governments need not invest in production but rather buy the services—like the kind of services offered by Amazon Web Services, or by Khan Academy to US school districts.

In adopting and scaling up EdTech, governments must not neglect addressing low levels of learning outcomes. While gains have been made in universalizing access to elementary education and other levels of education as well, the pace of improvement in learning outcomes has been very slow. In order to convert the impressive gains in access and enrollment into long-term gains, there is a critical need to address the lags and deficits in learning outcomes.

The following are six overarching priorities for addressing learning outcomes through digital strategies:

- (1) Sustain uninterrupted learning through multiple channels depending on the country context (no tech, low tech, mid tech, and high tech). As evidenced by the COVID-19 pandemic, education systems need to deal with and adapt to disasters, climate events, conflict, and other causes that may occur. Hence, bounce-back strategies need to ensure that quality learning is sustained and education systems are resilient in all settings.
- (2) Revamp training of teachers and trainers to transform learning experiences beyond the traditional cascade approach is needed in recognition of increasingly blended approaches to learning. Digital tools can help link improved teaching practices with enhanced student learning while also offering new pathways for teacher professional development.
- (3) Develop high quality digital content reflecting 21st century skills in partnership with national and global institutions. To gradually ensure high quality and relevant content aligned with regional and global standards, it is important to partner with selected national and international institutions to draw on innovative good practices from selected benchmark countries and adapt to local contexts.
- (4) Ensure equal attention to equity in quality of learning and in access requires attention to how girls and other disadvantaged groups are learning. Breaking the digital divide is a fundamental instrument to equalize access to high quality and relevant education. Technology needs to help universalize and scale up equity in learning for all by making available high quality learning materials to all students.
- (5) Reform high-stake examinations and assessments for higher order learning. Personalized and adaptive learning powered through technology can go a long way in bringing new metrics to assess soft skills and higher order learning like creative thinking, collaboration, problem solving, and applying

skills to a context. Building on the COVID-19 experience, this requires articulating clear policies toward assessments and examinations, and targeting lagging students that include both digital and non-digital solutions.

- (6) Ensure social protection measures for continued learning in key disciplines. In addition to scholarships to ensure enrollments and participation of vulnerable groups, there is a need to consider the support needed to bridge learning gaps that include poor language, and digital and science-based attainments. Here, too, tech tools can help to diagnose the gaps, identify student cohorts that need specific attention, and put in motion teaching and learning that can help to bring such students on par. Subventions for connectivity and devices can be an important equalizer for online learning.

Leveraging Digital Technologies for Good Health and Well-Being

State of Play

Digital health is a generic term describing the application of information and communication technology (ICT) to drive better health outcomes. In the next 3 years to 2023, it is projected that the digital health market in Asia will grow at a compounded annual rate of 5.7% (Deloitte 2019). In 2018, around 4,500 start-ups in Asia were granted regulatory approval to deploy digital health solutions (Timmers et al. 2020). For example, Halodoc, a start-up based in Indonesia has raised almost \$100 million in 2018. However, countries in the region are at different levels of digital maturity and health literacy, as well as in the development or implementation of their national health and digital health strategies. As a consequence, much investment is being wasted in proprietary unsustainable and ad hoc implementations.

Universal health coverage is seen as one of the major reasons why countries in the region are starting to use digital health. It requires everyone to have access to quality health care anytime, anywhere without experiencing financial hardship. Patient centric, precise,

and personalized universal coverage should be delivered in the community; reducing the focus on hospital-based treatments (Koh 2019). In order to achieve this, countries need to increase investment in primary health-care models by 1% of GDP (Roth, Parry, and Landry 2015).

Properly designed digital health offerings can make it easier to deliver patient-centric health care.

Current generation personal health records (PHRs), cloud-based health databases (subject to security, privacy, and confidentiality measures); mobile solutions for clinicians; and access through browsers, phones and tablets for patients are important. Wearable and even implantable technologies are already empowering patient-centric health-care service delivery. Indeed, digital platform solutions carry substantial promise in making health service delivery more efficient and inclusive (Box 8.6).

High quality data capture and analysis ensure that proper financing models can be utilized to achieve universal health coverage.

Accurate population databases of actual and potential service users allow better planning and procurement. But, measures must be in place to avoid claim fraud. There is good evidence that where patient records produce better claiming, health facilities and providers are incentivized to use digital health systems at the point of care and avoid double data entry.

Barriers to Implementing Digital Health

Successful digital health implementation increases access to health care, drives better quality of provision, and more comprehensive health services, and generates higher user satisfaction. In order to achieve these successes, strong technical, analytical, and organizational foundations need to be in place. However, barriers exist, such as the following:

- **Inadequate digital infrastructure.** Without a reliable and appropriate digital infrastructure, the health system (a) cannot benefit from online medical consultations that can address access constraints in underserved areas; (b) faces a limited market for service delivery

Box 8.6: The Benefits of Digital Health to Health Service Delivery Networks

The World Health Organization (WHO) identifies the following key characteristics for efficient health service delivery (Webb, Small, and Gregor 2019): **comprehensiveness, accessibility, coverage, continuity, quality, person centeredness, coordination, and accountability and efficiency.** Digital health drives health care along these WHO delivery lines by:

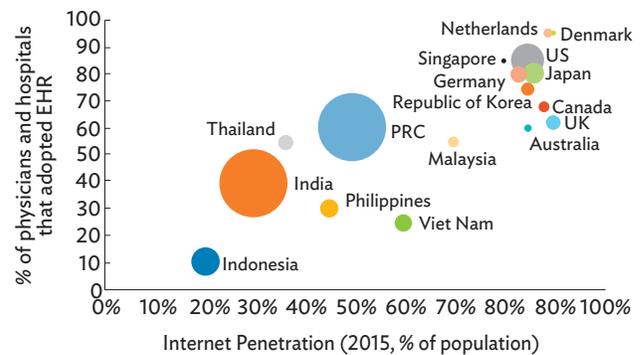
- **Reducing geographic barriers.** Applications like TeleDoctor (in Pakistan) and eHealthPoint (India) have demonstrated reductions in geographic barriers as doctors are able to connect with patients in areas that are hard to reach.
- **Improving access to health care.** Studies in rural areas in the People’s Republic of China (PRC) and India (WHO 2017; Lewis et al. 2012; Haenssngen and Ariana 2017) show that patients using mHealth have a higher chance of reporting symptoms and accessing primary care centers compared with those who are not using mHealth.
- **Improving the quality of health care received.** Symptom checkers, like Fullerton Health (Singapore), allow patients to check the symptoms they experience using the application on their phone. If the app suggests that the patients stay at home and self-care then the patient need not go to an actual health facility to see a clinician. This gives more convenience for the patient and allows health facilities to focus on the patients that are in the facilities.
- **Improving the coverage of health services.** In Indonesia, an increasing number of digital services across the region enable citizens to access doctors, anytime and anywhere.
- **Enabling comprehensive health service delivery.** Health service delivery should be comprehensive enough to provide preventive, wellness, and personalized health care. Personalized health information applications like Tangtang Quan allows diabetic patients in the PRC to receive preventive information and provides a social network among diabetics so that they can share their health regimen with one another.

Source: Bainbridge et al. (2020).

networks that require good communication channels; (c) will not be able to implement real-time referrals and consults during emergencies, especially in far flung areas; and (d) is denied the advantages derived from comprehensive data that drives good policy formulation. There is good evidence that successful electronic health records (EHR) adoption requires a good communications infrastructure (Haenssngen 2015). Figure 8.20 shows a strong relationship between in-country internet penetration and EHR adoption. Emerging markets with lower internet penetration have lower EHR adoption.

- **Missing regulatory framework.** Adopting digital health platforms requires regulations that ensure security and privacy of patients and providers, efficiently capture online transactions for taxation and revenue accounting purposes, and provide parameters within which platform providers operate.

Figure 8.20: Electronic Health Records Adoption versus Internet Penetration



EHR = electronic health records, PRC = People’s Republic of China, UK = United Kingdom, US = United States.

Notes: The bubble size corresponds to the population size. EHR Adoption includes usage of medical records, health records, and other digital solutions by hospitals and physicians to deliver healthcare service.

Source: McKeering, Norton, and Gulati (2017) as cited in Bainbridge et al. (2020).

- **Limited data sharing.** One of the key benefits that should be achieved in implementation of digital health is the ability to share data between different information systems (according to safety, privacy, and consent). Fragmented and proprietary systems limit this ability on technical and safety grounds.
- **Scant funding.** Most digital health programs are still structured as pilots and mostly government-funded technical assistance programs or implemented with loans from development partners. Sustainable financing that can support scaling is necessary. It is estimated that 77% of digital health programs around the world receive government funding, while 66% receive donor funding. Private funding (either via public-private partnership [PPP] or purely commercial endeavors) is present in only 40% of digital health programs (Greene 2013).
- **Poor skills training and stewardship in the health sector.** Digital health is still regarded as separate from the mainstream of health-care delivery. Clinical informatics is still not available as a career option in most countries in the region.

Digital Health: Policy Implications and Recommendations

There are three foundational frameworks that can be used by countries as they set up their digital health infrastructure: WHO-ITU eHealth strategy toolkit, Broadband Commission Digital Health Building Blocks, and Asia eHealth Information Network—Mind the Gaps, Fill the Gaps. These frameworks all include common themes which are needed for successful implementation:

Continuous effort to foster strong governance and regulation is vital. Digital health is frequently driven top-down by governments often with little consultation with clinical and ancillary workforce leadership. A strong governance structure must be in place to help drive digital health solutions with clear and agreed goals with clinical buy-in and clinical governance. There are three common digital health governance models in use across the world—government-led, multisector, or independent (Box 8.7).

A digital health strategy must be aligned with a country's overall health, education, and ICT strategies to reap the benefits from coordinated investments and complementary infrastructure. Governance is also responsible for implementing legislation, policies, and regulations needed to govern digital health, including data management policies, privacy and security laws,

Box 8.7: Digital Health Governance Models

Ministry of Health-led governance. The Ministry of Health leads in the development of the digital health strategy and is tasked to handle digital health operations. This model is used in Viet Nam where the eHealth Administration, under the Ministry of Health, is responsible for the development and adoption of a digital health strategy for the whole country.

Multisector governance structure. An interagency group is tasked to develop and implement the digital health strategy, drawing on the strengths of the various government units to ensure a robust and sustainable strategy. This is the governance structure used in the

Philippines, led by the National e-Health Steering Committee, with the Departments of Health, Science and Technology, Information and Communications Technology, and the PhilHealth as members. A secretariat group under the Department of Health supports the e-Health Working group.

Stand-alone agency. An entity independent of the existing government agencies is established to drive the digital health strategy. This ensures that the unique needs of setting up a digital health infrastructure can be addressed. Examples of this model include the Australian Digital Health Agency and the Canadian Health Infoway.

clinical use regulations, software compliance regulations, and telehealth regulations, among others.

There is a strong case to build common

infrastructure. Common infrastructure is a system that is shared both by government and private sector entities and can also be used across sectors. Examples are mobile/telco towers or fiber optic cables for internet connectivity, or even electricity in remote areas. They can also be soft infrastructure like citizen identifiers, common government platforms, e-Government systems, and health-related shared systems like health information exchanges or electronic health records. By investing in these common types of infrastructures, governments are able to provide a baseline infrastructure that health sector related systems can use, enable more innovations to occur as systems can share infrastructure resources, level the playing field as it allows small players to deploy innovative solutions on the shared platforms, improve technology adoption, reduce the barriers of entry in digital health, and test technologies before they are used in digital health use cases.

Promoting and adopting standards and interoperability measures are necessary. Interoperability is the capability of a software system to safely share patient data and meaning with other systems. Interoperability enables health facilities and health providers to provide better care and expands the options for patients. It would be important to establish an overarching health system architecture that can encompass and integrate internationally known health data standards that will be utilized by the various components of the ecosystem. An interoperable structure also opens up the marketplace to a wide range of vendors and reduces the risk of proprietary lock-in that can lead to high switching costs for patients and monopolistic behavior of providers.

Health standards are also important in attaining interoperability. Standards like the Digital Imaging and Communications in Medicine (DICOM) for images (NEMA 2020), the Health Level Seven–Fast Health Interoperability Resources (HL7 FHIR) (HL7 International 2019) and the Information Systems Interoperability Maturity Model (ISIMM) (van Staden and Mbale 2012) are widely used allowing any system using them to easily integrate. Standards for terminology and classification are equally important—with the Systematized Nomenclature

of Medicine (SNOMED) (Bhattacharyya 2016) and the International Classification of Diseases (ICD) being in frequent use for these purposes (Benson and Grieve 2016).

Currently, in Asia, ADB has led the establishment of a regional reference interoperability lab, the Standards and Interoperability Lab (SIL)—Asia (Bhattacharyya 2016). They have already helped in the development, conceptualization, and capacity development of several in-country interoperability labs in Indonesia, the Philippines, Thailand and Viet Nam.

The real challenge for digital health implementation is on scaling up as this requires sustained funding.

To reduce the cost of developing health platforms to a minimum, it is important to share methodologies and even software components, particularly those for use in public health. Governments can use several business models to ensure sustained financing and implementation of digital health platforms:

- (1) **Software Development Deployment.** The health facility pays for the whole cost of software development, including installation and system maintenance. Future enhancements are done either by the facility or by the original software developer.
- (2) **Software License Procurement.** Health facilities procure licenses to use digital health solutions developed by software companies. The cost of development and maintenance of the software is shared among the various health facilities that use the same software. Customization can be done but this will entail additional costs to the facilities.

For options 1 and 2, health facilities still need to invest in infrastructure to host the digital health solutions, such as devices and other hardware, and to train technical staff to operate and manage the systems.

- (3) **Software as a Service Model.** Health facilities procure a license to use existing digital health solutions. However, the digital health solutions will not be deployed to the respective facilities but on the cloud, and the original software company maintains and operates the software.

Challenges and Risks from Digital Platforms

Even as there are many benefits gained from digital platforms, it is important to recognize that there are attendant risks that have to be effectively managed. For one, the winner-takes-all dynamics typical in platform-based economies leads to significant market concentration. Appropriate policy responses will need to be designed to address possible negative impacts from the abuse of dominant position. Likewise, concerns about security, privacy, and movement and ownership of data have to be considered when formulating policies especially since the growth of the digital economy is fueled by the generation, storage, and processing and transfer of data, both within and across borders.

That online labor platforms have created new income-generating opportunities and transformed labor markets is well recognized. These new arrangements, however, have implications on income security, health-care benefits, and pensions as well as the provision of relevant education and training. Another major concern is that many of the key features of the growing digital economy heighten base erosion and profit shifting (BEPS) risks, which will impact on the availability of domestic resources for development.

As documented in section on benefits and opportunities, the economic gains from digital platforms are aplenty, and these benefits also help economies achieve their SDGs. However, the impact of digital platforms on the environment, on social cohesion, and the individuals' psychological well-being cannot be overlooked. These also have economic costs that could eventually negate the benefits if not managed properly. For instance, digital e-commerce platforms are fostering the movement toward paperless transactions and are helping reduce the need to operate physical stores which free up spaces for other uses (Tiwari and Singh 2011). On the downside, the parcelization of cross-border shipments has intensified the use of packaging materials, particularly plastic-based materials that are causing environmental damage.

The impact of the expanding internet retailing and parcelization of products on the environment has to be recognized and addressed properly. While most of the benefits are privately gained, the environmental problems become the concerns of governments, which in Asia are hard pressed for resources. There are ongoing pocket efforts to reduce wasteful packaging of parcels, but there is a need for more vigorous regulations and widespread implementation (Box 8.8).

The overarching challenge is to foster a regulatory climate that would optimize digital platforms' market and economic and social outcomes. This section examines the cross-sector policy issues that can help countries manage the risks to sustainable and inclusive development from digital platforms.

Competition

How Successful Digital Platforms Grow

High concentration and the presence of dominant digital platforms are common features across the globe. The Big Four (Amazon, Apple, Facebook, and Google) have already become household names and their market presence continues to expand. Of interest to competition policy is the trend of market leaders expanding their businesses by leveraging their position in one market to establish themselves in adjacent markets, sometimes to the detriment of its competitors. For example, Amazon is not just an e-commerce platform operator, it also competes with its own merchants by directly selling its own products in the platform, and is also one of the leading providers of cloud services through Amazon Web Services.

Regional markets such as Southeast Asia also exhibit the same pattern of high concentration. A 2019 end-of-year report on Southeast Asia's map of e-commerce covering Indonesia, Malaysia, the Philippines, Singapore, and Viet Nam identified Lazada and Shopee as the two leading firms, accounting for more than 55% of visits to the top 10 e-commerce websites (Iprice Group, App Annie, and SimilarWeb 2020). In the Philippines, Lazada

Box 8.8: E-commerce and the Environment

A typical e-commerce parcel will involve multiple packaging materials including cardboard boxes, plastic bags, adhesive tapes, and buffer materials (e.g., bubble wraps, expanded polystyrene, packing peanuts). Plastic packaging is usually the first choice for e-commerce sellers due to the material's relative durability, light weight, flexibility, and lower cost. Mordor Intelligence (2020) reports that the global e-commerce plastic packaging market was worth \$10.26 billion in 2019, and it is expected to reach \$21.78 billion by 2025 (a compound annual growth rate of 13.6% for 2020–2025). While this is a huge growth opportunity for packaging and plastics producers, the long-term potential damaging impact on the environment must be considered in the overall development equation. Management of plastic waste is particularly important in Asia, where a study by Jambeck et al. (2015) found the biggest contributors of plastic pollution in marine ecosystems were Indonesia, the People's Republic of China, the Philippines, Sri Lanka, and Viet Nam, accounting for 54.5% of the world's total mismanaged plastic waste.

While recycling technologies can potentially mitigate the problem, this route has been historically inadequate. For example, the United States (US) Environmental Protection Agency (2020), citing data from the American Chemistry Council, noted that the US produced 35.7 million tons of plastic in 2018, of which only 3 million tons (8.5%) were recycled. A study by Geyer, Jambeck, and Law (2017) on the product life

cycle of plastics estimates that 8.3 billion metric tons of virgin plastic have been produced in the world, of which only 9% have been recycled. Limits to effective recycling efforts include unsustainable packaging production and design, lack of waste management infrastructure, and limited waste tracking solutions.

A potential framework for tackling this issue is the adoption of circular economy models which promote sustainable production and consumption patterns, maximize the value of materials that circulate in the economy, minimize waste generation, and reduce hazardous components in products and their packaging. Governments play a crucial role in enacting policies and developing infrastructure that support a circular economy—such as discouraging single-use plastics through regulation, and ensuring adequate facilities for proper waste collection and management.

Manufacturers can augment these efforts by developing and using more sustainable products and packaging, exploring other materials such as bio-based or biodegradable packaging. A circular economy may also open up new markets and opportunities for businesses to offer products and services that reuse or recycle plastic products. For instance, start-ups have provided employment and income opportunities for women and out-of-school youth in poor areas to produce, for example, handicrafts, bags, footwear, reusing discarded plastics, cloth, and paper.

Source: Asian Development Bank.

and Shopee account for more than 90% of the visits. Likewise, Grab has been enjoying a virtual monopoly in car-hailing, while Angkas is just as dominant in motorcycle-hailing services. Grab is also able to leverage its market leadership in car-hailing to gain a foothold in other markets such as digital payments (GrabPay), food delivery (GrabFood), and point-to-point parcel delivery (GrabExpress).

Evans and Schmalensee (2007) posit that there are five determinants which influence market concentration in digital platform markets: network effects, scale economies, congestion, platform differentiation, and

multi-homing. The first two, indirect network effects and scale economies, tend to lead to higher concentration while the other three have the opposite influence on market concentration.

Network effects further entrenches first-movers who are able to reach critical mass, making it more difficult for newer players to gain market share and introduce more competition in markets. First-mover digital platforms have the additional advantage of having the market space to scale up operations due partly to the amount of data they are able to collect and process. Ezrachi and Stucke (2018) identify negative market distortions

from the emergence of what they call “data-opolies.” They argue that dominant incumbents use their advantageous positions in data ownership which can lead to the degradation of product quality and increasing information asymmetry. Dominant platform operators also have the ability to engage in exclusionary behavior, steering users and advertisers to its own products and services away from rival providers.

In Asia, some digital platform leaders, like Alibaba, are also first movers in their home countries and in the region. Alibaba has been successful in keeping at bay marketplace competitors from the region, and can compete with older global players, such as Amazon. Similarly, Grab controls considerable market power in 8 of the 10 economies in Southeast Asia. High barriers to entry induced by regulations magnify these advantages, paving the way for larger concentration of market power among few players.

Mergers and acquisitions are employed by larger and typically global players to penetrate or increase their presence in local markets (Box 8.9). As such, it is crucial for regulators to be well-equipped in terms of technical capacity in crafting responsive and unambiguous regulations.

Tirole (2020) argues that in situations where competition in the market is not feasible, it is important to preserve contestability by ensuring that there is competition for the market or what he calls “dynamic competition.” Instead of compelling the entry or creation of multiple competitors, an alternative is to incentivize incumbents to act competitively with the threat of entry.

A means to preserve contestability is through multi-homing or by limiting the ability of platforms to enforce exclusivity arrangements, such as drivers in ride-hailing apps. Multi-homing refers to the ability of users to join and use multiple platforms with minimal switching costs.

Box 8.9: Mergers and Acquisitions—Some Examples

Grab’s acquisition of Uber’s operations in Southeast Asia significantly increased its market share in the platform-based transportation sector. This particular merger was subject to heavy regulatory scrutiny among the competition authorities in the region. The Competition and Consumer Commission of Singapore (CCCS) found that the transaction violated Section 54 of their Competition Act, and imposed \$9.5 million in penalties on the parties.^a Similarly, the Philippine Competition Commission found the transaction to be anticompetitive, and also imposed a fine. In contrast, the Indonesia Competition Commission viewed the transaction not as a merger but an asset acquisition without any transfer of control from Uber Indonesia to Grab Indonesia.

Incidentally, Yandex.Taxi also merged with Uber in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, and the Russian Federation in 2018 (Yandex.Taxi n.d.) creating a private company called MLU B.V., incorporated in the Netherlands. In 2019, the Federal Antimonopoly Service of the Russian Federation ordered Yandex, Uber, and their joint venture “... *not to impose*

a ban on partners, drivers and passengers to work with other taxi aggregators” (Government of the Russian Federation, FAS 2019) to improve competition in the market for taxi aggregators.

Walmart India’s acquisition of more than three-quarters of Flipkart’s shares in 2018 likewise posed certain competition concerns. While the deal received approval from India’s Competition Commission, it induced calls for the creation of an exclusive e-commerce policy and regulator (Saraswathy 2019).

Alibaba’s acquisition of a controlling stake in Lazada in 2016 highlights a different aspect of increasing the platform’s market power. The deal not only neutralized one strong regional competitor for Alibaba, but, through Aliexpress, it also gained additional access channels for online retail in six of the largest economies in the Association of Southeast Asian Nations. This acquisition gave Alibaba a distinct competitive advantage in countries where operations of the two affiliates overlap despite it not raising any red flags among competition authorities when the merger was notified.

^a As of April 2019, the \$6.58 million fine for Uber has been suspended because Uber decided to appeal the CCCS decision.

Source: Villafuerte et al. (2020).

Chisholm and Jung (2015) warn against long-standing dominance in a market and barriers that prevent users from moving across platforms, in part, due to their exclusivity and data capture (Box 8.10).

The Role of Big Data in (Stifling) Competition

The economies of scale and scope, data-driven network effects, and control of data pose a high barrier to potential entrants effectively rendering the platform a non-neutral intermediary. In a case initiated by the European Commission and the Federal Cartel Office in Germany, for instance, Amazon is being scrutinized on the grounds of “abusing its market position to the detriment of sellers active on its marketplace” following complaints received by the German competition agency (Government of Germany, Federal Cartel Office 2018). Google was also fined by the European Commission in 2017 for giving its shopping service illegal advantage in search results (European Commission 2017).

In Asia, Müller (2020) noted that the Japan Free Trade Commission is investigating issues on data collection and digital cartels, and carrying out sector-wide inspections of large digital, globally operating platforms. The competition authority in the Republic of Korea has similarly signified intent to launch a probe into practices of big players like Google, Naver, Facebook, and Apple that lead to data monopolies (Kim 2019).

Big data collected and utilized by platforms matter in switching cost. For example, when the historical data (e.g., health, financial, or tax records) stored in platforms are important to the users, the switching cost can deter user movement between platforms (Tucker 2019a). Switching costs are also an issue when advertisers face high cost of leaving behind their data or converting it to a new format (Tucker 2019b). Network effects play a role in switching cost, as do the tailored content and ancillary services that in turn are produced using the extensive user data that platforms collect.

Box 8.10: Barriers to Multi-Homing

- **Contractual restrictions.** Contractual restrictions are commonly embodied in wide-scoping most favored nation (MFN) clauses and exclusivity and tying provisions.^a European competition authorities consider wide MFN clauses as those which “require suppliers and retailers to publish on a price comparison tool of online marketplace the same or better price and conditions as those published on any other sales channel,” while narrow ones necessitate publication directly on personal websites (Chappatte, O’Connell, and de Morant 2019).
- **Lack of capacity of customers to transfer existing profiles to a different competing platform.** This inability unduly locks-in a user and creates greater investments both to stay and to exit. Aside from

large network effects, an inability to multi-home may likewise be attributed to high transaction costs as a disincentive to switch.

- **Dominant players’ exclusive access to proprietary data.** A platform’s access to personal data, such as commonly searched items and historical transactions, enable an incumbent to better understand an individual’s consumer behavior. This allows dominant firms to provide better suggestions and insights to a user, as in the shape of targeted advertisements and promotions, which competitors are not able to do.

^a A popular citation of the use of a wide MFN clause is in the hotel booking market, particularly the Bundeskartellamt (Government of Germany, Federal Cartel Office) case against Booking.com in December 2015, which was dismissed because of mixed views of the narrowness of an MFN provision. In Booking.com’s clause, hotels were prohibited to offer favorable prices and conditions, namely, better booking and cancellation conditions or terms of availability on their own websites or through distribution channels offline. However, these would be permissible on portals such as Booking.com. A similar case was filed in Sweden. The Düsseldorf Higher Regional Court later quashed the initial decision by the Federal Cartel Office in June 2019 because narrow MFN clauses were found to be well-matched with competition law as they would permit a “fair and balanced contractual exchange of services between the portal and the hotels.” As such, Booking.com’s provision was required to subvert a “disloyal rechanneling” of portal customer bookings if the hotel were to establish more desirable prices and terms on their own online and offline media (BCLP 2019; Chappatte, O’Connell, and de Morant 2019).

Advancing Competition Regulations Should Consider Multiple Dimensions of Transactions

The responsiveness and precision of the regulatory framework are crucial in enabling a competitive landscape. OECD (2018b) has up-to-date competition policy and robust regional cooperation framework as well as clear and actionable consumer protection and data privacy. The quality and coverage of digital infrastructure is likewise crucial, along with rules on taxation, intellectual property, and labor protection.

Competition authorities should consider both monetary transactions and data flows in defining a multisided market (UNCTAD 2019b). For example, Germany revised its competition law in 2017 to recognize products or services provided free by platforms as a market. There is also a need to thoroughly reexamine the tools used in reviewing cases, such as the effectiveness of traditional ex-post competition instruments in dealing with digital markets that thrive in highly concentrated market structures dominated by very few big players. Perhaps utilizing well-timed and carefully targeted measures where anticompetitive behavior emerges can help tackle competition issues.

International cooperation cannot be overemphasized.

Considering the prominent cross-border dimension of digital platforms, efforts to strengthen competition laws, policy-setting, and regulatory agencies could benefit from multilateral cooperation, especially in standards regulation, data privacy rules, protectionist trade and industrial policies, and taxation, among others. Additionally, by working closely with various countries, authorities can harness synergies and respond faster and more effectively to emerging challenges by adapting key features of best practices.

The ASEAN Competition Action Plan 2025 sought to advance competition regulations in Southeast Asian economies and the implementation capacities of the designated agencies in a collective fashion (ASEAN 2016). In line with the ASEAN Economic Community Blueprint 2025, the action plan and other regional mechanisms (such as the ASEAN Competition Conference and the ASEAN Competition Enforcers' Network) can be leveraged to advance digital economy-specific regulations in the economic bloc.

Due consideration ought to be given to consumer protection and data privacy.

The extent of the collection and usage of data is critical to digital platforms. As it can be a mechanism to preserve and increase market power while exposing clients to privacy risks, this presents a strong case to integrate competition law and implementation with consumer protection and data privacy. In 2011, the Asia-Pacific Economic Cooperation (APEC) rolled out the Cross-Border Privacy Rules (CBPR) in an attempt to set the guidelines for transfer of personal information across participating economies (APEC 2019). The CBPR is a follow-up initiative to the APEC Privacy Framework launched in 2005. As of April 2019, 8 out of the 21 APEC member economies have formally joined the CBPR system.

Having strong and consumer-centric data privacy rules can foster a market ecosystem where consumers can trust businesses and authorities with their data. Secure and portable data will lower switching costs for consumers while also easing entry barriers for new businesses that can now access, with consumer consent, the data being held by dominant incumbents. Asian economies are following the lead of the European Union in this respect. Blackmore (2019) observed that there is a “consistent strengthening of data protection laws throughout the region” which are in line with the EU’s General Data Protection Regulation standards. However, the tightening of consumer protection and data privacy rules raises the operations cost of firms, which could deter competition. For example, as cited by Barker (2020), estimates of compliance cost to the regulation standards ranges from just under £1 million to £2.3 million per business in the United Kingdom, depending on the size of the company based on Calligo (2017); while most US firms surveyed indicated that they intend to allocate between \$1 million and \$10 million for compliance following PwC (2017).

Barker (2020) emphasized the importance of data rules in mergers arguing that this could reduce the quality of data protection and privacy and increase the barriers to entry or rivals’ costs. A relevant case is the Google–DoubleClick merger in 2008, where the European Commission deferred privacy considerations to the data

protection law, given the precedent set by the Asnef-Equifax case.⁹⁶ The merger was eventually approved, but the European Commission pressed the new entity to respect the fundamental rights of all parties involved to privacy and data protection.

Taxation and intellectual property rules matter in enhancing competition. Specific features of the digital economy, such as the lack of clarity in classifying digital activities and absence of harmonized cross-border tax rules, pose critical challenges to tax systems. In e-commerce, for example, the *de minimis* rules come into play in competition between digital platforms and traditional enterprises. Collection of value-added tax (VAT) or goods and services tax (GST) from digital platforms is a related concern. Indeed, plugging the gaps in consumption tax collection is one of the key objectives of the OECD-G20 BEPS Initiative.

The extent of protection of intellectual property likewise has implications on competition in the digital platform space. A standard tool in competition policy and intellectual property law is the requirement for a fair, reasonable, and nondiscriminatory access to certain assets, like software applications, hardware technology, or even digital content, that are necessary for entry and operation in the market.

Income Security and Social Protection

Persistent Work Informality and Lack of Social Protection

The emergence of the platform economy has exacerbated work informality in Asia. Work informality is highly present among the self-employed or own-account workers—86.2% of the region’s self-employed

are informal workers (ILO 2018)—where digital platform workers who self-enlist are found.

Informal workers usually lack coverage from social insurance or contributory schemes due to exclusion from legal coverage, low and inconsistent earnings, and complicated administrative processes. They also tend to be excluded from social assistance or noncontributory schemes that are typically targeted to the poor. In the process, informal workers are often left without any social protection coverage, hence, the case of the “missing middle” exists (ILO 2017, 2019; Ulrichs 2016).

Likewise, the adverse impact of digital technology on the health outcomes of users and workers is a growing concern. For example, constant use of digital devices could lead to physical illness, while exposure to unfiltered information and potentially exploitative methods may contribute to mental health issues (Box 8.11).

Among the informal workers vulnerable during the COVID-19 crisis are digital platform workers who lost jobs and experienced income shocks. For instance, it is estimated that around 90% of those working in the informal sector in India (400 million workers including rural-urban migrants) can be pushed deeper into poverty amid the government’s lockdown measures (ILO 2020a). Location-based gig workers involved in household services would have seen a decline in income opportunities given the lockdown measures. On the other hand, transport and delivery gig workers have ongoing demand as most people who self-isolate rely on digital platforms to access goods and services.⁹⁷ They have been on the forefront during the pandemic, despite their lack of proper social protection coverage.⁹⁸ These impacts have stirred global discussions on health insurance, sick pay, and other work-related benefits, and underscore the need for the extension of social protection (PYMNTS 2020).

⁹⁶ The case of Asnef-Equifax in 2006 was eventually cleared. However, issues about the sensitivity of personal data regarding the applicable competition laws were noted.

⁹⁷ Digital platforms offering delivery services like Grab, Lalamove, and Foodpanda have supported demand of households during the crisis. Other digital platforms like Didi have disabled their transport services and converted to delivery and grocery shopping services (Abacus 2020; Hung 2020; Sukumaran 2020).

⁹⁸ Grab announced measures such as contactless delivery to safeguard drivers from contracting the disease. Also, amid the ongoing discussions on the need for social protection, Grab has rolled out initiatives such as providing a one-time payment to cover loss of income for driver-partners who must undergo quarantine or medical treatment for COVID-19. It has also offered medical subsidies for affected driver-partners in some its countries of operation (Grab 2020).

Box 8.11: Digital Platforms and Mental Health

A growing body of evidence suggests a nexus between the ubiquity of digital platforms and trends in mental health outcomes. Indeed, the nature of social interactions through digital technologies could lead to mental health conditions including anxiety, depression, bipolar disorder, and lower self-esteem among users (Blachnio et al. 2016). Frequent internet use triggers neurological processes similar to other addictive substances and activities and these effects are more prevalent at younger ages. Some evidence also indicates that digital technologies can have negative impacts on physical health by crowding out healthy activities and deteriorating the quality of sleep (OECD 2019b). From a social perspective, research suggests children and teenagers can be vulnerable to cyberbullying and online

harassment through social media platforms (Lindert 2017, Mirsky and Omar 2015).

While findings have been documented, the causal effects of digital access on psychological and physical outcomes needs to be further explored. At present, most countries lack a proper indicator framework to monitor mental health outcomes and their link to digital technologies. National Statistical Offices have included questions and modules on self-reported health and subjective well-being in surveys on information and communication technology. However, more longitudinal data are needed to establish causal linkages between the use of digital technologies and people's well-being.

Source: Asian Development Bank.

Properly functioning social security systems can help address persisting challenges such as work informality, poverty, population aging, and gender inequality. Recently, governments have adopted a long-term perspective on social protection—seeing it as an investment that would yield social, economic, and political dividends. In fact, developing Asian countries have explored implementing, oftentimes concurrently, various social assistance programs such as social support services, noncontributory health insurance, food subsidies, training, fuel and electricity subsidies, unconditional in-kind transfers, school feeding programs, educational fee waiver, and conditional and unconditional cash transfers (IPC-IG and UNICEF 2019). However, due to limited fiscal space, some countries continue to make tradeoffs among different social protection investments depending on their priorities. For instance, a study shows that India, Indonesia, Kazakhstan, Nepal, and the Philippines would need to open new fiscal space to improve social protection up to the level required to achieve the SDGs, while, the PRC would have to increase its tax rates (Handayani, Cichon, and Carraro 2018).

The Appeal of Universal Basic Income

In this context, countries like India and the PRC have been examining the feasibility of a universal and unconditional cash-based social assistance scheme known as universal basic income (UBI).⁹⁹ UBI is a form of social assistance that involves regular unconditional transfer of uniform amounts of cash to all individuals of a given country. Although critics argue that UBI can create disincentives to work, inflationary effects, and fiscal pressure, it has potential to eliminate huge administrative costs and inclusion/exclusion errors associated with targeted social assistance schemes. The core features of a UBI can be defined along three dimensions (Box 8.12).

UBI benefits informal workers such as digital workers by providing them a guaranteed income not only during times of unemployment but also when they are employed yet still outside social protection systems. With UBI, transfers can act as top-up income during periods of employment, which they can utilize for any lifecycle shocks that may occur. UBI may also improve

⁹⁹ In India, a wide range of proposals have emerged following decades of debate and concerns over fragmentation (Banerjee 2016; Bardhan 2017; Ghatak 2016; Joshi 2017; Ray 2016). UBI proposals from politicians were also part of electoral campaigns in 2019. In the PRC, recent studies—mainly by UNDP China—were conducted to stir debate on UBI in the country and assess compatibility with the PRC social and economic system (UNDP China 2020a, 2020b; Zheng et al. 2017). A UBI scheme is also ongoing in Macau, China.

Box 8.12: Key Features of Universal Basic Income

Universality means that there is guaranteed coverage for everyone. Unlike targeted schemes that involve some types of means testing, universal basic income avoids the intrinsic risk of exclusion and inclusion errors associated with needs-based targeting and the transaction costs incurred to access benefits (e.g., time spent in applying for the program or verification of recipients' eligibility). From a political economy perspective, the universality of UBI "makes the public expenditure system more transparent and prevents problems of benefit fraud and not reporting income, which are typical disadvantages of means-tested benefit policies" (Fitzpatrick 1999; Zheng et al. 2017).

Another key feature of UBI rests on the provision of assistance **without conditions**. Conditionality is used to influence recipients' behaviors, typically toward nutrition, health and education—aspects where a gap commonly exists between an individual's perceived and expected returns. Implementation of a conditional social assistance requires institutional and administrative capacity (Gentilini et al. 2020), and proper coordination

across the whole government system is critical to monitor compliance to conditionalities.^a In most developing countries where complex government systems often lack coherence, public development programs need a robust design so they could perform well despite weak institutional environment. In this regard, given its unconditional nature, UBI may prove compatible with the existing institutional and governance scenario in developing countries in Asia.

UBI is a **cash-based** social assistance. Compared with public transfers of in-kind goods, cash transfers provide flexibility and power of choice to individuals, and are much easier for governments to move to recipients. The use of electronic payments to disburse cash transfers also reduces security risks. Cash transfers also entail a shorter process that does not require procurement, storage, and physical distribution making the scheme less prone to issues of red tape and corruption. Moreover, cash transfers like UBI can also promote greater transparency in fiscal accounting than other types of social security programs (Gentilini et al. 2020).

^a For example, the conditional cash transfers in the Philippines need to be coordinated to regional government offices, local government units, and so on.

Source: Arbo and Takenaka (2020).

overall work conditions as it gives workers the option to quit unsatisfying jobs, assured by the guaranteed cash income.

The most identifiable tradeoffs on whether to choose UBI over other social protection programs include "generosity vs. work disincentives, effective coverage of poor households vs. leakages to richer individuals, alternative use of available resources vs. fiscal cost, and implementation challenges vs. objectives" (Francese and Prady 2018). Macroeconomic implications of UBI should also be considered including inflationary effects of disbursing huge amounts of cash. The gravity of these tradeoffs may differ for each developing Asian country, but, there is some indication that UBI may offer solutions to some of the existing problems surrounding targeted and in-kind social protection programs, such as large transaction costs associated with in-kind support, mis-targeting and uneven coverage of programs due to a paucity of human resources to administer programs and

corruption. The appeal of broad or universal targeting will increase further as the per-person costs of delivering transfers is greatly reduced through the convenience and efficiency in digital payment infrastructures (Banerjee, Niehaus, and Suri 2019).

During the COVID-19 pandemic, cash transfers served as income support to the population, especially those with low income, while stimulating the macro-economy by encouraging consumption. As of 27 March 2020, there were 99 cash transfer programs adopted worldwide in response to the pandemic, with two of them (Hong Kong, China; Singapore) considered as quasi-UBI (Box 8.13).

Social Protection: Policy Implications and Recommendations

Digitalization has altered business models and created new types of jobs in developing Asia. However, a large

Box 8.13: Cash Transfer Measures Related to COVID-19 Pandemic

Some of the announced COVID-19-related cash transfer schemes in developing Asia are the following:

- **Hong Kong, China:** One-time universal cash transfer of HK\$1,280 (\$165) for 7 million adult residents in its effort to boost economic growth by 1% in 2020.
- **Singapore:** One-time payment of S\$300 (\$205), S\$200 (\$137) or S\$100 (\$61), based on income, to all Singaporeans aged 21 years and above.
- **People's Republic of China:** Increase in coverage and benefits of *dibao* assistance to people on low incomes, with differences in specificities at the local level. For example, temporary assistance of CNY3,000 (\$423) was provided to quarantine migrant population in Wuhan as well as CNY500 (\$70) for urban *dibao* recipients and CNY300 (\$42) for rural *dibao* recipients throughout Hubei province.
- **India:** Cash payment of ₹1,000 (\$13) each to all beneficiaries of the National Social Assistance Programme (NSAP) for elderly, widows, and disabled receiving social pensions; a monthly cash transfer of ₹500 (\$7) to all female Jan Dhan accounts for 3 months; and top-up of ₹2,000 (\$26) for farmers of the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) for 3 months.
- **Indonesia:** Monthly cash transfer of RP200,000 (\$14) to low-income households for 6 months.
- **Kazakhstan:** Monthly payment equal to the minimum wage, T45,000 (\$110) to those who have lost income during the crisis.
- **Malaysia:** Cash transfer of RM200 to household beneficiaries as part of the Bantuan Sara Hidup (BSH) program with BSH 2020 households receiving additional RM100 (\$24) and RM50 (\$12) as e-cash; one-off payment of RM600 (\$144) to taxi, tourist, and trishaw drivers and tourist guides; and special monthly critical worker allowance of RM400 (\$96) for medical doctors and other medical personnel and RM200 (\$48) for immigration and related frontline staff until end of outbreak.
- **Philippines:** Cash transfer of ₱5,000 (\$99) to ₱8,000 (\$158) monthly for 2 months to low-income households working in the informal economy (considering current conditional cash transfer grants and rice subsidy in the computation of emergency aid) as part of the Emergency Subsidy Program; launch of five new cash transfer programs: (i) compensation of ₱1,000 (\$20) to public and private health workers who contract the disease while on duty and ₱1 million to their families in case of their death, (ii) financial assistance for urgent medical and burial needs, (iii) payment of ₱5,000 (\$99) to workers in private establishments affected by the lockdown regardless of employment status, (iv) cash aid to overseas Filipino workers affected by the travel ban due to COVID-19, and (v) cash assistance of ₱10,000 (\$200) to stranded workers who are members of the Overseas Workers Welfare Administration Trust Fund.
- **Republic of Korea:** Reintroduction of jobseekers' allowance amounting to ₩500,000 (\$406) for up to 3 months; a new cash transfer scheme to roll out ₩200 billion to low-income households getting unemployed and to those under COVID-19 treatment.
- **Thailand:** Cash transfer of ฿5,000 (\$153) for 3 months, especially for people not covered by the Social Security Fund.

Sources: Gentilini, Almenfi, and Orton (2020); ILO (2020b); and IMF (2020).

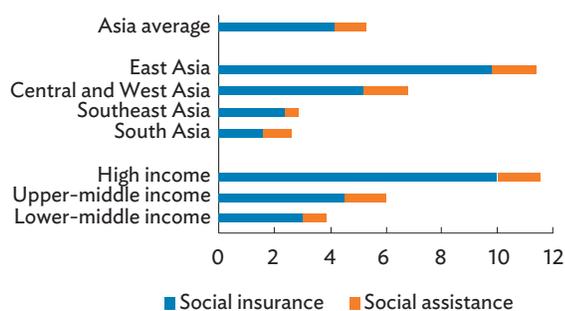
share of the population is still not covered by any form of social protection, such as social assistance and social insurance. Providing these, and also achieving the SDGs and the social protection agenda, entails fiscal requirements beyond the limited resources in developing Asian countries.

Governments must learn to respond to the informality and fast-changing nature of the digital platform labor

market with appropriate labor policies and social protection programs. The convenience offered by digital cash transfers can make it easier to distribute social amelioration funds; while accurate capture of digital platform workers in the labor force data enables the crafting of policies to address job security and mitigate abuses arising from contractual dominance of platform owners over digital workers.

Efficient fiscal management is needed to find space to extend social protection. Although resources are limited, some governments in developing Asia likely have not yet maximized their fiscal and revenue capacity to close the social protection gap. In 2015, public spending on social assistance or noncontributory cash transfers in Asia was only 1.1% of GDP, while expenditure on social insurance or contributory programs including pensions was 4.2% of GDP (Figure 8.21). On average, total spending for the broad categories of social protection was 5.3% of GDP in Asian countries (ADB 2019a). For lower-middle-income countries in the region, the figures are even smaller than the regional average: 0.9% of GDP for social assistance and 3.0% for social insurance (ADB 2019a).

Figure 8.21: Expenditure on Social Protection in 24 Asian Economies, 2015 (% of GDP)



GDP = gross domestic product.

Note: The economies included are Armenia, Azerbaijan, Bangladesh, Bhutan, Cambodia, Georgia, Indonesia, Japan, the Kyrgyz Republic, the Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Nepal, Pakistan, the People's Republic of China, the Philippines, the Republic of Korea, Singapore, Sri Lanka, Tajikistan, Thailand, Uzbekistan, and Viet Nam.

Source: ADB (2019a).

This means that there may be a manageable fiscal space to extend social protection in some developing countries in the region. To take advantage of this fiscal space, governments should focus on prioritizing social protection investments that cover informal workers, and improving the design and management of social protection schemes, such as UBI, to take advantage of the convenience offered by digital payment schemes.

Regulating Data Access, and Ensuring Privacy and Security

Learning and Contextualizing Policies from Advanced Economies

The globalized data flows present legal implications on the ability of states and data subjects to control and protect data, especially since digital platforms can conclude transactions beyond national borders (Serzo 2020). Data may be monetized by processing the same for targeted advertising and marketing communications, and other data science and machine learning applications such as credit scoring and market research.

The COVID-19 pandemic and the subsequent mobility restrictions set in place by government authorities sped up the adoption of technology and digital platforms. The pandemic also exposed ways that data may be exploited: identities of suspected patients are leaked in social media; employers require personnel to disclose travel and medical history; and local government units publish the names and addresses of individuals entitled to financial assistance. Academic and policy debates also abound relating to the implementation of GPS tracking technology to implement better contact tracing tools, and artificial-intelligence-enabled technologies that assist doctors identify COVID-19-infected patients through X-ray.

Challenges of Regulating Data Protection and Processing

The absence of enforceable intergovernmental data protection policies ought to be addressed by the governments in the region. The borderless nature of digital platform transactions will necessarily involve cross-border sharing and/or transfers of data. A transaction may therefore trigger the regulations of several jurisdictions. Except for the General Data Protection Regulation of the European Union, there is no enforceable and legally binding international standard for data regulation. Asian economies are not subjected to any overarching, international data protection regulation. This is in spite of

intergovernmental initiatives meant to encourage alignment of data protection policies.

The exponential developments in technologies are a big regulatory challenge that requires a fresh approach. Effective implementation of data protection measures is complicated by the fast-moving nature of technology development impacting operations of entities that process data. As such, existing regulations may not be sufficient to consider novel structures and processes. Due to lack of information and expertise, regulators may be tempted to immediately regulate a new business model, possibly discouraging further experimentation and innovation.

The normative challenges cannot be overlooked. Data protection is normatively and culturally challenging to enforce. Data protection legislation necessitates

the regulation of the behavior of different actors with regard to data. Unlike other prohibitive regulations, the benefits of restricting the processing of data may not be clearly apparent. Moreover, the expanding capacities of digital platforms to utilize data for various purposes, including manipulation of perceptions and distortion of information, have led to some erosion of trust in social and political institutions (Box 8.14).

Rules on Data Localization in Selected Countries in ASEAN

The importance of regional data protection structures cannot be overstated. There are a number of international and regional frameworks for data protection, but not all countries have data protection legislation or regulation. According to data from

Box 8.14: Digital Platforms and Trust

Together with their effect on individuals, digital platforms have also altered basic features of the social tissue, in particular the notion of trust, both among individuals (*interpersonal* trust) and toward institutions (*institutional* trust). Institutional trust is the basis upon which the legitimacy of governments is built, and trust in public institutions originates from their capacity to deliver public services, engage with citizens, and use public resources ethically.

Some concerns have surged among policy makers regarding the role of digital platforms to advance private or partisan interests and undermine institutional credibility. Evidence suggests that technology platforms played a pivotal role in the results of recent elections, making policy makers aware of the way social media undermines the democratic process. The mechanisms are diverse, from decentralized fundraising of parties, to targeted advertising of political information without accountability, to using algorithms to amplify content undermining trust in institutions. Digital platforms could have been instrumental in the political polarization and erosion of democracy in several countries as measured, for example, by the Democracy Index (EIU 2020).

To what extent the perils of digital platforms in political processes can be contained is still to be seen. As of 2019, more than 40 governments had introduced laws against disinformation and regulation of digital platforms to tackle some of the issues posing challenges to democratic political systems (Marsden, Meyer, and Brown 2020). Some of the measures include co-regulation (i.e., platforms self-regulate once measures are approved by state legislators), using artificial intelligence technologies to regulate online content, building trust indicators for media, improving transparency on platforms' data and algorithms, and promoting news literacy.

Despite this grim picture, digital technologies can also offer a platform for citizen participation. A telling example is Taipei, China, where increased participation on political debates—with nearly 90% of the population having access to social media—can also result in more trust in government. Decentralized technologies can provide an opportunity to capturing citizens' perspective on more complex issues and creating engagement in decision-making processes (OECD 2020a). Through a bottom-up approach, digital platforms could also contribute to improve transparency and accountability of public processes, including budgeting, nomination of civil servants, and public procurement.

UNCTAD and based on UNCTAD's grouping, 34 economies in Asia have some form of data protection legislation, 6 have draft legislations, 16 have no data protection legislation, and no available information is available for 4 of them. Brunei Darussalam, Cambodia, and Timor-Leste have no data protection legislation, while Myanmar's draft data protection legislation has yet to be enacted (UNCTAD 2020b).

The foregoing situation is interesting especially since these countries are parties to several existing international frameworks. For instance, in 2013, the United Nations General Assembly adopted a resolution on privacy rights in the digital age (UNGA 2013). The OECD has issued its Privacy Guidelines as early as 1980 (updated in 2013) which uphold certain principles with regard to data protection such as limits to the collection of personal data, safeguards on use and processing, among others, as well as the adoption of certain measures to foster international cooperation among regulators, including enforceability of country data protection laws and redress in all jurisdictions for relevant violations.

Additionally, the APEC Privacy Framework encourages improvement of the interoperability of privacy frameworks to enable information flows. APEC leaders then endorsed the APEC CBPR system which is “a voluntary accountability-based scheme to facilitate privacy-respecting data flows among APEC economies.” Nonetheless, only a handful of countries agreed to join the APEC CBPR System.¹⁰⁰ Among ASEAN countries, only the Philippines and Singapore have thus far joined the CBPR. There is also the WTO General Agreement on Trade in Services (GATS) that could function to limit the ability of states to implement arbitrary and unreasonable data protection policies that hinder data transfers and data sharing (GATS 1994).

Harmonizing data protection policies across borders remains a key issue. Despite these international agreements and frameworks, data protection policies vary, driven by different country motivations: some treat

data as a data sovereignty, national security, big-data driven economy issue (the “Chinese Model”); some recognize privacy as a fundamental human right (the “European Model”); and some treat data protection regulation through liberal and market-driven approach (the “American Model”). The three models may be concurrently applied in one region, thus making it difficult to achieve a supranational method of regulating data (Girod 2018).

Inconsistencies in cross-border data transfer regulations are another important concern. The legal standards for data transfers vary among jurisdictions. Some require consent before the data of a subject is exported to another jurisdiction; while some jurisdictions require that the receiving country is on a whitelist drafted by the regulator before data may be exported. The standards for what constitutes valid consent also vary from state to state.

In Asia, a working document published by the Asia Business Law Institute (ABLI) in May 2020 compiled the standards required under each country's regulation for data transfers to other jurisdictions. An abridged version quoting portions of the ABLI's comparative table and findings are compiled in Annex 8e. The table will show how standards for data transfer are implemented differently in each country (ABLI 2020).

Gaps and Challenges in Existing Regulations

Uncertainty and divergence in regulations are a key business concern. Despite the existing frameworks in place to regulate digital data collection and use, there is no binding international framework which provides a single standard for legal data transfers among different jurisdictions in Asia. Personal information is regulated by each state individually.

Business representatives across Asia mentioned compliance and adapting to new regulations as the biggest challenge facing Asian businesses

¹⁰⁰ As of 9 March 2020, the economies that have joined are Australia; Canada; Japan; Mexico; the Philippines; the Republic of Korea; Singapore; Taipei, China; and the United States.

(Baker McKenzie 2017) as cited in Girot (2018). An UNCTAD publication cited some concerns from businesses such as too stringent protection could stifle innovation and limit investments on emerging technologies reducing potential accompanying societal benefits (UNCTAD 2016). The compliance process is multijurisdictional, making it resource-intensive and costly to adopt, assess risk, and operate regionally.

The digital platform needs to ensure that its mechanism for procuring consent is recognized and enforceable in all jurisdictions that require these prior to data transfers. For a platform, additional steps for opt-ins could dampen user experience and limit transactions. The divergence in data protection legislation may also lead to tedious compliance measures from the digital platforms such as blanket consent forms that are all-encompassing, lengthy, and oftentimes, full of legalese.

Privacy regulations ought to take into account the likelihood of regulatory arbitrage and business climate competitiveness. Data protection legislation and regulations may act as nontariff trade barriers that can push platforms toward jurisdictions with less stringent data protection regulations. For example, due to the cost of compliance and the amount of risk they face when processing data in the Philippines, digital platforms may choose not to provide services to Philippine citizens and locate elsewhere. Some platforms try to avoid being subject to the Data Privacy Act (DPA) but still target the lucrative Philippine market by locating offshore. Despite the extraterritorial provisions of the DPA, its applicability and actual enforceability will be difficult for Philippine law enforcement agencies to enforce on offshore entities, without the cooperation of other concerned jurisdictions.

Broad protection for personal information empowers individuals. Most of the data protection regulations of Asian economies provide a blanket coverage for all personal information and for all persons processing personal information. This regime may provide greater privacy protection as it will be difficult for entities to try and circumvent the law in order to escape coverage.

For data subjects and the public, the explicit grant of certain rights under data protection legislation gives data subjects more control over how their personal information is being processed. The greater transparency and autonomy operationalize the constitutional protection to one's privacy. At the same time, this may lead to greater trust for businesses that are compliant with such regulations.

Weakness in mechanisms on self-management of privacy rights leads to legal exploitation of data. Self-management of privacy rights can be time-consuming and confusing, especially for those using and accessing numerous online services. One study estimated it would cost \$781 billion in lost productivity if everyone were to read every privacy policy at websites they visited over 1 year (McDonald and Cranor 2008). Lessig (2006) explains that “cluttering the web with incomprehensible words ... drives consumers away from even attempting to understand what rights they give away as they move from site to site.” The weakness, therefore, of a consent-based regime is that it may enable the legal exploitation of personal data.

Data Protection: Policy Implications and Recommendations

Stronger intergovernmental and multilateral data protection frameworks are needed. A more viable approach in the short to medium term may be to focus on intergovernmental mechanisms that will assist in the cross-border transfer of data, instead of lobbying for a general and comprehensive international data protection regime. This may include promoting cooperation among enforcement authorities; instituting mechanisms that will allow data subjects to enforce data protection rights in all relevant jurisdictions; and pushing for uniform certification standards for controllers, similar to the existing mechanism provided under the APEC CBPR to make data transfer standards more objective and predictable. Efforts should also be made in eliminating data transfer restrictions for data categories necessary for digital platform transactions, with due regard to each particular country's national security considerations.

More light-touch or flexible regulatory regime is worth considering. Regulators must balance public protection and the need to ensure that legislation and regulation do not have a chilling effect on innovation. The details of data protection rules may be ironed out in other instruments such as light-touch regulatory approaches and tools that provide oversight such as best practices guidelines, issuing warnings and advisories, providing official speeches, interpretations, and meetings with regulated parties. This allows the government to supervise developments in certain industries while observing how the technology will develop and affect consumers. Intergovernmental organizations may also consider issuing uniform guidelines and best practices suggestions.

The regulators may also consider adopting and issuing rules for regulatory sandboxes which are limited frameworks that allow certain, prequalified entities to soft-launch their products in controlled environments.

Taxation

The emerging digital economy is characterized by new features that have implications for tax systems.

These include (i) the mobility of intangibles and platform players; (ii) the increasing reliance on data and other intangible assets; (iii) the networks effects; (iv) the spread of multisided business models; (v) the tendency toward monopoly or oligopoly in a digital economy; and (vi) the volatility that accompanies the low barriers to entry owing to technological advances (OECD 2015).

It is essential to balance the granting of incentives to attract foreign investment and the need to enhance international taxation for domestic resource mobilization in Asian economies. Asia's appeal as a destination for foreign direct investment (FDI) has grown considerably, underlining the need for reinforcing mechanisms against tax avoidance. Despite declining global trends, Asia's inward FDI attracted 33% of the global total (estimated at \$1.5 trillion) in 2019. Inward FDI in services in Asia, often with a strong digital component, has increased steadily to reach \$243.2 billion in business, communications, financial, software, IT, and transportation services (ADB 2019b).

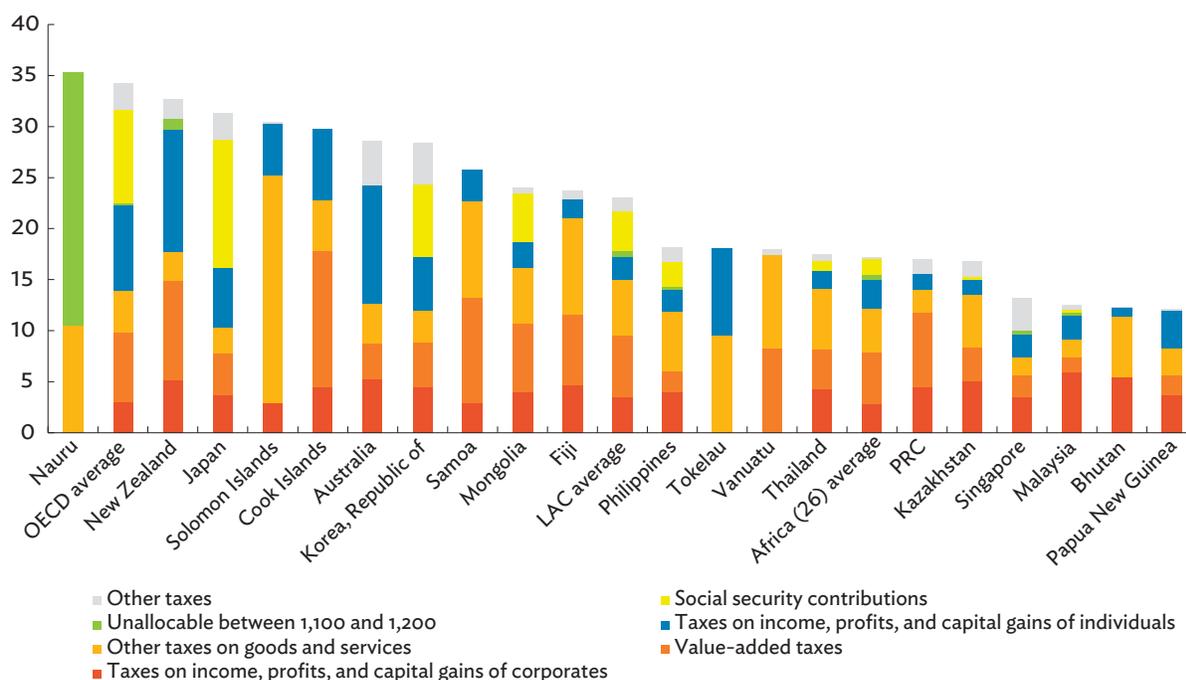
Asian governments have to balance their policy mix to offer a competitive tax environment to international investors with the need to ensure that an appropriate share of domestic tax is collected from multinationals. Cross-border flow analyses suggest that, on average, FDI decreases by 3.7% following a 1 percentage-point increase in the tax rate on FDI (OECD 2008). This sensitivity has risen over time as capital has become increasingly mobile. Southeast Asian economies like Thailand and Indonesia, for example, have introduced aggressive cuts in statutory tax rates and offered tax holiday incentives to attract FDI.

Policy makers in the region need to consider how international tax cooperation can help mobilize domestic tax revenues and address development gaps. With large variations among countries, domestic tax collection in Asia remains low relative to the OECD average (Figure 8.22). In 15 Asian economies for which comparable data are available, the average tax revenue as a share of GDP was lower than the 34.2% OECD average in 2018 (OECD 2020b). Value-added taxes still account for a large share of tax revenues, while shares from corporate income taxes vary across countries, ranging from 11% (Samoa) to 47% (Malaysia). The uneven composition highlights the different priorities of governments in regard to the digital economy. These figures also highlight the importance of broadening the tax base and enhancing tax compliance. Strengthening international taxation to increase domestic tax revenues should be an important long-term objective for Asian economies to help achieve the Sustainable Development Goals.

Challenges of Digitalization on Taxation and International Tax Cooperation

The ongoing evolution of the digital economy presents challenges for tax systems, broadly in terms of the reduced need for physical presence (nexus), the growing utilization of data, and uncertainties surrounding the adequate capturing of business income. The digital economy poses three main challenges: (i) the ability of digital businesses to operate in an area without a physical presence entails a review of the rules on physical presence (nexus rules),

Figure 8.22: Tax-to-GDP Ratios in Asian Economies, 2018 (%)



GDP = gross domestic product, LAC = Latin America and the Caribbean, OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

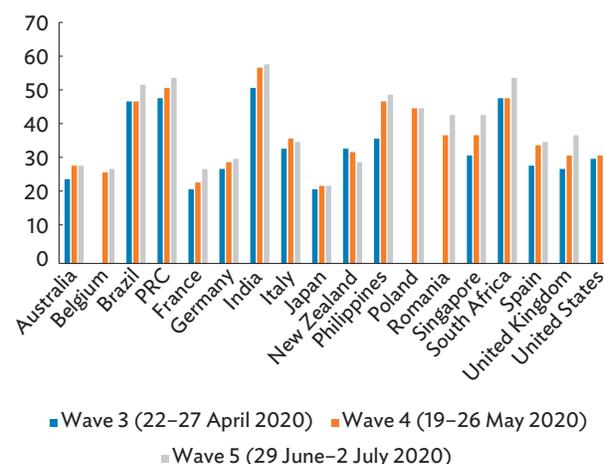
Notes: The figures do not include subnational tax revenue for the Cook Islands, Fiji, Malaysia, Papua New Guinea, Samoa, and Solomon Islands. The averages for Africa (26 economies), for LAC (25 economies), and the OECD (36 economies) are unweighted. Australia, Japan, New Zealand, and the Republic of Korea are part of the OECD group. 2017 data are used for the Africa (26) average, Australia, Japan, and the OECD average. The tax-to-GDP ratio for the PRC does not include revenue from social security contributions as detailed data were not available.

Sources: OECD (2019c, 2020b).

(ii) the extensive use and monetization of data requires examination of the economic value this generates and whether it is appropriately captured for tax purposes, and (iii) new business models such as cloud computing present difficulties in properly characterizing income for tax purposes (OECD 2015).

The current COVID-19 pandemic has accelerated the adaptation and use of technology, triggered rapid growth in the digital economy, and changed the corporate landscape. Survey data suggest that consumers expect to continue to participate in the digital economy even beyond the pandemic, with more than 50% of the respondents from India and the PRC stating that they will shop online more extensively after the COVID-19 outbreak is over (Figure 8.23). Against the backdrop of rapid digitalization and adoption of digital platforms triggered by the COVID-19 crisis, issues on the applicability of existing tax regimes, including

Figure 8.23: Share of Respondents Who Expect to Shop Online More Frequently Post-COVID-19 (%)



COVID-19 = coronavirus disease, PRC = People's Republic of China.

Note: The survey question was stated as the following: "After the outbreak is over, do you think you'll do any of the following: shop online more frequently?"

Source: GlobalWebIndex (2020).

cross-border components of taxing rights under tax treaty rules have come to the fore. As companies face major disruptions in business practices and the allocation of the working force, national tax regimes are starting to be redesigned. This in turn poses challenges to prevent BEPS, as large multinational corporates are the ones primarily engaging in these practices.

But progress in tackling tax and digitalization issues in the OECD/G20 Inclusive Framework has been considerable.

As of June 2020, 19 developing member countries (DMCs) and all 21 non-DMCs of ADB's 68 member countries had joined the G20/OECD inclusive framework. Concrete proposals were made in 2019 on two complementary pillars: one revisiting the allocation of profit and nexus rules, and another on a global anti base-erosion mechanism, including the consideration of a global minimum tax (Box 8.15 lays out the negative impact of BEPS on tax revenues). Together with these initiatives, international guidelines on making digital platforms fully and solely liable for assessing, collecting, and remitting the VAT/GST due on the online sales they enable are being developed (OECD 2019d). The experiences of the three largest digital platforms in the PRC illustrate this issue (Box 8.16).

Asia has made progress in committing to the international exchange of information (EOI), which is critical for tackling tax evasion. To date, 27 DMCs have joined the Global Forum on Transparency and Exchange of Information for Tax Purposes. Asia's rapid growth and global integration in recent years has prompted tax authorities to work together toward establishing better mechanisms for information exchange, and EOI agreements are an effective tool for tax administrations to track and assess cross-border transactions. DMCs have made progress in some areas relating to the Exchange of Information on Request and the Automatic Exchange of Information (Figure 8.24). At the same time, the region has continued to strengthen the rules on tax agreements, double taxation treaties, and other mechanisms for exchanging tax information.

Proposed measures for a country to counter BEPS practices include active participation in international forums, the adoption of domestic tax measures in the interim, the collection of value-added tax for C2C transactions, and improvement in tax administration capacity. Absent specific guidance on digital economy taxation, measures that countries can take include active participation in international forums for tax matters and the adoption of domestic

Box 8.15: Negative Impact of Base Erosion and Profit Shifting on Tax Revenues

There are significant negative effects of base erosion and profit shifting (BEPS) activities on tax revenues—which could be amplified by digitalization. Utilizing foreign direct investment (FDI) data of 79 countries, Jansky and Palansky (2019) estimated annual tax revenue losses of \$125 billion owing to profit-shifting activities, and that low-income and lower-middle-income economies incur the highest losses in corporate tax revenue, both as a percentage of gross domestic product and of total tax revenue. Johansson et al. (2017) estimated that annual revenue losses range from \$100 to \$240 billion per year or

4% to 10% of global corporate tax revenues.^a In estimating the fiscal effects of FDI-related BEPS, Bradbury, Hanappi, and Moore (2018) found that figures ranged widely from \$80 billion to \$647 billion annually. In contrast, preliminary estimates of the combined effects of Pillars 1 and 2 of the BEPS Action Plan found a potential annual global net revenue gain of up to \$100 billion or 4% of global corporate income tax revenues.^b Such revenue gains are projected to be largely similar across high-, middle-, and low-income countries and the reforms are expected to significantly decrease profit shifting (OECD 2020d).

^a This estimate takes into account the effects of these reforms and the United States' Global Intangible Low Taxed Income (US GILTI) Regime. Excluding the US GILTI regime, the potential annual net revenue gain would reach about \$80 billion or 3.2% of global corporate income tax revenues (OECD 2020c).

^b Pillar 1 involves the reallocation of taxing rights and Pillar 2 concerns the global anti-base erosion mechanism. In particular, change the allocation of taxing rights through a coherent and concurrent review of the profit allocation and nexus rules (Pillar 1); and remaining BEPS issues and minimum taxation (Pillar 2).

Source: Avendaño and Rosenkranz (2020).

Box 8.16: Issues and Challenges Relating to Big Tech

The digital economy, led by the Baidu, Alibaba, and Tencent (or the BAT) companies, has grown at an unprecedented scale in the People’s Republic of China. In 2019, e-commerce constituted 35.3% of retail sales—compared with a 10.9% share in the United States—accounting for an estimated 56% of the global total in 2019 and expected to be over 60% in 2022 (Turley and Leung 2019). The country’s Big Tech platform giants figure heavily in this trend, with Alibaba and Tencent featuring in the 10 biggest global companies by market capitalization as of March 2019 (PwC 2019).

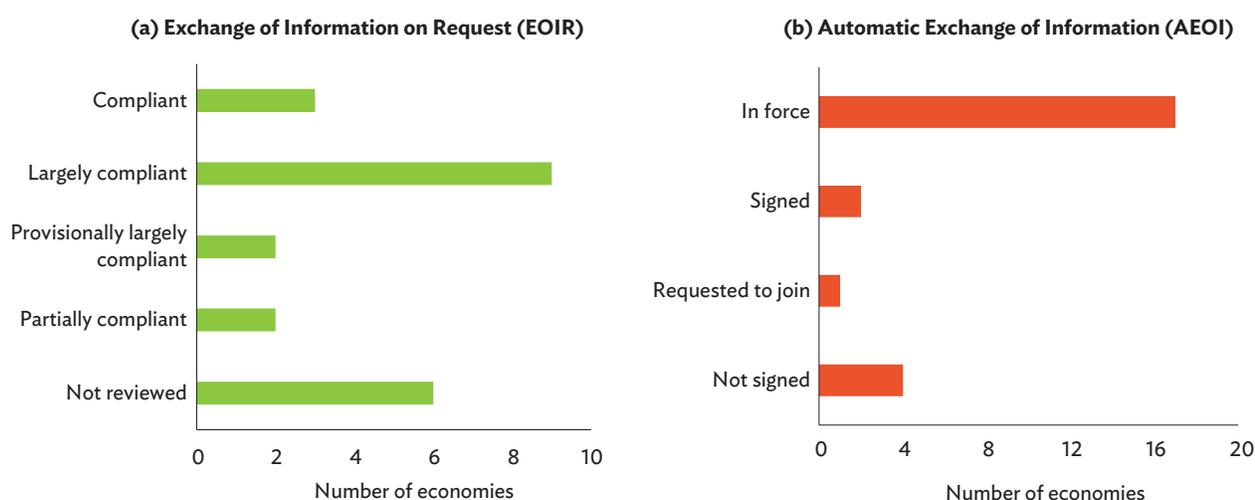
There are 10 million active sellers on the Alibaba e-commerce platform—which constitutes 60% of the domestic e-commerce market. The superapps embedded within the Tencent and Alibaba ecosystems encompass a wide range of economic activities, spanning entertainment and social media, payments and finance, shopping and dining, to health and education. The volume of data at the disposal of the BAT companies places them in a position to help potential partner firms optimize their offerings or targeting, streamline supply chains, or determine the distribution of store placements

(Turley, Ho, and Leung 2018). The reach of the BAT firms has expanded to South Asian and Southeast Asian markets, where Alibaba, Tencent, and others have invested substantially in regional e-commerce platforms (Turley and Leung 2019).

The challenges such giant companies operating cross-borders pose to tax systems span regulatory issues, classifying digital platforms, tax collection difficulties, as well as cross-border issues. Regulatory constraints have emerged such as (i) mismatches between the regulatory and taxation classifications (e.g., ride sharing or transport services); (ii) ambiguity in the treatment of platforms as brokers or as principals affecting requirements to meet tax obligations and compounding upon already low tax compliance levels among vendors; (iii) limited categorization of outbound payments within foreign exchange rules; (iv) defining when imported digital services can be said to be fully consumed outside the country; and (v) limited guidance on a definition of a permanent establishment, such as those pertaining to mirror servers or user interfaces (Turley and Leung 2019).

Source: Avendaño and Rosenkranz (2020).

Figure 8.24: Compliance to Exchange of Information Standards in Developing Asia



Notes: In panel (a), Compliance refers to Automatic Exchange of Information on Request, which includes relevant information for the administration or enforcement of the domestic tax laws of a requesting party. In panel (b), Compliance refers to the Common Reporting Standard regarding financial accounts on a global level between tax authorities.

Source: Avendaño and Rosenkranz (2020) using OECD. International Tax Co-operation: Key Indicators and Outcomes Database. <https://www.oecd.org/tax/international-tax-co-operation-map.htm> (accessed July 2020).

measures that comply with the country's international obligations in the interim.

As it stands, some economies in Asia have undertaken measures to improve taxation of digital transactions in the last few years (Avenidaño and Rosenkranz 2020). In 2019, India introduced an expanded definition of nexus for corporate income tax purposes by accounting for significant economic presence, based on income and number of users thresholds, and allowing for the taxation of profits of a nonresident corporation regardless of the level of physical presence of that company in the taxing jurisdiction (OECD 2018c).

In Australia, the Multinational Anti-Avoidance Law seeks to deter nonresident enterprises belonging to large multinational enterprises from avoiding establishing local permanence and evading taxes. Trade structures falling under this law are subject to a re-allocation of income in line with traditional permanent establishment terms and an additional penalty of a percentage of the tax avoided. It was estimated that an additional \$77 million in annual corporate tax revenue will be collected, translating to an annual \$5.4 billion in tax base recovered owing to this measure (OECD 2018c).

In Malaysia, Singapore, and other countries, electronic systems are used to enhance tax compliance, such as issuance of pre-filled returns for some or all sources of personal income. In Malaysia and the Philippines, measures have been taken to expand royalties by including payments for the right to use software, visual images, or sound transmissions under the scope of royalties. In India, a 6% charge is levied on gross consideration for online advertisement services offered by nonresidents (Terada-Hagiwara, Gonzales, and Wang 2019). As digital economy gains more traction during COVID-19, the Philippines has proposed a tax on digital platforms in the form of value-added tax and income tax.

Indeed, a value-added tax imposed on customer-to-customer transactions can be considered. Yet, while domestic measures can be effective to some extent, a proliferation of unilateral approaches, such as the introduction of a digital services tax, might not be a sustainable approach for domestic resource mobilization

in the long term. Providing conditions for equal treatment among national tax systems in the region is therefore necessary in reducing tax competition and potential loopholes. Importantly, improvements in tax administration capacity for both cross-border and domestic e-commerce transactions can be adopted, including digitizing tax invoices, the creation of a centralized and uniform tax administration system, and the introduction of risk-based management, self-assessment and tax audits to help collect tax information and reduce compliance costs for taxpayers (Terada-Hagiwara, Gonzales, and Wang 2019). Several economies in the region have crafted VAT or GST guidelines (Table 8.16) pursuant to the aforementioned objective and following the international standards.

Taxation: Policy Implications and Recommendations

The fast-changing nature and rapid expansion of the digital economy have posed challenges for tax systems. Countries have had to find ways to respond quickly to define aspects of digital transactions—such as valuing data as commodity, nexus requirements for multinationals that engage in cross-border transactions—in order to capture revenues and, at the same time, attract investments. While regional cooperation structures have been put in place, countries need to continue to coordinate to mitigate network effects, plug tax leaks, and foster cooperation.

Many of the key features of the growing digital economy heighten BEPS risks, necessitating careful examination by policy makers. Countries need to ensure that multinational firms do not gain inappropriately from exceptions from permanent establishment status. The presence of intangibles, growing pervasiveness of data in digital business, and the spread of global value chains across different locations have allowed firms to benefit from BEPS activities. Moreover, the ability of firms to operate from remote locations and to conduct business with minimal personnel, allow fragmentation of operations in order to evade taxes. In addition, measures to adapt controlled foreign company rules to advances in the

Table 8.16: Progress in Selected Asian Economies in Solving Challenges of the Digital Economy (BEPS Action 1)

Jurisdiction	Cross-Border B2C Supplies of Services and Intangibles		Low Value Imports
	Applies Principles of the International VAT/GST Guidelines On Cross-Border B2C Supplies of Services and Intangibles	Simplified Registration and Collection Mechanisms	Implementation of Mechanism for Collecting VAT/GST on Imports of Low-Value Goods from Online Trade
Hong Kong, China	N/A (no VAT/GST)	N/A (no VAT/GST)	N/A (no VAT/GST)
India	Yes ^a	Yes	No
Indonesia	Under consideration	N/A	No
Japan	Yes ^b	Yes	No
Kazakhstan	No	No	
Malaysia	Yes ^c	No	N/A
Philippines	Under consideration	No	No
PRC	Yes ^d	No	No
Republic of Korea	Yes ^b	Yes	No
Singapore	Yes	Yes	Under consideration
Sri Lanka	No	No	
Taipei, China	Yes	Yes	
Thailand	Under consideration		No
Viet Nam	Yes ^e	No	

B2C = business-to-costumer, BEPS = base erosion and profit shifting, GST = goods and services tax, N/A = not applicable, PRC = People's Republic of China, VAT = value-added tax.

^a Adoption of actions based on guidelines in 2017.

^b Adoption of actions based on guidelines in 2015.

^c Services tax policy on digital services.

^d Adoption of actions based on guidelines in 2009.

^e Adoption of actions based on guidelines in 2020.

Note: Blank cells indicate no public information available.

Sources: ADB compilation using OECD (2017, 2018e, 2019e); and national tax offices.

digital economy and to respond to tax planning by companies involved in VAT-exempt activities need to be considered (OECD 2015).

The predominance of digital transactions could also offer some opportunities to national tax authorities.

In many cases, the increasing use of digital platforms for economic purposes could facilitate tracing of taxable transactions. Digital transactions can be traced and information shared among concerned tax authorities, whereas cash transactions cannot be traced. Tax authorities in some countries have introduced tax credits and other incentives to promote electronic payments. Current discussions on the implementation of VAT/GST guidelines for online sales illustrate the importance of information sharing among platforms and tax authorities.

There are, however, significant gaps in the technological and operational capacities of tax administrations to implement these practices. Communication with digital platforms and businesses on their fiscal obligations will also be important if a cooperative compliance model is to be implemented.

As regional trade agreements gradually incorporate provisions on digital trade and data flows, coordination with the implementation of BEPS measures is important.

About 27% of the 275 existent regional trade agreements in the WTO explicitly address e-commerce issues, ranging from customs duties and consumer protection to data privacy (Monteiro and Teh 2017). From this group, about one-third specify a right to impose an internal tax or charge on digital products. As

these agreements include further measures against BEPS practices, Asian economies will need to incorporate these in their tax schemes.

Large-scale policy responses to COVID-19 will likely increase sovereign debt levels, underpinning the need for efficient tax systems and tackling BEPS to assure public debt sustainability in the longer term.

It is expected that the sovereign debt-to-GDP ratio in Asian DMCs will increase by 7 percentage points in 2020 compared with 2019.¹⁰¹ With the prospect of a significant economic downturn, high debt levels—potentially further increased by accommodative monetary and fiscal policies to mitigate the COVID-19 economic impact—not only pose considerable risks to Asian economies and financial markets, but will also weigh on governments' future fiscal space. Consequently, in order to assure public debt sustainability and maintain needed public spending post-COVID-19, tackling BEPS becomes even more important for domestic resource mobilization.

Regional and international cooperation and coordination are necessary elements underlying effective response to BEPS. Such cooperation should expand beyond OECD and G20 member economies to encompass developing economies. This encapsulates knowledge sharing on the best practices in tax administration and the monitoring of new developments. The OECD Inclusive Framework can facilitate and monitor the implementation of BEPS mitigation efforts. Critically, BEPS Action 1 on the Digital Economy may become a minimum standard, and countries will be assessed on their progress regardless of their membership in the Inclusive Framework. Meanwhile, the region should continue to strengthen the rules on tax agreements, double taxation treaties, and other mechanisms for exchanging tax information. Another promising area for cooperation in the region is the promotion of a unique legal entity identifier (LEI) to allow for cross-border data exchange on taxation. Regional policy forums (such as ASEAN/+3 and APEC) and multilateral development banks (such as ADB) can also help advance these efforts.

As part of these efforts, ADB recently announced the establishment of a Regional Hub on Domestic Resource Mobilization and International Tax Cooperation in Asia.

The regional hub will provide an open and inclusive platform for (i) strategic policy dialogue, institutional and capacity development, and exchange of information and ideas through a dialogue among DMCs; (ii) knowledge sharing across knowledge partners, international financial institutions, other bilateral revenue organizations, and DMCs in Asia; and (iii) collaboration and development coordination across development partners (Asakawa 2020). Through policy dialogue, research, capacity development and knowledge-sharing activities, the hub will assist each DMC to define differentiated domestic resource mobilization and international tax cooperation goals that will be appropriate for their circumstances and level of development.

Preparing for Greater Digital Inclusion in Asia

Digital Readiness

Digital connectivity has generally improved in Asia since the turn of the century. Between 2002 and 2018, the proportion of population that has accessed the internet has risen by 31 to 50 percentage points across subregions in Asia (Figure 8.25), translating to about 1.7 billion more people in the region having gained access to the digital space during the period. The increase in usage is bolstered by lower costs, better connection quality, increased adoption of online services, and the proliferation of smart phones.

Digital readiness is crucial to leave no one behind in the digital economy. The extent of penetration of online marketplaces still varies substantially across Asian economies. The digital platform penetration indexes (see Annex 8f) show that digital platform use and activity are generally more established in developed

¹⁰¹ This is based on the simple average of the difference in the 2020 and 2019 general government gross debt as percentage of GDP for ADB's developing member countries, using data from the International Monetary Fund. World Economic Outlook October 2020 Database. The calculation does not include Mongolia and Palau as data are unavailable.

Figure 8.25: Share of Population Using the Internet (%)

Notes: The data are simple averages of country-level shares. Subregional groupings follow ADB's convention. The Pacific does not include Palau due to absence of data since 2010. For Niue, the most recent data point is as of 2016.

Source: ADB calculations using data from International Telecommunication Union, ICT Eye Database. <https://www.itu.int/net4/ITU-D/icteye/#/> (accessed April 2020).

economies in the region (Table 8.17). Incidentally, with the exception of East Asia, where all but Mongolia are in the top group, economies in the other subregions do not appear to cluster together in terms of digital platform penetration. This means there is a large potential for subregional forums to promote learning between neighboring countries and extract synergy gains.

A structural assessment of drivers of digital platform penetration shows that apart from digital connectivity, factors such as urbanization, working age population, the expansion of the services sector, and governance quality exert a positive influence on digital platform penetration (Box 8.17).

The Digital Divide

The performance of the digital economy is tempered by the digital divide and the deeper issue of inequality. The benefits of the platform economy are not equitably distributed within and across countries, and gaps can exist based on levels of income, education, gender, and geographic location. There are four kinds of barriers to access (called divides) corresponding to

each of the four types of access: motivational or mental, material, skills, and usage (van Dijk 2006).

The *motivational or mental access divide* is driven by the lack of basic digital experience, presence of technology anxiety, and a perceived intimidation from new technology. Other factors include low levels of income and education, and lack of time to learn new things (Ghobadi and Ghobadi 2013). The *material access divide* includes barriers that limit physical access to devices and network connection. Low levels of income and education, and the absence of occupation also contribute to this barrier.

There are three types of skills that define the *skills access divide*: (i) *operational skills* or the ability to work with hardware and software; (ii) *information skills* or the proficiency in searching, selecting, and processing information using computer and network sources; and (iii) *strategic skills* or the competence to use a computer and related network sources (van Deursen, van Dijk, and Peters 2011; Ghobadi and Ghobadi 2013). Skills access can be limited by insufficient digital skills caused by a lack of user-friendliness in technologies, inadequate education, or social support. Ghobadi and Ghobadi (2013) point out that education is a critical factor on all three types of skills.

The *usage access divide* is about the various ways ICT applications are used and is generally associated with demographic characteristics and technical connections. Those who contribute to the internet (e.g., publishing a personal website, creating a web blog, and so on) are called active or creative users, while the passive users merely consume information available online.

The skills needed to participate in the platform economy are conditional on having the motivation to learn and the physical access to the basic technology on which one can practice and apply the skills. A person can participate in the platform economy or gain usage access only when the necessary skills have been acquired.

Trust and perceived security of the internet affects usage. One of the main barriers for accessing the internet is lack of knowledge about it. In a survey conducted by

Table 8.17: Digital Platform Penetration Index, 2019

Economy	DPP Index	Digital Platform Penetration Subcomponents			
		Revenue-to-GDP Ratio	Per User Spending, Proportion of per Capita Income	User accounts-to-Population Ratio	Revenue-to-Population Ratio (PPP Adjusted)
PRC	2.5847				
Korea, Republic of	2.5283				
Australia	2.1010				
Hong Kong, China	2.0323				
New Zealand	1.8795				
Japan	1.7794				
Singapore	1.7644				
Malaysia	1.1008				
India	1.0220				
Viet Nam	0.9429				
Indonesia	0.9190				
Brunei Darussalam	0.8322				
Philippines	0.8221				
Armenia	0.8077				
Pakistan	0.7960				
Kazakhstan	0.7929				
Thailand	0.7902				
Azerbaijan	0.7833				
Sri Lanka	0.6501				
Georgia	0.5751				
Kyrgyz Republic	0.5018				
Uzbekistan	0.4840				
Nepal	0.4619				
Fiji	0.4579				
Cambodia	0.4416				
Tajikistan	0.4155				
Bangladesh	0.3928				
Myanmar	0.3909				
Bhutan	0.3119				
Mongolia	0.2824				
Lao PDR	0.2523				
Timor-Leste	0.2486				
Papua New Guinea	0.2111				
Turkmenistan	0.1565				

DPP = digital platform penetration, Lao PDR = Lao People's Democratic Republic, PCA = principal components analysis, PPP = purchasing power parity, PRC = People's Republic of China.

Notes: The subcomponents were normalized. Low- to high-value spectrum: 

The PCA was estimated using data from 2017 to 2019. The divisions represent the groups above and below the 33rd and 66th percentiles. Users in the second column refer to AdTech-exposed Internet users.

Source: ADB calculations using data from Statista (2020a, 2020b).

Box 8.17: Drivers of Digital Platform Penetration

The analysis of the underlying drivers of digital platform penetration follows the technology-organization-environment (TOE) framework of DePietro, Wiarda, and Fleisher (1990)^a which provides a taxonomy for classifying adoption factors depending on the context (Tweneboah-Koduah, Endicott-Popovsky, and Tsetse 2014). In this exercise, the revenue per population (purchasing power parity-adjusted) and digital platform accounts per population serve as the measures of digital platform adoption and diffusion. In line with the nodes of the TOE framework, the independent variables include internet penetration, education index, services sector's share, urbanization, work age population, and government integrity—all lagged by one period.^b

Results using panel estimation with country group and time fixed effects covering 34 Asian economies with data from 2017 to 2019 indicate that apart from internet penetration, there is a positive association between digital platform diffusion on one hand, and urbanization, working age population, the expansion of the services sector and governance quality, on the other hand (box table). Unsurprisingly, the coefficients of the group dummies suggest that pace of adoption is faster in economies where platform activity is already well-established. In a separate estimation, income per capita, which tends to be collinear with education and urbanization, is also found to be significantly positively associated with digital platform penetration.

Factors Anchoring Diffusion of Digital Platform Participation—Asia

Dependent Variable	Accounts per 100 Persons		LN (Revenue per Person)	
	(1)	(2)	(3)	(4)
Proportion of internet users_lag1	0.780** (0.296)	0.596* (0.293)	0.009** (0.003)	0.008** (0.003)
Education index_lag1	-58.54 (33.67)	-33.30 (31.65)	0.138 (0.393)	0.292 (0.416)
Urban population share_lag1	1.336*** (0.315)	0.711** (0.250)	0.007* (0.003)	0.004 (0.003)
Working age population share_lag1	0.563 (1.011)	1.179 (0.933)	0.036*** (0.009)	0.041*** (0.009)
Services share in GVA_lag1	1.933*** (0.257)	1.233*** (0.280)	0.013*** (0.003)	0.009** (0.003)
Government integrity index_lag1		1.291*** (0.315)		0.008* (0.003)
Constant	-81.99 (64.71)	-112.0 (61.94)	5.132 (0.609)	4.897 (0.643)
Year fixed effects	Yes	Yes	Yes	Yes
Country-group fixed effects	Yes	Yes	Yes	Yes
Group dummies: Base is the lowest group				
Mid group	21.09* (9.789)	21.95* (9.541)	0.690*** (0.109)	0.688*** (0.105)
Top group	101.8*** (22.46)	98.05*** (22.06)	1.566*** (0.200)	1.514*** (0.199)
Observations	102	102	102	102
R-squared	0.909	0.923	0.932	0.936

GVA = gross value added.

Notes: Standard errors in parentheses. * p<0.05; ** p<0.01; *** p<0.001. Economies are divided into three groups based on the dependent variables (digital platform penetration metrics). The low-tier group consists of economies from 33rd percentile and below. The mid-tier group comprises economies higher than the 33rd percentile to the 67th percentile. Meanwhile, the top-tier comprises economies above the 67th percentile. The idea is to take into account changing dynamics in the stage of platform penetration an economy has reached relative to others.

Sources: ADB calculations using data from The Heritage Foundation. Index of Economic Freedom Database. <https://www.heritage.org/index/explore> (accessed October 2020); International Telecom Union. ICT Eye Database. <https://www.itu.net/net4/ITU-D/icteye/#/> (accessed April 2020); Statista (2020a, 2020b); United Nations Development Programme. Human Development Report Database. <http://hdr.undp.org/en/data>; United Nations Statistics Division. National Accounts Main Aggregates Database. <https://unstats.un.org/unsd/snaama/> (both accessed October 2020); and World Bank. World Development Indicators. <https://databank.worldbank.org/source/worlddevelopment-indicators> (accessed July 2020).

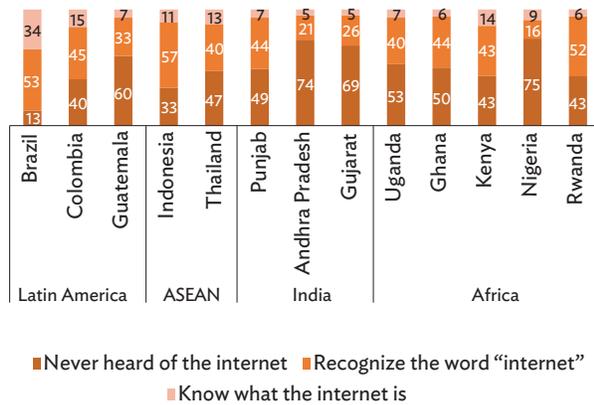
^a In a number of papers, the development of the TOE framework is associated with Tornatzky and Fleischer, editors of the book, *The Processes of Technological Innovation*, that contains the chapter on TOE by DePietro, Wiarda, and Fleisher (1990).

^b The network readiness index data set components were not used as independent variables because data have been available for only 1 year as of this writing, and economy coverage in Asia is limited.

Source: Asian Development Bank.

Wu et al. (2016) in 11 countries from 2014 to 2015, only 13% of respondents in Thailand, 11% in Indonesia, and 5% in India knew what the internet is (Figure 8.26). When trust is low and corruption is perceived in the policy environment, this affects the use of digital technology to undertake e-commerce transactions.

Figure 8.26: Awareness and Understanding of the Internet among Nonusers (2014–2015, % of non-internet users)



ASEAN = Association of Southeast Asian Nations.

Source: Wu et al. (2016).

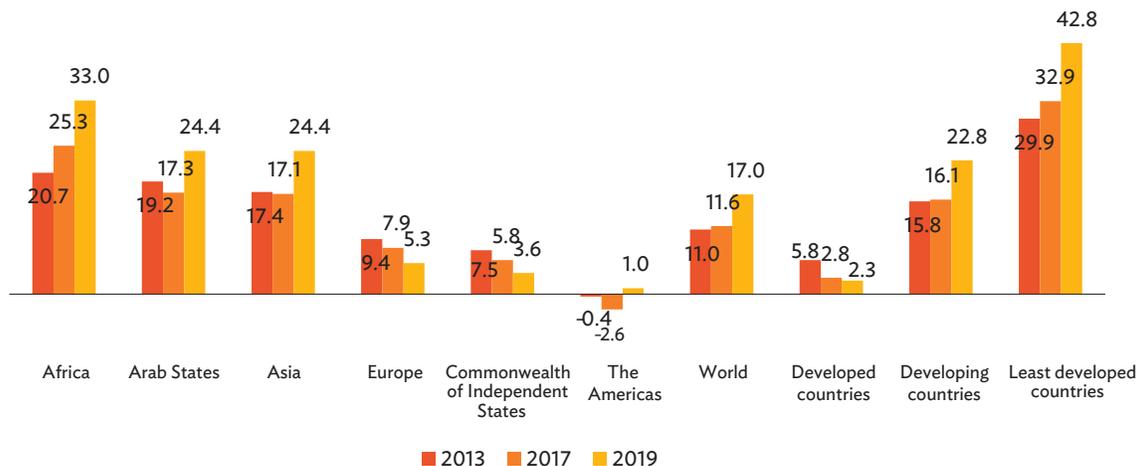
Trusting and comfortably using ICT does not translate to trusting digital platforms. This is especially true for e-learning, digital health, and even

mobile banking. For example, teachers and students in Viet Nam perceive that e-learning is inferior to face-to-face learning (CUTS International 2018, MacCallum and Jeffrey 2009). Privacy concerns (Binsaleh and Binsaleh 2013; Cummings, Merrill, and Borrelli 2010; Popescu and Ghita 2013), and distractions (Handal, MacNish, and Petocz 2013; Morales 2013) also impact the use of e-learning methods.

Similarly, e-clinic services in India face issues of trust and confidence in the efficacy of services obtained through digital platforms (CUTS International 2019). The presence of alternatives also reduces the use of e-clinic services as clients prefer face-to-face interaction with specialist doctors.

The gender divide persists but is narrowing. The difference between male and female internet user penetration rates is on average about 22.8% in developing countries and 2.3% in developed countries. The more significant gaps are observed in least developed countries at 42.8% and Africa at 33.0%. The gap has widened from 11% in 2013 to 17.0% in 2019—an increase of 6 percentage points in 6 years (Figure 8.27). Data for a number of countries¹⁰² also show that ICT access is commonly better for males than females (Figure 8.28). Only data for the Philippines show females having better access to the internet.

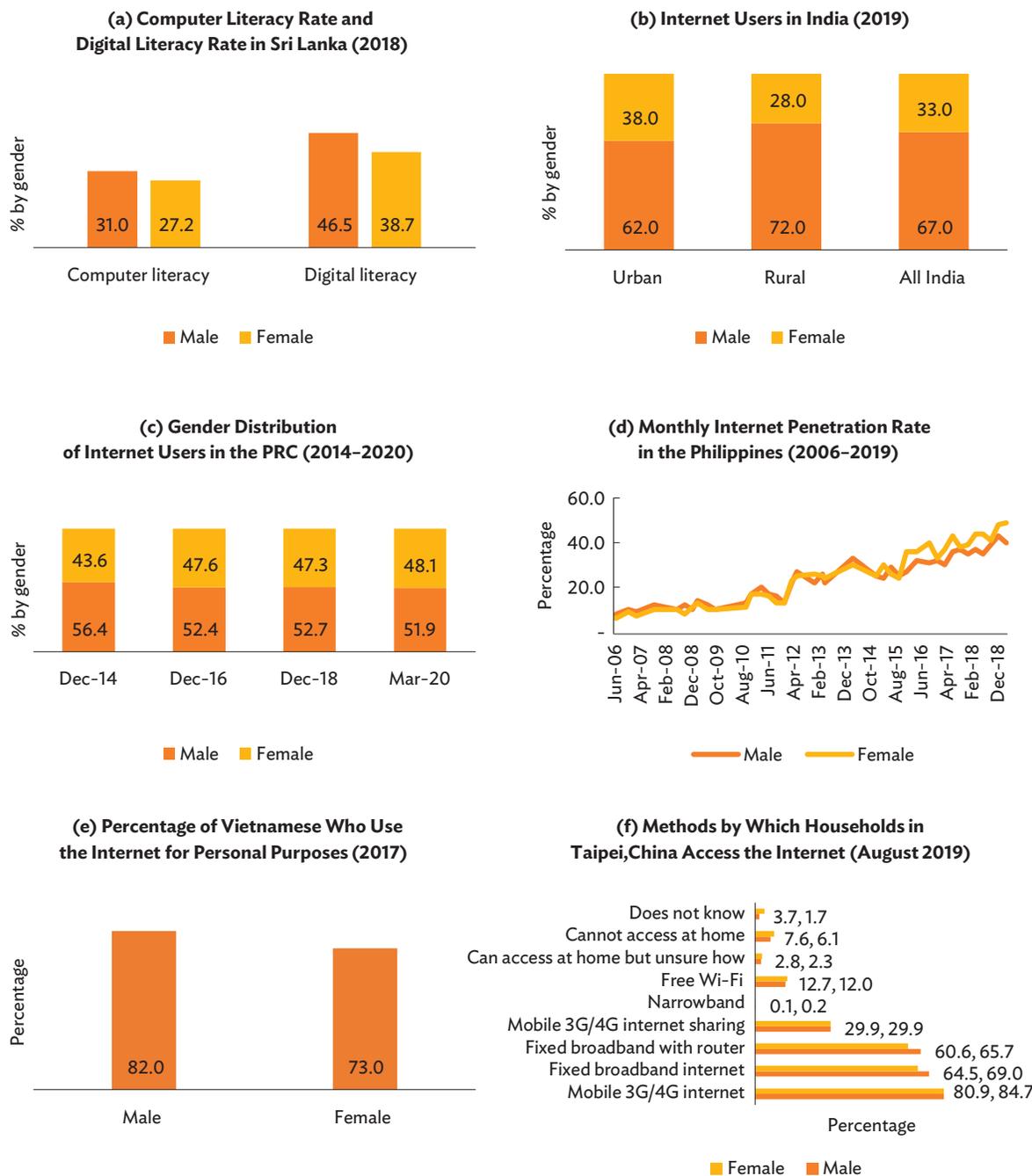
Figure 8.27: Internet User Gender Gap (%)



Sources: International Telecommunication Union (2017, 2019).

¹⁰² These economies are India; the People’s Republic of China; the Philippines; Sri Lanka; Taipei, China; and Viet Nam.

Figure 8.28: Indicators of ICT Access in Selected Asian Economies, by Gender



ICT = information and communication technology, PRC = People's Republic of China.

Sources: China Internet Network Information Center (2020). In Statista—The Statistics Portal. <https://www.statista.com/statistics/265148/percentage-of-internet-users-in-china-by-gender/> (accessed May 2020); Ecomobi (2017); Government of Taipei, China, National Development Council (2019). In Statista—The Statistics Portal. <http://statista.com> (accessed May 2020); Government of Sri Lanka, Department of Census and Statistics (2018); IAMA and Nielsen (2010); and SWS (2019). In Statista—The Statistics Portal. <https://statista.com/statistics/1104737/philippines-monthly-internet-user-penetration-rate-by-gender/> (accessed May 2020).

Beyond ICT, Junio (2019) found that while there is a gender divide in digital financial services, more women have become increasingly active in e-commerce, mobile

payments, and e-learning. Indeed, country-level data reveal that more women are using online banking and mobile payments than men in Taipei, China; e-commerce

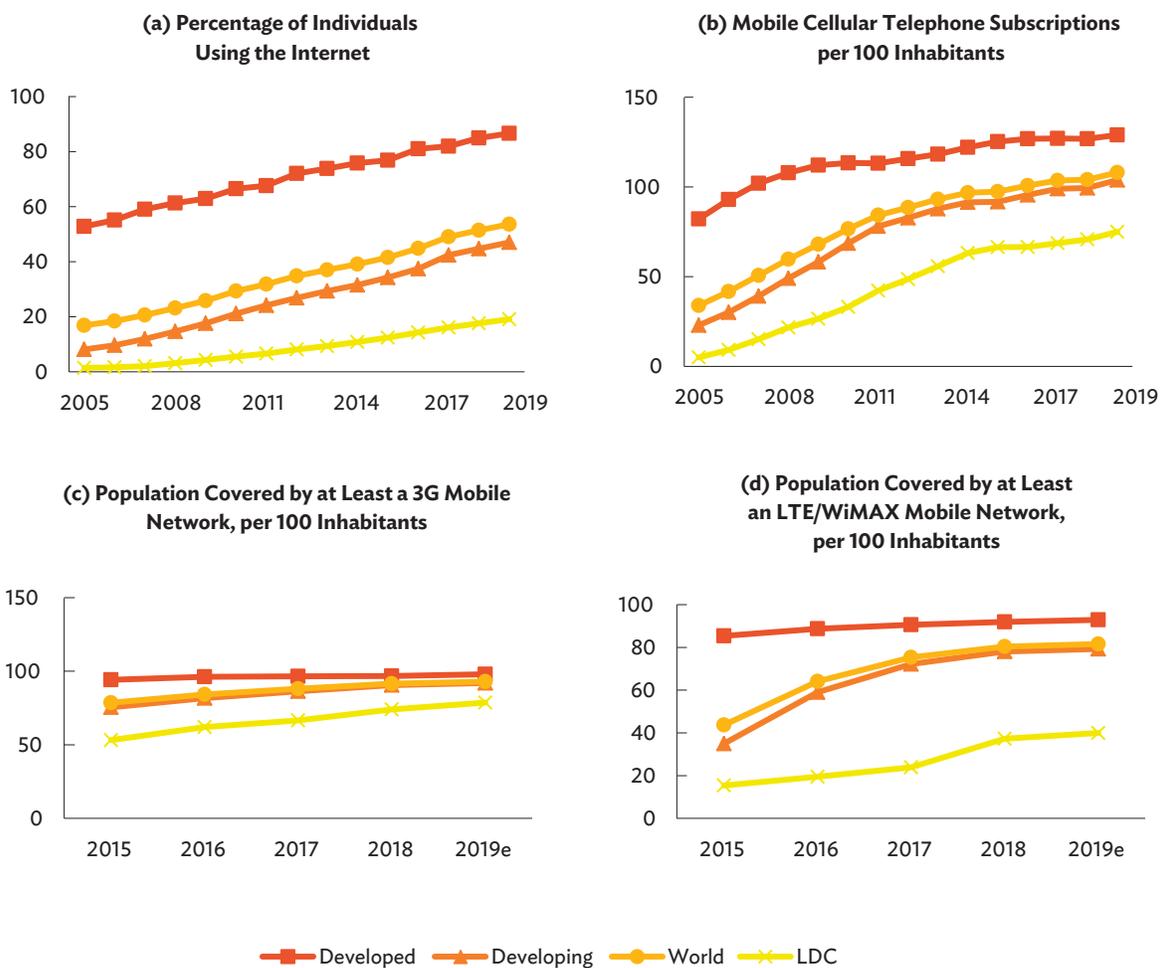
activity is higher for women than men in the PRC; and access to e-learning is higher for women than men in the Philippines and Viet Nam (Quimba, Rosellon, and Calizo Jr. 2020).

Material access in Asia is increasing but still lags behind developed countries. The number of internet users as a percentage of total population is an indicator of the availability of the internet to the population. In

late 2019, it is estimated that more than 85% of the population in developed countries accessed the internet, while it was only around 54% in developing countries and 16% in least developed economies (Figure 8.29).

At the regional level, Asia has the second-lowest proportion of people having used the internet in a 3-month period of 2019, while the Commonwealth of Independent States (CIS)¹⁰³ shows usage increased

Figure 8.29: Selected Material Access Indicators, by Income Groups



e = estimate, LDC = least developed country.

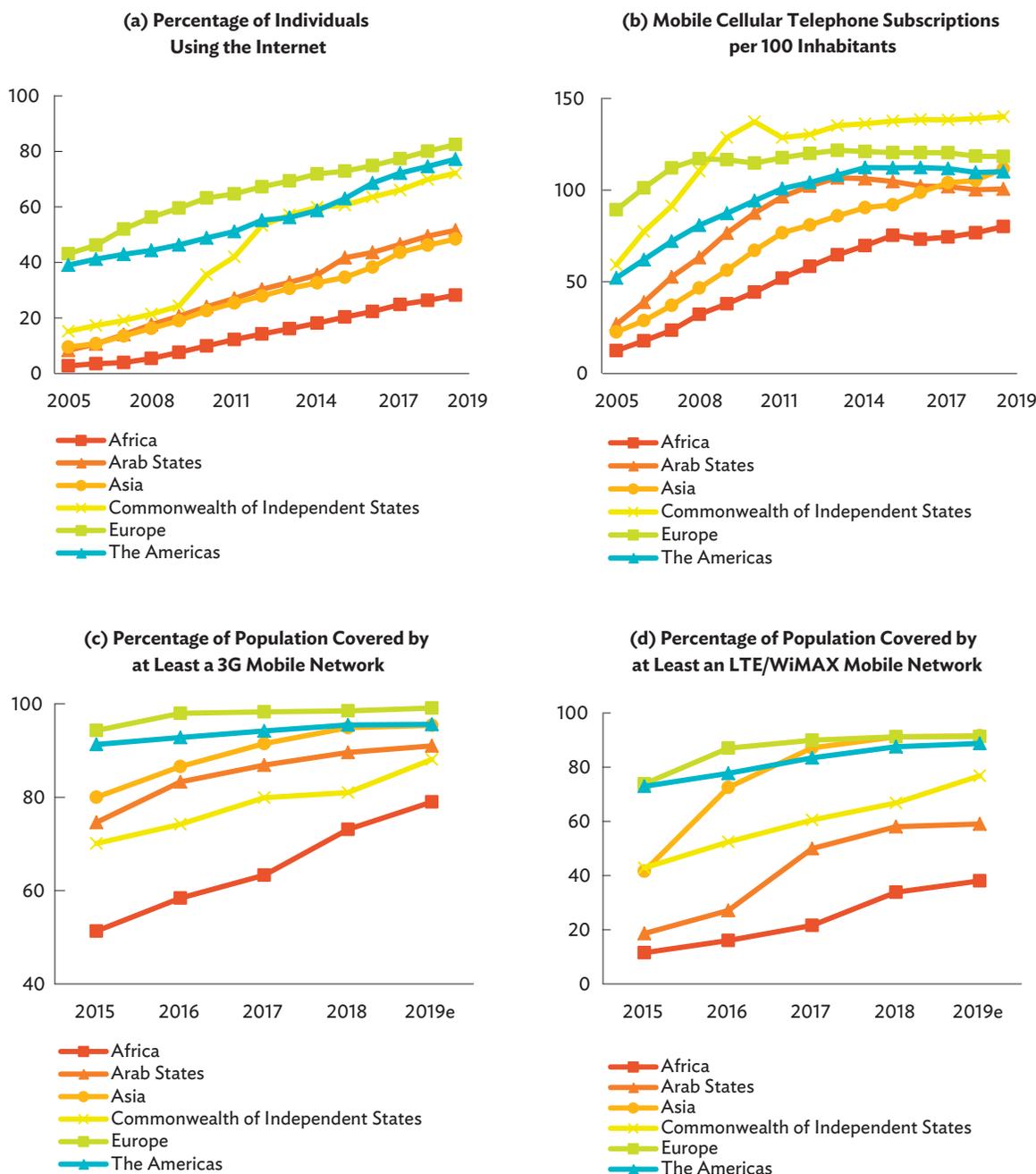
Source: Quimba, Rosellon, and Calizo Jr. (2020) using data from International Telecommunication Union. World Telecommunication/ICT Indicators 2020 Database. <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx> (accessed July 2020).

¹⁰³ The Commonwealth of Independent States (CIS) was founded in 1991 after the dissolution of the Soviet Union. The CIS refers to 12 countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic, Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

significantly from 2009 (Figure 8.30), fueled by mobile phone subscriptions that outpaced even Europe. The Asian region has nonetheless steadily increased mobile phone subscriptions, in line with the trend in Asia’s performance in the digital economy (Google, Temasek, and Bain and Company 2019).

Notably, reducing the material access divide does not necessarily translate to a more equitable distribution of benefits from the digital platform economy. According to UNCTAD (2019a), gaps exist within countries based on levels of income, education, gender, and even geographic location, regardless of the country’s level

Figure 8.30: Selected Material Access Indicators, by Region



e = estimate.

Source: Quimba, Rosellon, and Calizo Jr. (2020) using data from International Telecommunication Union. World Telecommunication/ICT Indicators 2020 Database. <https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx> (accessed July 2020).

of development. Hence, on top of the infrastructure and hardware, the policy strategy ought to give due consideration to the social, demographic, and location dimensions in an effort to bridge the gaps in digital access and participation.

The skills access divide exacerbates inequality.

In general, the population of higher income countries tends to have more digital skills. It is noteworthy that the upper- and upper-middle-income groups in East Asia and the Pacific exhibit more digital skills than their counterparts in Europe and Central Asia (Table 8.18). However, as the benefits of the digital economy accrue more to the richer and more digitally skilled countries, this exacerbates the digital divide, causing the poorer countries to lag farther behind.

Platforms may disproportionately benefit those who are already better off.

For example, the concentration of the Airbnb platform in central districts and busy areas may exacerbate the highly unequal distribution

Table 8.18: Digital Skills by Region and Income Group

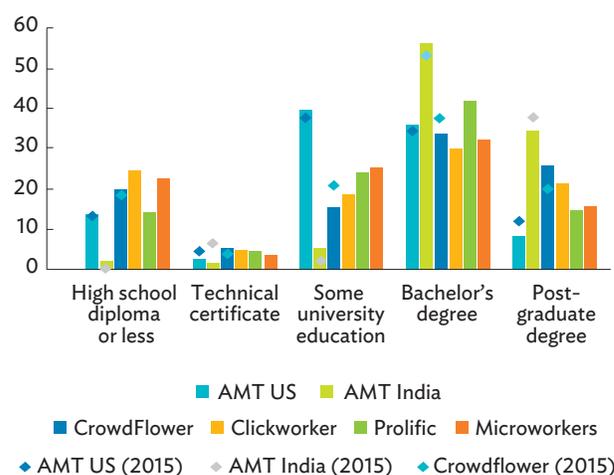
Region and Income Group	2017	2019
East Asia and the Pacific	4.7	4.6
High income	5.1	5.0
Upper-middle income	4.8	4.8
Lower-middle income	4.1	4.1
Europe and Central Asia	4.7	4.6
High income	4.9	4.9
Upper-middle income	4.3	4.3
Lower-middle income	4.4	4.3
Low income	no data	4.4
South Asia	3.8	4.0
Upper-middle income	3.9	4.2
Lower-middle income	3.9	4.0
Low income	3.7	3.7

Notes: The extent to which the population possesses sufficient digital skills (e.g., computer skills, basic coding, and digital reading); [1 = not all; 7 = to a great extent]. The data used for this table are based on the World Economic Forum (WEF) Global Competitiveness Index 4.0: Digital Skills Among Population indicator. A change in methodology occurred in 2018 and 2017 data have been backcasted. WEF published a technical note on how they backcasted data, which can be read in full here: <https://reports.weforum.org/global-competitiveness-report-2018/appendix-c-the-global-competitiveness-index-4-0-methodology-and-technical-notes/>.

Source: Quimba, Rosellon, and Calizo Jr. (2020) using data from the World Bank. TCdata360. <https://tcdata360.worldbank.org/> (accessed May 2020).

of income and development between urban and rural areas, resulting in an observable gap in development. Similarly, crowdworkers are well-educated (Figure 8.31). Additionally, a study by Farrel and Greig (2016) shows that those with assets that can be rented out can earn supplemental income from digital platforms (Figure 8.32), unlike those who participate only in labor platforms.

Figure 8.31: Educational Level of Crowdworkers, by Platform (%)

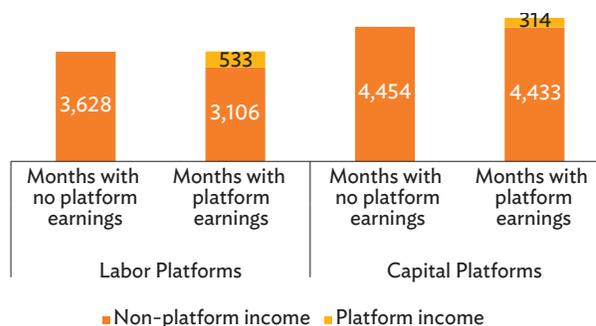


AMT = Amazon Mechanical Turk, ILO = International Labour Organization, US = United States.

Notes: The ILO conducted two surveys of crowdworkers: one in 2015 (diamonds) and another in 2017 (bars). The 2015 survey's sample consisted of workers who were based in either the US or India, had completed at least 500 tasks, and had achieved a 95.0% or greater task acceptance rate from the platform AMT. Apart from AMT, the 2015 survey also included quality workers from CrowdFlower. In 2017, the survey's sample was expanded to include other quality workers from other crowdsourcing platforms, such as Clickworker, Microworkers, and Prolific.

Source: Berg et al. (2018).

Figure 8.32: Earnings in Months with and without Platform Earnings in the United States (%)



Source: Farrel and Greig (2016).

The challenge of bridging digital divides requires a multidimensional approach. The digital divide is manifested in different forms and varies across gender, age, and income groups as well as geographic areas. This has implications on who gets to benefit from the platform economy. Addressing the digital divide will involve, among others:

- (1) Coordination among member countries to define and measure various indicators in the four areas of access and participation in digital platforms. For example, this assessment suffers from the limited examples from Oceania and other Pacific island countries. Moreover, the cross-border cooperation should ensure convergence among Asian economies in the degree of ICT access and participation in the platform economy.
- (2) Simultaneously removing the barriers for each type of access divide to maximize benefits gained from participation in the digital economy. Providing material access and the requisite infrastructure to support internet access are necessary conditions for digital platform participation, but are not sufficient alone. Cultural and skills barriers also need to be lowered.
- (3) Support from international and regional organizations to provide material access to ICT in least-developed countries. Without the basic ICT infrastructure on which people can begin to practice and learn using ICT, it would be hard for them to reach the level of developed economies.
- (4) Formulation of plans for utilizing digitization, facilitating innovation, and supporting start-ups. Governments should address the income inequality that may worsen because of the digital divide.
- (5) Greater skills development for the youth and retraining of adults. There is also a need to change the mindset on using technology to increase participation in the digital economy and reap the benefits it affords in terms in convenience, increased income, and access to more products and services including health and education.

Conclusions and Recommendations

As digital platform markets expand in Asia, there will be expected disruptions in trade, finance, and investment, among other areas. However, while technology could be disruptive, it also ushers in positive and inclusive development impacts. For instance, the diffusion and application of existing digital platforms have the tremendous potential to substantially raise rural and agricultural productivity, increase access to health and education, and greatly improve living standards. These new emerging technology platforms could also enable economies to pursue a different innovation pathway and develop more appropriate systems for their particular needs. How Asian economies manage this digital transformation will determine their economic fortune, dividing the winners from losers.

Governments should help shape how platforms lead to better outcomes. They need to lead collective efforts to understand this new market behavior and identify policy and regulatory needs based on sound fundamental principles. Governments should formulate plans for utilizing digitization, facilitating innovation, and developing a digital business start-up ecosystem. They should also focus on dissemination of digitization plans, upscaling the value chain, and facilitating agglomeration economies. As software, apps, and data are core to digital platforms, government should invest in basic internet or broadband technology to encourage app accumulation and the flow of data. Governments also have a role in acquiring essential technology by forging partnership with the private sector through smart policies and effective but light touch regulations.

Adopting a harmonized and clear definition and measurement of indicators in the digital market is an important first step. Presently, obtaining information from digital platforms is a big challenge because of their complexity, cross-sector and cross-border activities, and rapid growth amid vastly changing goods and services. Improving the visibility of digital platform through a well-thought-out taxonomy of indicators and data collection method is crucial to understanding their socioeconomic impact, tax implications, and link to growth and

development. It is essential that national statistical agencies work with platform companies to obtain key information by using and expanding on traditional and alternative data sources.

Planning and coordination among key institutions are critical. Innovation and digital platforms require new forms of public policy and public–private partnerships. It demands multisector support and coordination especially in areas of regulation, taxation and accounting, investment in materials and infrastructure, dissemination of knowledge, and training and education.

A flexible policy and regulatory environment can nurture growth and innovation. Regulating technologies that are quickly developing and continuously changing is difficult. It may be more effective to use policies to enhance an ecosystem that supports innovation-driven entrepreneurship to bolster the competitiveness of domestic enterprises in the digital space. This requires governments to improve access to entrepreneur finance, enact competition policies to mitigate rent-seeking behavior, and improve education systems to incorporate entrepreneurship besides technical skills. Policies to protect intellectual property, consumers, and the privacy of personal data are crucial, as are those promoting effective cybersecurity.

Regulators must protect public interests while ensuring that legislation or regulations do not have a chilling effect on innovation. Implementing light-touch regulatory approaches on technologies that involve the processing of data, alongside more general data protection legislation is helpful. Likewise, policies that encourage innovation to manage the harmful impact of digital technology and the digital economy (e.g., devices and the packaging materials used in e-commerce) on the environment and those that deal with the adverse health outcomes of users (e.g., physical and mental health issues) must be considered as well. These could take the form of best practices guidelines, issuing warnings and advisories, providing official speeches, interpretations, and meetings with regulated parties.

Upgrading of education and labor market policies will help spread the benefits of digital platforms more widely. Digital platforms hold great promise to solve critical problems in education and learning, especially as the COVID-19 pandemic has eased more than 1.5 billion students out of face-to-face learning at one point when the countries closed their educational institutions. Governments should improve technology service in public education by addressing obsolescence in hardware and software. Creating an ecosystem for skills development and training to prepare workers for the digital future by improving access to connectivity, devices, and learning environments is crucial. This way, workers can easily access education and training materials to allow them to reenter the labor market at different levels. Developing arrangements for online quality assurance and online credentials such as micro-credentials, digital badges, among others will be helpful. To support start-ups, experiential entrepreneurship education among students and faculty may also be relevant as digital platforms create a pool of human resources with skills and expertise that are useful in many work settings. Governments may also use social media for citizen education and engagement. Strengthening of the social protection system and making it portable and flexible to be applicable to a wide range of work arrangements is important to protect digital workers' welfare.

Software and data management, and competition are crucial. Within the realm of digital platforms, competition has become indispensable and essential to ensure its continued development and accessibility on all fronts. The quickly evolving nature of this sector and consequent tendency to entrench incumbents underscore the need to lower barriers to entry to simultaneously promote consumer welfare and safeguard a level playing field among players of all sizes.

Certain tools such as intellectual property rights implemented on fair, reasonable, and nondiscriminatory terms can serve as incentives for businesses to innovate and preclude the exclusive ownership of dominant players' assets, such as interfaces or software. From a competition lens, open ecosystems serve to benefit all sides of a platform because of increased component

compatibility, network effects, economies of scale, ease in entry, and intra-ecosystem competition. In closed structures or highly concentrated systems, interoperability and multi-homing create access points and integration and combat abuses of market power. However, the former requires careful and timely intervention to avoid distortions and to protect user privacy, particularly with regard to data-sharing policies.

The same circumspection is integral to the harmonization of universal criteria of transferability and translatability policies for a trustworthy data ecosystem. The best practices in other jurisdictions on pro-competitive data access policy include securing consumers' control of personal and machine-generated data, setting standards for data portability, accountability, and accuracy, and prioritizing consumer-centric policies.

Despite advances in technology and digital platforms, a large segment of the population is still left behind. Many in Asia still lack access to power, clean water, or infrastructure that supports communication and information sharing, creating a digital and economic divide. To narrow these divides, the key ingredients are the provision of material access; infrastructure investments; and education and training to remove barriers pertaining to location, age, gender, culture, skills, and trust.

Some key infrastructure, trade, and logistics reforms are needed to reap the benefits from the digital economy. The first is to improve infrastructure connectivity and services which would deliver affordable mobile communications, access to broadband and the internet, and set the foundation for interoperable systems. It is also important to improve trade and logistics systems, and interoperability among land, sea, and air transport to expedite the movement of goods and services. Reforms to speed customs clearance and border procedures are also important. There is a need to broaden e-payment availability options and to harmonize different national norms and standards while reducing risk of fraud and establishing consumer protection. Attracting FDI, venture capital and equity, and working with established

businesses could supply the needed financing for technology and innovation start-ups.

Funding for investment to support technology adoption in the region is important. With limited fiscal and financial resources in the region, a comprehensive approach to raise finance for technology is important. Generally, three key factors could help close the technology funding gap: (i) increasing the pipeline of technology projects; (ii) crowding in private capital; and (iii) mitigating the risks and costs of technology projects.

International tax cooperation, including the development of digital tax policies and options, is important. Large-scale policy responses to COVID-19 will inevitably result in increased levels of sovereign debt, underpinning the need for efficient tax systems and addressing of BEPS to assure public debt sustainability in the longer term. Thus, strengthening international cooperation for effective response to BEPS and better taxation is important. Policy makers in the region need to consider how enhanced international taxation can help mobilize domestic tax revenues, including tax issues that are tied to cross-border transactions, such as the de minimis rule.

Regional cooperation is also critical to address cross-border issues and challenges. Cooperation could be initiated through sharing of country lessons and experience, conducting regional dialogue, and working together to collect data and produce knowledge products that will help understand how digital platforms could either accelerate or derail progress toward inclusive and sustainable development. Cooperation could further focus on forging an intergovernmental mechanism to discuss a regionally consistent framework, strategy, and regulations—especially on cross-border data transfers. Although a unified cross-border data-sharing regime and protection framework may not be feasible at this point, the regional mechanism could help deliver a general and comprehensive international data protection regime. It may also help eliminate data transfer restrictions for data categories essential for the region's growth and development, without any prejudice to each country's national security.

Development organizations can play an important role in supporting a more sustainable and equitable transition to the digital economy.

Development organizations can support investments in technologies that will help bring the benefits of digital platforms to more people, and they can support creation of national and regional policies in many important areas

like competition, security, privacy, social protection, and education. Development organizations can also support knowledge creation and capacity building to help developing countries build up their institutions and human capital to better understand and take advantage of emerging technologies.

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Annex 8a: Data and Indicators Needed for Measuring Platform Economy

To get an accurate, robust, and meaningful profile of platforms in a country, data have to be collected from the various actors of the platform ecosystem: the

providers, users, and platforms themselves. That means three different groups should be respondents for surveys to measure the platform economy.

Dimension	Data	Indicators
General Information on Platforms	Business name, registered name, and address of owner of platform (including headquarters/main office and parent company, if any) URL(s) of the platform(s) Birth date or year that the platform(s) started operations Geographic reach of the platform's operations (i.e., local, national, global) Type of platform: (based on either general or specific functional base, or other typology) Whether platform is part of C2C economy (yes/no) Whether platform is part of sharing economy (broad and narrow definition) (yes/no) Product/s and service/s exchanged between providers and users: asset and service mix (economic activity group) Breakdown of providers by type (professional or nonprofessional) Advertisement parties involved	Number of platforms by region Proportion of platforms by age Number of platforms by geographic reach Proportion of platforms by type of platform Number of platforms in the C2C economy, in the sharing economy Number (and size) of platforms by economic activity group Number (and size) of platforms by type of provider Number (and size) of platforms by advertisement parties involved
Economic Information on Platforms	Business model: profit-orientation (profit, nonprofit, commission-based, advertisement-based or a combination); other sources of income from other services or add-ons; or more general: how the platform makes money Employment: number of persons directly employed by platform (employers + employees, e.g., those maintaining tech infrastructure, administration and marketing); Characteristics of employed: breakdown by sex, breakdown by educational attainment, hours worked Type of investors and investments made in the platform Tax payment (and type, i.e., income tax, VAT, etc.) Type of network effects: what drives the growth of the online platform (e.g., more participants, more transactions, more content, etc.) Who sets the prices and circumstances of logistics (e.g., delivery of good or service) Turnover, including source/s of the turnover Value added: i.e., turnover minus costs for intermediate goods and services Investments made in the platform, including the type of partners Type of providers: noncommercial and commercial	Number (and size) of platforms by business model Number of employed (by sex) by type of platform (or economic group) Number of employed by educational attainment and by type of platform (or economic group) Hours worked by type of platform (or economic group) Number of platforms by type of investors (or investments made) Percentage of platforms that paid taxes Number of platforms by type of network effects Number of platforms by mechanism for setting prices and logistics Average turnover, by source and by type of platform Average value added, by type of platform (or economic activity group) Average investments in platform, by type of platform (or economic activity group) Number of platforms by type of providers

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Appendix 8a continued

Dimension	Data	Indicators
Social Information on Platforms	Verifying providers and their offers and checking for illegal content Verifying clients Advertisement parties involved Collection of data of providers and clients and the uses of these data (e.g., algorithms and selling of data)	Number of platforms by type of verification process for providers Percentage of platforms with verification process for clients by type of platform (or economic activity group) Percentage of platforms with advertisement parties involved by type of platform (or economic activity group) Number of platforms by type of platform and by type of data collection activities on platform users Number of platforms by type of platform and by data collection use
Basic Information on Platform Providers	Name of individual/household respondent or business Background characteristics: location; year that the provider(s) started offering good or service in platform/s; individual/household or business Reasons to use a platform Type of goods or services offered (relative to some classification system); part of sharing economy (i.e., offering use of idle asset, or not) Number of transactions per year (including turnover)	Total number of unique providers by type (individual/household vs. business) Total number of unique individual providers (active or passive) by location (urban/rural, or region) Growth rates in number of unique providers (active or passive) Total number of providers by reasons to use a platform Total number of providers by type of goods or services offered Percentage of providers in sharing economy, by location
Economic Information on Platform Providers	Number of transactions per year in past 2 years Average prices per transaction Average transaction costs made to use the platform (commission and/or access) Investments and value added Tax payment International trade/cross-border transactions (percentage compared with all transactions) Main source or supplementary source of income	Total number of transactions per year by location Growth/decline of transactions per year, including total turnover; estimate of total turnover: average price x number of transactions per year (minus transaction costs) Total investments and value added Percentage of providers paying tax Share of international trade/cross-border transactions (in percentage) to total transactions Percentage of providers whose income from platforms is main source (or supplementary source) of income
Social Information on Platform Providers	If provider has working relationship to the platform (relates mostly to indirect employment): hours worked and earnings (does this constitute the main income?). Account should be taken of the fact that people can work for or be associated to more than one online platform Total income Social security Legal contracts Training possibilities	Percentage of providers with working relationship to the platform Average hours worked, by sex and location Average earnings, by sex and location (for those with platform incomes constituting the main source of income, and for others) Average income by sex and location Percentage of providers with social security Percentage of providers with legal contract Percentage of providers with training possibilities

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Appendix 8a continued

Dimension	Data	Indicators
Basic Information on Platform Clients	Name of platform client	Total number of unique clients by type (individual/household vs. businesses)
	Background characteristics: location; year that the client(s) started purchasing good or service in platform/s; individual-household or business; number of visits to a platform per year; type of goods or services bought or shared, including prices; reasons to use platform(s)	Total number of unique clients by sex and location (and growth or decline)
	Number of visits to an online platform per year (or month or week)	Average number of visits to a platform per year (or month or week)
	Number of transactions per year (money spent, including the commission to the platform)	Total number of clients by type of goods or services bought or shared
	Type of goods or services bought or shared	Average prices for major good or service bought or shared
	Reasons to use online platform(s)	Total number of clients by reason for using platform(s)
	Trust in platforms (e.g., role of reviews and rating systems)	Average share of cross-border transactions to total transactions
	International trade/cross-border transactions (percentage compared with all transactions)	
Economic Information on Platform Clients	Average number of transactions per year (or month or week)	Number of transactions per year
	Average expenditures on platforms, including the commission to the platform)	Growth/decline of transactions per year
	International trade/cross-border transactions (to total transactions) in platform	Average expenditures on platforms by type of platforms (including the commission to the platform)
		Share of cross-border transactions to total transactions in platform
Social Information on Platform Clients	Trust in platforms (e.g., role of reviews and rating systems)	Average trust rating of platforms by type of platform
	Number of complaints in platform (and of which, how much got sufficiently resolved)	Average number of complaints in platform(s) by type of platform

C2C = customer-to-customer, ICT = information and communication technology, VAT = value-added tax.

The data for the indicators mentioned above can be collected in different ways. An important first step is to have a target population or list frame of platforms. Such a frame is likely not available in many countries except perhaps those attempting to measure the platform economy, specifically the sharing economy. National statistical offices (NSOs) could start with the most “important” platforms, in terms of public visibility, and so limit the coverage of examination.

Some data collection methods are better for particular actors of the platform ecosystem. When it concerns cross-border digital trade, international cooperation is necessary. Possible options of data collection are as follows:

1. Setting up a new dedicated survey for measuring the platform economy. Survey questionnaires can be sent to providers and users, but especially to the platforms. Households are no longer just consumers, but also producers; the nature and extent of their productive activities including direct imports of goods and services need to be properly recorded in national accounts. NSOs need to work with platforms to obtain aggregate information on productive activities of households, and cross-border flows. It is likely, however, that most platforms will not be very willing to share information, thus it could be considered to legally mandate data sharing to NSOs, even when the headquarters of a platform company is outside the country (Scassa 2017).
2. Alternatively, NSOs could add a module of questions for measuring the platform economy to existing surveys, such as the Labor Force Survey, household and business surveys of ICT usage. These surveys can target the providers and users of platforms (but not the platforms themselves).
3. The available digital footprints on platforms could be web-scraped. NSOs can use web scraping and application programming interfaces to collect some desired information from the websites of platforms (such as site visits of users, and possibly financial accounts). If the list of platforms is not available, an initial list could be created on the basis of a web search of the whole internet (focusing on a country domain) with a bot. The bot, with the aid of machine learning, should be able to distinguish “normal” websites from websites with platforms on the basis of available data from the web search.

Source: Adopted from Heerschap, Pouw, and Atmé (2018).

Annex 8b: Key Technologies Critical to Growth of Digital Platforms and the Digital Economy

Technology	Description
Semiconductor Technologies	Integrated Circuits represent the fundamental basis of most technology improvements, as they are the main technology underpinning microprocessors, memory, communications, sensors, and imaging.
Infrastructure Technologies	<p>Connectivity: In 2019, internet connectivity reached 54% of the global population. Universal connectivity is a key requirement for continued growth of the digital economy.</p> <p>Devices: Currently the smartphone is the dominant device globally, and wearables (smartwatches, glasses, headphones, etc.) are positioned to be the next trend.</p> <p>Imaging: Imaging technologies, like smartphone cameras, are a key technology that is enabling rapid advances in the use of photography and video.</p> <p>Cloud Computing: Cloud technology represents on-demand computing infrastructure that is more scalable and cost-effective than traditional computing infrastructure, enabling new services and tech start-ups.</p>
Transactional Technologies	<p>Digital Payments: Secure, low-cost digital payment technologies are critical in enabling digital commerce. Digital payments via mobile money accounts, online banking or smartphone app-based platforms offer a more secure payment model with the ability to enable participation in the digital economy.</p> <p>Digital Identity: Secure, low-cost identity services are critical in enabling access to services, like health, education, and bank accounts, and citizenship rights like the ability to vote or receive social benefits. Digital technologies, leveraging biometrics like fingerprinting, facial recognition, and iris scanning, are providing an opportunity to build dependable and low-cost ID systems that can scale to national levels.</p> <p>Cybersecurity and Privacy: Cybersecurity is crucial for keeping company and customer data safe, enabling secure transactions and management of devices. Cybersecurity concepts are used to protect against unauthorized access to data centers and other computerized systems.</p>
Integrating Technologies	<p>Artificial Intelligence (AI): Artificial intelligence is a set of algorithms that aim to imitate the human's cognitive functions to tackle complex real-world problems. As a subfield of AI, machine learning algorithms automatically improve in solving a problem through experience, also called training. Recent advances in AI are due to advances in computational power and the availability of big data. Examples include image recognition, language translation, medical diagnosis, etc.</p> <p>Robotics/Drones: The combination of AI, communications, processing and sensor technologies enable autonomous operations of robots, vehicles and drones, leading to new services. Robotic technology has been used extensively in manufacturing for several decades, and the recent advances in computing have enabled new, low-cost applications of robotics into new areas. Self-driving cars employ a range of technologies from machine vision systems powered by digital cameras, radar, and lidar to advanced computing platforms for navigation running AI solutions. Drones offer low-cost flight platforms for mapping and monitoring of physical infrastructure. Drones can also be powered by autonomous navigation systems to perform more complex tasks like package delivery or search and rescue missions.</p> <p>Internet of Things (IoT): IoT involves connecting devices or sensors directly to the internet over wireless networks without the need to connect through a computer or mobile phone; they can be remotely monitored and controlled. In commercial settings, IoT devices are typically sensors that monitor conditions like temperature and humidity, or devices that track movement or may even include cameras to track imagery. In household settings, IoT devices are often used for "smart home" solutions to control lighting, thermostats, cameras, and security systems.</p> <p>Earth Observation: Satellite technology, combined with communications and sensors, enable low-cost imagery covering the entire globe for services such as for land management, agriculture, environment, etc.</p> <p>Geospatial Information Services (GIS): GIS systems play a critical role in the platform economy due to their ability to accurately map and measure physical locations, allowing more sophisticated tracking and analysis of land, infrastructure, resources, and human activity. This has opened up new opportunities for designing and managing transportation systems.</p>
Future Technologies	<p>Genetics: Genetic technologies, including gene sequencing and gene editing, are among of the most promising future technologies. Gene sequencing has enabled the study of genetic origins associated with many human diseases as well as the study of evolution. Gene editing, using the recently discovered CRISPR system, is rapidly developing into new solutions for disease treatment and agricultural improvement.</p> <p>Quantum Computing: Quantum technologies have the potential to outpace digital computing and to enable unbreakable encryption systems. Although current technologies are mainly limited to research laboratories, quantum is positioned as a breakthrough disruptive technology.</p>

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Appendix 8b continued

Technology	Description
	<p>Artificial General Intelligence (AGI): Although highly controversial, there is a potential for the emergence of general intelligence that could perform traditional human activities like writing, research, art, etc. as AI becomes more powerful, driven by larger data sets, more computing resources, and new models.</p> <p>Human-Computer Interfaces: Current digital technologies are limited by the ability of people to speak or type into their devices. New interface technologies are being envisioned that would enable humans to interact with digital solutions more directly. Direct neural interfaces, for example, are being developed for people with disabilities who are unable to move their hands or speak.</p>

AGI = Artificial General Intelligence, AI = Artificial Intelligence, GIS = Geospatial Information Services, IoT = Internet of Things.

Source: Abell (2020).

Annex 8c: Trade and Employment Impact from Greater Usage of Digital Inputs, 2021–2025

Trade Impact from Greater Usage of Digital Inputs, 2021–2025

Economy	Gains from Same Year Baselines (\$ billion)					Total	Average
	2021	2022	2023	2024	2025		
World	771.8	1,546.4	2,341.4	3,166.0	4,025.1	11,850.7	2,370.1
Asia	342.9	678.3	1,013.7	1,352.8	1,697.2	5,084.9	1,017.0
Australia and New Zealand	10.5	19.1	26.9	34.1	41.0	131.5	26.3
Central Asia	7.1	14.7	23.0	31.8	41.2	117.7	23.5
East Asia ex-PRC and Japan	41.0	81.4	122.1	163.8	206.7	614.9	123.0
PRC	104.4	188.9	256.0	307.1	343.1	1,199.5	239.9
Japan	61.1	131.6	212.4	304.4	408.3	1,117.8	223.6
Southeast Asia	76.7	157.6	243.4	334.4	430.8	1,242.9	248.6
South Asia	35.2	74.2	116.4	161.3	208.5	595.5	119.1
Pacific	7.0	10.8	13.6	15.9	17.8	65.1	13.0
G2	269.8	524.6	773.9	1,023.1	1,275.4	3,866.8	773.4
United States	37.3	71.8	105.0	138.0	171.0	523.1	104.6
EU-28	232.5	452.8	668.9	885.1	1,104.4	3,343.7	668.7
Rest of the World	159.1	343.6	553.8	790.1	1,052.5	2,899.0	579.8
Economy	Gains as Proportion of 2020 Baseline Trade (%)					Total	Average
	2021	2022	2023	2024	2025		
World	1.8	3.6	5.4	7.3	9.3	27.5	5.5
Asia	2.3	4.6	6.8	9.1	11.4	34.2	6.8
Australia and New Zealand	1.6	2.9	4.1	5.2	6.2	20.0	4.0
Central Asia	2.3	4.8	7.5	10.4	13.5	38.6	7.7
East Asia ex-PRC and Japan	1.7	3.3	5.0	6.7	8.5	25.1	5.0
PRC	2.0	3.6	4.9	5.8	6.5	22.8	4.6
Japan	3.8	8.1	13.1	18.7	25.1	68.8	13.8
Southeast Asia	2.5	5.1	7.9	10.8	13.9	40.2	8.0
South Asia	2.5	5.4	8.4	11.7	15.1	43.1	8.6
Pacific	8.3	12.9	16.3	19.0	21.3	77.8	15.6
G2	1.5	2.9	4.3	5.6	7.0	21.2	4.2
United States	0.8	1.5	2.2	2.9	3.5	10.8	2.2
EU-28	1.7	3.4	5.0	6.6	8.3	25.0	5.0
Rest of the World	1.6	3.4	5.5	7.9	10.5	28.8	5.8

EU = European Union, G2 = Group of 2, PRC = People's Republic of China.

Notes: The calculations are based on the Global Trade Analysis Project (GTAP) database. The Pacific subregion includes non-ADB member economies. Asia and the Pacific includes economies that are non-ADB members due to the aggregation of the Pacific subregion in GTAP.

Source: Narayanan and Villafuerte (2020).

Employment Impact from Greater Usage of Digital Inputs, 2021–2025

Economy	Gains from Same Year Baselines (million)					Total	Average
	2021	2022	2023	2024	2025		
World	52.1	98.8	142.0	182.9	222.0	697.8	139.6
Asia	25.8	47.9	67.5	85.1	101.2	327.5	65.5
Australia and New Zealand	0.2	0.4	0.6	0.8	0.9	2.9	0.6
Central Asia	0.8	1.6	2.4	3.1	3.8	11.7	2.3
East Asia ex-PRC and Japan	0.6	1.1	1.5	1.9	2.3	7.4	1.5
PRC	7.5	12.6	15.8	17.6	18.2	71.7	14.3
Japan	1.3	2.5	3.7	4.8	6.0	18.3	3.7
Southeast Asia	6.5	12.5	18.2	23.7	29.0	89.9	18.0
South Asia	8.3	16.4	24.3	32.1	39.8	120.9	24.2
Pacific	0.5	0.8	1.0	1.1	1.2	4.7	0.9
G2	4.7	8.5	11.9	14.9	17.7	57.8	11.6
United States	1.1	1.9	2.7	3.3	3.8	12.8	2.6
EU-28	3.6	6.6	9.3	11.7	13.9	45.0	9.0
Rest of the World	21.6	42.3	62.6	82.8	103.2	312.5	62.5
Economy	Gains as Proportion of 2020 Baseline Employment, %					Total	Average
	2021	2022	2023	2024	2025		
World	1.9	3.6	5.1	6.6	8.0	25.2	5.0
Asia	1.5	2.9	4.0	5.1	6.0	19.5	3.9
Australia and New Zealand	3.0	5.3	7.2	8.9	10.5	34.9	7.0
Central Asia	2.5	4.9	7.2	9.4	11.5	35.5	7.1
East Asia ex-PRC and Japan	2.2	4.0	5.7	7.1	8.4	27.5	5.5
PRC	1.1	1.9	2.4	2.7	2.7	10.8	2.2
Japan	2.9	5.6	8.2	10.7	13.2	40.5	8.1
Southeast Asia	2.2	4.3	6.3	8.1	10.0	30.9	6.2
South Asia	1.4	2.7	4.0	5.3	6.5	19.9	4.0
Pacific	14.4	22.3	27.7	31.6	34.6	130.6	26.1
G2	2.0	3.7	5.1	6.4	7.6	24.9	5.0
United States	1.2	2.2	3.0	3.7	4.4	14.6	2.9
EU-28	2.5	4.6	6.4	8.0	9.6	31.1	6.2
Rest of the World	2.5	5.0	7.3	9.7	12.1	36.6	7.3

EU = European Union, G2 = Group of 2, PRC = People's Republic of China.

Notes: The calculations are based on the Global Trade Analysis Project (GTAP) database. The Pacific subregion includes non-ADB member economies. Asia and the Pacific includes economies that are non-ADB members due to the aggregation of the Pacific subregion in GTAP.

Source: Narayanan and Villafuerte (2020).

Change in Digital Sector Size, 2021–2025

Economy	Gains from Same Year Baselines (\$ billion)					Total	Average
	2021	2022	2023	2024	2025		
World	205.8	411.5	617.3	823.1	1,028.9	3,086.6	617.3
Asia	61.3	122.6	183.8	245.1	306.4	919.1	183.8
Australia and New Zealand	4.6	9.2	13.8	18.4	23.0	69.1	13.8
Central Asia	0.6	1.1	1.7	2.2	2.8	8.3	1.7
East Asia ex-PRC and Japan	5.2	10.3	15.5	20.7	25.9	77.6	15.5
PRC	21.2	42.4	63.5	84.7	105.9	317.6	63.5
Japan	17.3	34.6	51.9	69.2	86.5	259.5	51.9
Southeast Asia	6.7	13.4	20.1	26.8	33.5	100.4	20.1
South Asia	4.8	9.7	14.5	19.3	24.2	72.5	14.5
Pacific	0.9	1.9	2.8	3.8	4.7	14.1	2.8
G2	104.2	208.5	312.7	417.0	521.2	1,563.7	312.7
United States	39.8	79.6	119.3	159.1	198.9	596.7	119.3
EU-28	64.5	128.9	193.4	257.9	322.3	967.0	193.4
Rest of the World	40.3	80.5	120.8	161.0	201.3	603.8	120.8
Economy	Gains as Proportion of 2020 Baseline Trade (%)					Total	Average
	2021	2022	2023	2024	2025		
World	4.3	8.5	12.8	17.0	21.3	63.8	12.8
Asia	4.4	8.8	13.1	17.5	21.9	65.7	13.1
Australia and New Zealand	4.1	8.1	12.2	16.3	20.4	61.1	12.2
Central Asia	5.3	10.5	15.8	21.0	26.3	78.8	15.8
East Asia ex-PRC and Japan	3.9	7.7	11.6	15.5	19.3	57.9	11.6
PRC	5.2	10.5	15.7	21.0	26.2	78.6	15.7
Japan	3.6	7.1	10.7	14.3	17.8	53.5	10.7
Southeast Asia	4.7	9.3	14.0	18.6	23.3	69.9	14.0
South Asia	5.3	10.5	15.8	21.1	26.3	79.0	15.8
Pacific	5.5	11.1	16.6	22.1	27.7	83.0	16.6
G2	4.1	8.2	12.2	16.3	20.4	61.2	12.2
United States	4.3	8.6	12.8	17.1	21.4	64.2	12.8
EU-28	4.0	7.9	11.9	15.9	19.8	59.4	11.9
Rest of the World	4.5	9.1	13.6	18.2	22.7	68.2	13.6

EU = European Union, G2 = Group of 2, PRC = People's Republic of China.

Notes: The calculations are based on the Global Trade Analysis Project (GTAP) database. The Pacific subregion includes non-ADB member economies. Asia and the Pacific includes economies that are non-ADB members due to the aggregation of the Pacific subregion in GTAP.

Source: Narayanan and Villafuerte (2020).

Investment Requirement, 2021–2025

Economy	Markup from Same Year Baselines (\$ billion)					Total	Average
	2021	2022	2023	2024	2025		
World	231.1	464.2	699.3	936.6	1,175.8	3,507.0	701.4
Asia	59.3	119.7	181.0	243.4	306.7	910.2	182.0
Australia and New Zealand	3.0	6.1	9.3	12.5	15.7	46.6	9.3
Central Asia	0.5	1.1	1.7	2.3	2.9	8.5	1.7
East Asia ex-PRC and Japan	4.1	8.3	12.5	16.8	21.1	63.0	12.6
PRC	6.6	13.2	19.9	26.7	33.5	99.9	20.0
Japan	36.1	72.8	110.1	148.0	186.5	553.4	110.7
Southeast Asia	5.3	10.8	16.4	22.2	28.0	82.8	16.6
South Asia	2.9	5.9	9.0	12.2	15.4	45.4	9.1
Pacific	0.7	1.4	2.1	2.8	3.5	10.6	2.1
G2	119.5	239.2	359.2	479.4	599.8	1,797.0	359.4
United States	5.0	10.0	15.1	20.1	25.2	75.5	15.1
EU-28	114.5	229.2	344.1	459.2	574.6	1,721.6	344.3
Rest of the World	52.2	105.3	159.1	213.8	269.4	799.8	160.0
Economy	Markup as Proportion of 2020 Baseline Investment (%)					Total	Average
	2021	2022	2023	2024	2025		
World	18.1	36.4	54.8	73.4	92.2	275.0	55.0
Asia	14.9	30.0	45.4	61.0	76.9	228.2	45.6
Australia and New Zealand	14.7	29.7	44.9	60.3	75.9	225.6	45.1
Central Asia	14.3	29.2	44.7	60.7	77.5	226.3	45.3
East Asia ex-PRC and Japan	12.9	26.0	39.2	52.5	66.0	196.6	39.3
PRC	6.0	12.0	18.1	24.2	30.4	90.8	18.2
Japan	23.9	48.2	72.9	98.0	123.4	366.4	73.3
Southeast Asia	10.2	20.7	31.5	42.5	53.8	158.7	31.7
South Asia	10.6	21.5	32.7	44.3	56.1	165.3	33.1
Pacific	44.1	88.5	133.2	178.2	223.5	667.5	133.5
G2	20.8	41.6	62.4	83.3	104.3	312.4	62.5
United States	4.7	9.4	14.1	18.8	23.5	70.4	14.1
EU-28	24.5	49.0	73.5	98.1	122.8	367.9	73.6
Rest of the World	17.3	34.9	52.8	71.0	89.4	265.5	53.1

EU-28 = European Union, G2 = Group of 2, PRC = People's Republic of China.

Note: The calculations are based on the Global Trade Analysis Project (GTAP) database. Southeast Asia includes Timor-Leste. The Pacific subregion includes non-ADB member economies. Asia and the Pacific includes economies that are non-ADB members due to the aggregation of the Pacific subregion in GTAP.

Source: Narayanan and Villafuerte (2020).

Annex 8d: Public and Private Platforms for e-Learning

	National Platforms	Private Platforms
Azerbaijan	<ul style="list-style-type: none"> E-resurs – free learning resources Elektron Dərslik Portalı – Electronic Textbook Portal Video.edu.az – Video lessons Virtual School http://mesafedenmekteb.edu.az^a Over 1 million students registered for virtual school^b (out of 2 million total students)^c Three-fourths (75%) of schoolchildren supported by distance learning^d 	
People's Republic of China	<ul style="list-style-type: none"> National Cloud-Platform for Educational Resources and Public Service EduCloud Empower Learning^e 	<ul style="list-style-type: none"> ClassIn – Daily active users, 10 times higher than previous year Zhiboyun – customer numbers have increased 8–10 times Baijiayun – customer leads have increased by a factor of 15–20 times^f Xueersi users have increased 2680%^g
Georgia	<ul style="list-style-type: none"> EL.GE – resources based on national curriculum Email.mes – instructive site on COVID-19 Feedc Edu – national online learning platform Teleskola – TV program^h 	
India	<ul style="list-style-type: none"> MHRD – collection of platforms by the Ministry of Human Resource Development National Digital Library of Indiaⁱ Dishka – e-learning content e-Pathshala – app by the National Council of Educational Research and Training in multiple languages National Repository of Open Educational Resources Swayam – platform for higher education Swayam Prabha – TV channels broadcasting educational programming e-PG Pathshala – platform for postgraduate students^j 	<ul style="list-style-type: none"> “Ed-tech firms have witnessed 10-fold rise in registration for trial or free coaching”^k BYJUs have witnessed a 200% increase in students using its “Think and Learn app”^l BYJU – 7.5 million new users since the company started offering free content. Time spent on the app increased from 70 minutes pre-lockdown to 91 minutes during lockdown. Despite offering free content, April was the company’s most profitable month to date. “Toppr has seen a 100 percent growth in paid users’ on a monthly basis, with free user engagement witnessing a 100 percent spike.”^m White Hat Jr. – “The company has been growing at 40% MoM growth over the past 12 months and with the current lockdown, MoM growth has accelerated to 100 percent.”ⁿ
Indonesia	<ul style="list-style-type: none"> Rumah Belajar – distance learning resources SPADA – e-learning for tertiary^o 	<ul style="list-style-type: none"> More than 200% growth in EdTech platforms’ active users and downloads in March 2020^p
Viet Nam	<ul style="list-style-type: none"> Elearning – Ministry of Education distance learning National and local TV channels Taphuan – additional resources from Ministry of Education^q 	<ul style="list-style-type: none"> VNPT E-Learning users increased by 4 times ViettelStudy gained 41 million visits in a month^r

COVID-19 = coronavirus disease.

^a UNESCO. 2020c. *National Learning Platforms and Tools*. 7 July. <https://en.unesco.org/covid19/educationresponse/nationalresponses>.

^b CEE Multi-Country News Center. 2020. Azerbaijan: How One Ministry Found the Right Strategy, Resources, and Technology to Quickly Create Online Classrooms. Microsoft. 9 July. <https://news.microsoft.com/en-cee/2020/07/09/azerbaijan-how-one-ministry-found-the-right-strategy-resources-and-technology-to-quickly-create-onlineclassrooms/>.

^c World Bank. World Bank Education and COVID-19. <https://www.worldbank.org/en/data/interactive/2020/03/24/world-bank-education-and-covid-19> (accessed July 2020).

^d UNICEF Azerbaijan Country Office. 2020. *COVID-19 Situation Report No. 9*. Baku.

^e UNESCO. 2020c. *National Learning Platforms and Tools*. 7 July. <https://en.unesco.org/covid19/educationresponse/nationalresponses>.

^f Wang, C., and T. Quin. 2020. *How COVID-19 is Transforming Chinese Education*. New York: Oliver Wyman. <https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2020/March/how-covid-19-is-transforming-chinese-education.pdf>.

^g Wu, J. 2020. *Infographic: Coronavirus-Impacted Economy Brings New Opportunities to These Tech Sectors*. KR Asia. <https://kr-asia.com/infographic-coronavirus-impacted-economy-brings-new-opportunities-to-these-tech-sectors>.

- ^h UNESCO. 2020c. *National Learning Platforms and Tools*. 7 July. <https://en.unesco.org/covid19/educationresponse/nationalresponses>.
- ⁱ Ibid.
- ^j Jena, P. K. 2020. Impact of COVID-19 on Education in India. *International Journal of Current Research*. 12(7). pp. 12582–12586.
- ^k Samantaray, P. K. 2020. COVID Challenges to India Education System. *Article*. Uttar Pradesh: Digital Learning. <https://digitallearning.eletsonline.com/2020/06/covid-challenges-to-india-education-system/>.
- ^l Bindra, V. 2020. With COVID 19 Providing a Major Disruption, The Future of EdTech Platforms Looks Promising. *Express Computer*. 2 July. <https://www.expresscomputer.in/industries/education/with-covid-19-providing-a-major-disruption-the-future-of-edtech-platforms-looks-promising/59609/>.
- ^m Medhi, T. 2020. Meet The 6 Edtech Startups That Have Seen Record Growth Amid COVID-19 Lockdown. *YourStory*. 16 June. <https://yourstory.com/2020/06/edtech-startups-growth-coronavirus-byjus-unacademy-toppr-startups>.
- ⁿ *Express Computer*. 2020. EdTech Startup WhiteHat Jr. Ramps Up Hiring to Meet Massive Surge in Student Enrollment. 8 May. <https://www.expresscomputer.in/news/edtech-startup-whitehat-jr-ramps-up-hiring-to-meet-massive-surge-in-student-enrolment/55276/>.
- ^o UNESCO. 2020c. *National Learning Platforms and Tools*. 7 July. <https://en.unesco.org/covid19/educationresponse/nationalresponses>
- ^p World Bank 2020. *EdTech in Indonesia—Ready for Take-off?* Washington, DC.
- ^q UNESCO. 2020c. *National Learning Platforms and Tools*. 7 July. <https://en.unesco.org/covid19/educationresponse/nationalresponses>.
- ^r Ministry of Information and Communications of the Socialist Republic of Vietnam. 2020. Online Applications Blooming in Vietnam during Covid-19 Outbreak. 18 March. <https://english.mic.gov.vn/Pages/TinTuc/140855/Online-applications-blooming-in-Vietnam-during-Covid-19-outbreak.html>.

Annex 8e: Data Protection Measures, Select Asian Countries

Jurisdiction and Data Protection Regulation	Consent	White Lists, Adequacy Findings
<p>Australia</p> <p>Privacy Act (1988), Australian Privacy Principle (APP) 8.1 Accountability Principle: Before an entity discloses personal information to an overseas recipient, the entity must “take such steps as are reasonable in the circumstances to ensure that the overseas recipient does not breach the APPs (other than APP 1) in relation to that information.”</p> <p>S16C: If an entity discloses personal information about an individual to an overseas recipient and APP 8.1 applies to the disclosure of the information, the entity is accountable for any acts or practices of the overseas recipient that would breach the APPs in relation to the information.</p>	<p>Yes (optional)</p> <p>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 (APP Guidelines at para. 8.27 ff.).</p> <p>Consent means “express consent or implied consent” (Privacy Act s 6[1]).</p>	<p>No.</p>
<p>Indonesia</p> <p>Law No. 11 of 2008 on Electronic Information and Transactions (EIT Law), Art 26 Regulation No. 20 of 2016 of the Ministry of Communication and Information (MCI 20/2016), Arts 21 and 22</p> <p>Principle: Electronic System Providers (ESPs) may transfer data only with the individual’s consent; and following “coordination with the Ministry” (in the current case the Ministry of Communication and Information, or “Kominfo”). The coordination requirement seems closer to a notification requirement than to a prior authorization but sometimes regulatory scrutiny is applied.^a</p>	<p>Yes (required):</p> <p>The written consent of the “data owner” is required unless specific regulations apply (MCI 20/2016, Art 21[1]). Express opt-in is not explicitly required by Art 21(1) but is derived from MCI 20/2016, Art 1(4).</p>	<p>Uncertain:</p> <p>It is not known if the ministry would assess the level of protection in certain countries (e.g., countries with data protection laws) in the context of the coordination provided in MCI 20/2016 Art 22.</p>
<p>Malaysia</p> <p>Personal Data Protection Act (PDPA) 2010:</p> <p>Data transfers outside Malaysia may in principle take place only to places specified by the Minister where there is in force any law which is substantially similar to, or that serves the same purposes as the PDPA or which ensures an adequate level of protection which is at least equivalent to the level of protection afforded by PDPA.</p>	<p>Yes (optional):</p> <p>Consent may operate as an exception to the requirement that transfers may take place only to places specified by the Minister (s 129[2][a]).</p>	<p>Yes:</p> <p>The minister, upon the recommendation of the commissioner, may specify any place outside Malaysia to where data may freely flow.</p>
<p>New Zealand</p> <p>Privacy Act 1993:</p> <p>International transfers are permitted, as long as the legal requirements in the privacy principles and appropriate conditions for privacy protection are observed. However, in exceptional circumstances the Privacy Commissioner may prohibit a transfer to another State when: - The personal information has been received from another State and will be transferred to a third State where it will not be subject to a law providing comparable safeguards to the Privacy Act; and - The transfer would be likely to breach the basic principles of national application set out in the OECD Guidelines.</p>	<p>No:</p> <p>Consent is neither optional nor required, and would not currently appear to waive the requirements of existing privacy safeguards in the country of destination.</p>	<p>No:</p> <p>The Privacy Act does not provide for the possibility to adopt “white lists.” However, the commissioner may prohibit a transfer “if the information has been, or will be, received in New Zealand from another State and is likely to be transferred to a third State where it will not be subject to a law providing comparable safeguards to this Act” and the transfer would be likely to lead to a contravention of the basic principles of national application.</p>

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Appendix 8e continued

Jurisdiction and Data Protection Regulation	Consent	White Lists, Adequacy Findings
<p>Philippines</p> <p>Data Privacy Act (DPA) of 2012 and its Implementing Rules and Regulations (IRRs)</p>	<p>Yes (optional):</p> <p>Data may only be processed (includes transfer) if there is a lawful criteria for doing so. Consent is one lawful criterion.</p> <p>The IRR provides that data sharing shall be allowed in the private sector if the data subject consents to the data sharing.</p>	<p>No:</p> <p>The DPA does not recognize or consider the data protection regulations in the country of destination.</p>
<p>Singapore</p> <p>Personal Data Protection Act (PDPA), 2012:</p> <p>s. 26: An organization shall not transfer any personal data to a country or territory outside Singapore except in accordance with requirements prescribed under the PDPA to ensure that organizations provide a standard of protection to personal data so transferred that is comparable to the protection under PDPA.</p>	<p>Yes (optional):</p> <p>The requirements of s 26 may be satisfied if the transferring organization obtains the individual's consent to the effect of transferring the data (Reg 9[3][a]).</p> <p>Consent cannot be used to waive the requirement of existing privacy safeguards in the country of destination.</p>	<p>Conceivable:</p> <p>The exporting organization must have taken "appropriate steps to ascertain whether, and to ensure that, the recipient of the personal data in that country or territory outside Singapore (if any) is bound by legally enforceable obligations to provide to the transferred personal data a standard of protection that is at least comparable to the protection under the Act."</p>
<p>Thailand</p> <p>Personal Data Protection Act 2019:</p> <p>s. 28: Data transfers may freely take place to a foreign country or international organization that have adequate data protection standards, and in accordance with the data protection rules prescribed by the Data Protection Committee.</p> <p>--</p> <p>Exceptions to the "adequacy" requirement apply in four series of circumstances: the data subject's consent has been obtained; specific statutory exemptions apply; the receiving organization provides suitable protection measures which enable the enforcement of the data subject's rights; or the receiving organization has put in place a "Personal Data Protection Policy" app.</p>	<p>Yes (optional):</p> <p>Obtaining the data subject's consent will be one of the circumstances in which the data controller may derogate to the rule that transfers may take place only to a destination country or international organization that has adequate data protection standards under PDPA.</p> <p>Where consent is obtained, data subject must be informed of the inadequate data protection standards of the destination country or international organization.</p> <p>The conditions for obtaining valid consent are defined in the PDPA.</p>	<p>Conceivable:</p> <p>When PDPA Chapter 3 enters into force, in the event that the data controller sends or transfers the personal data to a foreign country, unless an exemption applies, the destination country or international organization that receives such personal data must have an "adequate data protection standard," and the transfer must be carried out in accordance with the rules for the protection of personal data as prescribed by the Committee (s 28).</p>

^a Kobrata (2018) as cited in ABLI (2020).

Source: Asia Business Law Institute (2020).

Annex 8f: Construction of the Digital Platform Penetration Index and Insights from the Network Readiness Index

The digital platform index is constructed using the data compiled from Statista (2020a, 2020b) and national sources. The full data set comprises seven sectors: AdTech, Digital Media, E-Commerce, E-Services, Online Travel, and Transportation. This exercise covers 34 Asian economies and data from 2017 to 2019.

To construct the index, principal components analysis (PCA) was employed. PCA is a common method used to reduce the number of dimensions of large data sets with the intent of explaining the variations. The specific variables used in the index construction are revenue-to-GDP ratio, per user spending as proportion of GDP per capita, active user accounts-to-population ratio and revenue-to-population ratio (PPP adjusted). Revenue-to-GDP and revenue-to-population ratios are straightforward self-explanatory metrics in terms of the extent of digital platform penetration. Per user spending as proportion of GDP per capita captures the relative size of spending of every internet user to income. In the absence of data on unique digital platform users, internet users derived from the AdTech data set is used. Notably, users refer to AdTech-exposed internet users in the AdTech source file while it refers to active user accounts in the other sectors. This is understandable considering that AdTech from a consumer perspective is more of a rider in other platforms as opposed to a stand-alone platform itself. Finally, active and paying user accounts-to-population ratio captures another dimension of the willingness of the population to participate in various digital platforms. These accounts cover the data of the six sectors excluding AdTech and can be more than one per actual person user within sector and across sectors.

The variables were normalized before the estimation and the resulting index is essentially a linear combination of them. The subsequent equation summarizes the construction of the index, whereby the normalized right-hand side variables are weighted by the principal component (PC) 1 loadings. Two notes regarding the results. Firstly, the component 1 turns out to account for

about 64% of the observed variance given the data set. Second, the PC loadings are eigenvectors normalized by the square root of the eigenvalue.

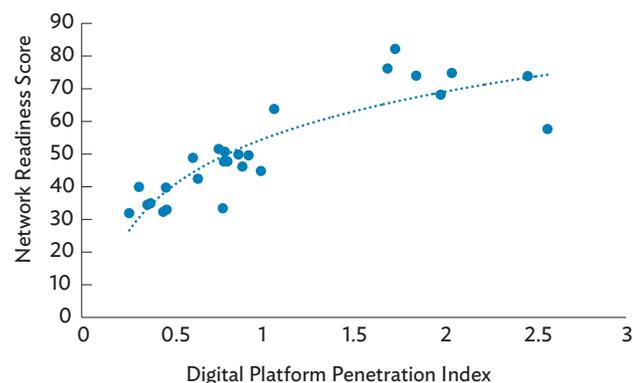
$$\text{Equation: } DPP \text{ Index} = 0.8955^*(\text{revenue-to-GDP ratio}) + 0.4793^*(\text{per user spending as a proportion of per capita income}) + 0.8990^*(\text{user accounts-to-population ratio}) + 0.8990^*(\text{revenue to population, PPP})$$

Cybersecurity, integrity, and privacy of systems are crucial to the overall credibility of the ecosystem. While physical infrastructure, education, and skills remain an integral component in line with the Sustainable Development Goals, mitigating the risks of fraud, data privacy breach, intellectual property infringement, and consumer rights violations are equally crucial in ICT policy making.

One of the metrics that captures this multidimensionality is the network readiness index (NRI). The NRI incorporates quality and access to ICT infrastructure; readiness of the people, businesses, and governments; responsiveness of regulations and trust in authorities; and the impact of technology on the economy, quality of life, and the Sustainable Development Goals.

Plotting the DPP index against the NRI indicates that digital platform penetration is high in countries where digital readiness is also high, which is intuitive (Annex 8f Figure). Indeed, it is no coincidence that large digital platforms operating in the region have established headquarters in countries where the infrastructure base is robust and absorptive capacities are large, such as Singapore, Japan, and the People's Republic of China. This suggests that in order to sustainably develop the domestic digital platform economy, governments cannot slacken in upgrading the underlying infrastructure and regulatory foundations.

Digital Platform Penetration and Network Readiness—Asia, 2019



Source: ADB estimates and Dutta and Lanvin (2020).

For countries in the lowest group, there is a great need to catch up in all four aspects of network readiness (Annex 8f Table). Drawing specific lessons from

neighboring countries can be a viable strategy to improve the competitiveness of and access to technology infrastructure as well as regulatory foresight.

Digital platforms have the potential to promote economic inclusion in various dimensions with the right mix of policies. Empowering MSMEs, which account for over 90% of the total number of firms in many economies in the region (Yoshino and Taghizadeh-Hesary 2018) is one policy area where digital platforms can contribute significantly. Increasing the flow of funds to population segments not served by traditional financial institutions is another target, considering that around 1.5 billion people in developing Asia are assessed to be still unbanked (Mylenko and Park 2015). The platforms' potential to broaden health and education services also appears promising where the infrastructure and requisite skills are already well established.

Digital Platform Penetration Index and Network Readiness Subindexes

Economy	DPP Index	Network Readiness Main Subindexes			
		Technology	People	Governance	Impact
PRC	2.5847				
Korea, Rep. of	2.5283				
Australia	2.1010				
Hong Kong, China	2.0323				
New Zealand	1.8795				
Japan	1.7794				
Singapore	1.7644				
Malaysia	1.1008				
India	1.0220				
Viet Nam	0.9429				
Indonesia	0.9190				
Brunei Darussalam	0.8322	n.d.			
Philippines	0.8221				
Armenia	0.8077				
Pakistan	0.7960				
Kazakhstan	0.7929				
Thailand	0.7902				
Azerbaijan	0.7833				
Sri Lanka	0.6501				
Georgia	0.5751				

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Appendix 8f continued

Economy	DPP Index	Network Readiness Main Subindexes			
		Technology	People	Governance	Impact
Kyrgyz Republic	0.5018				
Uzbekistan	0.4840	n.d.			
Nepal	0.4619				
Fiji	0.4579	n.d.			
Cambodia	0.4416				
Tajikistan	0.4155				
Bangladesh	0.3928				
Myanmar	0.3909	n.d.			
Bhutan	0.3119	n.d.			
Mongolia	0.2824				
Lao PDR	0.2523				
Timor-Leste	0.2486	n.d.			
Papua New Guinea	0.2111	n.d.			
Turkmenistan	0.1565	n.d.			

Lao PDR = Lao Democratic People's Republic, n.d. = no available data, PRC = People's Republic of China.

Notes:

- (i) Maximum and minimum values are set at 0 and 100, following the scale in Dutta and Lanvin (2020).
- (ii) Low to high value spectrum:
- (iii) The Technology sub-index captures access, content, and future technologies.
- (iv) The People sub-index captures the readiness and aptitude of individuals, businesses, and governments.
- (v) The Governance sub-index captures trust, regulation, and inclusion.
- (vi) The Impact sub-index captures economic value, quality of life, and contribution to sustainable development goals.
- (vii) The specific indicators used and the methodology are laid out in Appendixes 1 to 3 of Dutta and Lanvin (2020), https://networkreadinessindex.org/wp-content/uploads/2020/11/NRI-2020-V8_28-11-2020.pdf.

Source: ADB estimates and Dutta and Lanvin (2020).