



EMBRACING THE E-COMMERCE REVOLUTION IN ASIA AND THE PACIFIC

JUNE 2018

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FOREWORD

The report, *Embracing the E-commerce Revolution in Asia and the Pacific*, reviews the current state and dynamic potential of business-to-consumer (B2C) e-commerce in the region. The potential of e-commerce is undeniable. From e-banking for the unbanked to small and medium-sized enterprises joining supply chains, to individuals marketing new products and services and farmers accessing real-time weather and market data, e-commerce provides a modern, still evolving marketplace that can make economies far more inclusive. Linking rural and urban markets, attracting women entrepreneurs, and offering the poor ways to profit from new opportunities will drive up incomes for traditionally disadvantaged segments of the population. But developing e-commerce also means dealing with multiple hurdles and challenges related to economic, legal and institutional, and social developments.

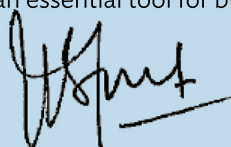
Asia is already the world's largest e-commerce marketplace and continues to grow rapidly. However, there is wide diversity among economies in e-commerce development. Several rank among the top 10 globally, while others continue to lag far behind the world average. Information and communication technology (ICT) infrastructure is essential to allow e-commerce to grow. Internet access, speed and affordability, logistics, and delivery capabilities are all part of the crucial ecosystem that allows e-commerce to thrive.

The report presents a new comprehensive framework to better examine the development of B2C e-commerce in the region. It provides a systemic way of understanding different facets and factors that define and affect the industry's evolution. The framework consists of three dimensions: (i) economic factors and conditions, (ii) legal and institutional environment, and (iii) social acceptance and awareness. Each interacts with the others—the strength of any ecosystem can be only as good as its weakest link. A problem in any specific dimension might have derived from weaknesses in others, while a solution in one dimension could potentially ease problems across all.

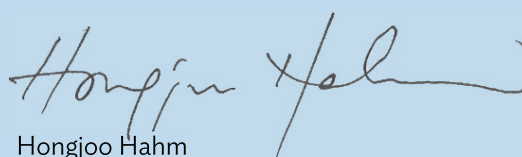
Moreover, the report examines the impact on e-commerce of so-called Fourth Industrial Revolution (4IR) technologies—such as blockchains, the internet of things, machine learning, artificial intelligence, and 5G wireless technology. These will allow for greater reach, better targeting, stronger security, and faster and more stable connectivity, among other benefits. However, to power innovation in the 4IR, new risks and challenges presented by the digital-enabled 4IR have to be met. Efforts to uphold digital integrity need to move beyond ensuring privacy and data protection; countering counterfeit products, scams, and fraud; and providing effective consumer protection.

The report offers policy recommendations that could reduce barriers to B2C e-commerce. It breaks them down into groups that directly impact e-commerce development: (i) governments and international agencies, (ii) trade associations, (iii) businesses within the e-commerce ecosystem, and (iv) consumers and the general public. The role of governments is important, for example for improving access to affordable and reliable internet connections, developing the delivery and logistics systems, enacting e-transaction laws, and enforcing online intellectual property rights, along with strengthening financial and e-payment infrastructure.

We hope this report informs the public and provides policy makers a clear sense of what needs and can be done to further unlock the great economic and developmental potential of the e-commerce industry. It could very well become an essential tool for building sustainable and inclusive growth across Asia and the Pacific.



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Cyn-Young Park, ERCI Director of ADB, and Mia Mikic and Tsuen Yip Jonathan Wong of ESCAP led the preparation of this publication. Jong Woo Kang, Principal Economist, ERCI of ADB and Tengfei Wang, Economic Affairs Officer, TIID of ESCAP coordinated overall production, assisted by Mara Claire Tayag, ERCI Senior Economics Officer. The main contributors include Jong Woo Kang and Nir Kshetri, Professor of the University of North Carolina at Greensboro. David Joseph Anabo and Mara Claire Tayag provided research support. The main contributor from ESCAP includes Tengfei Wang. Comments were provided by Yann Duval, Witada Anukoonwattaka, and Sharon Amir, as well as Anurag Kumar during his internship with ESCAP.

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ABBREVIATIONS

3D	three dimensions
5G	fifth generation
ADB	Asian Development Bank
AI	artificial intelligence
AR	augmented reality
ASEAN	Association of Southeast Asian Nations
ASYCUDA	Automated System for Customs Data
B2B	business-to-business
B2C	business-to-customer
C2C	customer-to-customer
CAGR	compound annual growth rate
COD	cash on delivery
DMC	developing member country
DSCI	Data Security Council of India
e-CAB	e-Commerce Association of Bangladesh
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FICO	Fair Isaac Corporation
G2C	government-to-consumer
GBPS	gigabits per second
GDP	gross domestic product
GDPR	General Data Protection Regulation
GSMA	Groupe Spéciale Mobile Association
GST	goods and services tax
ICT	information and communication technology
IoT	internet of things
IPR	intellectual property rights
IT	information technology
ITU	International Telecommunication Union
KBPS	kilobits per second
KITA	Korea International Trade Association
Lao PDR	Lao People's Democratic Republic
LDCs	least developed countries
MBPS	megabits per second
ML	machine learning
MNC	multinational corporation
NASSCOM	National Association of Software and Service Companies
OECD	Organisation for Economic Co-operation and Development
PPP	public-private partnership
PRC	People's Republic of China
SEC	Securities and Exchange Commission
SMEs	small and medium-sized enterprises

UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
US	United States
VAT	value added tax
VECOM	Vietnam E-commerce Association
VR	virtual reality
WCO	World Customs Organization
WTO	World Trade Organization

EXECUTIVE SUMMARY

E-commerce revolution in Asia and Pacific presents vast economic potential. Asia is the fastest-growing region in the global e-commerce marketplace, accounting for the largest share of the world's business-to-consumer e-commerce market. By the end of 2015, the size of e-commerce relative to gross domestic product was 4.5% in Asia and the Pacific. E-commerce enables small and medium-sized enterprises to reach global markets and compete on an international scale. It has improved economic efficiency and created many new jobs in developing economies and least developed countries, offering a chance for them to narrow development gaps and increase inclusiveness—whether demographic, economic, geographic, cultural, or linguistic. It also helps narrow the rural–urban divide. Nevertheless, Asia's e-commerce market remains highly heterogeneous. In terms of e-commerce readiness—based on the United Nations Conference on Trade and Development 2017 e-commerce index—the Republic of Korea ranks fifth globally (95.5 score) while Afghanistan ranks 132 (17 score).

This report introduces a new analytical framework to assess the level and quality of e-commerce development. The framework incorporates three key dimensions of e-commerce development: (i) economic factors and conditions, (ii) legal and institutional environment, and (iii) social acceptance and awareness. The multidimensional framework allows a systemic review of underlying conditions and factors characterizing e-commerce development to evaluate the current status, identify multifaceted development challenges, and suggest the way forward. These conditions and factors are also closely related, while each would have direct and indirect effects on the e-marketplace.

- **Economic factors and conditions directly affect e-commerce readiness and viability.** E-commerce opportunities build on access, availability, and affordability of information and communication technology (ICT) infrastructure and services. While the availability of broadband internet connections has been a key factor in fueling its growth, e-commerce requires substantial infrastructure that allows sellers to transact business with buyers. One of the key barriers to e-commerce development in many developing economies is lack of secure online payment options. Quality and speed of delivery logistics also matter. On the other hand, economies of scale and network externalities in general present hurdles to e-commerce development in small developing countries. Therefore, the review of economic factors and conditions has been conducted in areas of (i) ICT affordability and accessibility, (ii) bandwidth availability, (iii) availability of online payment options, (iv) delivery infrastructure, and (v) economies of scale.
- **Legal and institutional environment can be a powerful facilitator for e-commerce adoption and development.** Appropriate legislation is part of the backbone of e-commerce industry. Weak legal and regulatory frameworks can result in low levels of trust in e-commerce transactions, and thus reduce e-commerce use. Basic laws that are needed for e-commerce adoption fall into four categories: (i) e-transactions, including rules related to electronic signatures and authentication; (ii) consumer protection; (iii) data protection and privacy; and (iv) cybercrime.
- **Social acceptance and awareness play a major role in the initial adoption stage for e-commerce development.** The level of confidence, risk aversion, and inertia among firms are critical factors for adopting e-commerce, as are awareness, knowledge, and understanding of e-commerce opportunities. The consumers often have low level of (i) awareness and knowledge of e-commerce benefits; (ii) general and computer literacy, along with English proficiency; (iii) trust in e-commerce vendors, postal services, and other logistics; and (iv) perception of foreign products and/or vendors. This presents a variety of challenges for developing e-commerce.

The devil is in the details as to understand cross-country variation in e-commerce development, such as quality and sophistication of ICT infrastructure, legislation, and cognitive components. Despite remarkable progress in basic internet access and availability, the region lags behind the world average in terms of the speed and affordability of broadband services as well as availability of secure internet servers. Fixed and mobile broadband subscriptions in Asia and the Pacific are higher than other developing regions such as Africa and Arab states. However, there is a wide variation in affordability of broadband access, with the irony being that the poorer the economy, the higher the cost of broadband access. Availability of alternative payments also varies widely across countries in the region. The top four economies in the region spend around 200 times the bottom four economies in credit card transactions per capita. With limited online payment options, many economies in the region still rely on cash on delivery as a popular payment method for online transactions. On the legal front, most economies in the region have some type of electronic transaction and cybercrime legislation. However, the laws related to privacy, data protection, and consumer protection remain laggard. Lack of awareness of potential opportunities digital businesses offer, and low computer literacy and English proficiency in the context of the English-centric nature of internet websites, software, and computer interfaces pose additional challenges to many developing economies in the region in fostering an enabling environment for e-commerce marketplace.

The emergence of new technologies will impact the e-commerce landscape. New technologies and trends, especially those associated with the wave of the Fourth Industrial Revolution, are rapidly developing and shaping a strong digital ecosystem supporting e-commerce. E-commerce is not only about merchants selling products online. With rapidly evolving technologies, customer expectations have risen higher. E-commerce firms around the world are embracing new technologies—such as big data analytics, the internet of things (IoT), artificial intelligence (AI), augmented reality (AR), virtual reality (VR), and blockchain technology—to meet evolving customer needs, befitting greater customization, maximum convenience, and security.

- **Smart factory adopting new technology, big data analytics, and supply chain digitalization constitute essential elements for customization.** Early and active engagement of customers is possible with mobile and digital technology facilitating their participation in the whole production process from developing concept to final delivery. With advanced technology and big data, some suppliers start to offer more customized products with smaller order, lower cost, and shorter lead time. Smart factory is important for customization through digitalized business process and automation to improve the flexibility and productivity of product lines. New technologies such as big data analytics, artificial intelligence, and automation can also help improve the agility of the supply chain to allow real-time tracking and tracing, flexible adjustments in production, and quick responses to the customer demand.
- **E-commerce will gain dramatically from fifth generation wireless networks.** In combination with AI, IoT, AR, and VR, fifth generation (5G) networks will likely transform the e-commerce industry and e-marketplace. 5G networks improve the efficiency of existing technologies, such as IoT, where 5G can increase the data transmission rate, and in the case of AR and VR, where 5G can reduce latency.
- **Blockchain technology can be a major disruptive force for e-commerce.** Blockchain technology applications can affect a full range of e-commerce systems such as payments, supply chains, management processes, data security, and logistics. These go beyond the creation of cryptocurrencies such as Bitcoin as a method of payment. Several companies are launching blockchain-powered digital identity programs to help create and validate individual identities, which help consumers, especially the poor, participate in e-commerce. In Asia and the Pacific, many people living in poor urban areas cannot provide birth certificates, utility bills, or other documents to open bank accounts or thus participate in e-commerce. Blockchain technology can also help prevent counterfeit products from being sold online by updating digital product data with ownership and

storage records, as they move down the supply chain. One of the most high-profile future uses of blockchains, however, will likely be the smart contracts that online vendors will use to automate order fulfillment for digital product delivery. Smart contracts enabled by blockchain technology allow for direct transactions between sellers and buyers by allowing the smart contract to be programmed to execute when specified obligations have been fulfilled.

Developing a viable e-commerce ecosystem requires a holistic approach and concerted efforts by all stakeholders and major players in e-commerce development. There are four main actors in the global e-commerce marketplace, each playing an important role in shaping the e-commerce business landscape: (i) national governments and international agencies; (ii) trade associations and industry bodies; (iii) businesses within the e-commerce ecosystem (e-commerce vendors, payment service providers, and logistics service providers, among others); and (iv) consumers and the public.

- **Government agencies, trade associations, and other stakeholders should focus on appropriate e-commerce-related laws, regulations, and institutions.** Policy priority should be on establishing legal and regulatory framework for e-commerce, harmonizing international laws and standards, promoting ICT infrastructure development, broadening internet access and improving affordability, and supporting financial and e-payment infrastructure. Government agencies can also help develop e-commerce skills and capacity; enforce intellectual property rights; enact laws on e-transactions, data protection, privacy, and cybersecurity; and develop enforcement mechanisms. Trade associations can play a supplementary role to regulative institutions.
- **Business can help build e-commerce market trust and foster innovation.** Businesses need to offer consumers detailed product descriptions; provide transaction support over a wide range of e-payment choices; assure efficient, reliable, and timely logistics and delivery services; deploy innovative technological solutions to improve the quality of client services and operational efficiency; and avoid fraudulent practices. Business should be ethical to do the right thing. Ethical and legal issues concerning e-commerce transactions are important test grounds for businesses to ensure a safe and secure e-commerce environment for customers.
- **Consumers must prioritize transparency while sharing the responsibility for maintaining an ethical marketplace to strengthen the virtuous circle of e-commerce development.** Consumers should actively evaluate online vendor reputation and authenticity. Responsible consumer behavior includes reporting counterfeit products or contraband items, such as illegal drugs.

Complex border-crossing procedures, regulatory burdens, and uncertain return processes continue to hinder the development of cross-border e-commerce. All current estimates show rapid expansion of cross-border e-commerce growth. The cross-border e-commerce in Asia and the Pacific was projected to grow 37% annually from 2014 to 2020. Despite rapid growth, cross-border e-commerce could expand faster if various barriers were removed. International trade would benefit, consumers proliferate, people's welfare enhanced, and business opportunities for enterprises expanded. Economies in Asia and the Pacific vary widely in logistics performance. The rapid growth in parcel flows has created congestion and valuation problems for customs officials across much of the region. Global online companies also face the challenge of delivering packages due to poor address systems. Moreover, cross-border e-commerce must deal with some difficult issues, such as duty and tax collection, transfer pricing, smuggling, and customs clearance in handling ever-growing volumes of low-value shipments.

The background is a blue-toned illustration depicting e-commerce logistics. It features a large smartphone frame containing a server room with glowing blue lights, a white delivery truck heavily loaded with cardboard boxes, and a smaller white van. Various icons representing e-commerce and logistics, such as a shopping cart, a location pin, a gear, a mail envelope, and a person, are scattered in the upper right area. In the bottom left, there is a large orange circle containing a white number '1'.

1

E-commerce Evolution in Asia and the Pacific



E-commerce Evolution in Asia and the Pacific

Introduction

Buying and selling over digital networks has grown rapidly and will continue to do so, particularly across Asia and the Pacific. Electronic commerce, better known as e-commerce, offers many benefits. It creates greater competition, both within and across countries. It also allows greater inclusiveness in economic activity and boosts trade. However, it must deal with the many challenges that go beyond traditional commerce. These include building sufficient information and communication technology (ICT) infrastructure, enhancing digital literacy, legislating consumer and other legal protections, and enforcing cybersecurity, among others.

Major e-commerce categories include business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C), and business-to-government (B2G) transactions.

This report mainly focuses on B2C transactions. Even though B2B e-commerce is by far the largest in market turnover—almost 10 times the size of B2C in 2015—B2C is better discussed holistically, considering the entire e-commerce ecosystem of hardware and software infrastructure, legal issues (including those covering privacy and consumer protection), e-payment options, and delivery services, including the last mile ones.

Whereas the report mostly refers to B2C e-commerce, it also discusses various subsets, such as internet retail and mobile commerce (m-commerce), depending on available data or a specific segment that deserves special attention. Box 1.1 defines e-commerce as used in this report and lists data sources on B2C and internet retailing transactions.

Objectives, Scope, and Methodology of the Report

This report aims to answer an important policy question. How can the e-commerce industry and market be developed and grown to deliver positive social and economic outcomes in Asia and the Pacific? This report will:

- (i) identify, document, evaluate, and provide an authoritative and up-to-date account of B2C e-commerce in the region;
- (ii) develop a conceptual framework to study B2C e-commerce across the region;
- (iii) identify and assess barriers organizations and consumers face when adopting e-commerce;
- (iv) examine the macro-level impact of B2C e-commerce;
- (v) evaluate how technological advances can help develop the e-commerce industry and market;
- (vi) investigate ways to enhance inclusiveness in e-commerce development;
- (vii) provide in-depth case studies from selected economies in Asia and the Pacific across the development spectrum to look for any development trends and patterns of the e-commerce industry and market—to better understand its facilitators and barriers; and
- (viii) suggest options for key stakeholders such as businesses, governments, international organizations, trade associations, and consumers.

While the scope of this report is primarily B2C e-commerce, internet retail data are also used (subject to data availability) to supplement the discussions. We limit our focus to Asia and Pacific economies, although other regional and national economies are discussed for the purpose of comparison and benchmarking.

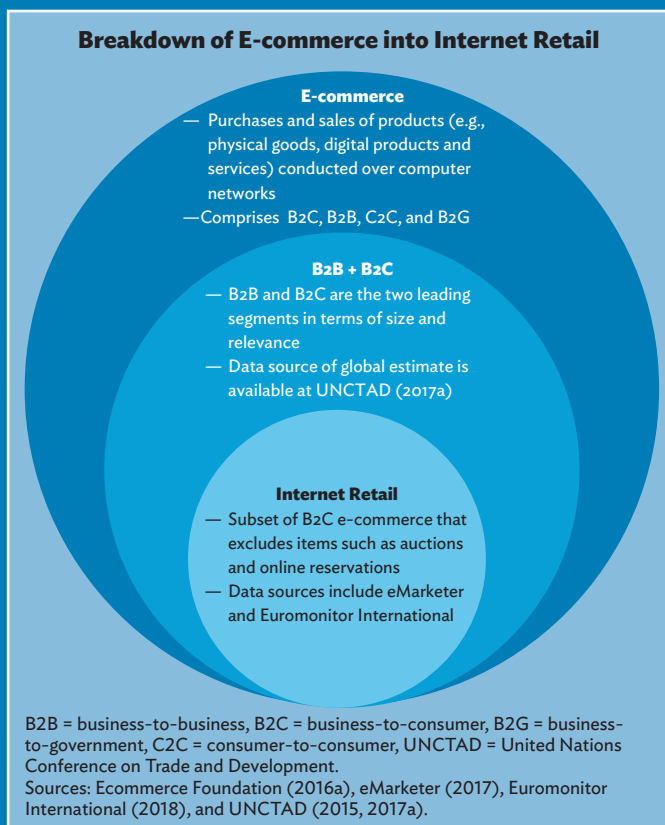
Box 1.1: Definitions and Coverage of E-commerce

The definitions and sources of e-commerce data used in the report are illustrated in the box figure, and described below and in the box table:

E-commerce: This report uses the Organisation for Economic Co-operation and Development (OECD 2011) definition of e-commerce—also used by the United Nations Conference on Trade and Development (UNCTAD 2017a). E-commerce involves the purchase and sale of products (such as physical goods, digital products or services) transacted over computer networks. Technologies such as internet and electronic data interchange over devices such as personal computers, tablets, and mobile phones can be used for such purposes. Major e-commerce categories include business-to-consumer (B2C), business-to-business (B2B), and consumer-to-consumer (C2C).

Internet retailing: A subset of B2C e-commerce, internet retailing does not include activities such as auctions or travel reservations (Francis and White 2004).

Mobile commerce: E-commerce activities conducted through wireless handheld devices such as mobile telephones and personal digital assistants.



E-commerce Data Sources and Coverage

Source	Coverage
UNCTAD	<ul style="list-style-type: none"> • Compiles data from multiple government sources of UN members, among others • B2C covers sales by “pure play” e-commerce enterprises to consumers and traditional brick-and-mortar retail or manufacturing firms that possess an online sales channel; covers both physical and digital products • Excludes transactions between businesses (B2B); private individuals (C2C); businesses and governments (B2G); and orders made by telephone, facsimile, manually typed e-mail
Ecommerce Foundation	<ul style="list-style-type: none"> • Compiles data from multiple government and private agencies, trade associations, etc. • B2C covers any B2C contract for the sale of goods and/or services, fully or partially concluded by a technique for distance communication • Excludes (i) C2C and B2B; (ii) online gambling and gaming; (iii) cars and other motor vehicles; (iv) houses and real estate; (v) utilities (e.g. water, heating, and electricity); (vi) mortgages, loans, credit cards, and overdrafts; and (vii) savings accounts, funds, stocks and shares, and bonds
eMarketer	<ul style="list-style-type: none"> • Compiles data from multiple government and private agencies, trade associations, etc. • Retail e-commerce includes products and services except travel, restaurant, and event ticket sales ordered over the internet using any device
Euromonitor International	<ul style="list-style-type: none"> • Compiles data from multiple government and private agencies, trade associations, etc. • Retail e-commerce includes orders placed over the internet for which payment is then made through a store card, an online credit account subsequent to delivery or on delivery of the product. Also includes mobile retailing and digital music and movie downloads. • Excludes (i) products generated over C2C sales websites, such as eBay (all sales over such websites are excluded, even if generated by companies operating through the website); (ii) sales of motor vehicles, motorcycles, and vehicle parts; (iii) tickets for events (sports, music concerts, etc.) and travel; (iv) sales of holiday packages; (v) revenue generated by online gambling sites; (vi) quick delivery services of food, magazines, household goods, and DVD rentals; and (vii) sales of wallpapers and ringtones.

B2B = business-to-business, B2C = business-to-consumer, B2G = business-to-government, C2C = consumer-to-consumer, UN = United Nations, UNCTAD = United Nations Conference on Trade and Development.
Sources: Ecommerce Foundation (2016a), eMarketer (2017), Euromonitor International (2018), and UNCTAD (2015).

Source: ADB based on Ecommerce Foundation (2016a), eMarketer (2017), Euromonitor International (2018), Francis and White (2004), Gartner. M-commerce. <https://www.gartner.com/it-glossary/m-commerce-mobile-commerce> (accessed 28 April 2018), and UNCTAD (2015, 2017a).

Given the limited availability of official e-commerce data, the research here is based mostly on secondary data and information. Quantitative as well as qualitative data are gathered from multiple sources (Appendix A presents the methodology used in greater detail).

Overview

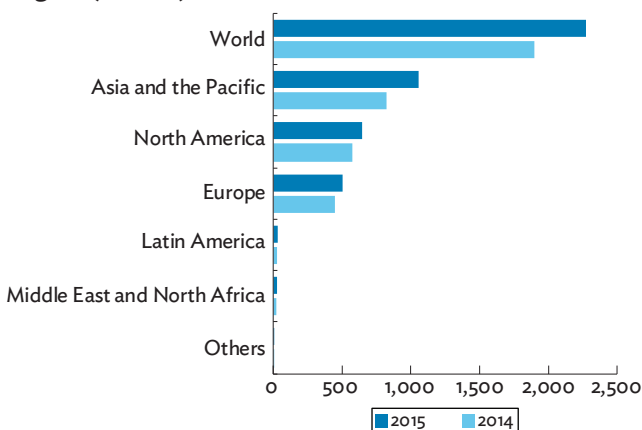
Asia and the Pacific is a major driver of expansion in global B2C e-commerce.

The Asia and Pacific region holds the largest share of the B2C e-commerce market (Figure 1.1). According to the Netherlands-based Ecommerce Foundation, the region accounted for over \$1 trillion of the \$2.3 trillion global e-commerce total in 2015. North America had the second-largest share, with turnover at around \$644 billion. Asia and the Pacific also had the fastest e-commerce growth in 2015—28% (the same as Latin America)—compared with the global growth rate of 20% (Ecommerce Foundation 2016a).

E-commerce is clearly growing in economic activities (Figure 1.2). The share of e-commerce in global gross domestic product (GDP) rose from 1.3% in 2011 to 3.1% in 2015. Its contribution to the economy is most prominent in the Asia and Pacific region.

By the end of 2015, the size of e-commerce relative to GDP was 4.5% in Asia and the Pacific—the highest

Figure 1.1: Size of Business-to-Consumer E-commerce by Region (\$ billion)



Notes: Business-to-Consumer (B2C) e-commerce covers any contract for the sale of goods and/or services, fully or partially concluded by a technique for distance communication. Values refer to the total of goods and services sold through B2C transactions.

Source: Ecommerce Foundation (2016a).

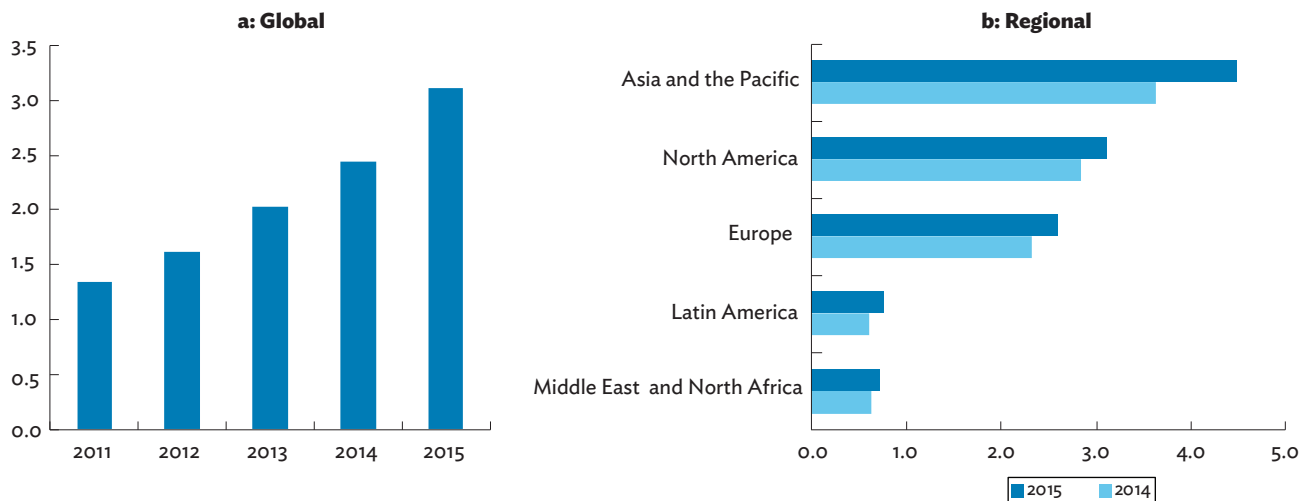
among regions globally. In comparison, the share of e-commerce in regional GDP stood at 3.1% and 2.6% in North America and Europe, respectively. E-commerce held even lower shares in Latin America (0.8% of regional GDP) and the Middle East and North Africa (0.7%).

Asia and the Pacific also does well in terms of the market size of internet retailing, a subset of B2C e-commerce (Figure 1.3). In 2017, the combined internet retailing market share of Asia and the Pacific was already above that of North America and Europe combined. According to Euromonitor International, the global internet retailing market share of Asia and the Pacific will reach 48.5% of the global total in 2021 compared with 47.2% in 2017 (Kshetri 2018a).

Yet e-commerce development varies greatly across the region.

Asia's e-commerce market remains highly heterogeneous. For instance, Table 1.1 lists the top and bottom five economies in terms of e-commerce readiness based on the United Nations Conference on Trade and Development (UNCTAD) 2017 e-commerce index. There is great variation in index scores, particularly if comparing the Republic of Korea's 95.5 score (ranked 5 globally) and Afghanistan's 17 (132) (UNCTAD 2017b). In addition, among the economies for which data are available from Euromonitor International, per capita internet retail spending in 2016 varied from \$0.60 in Pakistan to \$871 in the Republic of Korea (Kshetri 2018a).

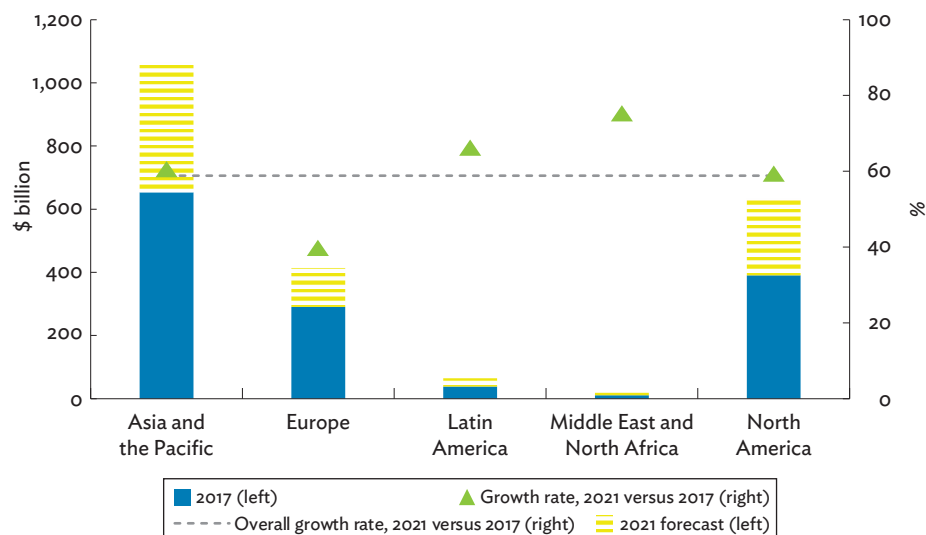
There are many other key differences among Asia and Pacific economies when it comes to developing their e-commerce market. One relates to the cross-border orientation of e-commerce activities. For instance, consumers in some markets—such as Australia, New Zealand, the People's Republic of China (PRC), the Republic of Korea, and Singapore—use cross-border e-commerce more often than others (yStats 2017). Another major difference is how economies access the internet. For instance, McKinsey & Company (2016) shows that in Indonesia, most online consumers use mobile devices for e-commerce. Some developed economies such as New Zealand, on the other hand, mainly use personal computers (New Zealand eCommerce Insights 2017).

Figure 1.2: Size of Business-to-Consumer E-commerce (% of GDP)

GDP = gross domestic product.

Notes: Business-to-Consumer (B2C) e-commerce covers any contract for the sale of goods and/or services, fully or partially concluded by a technique for distance communication. Values refer to the total of goods and services sold through B2C transactions as a percentage of GDP.

Source: Ecommerce Foundation (2016a).

Figure 1.3: Internet Retail Market Size by Region

Notes: Market size refers to the total goods and services sold through internet retail market. See Box 1.1 for the definition of internet retailing. Asia and the Pacific comprises of Australia; Azerbaijan; Hong Kong, China; India; Indonesia; Japan; Kazakhstan; Malaysia; New Zealand; Singapore; Taipei, China; Thailand; the People's Republic of China; the Philippines; the Republic of Korea; Uzbekistan; and Viet Nam.

Source: Kshetri (2018) using data from Euromonitor International. Passport database.

B2C cross-border e-commerce in the region is growing rapidly.

Estimates of cross-border e-commerce in 2015 vary widely—from \$189 billion (UNCTAD 2017a) to \$308 billion (Table 1.2). This is partly due to the difficulties in accurately separating e-commerce shipments from traditional trade. Currently, reporting requirements under a certain product value are

exempted—the so-called *de minimis* rule—adding to the problem. However, various factors—such as complex border crossing procedures, regulatory burdens, and uncertain return processes—hinder the development of cross-border e-commerce. Yet all current estimates point to the fact that cross-border e-commerce growth will likely expand. UNCTAD estimates show global cross-border B2C e-commerce was only 7% of total B2C e-commerce in 2015. Nevertheless, cross-border

Table 1.1: E-commerce Readiness Score—Selected Asian Economies, 2017

Global Rank	Economy	Score	Global Rank	Economy	Score
5	Republic of Korea	95.5	115	Cambodia	29.0
8	Japan	93.6	117	Kyrgyz Republic	29.0
10	New Zealand	93.0	120	Pakistan	24.0
14	Australia	92.0	123	Myanmar	23.0
16	Hong Kong, China	91.0	132	Afghanistan	17.0

Notes: The e-commerce readiness score refers to the United Nations Conference on Trade and Development (UNCTAD) Business-to-Consumer Readiness Index score. It is comprised of four indicators: (i) percent of internet users; (ii) number of secure servers; (iii) financial account penetration; and (iv) postal reliability score, measuring the readiness of an economy to engage e-commerce. The index covers 144 economies as of 2017. Source: UNCTAD (2017b).

e-commerce was more pronounced in Asia and the Pacific compared with other regions. For example, 40% of Malaysian and 55% of Singaporean e-commerce transactions were cross-border (Frost and Sullivan 2016a, Payvision 2013). In fact, Frost and Sullivan (2016b) report that cross-border transactions comprise some 40% of all Southeast Asia's e-commerce. They expect this share to rise to 60% as new trade initiatives—such as those under the Association of Southeast Asian Nations (ASEAN) Economic Community—are implemented. Generally, cross-border e-commerce in Asia and the Pacific is expected to grow faster than domestic e-commerce (Frost and Sullivan 2016a, Frost and Sullivan 2016b, AliResearch and Accenture 2015, Payvision 2017).

Global cross-border B2C e-commerce is expected to grow at a compound annual growth rate (CAGR)

of 27% from 2014 to 2020, climbing to almost \$1 trillion (Table 1.2). DHL (2016) finds a slightly more conservative CAGR of 25%, with the gross market value of cross-border e-commerce rising from \$300 billion in 2015 to \$900 billion in 2020. Asia's cross-border e-commerce CAGR is projected at 37% over 2014–2020, only surpassed by Latin America (44%).

Advanced technologies shaping the e-commerce landscape in the region.

New, increasingly popular technologies—such as blockchain technology, machine learning (ML), artificial intelligence (AI), the internet of things (IoT), and fifth generation (5G) wireless systems—are spreading to Asia and the Pacific and are shaping the online business environment, lowering transaction costs, improving advertisement targeting, and increasing data collection, among others. Firms in Japan, the PRC, and the Republic of Korea—the top three economies in Asia and the Pacific in B2B and B2C e-commerce—have already begun using these new technologies in their e-commerce activities.

For example, Rakuten, Japan's largest e-commerce website, combines ML and AI for image recognition—especially useful for its PriceMinister-Rakuten C2C platform, which recognizes and automatically categorizes objects visually, allowing a seller to more easily post products. Japan's household and consumer goods retailer Mujirushi Ryohin, or Muji, also uses ML on its online platforms, using big data analytics (2 terabytes of data) to make context-specific, real-time recommendations to users (Infosys 2014).

Table 1.2: Cross-border Business-to-Consumer E-commerce Market Forecast by Region (\$ billion)

Economy	2014	2015	2016	2017	2018	2019	2020	CAGR 2014-2020
Asia and the Pacific	71	99	144	218	299	381	476	37%
Latin America	6	10	15	25	37	47	53	44%
Mid-Eastern Europe and Central Asia	13	17	22	28	34	40	45	23%
Middle East and Africa	5	8	10	14	18	22	26	32%
North America	67	82	98	115	133	153	177	18%
Western Europe	73	92	112	131	156	184	217	2%
Total	235	308	401	530	675	826	994	27%

CAGR = compounded annual growth rate.

Note: Figures may not add up to 'total' due to rounding.

Source: AliResearch and Accenture (2015).

In the PRC, some companies have ventured into IoT and blockchain technology to offer better products and services. For instance, JD.com's 3 System Fridge uses sensors and cameras to register the time and date when food is stored inside. It can send alerts when an expiry date is approaching, and order a grocery list from JD.com based on the refrigerator's contents (Lye 2016). Alibaba's T-Mall platform teamed up with logistics company Cainiao to deploy blockchain technology in its cross-border supply chain to enhance tracking and provide online shoppers fully-transparent data on the products they buy (Zhao 2018). As of March 2018, the system covered 30,000 goods imported from more than 50 countries through major ports such as Guangzhou, Hangzhou, Shanghai, Shenzhen, and Tianjin (Xinhua 2018).¹

Subregional Overview

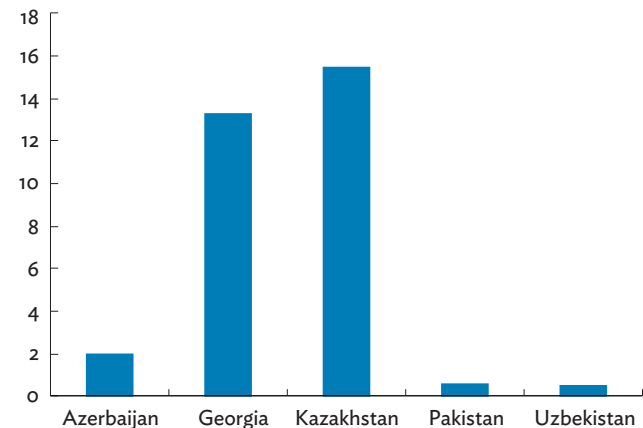
Central and West Asia

Figure 1.4 shows per capita internet retailing in economies in Central and West Asia for which data are available (Kshetri 2018a). It is clear that Georgia and Kazakhstan have the most developed e-commerce markets in the subregion. Kazakhstan's e-commerce market is growing 55% annually, with a market value of \$3.6 billion, or around 5% of total retail sales – up from just over 1% in 2016 – as the number of mobile shoppers in the country rapidly increases (Kazakh TV 2016, PPRO Financial 2018). Among the top five online retailers in 2014, three were foreign. However, sales of local e-retailers such as Arena S and Chocofamily Holding are growing rapidly (yStats.com 2015).

Internet penetration in several economies has reached advanced country levels (Figure 1.5). In Azerbaijan, for example, the key drivers of internet usage and online shopping growth are under 25 years old. About half of all internet users in the country are reported to be under 25, with online shopping growth in double digits in early 2015 (yStats.com 2015).

Foreign vendors and platforms are key players in the Central and West Asian e-commerce market. In

Figure 1.4: Internet Retail Spending Per Capita—Central and West Asia, 2016 (\$)



Source: Kshetri (2018) using data from Euromonitor International. Passport database.

Figure 1.5: Internet Penetration—Central and West Asia, 2016 (% of population)



AFG = Afghanistan, ARM = Armenia, AZE = Azerbaijan, GEO = Georgia, KAZ = Kazakhstan, KGZ = Kyrgyz Republic, PAK = Pakistan, TAJ = Tajikistan, TKM = Turkmenistan.

Note: Internet penetration is defined as the number of internet users per 100 population.

Source: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017).

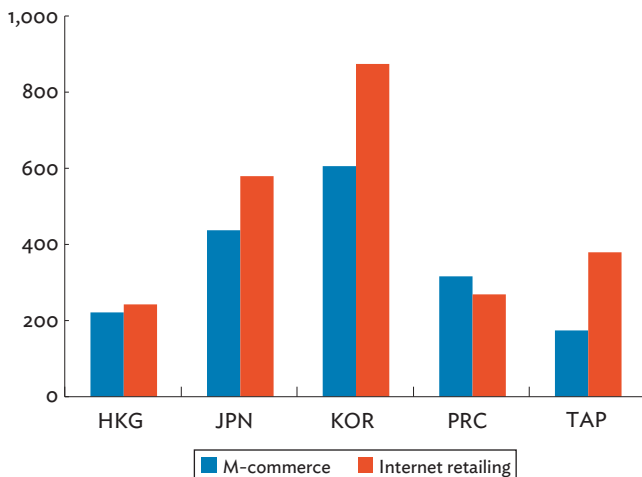
Uzbekistan—the most populous subregional country—international e-commerce vendors such as Aliexpress.com, eBay.com, and Amazon.com dominate the market (yStats.com 2015). Azerbaijan's young internet users prefer to use international platforms such as eBay (yStats.com 2015). Foreign online vendors are also dominant in Kazakhstan.

¹ See online annex for the state of e-commerce in the PRC. https://aric.adb.org/pdf/ecommerce2018_app.pdf

East Asia

Figure 1.6 shows per capita internet retail and m-commerce spending in East Asia. The subregion has some of the world's biggest and most advanced e-commerce markets (Kshetri 2018a). The PRC is the largest e-commerce market globally, while Japan is Asia's second-largest e-commerce market and the fourth-largest in the world (Ecommerce Europe 2015). The Republic of Korea is Asia's third-largest retail e-commerce market, and seventh worldwide (eMarketer 2015a).

Figure 1.6: Internet Retail and M-commerce Spending Per Capita—East Asia, 2016 (\$)



HKG = Hong Kong, China; JPN = Japan; KOR = Republic of Korea; PRC = People's Republic of China; TAP = Taipei, China.

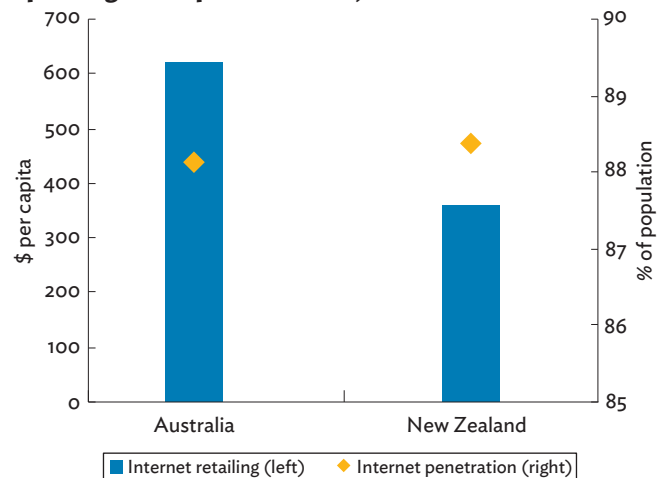
Note: See Box 1.1 for definitions of internet retailing and m-commerce. Source: Kshetri (2018) using data from Euromonitor International. Passport database.

Mongolia's e-commerce market is just emerging as its supportive ecosystem strengthens. For instance, the Mongolian Market Consulting Group found that in 2017, smartphone penetration was at 79% of the total population (Chintushig 2018). Of the 2.2 million customers of the country's largest bank, Khan Bank, more than half were reported to use mobile banking (Tech Abroad 2017).

Oceania

In Oceania, both Australia and New Zealand have highly developed e-commerce markets (Figure 1.7). The Ecommerce Foundation notes that 65% of Australians shopped online in 2016, and forecasted online

Figure 1.7: Internet Penetration and Internet Retail Spending Per Capita—Oceania, 2016



Note: Internet penetration is defined as the number of internet users per 100 population.

Sources: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017); and Kshetri (2018) using data from Euromonitor International. Passport database.

sales to exceed A\$33 billion (\$24.8 million) in 2016 (Ecommerce Foundation 2016b). Australia also ranks 10th globally, based on the management consulting firm A.T. Kearney's 2015 Global Retail E-Commerce Index (A.T. Kearney 2015a).

New Zealand's e-commerce market turnover was NZ\$2.8 billion (about \$2.3 billion) in 2013, and \$3.75 billion (about \$2.6 billion) in 2016 (Bank of New Zealand 2014, 2017). Online spending grew faster than spending in local conventional stores between April 2017 and April 2018. The total online retail sales grew 14% and local online retail sales 16% during the period, while local brick-and-mortar store sales grew 0.4% (Bank of New Zealand 2018). As of 2016, there were over 2 million online shoppers (66% of the population), with 2015 statistics showing desktop computers were the most popular means of purchase—94% used desktops, 21% smartphones, and 16% tablets (Boyte 2016, 2018).

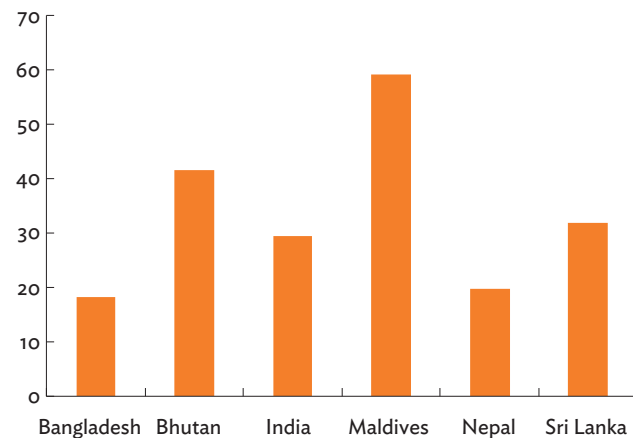
E-commerce consumers in Oceania shopped more cross-border than other economies in Asia and the Pacific. Some 34% of New Zealand e-commerce transactions in 2013 were cross-border (Boyte 2014), and 38% in 2017 (New Zealand eCommerce Insights 2017). Similarly, Australian cross-border e-commerce was about half of total e-commerce trades in 2015 (Singapore Post 2015).

South Asia

India's dominant position in the subregion's e-commerce market is driven by the country's size. Figure 1.8 shows internet penetration in South Asia—with India fourth behind Maldives, Bhutan, and Sri Lanka.

According to Euromonitor International, India's per capita internet retailing in 2016 was \$16.80 (Kshetri 2018a). The National Association of Software and Service Companies (NASSCOM) estimated the size of India's e-commerce market at \$33 billion in fiscal year 2017 (*The Economic Times* 2017). Nevertheless, the country is expected to see rapid e-commerce market growth. Investment bank Morgan Stanley reports India's e-commerce market should reach \$200 billion by 2026 (Bansal 2018).

Figure 1.8: Internet Penetration—South Asia, 2016
(% of population)

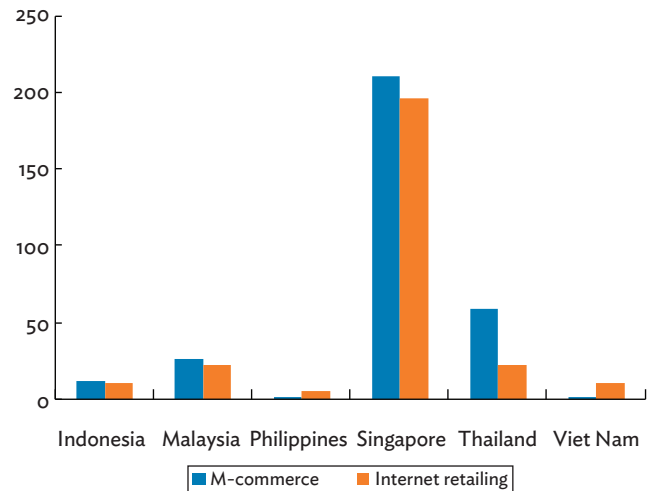


Note: Internet penetration is defined as the number of internet users per 100 population.
Source: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017).

Southeast Asia

In 2016, Southeast Asia was estimated to have 260 million internet users and is expected to have 480 million by 2020 (Google and Temasek 2016). As of 2017, however, only 3% of the 560 million people in Southeast Asia had shopped online (Wenyu 2017). However, three factors unique to the subregion will likely drive the region's e-commerce in the future: (i) a young population (70% of the population is under 40); (ii) there are not many big-box stores such as supercenter, superstore, or megastore; and (iii) the

Figure 1.9: Internet Retail and M-commerce Spending Per Capita—Southeast Asia, 2016 (\$)



Note: See Box 1.1 for the definition of internet retailing and m-commerce.
Source: Kshetri (2018) using data from Euromonitor International. Passport database.

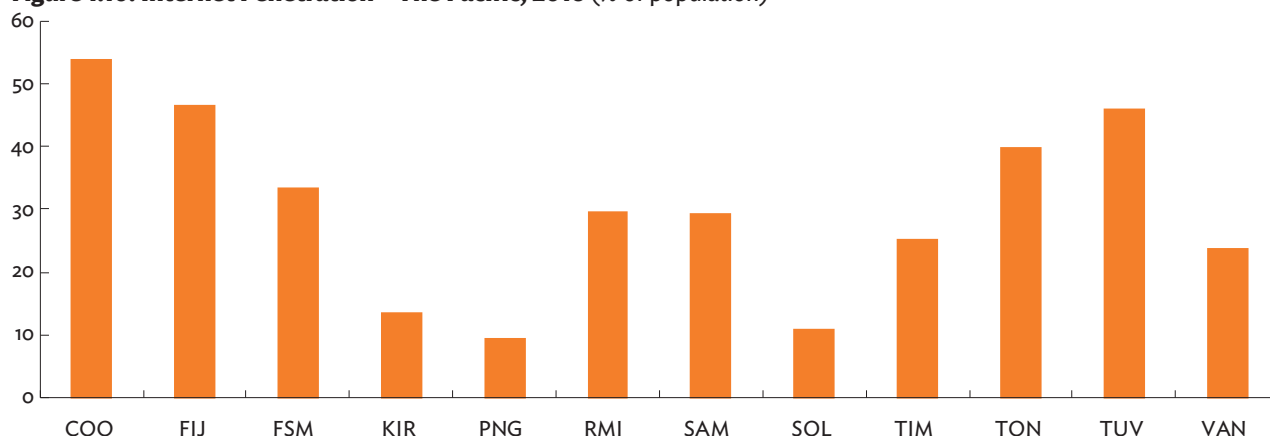
region's middle-class continues to grow rapidly (Google and Temasek 2016).

Figure 1.9 shows per capita internet and m-commerce spending in Southeast Asia. Singapore has the highest per capital e-commerce spending, with more than three times the e-commerce spending in Thailand, and m-commerce spending more than eight times that of Malaysia. As for Indonesia, while per capita spending is low, it is expected to soon become the third-biggest e-commerce market in Southeast Asia (Kshetri 2018a). Estimates show that internet retail in Indonesia has grown 60%–70% annually since 2014, and will grow from \$8 billion in 2016 to \$60 billion in 2020 (Macquarie Research, as cited in Austrade 2018).

E-commerce is heavily cross-border in some Southeast Asian economies. For instance, one estimate suggests that 55% of e-commerce in Singapore and 40% in Malaysia's are cross-border (Payvision 2013).

The Pacific

Major e-commerce data sources do not report statistics for economies in the Pacific. The main reason is that e-commerce is almost nonexistent in the region. For example, a 2015 article published by the advertising and communication consulting company Webmedia Fiji said there was "almost no e-commerce in Fiji"

Figure 1.10: Internet Penetration—The Pacific, 2016 (% of population)

COO = Cook Islands, FIJ = Fiji, FSM = Federated States of Micronesia, KIR = Kiribati, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands, SAM = Samoa, SOL = Solomon Islands, TIM = Timor-Leste, TON = Tonga, TUV = Tuvalu, VAN = Vanuatu.

Source: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017).

(WebMedia 2015). However, on the positive side, internet penetration in the Pacific is growing rapidly.

Figure 1.10 shows that the Cook Islands, Fiji, and Tuvalu have the highest internet penetration rates in the subregion, with penetration rates above 40%. Comparing Pacific developing countries (Pacific DMCs) with some of the biggest e-commerce markets in Asia, six Pacific DMCs have penetration rates higher than India (29.6%), with the Cook Islands surpassing even that of the PRC (53.2%).

Tourism drives e-commerce use, as it is considered a “pillar of economic growth” (Pacific Islands Forum Secretariat 2013). According to data from the World Bank’s World Development Indicators, 2015 tourism receipts-to-GDP for Fiji was at 23.6%, Vanuatu’s was at 34.2%, and Palau’s was at 52.4%. The European Union funded—and the South Pacific Tourism Organization (SPTO) implemented—an e-commerce project to support SME internet use for online booking sales and processing.² Reports show that 165 websites handled 7,816 enquiries and received 2,345 bookings between April 2012 and December 2014 (WTO and OECD 2017).

Summary

Economies in the Asia and Pacific region vary greatly in terms of e-commerce industry and market development. The region is home to the world’s biggest e-commerce market, with the PRC, Australia, Japan, New Zealand, Singapore, and the Republic of Korea as some of the world’s most developed. At the same time, however, e-commerce is virtually nonexistent in some of the Pacific DMCs. An encouraging trend, however, is that internet penetration is rapidly growing even in the region’s least developed countries, which is likely to stimulate e-commerce growth.

The remainder of this report is divided as follows. Chapter 2 introduces a framework for analyzing and evaluating B2C e-commerce development in Asia and the Pacific. Chapter 3 presents the status and challenges to e-commerce in the region, in terms of economic factors and conditions, legal and institutional environment, and social acceptance and awareness. Chapter 4 examines key opportunities for developing the B2C e-commerce industry and market. Chapter 5 discusses lessons learned and policy implications for major stakeholders of e-commerce development. An online appendix provides in-depth country case studies of Cambodia, the PRC, and the Republic of Korea.³

² The project covered 11 Pacific DMCs—the Federated States of Micronesia, the Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tuvalu, and Vanuatu.

³ See online appendix on e-commerce country cases: https://aric.adb.org/pdf/ecommerce2018_app.pdf

2 Analytical Framework for Assessing E-commerce Development

Analytical Framework for Assessing E-commerce Development

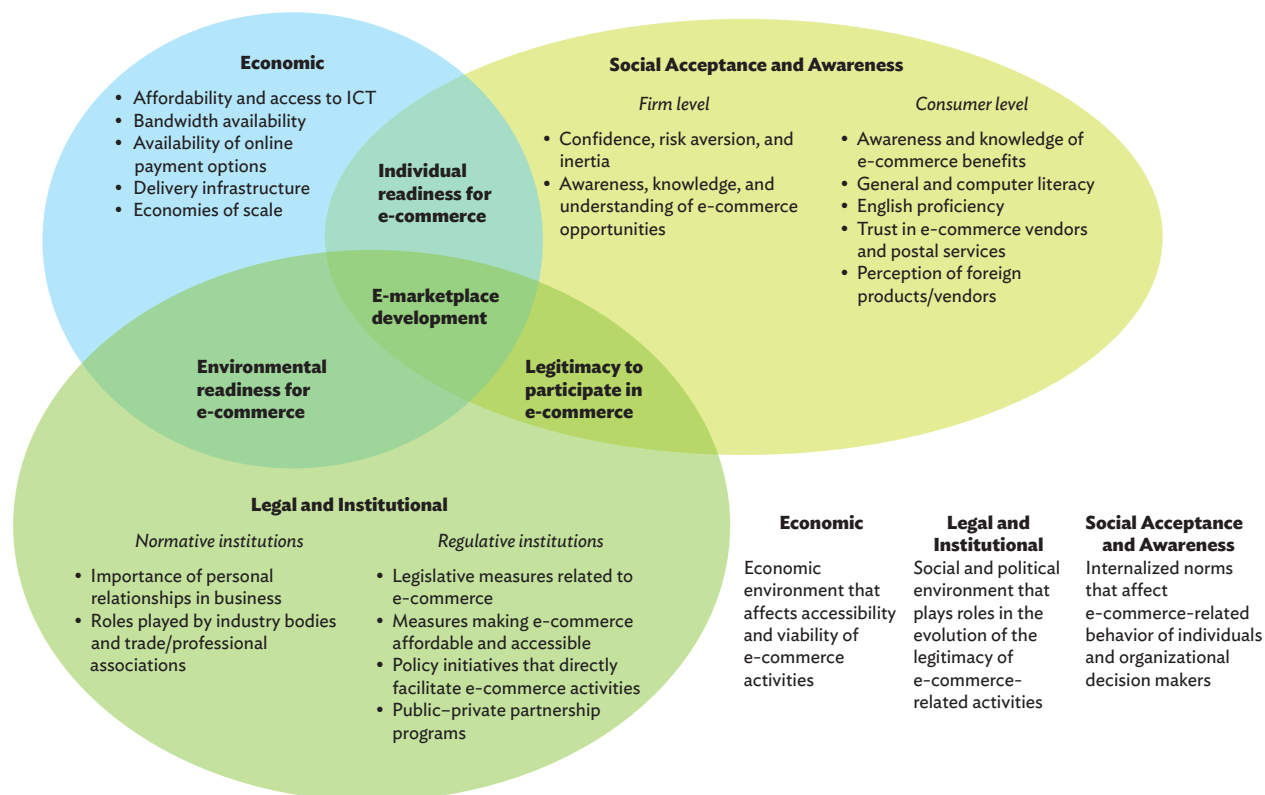
Introduction

Various factors can attract or repel potential e-commerce clients. Thus, at the core of e-marketplace development is how demand- and supply-side participants engage in e-commerce-related activities. Firms can make sizable investments to join the e-commerce market only to find consumers unwilling to purchase on the internet. Similarly, consumers can browse the internet for products, only to find either a lack of websites translated in their language or a lack of local merchants able to supply the products they want. In addition, both firms

and consumers may want to use e-commerce for transactions only to find they are unprotected—a lack of legislation and enforcement agencies to ensure a safe trade.

An analytical framework can be constructed to examine the factors that act as barriers or facilitators to e-marketplace development—participants' ability and/or willingness to do what is required to establish a viable e-marketplace. This section describes the analytical framework, offering a perspective on the mechanisms that foster e-marketplace development (Figure 2.1).

Figure 2.1: Factors Affecting the Development of the E-marketplace



ICT = information and communication technology.

Source: ADB compilation based on Kshetri (2007a, 2018b), North (1996), Parto (2005), Scott (1995, 2001), and World Bank (2016a).

Analytical Framework

The framework reviews what affects e-marketplace development by three dimensions: (i) economic factors and conditions, (ii) legal and institutional environment, and (iii) social acceptance and awareness. Each has direct and indirect effects on the e-marketplace. Economic factors directly affect the accessibility and viability of e-commerce activities. Legal and institutional environment directly legitimizes e-commerce-related activities. And social acceptance and awareness directly affect the e-commerce behavior of individuals and organizational decision-makers.

While the first two factors focus primarily on the market's environmental characteristics, social acceptance and awareness reflect on organizational and individual behavior. Arguably, to initially adopt e-commerce in developing countries, the social acceptance and awareness dimension is more influential than economic or legal and institutional factors. As organizations assimilate more sophisticated e-commerce practices, however, economic factors and conditions play a more prominent role (Kshetri 2007a).

The barriers and facilitators effecting e-commerce can be conceptualized and categorized into three feedback systems: (i) economic, (ii) sociopolitical (or legal and institutional), and (iii) cognitive (or social acceptance and awareness) (Kshetri 2007a). The last two can be explained in terms of formal and informal institutions (North 1996, Scott 2001)⁴—where all economic phenomena, including participation in e-commerce, have institutional components and implications (Parto 2005):

- **Institutions involving the legal and institutional environment** can be categorized as either social or political. Political factors consist of “explicit regulative processes such as rule setting, monitoring, and sanctioning activities,” while social factors refer to normative

institutions that introduce “a prescriptive, evaluative, and obligatory dimension into social life” (North 1990, Scott 1995).

- **Institutions involving social acceptance and awareness** “constitute the nature of reality and the frames through which meaning is made”, and focus on psychological factors that influence individuals and organizational decision-makers (Scott 1995).

Institutional factors tend to be more difficult and time consuming to overcome than technological barriers. For e-commerce, a country's weak institutional capacity can cause difficulty in accessing networks and developing e-commerce websites.

Economic factors and conditions

If firms cannot or do not stay abreast of latest industry developments, internet use and e-commerce may not add business value (Hassen and Svensson 2014). Conversely, weak competitiveness can also be aggravated by a weak infrastructure affecting access to information and communication technology (ICT), such as electrical supply, teledensity, and purchasing power (Mercer 2006). In addition, traditional agriculture sectors account for a large portion of economic activity in developing countries—particularly least developed countries—where lack of internet penetration and related technologies do not yet offer farmers major cost savings (World Bank 2016a, McKinsey & Company 2014a).

The types of economic factors include (i) affordability and access to ICT, (ii) bandwidth availability, (iii) availability of online payment options, (iv) delivery infrastructure, and (v) economies of scale (see Figure 2.1). Similar to the interrelationships between economic, legal and institutional, and social acceptance and awareness issues, the factors within each dimension are interrelated as well. For instance, affordability, lack of bandwidth availability, and economies of scale are interrelated as they tend to hinge on telecommunication firms' incentive to build infrastructure, which will not be supplied if the company sees no market (not affordable) to increase bandwidth. Another would be that both lack of broadband affordability and bandwidth availability reduce the benefits to merchants participating in e-commerce due to a lack of economies of scale.

⁴ North (1990, 1996) notes that institutions are “macro-level rules of the game” that include formal constraints such as rules, laws, and constitutions; and informal constraints such as social norms, conventions and self-imposed codes.

Scott (1995) defines institutions as “multifaceted systems incorporating symbolic systems—cognitive constructions and normative rules—regulative processes carried out through and shaping social behavior.”

Legal and institutional environment

Legal and institutional factors can be divided into regulative (formal) institutions and normative institutions. First, regulative institutions encompass regulatory bodies, and existing laws and rules influencing an individual's or organization's e-commerce-related behavior. Second, normative institutions involve the value systems of national cultures.

REGULATIVE INSTITUTIONS

Legal barriers are one of the major barriers to adopting both domestic and cross-border e-commerce, especially in developing countries. Some ways of reducing these barriers include (i) enacting e-commerce legislation, (ii) implementing measures making e-commerce more affordable and accessible, (iii) directly facilitating and supporting e-commerce activities, and (iv) launching public-private partnership programs.

NORMATIVE INSTITUTIONS

To be successful, practices should be consistent with the value systems of national cultures (Kshetri 2018b). Normative institutions are concerned with procedural legitimacy and require e-commerce providers and online shoppers to embrace social norms and behavior. Several mechanisms affecting the e-commerce industry and market include how important personal relationships are in business and the unique roles industry bodies and professional associations play (see Figure 2.1).

Regulative institutions include government measures that support e-commerce development. In contrast, normative institutions include socially accepted norms and behavior beyond government influence. Trade associations are examples as they can use social obligations to affect members' decisions. Importantly, regulative institutions and normative institutions interact to reach similar goals. For example, if e-commerce legislation is passed by a regulative institution and trade bodies find it beneficial to their industry, the body or association can help with enforcement among members.

Social acceptance and awareness

Arguably, barriers to e-commerce in developing countries are more psychological than economic (UNCTAD 2000). Awareness, knowledge, skills, and confidence are among those that can serve as cognitive

feedback, depending on the internet buyer and seller. These factors can be broken down into those facing firms and those facing consumers (see Figure 2.1). Some factors that affect consumers also affect firms, albeit indirectly. For example, the lack of general and computer literacy can affect e-commerce development, as it both potentially prohibits consumers from participating in e-commerce and reduces the number of computer-literate individuals firms can hire to adopt or expand e-commerce operations.

Interrelationship among the three factors

CAUSAL CHAIN

Each dimension is both impacted by and impacts other dimensions—interrelating all three. Figure 2.2 illustrates one way of analyzing why—in Samoa—adopting mobile money accounts has been so slow. Only 3.7% of mobile phone owners in Samoa have a mobile money account (economic factor), which can be attributed to a low level of trust in online payment systems (social acceptance and awareness), which in turn can be attributed to weak institutions, an incomplete, outdated legal framework supporting e-commerce (legal and institutional factor) (UNCTAD 2017c).⁵

Figure 2.2: Low Use of Mobile Money Accounts Among Samoan Mobile Phone Owners



Source: ADB based on UNCTAD (2017c).

Likewise, low credit card use in many economies (economic barrier) can be attributed to the lack of trust in credit card transaction security, and not credit card access (social acceptance and awareness) (Kshetri 2018b). Another survey implies that the degree of trust individuals have in the postal network (social acceptance and awareness) with a \$100 package was strongly

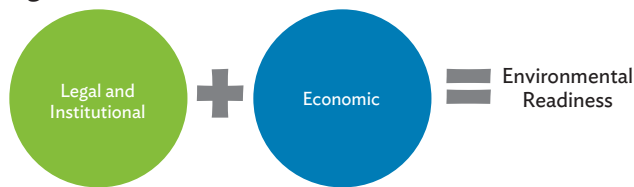
⁵ As of December 2017, Samoa had no data protection or privacy law (UNCTAD. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (accessed December 2017).

correlated with gross domestic product per capita (economic factor) (Kirkman et al. 2002).

E-COMMERCE READINESS

If the economic and legal and institutional factors are well-developed, but social acceptance and awareness are insufficient, then an economy is environmentally ready for e-commerce. Figure 2.3 shows this relationship. For instance, countries such as Germany, Singapore, and the United Kingdom (UK)—with legal and institutional frameworks in place and where ICT infrastructure and online payment systems are well-developed and widely available (economic factor)—governments are actively building small and medium-sized enterprise (SME) ability and confidence (social acceptance and awareness) to participate in e-commerce. The UK targets SMEs with little or no online presence for training and through e-commerce information campaigns (Ng 2016).

Figure 2.3: Environmental Readiness for E-commerce



Source: ADB.

Similarly, when economic and social acceptance and awareness factors are well-developed, but legal and institutional factors are not, then an economy has individual readiness for e-commerce. Figure 2.4 shows this relationship. Though individuals are ready and willing to engage in e-commerce—and may even have the means to participate—their laws and norms may inhibit them from doing so. A lack of consumer protection laws, for example, may stave off internet users from shopping on e-commerce websites.

Finally, if legal and institutional factors and social acceptance and awareness factors are well-developed,

Figure 2.4: Individual Readiness for E-commerce



Source: ADB.

but economic factors lag behind, then an economy holds legitimacy to participate in e-commerce. Figure 2.5 shows this relationship. Though developing countries engaging in e-commerce may have governments that support e-commerce through legislation, information campaigns, and training—with computer literate individuals and firms willing to take e-commerce risks—they may still be blocked by limited ICT, payment systems, or logistics infrastructure.

Figure 2.5: Legitimacy to Participate in E-commerce



Source: ADB.

Application of the Framework

To allow for an empirical analysis of the diffusion of e-commerce, it is important to operationalize the conceptualized feedback systems mentioned above, recognizing they may be barriers or facilitators of e-commerce. While some of these are fairly easy to operationalize, others may be more difficult. Table 2.1 describes the feedback systems, some possible operational measures for several of them, and some proposed variables for measuring these concepts.

Economic factors and conditions are especially easy to operationalize and measure. These can be divided into three main phases in logical sequence: (i) accessing the internet to engage in online transactions, (ii) making and receiving payments, and (iii) delivery.

Legal and institutional environment includes the four legal categories mentioned—laws covering e-transactions, consumer protection, data protection and privacy, and cybercrime. Each can be captured by categorical measurements—for instance, the existence or nonexistence of laws.

Social acceptance and awareness is more difficult to measure meaningfully. Previous researchers recognized there are challenges in measuring different elements

Table 2.1: Facilitators of and Barriers to E-commerce: Operationalizing Them

Dimension/Factors	Explanation/Background	Some Indicators That Can Be Used to Assess the Related Factors	Some Possible Specific Factors to Measure
Economic	Attractiveness of the internet as a vehicle to engage in economic transactions	Development of internet infrastructure	Economies of scale Bandwidth availability Affordability of and access to ICT <ul style="list-style-type: none"> • Wireless networks • Broadband penetration • Cloud computing and data centers • Access costs • Secure servers
	The ease with which payments can be made and received	Development of e-payment systems	Penetration rates of <ul style="list-style-type: none"> • Credit cards • Debit cards • Store cards • M-payment solutions • Crypto-currencies
	The ease of delivery of products bought and sold online	Development of delivery and logistics infrastructure	<ul style="list-style-type: none"> • Population having mail delivered at home • Speed of mail delivery • Logistics Performance Index
Legal and institutional	Regulative institutions (political)	<ul style="list-style-type: none"> • Legal and regulatory environment to facilitate online transactions • Measures to make participation in e-commerce affordable and accessible • Policy initiatives to directly facilitate e-commerce activities • Public-private partnership efforts 	The existence and enforcement capacities related to: <ul style="list-style-type: none"> • E-transactions Laws • Consumer Protection Laws • Privacy and Data Protection Laws • Cybercrime Laws
	Normative institutions (social)	<ul style="list-style-type: none"> • Personal relationships and tradition • Industry and trade/professional associations 	<ul style="list-style-type: none"> • Most are hard to measure in a meaningful way • Some can be measured (e.g., existence/number of trade and industry associations)
Social acceptance and awareness	Social acceptance and awareness institutions	Firm level <ul style="list-style-type: none"> • Confidence, risk aversion, and inertia • Awareness, knowledge, and understanding of e-commerce opportunities Consumer level <ul style="list-style-type: none"> • Awareness and knowledge of e-commerce benefits • General and computer literacy and English proficiency • Trust in e-commerce vendors and postal services • Perception of foreign products/vendors 	Most are hard to measure in a meaningful way

ICT = information and communication technology.
Source: Kshetri (2007a).

related to formal and informal institutions. Practical difficulties include collecting meaningful data for measuring or capturing trust in the internet as a vehicle for conducting online transactions. This is true for other indicators related to normative, and social acceptance and awareness-related institutions.

Current Status and Challenges of E-commerce Development



Current Status and Challenges of E-commerce Development

Introduction

E-commerce technologies and business models are evolving rapidly. Thanks to major e-commerce firms' use of sophisticated technologies—such as artificial intelligence, machine learning, and big data—more consumers have been able to enjoy the increased convenience of online shopping and super-fast delivery.

E-commerce technologies have also allowed small and medium-sized enterprises (SMEs)—especially in

rural areas—to tap global markets and value chains with minimal additional cost and effort. For example, in the People's Republic of China (PRC), many farmers have become internet entrepreneurs thanks to internet-based tools provided by the country's technology companies. As of 2013, over 22% of the 7 million stores on Alibaba's Taobao Marketplace and Tmall.com originated from villages and towns, with 16 of these villages creating 40,000 jobs, generating CNY5 billion or more in online sales. This use of e-commerce has contributed to the slowdown in rural-urban migration (Chen 2013).

The state of e-commerce in most parts of the world, however, is far from ideal. Most potential buyers and sellers face various barriers and challenges when trying to participate in e-commerce. The obvious issue is lack of internet access—52% of the world population lacked internet access in 2017, with 62% of these from Asia and the Pacific according to International Telecommunication Union (ITU). Lack of internet access can be broken down further to factors including affordability, among others (Facebook 2016) (Box 3.1).

Box 3.1: Four Key Barriers to Internet Access

Facebook's State of Connectivity 2015 report breaks down key challenges of accessing information and communication technology into availability, affordability, relevance, and readiness:

- **Lack of internet access** for remote and low income economies—there remain 1.6 billion people outside the range of 3G or 4G networks.
- **Lack of affordable internet access** for a large portion of the world population—the cost of a 500 megabyte/month data plan is unaffordable for 2 billion people globally.
- **Lack of relevant online content in local languages**—over 2 billion people lack access to sufficient local language content, with 10 languages accounting for 89% of internet content (56% in English).
- **Lack of basic literacy and knowledge** in using e-commerce—of those without internet access, over two-thirds do not understand what the internet is (in Thailand, 47% of nonusers have never heard of the internet).

In many least developed countries (LDCs) and developing countries in Asia and the Pacific, e-commerce use among firms is extremely low. For instance, in September 2017, Pakistan only had some 400 e-commerce vendors, roughly 0.44% of its estimated 900,000 physical stores (Aziz 2017a). Likewise, the Philippines had 0.5% of its retail sales conducted online in 2015 (Sayson and Yap 2017); Armenia's e-commerce amounted to 0.08% of GDP in 2012 (Vanoyan 2014); and Bangladesh's online grocery market is just 0.03% of its overall grocery sales (Bansal 2017). In contrast, in 2016, the share of online fast-moving consumer goods (FMCG) to total FMCG market was estimated at 16.6% in the Republic of Korea (Kantar Worldpanel 2016).⁶

Source: Facebook (2016).

⁶ See online appendix for the state of e-commerce in the Republic of Korea. https://aric.adb.org/pdf/ecommerce2018_app.pdf

Inadequate infrastructure and consumers' limited technical and economic resources are often barriers to participating in e-commerce. For instance, according to the World Bank, only 60.5% of the population in Myanmar had access to electricity in 2015. Consequently, some developing countries and LDCs have very low internet penetration rates. For instance, according to the ITU, in Papua New Guinea, only 9.6% of the population used the internet in 2016.

The rural–urban divide is visible in e-commerce activity of most developing countries. Figure 3.1 shows the concentration of e-commerce activities in Viet Nam and Bangladesh. In 2015, 75% of Viet Nam's \$4 billion e-commerce sales (or 3% of total retail sales) came from just two cities (VIETRADE 2016). Likewise, 80% of visitors to e-commerce sites in Bangladesh were reported to come from three cities (Ahmed 2017). In India, most people with internet access and credit or debit cards live in large cities (*The Economist* 2017a).

There are many challenges facing farmers and rural smallholders in joining e-commerce activities. In many developing countries, rural transport remains a challenge, increasing logistics costs and delivery time. And in some cases, farmers and rural enterprises lack knowledge about the potential benefits of e-commerce and ways to access it (ESCAP 2017).

Firm size also matters in using e-commerce (see Figure 3.1). In Hong Kong, China, for example, only

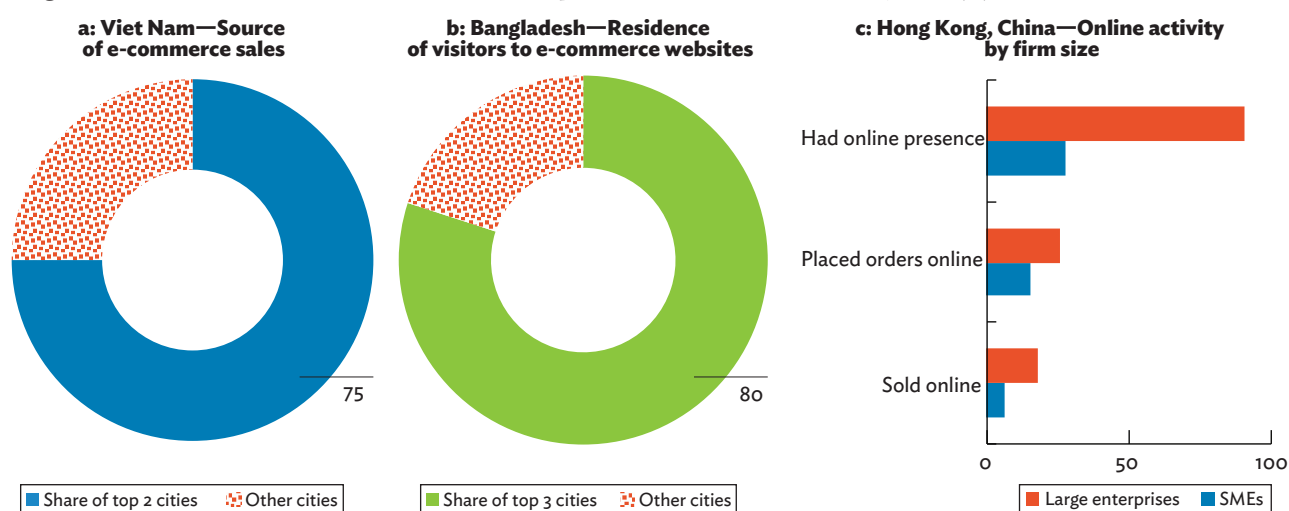
6.6% of SMEs sold goods or services online in 2015, and only 15.3% placed online orders, as opposed to large enterprises which sold 18.1% and ordered 25.6%. Likewise, only 28% of small enterprises in Hong Kong, China operated a website or had an online presence through a third-party website. The proportion of enterprises with website presence was 62% for medium firms and 91% for large firms (Ng 2016). In Azerbaijan, only 2% of small enterprises received orders over the internet in 2012, compared with 11% for large enterprises. In Kazakhstan, about 4% of small enterprises and 8% of large enterprises received orders over the internet (ESCAP 2017).

To facilitate e-commerce development, it is important to enhance internet inclusiveness beyond the simple internet penetration rates (Box 3.2).

Economic Factors and Conditions

Economic factors and conditions comprise the state of (i) ICT affordability and accessibility, (ii) bandwidth availability, (iii) availability of online payment options, (iv) delivery infrastructure development, and (v) economies of scale.

Figure 3.1: Concentration of E-commerce Activity—Selected Asian Economies, 2015 (%)



SMEs = small and medium-sized enterprises.
Sources: Ahmed (2017), Ng (2016), and VIETRADE (2016).

Box 3.2: Internet Inclusiveness in Asia and the Pacific

The state of internet inclusiveness can be measured using the four factors highlighted in Box 3.1—availability (economic), affordability (economic), relevance (social acceptance and awareness), and readiness (social acceptance and awareness, and legal and institutional). The Economist Intelligence Unit defines these categories in greater detail. Availability and affordability refer to the quality and breadth of infrastructure for internet access, the cost of access relative to income, and the level of competition in the marketplace. Relevance refers to the existence of relevant content and the existence of content translated in the local language. And readiness refers to the capacity to access the internet, including skills, cultural acceptance, and supporting policy.

The box table presents the state of internet inclusiveness in Asia and the Pacific, based on the Economist Intelligence Unit's internet inclusiveness index commissioned by

Facebook. The index covers a total of 88 economies in 2018, up from the 75 economies covered in 2017. Overall, developed economies top the list—Singapore, the Republic of Korea, and Japan—mostly due to high availability and affordability compared with other economies surveyed. The Republic of Korea also topped the region in relevance (ranked 4th globally), while Viet Nam was second (13th). Malaysia ranked first globally in readiness, with Singapore second in the region (12th worldwide).

Inclusiveness varies widely across the region, with some economies ranked in the top 10 globally, and others in the bottom half—Pakistan ranked 68th; Nepal, 70th; and Cambodia, 72nd. One noticeable trait for those ranking low is that problems lie across the board, from availability to readiness—economic, legal and institutional, and social acceptance and awareness.

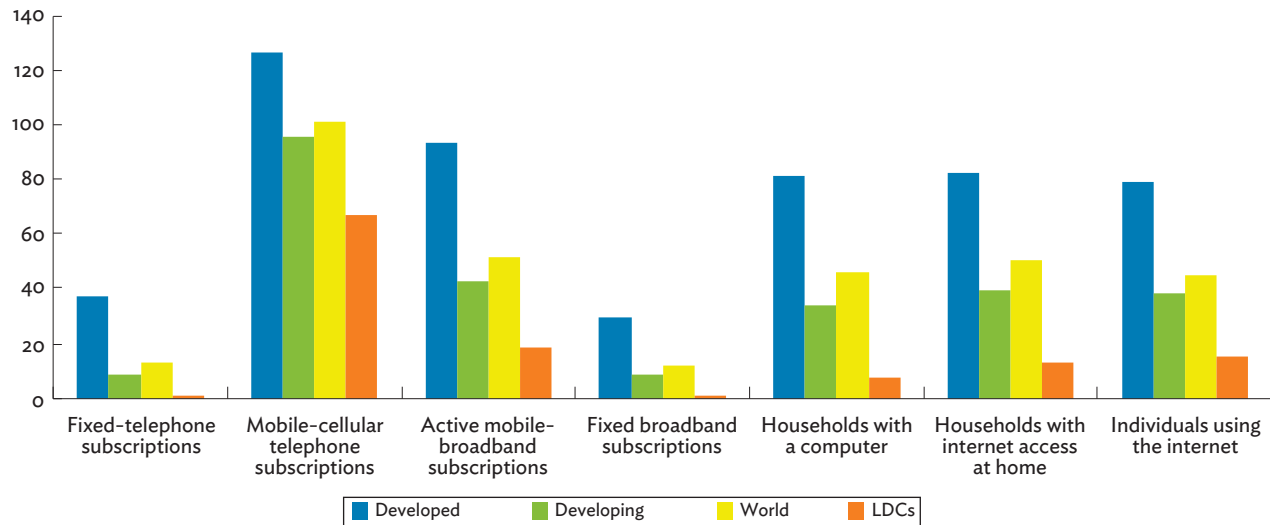
Internet Inclusiveness—Asia and the Pacific, 2018 (global rank)

Economy	Overall	Availability	Affordability	Relevance	Readiness
Singapore	2	1	30	23	12
Republic of Korea	5	6	12	4	30
Japan	11	7	14	18	31
Taipei, China	19	16	34	12	32
Australia	25	12	28	36	28
Malaysia	28	34	36	16	1
Thailand	31	26	27	49	26
People's Republic of China	36	38	45	31	14
Mongolia	42	50	10	38	72
Viet Nam	43	52	40	13	39
Kazakhstan	46	31	47	73	22
India	47	62	39	37	23
Indonesia	49	49	41	62	38
Sri Lanka	52	57	42	50	62
Philippines	54	46	71	54	43
Uzbekistan	58	58	67	52	57
Bangladesh	62	63	57	67	47
Maldives	64	48	62	80	83
Myanmar	65	70	69	45	69
Pakistan	68	77	43	70	68
Nepal	70	67	80	74	48
Cambodia	72	65	68	84	81

Notes: The Inclusive Internet Index covers 86 economies and 91% of the world's population in 2018. The index provides a rigorous benchmark of national-level internet inclusion across four categories: availability, affordability, relevance, and readiness.

Source: Economist Intelligence Unit. The Inclusive Internet Index: Measuring Success 2018. <https://theinclusiveinternet.eiu.com> (accessed 3 April 2018).

Source: ADB based on Economist Intelligence Unit. The Inclusive Internet Index: Measuring Success 2018. <https://theinclusiveinternet.eiu.com> (accessed 3 April 2018).

Figure 3.2: Key ICT Indicators by Income Group, 2016 (per 100 people)

ICT = information and communication technology, LDCs = least developed countries.

Notes: List of developed and developing countries is based on United Nations M49 standard. <https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx> (accessed 26 December 2016). LDCs listed by International Telecommunication Union.

Source: International Telecommunication Union. Global and Regional ICT Data. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 1 January 2018).

ICT accessibility, availability, and affordability

While the availability of broadband internet connections has been a key factor in fueling its growth, e-commerce requires substantial ICT infrastructure that allows sellers to transact business with buyers. Figure 3.2 presents key ICT indicators—fixed and mobile telephone, computer, and the internet penetration levels. It shows that developing economies and LDCs perform poorly compared with developed countries in terms of the economic and infrastructural factors needed to participate in e-commerce. Notably, all groups show an inclination toward mobile versus fixed telephone subscriptions, as well as an inclination toward mobile broadband subscriptions versus fixed broadband subscriptions.

Figure 3.3 uses the same indicators as above, but with economies grouped by region. It also shows that, across all regions, mobile subscriptions are more prevalent to fixed subscriptions, and that mobile broadband subscriptions are more widely used than fixed broadband subscriptions. Asia and the Pacific performs better than Africa and Arab States in most indicators, but lags behind other regions.⁷

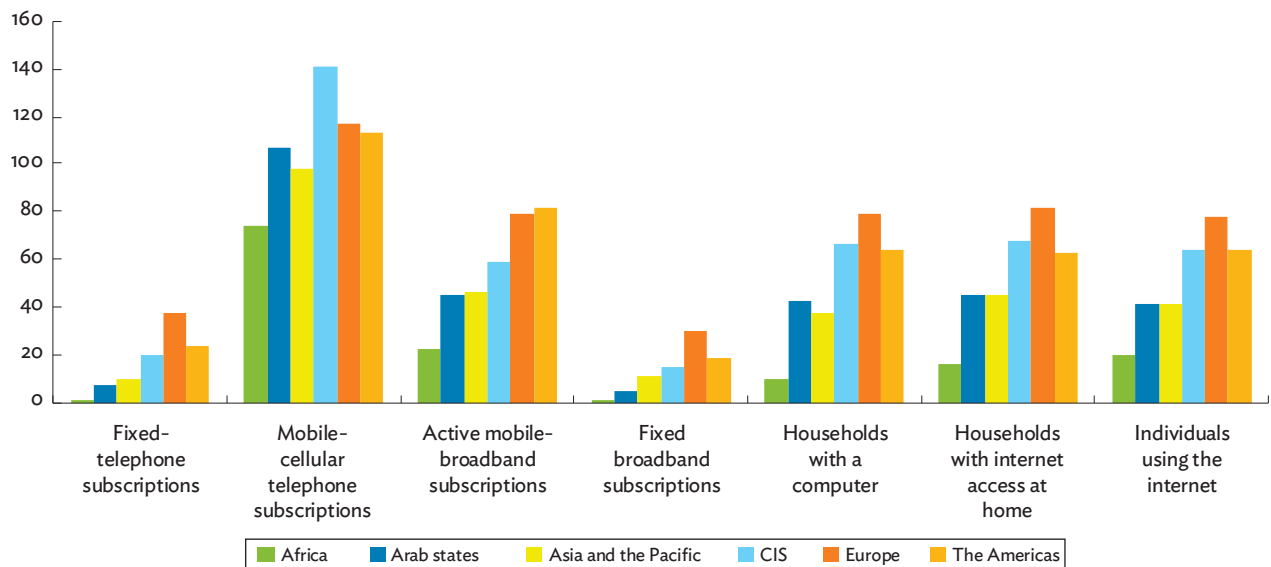
However, conducting e-commerce transactions requires more than basic internet access. For instance, the availability of secure internet servers is key to the growth and sustainability of the e-commerce industry and market.⁸ Figure 3.4 offers a broad picture of the current state of secure servers in selected economies in Central and West Asia, South Asia, and the Pacific. The number of secure internet servers per million people in each of these economies is significantly below the world average (215 per million people).

Another key concern in e-commerce development is affordability of ICT hardware, software, and services. Figure 3.5 shows the monthly fixed and mobile broadband prices, as well as the bandwidth availability across economies in various stages of development. There is wide variation in fixed and mobile broadband prices across economies, with the irony being that the poorer the economy, the higher the price of broadband access.

Figure 3.6 shows the low bandwidth availability in LDCs and developing countries in Central and West Asia, South Asia, and Southeast Asia. A lower bandwidth means a longer time is needed to transfer data and hence low relative advantage of using the internet and e-commerce. By region, in 2016, the international

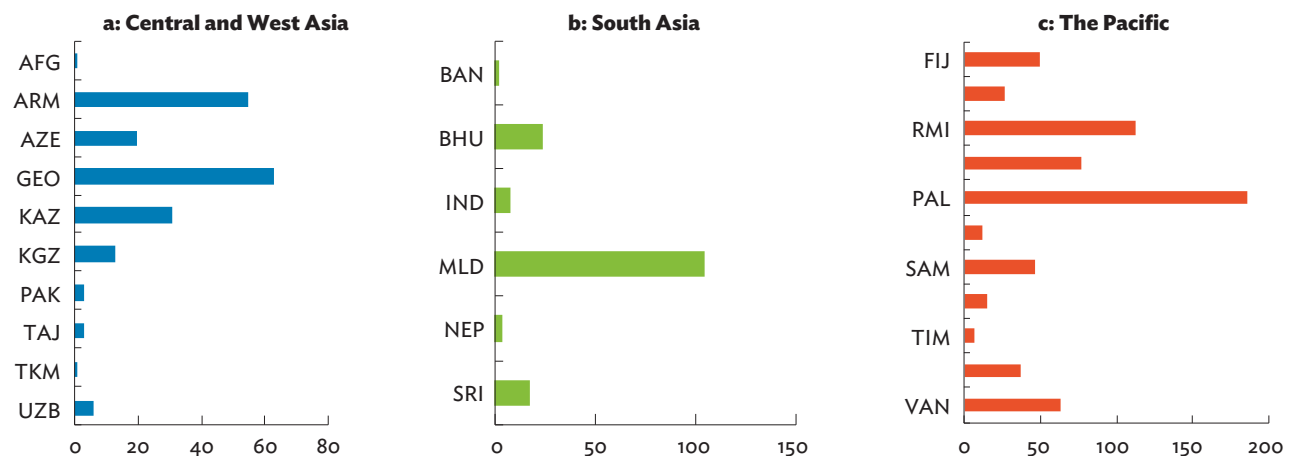
⁷ Africa and Arab States regions are based on ITU country classifications. See ITU. Country classifications. <https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx>

⁸ Secure servers are computer systems that use encryption technology for conducting secure e-commerce transactions over a network.

Figure 3.3: Key ICT Indicators by Region, 2016 (per 100 people)

ICT = information and communication technology, ITU = International Telecommunication Union.

Notes: Regional grouping based on ITU country classifications. Asia and the Pacific comprises of Afghanistan; Australia; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Democratic People's Republic of Korea; Fiji; India; Indonesia; Iran; Japan; Kiribati; the Lao People's Democratic Republic; Malaysia; Maldives; the Marshall Islands; the Federated States of Micronesia; Mongolia; Myanmar; Nauru; Nepal; New Zealand; Pakistan; Papua New Guinea; the People's Republic of China; the Republic of Korea; Samoa; Singapore; Solomon Islands; Sri Lanka; Thailand; the Philippines; Timor-Leste; Tonga; Tuvalu; Vanuatu; and Viet Nam. Source: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017).

Figure 3.4: Secure Internet Servers, 2016 (per million people)

AFG = Afghanistan, ARM = Armenia, AZE = Azerbaijan, BAN = Bangladesh, BHU = Bhutan, FIJ = Fiji, GEO = Georgia, IND = India, KAZ = Kazakhstan, KGZ = Kyrgyz Republic, KIR = Kiribati, MLD = Maldives, NAU = Nauru, NEP = Nepal, PAL = Palau, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands, SAM = Samoa, SOL = Solomon Islands, SRI = Sri Lanka, TAJ = Tajikistan, TIM = Timor-Leste, TKM = Turkmenistan, TON = Tonga, UZB = Uzbekistan, VAN = Vanuatu.

Source: World Bank. World Development Indicators. <https://data.worldbank.org/indicator/IT.NET.SECR.P6> (accessed 15 October 2017).

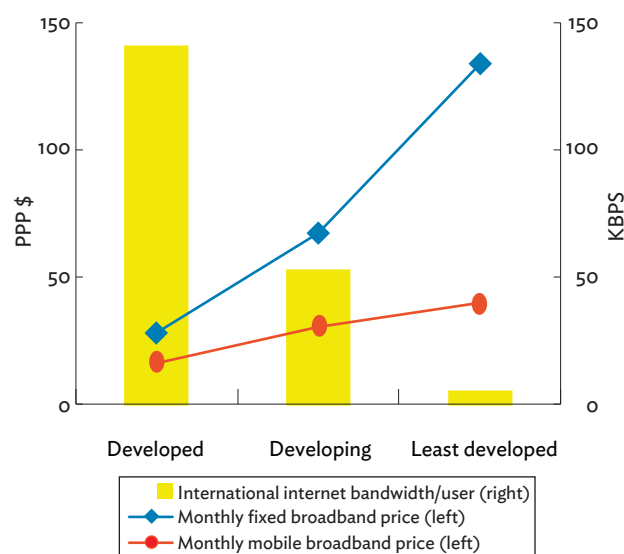
internet bandwidth per internet user in Asia and the Pacific was 48 kilobit per second (KBPS), below Africa's 51 KBPS. As a region, only the Arab States had lower international internet bandwidth per internet user (39 KBPS) than Asia and the Pacific. For comparison,

developing economies' international internet bandwidth per internet user stood at 53 KBPS (ITU 2017).⁹

In many cases, progress has been limited due to the use of basic devices such as low-end mobile devices,

⁹ Asia and the Pacific, Africa, Arab States, and developing economies are based on ITU country classifications. See ITU. Country classifications. <https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx>

Figure 3.5: Monthly Fixed and Mobile Broadband Average Prices and Bandwidth Availability, 2016



KBPS = kilobit per second, PPP = purchasing power parity.
 Notes: Figures based on simple averages including data from 159 economies. Prices based on a 1-gigabyte cap.
 Source: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017).

which cannot support performing e-commerce tasks. While an increasing proportion of populations have a mobile phone, a large proportion own feature phones rather than smartphones. For example, while in 2016 there were 71 mobile phones per 100 people in Pakistan, smartphone penetration was just 2.3% (Figure 3.7). This

is similar to other economies in Asia and the Pacific, such as Georgia, India, and Turkmenistan.

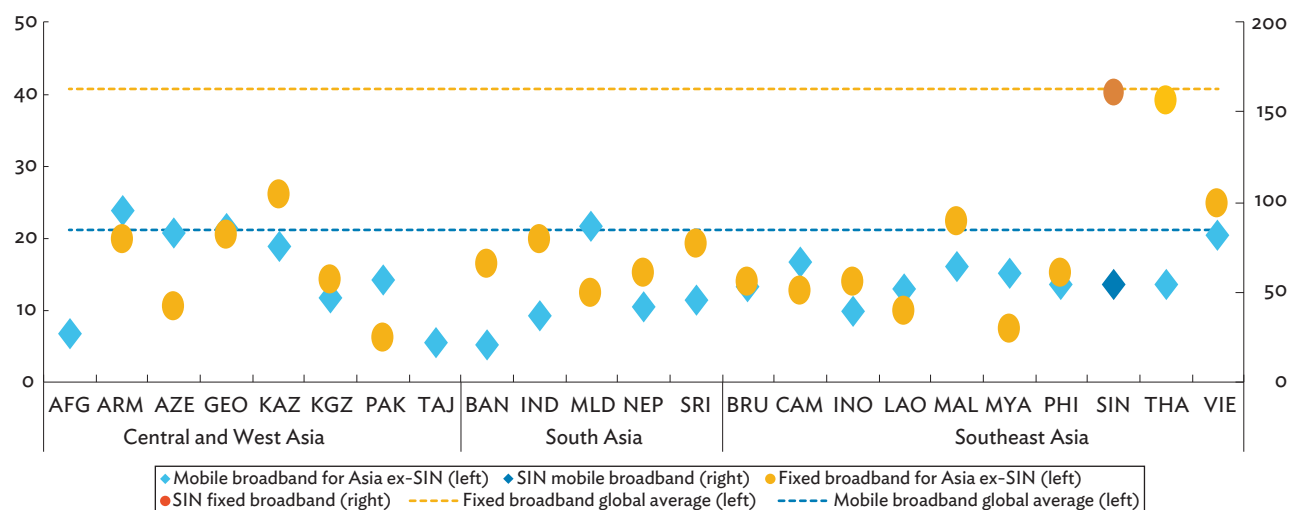
Availability, accessibility, and affordability are basic requirements to transact e-commerce. Governments need to promote widespread ICT infrastructure that offers low-cost, secure broadband. Governments can build an investment climate attractive to private sector involvement in ICT infrastructure and technology. They can also mobilize public resources for ICT infrastructure where it may be unprofitable for the private sector to do so.

Availability of online payment options

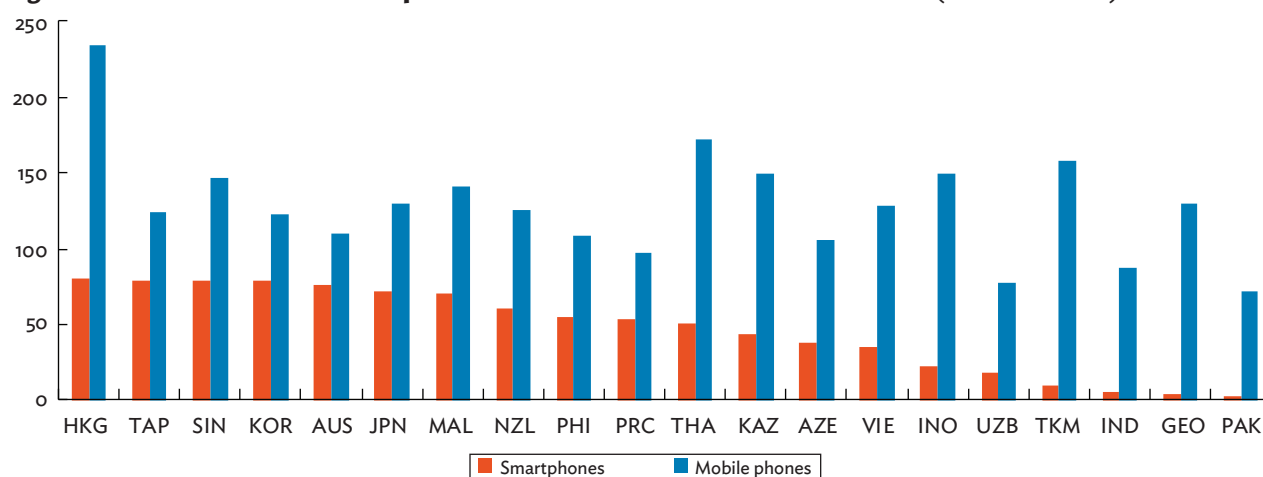
Apart from lack of internet access, another barrier is the inadequacy of payment solutions, with online shopper payment systems failing to meet what online vendors need. Table 3.1 describes current e-commerce payment options. Though many are available in advanced economies such as Hong Kong, China; Japan; and Singapore, they have yet to find LDCs and developing countries attractive markets. For instance, Nepal and Pakistan either do not have access to PayPal or some of its services (Aziz 2017a, Nepal E-commerce 2017).

Lack of trust is also a barrier, with some participants capable, but unwilling, to join the e-marketplace. In much of Asia and the Pacific, for example many remain

Figure 3.6: Mobile and Fixed Broadband Speed—Central and West Asia, South Asia, and Southeast Asia, as of December 2017 (megabits per second, download)



AFG = Afghanistan, ARM = Armenia, AZE = Azerbaijan, BAN = Bangladesh, BRU = Brunei Darussalam, CAM = Cambodia, GEO = Georgia, IND = India, INO = Indonesia, KAZ = Kazakhstan, KGZ = Kyrgyz Republic, LAO = Lao People's Democratic Republic, MAL = Malaysia, MLD = Maldives, MYA = Myanmar, NEP = Nepal, PAK = Pakistan, PHI = Philippines, SIN = Singapore, SRI = Sri Lanka, TAJ = Tajikistan, THA = Thailand, VIE = Viet Nam.
 Source: Speedtest. Speedtest Global Index December 2017. <http://www.speedtest.net/global-index> (accessed 11 January 2018).

Figure 3.7: Mobile Phone and Smartphone Penetration—Selected Asian Economies (% of households)

AUS = Australia; AZE = Azerbaijan; PRC = People's Republic of China; GEO = Georgia; HKG = Hong Kong, China; IND = India; INO = Indonesia; JPN = Japan; KAZ = Kazakhstan; KOR = Republic of Korea; MAL = Malaysia; NZL = New Zealand; PAK = Pakistan; PHI = Philippines; SIN = Singapore; TAP = Taipei, China; THA = Thailand; TKM = Turkmenistan; UZB = Uzbekistan; VIE = Viet Nam.

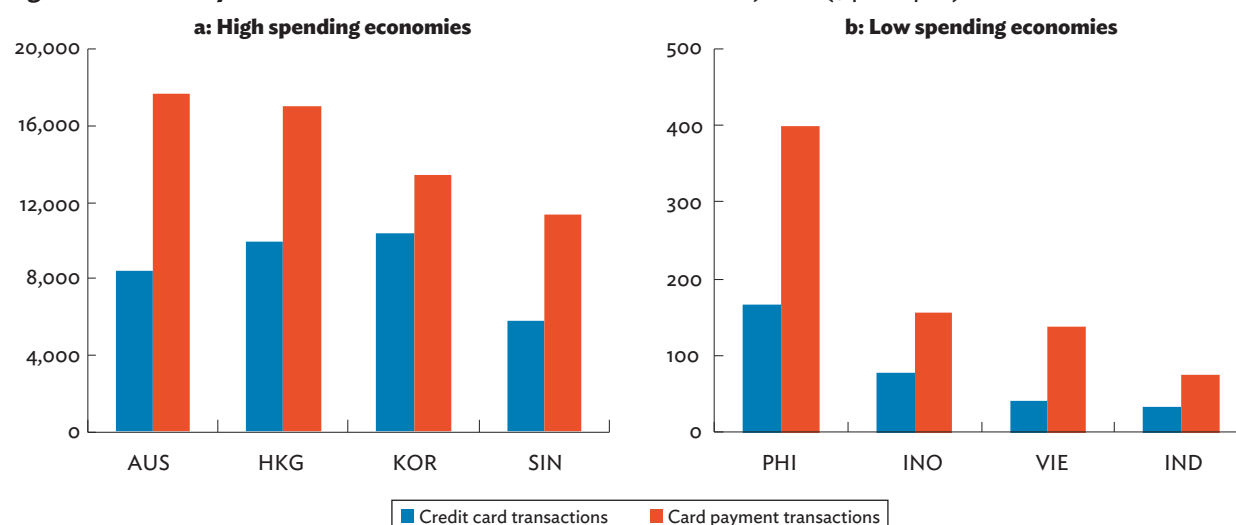
Notes: Based on number of households owning a mobile phone or smartphone as percentage of total number of households. A 'mobile phone' is any device capable of telecommunication over a cellular network of base stations or a satellite network. Mobile phones can come with functions including camera, video and internet access. A 'smartphone' is any device capable of voice communication over a cellular network. A smartphone must have an identifiable operating system, allows installation of software applications and screen size of less than 5 inches.

Source: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 October 2017).

Table 3.1: E-commerce Payment Options

Payment Method	Description
Cash on delivery	Consumers pay for goods with cash when item is delivered.
Charge and deferred debit card	Consumers pay monthly, with no interest, and must pay the outstanding balance in full upon receipt of statement or receive stiff penalties—includes deferred debit cards (e.g. American Express).
Credit card	Draws on a credit limit approved by card-issuer—at least the stated minimum amount of the balance needs to be paid on a 30-day basis, with interest and/or charges added until the full balance is paid.
Debit card	Consumer purchase amounts are withdrawn from the available balance in their bank account. If the available funds are insufficient, the transaction is not completed (except where an overdraft facility is in place). Differs from pre-paid cards in that it is linked to a bank account.
Direct debit	Consumers allows merchants direct access to their debit account to collect varying amounts at set intervals—normally used for regular, predictable payments such as subscriptions (e.g. Single Euro Payments Area (SEPA) and Elektronisches Lastschriftverfahren (ELV).
E-invoice	Consumers pay for goods after delivery, without sharing credit card or bank details, and can use e-mail address and postcode to make payments (e.g. Kiarna and Afterpay).
eWallet	Consumers either use stored value or extract funds from other payment method—like a credit card—linked to their eWallet (e.g. Alipay and Tenpay).
Offline bank transfer	Consumers receive a reference number during their purchase and pay later using their online banking facility—authorization is not immediate (e.g. Dineromail and SafetyPay).
Others	Includes mobile carrier billing, crypto-currencies and other emerging technologies (e.g. Bitcoin and Zong).
PostPay	Consumers buy online, and pay later at an affiliated outlet or store—not suitable for perishable goods or time-sensitive purchases due to the delay in payment (e.g. Konbini and Boleto Bancario).
Prepaid card	Consumers make purchases or withdraw cash similar to a debit or credit card, but card must be loaded with cash in advance—the balance functions as spending limit—often offered to the unbanked or underbanked, young people, or people with a poor credit history (e.g. VirginMoney).
PrePay	Consumers need to buy a card or voucher before starting a transaction—most prepay products have a funding limit and some do not allow multiple cards/vouchers to fund one transaction (e.g. paysafecard and NeoSurf).
Real-time bank transfer	Consumers pay for goods using online banking facilities. Authorization is immediate in most cases (e.g. iDeal and Sofort Banking).

Sources: Direct Debit. What is Direct Debit? <https://www.directdebit.co.uk/DirectDebitExplained/pages/whatisdirectdebit.aspx>; Security Bank. Credit Card vs Debit Card vs Prepaid Card: Which Should You Use? <https://www.securitybank.com/blog/credit-card-vs-debit-card-vs-prepaid-card-use/> (both accessed 23 April 2018); and WorldPay (2017).

Figure 3.8: Card Payment Transactions—Selected Asian Economies, 2016 (\$ per capita)

AUS = Australia; HKG = Hong Kong, China; IND = India; INO = Indonesia; KOR = Republic of Korea; PHI = Philippines; SIN = Singapore; VIE = Viet Nam.
 Note: Card payments include transactions through debit cards, credit cards, charge cards (special credit cards with balances payable in full upon statement receipt, i.e. no rollovers), store cards, and prepaid cards.

Source: Kshetri (2018a) using data from Euromonitor International. Passport database.

reluctant to use the internet as a means to conduct financial transactions (Paypal 2017; Razdan, Das, and Sohoni 2014; Soh 2013).

The development of financial markets and institutions is critical to the development of an e-marketplace. In many developing countries and LDCs, the unwillingness or inability of financial institutions to facilitate electronic payments—and the lack of payment options—are major obstacles to organizations and individuals who want to participate in the e-marketplace. In many African economies, for example, online payment platforms such as Mastercard, Paypal, Skril, and Visa are “unfriendly” to users due to the risks associated with money laundering (Mwanza 2017). Hawk (2004) studied e-commerce payments in India, the Russian Federation, and across Latin America, and found low credit card penetration is a hindrance to the development of B2C e-commerce in these developing countries.

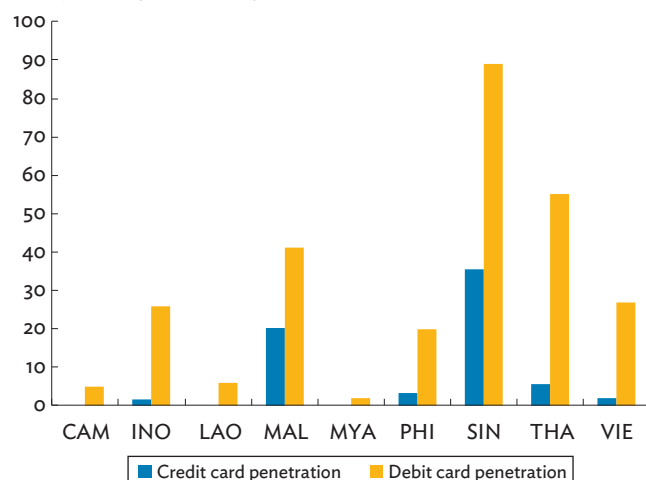
Figure 3.8 presents per capita credit card transactions as well as total card payment transactions for selected Asian economies (Kshetri 2018a).¹⁰ Across the region there are large differences in the use of credit cards and other online forms of payment. The top four economies in the region spend around 200 times the bottom

four economies in credit card transactions per capita. For instance, the Republic of Korea’s per capita credit card spending is 306 times that of India’s. Across all types of cards, consumers from the Republic of Korea outspend their Indian counterparts by a wide margin. These differences partly explain why some markets have a more developed e-commerce industry and market than others.

Studies suggest that, due to lack of preferred payment options being offered, about 24%–25% of online shoppers abandon their virtual shopping baskets before completing online purchases (BI Intelligence 2014, Paypal 2018). This is a major concern as most LDCs and developing countries have low credit and debit card penetration rates.

Figure 3.9 shows the credit and debit card penetration rates for ASEAN members. As of 2016, only 30% of adults held a debit card and only 9% a credit card. Singapore had the highest penetration rates for credit card (35%) and debit card (89%)—while most others had a credit card penetration rate below 30%, and a debit card penetration rate below 6%. According to a survey conducted among Malaysian SMEs, 20% of respondents cited concern about e-payment as a major barrier to e-commerce participation (A.T. Kearney 2015b).

¹⁰ Total card payment transactions include debit, credit, charge, store, and prepaid transactions. For data on more economies in Asia and the Pacific, see Appendix B, Figure B.1.

Figure 3.9: Credit and Debit Card Penetration—Southeast Asia, 2016 (% of adults)

CAM = Cambodia, INO = Indonesia, LAO = Lao People's Democratic Republic, MAL = Malaysia, MYA = Myanmar, PHI = Philippines, SIN = Singapore, THA = Thailand, VIE = Viet Nam.

Notes: No data on credit card penetration for CAM, LAO, and MYA. Debit card penetration refers to the proportion of individuals aged 15+ possessing a debit card, while credit card penetration refers to the proportion of individuals aged 15+ possessing a credit card.

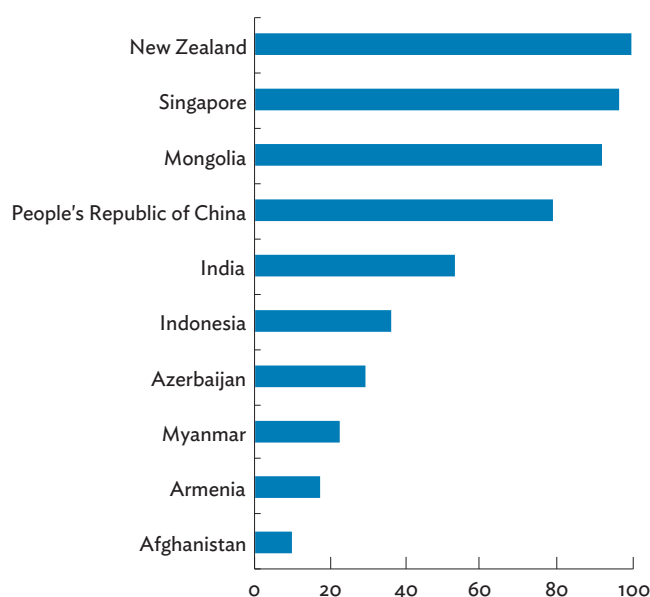
Sources: BBVA Research (2017) and de Luna-Martínez (2016).

Table 3.2: Cash-on-delivery Transactions—Selected Asian Economies (% of total online transactions)

Economy	Year	% share
Bangladesh	2016	90.0
People's Republic of China	2009	70.0
	2014	30.0
India	2017	67.0
Indonesia	February 2017	65.3
Pakistan	2017	80.0–95.0
Thailand	2014	70.0
Philippines	2017	80.0
Viet Nam	2016	91.0

Sources: Aziz (2017b), Chadha (2017a), Domingo (2017), e-CAB (2016), Ministry of Industry and Trade (2016), Rauf (2014), Sakawee (2014), Shaffi (2017), *The Economist* (2017a).

Table 3.2 shows the frequency of using cash on delivery (COD) as a payment method for online transactions in select economies in Asia and the Pacific. The unavailability of e-payment options means a large proportion of e-commerce transactions remain COD—over 95% in Pakistan (Shaffi 2017), 90% in Bangladesh (e-CAB 2016), and 91% in Viet Nam (Ministry of Industry and Trade 2016). Likewise, Myanmar's Shop.com.mm was reported to have 95% of payments made COD in 2016 (Gaung 2016).

Figure 3.10: Population with Access to Financial Services—Selected Asian Economies, 2016 (% of population)

Source: World Bank. Global Findex Database. <http://datatopics.worldbank.org/financialinclusion> (accessed 15 October 2017).

The lack of well-developed e-payment systems forces e-commerce firms to rely on fragile business models. For instance, COD can create friction between buyers and sellers, because it involves a high degree of uncertainty whether vendors get paid. Another is the safety of customers, who can be threatened if they refuse to pay for unsatisfactory goods (Vi 2014). In addition, though workarounds such as vouchers are available—as in Latin America—these extra processes require more work for both vendors and shoppers—markets that are predominantly credit card-oriented are more e-commerce-friendly.

The lack of e-payment options is related to the broader problem of underdeveloped financial systems. Figure 3.10 presents the share of population with access to financial services in select economies in Asia and the Pacific. Again, there is wide diversity in the proportion of population with an account at a financial institution.¹¹ New Zealand ranks first with almost 100% holding an account with a financial institution. In contrast, Afghanistan is at the bottom, with less than 10% having access to financial services.

¹¹ See Appendix B, Figure B.2 for data on more economies in Asia and the Pacific.

Addressing the challenge of building e-payment systems is no small feat, but some measures can make the process easier. For instance, governments can help by distributing reliable credit information—thus increasing transparency and minimizing bank lending risks. Many emerging economies lack credit agencies, while those that do tend to function poorly (Kshetri 2014). Establishing a functioning national credit bureau should thus be a priority.

Governments should also create an environment conducive for fintech companies that use big data and machine learning to support assessing the likelihood of loan repayment. Data sources could include social media, mobile-phone usage patterns, and utility-bill payment histories, for example (ITU 2016). Fair Isaac Corp (FICO), which created the widely used credit risk scores in the United States (US), has started using nonfinancial/nonpayment information to determine scores (Andriotis and Demos 2016).¹² FICO partnered with Lenddo in India to develop similar scores for consumers with limited or no formal credit history (FinTech Innovations 2016)—as of August 2015, it was issuing about 100,000 scores per month (Vageesh 2016). China CITIC bank provides a similar service in the PRC (Box 3.3).

Delivery infrastructure development

Well-developed delivery infrastructure is central to maximizing value-added from e-commerce. Poor delivery infrastructure leads to late deliveries, damage or loss of parcels, delivery operator's negative attitude, and poor return procedures (A.T. Kearney 2011). For example, the rapid growth of e-commerce in the US can partly be attributed to the infrastructure developed by the early catalogue business, and easy availability of delivery systems. Many developing countries and LDCs have no such access. For instance, in 2012, less than 50% of the population in 38 countries could receive postal delivery at home (World Bank 2016b).

Figure 3.11 shows the proportion of people that have mail delivered to their homes.¹³ Japan and Uzbekistan

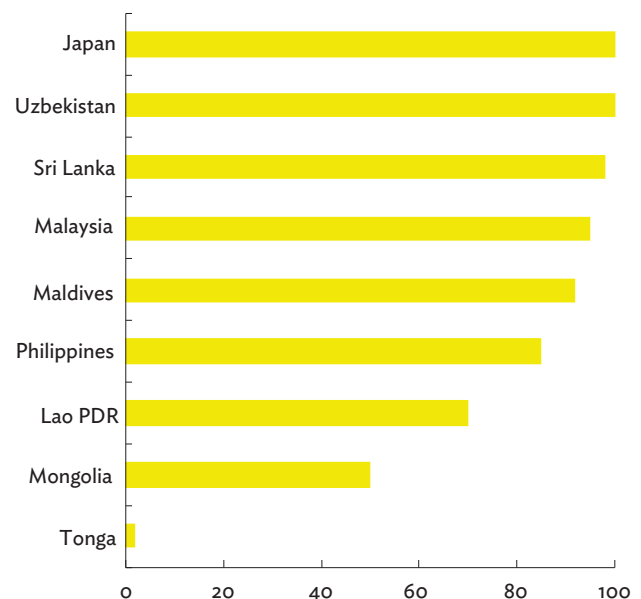
Box 3.3: China CITIC bank

China CITIC bank in the People's Republic of China has established a database that holds detailed customer profiles—including demographic information (transaction data, customer attributes, and residence information, among others) and online behavioral information (such as transaction and risk preferences, along with social networking activities, among others). It uses the information for more precision marketing and better targeting of credit card customers.

Previously, the bank's credit approval process limited its indicators to income and employment status, which led to the rejection of a large proportion of qualified customers. Under the new system, the approval rate for new customers applying through the bank's online channels increased from about 25% to 70%–80%.

Source: Ching and Zhang (2014).

Figure 3.11: Population with Access to Home Mail Delivery—Selected Asian Economies, 2015
(% of population)



Lao PDR = Lao People's Democratic Republic.

Source: Universal Postal Union. Postal statistics. <http://www.upu.int/en/resources/postal-statistics/query-the-database.html> (accessed 15 October 2017).

¹² FICO uses nonpayment data when there is the lack of enough loan or bill payment information to come up with a traditional FICO score.

¹³ Figure B.3 in Appendix B for data on more economies in Asia and the Pacific.

come out on top with 100% having access. In contrast, only 2% of Tonga's population can avail of the service. A similar challenge has been reported in Africa, where over half its population must collect mail from post offices (UPU 2015). It is difficult for small developing countries to attract global logistics companies such as FedEx or United Parcel Service (UPS) to provide delivery services.

Aside from vendors delivering online purchases on time and cost-effectively, consumers need the option to return goods, which also builds trust between the two. Thus, an underdeveloped delivery system is a major roadblock for developing e-commerce. But improving delivery systems are difficult when geographic factors are involved. For example, Indonesia has more than 17,500 islands. The Philippines has 7,641. So delivering products cost-effectively is challenging (A.T. Kearney 2015b).

Well-functioning logistics is the bedrock of shipping, transportation and door-to-door delivery of physical e-commerce products. Once more, economies in Asia and the Pacific vary widely in logistics performance. Table 3.3 presents the Logistics Performance Index (LPI)

Table 3.3: Logistics Performance Index Score and Rank—Selected Asian Economies

	Overall LPI Score		Overall LPI Rank		
	2014	2016	2014	2016	
Singapore	4.00	4.14	5	5	■
People's Republic of China	3.53	3.66	28	27	▲
New Zealand	3.64	3.39	23	37	▼
Indonesia	3.08	2.98	53	63	▼
Bangladesh	2.56	2.66	108	87	▲
Fiji	2.55	2.32	111	136	▼
Tajikistan	2.53	2.06	114	153	▼
Papua New Guinea	2.43	2.51	126	105	▲
Afghanistan	2.07	2.14	158	150	▲

▲ = increase, ▼ = decrease, ■ = unchanged.

LPI = Logistics Performance Index.

Note: LPI scores are based on five factors: (i) efficiency of border control and customs process; (ii) transport and trade-related infrastructure; (iii) competitively priced shipments; (iv) ability to track and trace consignments; and (v) timeliness of shipments. The LPI covered 160 economies in 2016.

Source: World Bank. Logistics Performance Index. <https://lpi.worldbank.org/international/global> (accessed 15 December 2017).

scores of select economies in Asia and the Pacific.¹⁴

Among the 160 economies studied by the World Bank in 2016, Singapore ranked highest in the region (overall LPI score: 4.14, rank: 5), while Tajikistan was lowest (overall LPI score: 2.06, rank: 153). Bangladesh improved most between 2014 and 2016, climbing from 108 to 87, while Tajikistan fell from 114 to 153.

Cross-border e-commerce is especially affected by logistics. Rapid growth in parcel flows creates new problems for customs officials across much of Asia and the Pacific. However, carriers face many more problems in delivering packages from global online companies, including the lack of or poor address systems. As a result, many packages get returned to vendors—in the US and the UK, for example—because they could not be delivered (Margolis 2017). Central Asian economies epitomize some of these cross-border logistics issues (Box 3.4).

Given these problems, economies in Asia and the Pacific that need to reduce congestion in international delivery should work to streamline international parcel flows—for example, by establishing a single-window system, and by implementing the Automated System for Customs Data (ASYCUDA) developed by UNCTAD. ASYCUDA uses advanced software specifically designed for customs administrations and those participating in international trade. The applications ensure that participants comply with international standards when importing, exporting, and engaging in other transit-related procedures.¹⁵ As of March 2018, the system has been installed or implemented in over 90 economies.¹⁶

Policy support can also increase postal and delivery system efficiency. Computerizing postal counter operations and postal services increases speed and

¹⁴ The LPI is developed by the World Bank. It stands as one of the most comprehensive measures to assess logistics performance outcomes, with the score based on six components: efficiency of customs/border clearance efficiency, the quality of trade/transport infrastructure, price competitiveness in shipping parcels, the quality of logistics services, ability to track/trace shipping, timeliness of delivery (World Bank 2014).

¹⁵ For more information on ASYCUDA, see UNCTAD. Customs Automation - ASYCUDA. <http://unctad.org/en/Pages/DTL/TTL/ASYCUDA-Programme.aspx>

¹⁶ For the complete list of countries, territories, and regions using ASYCUDA, see UNCTAD. ASYCUDA User Countries, Territories and Regions. <http://new.asycuda.org/user-countries/>

Box 3.4: Cross-border Logistics Issues in Central Asia

In Central Asia, there are three unexpected problems customs officials found as e-commerce increased parcel flows:

- Acute congestion in customs handling in Uzbekistan and other countries that rely on paper-based clearing procedures.
- The lack of a well-developed system to assess and deal with the uncertainties and risks associated with small parcels—for example, enforcing rules governing global antiterrorism and money laundering.
- The problem of assessing duties based on parcel delivery method instead of the nature of traded goods, where traditional postal services have the advantage of decades-old international agreements. Parcels delivered by express service providers, however, do not benefit from these agreements.

Source: Dicaprio and Procak (2016).

decreases error rates. Many developing countries and LDCs also need to improve their address systems.

Economies of scale

Economies of scale and network externalities are important challenges to developing e-commerce in small developing countries. Williams (2015) finds, for example, that the tiny size of many Caribbean nations inhibited e-marketplace development. Table 3.4 shows the number of internet users in selected Asian economies.¹⁷ Large economies such as India and the PRC can offer e-commerce vendors economies of scale, allowing a wide range of affordable products to online customers. In contrast, the small number of internet users in smaller economies such as the Cook Islands and Tuvalu makes e-marketplace development difficult.

Table 3.4: Number of Internet Users—Selected Asian Economies, 2016 ('000)

	Rank within Asia and the Pacific	Number of Internet Users
1	People's Republic of China	731,298
2	India	381,712
3	Japan	116,339
4	Indonesia	66,235
5	Philippines	56,749
21	New Zealand	4,111
22	Cambodia	4,031
23	Afghanistan	3,672
24	Kyrgyz Republic	2,055
25	Georgia	1,860
41	Federated States of Micronesia	35
42	Marshall Islands	16
43	Kiribati	16
44	Cook Islands	9
45	Tuvalu	5

Sources: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 October 2017) and Kshetri (2018a) using data from Euromonitor International. Passport database.

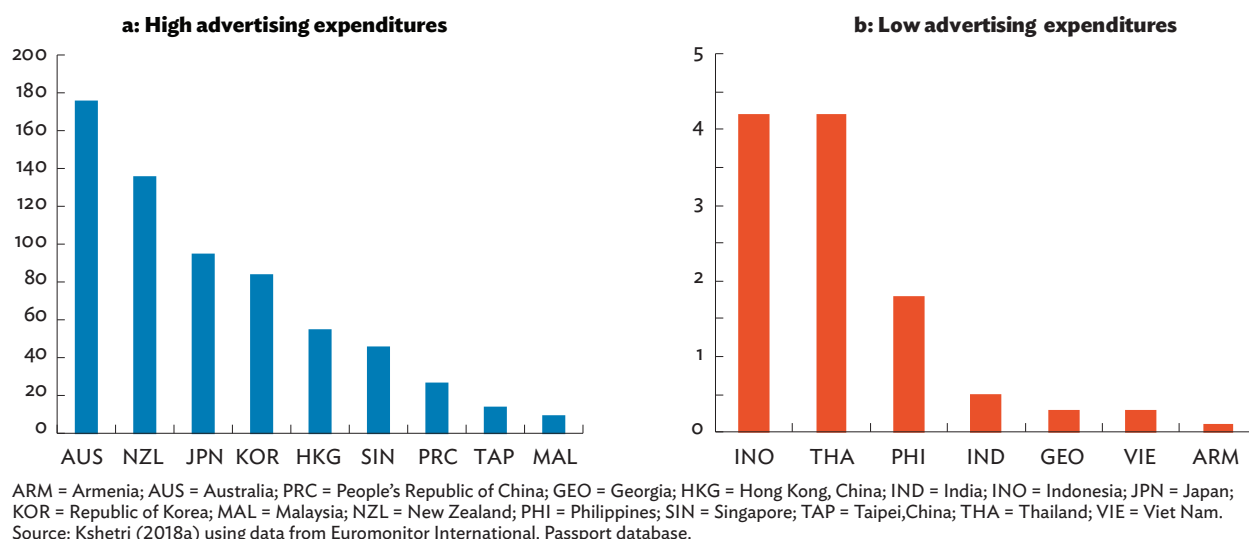
The potential market for most e-commerce firms in Cambodia ranges from 5,000 to 10,000 people (Gaudemar 2016).¹⁸ This is a similar challenge for other LDCs and developing countries such as Myanmar, where Zaw Gyi Mart for example had just 10,000 users after 2 years of operation, Myanmar Online Store only gets 3,000 to 10,000 visitors per month, and Yangon Online Store only has 2,000 page visits per month, of which, only five users make purchases per day (Cunningham 2015, Nyunt and Trautwein 2015).

This lack of economies of scale leads to a poorly developed ecosystem for e-commerce. E-commerce business models that depend heavily on online advertising are heavily effected—such as Nepal's Hamrobazar, and Cambodia's Khmer24 and Mall 855 (Chand 2017).

Online advertising remains nascent in developing economies and LDCs. Figure 3.12 presents per capita online advertising spending in select economies in Asia and the Pacific. The typical wide diversity across the region also applies to per capita advertising. Australia's per capita advertising spending, for example, exceeds

¹⁷ See Appendix B, Table B.1 for data on more economies in Asia and the Pacific.

¹⁸ See online appendix for the state of e-commerce in Cambodia. https://aric.adb.org/pdf/ecommerce2018_app.pdf

Figure 3.12: Online Advertising Spending—Selected Asian Economies, 2016 (\$ per capita)

Armenia's by a factor of 1,763. And while there is no data on the size of online advertising in developing countries and LDCs such as Cambodia and Nepal, their internet portals struggle to survive and thrive.

Access to entrepreneurial financing is a major barrier for e-commerce start-ups in developing countries such as Pakistan, Bangladesh, and Myanmar. Pakistan suffers from a lack of venture capital investment due to the absence of a well-developed start-up ecosystem, Bangladesh suffers from a lack of laws and institutions related to venture capital investment, and Myanmar faces obstacles related to bureaucracy and political stability (Ahmed 2017, Hamza 2017, Hendrix and Noland 2015).

To counter this, governments need to establish appropriate regulations and ease legal bottlenecks to attract more e-commerce investment. For example, tax incentives and other policies promoting venture capital investments could be effective in drawing more capital inflows to e-commerce.

It is also important to develop an entrepreneurial ecosystem that supports start-ups. For instance, entrepreneurs and policy makers can work together to improve the business climate for venture capital, based on a better understanding of how venture capital works. The government and private sector could also team up to offer technical and business training programs to develop strong e-commerce human capacity to attract venture capital funds.

To address challenges associated with scale economies, measures need to be taken to facilitate access to international e-commerce markets. In some cases, supranational institutions, national governments, and the private sector have teamed up to help firms recognize and exploit cross-border e-commerce opportunities (Box 3.5).

Sustainable e-commerce business models

Some e-commerce players use unsustainable business models and practices. For instance, some e-commerce businesses offer heavy discounts and subsequently make losses. Also, a large proportion of small businesses in some Asia and Pacific economies use Facebook as their main storefront and tool for increasing sales and marketing reach. Myanmar, Thailand, Cambodia,¹⁹ and Bangladesh rely heavily on social commerce (West Coast Growth Picks 2016, Krutaine 2016)—for example, in Bangladesh, about 15,000 small merchants earn \$20 million (or roughly 40% of total B2C e-commerce transactions) through sales using the Facebook platform (Bansal 2017). The contribution of social media to establishing sustainable e-commerce business models for different industries remain yet to be examined.

¹⁹ See online appendix for the state of e-commerce in Cambodia. https://aric.adb.org/pdf/ecommerce2018_app.pdf.

Box 3.5: The Lao People's Democratic Republic and the Plasme Website

Plasme was launched in 2017 in the Lao People's Democratic Republic (Lao PDR) through a \$562,000-loan from the Asian Development Bank. The website was launched through an initiative of the Department of Import and Export of the Lao PDR Ministry of Commerce and Industry and the Lao National Chamber of Commerce and Industry. It operates as part of the government's effort to promote small and medium-sized enterprise access to the wider Association of Southeast Asian Nations (ASEAN) market, along with other regional trading partners.

Plasme, which can be translated to Lao and English languages, focuses on Lao PDR goods and is a trading platform for online and offline businesses. It provides information about products and producers, trade agreements, workshops on business and other activities. As of August 2017, 82 Lao PDR companies covering over 300 products and services were registered on Plasme for online trading. The portal is managed by Singapore-based e-commerce service provider Barterfli Holdings.

Source: University of the Thai Chamber of Commerce (2017).

Policies and other measures are needed at various levels to enhance managers and entrepreneurs understanding of the basic functioning of e-commerce business models. For example, e-commerce entrepreneurs and venture capitalists need to monitor the long-term viability and sustainability of e-commerce business

models of the companies in which they invest. While it is important to understand what constitutes a customer value proposition in online businesses, they should also remember that too much focus on attracting new customers risks profitability.

SMEs need the training and knowledge to make better, longer-term decisions that improve e-commerce efficiency. This includes building capacity to design a self-run website as a more sustainable e-commerce platform in the long run.

Legal and Institutional Environment

The legal and institutional environment adds another layer of challenges affecting e-commerce development in Asia and the Pacific. Table 3.5 summarizes the main challenges.

Regulative institutions

Legislation related to e-commerce and measures that make e-commerce participation more affordable and accessible should be promoted.

LEGISLATIVE MEASURES RELATED TO E-COMMERCE

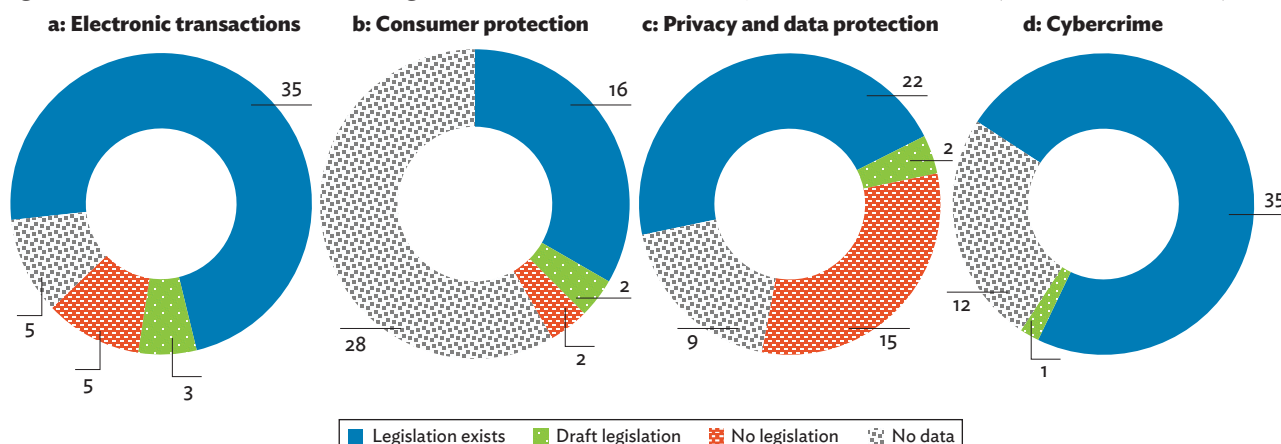
Enacting appropriate legislative and regulatory mechanisms can lower legal barriers to e-commerce use and expand cross-border transactions. These laws fall into four categories, covering e-transactions, consumer protection, data protection and privacy, and cybercrime:

Table 3.5: Some Key Legal and Institutional Challenges and Issues Facing the E-commerce Industry and Market—Asia and the Pacific

Legal and Institutional Factors	Description
Regulative	
Legislative measures related to e-commerce	<ul style="list-style-type: none"> • Slow evolution of e-commerce regulations and weak enforcement of existing laws • High costs associated with online fraud
Measures that make participation in e-commerce affordable and accessible	<ul style="list-style-type: none"> • Slow evolution of e-commerce regulations and weak enforcement of existing laws
Normative	
Personal relationships and tradition	<ul style="list-style-type: none"> • Gender disparity in access to ICT and e-commerce

ICT = information and communication technology.

Sources: ADB compilation based on Ayruani (2017), Dicaprio and Procak (2016), Kshetri (2007a), Mahbub (2015), McKinsey & Company (2014b), and Srivastava (2016).

Figure 3.13: Status of E-commerce Legislation—Asia and the Pacific, as of December 2017 (number of economies)

Sources: Blackmore (2017); Blythe (2011); Consumer Council. Hong Kong Consumer Protection Legislations. https://www.consumer.org.hk/ws_en/legal_protection/hk_consumer_protection_legislations/Index.htm; Hui-ling and Fahey (2017); infosec. Related Ordinances. <https://www.infosec.gov.hk/english/ordinances/corresponding.html>; International Telecommunication Union (2013); Kennedy (2003); luatcanhtranhvabaovenguoitiedung (2011); United Nations Conference on Trade and Development. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (all accessed December 2017).

- **E-transaction** facilitates e-commerce, by making paper-based and electronic forms of exchange legally equivalent;
- **Consumer protection** aims to stop businesses engaging in unfair, deceptive or fraudulent practices online;
- **Data protection and privacy** regulates how individual's personally identifiable information collected by any entity—such as governments, public or private organizations—can be stored and used; and
- **Cybercrime** covers criminal activities where computers or computer networks are used to commit an offense (Kshetri 2009).

Figure 3.13 illustrates the number of Asia and Pacific economies at various stages of legislation affecting e-commerce.²⁰ Most economies have some type of electronic transaction and cybercrime legislation, while many are lax when it comes to privacy and data protection and consumer protection laws.

As of December 2017, economies like Afghanistan and India lacked consumer protection laws; Afghanistan, Cambodia, and the Lao PDR lacked privacy and data protection laws; Afghanistan, the Lao PDR, and Papua

New Guinea lacked cybercrime laws. At the same time, Afghanistan, Cambodia, and Papua New Guinea had only draft legislation on e-transactions; Cambodia and the Lao DPR had only draft legislation regarding consumer protection; Thailand and Pakistan only had draft legislation on privacy and data protection; and Cambodia only had draft legislation for cybercrime.²¹

The rapid increase in online fraud has increased costs for online vendors. One study suggests that every dollar spent fraudulently costs merchants \$2.4 (LexisNexis 2016), while another shows that the cost of a data breach to an online retailer is \$172.0 per record breached (Ponemon Institute 2016). Likewise, a study commissioned by the Federation of Malaysian Manufacturers (FMM) among members noted that 69% of respondents identified setup cost and cybersecurity as key factors affecting the adoption of ICT (Lee 2018).

According to a study conducted by the Anti-Phishing Working Group (APWG), phishers attacked the retail/service sector most in the third quarter of 2016—43% of phishing attacks targeting this sector (Anti-Phishing Working Group 2016).²² Table 3.6 presents the

²⁰ See Appendix B, Table B.2 for the state of e-commerce legislations in individual Asia and Pacific economies.

²¹ UNCTAD. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx

²² Phishing involves a fraudulent acquisition of personal information by tricking an internet user. Phishers often use social engineering schemes to send fake e-mails to consumers requesting personal information. Victims mistakenly believe the e-mails come from legitimate businesses or agencies and divulge financial and/or personal information.

Table 3.6: Percentage of Machines Infected by Phishing Attacks, Q3 2016 (%)

a: Top 10 (most infected)			b: Bottom 10 (least infected)		
Global Ranking	Economy	Infection Rate	Global Ranking	Economy	Infection Rate
1	People's Republic of China	47.2	36	Belgium	24.1
2	Taipei, China	43.4	37	United Kingdom	23.4
3	Turkey	39.0	38	Germany	23.2
4	Russian Federation	37.9	39	Switzerland	22.3
5	Ecuador	37.2	40	Netherlands	21.8
6	Guatemala	36.6	41	Denmark	21.4
7	Peru	36.0	42	Japan	20.8
8	Mexico	35.8	43	Sweden	20.3
9	Brazil	33.9	44	Finland	19.8
10	Venezuela	32.3	45	Norway	19.7

Q3 = third quarter.

Note: Phishing is a criminal mechanism employing both social engineering and technical subterfuge to steal consumers' personal identity data and financial account credentials.

Source: Anti-Phishing Working Group (2016).

percentage of machines infected by phishing attacks. In Asia and the Pacific, the PRC and Taipei, China had the highest proportions of machines infected by phishing attacks in the period, while Japan was one of the least infected.

Cyberattacks also impose significant costs on national economies. According to the *2017 Norton Cyber Security Insights Report*, for example, 186.4 million people in India were cybercrime victims, costing the economy \$18.5 billion in 2017 (Symantec 2018). The Mahila E-haat website—designed for India's women entrepreneurs to export their products—was attacked in early 2017 and had to be shut down for a couple of months. The website reopened in June 2017 (*The Indian Express* 2017).

Though outdated regulations can be barriers to joining the e-commerce market, a bigger challenge is enforcing e-commerce-related laws. Two major concerns for developing economies and LDCs in Asia and the Pacific are (i) the serious shortage of cybersecurity manpower and (ii) technological illiteracy and a low level of cybercrime awareness in law enforcement.

Enacting appropriate legislation that supports e-commerce development is critical. Many economies in the region have adopted regulations that promote and encourage e-commerce development. The four categories of laws discussed correlate positively with consumer propensity to engage in online transactions.

Governments can also team up with other relevant stakeholders—the private sector, trade associations, and supranational bodies, among others—to overcome legal and institutional barriers. For instance, the Bangladesh government requested the e-Commerce Association of Bangladesh (e-CAB) to prepare a draft of policy guidelines for developing the e-commerce sector and controlling online fraud. e-CAB subsequently submitted a draft of the said policy guidelines to Bangladesh's ICT division in the latter half of 2016 (e-CAB 2016, Islam 2016). In other economies, memberships in international organizations have led to the development of an e-commerce-friendly environment. For example, Tajikistan's accession process to the World Trade Organization (WTO) boosted the legal transparency that helped facilitate e-commerce (Dicaprio and Procak 2016).

Trade associations are key in helping cybersecurity awareness among organizations, businesses, and individual internet users. India's National Association of Software and Service Companies (NASSCOM), aside from conducting studies on the India's e-commerce and providing insights to the government, also helps improve compliance with cybersecurity standards (Kshetri 2017a). Also, the Data Security Council of India (DSCI) is a self-regulatory member organization established by NASSCOM to build trust in India's global outsourcing service providers.

Naturally, the laws mentioned mainly affect those with the ability to participate in e-commerce. For those without the internet access to adopt e-commerce, public policies geared toward encouraging participation in the e-marketplace are critical. Governments can also directly facilitate e-commerce activities. Examples include government-launched e-commerce platforms to connect buyers and sellers (BADASA in Viet Nam) (Nhan Dan Online 2017) and providing funding to find e-commerce opportunities (in Hong Kong, China) (Ng 2016).

Some governments change the regulatory environment to make ICT products more affordable. For instance, some Asian economies—such as Azerbaijan—use single-window facilities to address the congestion associated with the rapid growth in parcel flows.²³ As of early 2016, Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan were also developing similar facilities. Afghanistan, Kazakhstan, and Turkmenistan were implementing UNCTAD's ASYCUDA system to automate customs (Dicaprio and Procak 2016).²⁴

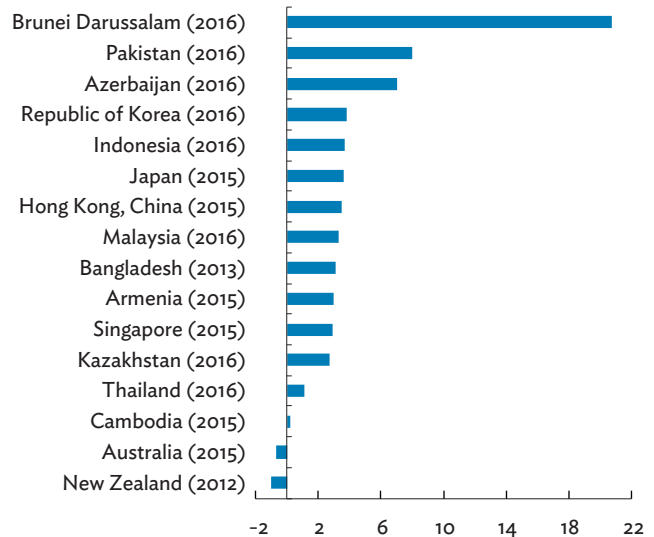
Normative institutions

Personal relationships and trade associations also have important roles to play in developing e-commerce marketplace in the region.

PERSONAL RELATIONSHIPS AND TRADITION

In Asian economies, personal relationships are important for doing business. Anonymous online relationships threaten to undermine these established interpersonal networks (Bebenroth, Kshetri, and Hunerberg 2014). Similarly, tradition can hamper the use of e-commerce in societies where tradition marginalizes certain groups such as women. The lack of cultural or social acceptance of the internet and e-commerce for some social groups is a key challenge for some societies (McKinsey & Company 2014). Among the most prominent results of these would be a relatively lower level of female

Figure 3.14: Gender Gap in Internet Access—Selected Asian Economies (% of males minus % of females)



Source: International Telecommunication Union. Gender ICT statistics. <http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 October 2017).

participation in e-commerce activities. In Bangladesh, for example, computer access is reserved mainly for boys (APC 2010).

Figure 3.14 gives the share of males and females using the internet in selected economies in Asia and the Pacific. In some cases there is a high gender difference in internet usage—internet access rates for males in Brunei Darussalam are 20.7 percentage points higher than that for females. In contrast, two economies have access rates higher for females than males—with internet access rates of females higher by 0.7 percentage points in Australia and 1.0 percentage point in New Zealand.

This gender disparity in internet usage can lead to a similar disparity in e-commerce use. In addition to internet access, cultural factors play an important role (Box 3.6).

Cultural factors cannot be changed overnight, and this applies to changing the perception and attitude toward a digital economy as well. Nonetheless, measures can be put in place to narrow the gender gap in internet access, and improve and promote gender inclusiveness in e-commerce.

School and university curricula should be redesigned to include digital literacy, so that all students can learn about computer during the school day. It is also

²³ In a single-window system, cross-border traders submit all regulatory documents (e.g. customs declarations, applications for import/export permits, and certificates of origin and trading invoices) at one location and/or to one entity.

²⁴ The goal of the ASYCUDA system is to assist customs authorities in automating and controlling core processes in customs, and receive timely, accurate, and valuable information that support of projections and planning.

Box 3.6: Gender Disparity in Bangladesh

A study on Bangladesh's e-commerce climate said of those purchasing online, 17% were women and 83% men (Mahbub 2015). Facebook statistics also showed that among the 23 million Facebook users in Bangladesh in September 2016, only 21.7% were female (Ayruali 2017).

Part of the reason for this may be cultural. Bangladesh society considers computer access to be primarily for boys (APC 2010). As noted by the Association for Progressive Communications, cultural factors play a more dominant role than access to financial resources in explaining whether a female attended computer-related training. Computer classes in Bangladesh schools are often extra-curricular activities lasting until evening. This becomes a problem for girls, as the culture does not allow girls to be in school after dark.

Source: ADB based on APC (2010), Ayruali (2017), and Mahbub (2015).

important to design computer-related workshops for girls in middle school and high school.

Some policy initiatives can directly facilitate women's participation in e-commerce activities. As mentioned earlier, the Mahila E-haat platform launched by India's Women and Child Development Ministry has been a good example. The ministry invested about \$15,000 to develop a platform where women entrepreneurs can directly sell products to customers worldwide. Women can register on the website for free; and there is no fee for selling products (Gadgets Now 2016). By November 2016, 300,000 women entrepreneurs had registered on Mahila E-haat. The website transacted \$3.1 million from April to October 2016 (Srivastava 2016).

INDUSTRY AND TRADE/ PROFESSIONAL ASSOCIATIONS

Normative institutions also include industry bodies and trade/professional associations that can use social obligations to influence behavior within the e-commerce industry. As mentioned laws are often weak in developing economies and LDCs, with a lack of regulatory efforts for budding e-commerce sectors compared with established industries (Kshetri and

Dholakia 2009). One reason is that governments do not have the capability or resources (Pugh 1999). Another is the lack of clear government policies, which often prohibits expenditures on new, promising sectors at the expense of established sectors like agriculture, upon which many poor people depend.

Table 3.7 presents a list of trade associations related to e-commerce in Asia and the Pacific. Trade associations have direct roles in influencing members behavior, and play indirect roles in strengthening regulative institutions, for example. In India, NASSCOM facilitates software and services businesses, and encourages research and development (Kshetri and Dholakia 2009).²⁵ It also publishes e-commerce reports—for example, the 2001 NASSCOM-BCG Report on E-commerce,²⁶ and in 2016, the report *eCommerce in India - Fueling a Billion Digital Dreams*,²⁷ which described e-commerce in India and offered analysis supporting policies needed to develop the market.

There have also been discussions on establishing e-commerce trade associations. In India, for example, several e-commerce firms formed an industry body in 2017 to represent local ventures (Bailay 2018). In 2009, the PRC government-backed Internet Society of China (ISC) conferred a “China Internet Self-Discipline Award” to 20 firms for their roles in fostering and supporting a “harmonious and healthy internet development” (Kshetri 2013a).²⁸ Similar efforts are under way in other parts of Asia and the Pacific—such as Bangladesh (e-CAB), the Republic of Korea (KITA), and Vietnam E-commerce Association or VECOM.

One way for the government to develop the e-commerce industry and market is to work with the private sector through public-private partnerships

²⁵ For more information on NASSCOM, see NASSCOM. Who We are. <http://www.nasscom.in/who-we-are>

²⁶ For more information on the report, see Exchange4media. NASSCOM-BCG Report on E-commerce. http://www.exchange4media.com/Advertising/NASSCOM-BCG-Report-on-E-commerce_3762.html

²⁷ For more information on the report, see NASSCOM. eCommerce in India - Fueling a Billion Digital Dreams. <http://www.nasscom.in/knowledge-center/publications/ecommerce-india-fuelling-billion-digital-dreams-0>

²⁸ The ISC was formed in May 2001 with more than 130 members and is sponsored by network access carriers, internet service providers, facility manufacturers and research institutes (Kshetri 2007b).

Table 3.7: Examples of Trade Associations Related to E-commerce in Asia and the Pacific

Economy	Trade Association	Some Key Activities that Facilitate E-Commerce
Bangladesh	e-Commerce Association of Bangladesh (e-CAB) (635 members as of August 2017)	<ul style="list-style-type: none"> Provides a platform for organizations involved in e-commerce to exchange views and ideas Aims to find common positions on regulatory and other issues facing the country's nascent e-commerce market
India	National Association of Software and Service Companies (NASSCOM)	<ul style="list-style-type: none"> Offers expertise to the government in developing a new regulatory framework to facilitate e-commerce and strengthen enforcement mechanisms Publishes reports that evaluate the impact of e-commerce on the economy
People's Republic of China (PRC)	Internet Society of China (ISC)	Aims to ensure firms' internet-related activities and behavior support the public interest.
Republic of Korea	Korea International Trade Association (KITA)	In 2016, KITA teamed up with Tmall Global, the PRC's overseas platform (Tmall.com), to organize a business workshop to help the Republic of Korea firms enter the PRC e-commerce market
Viet Nam	Vietnam E-commerce Association (VECOM) (formed in 2007)	VECOM has worked on initiatives to increase Viet Nam business participation in e-commerce. For example, it has conducted studies on the relative effectiveness of various e-commerce channels (e.g. social networks, search engines, online news websites, mobile apps, and text messaging). It also holds e-commerce forums.

Sources: Ahmed (2017), Chadha (2017b), Moinur (2015), Kshetri (2007b), Kshetri and Dholakia (2009), VOV.VN (2017a), Weigand (2016), and VECOM. <http://www.vecom.vn/en/INTRODUCTION.html> (accessed 16 November 2017).

(PPPs) to enhance the e-commerce capacity of firms, especially SMEs. PPPs use arrangements and cooperative relationships between public and private sectors, where the private sector does work traditionally performed by government (Kshetri 2015). PPPs are especially well-suited for areas that require diverse expertise and knowledge to address complex problems—such as those related to e-commerce (Yu and Qu 2012) (Box 3.7).

Social Acceptance and Awareness

Social acceptance and awareness is key to expanding the use of e-commerce among businesses and consumers. There are many challenges that must be overcome—for both firms and consumers—to enable e-commerce and its market development. Table 3.8 offers a summary of these challenges and issues as they affect the e-commerce industry and market in Asia and the Pacific.

Firm level

The state of confidence, risk aversion, and inertia among firms in adopting e-commerce are important factors in developing the industry, as are their awareness, knowledge, and understanding of e-commerce opportunities.

Box 3.7: Singapore Public-Private Partnership

International Enterprise (IE) Singapore of the Ministry of Trade and Industry has teamed up with major e-marketplaces—such as Amazon.com and T-mall—to help Singapore's small and medium-sized enterprises reach global markets (Ng 2016). Government agencies such as IE Singapore have the financial resources but often have no e-commerce related experience or expertise.

IE Singapore helps create partnerships among local companies that offer complementary solutions, with the goal is enabling them to exploit international e-commerce opportunities. In November 2017, the agency announced a plan to organize business missions to international locations such as India, Indonesia, the Republic of Korea, Latin America, and Viet Nam in 2018 (Yi 2017).

Source: ADB based on Ng (2016) and Yi (2017).

CONFIDENCE, RISK AVERSION, AND INERTIA

In an organization, top management's confidence and understanding of new technologies—such as e-commerce—influence their bias toward or against new systems; where a high degree of risk aversion and inertia among managers and owners can be barriers to adopting e-commerce (Lee 2018). According to a survey

Table 3.8: Some Key Social Acceptance and Awareness Challenges and Issues Facing the E-commerce Industry and Market—Asia and the Pacific

Social Acceptance and Awareness Factors	Description
Firms	
Awareness, knowledge, and understanding of e-commerce opportunities	<ul style="list-style-type: none"> • Lack of sustainable e-commerce business models • Firms' lack of skills, experience and expertise to seize e-commerce opportunities
Consumers	
Trust in e-commerce vendors, postal services, and other related actors	<ul style="list-style-type: none"> • Privacy and security concerns • Trust in e-commerce vendors and support services
Awareness and knowledge of e-commerce benefits	<ul style="list-style-type: none"> • Consumers' lack of knowledge and awareness

Source: ADB compilation based on Benang Merah Komunikasi (2017), Google and Tamasek (2016), KPMG (2014), Kshetri (2007a), Ng (2016), Swanson (2015), and Veritas (2017).

conducted among businesses in Hong Kong, China that do not sell online, some 90% were comfortable with and preferred to maintain a business model that involved face-to-face interaction (Ng 2016).

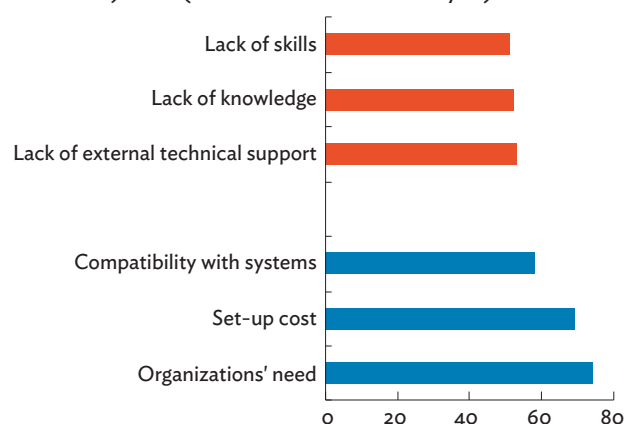
AWARENESS, KNOWLEDGE, AND UNDERSTANDING OF E-COMMERCE OPPORTUNITIES

One problem for developing countries is that organizations often lack resources, along with awareness and understanding of potential opportunities. Figure 3.15 shows the results from a 2016 study commissioned by the Federation of Malaysian Manufacturers (FMM) covering its members. Of the survey's 148 manufacturers that responded, 52% said lack of knowledge, 51% lack of

skills, and 53% lack of external technical support as key factors affecting their adoption of ICT. Other factors cited were organizational need, setup costs and security, and compatibility with existing systems (Lee 2018).

LACK OF SKILLS, EXPERIENCE, AND EXPERTISE TO SEIZE BUSINESS OPPORTUNITIES

Most developing countries and LDCs suffer from lack of skills, experience, and expertise to benefit from e-commerce. For example, online vendors in Pakistan lack trained and experienced people providing customer services (Saeed 2017). This is similar in Thailand, where a survey of businesses found almost half of respondents were held back from selling online by limited internal expertise or resources (Kinasih 2016).

Figure 3.15: Key Factors Affecting ICT Use Among FMM Members, 2018 (% of manufacturers surveyed)

FMM = Federation of Malaysian Manufacturers, ICT = information and communication technology.
 Note: Based on FMM–Multimedia Development Corporation–University of Monash survey of 2016, which measured ICT use among FMM members (148 manufacturers participated).
 Source: Lee (2018).

While some organizations in Asia and the Pacific use basic e-commerce, they lack the technological sophistication to adopt more advanced approaches. For example, improved analytics—such as statistical machine-learning and algorithms—can help understand patterns and trends in data related to e-commerce activities. In Asia and the Pacific, however, there are too few big data engineers and scientists. Analytic consultants also lack the capability to understand, interpret, and use available data. One estimate suggests that Asia and the Pacific currently lacks around 1 million data scientists (Leesa-Ngaunsuk 2017).

There is also a lack of big data personnel with the capacity for high-level strategic thinking. For instance, the PRC has a rich endowment of big data human resources thanks to an abundant supply of engineers. But its executives lack expertise (Swanson 2015). Similarly, in Hong Kong, China, though many SMEs

are aware of e-commerce benefits, a large proportion lack the capability and knowledge needed to manage e-commerce. Many feel these barriers reduce the willingness of SMEs to invest in the digital infrastructure required for e-commerce adoption (Ng 2016).

Dealing with these shortcomings is essential for e-commerce growth. It will likely require a multipronged approach that address challenges related to lack of skills, experience, and expertise; and improving firms' ability and willingness to join the e-commerce marketplace.

Initiatives like Viet Nam's VECOM or Bangladesh's e-CAB are examples that can help local firms understand the opportunities and benefits e-commerce offers. Trade associations and government agencies in smaller developing countries could also help organize or sponsor seminars for local start-ups, inviting global IT representatives as speakers. Currently, most global companies are focused on larger markets, such as India and Indonesia.

Consumer level

At the consumer level, the state of (i) consumer awareness and knowledge of e-commerce benefits; (ii) general and computer literacy, along with English proficiency; (iii) trust in e-commerce vendors, postal services, and other relevant actors; and (iv) perception of foreign products and/or vendors present a variety of challenges.

AWARENESS AND KNOWLEDGE OF E-COMMERCE BENEFITS

On the demand side, as mentioned earlier, the slow penetration of e-commerce in developing countries can be attributed to the public's lack of awareness and knowledge of e-commerce benefits. A main reason is the lack of understanding that using digital tools can create value for the offline population and other disadvantaged groups (McKinsey & Company 2014b). The acceptance of e-banking is affected by factors like simple awareness, among others (Dixit and Datta 2010).

COMPUTER LITERACY AND ENGLISH PROFICIENCY

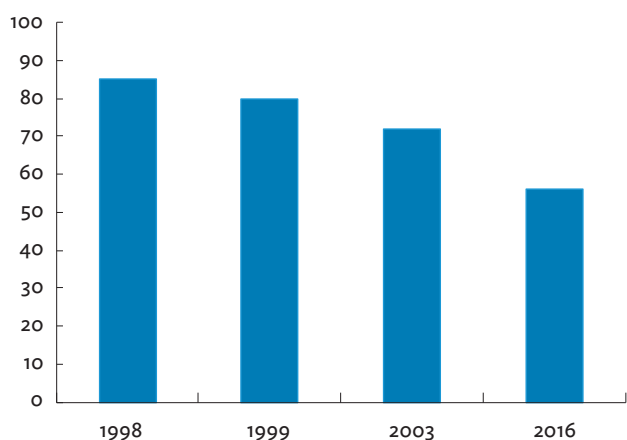
According to McKinsey & Company (2014b), illiteracy and language illiteracy are among the key barriers disadvantaged groups face in participating in the

e-marketplace. English language proficiency correlates positively with the propensity to shop online, partly due to the English-centric nature of the internet. Figure 3.16 shows use of English on the web. Some 85% of content in 1998 was in English (Nunberg 2000), but it has steadily declined—to 56% in 2016 (Armbrrecht 2016). While a substantial improvement, more is needed to encourage many disadvantaged groups to join the e-marketplace. Moreover, most software and human-computer interfaces are also in English.

Unsurprisingly, e-marketplace participation has a high degree of bias toward individuals with English language skills (Kenny 2002). Many in Asia and the Pacific, however, especially older generations, lack English proficiency. India, for example, has 22 official languages (Lalmalsawma 2013), but only 125 million (10.4% of the total population) speak English. This acts as a substantial social acceptance and awareness barrier to engaging in e-commerce activities, most of which are conducted in English (Mundy 2016). Another consideration with social acceptance and awareness barriers is related to general and computer illiteracy, which is particularly acute in developing countries.

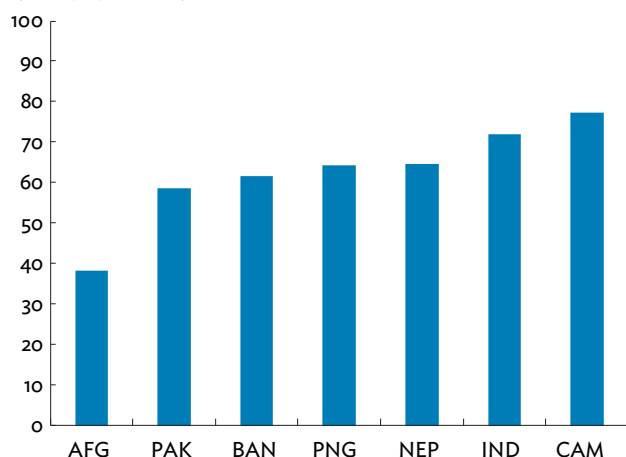
Illiteracy is a natural fundamental barrier to consumer participation in e-commerce. Figure 3.17 presents some of the lowest literacy rates in Asia and the Pacific (UNDP 2016). The adult literacy rate in East Asia and the Pacific was 95.7%. But South Asia was 70.3%, with Afghanistan (38.2%) and Pakistan (58.7%) particularly low. And it is in a country's rural areas where the literacy challenge is greatest. For instance, UNESCO (2017) notes that gender inequality in literacy is present in South Asia,

Figure 3.16: Percentage of Web Content in English (%)



Sources: Armbrrecht (2016), Nua Internet Surveys (1999), Nunberg (2000), and Zuckerman (2013).

Figure 3.17: Literacy Rates—Selected Asian Economies
(% of population)



AFG = Afghanistan, BAN = Bangladesh, CAM = Cambodia, IND = India, NEP = Nepal, PAK = Pakistan, PNG = Papua New Guinea.
Source: United Nations Development Programme (2016).

especially among its adult population. The illiterate population is far from ready to embrace e-commerce.

While literacy remains an overall challenge, more relevant to e-commerce is digital literacy. For most people in developing countries and LDCs, e-commerce is an entirely new phenomenon, and thus many are not aware it exists (Box 3.8).

E-commerce companies need to work harder to build e-commerce awareness among consumers. For example, Sri Lanka's Anything.lk—an e-commerce venture founded in 2011—has a customer service team that educates potential customers on the basics of e-commerce. This includes lessons on what a website

and e-mail are, and the processes associated with transacting online (YourStory 2013). In an interview with YourStory, Anything.lk's founder said that about 400 customers visited the company's office in Colombo, about one-third had never bought online before (YourStory 2013).

TRUST IN E-COMMERCE VENDORS, POSTAL SERVICES, AND OTHER RELEVANT ACTORS

As mentioned, consumers in developing economies also lack trust in e-commerce vendors and support services. The 2018 CIGI-Ipsos Global Survey on Internet Security and Trust, for example, finds that in 2018, 41% of individuals in Asia and the Pacific that never make an online purchase cited a lack of trust in the online marketplace as one of the factors for not doing so. In addition, the survey finds that there is greater inclination for consumers in Asia and Pacific economies to choose local vendors over foreign ones, with 32% of respondents saying they prefer local e-commerce platforms, while only 7% prefer foreign e-commerce platforms. Box 3.9 presents Asia and the Pacific consumers' propensity to purchase products from foreign suppliers.

As noted earlier, in much of Asia and the Pacific, many remain reluctant to use the internet as a means to conduct financial transactions (Paypal 2017). This poses as a problem as trust in vendors, and support systems such as payment systems and delivery systems—such as postal services—is also key to e-marketplace development.

Privacy and security concerns are also major barriers for consumers participating in e-commerce. Cybersecurity is emerging as a major issue in many developing economies. For example, among India's organizations that responded to KPMG's (2014) cybercrime survey report, 89% considered cybercrime a "major threat".

Table 3.9 presents several representative surveys measuring business and consumer perceptions of privacy and security, covering a range of Asia and Pacific economies.²⁹ According to a 2016 report by KPMG International, 55% of consumers surveyed globally decided against buying products online due to privacy concerns (KPMG 2016). The surveys also indicated that a large proportion of organizations are

Box 3.8: India's Mobile Literacy

As of August 2017, India's mobile phone penetration was reported at 88% (Ericsson 2017). But the lack of "mobile literacy" was also evident, especially in rural areas, as a large proportion of mobile phone users in rural areas make simple voice-based calls. A large proportion of mobile phone users also lack awareness and the skills needed to use the internet.

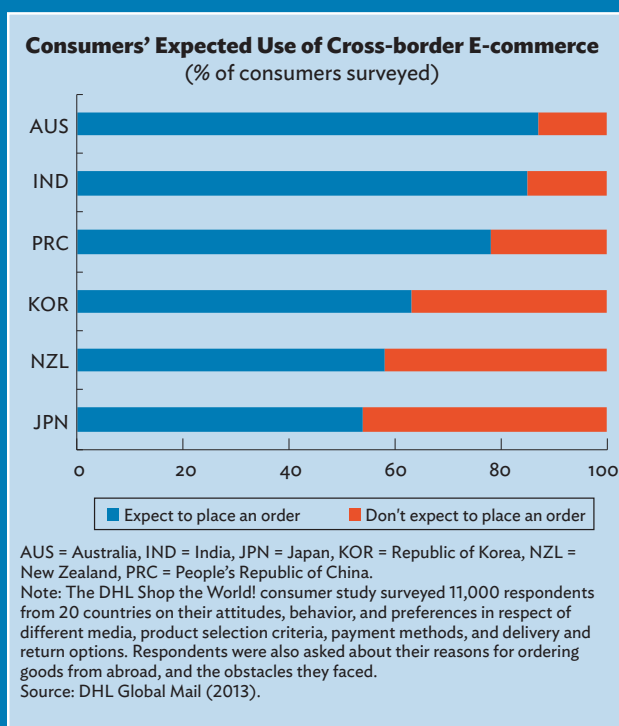
Source: ADB based on Ericsson (2017) and Deloitte and Confederation of Indian Industry (2016).

²⁹ See Appendix B, Table B.3 for more representative surveys on security and privacy perception.

Box 3.9: Propensity for Foreign Products or Vendors

A key aspect of social acceptance and awareness in cross-border e-commerce is consumer perceptions of foreign products or vendors. Surveys have shown e-commerce shoppers worldwide differ widely in their willingness to purchase products internationally.

The box figure illustrates the results of a survey conducted by DHL Global Mail. More than 40% of respondents from Japan and the Netherlands were negative toward placing an order with a foreign supplier, while the proportion was only one-third for Republic of Korea and United States consumers. In Taipei, China, 42.3% of purchases made online were from foreign countries.



Sources: ADB based on DHL (2013) and Mic (2017).

Table 3.9: Principal Findings of Selected Business and Consumer Surveys on Privacy and Security Issues

Conducted/ Released In		Sample	Major Findings
Surveys Conducted Among Businesses			
Veritas	February–March 2017	900 business decision makers in Australia, France, Germany, Japan, the Republic of Korea, Singapore, the UK, and the US	56% of respondents in Singapore and over 60% in Japan and the Republic of Korea reported they doubt they would meet GDPR regulatory deadlines. ^a
Surveys Conducted Among Consumers			
Rakuten AIP	8–10 May 2017	300 consumers each in Japan, Singapore, Thailand, and Viet Nam	Credit card numbers were the most sensitive personal information for the highest proportion of respondents: 95% in Singapore, 89% in Japan, 87% in Viet Nam, and 74% in Thailand Less than 20% of Japanese respondents were confident that companies would securely store their information

GDPR = General Data Protection Regulation, UK = United Kingdom, US = United States.

^aFor non-European Union (EU) companies, this is relevant only if they operate in EU economies or deal with data of citizens from EU members.

Sources: Rakuten AIP (2017) and Veritas (2017).

unprepared to deal with security and privacy issues. For example, organizations in Japan, the Republic of Korea, and Singapore had the lowest readiness among countries surveyed to comply with the European Union's (EU) General Data Protection Regulation (GDPR) (Veritas 2017).³⁰

Consumers are also concerned over the lack of honesty among businesses and the potential misuse of personal information. They particularly worry over possible misuse by government agencies and businesses. This is particularly acute among consumers in countries without data protection and privacy laws. This high degree of mistrust toward businesses disrupts B2C e-commerce growth in the region (Econsultancy 2014).

For example, there have been complaints that products sold on e-commerce platforms in the region have lower quality than what was shown on websites. In Viet Nam, a major reason why customers prefer to pay in cash is the fear they would be victimized online, with limited or no recourse (Xinhua 2017a, VOV.VN 2017b). COD payment also gives consumers more control, as they can refuse an item they do not like. Pakistan also has to deal with the prevalence of fake or inferior goods (Saeed 2017).

To address the issue, e-commerce firms could consider strategies to build trust—such as those used by Lazada in Viet Nam, which works with local post offices to take customer returns and give cash refunds. Pickaboo in Bangladesh offers a 3-day return policy. Trust can grow if trade associations and government agencies help develop and enforce regulations and standards—creating what is known as institution-based trust (Zucker 1986).

³⁰ GDPR aims to harmonize the governance of personal data (such as credit card, banking and health information) across the EU. To comply with the GDPR, organizations offering goods or services to EU residents, or that monitors their behavior, are required to have greater oversight and control over where and how personal data is stored and transferred, and are required to rigorously police and audit access to personal data.



4

Key Opportunities for Developing E-commerce



Key Opportunities for Developing E-commerce

Introduction

E-commerce in Asia and the Pacific is being transformed by several factors. Technical, regulatory, and political developments have been key factors for e-marketplace growth.

Government actions and private sector investments—e-commerce companies—have helped improve economic performance on the factors discussed in Chapter 3.

Fast-growing cross-border online transactions are also gaining traction, bringing greater potential for the international trade and commerce in the region. One estimate suggests that cross-border e-commerce has been and will continue to be a major driver of global B2C trade growth—with Asia and the Pacific accounting for 53.6% of the growth during the period 2014–2020 (AliResearch and Accenture 2015).

This chapter delves into main opportunities the region can tap to further develop e-commerce and the e-marketplace. It focuses on (i) the macroeconomic impact of information and communication technology (ICT) and e-commerce, (ii) e-commerce as a tool for inclusiveness, and (iii) emerging technologies affecting the evolution of e-commerce.

First, research and anecdotal evidence suggest that ICT and e-commerce have a powerful impact on national economies (Goldman Sachs 2000). For one example, e-commerce has created many new jobs in developing economies and least developed countries (LDCs). As of August 2017, an estimated 50,000 people worked directly or indirectly on e-commerce activities in Bangladesh (Ahmed 2017).

Second, e-commerce can drive greater inclusiveness, whether demographic (for example, gender and age), economic (income level and firm size), geographic

(urban versus rural and developed versus developing and LDC markets), cultural (“East versus West” and religion), or linguistic (moving beyond English and other major languages). E-commerce has been central in narrowing the rural–urban divide. In India, for example, an e-retailer receives 60% of revenues from small towns; in the People’s Republic of China (PRC), an established e-commerce firm (Alipay) is expanding to reach non-e-commerce users in third- and fourth-tier cities, and in rural areas; and Serbia purchases livestock from traders across Central and West Asia (ChinaCSR.com 2012, Dicaprio and Procak 2016, Talukdar 2014).

Finally, several emerging technologies will impact e-commerce, especially those associated with increased digitization and the so-called Fourth Industrial Revolution. A strong digital ecosystem supporting e-commerce is rapidly developing in several Asia and Pacific economies. E-commerce firms are employing new technologies such as cloud computing, big data analytics, the internet of things (IoT), artificial intelligence (AI), machine learning (ML), and blockchain technology (Table 4.1). Japan’s Rakuten, for example, uses AI and ML for image recognition, especially useful for its C2C platform “PriceMinister-Rakuten”. Its system recognizes and automatically categorizes objects in picture format, allowing a seller to easily post products using the platform. Blockchains could also transform e-commerce activities. For example, online vendors can use blockchain-based smart contracts to automate processing orders for digital product delivery—blockchains can also help prevent counterfeit products from being sold online.

Macroeconomic Impact of ICT and E-commerce

Academic researchers have collected evidence to show that ICT and the internet impact economic growth (Table 4.2). A study conducted as early as 2000 suggested that B2B

Table 4.1: Technologies That Shape the E-commerce Landscape

Technology	Description
Big data and cloud computing	<p>Gartner defines big data as “high-volume, high-velocity, and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making”. In this report’s context, big data can provide insights that can help e-commerce vendors effectively leverage data and information to arrive at better e-commerce strategies and tactics.</p> <p>Cloud computing involves hosting applications on servers and delivering software and services via the internet. In this model, companies can access computing power and resources on the cloud and pay for services based on the usage. Services offered include the use of software, platforms, and infrastructure.</p>
Internet of things	<p>The internet of things (IoT) is the network of physical objects or things (e.g. machines, devices and appliances, animals, or people) embedded with electronics, software, and sensors, which are provided with unique identifiers and have the ability to transfer data across the worldwide web with minimal human intervention.</p> <p>According to Gartner, there are three components of an IoT service: edge, platform, and user. The edge is where data originates or is aggregated. Data goes to the platform, typically in the cloud, where analytics are often performed using algorithms. The user applies the results for business.</p>
Artificial intelligence and machine learning	<p>Artificial intelligence (AI) simulates human intelligence by machines. The key processes involved include learning (acquiring information and understanding the rules for using the acquired information), reasoning (applying the rules to reach conclusions), and self-correction.</p> <p>Machine learning (ML) is a type of AI that helps increase the accuracy of software applications in predicting outcomes without explicit programming. Algorithms receive data and use statistical analysis to predict output values within acceptable ranges. ML processes are similar to data mining and predictive modelling, which also look for data patterns to adjust programs.</p> <p>AI and ML can be applied in diverse settings, such as in (near) real-time personalization and delivery of advertisements related to customer purchases.</p>
Blockchain	<p>A blockchain uses distributed ledger technology that enables users to store and access information or records across a shared database (the ledger). The ledger applies its own standards and processes and is capable of operating without a central validation system.</p> <p>Marshall, Gerstein, and Borun LLP suggests that a minimal definition of blockchain includes “a distributed ledger network using public-key cryptography to cryptographically sign transactions that are stored on a distributed ledger, with the ledger consisting of cryptographically linked blocks of transactions”.</p> <p>The cryptographically linked blocks of transactions form the blockchain. Mathematical techniques are used for encrypting and decrypting data, ensuring the data is kept private when transmitted or stored electronically.</p>
5G	Fifth generation (5G) wireless technology offers higher bandwidth and lower latency, allowing more connections, and allowing for higher definition and greater processing accuracy. 5G currently offer speeds of 1-2 gigabits per second, making it at least 20 times faster than the prevalent 4G long-term evolution (LTE) technology.

Sources: Castillo (2018); Gartner. Big Data. <http://www.gartner.com/it-glossary/big-data/>; Moorhead (2018); Kost de Sevres and Kakavand (2017); Laskowski (2016); Marshall, Gerstein, and Borun LLP (2017); OpenSignal. The State of LTE (February 2018). <https://opensignal.com/reports/2018/02/state-of-lte>; TechTarget. Machine Learning. <http://whatis.techtarget.com/definition/machine-learning>.

Table 4.2: Roles of ICT and the Internet in GDP Growth

	Period Coverage	Findings
OECD economies	1980s and 1990s	ICT contributed 0.2%–0.5% annually to GDP growth (second half of the 1990s 0.3%–0.9%).
United States	1995–1998	0.94% of GDP growth attributed to ICT.
Japan and the Republic of Korea	1995–2000	1.5% of GDP growth attributed to ICT in Japan, 5% in the Republic of Korea
Advanced economies	2006–2010	The internet accounted for 21% of GDP growth during 2006–2010. It accounted for 3.4% of GDP in 2009, more than communication, utilities, agriculture, and mining

GDP = gross domestic product, ICT = information and communication technology, OECD = Organisation for Economic Co-operation and Development.
Source: ADB compilation based on Colechia and Schreyer (2001), Jorgenson and Stiroh (2000), Manyika and Roxburgh (2011), and OECD (2003).

Table 4.3: Economic Benefits and Costs of Using E-commerce

Benefits	Costs
<ul style="list-style-type: none"> • Boosts efficiency and has positive impact on gross domestic product • Allows economies to increase participation in global value chain • Increases labor productivity and supports job creation, entrepreneurship, innovation, and creativity • Leads to energy savings and lower carbon emissions • Potential to advance inclusive growth (developing economies, rural areas, women, etc.) 	<ul style="list-style-type: none"> • Requires social and physical capital investments • Could lead to transfer pricing and erosion of tax revenue • Potential to widen economic disparity • Potential to distort competition

Source: ADB compilation based on Anvari and Norouzi (2016); Bram and Gorton (2017); Ca' Zorzi (2000); Carnegie Mellon University (2009); Cockfield et al. (2013); Hinojosa (2017); Mueller and Shoenmaker (2007); Organisation for Economic Co-operation and Development, United Nations Conference for Trade and Development (UNCTAD), and World Trade Organization (2016); Palsson, Patterson, and Hiselius (2017); Savrul and Kılıç (2011); UNCTAD (2015, 2017b); and World Bank (2003, 2016b).

e-commerce would increase GDP by 5% over the long term in advanced economies (Brookes and Wahhaj 2000). A more recent cross-country study empirically found ICT investment is strongly associated with positive economic effects in both developed and developing countries (Dedrick, Kraemer, and Shih 2013).

E-commerce is widely considered a tool to improve economic performance—in both mature and developing markets. It is a new way to enable small and medium-sized enterprises (SMEs) to compete regionally and globally. And it holds the potential to help firms in developing countries narrow the economic gap with competitors in industrialized countries (Economic Commission for Africa, as cited in World Bank 2003).

The benefits for an economy joining the e-commerce marketplace can be significant (Table 4.3). The macroeconomic benefits include boosting output and efficiency, increasing participation in regional and global value chains, and promoting inclusive growth, among others.

E-commerce has a positive impact on efficiency.

Central and West Asia's experience in lowering trade barriers is a prime example. Central and West Asia had the highest trade costs in the world, with vast distances from major markets making it difficult to find buyers and long delivery times for goods purchased. E-commerce has made a major difference. Trade costs have dropped as a concern—they matter 60% less for eBay transactions than for traditional trade (DiCaprio and Procak 2016, eBay 2012).

E-commerce can improve inclusiveness. For example, rural areas can now connect to the rest of the country and the world. The PRC's Taobao villages—essentially composed of rural entrepreneurs—have

grown dramatically due to cross-border e-commerce. The number of Taobao villages expanded from 20 to 780 from end-2013 to end-2015 (Alizila 2016).³¹ As an example, Dongfeng village in Jiangsu province shifted from producing agricultural products, migrant labor, and recycled plastic to assembling and manufacturing furniture sold online. Its success brought more industries and shops to the village, increased average income, ended the incentive to migrate, and even improved the environment. By the end of 2010, Dongfeng had over 400 online shops with an annual revenue of over \$50 million (UNCTAD 2015, Kan 2010).

E-commerce has a positive impact on the environment.

Transacting online uses an estimated 30% less energy compared with traditional retailers. There is less reliance on physical stores; there is no need for lighted signage, temperature regulation, consumer or employee travel, and less construction, among others. (Carnegie Mellon University 2009).

E-commerce also comes with costs—such as potential transfer pricing and tax revenue erosion, and the risk of widening economic disparity. E-commerce can either increase or decrease economic disparity depending on whether it offers better competition with firms in developed economies and among firms within the economy; and/or whether it promotes inclusive growth domestically.

³¹ There are several requirements to be considered a Taobao village: (i) residents use the online Taobao marketplace to begin e-commerce activities; (ii) the village has annual e-commerce transactions worth at least CNY10 million (\$1.6 million); and (iii) at least 10% of village households are involved with e-commerce or there are at least 100 active online shops run by villagers (Alizila 2016).

E-commerce can erode tax revenue. Eroding tax revenue is a major issue for governments promoting cross-border e-commerce—as most e-commerce is not taxed (Hinojosa 2017). One reason is that, compared with traditional commerce, e-commerce items are traded in larger volumes with smaller values (WCO 2015). Australia removed their *de minimis* threshold in July 2018 (Australian Taxation Office, Australian Government 2017) and is shifting collecting taxes at the border to collecting taxes directly from vendors. This should generate A\$300 million over the first 3 years, while costing perhaps A\$13 million to implement (Productivity Commission, Australian Government 2017). Several Southeast Asian economies—Malaysia, Singapore, and Thailand—are considering ways of taxing e-commerce trade (Reed and Lucas 2018).

E-commerce can increase economic disparity.

Though online marketplaces can accelerate developing countries' integration into global markets, the gains can be concentrated in developed countries in the short run—developing countries tend to benefit more over time (Terzi 2011, World Bank 2016b). In addition, economic disparity can exist domestically—even within the same locality—as e-commerce firms tend to attract and concentrate labor in specific regions. Also, different local circumstances—product access, income level, computer literacy and training, among others—can affect the use of e-commerce (Bram and Gorton 2017, Couture et al. 2017).

E-commerce brings significant implications for competition issues.

While e-commerce can increase competition within the market, and help lower prices by reducing search costs and enhancing efficiency gains in supply chain management, it can pose anti-competitive challenges due to the advantages for the incumbents stemming from the economies of scale and scope, and their exclusive access to sources and information. Network effects that make it difficult for retailers and vendors to change sales platforms can exacerbate this problem (C.K. Lim 2018). Increasing market power of e-commerce platforms is likely to prompt growing attention in the sphere of competition policies.

Six studies on the impact on firms of e-commerce all illustrate the positive impact e-commerce has on firm activity (Table 4.4). In Viet Nam, growth in total factor productivity of firms doing e-commerce was higher than those that did not. Similarly, the PRC also saw productivity grow due to e-commerce, although input congestion slowed its potential. The positive impacts of e-commerce on firm productivity are also evident in the European Union (EU) and the United States (US). In the EU, ICT and e-commerce activities did not reduce employment, whether in manufacturing or services, or for SMEs and large firms.

Overall, e-commerce holds huge growth and development potential. The overall challenge is how to nurture positive impacts and spillovers while minimizing

Table 4.4: Economy Case Studies of the Impact of E-commerce on Firm Productivity

Economy	Impact	Source
Europe	OLS estimates show an increase in e-sales by 1 ppt raises labor productivity growth by 0.3 ppts. Services show larger impact than manufacturing.	Falk and Hagsten (2015)
	Dynamic panel data estimations show that the increase in e-sales accounts for 18% of total labor productivity growth. Smaller firms gain most from increases in e-sales.	
	Used unique panel of micro-aggregated, firm-level data for 14 European countries covering 2002–2010.	
	Increase in ICT/e-commerce over time did not reduce jobs. This was true in both manufacturing and services, for both SMEs and large firms.	Biagi and Falk (2017)
	Based on unique firm-level data for 10 European countries covering 2002–2010.	
People's Republic of China	E-commerce firms gain productivity but suffer from input congestion. Congestion weakens profitability and leads to negative returns of inputs (operating expenses, total assets, and number of employees) to outputs (operating revenue and market share). Operational efficiency increases profitability by 12% and technological change in e-commerce by 1%, while the degree of congestion weakens profitability by 15%. Used Data Envelopment Analysis technique to measure e-commerce returns to scale and total factor productivity.	Yang, Shi, and Yan (2017)

Continued on next page

Table 4.4 continued

Economy	Impact	Source
Taipei, China	Both e-commerce and R&D capital had a positive influence on productivity, while R&D had a larger productivity-enhancing effect. A 1% increase in e-commerce capital (R&D capital) induces a 0.002% (0.016%) increase in value added (sales minus the sum of intermediate goods and utility expenses). E-commerce and R&D capital appear to have a complementary relationship in their influence on productivity. Inter-industry e-commerce network externalities contribute more significantly to productivity among the various spillover effects brought about by e-commerce and R&D. Based on GMM technique using unique firm-level panel data covering 1999–2002.	Liu et al. (2013)
United States	Significant positive relationship between firm performance (inventory performance) and e-commerce metrics (information, transaction, customization, and supplier connection). Based on data from 260 manufacturing firms, divided into high and low IT-intensity groups. However, e-commerce tends to be associated with increased costs of goods sold for traditional manufacturing companies, with the opposite relationship for high-technology manufacturing firms.	Zhu and Kraemer (2002)
Viet Nam	Firms using e-commerce had on average 3.6 ppt higher total factor productivity growth than firms not using e-commerce.	World Bank (2016b)

GMM = generalized method of moments, ICT = information and communication technology, IT = information technology, OLS = ordinary least squares, ppt = percentage point, R&D = research and development, SMEs = small and medium-sized enterprises.
Source: ADB compilation.

potential drawbacks using both government policy and initiatives from diverse e-commerce stakeholders.

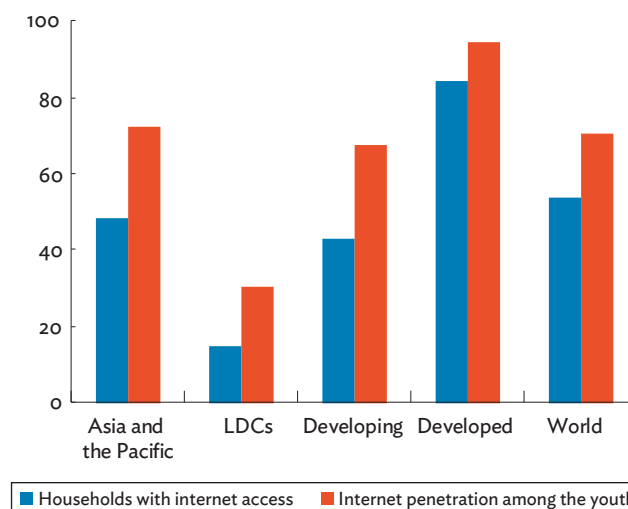
E-commerce as a Tool for Inclusiveness

E-commerce can improve economic efficiency and create many new jobs in developing economies and LDCs, offering a chance for them to narrow development gaps and increase inclusiveness—whether demographic, economic, geographic, cultural, or linguistic. It also helps narrow the rural–urban divide.

Rapid growth in internet and mobile phone access

Internet access is growing rapidly in the region. Figure 4.1 shows household internet access and internet usage among youth in Asia and the Pacific, LDCs, and developing and developed economies. According to *ICT Facts and Figures 2017*—published by the International Telecommunication Union (ITU)—42.9% of households in developing countries (48.1% in Asia and the Pacific)

Figure 4.1: Household Internet Access and Youth Usage, 2017 (%)



LDCs = least developed countries.

Notes: Internet penetration refers to the number of internet users per 100 population. 'Youth' is defined as individuals ages 15–24 years old. List of developed and developing countries is based on United Nations M49 standard. <https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx> (accessed 26 December 2017).

Source: International Telecommunication Union (2017).

had internet access.³² A larger proportion of young people go online compared with the overall population—the proportion of 15–24 years old population that goes online in Asia and the Pacific reached 72.3%.

The proportion of those using the internet is rising rapidly due to increased affordability and smartphone development—rapid penetration of mobile phones in Asia and the Pacific has facilitated the growth of e-commerce. For instance, Ericsson (2017) predicts parts of Asia and the Pacific to see double-digit CAGRs on smartphone subscriptions between 2017 and 2023, with subregions like Southeast Asia and Oceania growing at a CAGR of 11%, and Bhutan, India, and Nepal growing at a CAGR of 17%.

The importance of mobile commerce has risen in some Asia and the Pacific economies. In the Republic of Korea, many businesses use mobile-centric business models, where KOSTAT (2018) reveals a great majority of online shoppers in the country use mobile phones to go online.³³ In India, mobile phones were used for 65.3% of retail e-commerce in 2016—estimated to increase to 80% by 2020 (eMarketer 2016). In the PRC, mobile phone use accounted for 73% of e-commerce in 2017 (Kleiner Perkins Caufield & Byers 2018).

Many Asian e-retailers report that shoppers use more mobile phones than desktop personal computers. In the Philippines, one e-commerce firm reported that 60% of buyers purchased goods through mobile internet (Sayson 2016), while an e-commerce firm in Malaysia reported that 50% of its buyers were mobile (Lee 2015). In Thailand and in Indonesia, 85% and 79% of consumers outside major metropolitan hubs use mobile phones for online purchases (Hoppe, Lamy, and Cannarsi 2016).

Also, with widespread diffusion and innovations, ICT becomes more accessible to disadvantaged groups and marginalized communities, low income families, and the rural population in general—known as the “rank effect” in the industrial economics literature (Gotz 1999).

Developments in e-payment

E-payment options are rapidly improving due to new technology and organizational initiatives. They are making e-commerce more inclusive. Among the most impressive are those associated with mobile payments (m-payments). There is the WING system in facilitating e-payments in Cambodia. Similarly, in India, ICICI Bank teamed up with digital payment platform Paytm to provide short-term credit to common customers (ICICI Bank 2017).³⁴

Table 4.5 describes select payment solutions operating in Asia and the Pacific. Stripe has users in over 100 economies (Wang 2017) and, as of November 2016, could handle 130 different currencies (Lunden 2016). In Asia and the Pacific, the company operates in Australia; Hong Kong, China; Japan; New Zealand; and Singapore.³⁵ It works with Alipay and WeChat Pay, which account for 94% of the mobile wallet ecosystem in the PRC, allowing online vendors worldwide to access the PRC consumer market (iResearch 2017). Stripe also has tools for detecting fraud, and allows online vendors to add various features, such as alternate and localized payment methods, m-payments, and autofill scripts (Lunden 2017).

Blockchains can allow firms to sell directly to consumers, excluding financial intermediaries. This allows firms to keep a larger share of sales compared with traditional systems, where large commissions and/or foreign currency exchange fees reduce profits on both domestic (Lunden 2016) and cross-border transactions (Xiang 2018).

Role of rising international investment flows

International investment flows promote greater inclusiveness in developing countries and LDCs through e-commerce. One important emerging trend is that e-commerce firms in several developing countries have become magnets for venture capital investments (Table 4.6). India’s most promising start-ups are arguably in the online retail sector, including Flipkart (Fannin 2017). Two other notable firms are Malaysia’s cosmetics and skincare platform Hermo, and the Armenian online food

³² See ITU. Statistics. <http://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx>

³³ See online appendix for the state of e-commerce in the Republic of Korea. https://aric.adb.org/pdf/ecommerce2018_app.pdf

³⁴ See online appendix for more details on the WING system. https://aric.adb.org/pdf/ecommerce2018_app.pdf

³⁵ See Stripe. About Stripe. <https://stripe.com/about>

Table 4.5: Selected Payment Systems in Asia and the Pacific

Payment System	Origin	Description
Wave Money	Myanmar	Users of Wave Money go to a Wave Shop (e.g. an e-commerce company) to deposit (or withdraw) cash from their Wave Accounts, which are linked to customers' phone numbers, and allows them to store and transfer money.
Easypaisa	Pakistan	Easypaisa is an M-commerce platform that facilitates online transactions. Users can pay their Easypaisa account online via Visa or Mastercard, or pay offline at over 75,000 Easypaisa shops across Pakistan.
Adyen	Netherlands	Adyen addresses payment problems associated with international e-commerce, and offers over 250 different types of payment options for merchants—such as Indonesia's Mandiri Clickpay and the Philippines' GCash. Uses machine learning to customize payment methods.
Stripe	United States	Online vendors can integrate the Stripe payment processing system into their websites, thus bypassing banks in accepting credit card payments. It also allows online vendors to accept payments from various local and international cards, depositing them into bank accounts.

Sources: Bullock (2017); Choudhury (2016); Dawn (2017); Soo (2017); The Sydney Morning Herald (2014); and Wave Money. Using App. <https://www.wavemoney.com.mm/products-prices/wave-account/using-app/>

Table 4.6: Selected Venture Capital Investments in Asia and the Pacific

Company	Description
Farm Taaza	A B2B company connected with 1,400 farmers (as of October 2017) supplying over 100 varieties of fruits and vegetables. The company was started with seed funding from Silicon Valley-based angel investors in 2015, and obtained second round funding from Hong Kong, China-based Epsilon Venture partners, among others.
Flipkart	A major e-commerce player in India. Flipkart raised \$150 million from Accel, IDG, IndoUS and Tiger Global in 2012, and raised an additional \$1.4 billion in venture capital from Tencent Holdings, Microsoft, and eBay.
Hermo	A Malaysian cosmetics and skincare e-commerce platform that received \$2 million from PRC-based venture capital firm Gobi Partners, among others
Menu Group	An Armenian online food delivery start-up that raised \$3 million from venture capital firms such as the Russian Federation's SOLventures and United States-based Perea Capital and Hayastan

B2B = business-to-business, PRC = People's Republic of China.

Sources: Abudheen (2017), Fannin (2017), Iza (2017), Lee (2015), and PYMNTS (2017).

delivery service Menu Group, each beneficiaries of \$2 million–\$3 million in venture capital.

Improving logistics-related technologies and infrastructure to benefit the disadvantaged

Logistics infrastructure is improving across economies in Asia and the Pacific. Technologies are being used to overcome mail delivery problems, including delivering to remote areas and delivering to areas without formal address systems. For example, drone technology allows for superfast delivery even in some remote areas in the PRC, while What3words creates an inexpensive, informal address system—used by some LDCs in Asia and the Pacific—to enable home mail delivery (Box 4.1).³⁶

As of October 2017, eight countries had adopted the What3Words-based address system—including Kiribati, Mongolia, Solomon Islands, and Tonga. Mongolia's Mongol Post started using What3Words in 2016, becoming the world's first national mail carrier to do so (Margolis 2017). Solomon Islands announced in June

Box 4.1: What Is the What3Words Application?

What3Words is an online application that divides the world's surface into 57 trillion 3-square meter areas, assigning each a unique three-word sequence. That sequence then becomes the location's address. For instance, the What3Words address of the US Embassy in Ulaanbaatar, Mongolia is "constants.stuffy.activism".

Source: Wong (2016).

³⁶ See online appendix for the use of drones in the PRC. https://aric.adb.org/pdf/ecommerce2018_app.pdf

2017 it would follow suit, targeting an initial population of 10,000 in Honiara beginning 6 July 2017 (SIBC 2017). Kiribati adopted the application in October 2017 (Taylor 2017).

Improved access to e-commerce-enabling technologies in developing countries and LDCs

E-commerce firms are embracing new technologies that can expand their business, not just in advanced economies, but in developing economies and LDCs as well. Because most developing economies and LDCs cannot yet develop new technologies on their own, they tend to welcome advanced technology and adapt them to local needs. For instance, many firms throughout the region use e-commerce applications developed by global technology companies like Google, Microsoft, Amazon, and Dell within their own platforms (Table 4.7).

Multinational corporations (MNCs) increasingly innovate within and across many countries—a driver of technological globalization (Iammarino and Michie 1998). In Asia and the Pacific, the mix of domestic and foreign MNCs are adopting new and emergent technologies—such as cloud, big data, and artificial intelligence—to regional settings. In the PRC, the Alibaba Group teamed up with Japan's SoftBank Group to form a cloud computing service venture—SB Cloud Corp (SB Cloud Corp. 2016). In April 2016, Alibaba acquired Southeast Asia's largest e-commerce website, Lazada, which is using Alibaba's big data and analytics services to improve vendor sales (Leesa-nguansuk 2016).

Improved access to advanced e-commerce-enabling technologies for SMEs

SME access to advanced e-commerce-enabling technologies have significantly increased. Alibaba has been in the forefront (Box 4.2). Another example is India's Betaout—a customer segmentation and marketing automation platform—which offers SaaS subscription-based licensing of software to e-commerce companies. It also offers real time data and machine learning to segment customers to help companies retain customers, personalize user engagement, and achieve specific goals such as increased sales, page views, etc. (Kumar 2016).

Emerging Technologies Affecting the Evolution of E-commerce

The emergence of new technologies will impact e-commerce in various ways. New technologies and trends, especially those associated with the wave of the Fourth Industrial Revolution, are rapidly developing and shaping a strong digital ecosystem supporting e-commerce. With rapidly evolving technologies, customer expectations have risen higher. E-commerce firms around the world are embracing new technologies such as big data analytics, the internet of things (IoT), artificial intelligence (AI), augmented reality (AR), virtual reality (VR), and blockchain technology to meet

Table 4.7: Examples of Indian E-retailers Using Foreign-supplied Technologies

Company Name	Description
Flipkart	Used Dell PowerEdge servers to build its cloud infrastructure.
Snapdeal	Placed its entire information technology infrastructure in the cloud—including storage, web accelerator (proxy server that reduces time to access a website), and firewall components. It extensively utilizes SaaS solutions and uses Google AdWords for tweeting catalogues and listings, contextual advertising, customer loyalty programs, and roll-out campaigns.
Jabong.com (bought by Flipkart)	Uses cloud offerings from Oracle, Adobe, and other cloud service providers.
Zovi	Uses Google's cloud application for communication and document storage, and Amazon Web Services for applications (e.g., relationship-marketing software, chat, e-mail, browsing, e-banking, security) and analytics (e.g., tools that allow the company to personalize services and product recommendations). It uses the free open-source hosting platform GitHub for codes that drive the platform/storefront.

Sources: Chowdhary (2014), Haran (2014), and *The Economic Times* (2014).

Box 4.2: Alibaba's Advanced E-commerce Enabling Services to Small and Medium-Sized Enterprises

Alibaba has launched several initiatives to become a one-stop shop for small and medium-sized enterprises (SMEs) conducting business online. It offers online marketplaces, back-end e-commerce merchant services, and its cloud-computing e-commerce platform (Jing 2014). Its e-commerce platform also offers online storefronts and an order management system.

In August 2014, for example, AliCloud introduced a data mining and analytics product—Open Data Processing Service (ODPS)—which, for a \$100 per month subscription, gives e-retailers analytical data on website activity. The ODPS algorithm scans sales data and predicts future sales and products likely to be in high demand over the following period (Tong 2014). AliCloud mostly targets SMEs in the People's Republic of China (PRC) and countries such as Malaysia (Alibaba Cloud 2017) and Singapore (SMBWorld Asia 2016).

Alibaba also offers Aliyun Search, which helps users research various brands and products before making purchases (Lau 2013). Alibaba's cloud unit specializes in data management, which involves e-commerce data mining, processing to customization. Suggestions from Aliyun search are based on buying. Experts say that Alibaba is in the best competitive position to develop an e-commerce

oriented search engine since it can combine Yahoo's search algorithm with purchasing insights from Taobao and ETao (Lau 2013). Alibaba's Taobao is the PRC's largest e-commerce platform, while ETao is a comparison shopping engine, with over a billion product listings and more than 5,000 business-to-consumer and group-buying websites (Lau 2013).

Alipay Wallet is another Alibaba cloud-based app, allowing users to link their Alipay account to local bank accounts for money transfers from a pre-paid account, facilitating online payments (GSMA 2014). In August 2014, Alipay Wallet announced it released more than 60 new application programming interfaces for third party developers to build online storefronts that integrates Alipay's programming functions into their applications (Alizila 2014). This makes it easier and faster for merchants to develop Alipay Wallet virtual storefronts. Within 2 months, it recruited over 1,000 merchants (Alizila 2014). As of October 2017, Alipay had over 520 million active users and more than 10 million PRC brick-and-mortar users. Alipay is accepted in over 30 countries (Najberg 2017). Retailers who set up in-app storefronts can sell and market products to Alipay Wallet users and gain access to data analytic tools that allow them to personalize product recommendations (Alizila 2014).

Source: ADB based on Alibaba Cloud (2017), Alizila (2014), GSMA (2014), Jing (2014), Lau (2013), Najberg (2017), SMBWorld Asia (2016), and Tong (2014).

evolving customer needs befitting greater customization, maximum convenience, and security.

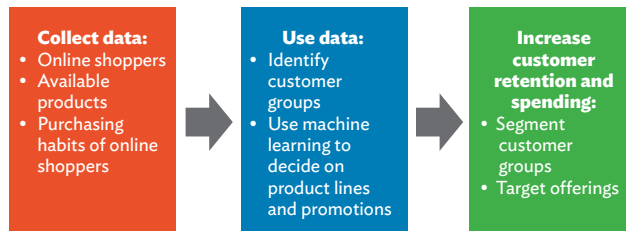
New technologies can support e-commerce development in vast areas. For example, big data technologies help reduce costs for inventory management, enable vendors to provide customized client services, and speed up deliveries along the supply chains of e-commerce. IoT can also help minimize waste, control costs, and reduce the risks of delivery product shortages. Likewise, AR and VR technology can advance e-commerce development by creating a consumer experience similar to brick-and-mortar stores. Blockchain technology applications can affect a full range of e-commerce systems such as payments, supply chains, management processes, data security, and logistics.

Big data and cloud computing

Big data- and cloud-based e-commerce activities are spreading rapidly across Asia and the Pacific, serving a wide range of users and geographic areas, and adding to e-commerce profits. Using big data, for example, allows e-commerce companies to more accurately predict price, inventory, and traffic (eMarketer 2015b). Some firms in the PRC and India have used big data to lower costs on inventories, speed up deliveries, and/or generate sales (Hiner 2016, Murgai 2015).

Unsurprisingly, rapid database growth offers indicators on online shoppers, stock keeping unit of products, and purchasing habits. In the PRC, major e-commerce firms use these data to increase the amount of spending and retain customers by segmenting and identifying groups,

Figure 4.2: Big Data Use in the People's Republic of China to Boost Customer Retention and Spending



Source: ADB based on Wang (2016).

targeting offerings to increase sales. Some e-retailers also use machine learning to decide on product lines and promotional activities (Figure 4.2) (Wang 2016).

Big data and cloud computing help SMEs—especially those in developing countries and LDCs—participate in e-commerce and increase efficiency by overcoming barriers to ICT infrastructure access. For instance, the cloud allows SMEs to access the same infrastructure, data centers, and applications available in developed countries, thus reducing infrastructure costs and leveling the playing field. Cloud-based software is also easier to install, maintain, and update than client-based computing. Finally, the cloud provides the flexibility to scale up should demand increase.

Internet of things

There are several ways IoT benefit e-commerce. For instance, it makes it easier to track inventory in real-time and manage more effectively, for example by reducing human error when reordering items. IoT can also help minimize waste, control costs, and reduce shortages. For instance, temperature-monitoring sensors can maintain optimum temperatures for perishable products (Dave

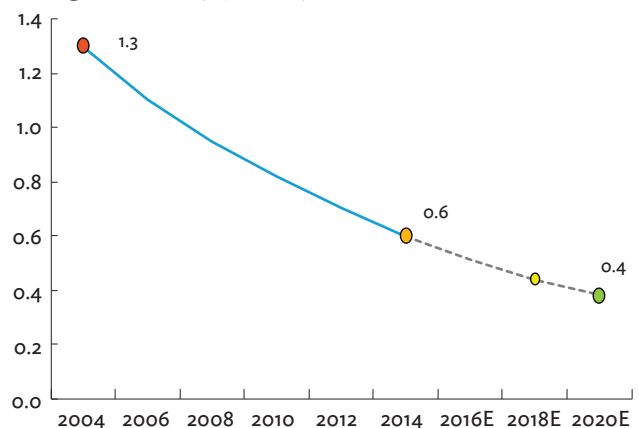
2017). The costs of IoT devices are declining rapidly, with sensor costs dropping more than 50% from \$1.30 in 2004 to \$0.60 in 2014 (Figure 4.3). It is expected to decline to \$0.38 by 2020 (BI Intelligence 2014).

Artificial intelligence and machine-learning

Artificial intelligence and machine-learning are used in several ways to facilitate e-commerce. Machine-learning algorithms can analyze customer online activities, including websites visited, information searched, and products viewed and purchased to understand users' demographic profiles, behavior, location, and the product attributes they look for.

Table 4.8 shows some of the ways Rakuten uses artificial intelligence and machine-learning to classify products and recognize images to help consumers find the items

Figure 4.3: Average Sensor Cost for the Internet of Things—Global (\$ per unit)



E = estimate.

Source: BI Intelligence (2014).

Table 4.8: Some Uses of Artificial Intelligence and Machine Learning in E-commerce Activities by Rakuten

	Examples	Remarks
Predicting sales	A “supervised” ML forecasts sales.	The algorithm in “supervised” ML uses past data to “train” the machine to predict future sales more accurately.
Market segmentation	An “unsupervised” ML algorithm segments customer groups to increase marketing campaign effectiveness.	Real-time data helps identify most effective ways of market segmentation (e.g., online behavior or preferences) to more accurately predict consumer interests or tastes.
Product classification	A “semi-supervised” learning algorithm classifies products in ways customers will more likely find the items they need.	Data is resampled repeatedly until the algorithm finds the most efficient way to process data.

Continuation on next page

Table 4.8 continued

	Examples	Remarks
Analyzing ratings and reviews	“Structural” ML algorithms analyze customer ratings and reviews to more efficiently collect and analyze product reviews and mine valuable information.	This is often used to study the structure and formation of words (morphology).
Product recommendations and search	Reinforcement learning algorithms process data on past customer reactions (e.g., in response to products presented) to learn the most effective way in the future under similar circumstances. For instance, information on a consumer’s response to a product shown to them in search results or by recommendation (e.g., whether they clicked or not) can help provide better future product recommendations. The algorithm becomes more efficient, robust, and smarter after each action and reaction.	Uses external feedback to teach a system how to better “guess” in the future. The system identifies factors that made the largest difference in the success of the algorithm’s decision, which is then used to reinforce accuracy and minimize failed decisions.
Image recognition	Uses deep learning algorithms for image recognition, especially useful for customer-to-customer platforms such as PriceMinister-Rakuten.	Deep-learning algorithms can recognize and automatically categorize objects in a picture, allowing users to more easily post products to sell on the platform.

ML = machine learning.

Note: Rakuten is the largest e-commerce marketplace in Japan.

Sources: Hintze (2017) and Mori (2017).

they need. It can even help segmenting markets and recommending products to help consumers find items that they may want (Mori 2017).

Advancements in artificial intelligence give countries that generate lots of data great advantage. Recently, deep-learning algorithms are used across a broad range of industries. These algorithms use rules based on patterns extracted from large data, refining themselves—becoming “smarter”—as data increase. Thus, countries in the region that generate large quantities of data have a clear advantage—some estimates suggest the PRC’s 1.4 billion people generate more data than the rest of the world combined (The Economist 2017b). Likewise, e-commerce users in India are estimated to generate over 30–40 terabytes of data each day (Lakshminarayanan 2017). Progress in augmented reality (AR) and virtual reality (VR) technology can also advance e-commerce development (Box 4.3).

The emergence of blockchains and their impact on e-commerce

Blockchains can help consumers, especially the poor, participate in e-commerce. In Asia and the Pacific, many people living in poor urban areas cannot provide birth certificates, utility bills, or other documents to open bank accounts or thus participate in e-commerce. Several

companies are launching blockchain-powered digital identity programs to help create and validate individual identities (Box 4.4).³⁷

Blockchain-based solutions can also help strengthen cybersecurity and protect privacy in e-commerce transactions—as its decentralized ledger system makes it less susceptible to manipulation or forgery (Kshetri 2017b). For example, telecommunication companies can provide an embedded subscriber identification module (eSIM) or an app that creates a unique virtual identity to their subscribers. This identity is encrypted and stored in a blockchain (Kochhar 2017) and can be used for automatic authentication on e-commerce websites (Owyang 2018). Blockchains also allow secure peer-to-peer (P2P) network solutions (Cummings 2017).

Blockchains can help prevent counterfeit and fake products from being sold online by updating digital product data with ownership and storage records as it moves down the supply chain. Retailers, warehouses, and other sales platforms can use this to trace the product to its digital identity for verification. Authentication certificates can remain private or be made public for marketing purposes (Kshetri 2018c).

³⁷ In some cases, four or more documents may even be required, such as in Bangladesh and Nepal (Beck, Demirgüç-Kunt, and Peria 2008)

Box 4.3: Augmented Reality and Virtual Reality in E-commerce

According to TimeTrade (2015), 85% of consumers prefer shopping in physical stores. This is because many features of brick-and-mortar stores cannot be reproduced online. Augmented reality (AR) and virtual reality (VR), however, can create a consumer experience similar enough to brick-and-mortar stores. Through a VR headset, shoppers can find themselves in a company's virtual shop in three dimension (3D). They can "walk" around and explore items the same way they would in a physical shop. It also offers relevant information on items, such as price and best offers (IDG 2018).

AR applies VR in the real world with live video imagery (Perdue 2017). It can be used by vendors selling a wide range of items, such as jewelry and watches. For example, a furniture vendor can develop an AR-enabled application that uses the camera and a 3D model of the furniture they sell, and overlay the 3D model on the live image. This gives the shopper a clear visualization of how the furniture would best fit in their living room (IDG 2018). This has already been done by some companies such as Lego, IKEA, and Wayfair (Forbes Agency Council 2017, Business Wire 2016).

Retailers can also use AR and VR in concept testing to measure consumer response and feedback to concepts and ideas. These tests can provide retailers insights into how consumers react to products, so they can adjust strategies for greater market impact (Tamang 2018).

Source: ADB based on Business Wire (2016), Forbes Agency Council (2017), IDG (2018), Perdue (2017), Tamang (2018), and TimeTrade (2015).

One of the most high-profile future uses of blockchains, however, will likely be the smart contracts online vendors can use to automate order fulfillment for digital product delivery (Aitken 2017, Sales and Cole 2016).³⁸ A powerful

³⁸ A smart contract is a digital contract that automates a transfer of assets upon the fulfillment of certain conditions. It not only defines the rules and penalties around an agreement in the same way that a traditional contract does, but it can also automatically enforce those obligations (Sales and Cole 2016). It can be executed either 'above' the blockchain or 'on' the blockchain. In the former, the software program runs outside the blockchain and feeds information to the blockchain. In the second case, the software program is coded into blocks (Farrell et al. 2016).

Box 4.4: Blockchain-powered Digital Identity Programs

According to World Bank (2017b) estimates, about 1.1 billion people lack formal identification. These "unidentified" individuals cannot avail of many basic rights and entitlements, as proof of legal identity is required. Many countries are thus turning to digital identification to register those marginalized under paper-based systems. As of 2017, the World Bank has been supporting over a dozen countries in developing digital identification and civil registration (World Bank 2017c).

Digital identity can be secured using only an internet-connected smartphone. A person is photographed, and a video is recorded while the person is making specific facial expressions. An audio file is recorded while the person is reading and speaking onscreen text (Kshetri 2017a). The data gathered are recorded on a blockchain and can be accessed by anyone needing to confirm the person's identity. Microsoft is currently developing a digital identity program built on blockchain technology (Kirk 2018).

Without e-mail, phones, passports, or even birth certificates, a blockchain could be the only way many of Asia's poor can prove who they are, eventually making e-commerce more widely usable.

Source: ADB based on Kirk (2018), Kshetri (2017c), and World Bank (2017a, 2017b).

blockchain-IoT combination could transform many industries (Kshetri 2017d), as IoT devices securely carry out autonomous transactions through smart contracts.

5G wireless technology

An estimate of the cellphone trade group, Groupe Spéciale Mobile Association (GSMA), suggests that there will be 1.2 billion fifth generation (5G) connections worldwide by 2025 (Rakuten Today 2018). Though the development of 5G networks, platforms, and devices

Box 4.5: 5G Wireless Technology and Online Advertising

Most video advertising (video ad) tags contain sophisticated tracking codes, making it possible for advertisers to track user interaction with advertisements. Given their large file size, however, loading video ads is more difficult and time-consuming than loading text or photos. This is a major concern given viewers' strong dislike for ads and other content that does not download fast (Benes 2018).

A couple of surveys conducted in the United States (US) and Germany in 2017 show that 78% and 76% of respondents would stop viewing contents or would switch to a different device if contents take too long to download (Adobe 2018a, 2018b). Likewise, another study conducted

in the US in the first quarter of 2017 showed that around 85% of respondents would stop watching a video if it takes too long to load, or if it is rebuffering and stalling (Mux 2017).

5G can deal with this challenge. By significantly boosting transmission and processing speeds, 5G will create and deliver effective online video advertising that can better attract customer attention. 5G networks also reduce connectivity loss when moving from one location to another. In 2017, social video ad spending in the US was estimated at over \$4 billion, or 20% of total social media ad sales (BI Intelligence 2017).

Source: ADB based on Adobe (2018a, 2018b), Benes (2018), BI Intelligence (2017), and Mux (2017).

require large investments, there are important economic, social, psychological, and other intangible benefits associated with its use—as a standalone technology and in combination with other technologies. These effects will pass through different mechanisms. For example, faster speed and higher resolution screens of 5G-enabled devices can lead to higher degrees of:

- consumer willingness to engage in e-commerce, longer times on e-commerce websites and more purchases online;
- consumer enjoyment when engaging in e-commerce-related activities; and
- vendor effectiveness in activities such as online advertising (Box 4.5).

COMBINING 5G WITH OTHER TECHNOLOGIES TO STIMULATE E-COMMERCE

Geographically, East Asia along with the US are expected to take the lead in early 5G use—Europe may take longer (CCS Insight 2018). The US Federal Communications Commission announced it would auction 5G spectrum in late 2018 (Auchard 2018). Japan and the Republic of Korea are expected to launch 5G in 2019 and the PRC in 2020.

E-commerce will likely be most impacted by the 5G networks. 5G, in combination with other technologies such as AI, IoT, blockchains, AR, and VR will likely transform the e-commerce industry and market (Table 4.9). 5G networks improve the efficiency of existing technologies, such as IoT, where 5G can increase the data transmission rate, and in the case of AR/VR, where higher bandwidth reduces latency (Box 4.6).

Table 4.9: Combining 5G with Other Technologies to Enhance E-commerce

Technology	Examples of Use	Benefits of Combining with 5G
IoT	IoT can improve consumer experience, track inventory in real time and manage more effectively (e.g., JD.com)	5G's faster data transmission will make it easier to transfer data created by IoT devices.
AI	AI-enabled apps—such as Amazon and Google assistant—can order products online, track orders and perform other e-commerce activities.	5G's faster data transmission will allow quicker access to additional information and help the AI better understand the environment and context.
Blockchain	Blockchain-based smart contracts can be used by online vendors to automate order fulfillment. Blockchains have been used in supply chain management systems and B2B e-commerce (e.g. the PRC's JD.com).	5G can help feed information (e.g., from IoT devices) required for a smart contract more efficiently. It can also provide better security.
AR/VR	AR enabled apps allow a potential customer to place real products in a virtually setting to provide clear visualization of product use (e.g., Lego and IKEA).	5G network's higher bandwidth, reduced latency, and greater uniformity (mobile connection's consistency across locations) allows transmission of complex worlds and sophisticated inputs that require processing of huge amounts of data.

AI = artificial intelligence, AR= augmented reality, IoT = the Internet of Things, VR =virtual reality, 5G=fifth generation wireless system.
Source: ADB compilation based on Dave (2017), Harbet (2018), IDG (2018), and Xiao (2017).

Box 4.6: Combining 5G with Other Technologies

Internet of Things

Zebra (2017) found 70% of retailers worldwide were ready to adopt the internet of things (IoT) to improve consumer experience. However, it remains a challenge to handle the exponential growth in the data created by IoT devices—data created is growing twice as fast as available bandwidth (Desai 2017). It is estimated that by 2020, network capacity will have to be at least 1,000 times the 2016 level (Slovick 2014). The amount of communication that needs to be handled will increase costs exponentially, and current 4G networks are incapable of handling this growth. 5G networks will play a vital role in addressing the bandwidth deficit.

Augmented reality and virtual reality

Augmented reality (AR) and virtual reality (VR) will likely emerge as driving forces of e-commerce. The complexity and richness of the AR and VR worlds require processing large quantities of data. Current 4G networks suffer from limitations in bandwidth, latency, and uniformity. This is especially challenging if data are fed remotely. 5G will unlock the full potential of current VR and AR technologies through significantly faster speed and lower latency—a transmission delay of 1 millisecond (Mundy 2018).

Blockchains

Smart contracts will be among the most high-profile future uses of blockchains. 5G can play a key role in feeding information (from IoT), especially for smart contracts

executed “above” the blockchain, more efficiently (Aitken 2017; Farrell, Hinchcliffe, and Warren 2016). Also, securing systems will grow in importance as cyberattacks remain a top concern for the growth of e-commerce—as the rapid growth of IoT networks may carry sensitive information about users. Blockchains, through the use of digital identity programs, for example, can be used with 5G to create fast, reliable, and secure connections for e-commerce transactions.

Artificial Intelligence

Artificial intelligence (AI)-enabled devices are already playing important roles in helping e-commerce consumers, such as in making buying decisions and tracking products (such as Amazon Echo's Alexa personal assistant) (Asling 2017, Renfrow 2018). These devices have also already begun handling unstructured information—such as in social media platforms—enabling facial recognition and photo tagging (Harbet 2018). In these cases, 5G can dramatically improve the consumer experience, allowing AI-based devices access additional structured and unstructured information quicker and better understand the environment and context. Overall, AI-powered services will be more reliable over a wide range of environments in which they operate.

Source: ADB based on Aitken (2017), Asling (2017), Desai (2017), Farrell, Hinchcliffe, and Warren (2016), Harbet (2018), Mundy (2018), Renfrow (2018), Slovic (2014), and Zebra (2017).



5

Lessons Learned and the Way Forward

Lessons Learned and the Way Forward

Introduction

As discussed earlier, e-commerce can have positive social and economic effects on local communities, as well as countries themselves. There is a wide variety of measures that can help businesses and consumers engage in e-commerce and support the development of the e-marketplace. This chapter provides a detailed analysis and description of these measures, to be taken at various levels, to develop the industry.

There are four main actors that shape an economy's e-commerce landscape: (i) national governments and international agencies; (ii) trade associations and industry bodies; (iii) businesses within the e-commerce ecosystem (e-commerce vendors, payment service providers, and logistics service providers, among others); and (iv) consumers and the public. While some of these roles are equally relevant and important for economies at all levels of e-commerce development, others have varying degrees of relevance depending on the level of economic development. Table 5.1 presents a matrix of the possible roles these actors play in developing and enriching the e-marketplace.

Table 5.1: Ways to Develop and Enrich the E-marketplace

Development Actors/Roles	Level of E-marketplace Development		
	Low	Medium	High
National governments and international agencies			
Collect accurate, relevant data, and related indicators on e-commerce			
Harmonize international laws and standards			
Broaden internet access ^a			
Reduce broadband cost			
Establish financial and e-payment infrastructure			
Develop e-commerce skills and capacity			
Improve delivery and logistics systems ^b			
Adopt measures to attract foreign firms to enrich e-commerce ecosystem			
Promote development of local firms in e-commerce and related sectors			
Enforce intellectual property rights online			
Promote public-private partnerships			
Encourage formation of trade associations and industry bodies related to e-commerce			
Increase gender inclusiveness in e-commerce			
Enact e-transaction laws and develop enforcement mechanisms			
Enact laws on data protection, privacy and cybersecurity, and develop enforcement mechanisms			
Enact consumer protection laws and develop enforcement mechanisms			
Maintain regulatory environment that supports innovation ^c			
Trade associations			
Collect accurate, relevant data, and related indicators on e-commerce			
Strengthen regulatory institutions to stimulate e-commerce			
Create awareness of e-commerce benefits among businesses			

Continued on next page

Table 5.1 continued

Development Actors/Roles	Level of E-marketplace Development		
	Low	Medium	High
Facilitate exchange of knowledge, information, experience, ideas and techniques			
Help develop and enforce standards (e.g., privacy and cybersecurity)			
Facilitate enforcement of relevant legislation			
Businesses in the e-commerce ecosystem^d			
Develop e-payment systems			
Provide logistics and delivery services			
Adopt more advanced e-commerce enabling technologies			
Deploy blockchains to reduce fraud, strengthen cybersecurity, protect consumer privacy, and attract more consumer involvement			
Build trust			
Provide relevant and detailed information on products			
Offer features to increase customer convenience			
Strengthen cybersecurity and protect privacy			
Create local contents			
Consumers and the public			
Determine and evaluate online vendor reputation and authenticity before engaging in e-commerce			
Utilize online shopping as cost effective alternative to physical stores for some product categories			
Enhance cybersecurity orientation			
Lobby businesses to strengthen cybersecurity			
Participate in e-commerce activities to contribute to positive environmental impact			

^a Includes exploring practical alternate means such as mesh network technology.

^b For example, adopting What3Words-based address system.

^c For example, laws related to drones and automated guided vehicles.

^d Include e-commerce vendors, payment services providers, logistics services providers, etc.

Source: ADB compilation based on Brandeisky (2016); Carnegie Mellon University (2009); Chu and Burkitt (2014); Connolly and van Dijk (n.d.); Dedrick, Kraemer, and Shih (2013); Gallagher (2017); GSMA (2015); Gustke (2016); Hardy and Phillips (1998); Hwang, McInerney, and Shin (2015); Huang (2017); Joerss et al. (2016); Keyes (2018); Kshetri (2013b); Kshetri and Dholakia (2009); Lackie (2016); Lee (2009); Nolen (2012); Scott (1992); Simpson (2017); Ujikane (2017); Waggone (2018); World Economic Forum (2017); Yu and Qu (2012); and Zucker (1986).

Main Actors That Shape an Economy's E-commerce Landscape

Governments and international agencies

EFFORTS TO COLLECT ACCURATE AND RELEVANT DATA ON E-COMMERCE

Limited data makes it difficult to discuss accurate e-commerce trends and developments—and conduct quantitative analysis. Even in developed countries, e-commerce data is of questionable accuracy. Different working definitions of e-commerce among institutions that track its growth make it difficult to measure, particularly valuing trade. Existing studies primarily use private data sources that offer mere glimpses of

e-commerce trends and patterns (ADB 2017). For example, an understanding of how much people spend and what they buy is important for building a clear picture of e-commerce development. To deal with this, governments should collaborate with the private sector to collect more relevant and higher quality data. Japan has tried to do this (Box 5.1).

HARMONIZATION OF INTERNATIONAL LAWS AND STANDARDS

Some analysts argue that different international rules related to online transactions, electronic signatures, and authentication increase the complexity and cost of cross-border e-commerce (World Economic Forum 2017). Economies need to work together to unify these and other related rules and laws. For instance, members of the Asia-Pacific Economic Cooperation (APEC) can join the APEC Cross-Border Privacy Rules (CBPR) System, which strengthens protection of consumer information. This is particularly important

Box 5.1: Improving Data Collection in Japan

Government data on household spending in Japan is affected by a higher tendency of older people to participate in surveys than young people. Also, online shopping collected by websites are said to be underreported. To overcome this problem, financial-technology venture Nowcast is using credit card transaction data to examine consumption trends. It has teamed up with Japanese credit card issuer JCB to release new consumption indicators based on a sample of tens of thousands of consumers. An advantage to using these indicators is that they are more up-to-date—released faster than the government’s normal 4-week delay.

Source: Ujikane (2017).

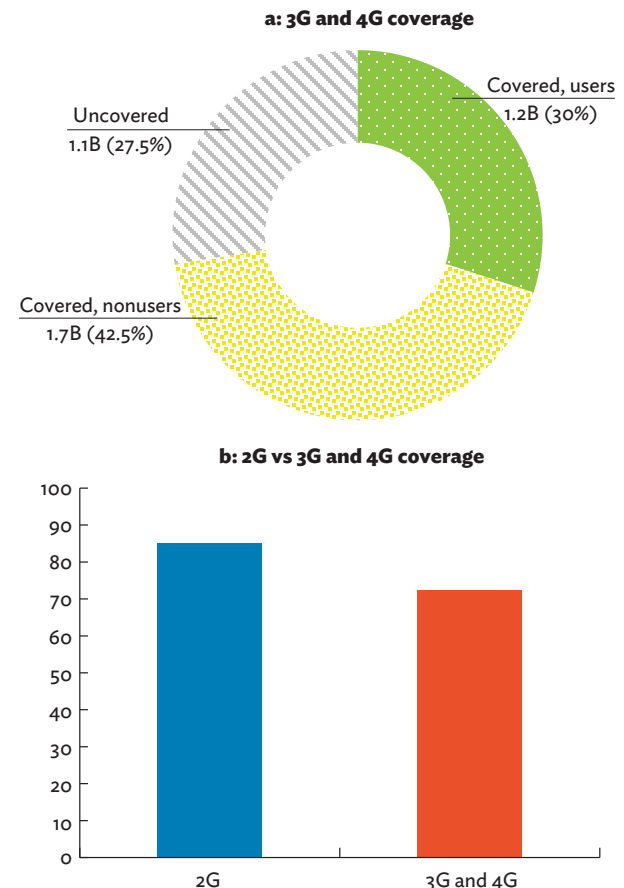
as consumers increase cross-border e-commerce transactions.³⁸

Regional development organizations such as ASEAN can drive these processes subregionally, where countries can negotiate with each other to facilitate the entry and operations of e-commerce businesses from other members.

BROADENING INTERNET ACCESS

For countries successfully carrying out e-commerce initiatives, sufficient access to 3G/4G network is a prerequisite to join the digital economy. Figure 5.1 illustrates the state of internet availability and accessibility of Asia and the Pacific as of 2014, based on a 2015 report of the Groupe Speciale Mobile Association (GSMA). A third of Asia’s population actively use mobile internet, but this accounts for less than half the population covered by 3G and 4G networks. Possible reasons included cost, illiteracy, awareness and perceptions of relevance (GSMA 2015). At the same time, over 25% of the population remained uncovered by 3G and 4G networks.

Figure 5.1: 2G, and 3G and 4G Coverage—Asia and the Pacific, 2014 (% of population)



2G = second generation wireless system, 3G = third generation wireless system, 4G = fourth generation wireless system, B = billion.

Note: Covered population includes users and nonusers of mobile internet.

Asia and the Pacific in this figure comprises of American Samoa; Australia; Bangladesh; Bhutan; Brunei Darussalam; Cambodia; the People's Republic of China; the Cook Islands; Democratic People's Republic of Korea; Fiji; French Polynesia; Guam; Hong Kong, China; India; Indonesia; Japan; Kiribati; the Lao People's Democratic Republic; Malaysia; Maldives; Myanmar; Mongolia; Nauru; Nepal; New Caledonia; New Zealand; Northern Mariana Islands; Pakistan; Papua New Guinea; the Philippines; the Republic of Korea; Samoa; Singapore; Solomon Islands; Sri Lanka; Taipei, China; Thailand; Timor-Leste; Tonga; Vanuatu; and Viet Nam.

Source: GSM Association (2015).

Thus, expanding broadband access should be a top government priority in developing countries and LDCs. Governments can also explore practical alternative ways to achieve this goal. For instance, one way to connect the 1.1 billion unconnected population in Asia and the Pacific would be to use mesh network technology (Box 5.2).

ENHANCING THE AFFORDABILITY OF BROADBAND

ICT access costs influence the strength of the relationship between ICT investment and economic growth (Dedrick, Kraemer, and Shih 2013), where

³⁸ As of early 2018, Japan and the Republic of Korea were among the five participating economies at the CBPR system. See CBPRs. For Government. <http://www.cbprs.org/Government/GovernmentDetails.aspx>

Box 5.2: Mesh Technology

Mesh technology interconnects devices by routing Wi-fi signals across multiple devices—known as nodes. This technology extends the reach, stability, and speed of a network, delivering fast and reliable Wi-fi (eero, n.d.). Due to wireless capacity constraints, however, mesh networks are not considered a serious alternative to fiber or coaxial (copper cable) broadband connections in developed markets. Nevertheless, it is considered a reasonable method of providing broadband to consumers in developing countries due to the lack of other options (Lee 2009).

Mesh network technology can be leveraged to improve internet access in unconnected rural communities. For example, IBM's mesh network technology uses built-in cellphone radio hardware to make peer-to-peer connections with other devices located nearby. In May 2017, IBM's "The Weather Company" launched the mobile alerting platform Mesh Network Alerts, which delivers weather alerts without using the internet (Dubey 2017). The goal is to send critical weather alerts to people in remote areas with lower connectivity and data availability. In emergencies, it can send government emergency alerts even when the cellular or Wi-fi signal networks are down (Sullivan 2017).

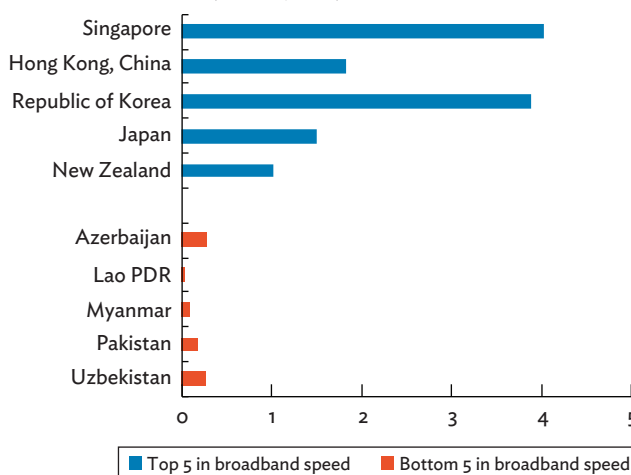
Source: ADB based on Dubey (2017); Eero. What's a Mesh Network? <https://support.eero.com/hc/en-us/articles/207646676-What-s-a-mesh-network->; Lee (2009); and Sullivan (2017).

lower ICT access costs can strengthen the effect of ICT investment on economic growth. In some economies, costs associated with accessing broadband are prohibitively high—and thus a major roadblock for developing the e-commerce market.

Figure 5.2 shows the fixed broadband download speed \$1 can buy in the top 5 and bottom 5 economies in Asia and the Pacific in terms of broadband speed. Whereas a \$1 in Uzbekistan can buy an average 0.26 MBPS in download speed, the same dollar would let Singaporean residents enjoy 4 MBPS. This further highlights how broadband can be more expensive for residents in LDCs and developing economies.

Policy measures should focus on improving availability of low-cost broadband for residents and businesses. An increase in rural broadband penetration has been a

Figure 5.2: Spending on Fixed Broadband—Selected Asian Economies (MBPS per \$)



Lao PDR = Lao People's Democratic Republic, MBPS = megabits per second. Note: Data on download speeds are from February 2018, while data on broadband package costs are from August–October 2017. Sources: Speedtest Global Index February 2018. <http://www.speedtest.net/global-index>; cable.com.uk. <https://www.cable.co.uk/media-centre/release/new-worldwide-broadband-price-league-unveiled/> (all accessed 1 April 2018).

key factor in the growth of e-commerce in rural areas (Cui 2017).

DEVELOPING E-COMMERCE CAPACITY

The higher the education level, the more impact ICT investment has on economic growth (Dedrick, Kraemer, and Shih 2013). A key focus of national governments should be on developing a workforce trained in e-commerce. The development of a well-educated and skilled workforce knowledgeable in areas such as big data analytics, blockchain technology, and cybersecurity, among others will be increasingly important.

ESTABLISHING AND PROMOTING THE USE OF FINANCIAL AND E-PAYMENT SYSTEMS

Developing efficient e-payment systems should be a priority for Asia and the Pacific governments. One way to do this would be to introduce competition in the e-payment sector—and more broadly in banking and finance—to strengthen basic financial infrastructure. Governments should also encourage and support financial technology (fintech) companies that use big data and machine learning capabilities to facilitate lending, and take measures to attract foreign online payment companies.

There has also been limited awareness of, and interest in, e-payment systems among vendors and consumers, with some preferring cash transactions—they lack

confidence and comfort in using e-payment systems (Paypal 2017). Changing the behavior of small vendors and consumers to adopt e-payment systems may require an integrated campaign to increase awareness and understanding of how they work and the benefits they offer—perhaps teaming up with e-payment providers and e-commerce vendors.

IMPROVING DELIVERY AND LOGISTICS SYSTEMS

Underdeveloped logistics infrastructure is a major barrier in developing e-commerce. Developing countries and LDCs need dramatic improvement in major aspects of delivery and logistics.

For instance, Indonesia and Singapore initiated a learning-exchange program in 2018 through a leadership workshop, as part of both nations' efforts to develop a digital economy (Temasek Foundation International, Singapore Cooperation Enterprise, and Republic Polytechnic 2018). Governments can also consider attracting global logistics services providers such as DHL and FedEx, and e-commerce companies such as Amazon and Alibaba, to stimulate logistics development (Box 5.3).

Among other measures, governments need to apply the latest tools and technologies to improve the performance of the package delivery system. As discussed in Chapter 4, some economies in Asia and the Pacific adopted the What3Words-based address system to improve the mail delivery system. Asia and the Pacific economies, especially those with low Logistics Performance Index (LPI) scores, can examine this and other tools for their feasibility in improving mail delivery.

MEASURES TO ATTRACT FOREIGN FIRMS TO ENRICH THE E-COMMERCE ECOSYSTEM

Foreign firms can have a positive influence on ICT investments and technologies—crucial for e-commerce development in developing economies (Dedrick, Kraemer, and Shih 2013). Due to the knowledge associated with e-commerce activities, the presence of sophisticated foreign e-commerce firms can enhance the capabilities of domestic e-commerce firms. Knowledge transfer from these companies can help merchants via e-commerce experience (Rakuten 2014), teaching merchants e-commerce strategies.³⁹ And as mentioned, foreign

Box 5.3: Entry of Global E-commerce Companies and Logistics Infrastructure Development

In March 2018, Amazon announced it planned to enter the Viet Nam market. Initially, Amazon would provide e-commerce services for the Vietnam E-commerce Association (VECOM) to help members sell and export their products (Keyes 2018).

JD.com also invested about \$50 million in Viet Nam online retailer Tiki to help Tiki with logistics and other functions (Keyes 2018). In early 2017, Lazada, which is 83% owned by Alibaba (Lin and Purnell 2017), invested in three warehouses (22,000 square meters) in three major cities in Viet Nam: Ho Chi Minh City, Da Nang, and Ha Noi. Lazada also developed a network of 34 distribution centers in the country (Le 2017).

Logistics costs are estimated to account for 60%-70% of online retailer revenues in Viet Nam (Anh 2018).

Source: ADB based on Anh (2018), Keyes (2018), Le (2017), Lin and Purnell (2017).

firm entry in horizontal business functions such as e-payment and logistics also helps enrich the e-commerce ecosystem.

EFFORTS AND INITIATIVES TO DEVELOP LOCAL FIRMS IN THE E-COMMERCE MARKETPLACE

Local firms in e-commerce and related sectors contribute to the national economy as they are better acquainted with local consumer preferences and are thus in a better position to develop appropriate e-commerce business models for local consumers. The online appendix presents some local e-commerce firms in Cambodia, the PRC, and the Republic of Korea.⁴⁰ Local e-commerce firms are also likely to support a country's exports and trade.

Government incentives such as tax credits can spur growth of local firms. Another important way to

³⁹ Forbes' 30 "Most Innovative Companies" since 2012 (Amick 2017)

⁴⁰ See online appendix for the state of e-commerce in Cambodia, the PRC, and the Republic of Korea. https://aric.adb.org/pdf/ecommerce2018_app.pdf

stimulate local business participation in e-commerce would be to lower related bureaucratic hurdles and costs.

ENFORCING ONLINE INTELLECTUAL PROPERTY RIGHTS

Online selling of fake and counterfeit products has been widespread—a major problem for healthy e-commerce growth, especially in developing countries and LDCs.

Three observations need to be noted:

- First, in some cases, transactions of fake products might be compliant with business interests. Thus, some kind of pressure rather than self-motivation is more effective in driving the actions of firms to protect intellectual property rights (IPR).
- Second, resource constraints need to be considered. Powerful and resourceful e-commerce companies can take bolder steps toward controlling fake and counterfeit products. However, most smaller e-commerce firms lack resources, capability, and competence to protect IPR on their websites.
- Third, governments need to join the private sector to ensure the effectiveness of IPR rules and regulations. Government have a critical role to play in controlling counterfeit—as well as low quality—products transacted online.

When the government fails to enforce IPR, legitimate e-commerce platforms may also inadvertently fall prey to selling counterfeits and fake products. Some may purposely do so to compete with illegitimate sellers.

INITIATING PUBLIC-PRIVATE PARTNERSHIP ACTIVITIES

The public and private sectors often possess different, yet complementary, strengths, expertise, and experience. These can combine to meet developmental and social needs (Linder 1999). At the same time, governments and the private sector have different objectives, agendas, and interests in creating public-private partnerships (PPPs). For example, one public sector goal is to use private sector capital and technology and share risks for higher economic growth, or to provide public services or goods and increase welfare. The private sector generally aims to increase profits (Kshetri 2015).

PPPs are especially well-suited in areas requiring diverse types of resources, expertise, and knowledge to address complex problems—such as those related to e-commerce (Yu and Qu 2012). For instance, rural infrastructure is a public good, yet unlikely to attract sufficient private sector finance. They may thus require government investment or guarantees. Meanwhile, private e-commerce firms possess the knowledge, expertise, and skills to help develop rural e-commerce.

With government endorsement and support, for example, e-marketplaces could more easily gain trust from market players, including potential rural consumers in particular.

ENCOURAGING THE ROLE OF TRADE ASSOCIATIONS AND INDUSTRY BODIES RELATED TO E-COMMERCE

Developing templates and monitoring industry behavior are resource- and expertise-intensive in emerging economic sectors such as e-commerce. Many developing country governments are, however, characterized by weak public administration, inadequate technical competence and political leadership in implementing economic and social policies. In this regard, collaboration with trade associations and industry bodies can help governments better form appropriate policies and measures (Scott 1992).

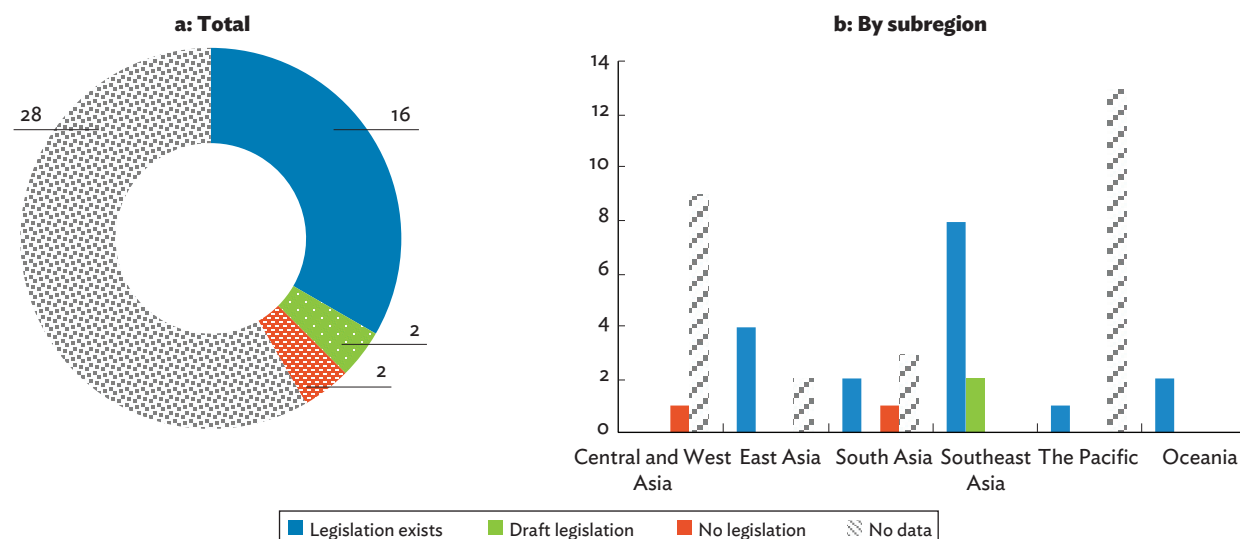
INCREASING GENDER INCLUSIVENESS IN E-COMMERCE

Gender disparity in internet use and e-commerce must be reduced. Gender inclusiveness in e-commerce is vital to maximize the social and economic benefits of e-commerce. It is important to develop training programs and curriculum materials to encourage girls and women to access the internet. Training and access to finance should also be provided to help them engage in e-commerce entrepreneurship.

ENACTING CONSUMER PROTECTION LAWS AND DEVELOPING ENFORCEMENT INFRASTRUCTURE

Consumer protection laws are needed to stop unfair, deceptive and fraudulent online business practices. Figure 5.3 shows the breakdown of consumer protection laws in Asia and the Pacific. Interestingly, only Afghanistan has no law and no pending draft.⁴¹ India has

⁴¹ Some of economies for which relevant data is unavailable may not have enacted laws as well.

Figure 5.3: Status of Consumer Protection Laws—Asia and the Pacific, 2017 (number)

Sources: Blackmore (2017); Blythe (2011); Consumer Council. Hong Kong Consumer Protection Legislations. https://www.consumer.org.hk/ws_en/legal_protection/hk_consumer_protection_legislations/Index.htm; Hui-ling and Fahey (2017); infosec. Related Ordinances. <https://www.infosec.gov.hk/english/ordinances/corresponding.html>; International Telecommunication Union (2013); luatcanhtranhvabaovenguoitiedung (2011); Kennedy (2003); United Nations Conference on Trade and Development. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and-ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (all accessed December 2017).

a pending draft law.⁴² Enacting consumer protection laws should be a regulatory priority.

Merely enacting consumer protection laws without establishing appropriate enforcement mechanisms will not benefit the e-commerce landscape. Enforcement agencies must develop the needed capacity to deal with anticompetitive or fraudulent online behavior. Individuals and businesses should be aware of the need for consumer protection. Consumers need the knowledge to exercise their rights, while vendors must fulfill their responsibilities (UNCTAD 2017d).

ENACTING E-TRANSACTION LAWS AND DEVELOPING ENFORCEMENT INFRASTRUCTURE

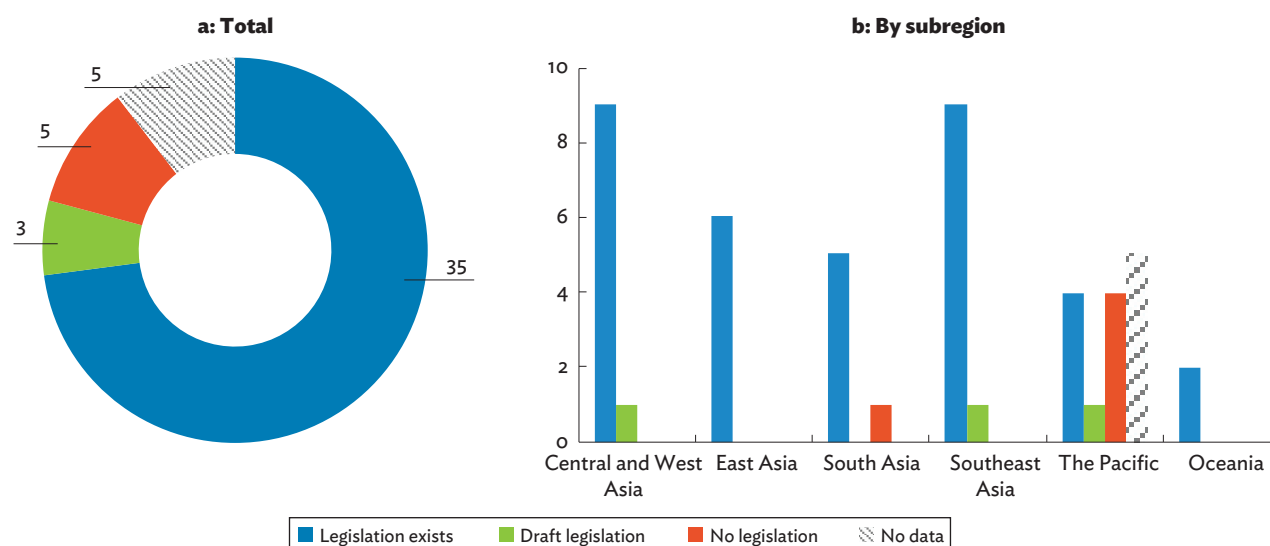
E-transaction laws are prerequisite for conducting e-commerce transactions—as they make electronic forms of exchange legally equivalent to paper-based transactions. Figure 5.4 shows the breakdown of e-transaction laws in Asia and the Pacific. Some economies in the region, such as Tuvalu and Nauru, have no such legislation.

Still, e-transaction laws alone are insufficient to give electronic transactions the same level of legal recognition as paper-based transactions. Businesses and consumers need the training, education, and awareness to improve their understanding of these laws. Some changes to court rules and procedures related to the admission of electronic evidence may be needed as well. In some cases, additional legal infrastructure such as a specialist tribunal may also be needed (Connolly and van Dijk, n.d.).

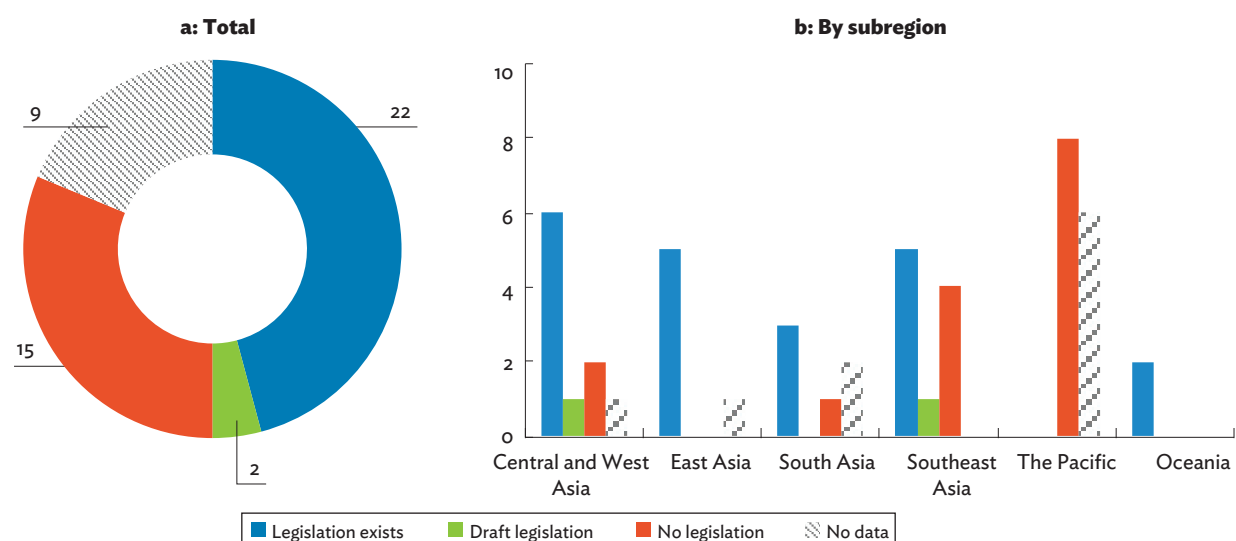
ENACTING LAWS ON DATA PROTECTION, PRIVACY AND CYBERSECURITY, AND DEVELOPING ENFORCEMENT INFRASTRUCTURE

Enacting data protection and privacy laws is extremely important and is becoming increasingly urgent to raise consumer confidence in e-commerce. Figure 5.5 illustrates the breakdown of data protection and privacy laws in Asia and the Pacific. Economies in the Pacific either have no legislation on data protection and privacy, or have no data available. Moreover, these laws need to be regularly updated, especially with the development and use of new technologies. For instance, in March 2018, the UK government announced new guidelines to make IoT devices safer, such as through data encryption when transmitting sensitive data (Department for Digital, Culture Media & Sport 2018).

⁴² See PRS Legislative Research. The Consumer Protection Bill, 2018. <http://www.prsindia.org/billtrack/the-consumer-protection-bill-2018-5035>

Figure 5.4: Status of E-transactions Laws—Asia and the Pacific, 2017 (number)

Sources: Blackmore (2017); Blythe (2011); Consumer Council. Hong Kong Consumer Protection Legislations. https://www.consumer.org.hk/ws_en/legal_protection/hk_consumer_protection_legislations/Index.htm; Hui-ling and Fahey (2017); International Telecommunication Union (2013); Kennedy (2003); infosec. Related Ordinances. <https://www.infosec.gov.hk/english/ordinances/corresponding.html>; luatcanhtranhvabaovenguoitieudung (2011); United Nations Conference on Trade and Development. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (all accessed December 2017).

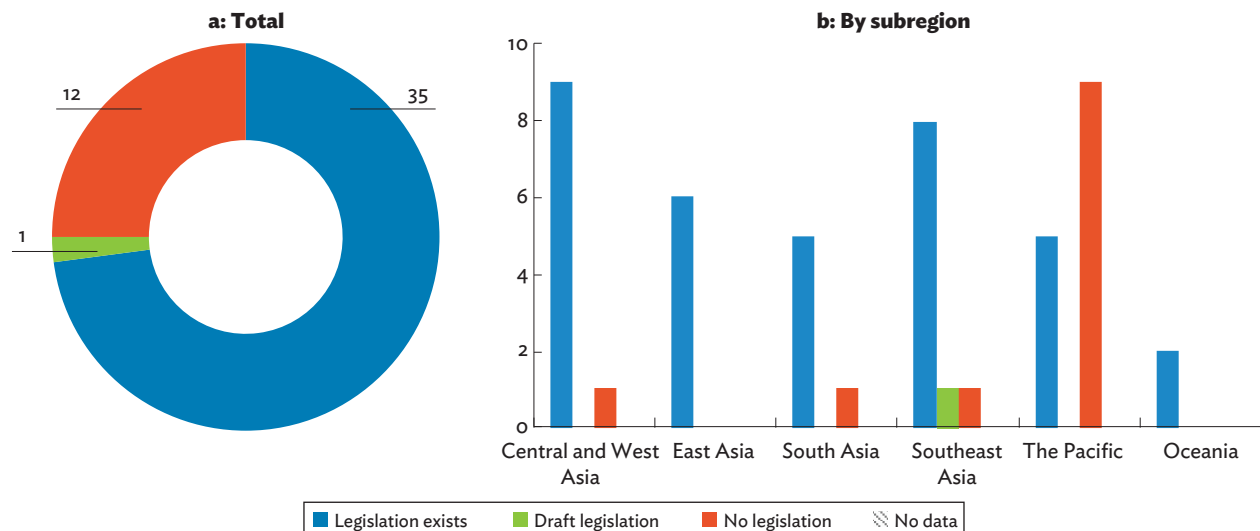
Figure 5.5: Status of Data Protection and Privacy Laws—Asia and the Pacific, 2017 (number)

Sources: Blackmore (2017); Blythe (2011); Consumer Council. Hong Kong Consumer Protection Legislations. https://www.consumer.org.hk/ws_en/legal_protection/hk_consumer_protection_legislations/Index.htm; Hui-ling and Fahey (2017); infosec. Related Ordinances. <https://www.infosec.gov.hk/english/ordinances/corresponding.html>; luatcanhtranhvabaovenguoitieudung (2011); Kennedy (2003); United Nations Conference on Trade and Development. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (all accessed December 2017).

As of July 2017, Cambodia was crafting and reviewing a new cybercrime law.⁴³

The lack of cybercrime laws is also of special concern in several Asian economies. Figure 5.6 shows the current status of cybercrime laws in Asia and the Pacific. As of December 2017, 12 economies lacked cybercrime laws, mostly from the Pacific. Cybercriminals consider computers in developing countries and LDCs as low

⁴³ See online appendix for the state of e-commerce in Cambodia. https://aric.adb.org/pdf/e-commerce2018_app.pdf

Figure 5.6: Status of Cybercrime Laws—Asia and the Pacific, 2017 (number)

Sources: Blackmore (2017); Blythe (2011); Consumer Council. Hong Kong Consumer Protection Legislations. https://www.consumer.org.hk/ws_en/legal_protection/hk_consumer_protection_legislations/Index.htm; Hui-ling and Fahey (2017); infosec. Related Ordinances. <https://www.infosec.gov.hk/english/ordinances/corresponding.html>; International Telecommunication Union (2013); luatcanhtranhvabaovenguoitiedung (2011); Kennedy (2003); United Nations Conference on Trade and Development. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (all accessed December 2017).

hanging fruit due to weak cybersecurity. Developing countries and LDCs need these laws to counter online perpetrators and bring them to legal justice.

To do this, a well-functioning cybersecurity-related court system is also needed, training judges so they are well-versed in cybersecurity and enforcement mechanisms.

MAINTAINING REGULATORY ENVIRONMENT SUPPORTING INNOVATION

Regulatory framework should support innovative firms entering the marketplace and creating value through e-commerce. An unclear regulatory environment limits value creation through e-commerce initiatives. While some governmental agencies have been working on pilot efforts, there should be clearer indication on the timing or nature of these new regulatory changes (Joerss et al. 2016).

Trade associations

Trade associations can help shape e-commerce in several ways; their actions and initiatives can complement government measures. They can influence the development of e-commerce directly (for example, monitoring industry behavior) or indirectly (by persuasion and peer pressure). Their activities can

include initiatives that increase e-commerce-related awareness and knowledge of firms, contributing to the formulation of cybersecurity-related legislation and policy framework, and collecting accurate and relevant data on e-commerce and related indicators. These are discussed in greater detail below.

These roles will likely be especially important for developing countries and LDCs characterized by underdeveloped e-commerce related regulative institutions. A trade association's enforcement strategy becomes efficient and powerful if a large number of firms join the association (Vinogradova 2006).

STRENGTHENING REGULATIVE INSTITUTIONS TO STIMULATE E-COMMERCE

Trade associations can work closely with state agencies to protect their self-regulating independence and autonomy (Greenwood and Hinings 1996). Thus, professional and trade associations play an important role in strengthening e-commerce-related regulative institutions by providing government with expertise in developing a more appropriate and effective regulatory framework, and in strengthening enforcement mechanisms (Kshetri and Dholakia 2009).

Box 5.4: India—Efforts to Facilitate Cybersecurity Enforcement Regulations

The National Association of Software and Service Companies (NASSCOM) and Data Security Council of India (DSCI) offered a detailed project report to establish cybercrime police stations and Cyber Labs across India. NASSCOM helped police departments in Mumbai and Thane establish cybercrime units and trained officers. In 2005, NASSCOM announced a training initiative for Pune's cybercrime unit (Cone 2005), and in 2007, helped establish a Cyber Lab in Bangalore (now Bengaluru) that trains around 1,000 police officers and other law-enforcement personnel annually, on techniques used in cybercrime (McDougall 2007). As of 2016, there were Cyber Labs in eight major Indian cities (Bajaj 2016). And as of 2015, over 45,000 law enforcement personnel had been trained through Cyber Labs (Alawadhi 2015).

NASSCOM and the DSCI also meet with bar councils in different cities to educate legal communities. In addition, NASSCOM offered to work with authorities in the United Kingdom and India to investigate cases involving identity theft (Kshetri 2017a)—a rapidly growing crime worldwide.

DSCI teamed up with Ministry of Electronics and Information Technology and Google India to launch the “Digital Payment Suraksha” Awareness Campaign—to educate consumers, small businesses and merchants on best practices related to digital transactions along with security issues (*The Banking and Finance Post* 2018).

DSCI is also taking the initiative to build an ecosystem of start-ups focusing on cybersecurity solutions for India. It is exploring ways to enable local and foreign cybersecurity start-ups to access India's market (Michu 2018).

Source: ADB based on Alawadhi (2015), Bajaj (2016), Cone (2005), Kshetri (2017a), McDougall (2007), Michu (2018), and *The Banking and Finance Post* (2018).

FACILITATING THE ENFORCEMENT OF LEGISLATION

Trade associations can also facilitate enforcement of relevant legislation. For example, in India, the National Association of Software and Service Companies (NASSCOM) and Data Security Council of India (DSCI) help facilitate the enforcement of cybersecurity regulations. These include helping establish cybercrime units and providing officers appropriate training, educating the legal community and consumers, and facilitating entry of cybersecurity firms (Box 5.4).

DEVELOPING AND ENFORCING STANDARDS

Trade associations can also develop and enforce standards. Association norms and codes can influence firms to behave in a certain way by penalizing noncompliance through various mechanisms (North 1990). This is especially important for developing countries and LDCs where it is more difficult to enforce regulations due to various bottlenecks (Roland 2004). Punishments can include lost memberships for noncompliance (Trombly 2006).

FACILITATING THE EXCHANGE OF KNOWLEDGE, INFORMATION, EXPERIENCE, IDEAS, AND TECHNIQUES

Trade associations can assist members as a network sharing technologies and best practices, and facilitate the exchange of knowledge, information, ideas, and experience. For instance, trade associations can help members understand the many benefits and opportunities associated with e-commerce—both domestically and internationally (for example, the Korea International Trade Association).⁴⁴ These associations can also help e-commerce firms understand the relative effectiveness of various industry techniques through e-commerce forums or other venues.

Indirect effects related to externalities also arise through “mimetic isomorphism”, which mimics the behavior of exemplary actors that have a high degree of effectiveness—knowledge is multiplied through externalities (Niosi and Banik 2005). Mimetic isomorphism may take place in the absence of an association, but an association can accelerate the process by stimulating interaction among its members.

⁴⁴ See online appendix for the state of e-commerce in the Republic of Korea. https://aric.adb.org/pdf/ecommerce2018_app.pdf

Businesses

Businesses can take advantage of the underdeveloped e-commerce systems by supplying services lacking or underprovided, or by competing or cooperating in areas where existing services are of much lower quality. For example, competition can boost the quality of e-payments and logistics infrastructure, especially in developing economies and LDCs.

DEVELOPING E-PAYMENT SYSTEMS

E-payment companies can take advantage of the fast-growing e-commerce market in Asia and the Pacific. Two ways they can do this are by focusing on the unbanked or by partnering with local banks. Although there are plenty of options in advanced e-commerce markets (Chan 2017), less-advanced e-commerce markets have large growth opportunities (Box 5.5).

PROVIDING LOGISTICS AND DELIVERY SERVICES

There are many ways e-commerce firms and logistic service providers can increase delivery efficiency for products ordered online. For example, Lazada developed its own logistics and delivery infrastructure in Viet Nam (see Box 5.2)—and is ranked first in terms of e-commerce revenue in the country (*Hanoitimes* 2017).⁴⁵ Additionally, DHL eCommerce—which offers end-to-end domestic delivery service to Thailand’s e-commerce merchants—has expanded its services to cover 100% of the Thai market in 2017, with the help of 200 service points from which one can send and receive parcels. The company has then added 300 more points in Thailand in the first quarter of 2018, and is planning to reach over 1,000 such points in the coming months (DHL 2017a, 2017b, 2018).

INVESTMENT IN NEW TECHNOLOGY TO ENHANCE E-COMMERCE BUSINESS MODELS

Investment in latest technologies can help firms create powerful business models. For instance, Wi-fi “sniffers”, “beacons”, and other methods can be used to collect data on visitors to retail outlets (Box 5.6). The data help determine store traffic flow. Other investments include use of improved personalization of pages viewed by shoppers (Lucas 2017) and, as mentioned, use of drones for delivery (Huang 2017).

⁴⁵ Lazada captures about 36% of Viet Nam’s \$4 billion B2C e-commerce market.

Box 5.5: Airpay and E-commerce Payments

Technology start-up Sea Limited, backed by Tencent Holdings, launched payment platform AirPay in 2014. The platform allows users without credit cards or bank accounts to make payments for e-commerce transactions and top up credits using cash at AirPay counters (Tung 2016). Airpay also teamed up with a local bank in Thailand to issue virtual Mastercard-branded prepaid cards known as AirPay cards (Chan 2017).

As of March 2018, an AirPay App was available in Taipei, China; Thailand; and Viet Nam; and with AirPay counters operating in Indonesia, the Philippines, Thailand, and Viet Nam. In the first half of 2017, about \$475 million in transactions used AirPay’s e-wallet (Waggone 2018).

Source: ADB based on Chan (2017), Tung (2016), and Waggone (2018).

Box 5.6: How Wi-fi Sniffers Work

Wi-fi sniffers gather data on visitors to stores. If a visitor opens their Wi-fi, the smartphone sends out a signal looking for available Wi-fi. The signal can be captured by the Wi-fi server, which tracks a unique ID for each device. If a store visitor’s device has an app with beacon capability, the signal sent to the server can capture the phone’s location. As of mid-2016, Alibaba had developed about 20,000 consumer data models based on various behavioral and demographic profiles. Some models had accumulated as many as one million customers.

Source: Hamill (2016).

In September 2016, Alibaba introduced new technology that improves page personalization for individual shoppers, allowing them to see only relevant items (Lucas 2017). JD.com has ventured into the use of drones for delivery, reducing costs from \$1 to \$0.2 per item (Huang 2017).

Blockchain technology can help improve several important aspects of e-commerce. One of them is reducing online fraud. For instance, “click fraud” is

arguably the cyberworld's largest scam. Blockchains can provide a real-time measure of an advertisement's status and performance, such as where the ad is placed and who has viewed it (Sloane 2017). Blockchains make it possible to verify delivery of online advertising to a real person and confirm if the intended person viewed the ad for a specified period, as often contractually specified (Berkowitz 2017) (Box 5.7).

BUILDING TRUST

Vendors, governments, and trade associations should try to create sufficient trustworthiness for consumers to join the e-commerce marketplace. Zucker (1986) identifies three ways to produce trust: (i) process-based

trust produced from the engagement in trustworthy relationships; (ii) characteristic-based trust generated by identifiable attributes linked to trustworthy behavior; and (iii) institution-based trust linked to institutions such as trade associations, professions, government bureaucracies, and other formal mechanisms.

Unfortunately, institutional trust-producing structures are largely undeveloped, especially in developing countries and LDCs. Trade associations, professions, government bureaucracies, and other formal mechanisms do not adequately protect consumers against online fraud. E-commerce vendors thus need to focus on the first two mechanisms. Process-based trust can build over a history of trustworthy engagements, in transacting with clients, and fulfilling transactional obligations (Bailey, Gurak, and Konstan 2003). In addition, the vendors can develop characteristic-based trust by demonstrating positive consumer reviews and growing sales volume. For example, some shoppers have a higher tendency to rely on buyer ratings and word-of-mouth to make purchase decisions (Tong 2013).

Box 5.7: Deepening Customer Engagement Through Blockchain Technology

Suppose customer A views an advertisement for a book on the smartphone. The book advertiser can ask A for his/her identity (through a selfie, using the phone's camera), ask A for access to his/her SIM card (to verify with the phone company that the person is the phone's owner), and ask A for his/her location (by using the phone's global positioning system [GPS] app). The advertiser can pay A cryptocurrency such as bitcoin in exchange for A's revealing his/her identity (Tan and Lim 2017).

While each of the individual's activities can also be performed in the non-blockchain world, blockchain technology allows for "smart" contracts that connects all of them together. In this example, the parties involved in the smart contract are customer A, the book advertiser, the phone company and GPS app provider. The advertiser promises a predefined payment in cryptocurrency to customer A for viewing the ad and agrees to provide verifiable information, which helps the advertiser decide which ad should be shown. Payment is released to customer A only after all parties fulfill their part of the contract (Tan and Lim 2017). It is thus possible to verify ad delivery and increase the level of personalization without breaching privacy laws (WARC 2017).

Source: ADB based on WARC (2017) and Tan and Lim (2017).

PROVIDING RELEVANT AND DETAILED PRODUCT INFORMATION

Relevant and detailed product information is critical for successful e-commerce in much of Asia and the Pacific. For instance, Alibaba offers more information about products compared to Amazon, in part because Alibaba's customers are often skeptical about product authenticity and quality—due to historical worries over the widespread availability of counterfeit or low-quality goods (Simpson 2017).

STRENGTHENING CYBERSECURITY AND PROTECTING PRIVACY

Strengthening cybersecurity must be a top priority for e-commerce firms. According to the online review site, Ecommerce Platforms, showing a website as "secure and trustworthy" is key to creating a successful online business (Zorzini 2018). Today's increasingly educated consumers expect companies to ensure a high level of cybersecurity.

The emphasis on cybersecurity and privacy is universal, but especially important in economies with developed e-commerce markets; in markets where consumers are likely to be more demanding. In a 2014 survey conducted by Princeton Survey Research Associates International, 45% of respondents with credit or debit cards indicated

that they would “definitely or probably avoid” retailers that experienced hacks. Among households earning \$75,000 or more annually, 31% would avoid these retailers compared with 56% of those earning less than \$30,000 (Queen 2014).

FEATURES TO INCREASE CUSTOMER CONVENIENCE

Effective value delivery can be achieved only if e-commerce firms can recognize the diverse motivations and interests within a target market segment—and design business models accordingly. In some markets, convenience is a key motivator for engaging in e-commerce. For instance, over 60% of mobile shoppers in the Republic of Korea reported convenience as their top priority for shopping online (Hwang, McInerney, and Shin 2015).

CREATING LOCAL CONTENT

The lack of English language skills is among the major barriers discouraging participation in e-commerce. Creating local language content should be part of key focus of firms within the e-commerce value chain. This is especially important for economies with low e-commerce development.

Consumers and the public

E-commerce-related actions and practices of well-informed and responsible consumers can help shape the e-commerce market positively. Among the roles consumers and the public play are evaluating the reputation of online vendors and learning enough about cybersecurity to avoid falling prey to fraudulent online activity.

STAYING VIGILANT ON THE AUTHENTICITY OF ONLINE VENDORS AND DIVERSE OPPORTUNITIES

The rise in online fraud in developed markets, developing economies, and LDCs makes it important to determine the reputability and authenticity of online vendors. Factors such as customer reviews, registration with government regulatory agencies, and other monitoring tools are particularly useful.

In some markets, e-commerce firms rely on low prices to lure customers to their online shops (PricewaterCoopers 2017). These firms typically sell products at a lower price than their online and offline

competitors. While this strategy may not be necessarily good for an e-commerce company’s long term success, it provides consumers a low-cost alternative to traditional brick-and-mortar stores. Consumer purchase strategies based on price comparison can, as a result, foster competition among sellers and help prevent monopolistic pricing behavior.

KEEPING COGNIZANT OF CYBERSECURITY RISKS

Cybercrime is tightly linked with consumer awareness. The rapid diffusion of ICT, however, is taking place with a relative lack of cybersecurity knowledge among the public, especially in developing economies and LDCs. ICT use comes initially with poor attention and poor orientation to cybersecurity, particularly when just starting to use the internet. For example, in many cases, users purchase smartphones and other devices without inquiring about security features. There are three aspects of cybersecurity that should be considered when tackling cybersecurity awareness: cognitive, behavioral, and technological (Kshetri 2013b) (Box 5.8).

Pressure needs to be applied to e-commerce companies to ensure they take appropriate action to strengthen cybersecurity and protect privacy of consumer data and information. Indeed, businesses in some countries are already facing these demands from customers and other stakeholders. For instance, in a survey of UK consumers, 52% warned they would take legal action against companies if their personal data were stolen or used for criminal purposes due to a data protection breach (FireEye 2016).

Measures to Address Bottlenecks in Cross-border E-commerce

As discussed in Chapter 1, most of Asia and the Pacific is quite open to cross-border e-commerce transactions—cross-border e-commerce is more pronounced in the region compared with others. For example, 40% and 55% of Malaysian and Singaporean e-commerce transactions were cross-border (Frost and Sullivan 2016a, Payvision 2013). And the region’s cross-border e-commerce is expected to grow faster than domestic e-commerce (Frost and Sullivan 2016a, Frost and Sullivan 2016b, AliResearch and Accenture 2015, Payvision 2017).

Box 5.8: Cognitive, Behavioral, and Technological Aspects of Cybersecurity Awareness

The cognitive dimension of cybersecurity includes knowledge about relevant cybercrime and cybersecurity issues, how it is structured, and the way knowledge is used to process information. For instance, internet users may not know the limitation of technologies (e.g., fake applications or those developed by companies that lack reputation). Users need to know about anti-virus software, the degree of vulnerability of different technologies and websites visited, legal and ethical implications of cyberspace behavior, and possible consequences of abusive and harmful online behavior.

The behavioral dimension captures the extent to which cyber-behavior reflects the existence of a healthy defence or precautionary measures taken against cybercrime.

Internet users may not know the risks associated with visiting websites with poor security track records, accepting unknown people as friends on social networking websites, or engaging in cyber-offenses.

The technological dimension involves technological defence mechanisms. Internet users in developing economies are less likely to place emphasis on security issues vis-à-vis other features or aspects when choosing hardware, software, and virtual tools. They are also less likely to use the latest anti-malware tools such as anti-virus software. They may also use outdated and pirated software, download questionable apps and software from unknown websites and/or via file sharing.

Source: Kshetri (2013b).

Opportunities, challenges, and ongoing work

Despite its rapid growth, cross-border e-commerce could expand faster if various barriers were removed. International trade would benefit, consumers proliferate, people's welfare enhanced, and business opportunities for enterprises expanded. At the same time, cross-border e-commerce must handle some difficult issues, including duty and tax collection, transfer pricing, smuggling, and burdensome time and effort for customs clearance in handling growing volumes of low-value shipments.

The range of factors also includes unreliable supply chains and complicated trade and border procedures. Also, the compatibility of e-transaction laws, international trade rules, and taxation procedures all impact cross-border e-commerce (ESCAP 2017). Fostering cross-border e-commerce requires a balanced approach to revolving bottlenecks while working to ensure proper risk management, prevent crime, and plug loopholes.

Various efforts are underway at the subregional, regional, and global levels to cope with growing challenges of cross-border e-commerce. Single windows are expected

to help facilitate cross-border e-commerce transactions by reducing procedural, documentary, and coordination requirements for consigners and consignees. For example, the National Single Window (NSW)—a one-stop shop to speed up customs clearances—has gone live in the ASEAN-6 (Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand). In addition, the ASEAN Single Window (ASW) is a regional initiative that connects and integrates the NSWs of ASEAN members. Indonesia, Malaysia, Singapore, and Thailand are now using the ASW to exchange electronic certificates of origin. Once the Protocol for the Legal Framework to implement the ASW is fully ratified, electronic certificates will be used for assigning preferential tariff rates and further expedite customs clearance of goods between participating ASEAN members.

The Automated System for Customs Data (ASYCUDA) system developed by UNCTAD uses advanced software applications specifically designed for customs administrations and participants in international trade. The applications ensure participants comply with international standards for imports, exports and transit-related procedures.

The new Framework Agreement on the Facilitation of Cross-Border Paperless Trade in Asia and the Pacific is a valuable tool to facilitate cross-border digital trade and better equip economies to implement the WTO Trade Facilitation Agreement (ADB 2017). The World Customs Organization (WCO) has also established a special e-commerce working group to deal with some of these issues. The working group is promoting development of international customs rules for cross-border e-commerce—intended to bring about a standard framework for cross-border e-commerce.

Taxation issues

Numerous bottlenecks to cross-border e-commerce are related to trade facilitation, border-crossing logistics and crime prevention. Against this backdrop, there are several revenue collection/taxation issues unique to cross-border e-commerce transactions. Notably, two taxation issues hampering the growth of cross-border e-commerce are costly tax collection procedures and prevalent noncompliance.

IMPROVING COSTLY TAX COLLECTION PROCEDURES

Costly revenue collection procedures are highlighted by the *de minimis* rule, where exceptions on tax and/or duties collections are given to items valued below a certain threshold. Table 5.2 presents the *de minimis* thresholds for select economies in Asia and the Pacific. It shows some variation in the thresholds.

The *de minimis* rule was established to avoid spending more on tax collection than what is actually collected (WCO News 2015). However, this also causes several problems, including unfair competition from untaxed imports and lower tax collections from abuse of the rule (C. Lim 2018). In some cases, the taxes, including VAT/GST, duties, and other taxes that can be avoided, are both sizable and lead to greater competitive advantage for nontaxpayers. The benefit from not paying taxes rises with applicable tax rates. Accordingly, e-commerce firms that circumvent tax payments can sell at lower prices than local firms that must pay them.

Some economies are already thinking of removing *de minimis* thresholds, but this must be coupled with more efficient collection methods. For example, a 2017 study on EU tax collection found that the EU will lose more

Table 5.2: De Minimis Thresholds—Selected Asian Economies, as of April 2016

Economy	Customs Duty and VAT/GST	
	Local Currency	\$
Australia	AUD 1,000	781
Brunei Darussalam	BND 400	301
China, People's Republic of	Customs Duty: No Customs duty will be collected for import goods that fall into the category of “cross-border e-commerce retail goods” VAT/GST: VAT and GST will be collected on 70% of the value of the goods imported for “cross-border e-commerce retail goods”	
India	INR 1,000	15
Japan	JPY 10,000	93
Korea, Republic of	KRW 162,420	150
Malaysia	MYR 500	127
Philippines	PHP 10,000	192
Singapore	SGD 400	301
Taipei, China	TWD 3,000	103
Thailand	THB 1,000	32

GST = goods and services tax, VAT = value-added tax.

Notes: “Cross-border e-commerce retail goods” should be no more than CNY2,000 per person each time and no more than CNY20,000 per person each year. Foreign exchange rates as of 28 February 2018.

Sources: Organisation for Economic Co-operation and Development (2016); Paolucci (2016); Republic Act No. 10863: An Act Modernizing the Customs and Tariff Administration, Philippines, 27 July 2015; and World Customs Organization (2017).

Figure 5.7: Estimated Effect of Removing *De minimis* in the European Union



Source: ADB based on Næss-Schmidt, Sørensen, and Basalisco (2017).

than it gains should it decide to remove its *de minimis* threshold and collect taxes from all low-value goods. Figure 5.7 shows that removing the threshold will lead to 144 million low-value products flowing into the EU, and potentially earn governments €594 million in revenue. However, this will increase processing costs for both transporters and tax authorities by €2,681 million. These lead to a net welfare reduction of €2,087 million, partly borne by purchasers in the form of higher prices (Næss-Schmidt, Sørensen, and Basalisco 2017).

In the case of the PRC, one report noted that a year after the country overhauled its cross-border e-commerce policies—which included a positive list of items that may be imported—removing its *de minimis* threshold (and removing the tax advantages cross-border e-commerce firms were enjoying), roughly 50%-70% of cross-border e-commerce firms shut down, due to low cash flow and insufficient supply of popular imported goods (Yu 2017). In September 20, 2017, the overhaul was then scaled back, allowing for a transition period to help firms adapt to the policy changes (Ministry of Commerce, PRC 2017).

A notable suggestion for improving tax collection includes using an alternative collection model to the prevalent border collection model. Table 5.3 presents the different tax collection models for cross-border trade. Australia is taxing items below the *de minimis* threshold, and coupling this with a shift in tax collection model. In particular, it will use a hybrid collection model instead of border collection model for items below the threshold. This effectively shifts the bulk of the tax collection efforts and costs from customs to vendors and e-commerce platforms. The border collection model still applies for items above the threshold.

Another suggestion to improve tax collection is to use electronic systems. In the EU, however, Næss-Schmidt et al. (2017) finds that even if the EU implements its

one-stop shop for collecting VAT on e-commerce goods, it will still not be enough to overcome the net tax loss. However, it can greatly lower the EU loss from €2,087 million down to €132 million.

ADDRESSING PREVALENT NONCOMPLIANCE

OECD defines tax compliance as the “degree to which a taxpayer complies (or fails to comply) with the tax rules of his country, for example by declaring income, filing a return, and paying the tax due in a timely manner”. It involves not just tax evasion⁴⁶, but tax avoidance as well⁴⁷, and other incorrect filing and tax payments, whether done intentionally or by accident.

Losses from noncompliance can be significant. In the EU, estimated VAT loss from cross-border B2C e-commerce noncompliance ranges from €2.6 billion to €3.8 billion, with losses thought to be at the higher end. Subsequently, losses to EU members are around from €4 million to €741 million, with Italy and the UK the largest uncollected VAT due to noncompliance on cross-border B2C e-commerce trades (Deloitte for European Commission 2015).

Table 5.4 lists compliance levels, ranging from compliant taxpayers to those committing fraud, and actions tax bodies should undertake to increase the probability of compliance. Different levels of noncompliance are mitigated differently, with actions commensurate to taxpayer behavior, or status within the continuum, so as to efficiently use limited resources available (European Commission DG TAXUD 2010). These involve (i) supporting compliant taxpayers, (ii) assisting taxpayers that want to comply but fail, (iii) monitoring noncompliant taxpayers, and (iv) litigating criminals and tax evaders.

⁴⁶ OECD defines tax evasion as “a term that is difficult to define but which is generally used to mean illegal arrangements where liability to tax is hidden or ignored, i.e. the taxpayer pays less tax than he is legally obligated to pay by hiding income or information from the tax authorities”. See OECD. Glossary of Tax Terms. <http://www.oecd.org/ctp/glossaryoftaxterms.htm>.

⁴⁷ OECD defines tax avoidance as “a term that is difficult to define but which is generally used to describe the arrangement of a taxpayer’s affairs that is intended to reduce his tax liability and that although the arrangement could be strictly legal it is usually in contradiction with the intent of the law it purports to follow.” See OECD. Glossary of Tax Terms. <http://www.oecd.org/ctp/glossaryoftaxterms.htm>.

Table 5.3: Characteristics of VAT/GST Tax Collection Models

Model	Characteristics
Border	<ul style="list-style-type: none"> Customs assesses and collects VAT/GST at the gateway of the importing country on behalf of the tax administration, and release imported items after VAT/GST has been paid.
Purchaser	<ul style="list-style-type: none"> Purchasers self-assess and pay the GST on imports of low value goods Has three types: <ol style="list-style-type: none"> Purchaser pre-registration: The purchaser registers with and obtains an identifier from customs, with which the purchaser would use when shopping online. The voluntary self-assessment and payment that will follow can happen at the check-out process or at the point of importation. Real-time purchaser self-assessment on delivery: Self-assessment and tax payment are made at the time the goods are released. Post-release purchaser self-assessment: The purchaser is required to periodically or annually account for the tax through a reporting mechanism, such as a GST declaration or income tax return.
Vendor	<ul style="list-style-type: none"> Vendors register with the importing country, collect VAT/GST from purchasers at the time of sale, and remits it to the tax authorities of the importing country.
E-commerce platform	<ul style="list-style-type: none"> Transparent e-commerce platforms collect VAT/GST from purchasers, and remit them to the importing country's tax authorities.
Transport	<ul style="list-style-type: none"> Postal operators and express carriers are the ones to collect and remit VAT/GST tax collections to the tax administration. For VAT assessment, set-up can be either customs or transporters. Has two types: <ol style="list-style-type: none"> Model by the 2012 Low Value Parcel Processing Taskforce: Tax assessment is done at the border; and the transporter collects taxes from the purchaser and remits it to the tax authorities. Modernized transporter model by Amazon: Tax assessment is done by the transporter and the tax is collected from vendors.
Financial intermediary	<ul style="list-style-type: none"> Legal responsibility for the collection of GST resides with banks, credit card schemes, and/or other payment providers. GST would be collected through the payments system. GST liability is imposed on the financial intermediary itself, or on the vendor or purchaser, with the intermediary collecting the GST liability from either the supplier or purchaser.

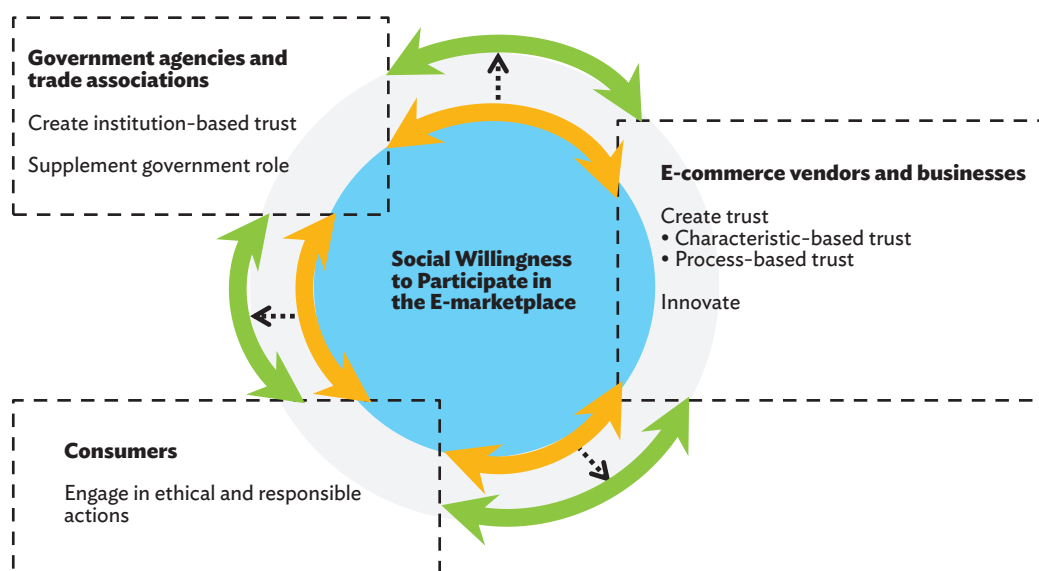
GST = goods and services tax, VAT = value added tax.

Sources: OECD (2015); Productivity Commission, Australian Government (2017).

Table 5.4: Compliance Continuum and Corresponding Actions from Government

Classification	Action	Taxpayer Population
Compliant	Informing	Compliant
Attempts to comply, but fails	Encouraging and assisting	New businesses and triers
Generally noncompliant	Monitoring and warning	Failures and chancers
Commits deliberate fraud	Full force of the law	Avoiders and evaders

Sources: Department of Commerce, Government of Western Australia (n.d); European Commission DG TAXUD (2010).

Figure 5.8: Creating a Virtuous Cycle in E-marketplace Development

Source: ADB compilation based on Albers-Miller (1999), Ang et al. (2001), Levi (1998), and Zucker (1986).

Creating a Virtuous Cycle of E-marketplace Development

This chapter shows that government agencies and trade associations, e-commerce vendors/e-marketplaces, and consumers can act to improve the determinants of e-commerce—especially the legal and institutional, and social acceptance and awareness aspects—which can create a virtuous cycle in e-marketplace development (Figure 5.8).

Government agencies, trade associations, and other related actors can help produce institution-based trust. For this to happen, businesses and consumers must trust the ability and competence of government to perform its trust-producing role. Trade associations can play a supplementary role to regulative institutions.

Businesses can help produce characteristic-based trust and process-based trust. For this to happen, businesses

must offer consumers detailed product descriptions; provide transaction support with a wide range of payment choices; assure efficient, reliable, and timely delivery; and avoid misleading advertisements.

Consumers must be ethical and responsible to strengthen the virtuous cycle of e-commerce development, in which businesses can win consumer trust, while trade associations and government agencies find it easy to create institution-based trust. This involves avoiding buying counterfeit products or contraband items such as illegal drugs and avoiding ordering the same product from multiple online vendors—with an intention to accept only one (e.g., the one delivered first).

For many countries in the region, developing e-commerce is a long and complicated process given the multi-dimensional challenges discussed in this report. There is probably no one-size-fits-all solution to all countries. However, one common underlying principle is that any measure aiming to improve e-commerce requires holistic approach and concerted efforts by stakeholders and major players.

APPENDIXES

Appendix A: Key Methods for Analysis

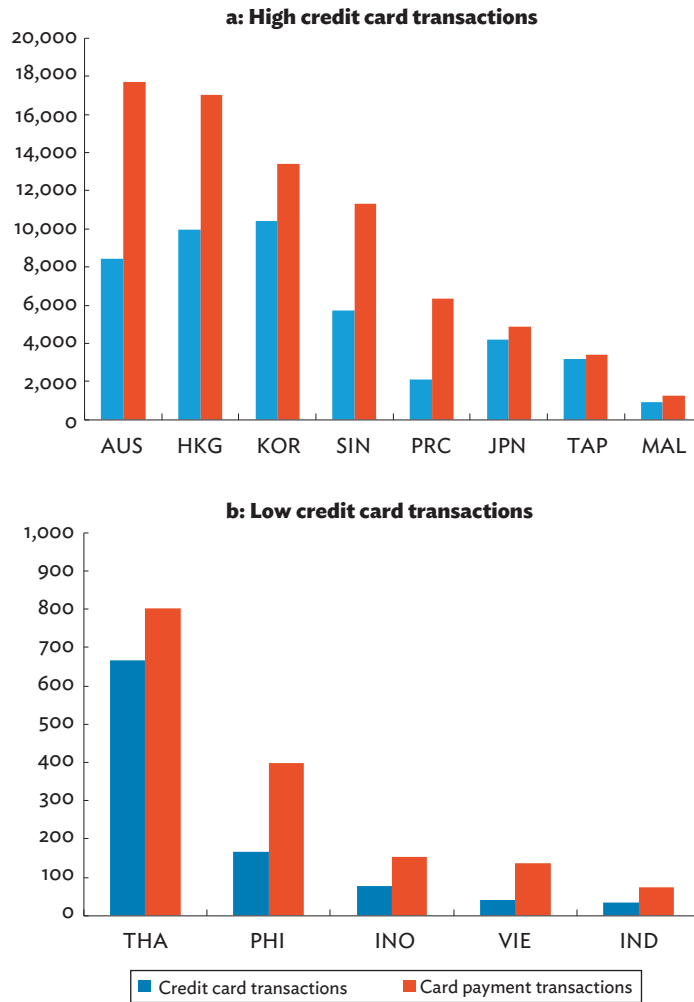
Most of the quantitative data in this report are from various United Nations agencies such as the International Communication Union or ITU (2013, 2016, 2017), the United Nations Conference on Trade and Development or UNCTAD (2015, 2017a), the United Nations Development Program or UNDP (2016), the Universal Postal Union (UPU), and the World Bank (2014). Data on various indicators related to e-commerce and related industries such as Internet retail spending, m-commerce spending, credit and total card payment transactions, and Internet advertising spending were obtained from Euromonitor International, which is a provider of market research and business intelligence covering many industry sectors. It is worth noting that there are some major constraints related to the use of any international quantitative secondary data, including accuracy, age, reliability and comparability (Kotabe 2002). Regarding Euromonitor International as a source of secondary data, academic researchers have noted that despite its reliance on various sources, Euromonitor International addresses the constraints related to international secondary data (Kshetri and Alcantara 2016).

Other sources of data include international consortia such as Anti-Phishing Working Group (APWG 2016 for machines infected by phishing attacks) consulting firms such as KPMG International as well as e-commerce firms such as Rakuten.

The qualitative data for this study mainly involved articles from national and international newspapers and magazines, blogs (from popular media), reports from consulting, and market research companies such as A.T. Kearney (2011, 2015a, 2015b), and policy documents from the international developmental agencies such as the Asian Development Bank (ADB), the Organisation for Economic Co-operation and Development (OECD), the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the UNCTAD, the World Bank, and the World Trade Organization. The sources of evidence were analyzed as well as the evidence by using various criteria such as time elapsed between events and reporting, openness to corrections, range of knowledge and expertise of the person reporting the events, and corroboration from multiple sources (Kshetri 2018).

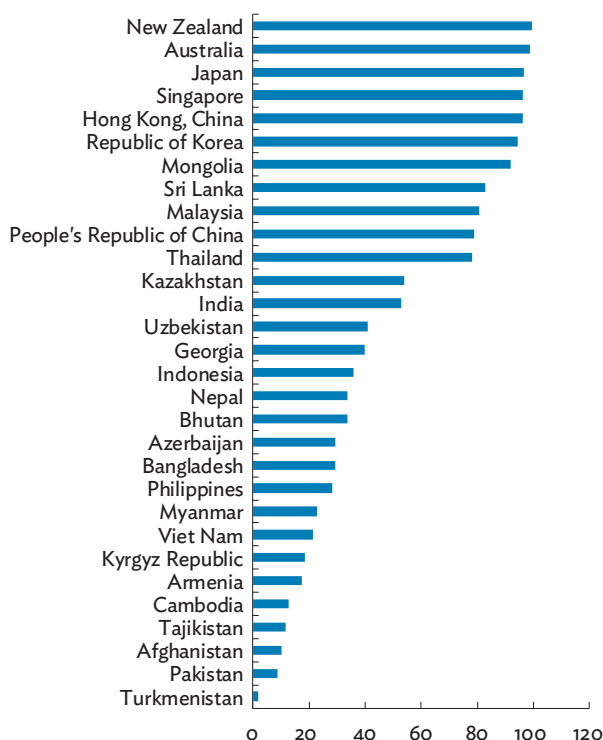
Appendix B: Tables and Charts

Figure B.1: Credit Card Transactions—Selected Asian Economies, 2016 (\$ per capita)

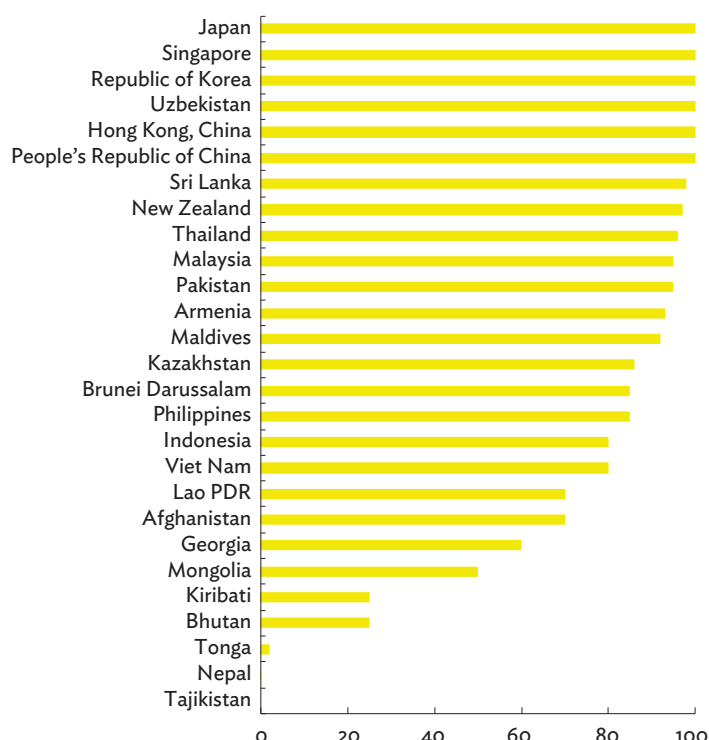


AUS = Australia; HKG = Hong Kong, China; IND = India; INO = Indonesia; JPN = Japan; KOR = Republic of Korea; MAL = Malaysia; PHI = Philippines; PRC = People's Republic of China; TAP = Taipei, China; THA = Thailand; VIE = Viet Nam.

Source: Kshetri (2018) using data from Euromonitor International. Passport database.

Figure B.2: Percentage of Population with Access to Financial Services—Asia and the Pacific, 2016 (%)

Source: World Bank. Global Findex Database. <http://datatopics.worldbank.org/financialinclusion/> (accessed 15 October 2017).

Figure B.3: Percentage of Population with Home Mail Delivery—Asia and the Pacific, 2015 (%)

Lao PDR = Lao People's Democratic Republic.

Source: Universal Postal Union. <http://www.upu.int/en/ressources/statistiques-postales/resultats-2015.html> (accessed 15 October 2017).

Table B.1: Number of Internet Users—Asia and the Pacific, 2016 ('000)

Economy	Number of Internet users	Economy	Number of Internet users
People's Republic of China	731,298	Kyrgyz Republic	2,055
India	381,712	Georgia	1,860
Japan	116,339	Armenia	1,813
Indonesia	66,235	Tajikistan	1,788
Philippines	56,749	Lao People's Democratic Republic	1,478
Viet Nam	43,975	Turkmenistan	978
Thailand	32,714	Mongolia	674
Pakistan	29,975	Republic of Korea	483
Bangladesh	29,734	Fiji	418
Malaysia	24,736	Bhutan	333
Australia	21,291	Timor-Leste	320
Taipei, China	18,734	Brunei Darussalam	317
Uzbekistan	14,178	Maldives	253
Kazakhstan	13,578	Solomon Islands	66
Myanmar	13,260	Vanuatu	65
Azerbaijan	7,590	Samoa	57
Sri Lanka	6,666	Tonga	43
Hong Kong, China	6,414	Federated States of Micronesia	35
Nepal	5,706	Marshall Islands	16
Singapore	4,534	Kiribati	16
New Zealand	4,111	Cook Islands	9
Cambodia	4,031	Tuvalu	5
Afghanistan	3,672		

Sources: International Telecommunication Union. Statistics. <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx> (accessed 15 December 2017) and Kshetri (2018) using data from Euromonitor International. Passport database.

Table B.2: Status of E-commerce Legislation—Asia and the Pacific

	Electronic Transactions	Consumer Protection	Privacy and Data Protection	Cybercrime
Central and West Asia				
Afghanistan	■	✗	✗	✗
Armenia	✓	-	✓	✓
Azerbaijan	✓	-	✓	✓
Georgia	✓	-	✓	✓
Kazakhstan	✓	-	✓	✓
Kyrgyz Republic	✓	-	✓	✓
Pakistan	✓	-	■	✓
Tajikistan	✓	-	✓	✓
Turkmenistan	✓	-	-	✓
Uzbekistan	✓	-	✗	✓
East Asia				
China, People's Republic of	✓	✓	✓	✓
Hong Kong, China	✓	✓	✓	✓
Japan	✓	-	✓	✓
Korea, Republic of	✓	✓	✓	✓
Mongolia	✓	-	-	✓
Taipei, China	✓	✓	✓	✓
South Asia				
Bangladesh	✓	✓	-	✓
Bhutan	✓	✓	✓	✓
India	✓	✗	✓	✓
Maldives	✗	-	✗	✗
Nepal	✓	-	✓	✓
Sri Lanka	✓	-	-	✓
Southeast Asia				
Brunei Darussalam	✓	✓	✗	✓
Cambodia	■	■	✗	■
Indonesia	✓	✓	✓	✓
Lao PDR	✓	■	✗	✗
Malaysia	✓	✓	✓	✓
Myanmar	✓	✓	✗	✓
Philippines	✓	✓	✓	✓
Singapore	✓	✓	✓	✓
Thailand	✓	✓	■ ^a	✓
Viet Nam	✓	✓	✓	✓

Continued on next page

Table B.2 continued

	Electronic Transactions	Consumer Protection	Privacy and Data Protection	Cybercrime
The Pacific				
Cook Islands	–	–	–	✓
Fiji	✓	✓	–	✓
Kiribati	✗	–	✗	✓
Marshall Islands	–	–	–	✗
Micronesia, Federated States of	–	–	–	✗
Nauru	✗	–	✗	✗
Papua New Guinea	■	–	✗	✗
Palau	–	–	–	✗
Samoa	✓	–	✗	✓
Solomon Islands	✗	–	✗	✗
Timor-Leste	–	–	–	✗
Tonga	✓	–	✗	✓
Tuvalu	✗	–	✗	✗
Vanuatu	✓	–	✗	✗
Oceania				
Australia	✓	✓	✓	✓
New Zealand	✓	✓	✓	✓

✓ = legislation exists, ■ = draft legislation, ✗ = no legislation, – = not available, Lao PDR = Lao People's Democratic Republic.

^aIn January 2018, Thailand's Ministry of Digital Economy and Society published the latest draft of the country's Personal Data Protection Bill for public hearing. The public consultation period was from 22 January 2018 to 6 February 2018. <https://www.lawplusltd.com/2018/01/thailands-personal-data-protection-bill-open-public-hearing/>

Sources: Blackmore (2017); Blythe (2011); Consumer Council. Hong Kong Consumer Protection Legislations. https://www.consumer.org.hk/ws_en/legal_protection/hk_consumer_protection_legislations/Index.htm; Hui-ling and Fahey (2017); International Telecommunication Union (2013); Kennedy (2003); infosec. Related Ordinances. <https://www.infosec.gov.hk/english/ordinances/corresponding.html>; luatcanhtranhvabaovenguoitieuung (2011); and United Nations Conference on Trade and Development. Summary of Adoption of E-Commerce Legislation Worldwide. http://unctad.org/en/Pages/DTL/STI_and ICTs/ICT4D-Legislation/eCom-Global-Legislation.aspx (all accessed December 2017).

Table B.3: Principal Findings of Business and Consumer Surveys on Privacy and Security Issues

Survey	Conducted/Released in	Sample	Major findings
Surveys conducted among businesses			
Information Systems Audit and Control Association (ISACA)	2013 IT Risk/Reward Barometer	2,013 Australian and New Zealand IT professionals	• 5% said that their enterprises were “very prepared” to ensure effective governance and privacy. 45% reported “adequately prepared” and 25% “not prepared at all”.
Accenture	2014	Brazil, France, Germany, India, the PRC, the UK, and the US	• 55% PRC and 28% Indian organizations thought that high-profile cybercrime/data breach instances would be “most disruptive” to the company's ability to realize value from collection and analysis of personal data “in the next three years”.
Veritas	February and March 2017	900 business decision makers in Australia, France, Germany, Japan, Singapore, the Republic of Korea, the UK, and the US.	• 56% of respondents in Singapore and over 60% in Japan and the Republic of Korea reported fear that they would not be able to meet the regulatory deadlines for GDPR. ^a

Continued on next page

Table B.3 continued

Survey	Conducted/Released in	Sample	Major findings
Surveys conducted among consumers			
Accenture	2014	Brazil, France, Germany, India, the PRC, the UK, and the US	<ul style="list-style-type: none"> • 55% PRC and 28% Indian consumers were not confident in the security of their personal data.
Management-consulting firm A.T. Kearney	2014	Thailand	<ul style="list-style-type: none"> • 62% of online shoppers reluctant to give credit-card information online.
China Youth Daily	2015	PRC	<ul style="list-style-type: none"> • 75.9% of respondents believed companies abuse their personal information.
KPMG International	2016	Worldwide	<ul style="list-style-type: none"> • 32% in Singapore, 35% in India and 39% in the PRC were “extremely concerned” about how their personal data are handled and used
Rakuten AIP	8-10 May 2017	Japan, Singapore, Thailand, and Viet Nam (Sample size: 300 per country)	<ul style="list-style-type: none"> • Credit card numbers were the most sensitive personal information for the highest proportion of respondents in each country: 89% in Japan, 95% in Singapore, 74% in Thailand, and 87% in Viet Nam. • Less than 20% of Japanese respondents were confident that companies would securely store their information

IT = information technology, PRC = People's Republic of China; UK = United Kingdom, US = United States.

*For non-European Union (EU) companies, relevant only if operating in EU economies or deal with data of citizens from EU members.

Source: ADB compilation based on Cooper and LaSalle (2016), CSO online (2013), KPMG (2016), Rakuten AIP (2017), The Nation (2015), Veritas (2017), and TMTPost (2015).

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Embracing the E-commerce Revolution in Asia and the Pacific

Asia is the world's largest e-commerce marketplace and continues to grow rapidly. Some countries lead. Others need to catch up. An efficient e-commerce marketplace requires information and communication technology infrastructure—including internet access, speed, and affordability—along with logistics, an effective legal and institutional framework, and social acceptance and awareness. This report reviews the opportunities and challenges in developing business-to-consumer e-commerce in the region. It also examines how Fourth Industrial Revolution technologies—blockchains, the internet of things, machine learning, artificial intelligence, and 5G wireless networks, among others—will transform the industry and unlock its dynamic potential. It also offers policy recommendations to help lower barriers to e-commerce development.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

