For more information about the OECD Emerging Markets Network, contact the Secretariat:

dev.emnet@oecd.org

www.oecd.org/dev/oecdemnet.htm
Accelerating Digitalisation in Asia

This Policy Note provides insights from the private sector and policy recommendations for governments on how to unlock investment opportunities from digitalisation in Asia. The analysis builds on discussions which took place at the meeting “Accelerating Digitalisation in Emerging Markets”, organised by the OECD Development Centre’s Emerging Markets Network (EMnet) at the OECD headquarters in Paris on 2 March 2018.

Key messages include:

- Asia is leading the growth of the digital economy among emerging markets worldwide and is generating significant opportunities for businesses.
- Technologies such as the Internet of Things (IoT), big data analytics, machine learning, blockchain, cloud computing and artificial intelligence (AI), are driving the digital transformation. Asian countries can take advantage of transformative digital technologies to enhance productivity and achieve sustainable and inclusive growth.
- Cross-border e-commerce offers the private sector important opportunities to expand business internationally. However, trade and investment agreements will need to be updated to accompany such developments.
- Companies see the shortage of skills as a key barrier to the development of the digital economy. They are encouraging governments to invest in education and engage in partnerships to promote human capital development.
- Infrastructure remains a constraint, although in some Asian countries more than others, and more investment is needed to develop basic information and communications technology (ICT) and digital infrastructure.
- Regulatory problems such as stringent financial licensing agreements, unclear Value Added Tax (VAT) policies and burdensome customs procedures, further limit business expansion.
- Solving issues related to digital payments, digital identity and taxation can accelerate productivity gains.
OECD DEVELOPMENT CENTRE

The Organisation for Economic Co-operation and Development (OECD) Development Centre was established in 1962 and comprises 27 OECD member countries and 27 non-OECD countries. The European Union also takes part in the work of the Centre.

The Development Centre occupies a unique place within the OECD and in the international community. It provides a platform where developing and emerging economies interact on an equal footing with OECD members. It promotes knowledge sharing and peer learning on sustainable and inclusive development. The Centre combines multidisciplinary analysis with policy dialogue activities to help governments formulate innovative policy solutions to the global challenges of development. Thus, the Centre plays a key role in the OECD’s engagement efforts with non-member countries.

To increase the impact and legitimacy of its work, the Centre adopts an inclusive approach and engages with a variety of governmental and non-governmental stakeholders. It works closely with experts and institutions from its member countries. It has established partnerships with key international and regional organisations, and hosts networks of private sector enterprises, think tanks and foundations working for development. The results of its work are discussed at expert sessions as well as in policy dialogues and high-level meetings, and are published in a range of high-quality publications and papers for the research and policy communities. For an overview of the Centre’s activities, please see www.oecd.org/dev.

OECD EMERGING MARKETS NETWORK

The Emerging Markets Network (EMnet) is an OECD-sponsored initiative dedicated to the private sector. Managed by the OECD Development Centre, the Network promotes dialogue and analysis on emerging economies and examines their impact on global economic, social and environmental issues.

EMnet brings together private sector executives (CEOs, CFOs, chief economists and heads of strategy), high-level policy makers (government ministers and heads of state) and OECD experts to debate issues. EMnet events are closed to the public and media and operate under the Chatham House Rule to encourage open and dynamic discussions on doing business in Africa, Asia and Latin America.

To learn more about EMnet, please see http://www.oecd.org/dev/oecdemnet.htm.
ACKNOWLEDGEMENTS

This Policy Note was written under the guidance of Lorenzo Pavone, Deputy Head of the Networks, Partnerships and Gender Division, and Miguel Castro, EMnet Co-ordinator (OECD Development Centre). The report was prepared by Robbert van Eerd, Policy Analyst, and Jialu Ma, EMnet trainee, of the OECD Development Centre’s Emerging Markets Network. The first chapter of the report was prepared by José Almeida Araújo, MBA student at the INSEAD business school, under the guidance of Robbert van Eerd.

The analysis in this Policy Note is based on discussions held at the EMnet meeting on 2 March 2018 at the OECD headquarters in Paris, as well as at bilateral discussions with EMnet members and contacts, and desk research.

Insights from Kensuke Tanaka, Head of the Asia Desk, and Prasiwi Ibrahim, Economist at the OECD Development Centre Asia Desk, helped to refine this note. The report also availed of comments from Microsoft that further sharpened the analysis.

Finally, special thanks go to Thibault Vasse, Hae Kyeung Chun, Jaya Jain, Grace Dunphy and Sonja Märki (OECD Development Centre) for their valuable assistance throughout the drafting and publishing process. The team is also grateful to the OECD Development Centre’s Communications and Publications Unit, especially Elizabeth Nash and Irit Perry.

The opinions expressed and arguments employed here are the sole responsibility of the authors and do not necessarily reflect the official views of the member countries of the OECD or its Development Centre, or of EMnet members.

© OECD 2019

This document, as well as any data and maps included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.
### ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D printing</td>
<td>Three-dimensional printing</td>
</tr>
<tr>
<td>AANZFTA</td>
<td>ASEAN-Australia-New Zealand Free Trade Agreement</td>
</tr>
<tr>
<td>AI</td>
<td>Artificial intelligence</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>B2B</td>
<td>Business-to-business</td>
</tr>
<tr>
<td>B2C</td>
<td>Business-to-consumer</td>
</tr>
<tr>
<td>BRI</td>
<td>Belt and Road Initiative</td>
</tr>
<tr>
<td>BPO</td>
<td>Business process outsourcing</td>
</tr>
<tr>
<td>CLM</td>
<td>Cambodia, Lao PDR and Myanmar</td>
</tr>
<tr>
<td>CPTPP</td>
<td>Comprehensive and Progressive Agreement for Trans-Pacific Partnership</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise resource planning</td>
</tr>
<tr>
<td>eWTP</td>
<td>Electronic World Trade Platform</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign direct investment</td>
</tr>
<tr>
<td>FTA</td>
<td>Free trade agreement</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>GSMA</td>
<td>Global System for Mobile Communications Association, an industry trade body</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and communications technology</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IoT</td>
<td>Internet of Things</td>
</tr>
<tr>
<td>IPv4</td>
<td>Internet Protocol version 4</td>
</tr>
<tr>
<td>ITeS</td>
<td>Information technology-enabled services</td>
</tr>
<tr>
<td>ITM</td>
<td>Industry Transformation Map</td>
</tr>
<tr>
<td>ITU</td>
<td>International Telecommunication Union</td>
</tr>
<tr>
<td>KYC</td>
<td>Know your customer</td>
</tr>
<tr>
<td>M&amp;A</td>
<td>Merger and acquisition</td>
</tr>
<tr>
<td>MFN</td>
<td>Most-favoured nation</td>
</tr>
<tr>
<td>MOOC</td>
<td>Massive open online courses</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PBC</td>
<td>People’s Bank of China</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>RCEP</strong></td>
<td>Regional Comprehensive Economic Partnership</td>
</tr>
<tr>
<td><strong>R&amp;D</strong></td>
<td>Research and development</td>
</tr>
<tr>
<td><strong>TeSA</strong></td>
<td>TechSkills Accelerator</td>
</tr>
<tr>
<td><strong>TDGA</strong></td>
<td>Thailand Digital Government Academy</td>
</tr>
<tr>
<td><strong>TFP</strong></td>
<td>Total factor productivity</td>
</tr>
<tr>
<td><strong>TPP</strong></td>
<td>Trans-Pacific Partnership (defunct)</td>
</tr>
<tr>
<td><strong>UIDAI</strong></td>
<td>Unique Identification Authority of India</td>
</tr>
<tr>
<td><strong>UNCTAD</strong></td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td><strong>VAT</strong></td>
<td>Value Added Tax</td>
</tr>
<tr>
<td><strong>WTO</strong></td>
<td>World Trade Organization</td>
</tr>
</tbody>
</table>
Table of contents

**Asia's economic and business overview** ................................................................. 7
  The economic outlook for Asia remains strong .................................................. 7
  Emerging Asia has regained its position as the world’s largest recipient of FDI ... 8
  Progress on free trade agreements is promising for regional integration .......... 8
  Further regulatory reforms can improve the mobility of labour and skills ............ 11

**Impact of digitalisation on businesses in emerging markets** .......................... 12
  Drivers of digitalisation ...................................................................................... 12
  Challenges arising from the development of digitalisation .............................. 13
  Digitalisation in Emerging Asia ....................................................................... 14
  Regional common challenges in Emerging Asia ............................................... 16

**Business insights on digitalisation: common challenges and evolving opportunities** 18
  Digital technologies can spur productivity growth and innovation ............... 18
  Digital infrastructure is a key enabler of connectivity ...................................... 26
  Digitalisation places a great demand on human capital development ............ 28
  Regulatory reforms should keep pace with accelerating digital growth ......... 29

**Conclusion** ........................................................................................................ 34
ASIA’S ECONOMIC AND BUSINESS OVERVIEW

The economic outlook for Asia remains strong

Growth in Emerging Asian economies is predicted to remain robust. Gross domestic product (GDP) in Emerging Asia is expected to grow by an average of 6.1% annually over the period 2019-23, according to the OECD Economic Outlook for Southeast Asia, China and India 2019 (Table 1). It is estimated that the ten ASEAN member states will achieve an average economic growth rate of 5.2% from 2019 to 2023, led by Viet Nam and the Philippines. In the Philippines, growth is largely propelled by remittance-based private consumption. Viet Nam has also recorded robust private consumption and has further benefited from an increase in foreign direct investment (FDI) and strong export performance. Within the entire ASEAN bloc, the CLM countries (Cambodia, Lao PDR and Myanmar) are expected to grow the fastest for 2019-23, with annual growth averaging 6.9%, 7.0% and 7.0%, respectively (OECD, 2018a).

Table 1. Real GDP growth in Southeast Asia, China and India

<table>
<thead>
<tr>
<th>Country</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2019-23 (average)</th>
<th>2012-16 (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEAN-5 countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>5.1</td>
<td>5.2</td>
<td>5.2</td>
<td>5.3</td>
<td>5.3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>5.9</td>
<td>4.9</td>
<td>4.8</td>
<td>4.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Philippines</td>
<td>6.7</td>
<td>6.4</td>
<td>6.5</td>
<td>6.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Thailand</td>
<td>3.9</td>
<td>4.5</td>
<td>4.1</td>
<td>3.7</td>
<td>3.4</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>6.8</td>
<td>6.9</td>
<td>6.7</td>
<td>6.5</td>
<td>5.9</td>
</tr>
<tr>
<td>Brunei Darussalam and Singapore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>1.3</td>
<td>2.0</td>
<td>2.3</td>
<td>2.0</td>
<td>-1.3</td>
</tr>
<tr>
<td>Singapore</td>
<td>3.6</td>
<td>3.5</td>
<td>2.9</td>
<td>2.7</td>
<td>3.5</td>
</tr>
<tr>
<td>CLM countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td>7.0</td>
<td>7.0</td>
<td>6.9</td>
<td>6.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>6.9</td>
<td>6.6</td>
<td>6.8</td>
<td>7.0</td>
<td>7.6</td>
</tr>
<tr>
<td>Myanmar</td>
<td>6.8</td>
<td>6.6</td>
<td>6.9</td>
<td>7.0</td>
<td>7.3</td>
</tr>
<tr>
<td>China and India</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>6.9</td>
<td>6.6</td>
<td>6.3</td>
<td>5.9</td>
<td>7.3</td>
</tr>
<tr>
<td>India</td>
<td>6.7</td>
<td>7.5</td>
<td>7.3</td>
<td>7.3</td>
<td>6.9</td>
</tr>
<tr>
<td>Average of ASEAN-10²</td>
<td>5.3</td>
<td>5.3</td>
<td>5.2</td>
<td>5.2</td>
<td>5.1</td>
</tr>
<tr>
<td>Average of Emerging Asia</td>
<td>6.5</td>
<td>6.6</td>
<td>6.3</td>
<td>6.1</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Emerging Asia has regained its position as the world’s largest recipient of FDI

Amid a decline in worldwide FDI of approximately 24% from 2016 to 2017, Developing Asia increased its share of global FDI inflows from 25% to 33% during the same period (UNCTAD, 2018). The largest inflows in 2017 were to China (USD 136 billion), which remains the world’s second largest recipient after the United States. Indonesia, on the other hand, climbed the rankings to become the 16th largest recipient of FDI in 2017, up 475% from USD 4 billion in 2016 to USD 23 billion in 2017 (UNCTAD, 2018). The attractiveness of the region as a whole is expected to remain high. In China, inflows are expected to experience continued growth, as the government enacts reforms to loosen restrictions on foreign ownership of domestic assets across several industries, including automotive and finance (UNCTAD, 2018).

Asia remains a major source of global FDI, although total outflows have declined

Despite a 9% decline in FDI outflows, from USD 385 billion in 2016 to USD 350 billion in 2017, Emerging Asia still accounted for almost 25% of global outflows in 2017. The region has remained close to this level since 2011. China is largely responsible for the decrease. With its Belt and Road Initiative (BRI), China aims to build connectivity and co-operation across key economic corridors along the ancient Silk Road and beyond, through investments in infrastructure (OECD, 2018b). Despite its cross-border investment ambitions via the BRI, Chinese outward FDI dropped for the first time since 2003, down 36% from USD 196 billion in 2016 to USD 125 billion in 2017 (UNCTAD, 2018). The drop reflects a more selective attitude in the promotion of outward FDI in China. In November 2016, for instance, the People’s Bank of China (PBC) released new rules under the heading “Further Clarifications on Overseas RMB Loans by Domestic Enterprises,” aimed at reducing outward FDI (Sheng et al, 2016). Conversely, Indian outward FDI in 2017 more than doubled to USD 11 billion, led mainly by the merger and acquisition (M&A) activities of ONGC, India’s state-owned oil and gas company.

Intraregional investment is on the rise as multinationals develop regional value chains

A potential source of strong and sustained capital flows in Emerging Asia is intraregional FDI, where Asian countries are investing in their neighbouring Asian economies. In absolute terms, intraregional FDI increased by 9%, from USD 250 billion in 2015 to USD 272 billion in 2016. It also increased as a share of total FDI inflows into the region, from 48% in 2015 to 55% in 2016 (ADB, 2017). Asian investors are increasingly looking to diversify their regional portfolios, and multinational enterprises (MNEs) from countries such as China, Korea and Singapore are playing a larger role than before. In particular, manufacturers are increasingly looking to gain a competitive advantage in targeted export markets by developing regional value chains. For instance, both Samsung and LG have invested heavily in building manufacturing and assembly plants for their products in Viet Nam since 2014 (UNCTAD, 2018).

Progress on free trade agreements is promising for regional integration

ASEAN is the world’s fourth-largest exporting region, accounting for just 3.3% of global GDP, but producing more than 7.0% of global exports, due to its integration into global value chains (OECD, 2018c). The ASEAN trade block is quite open, not just within the member group, but also
with non-member countries, which are often offered preferential tariffs on a most-favoured-nation (MFN) basis (OECD, 2018c). Among the ASEAN-6, more than 99% of items in the inclusion list have tariffs of 0% (OECD, 2018d). For the Cambodia, Lao PDR, Malaysia and Viet Nam (CLMV countries), approximately 90% of goods had zero import tariffs in 2016, and this was expected to have reached 97.5% by the end of 2018 (Figure 1). Furthermore, the Regional Comprehensive Economic Partnership (RCEP) under negotiation is expected to further harmonise the complex web of rules that govern dispute settlement, competition and intellectual property rights, all of which render regional trade costlier. The agreement is to include all ten ASEAN nations and six other Asian-Pacific countries with which ASEAN has existing free trade agreements (FTAs): Australia, China, India, Japan, Korea, and New Zealand (OECD, 2018d). Furthermore, in March 2018, 11 Asia-Pacific countries signed the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), replacing the Trans-Pacific Partnership or TPP after the United States’ withdrawal. The CPTPP integrates the region into one of the world’s largest free trade zones and includes chapters on liberalising trade in services (Constantinescu et al., 2018). “The e-commerce chapter has broad protections for data created through digital trade and protects the free flow of information across borders, while the government procurement chapter would open government contracts to foreign bidders” (Goodman, 2018).
Although regional integration has provided reasons for optimism, geopolitical tensions risk pushing Emerging Asia into a retreat from further integration and towards more inward-looking policies (IMF, 2018). Most significantly, 2018 saw a deterioration in the trading relationship between the United States and China. Such conflicts risk inflicting potential collateral damage on other economies across Emerging Asia, particularly those, such as Viet Nam and Malaysia, that are highly involved in global value chains and particularly integrated into China’s supply chains (Strauss and Romei, 2018). Conflicts can, however, also offer opportunities. For example, shortly after solar panel tariffs were imposed, Chinese manufacturers quickly moved production to Malaysia, the Philippines and Viet Nam. Similarly, some of the largest regional exporters, after China, of electrical machinery, furniture and lighting, toys and sports equipment to the United States are well positioned to benefit from the trade conflict (Strauss and Romei, 2018).

Non-tariff barriers remain prevalent across Asia

Despite progress on tariff reduction, the World Trade Organization (WTO) reports that the use of non-tariff barriers is becoming increasingly prevalent, and this includes Asian countries. Barriers include sanitary and phytosanitary rules, anti-dumping duties, quantitative restrictions, technical barriers and pre-shipment inspections, among other non-tariff measures (WTO, 2018). Although traditional tariffs have been slashed across the region for ASEAN members and non-member countries alike, non-tariff barriers have risen substantially (ADB, 2017). The cumulative number of measures in effect in Asia has increased from approximately 3 000 in the year 2000 to approximately 10 000 in 2017 (ADB, 2017). Non-tariff barriers increase the cost of trade across the region, hindering the development of global and regional value chains (OECD, 2018d). Furthermore, progress has been slower with respect to regional integration on trade in services. Although protocols covering intellectual property rights were established in the ASEAN Framework Agreement on Services, co-operation currently exists on a “best endeavours” basis only (Constantinescu et al., 2018). In effect, a lack of standardised norms on the protection of intellectual property rights acts as a de facto non-tariff barrier. Optimism nevertheless remains that tangible region-wide progress can be made via the implementation of RCEP (OECD, 2018d). This can become even more pertinent as Emerging Asia strives to establish a fair and competitive regulatory environment for its booming e-commerce activities. These activities are underpinned by

![Figure 1. The percentage of items without any tariffs in 2016 and 2018](https://doi.org/10.1787/9789264286184-en)
software, networks and other support systems and have the potential to transform regional economies, increase productivity and boost GDP (OECD, 2018c).

**Further regulatory reforms can improve the mobility of labour and skills**

In an era of digitalisation, technological innovation in industries such as agriculture, manufacturing and information and communications technology (ICT) can create new job opportunities. Moreover, new technologies have vast potential to provide more effective and efficient roll-out of public services, including healthcare, transportation infrastructure and education (ADB, 2018). Nonetheless, these trends can place low-skilled workers across Emerging Asia at risk of redundancy. A recent study suggests that approximately 14% of jobs across 32 industrial economies, equivalent to 66 million workers, are classified as “highly automatable” (Nedelkoska and Quintini, 2018). Furthermore, another 32% of jobs have a 50-70% risk rate of being significantly changed as a result of automation (Nedelkoska and Quintini, 2018). Regulatory reforms are needed to implement policies that improve the mobility of labour and skills in order to reap the benefits of new technologies. Furthermore, social safety nets in the region could be strengthened in order to protect those who face temporary displacement (ADB, 2018).

In terms, more specifically, of skills development, incentives can be put in place to strengthen digital literacy across the region. The Business and Sustainable Development Commission, a commission created to make a powerful case for why business leaders should work towards achieving the SDGs, expects approximately 230 million jobs to be created in Asia by 2030, yet some workers will simply not have the skills required for them. Consequently, schools and other educational institutions must cater for a rising number, not only of students, but also of adults seeking to upskill or reskill (ADB, 2018). For China in particular, rapidly rising wages are causing firms to embrace automation, with the country accounting for 30% of global robot purchases in 2016 (ADB, 2018). However, China faces demographic headwinds that are expected to dampen growth (IMF, 2017). China, Thailand, Viet Nam and Malaysia are all experiencing slow demographic growth and a declining working age (15-64 years) population (IMF, 2017). Across the region, the share of the population that is 65 years or older is expected to more than double by 2050 (IMF, 2017). On the contrary, India, Indonesia and the Philippines have some of the youngest populations in the region, and are poised to reap a demographic dividend. This has implications for digital literacy, and thus productivity, in these countries, as more advanced ICT skills are often best developed through exposure at a young age (OECD, 2018d).
IMPACT OF DIGITALISATION ON BUSINESSES IN EMERGING MARKETS

Digitalisation contributes significantly to economic growth in global and emerging markets. Research shows that each additional 10 percentage points of Internet penetration adds 0.77 percentage points to per capita GDP growth in developed countries and 1.12 percentage points in emerging markets (Zhen-Wei Qiang et al., 2009). Furthermore, each additional 10 percentage points of broadband penetration contributes 1.21 percentage points of per capita GDP growth in developed countries and 1.38 percentage points in emerging markets (Zhen-Wei Qiang et al., 2009).

Digitalisation is expanding rapidly in emerging markets, but with disparities. Emerging markets account for almost 90% of the total growth in mobile broadband subscriptions over the past five years (IEA, 2017). However, the development of the digital economy varies across regions. Among Asian countries, the rate of Internet use is around 80% in Singapore, Malaysia and Brunei Darussalam, but closer to 20% in Lao PDR, Myanmar, Indonesia and Cambodia (OECD, 2018d). The size of India’s e-commerce market is just 10% that of China (ITU, 2017). Africa, on average, has the world’s lowest mobile phone penetration, at 73%, by comparison with 98% in high-income countries.

Drivers of digitalisation

The rapid development of digital technologies and their impact on an economy and a society can be explained by a number of different factors. A closer look at the priorities for national digital strategies shows that the development of broadband infrastructure, the availability of qualified skills, the use of digital technologies in various business activities and the enhancement of public sector services can be identified as key drivers of digitalisation (OECD, 2017a).

Development of broadband infrastructure

Emerging markets are improving their broadband infrastructure to support digitalisation. In Malaysia, the Telekom High-speed Broadband project increased broadband penetration from 22% to 66% in less than four years (World Economic Forum, 2013). In China, a total of 90 000 kilometres of high-speed fibre-optic trunk cables are to be installed These were expected to expand broadband network coverage to all urban areas and to 90% of the countryside by 2018 (Xinhua, 2017). In Africa, the Main One cable system was the first submarine cable to connect West Africa with Europe, bringing open-access broadband capacity to multiple African countries (Purefoy and Kermeliotis, 2012). Meanwhile, the South Atlantic Undersea Cable was expected to have connected Brazilian coast with Angola and Africa by the end of 2018 (Angola Cables, 2018).

Availability of qualified skills

Many emerging markets are putting more effort into developing ICT skills and literacy to support digitalisation. Malaysia, for example, has launched the programme My Digital Maker to teach coding as part of the national school curriculum. The Thailand Digital Government Academy
(TDGA) was established to promote the development of digital knowledge of government authorities and public officials in that country. Latin American countries such as Chile, Colombia and Peru have also established programmes to connect schools, build digital literacy, and improve digital skills (Boston Consulting Group, 2012).

**Use of digital technologies in business**

In OECD countries, it has been estimated that three-quarters of businesses have an online presence and almost as many engage in e-commerce (OECD, 2017b). However, while 75% of consumers across OECD countries have accessed the Internet, only one out of two has made an online purchase (OECD, 2016a). In emerging markets, the penetration of e-commerce is increasing fast. Around 50% of the online population was expected to engage in e-commerce by 2018 (World Economic Forum, 2014). Particularly relevant for emerging markets is the widespread use of digital finance, including mobile wallets, online payments and digital savings accounts. Studies show that this sector could boost the annual GDP of all emerging markets by USD 3.7 trillion by 2025 (McKinsey, 2016a).

In Asia, China leads the sector’s growth, with a developed market of third-party payments, deep penetration of digital wealth management products and various innovations in financing methods, such as supply chain financing, consumer financing and peer-to-peer lending (McKinsey, 2016b). Cross-border remittance models have also gained popularity, for example in East and West Africa. Thus, Orange operates an international money transfer service that links Côte d’Ivoire, Mali and Senegal (GSMA, 2016a). Furthermore, the dLocal platform is enabling cross-border e-commerce transactions across Brazil, Mexico and much of Latin America (dLocal, 2018).

**Digital government services**

The development of digitalisation in emerging markets can be encouraged by its application to government services. According to a recent survey on e-government led by the United Nations, emerging economies such as China, South Africa and many Latin American countries show a high level of e-government development (UN, 2016). Meanwhile, more countries are raising their e-government standards. Thailand, for example, has introduced e-Government Portal to serve as a central information hub that facilitates people accessing public services provided by different government agencies (Bhunia, 2018). India has also launched several e-Governance initiatives, such as e-Filing for income tax (Government of India, n.d. a) and e-Procurement systems (Government of India, n.d. b).

**Challenges arising from the development of digitalisation**

Digitalisation is transforming the way the private sector conducts business in OECD countries, as well as emerging economies. However, a number of challenges exist that can hinder its development and limit the benefits for businesses and society.

Recent OECD analysis highlighted four key policy challenges related to the digitalisation of industrial production: access to ICT infrastructure; barriers to interoperability; issues of liability, transparency and ownership; and digital security and privacy (OECD, 2017b). Many businesses still lag behind in adopting advanced ICTs, such as cloud computing and ERP (enterprise resource
planning), due to proprietary issues and data security concerns (OECD, 2017b). In 2016, only 20% of businesses had adopted cloud computing, and fewer than 10% had adopted big data analytics (OECD, 2017a). Lack of interoperability and regulatory barriers in mobile communications markets can impede the development of the Internet of Things (IoT) (OECD, 2017a). Poor data quality, disruptive factors in the environment, misuse of data and security breaches are major digital issues impeding the development of digitalisation (OECD, 2017a). Digital risk and lack of trust can also prevent businesses and consumers from adopting digital technologies and applications.

Some policy initiatives can help overcome these challenges. Close co-operation between the private and public sectors is recommended as a means to close the digital divide in emerging markets. In Malaysia, the government co-operated with Alibaba to launch the first Digital Free Trade Zone, which promoted digital capabilities and encouraged cross-border e-commerce (MDEC, 2017). Digital infrastructure can also be used to enhance local public services. Under the national strategy Digital New Silk Road, China is incorporating digital sectors into international trade routes. It has directed effort into the development of “smart cities” through innovative services for citizens, such as barcodes for accessing city information and facial recognition software for bus fare collection (Brown, 2017).

Digitalisation in Emerging Asia

Growth in Emerging Asian economies is expected to remain robust. In this positive context, the development of digitalisation can further facilitate business activities, promote international trade and boost productivity in the manufacturing and service industries.

Business activities

In the manufacturing industry, digital technologies provide new solutions for production, communication, supply chain management and customer relationship management. In the service sector, ICT has made services more storable, transportable and tradeable. In Viet Nam and China, for example, more than 80% of manufacturing and service firms use e-mail to communicate with clients and suppliers (OECD, 2018d).

Trade

ICT products have been among the most dynamic components of trade in Emerging Asia. In most of the region, especially India, Brunei Darussalam and Indonesia, there was a noticeable growth in computer and telecommunications services embodied in manufacturing exports between 2000 and 2011. Emerging Asia is relatively important as a source of foreign inputs that feed into constituent countries’ own exports (see Figure 2); higher regional integration could further enhance the potential of trade.
Productivity

Digital technologies are a key factor in enhancing business productivity by improving flexibility, transparency and market competition, while reducing the costs of production and inventory management. It has been calculated that firms with ICT use had, on average, 197% of the total factor productivity (TFP) level of other businesses in Viet Nam, 153% in Indonesia, 139% in Myanmar, and 139% in China (see Figure 3). TFP can be considered a measure of technology growth and efficiency, or of the productivity growth that cannot be explained by capital or labour.

Regional common challenges in Emerging Asia

Many countries in Emerging Asia have achieved significant growth in digitalisation. China is outpacing other countries in the region through massive investments in 4G infrastructure, competitive mobile handset marketplaces, numerous popular mobile services (e.g. WeChat, Sina Weibo and Taobao) and leading technologies in artificial intelligence (AI) (Chakravorti and Chaturvedi, 2017). In Viet Nam, information technology-enabled services (ITeS) such as software services and business process outsourcing (BPO) are growing. In the Philippines, knowledge process offshoring, a movement from BPO into higher value-added activities based on research and information gathering, is becoming more common (OECD, 2018d).

However, the level of digitalisation varies across the region. In Indonesia, problems such as a lack of quality ICT infrastructure, high Internet prices and a shortage of skilled workers are limiting the benefits of digitalisation. In the Philippines, slow Internet broadband speed and challenges in online payments that affect the development of the e-commerce sector are having a similar effect. Thailand needs to improve infrastructure and ICT skills to catch up with its neighbours in terms of business competitiveness. In Viet Nam, the growth of the e-commerce sector has been slowed down by security concerns. Cambodia, Lao PDR and Myanmar still need to develop their basic ICT and digital infrastructures. Despite disparities in access to digital technologies, some regional common challenges can be identified (OECD, 2018d).
Policy restrictions on investment and trade pose challenges to digitalisation

Restrictions on FDI and trade in goods and services remain relatively high in Emerging Asia. In Malaysia, the Philippines, Viet Nam and China, restrictions on FDI in the communications sector are more stringent than the overall national averages across all sectors. In China, India and Indonesia, telecommunications and computer services face greater trade restrictions than the OECD average, according to the OECD Services Trade Restrictiveness Index. Countries also face regulatory challenges relating to the protection of intellectual property rights on traded digital goods and services (OECD, 2018e).

Underdeveloped infrastructure constrains the development of the digital economy

Relative to population, India, Indonesia, Cambodia, Lao PDR and Myanmar have fewer secure Internet servers than Singapore and other Emerging Asian countries, less high-speed broadband Internet (with the exception of Indonesia), and relatively high Internet prices (together with the Philippines). High-speed connections are particularly rare in India and the Philippines. Furthermore, the price of fixed broadband exceeds the affordability threshold of 5% of gross net income in several countries, including in India, the Philippines, Indonesia, Lao PDR, Cambodia and Myanmar (OECD, 2018d).

Shortage of skilled workers and digital literacy can limit the progress of digitalisation

According to a survey from the National Statistical Office of Thailand, lack of knowledge is the principal reason limiting the use of Internet by the population. In Indonesia, a country that aims to become the largest digital economy in Southeast Asia, the availability of qualified skills remains a serious issue for the ICT sector, mainly because of low tertiary education enrolment rates (OECD, 2018d).
BUSINESS INSIGHTS ON DIGITALISATION: COMMON CHALLENGES AND EVOLVING OPPORTUNITIES

Emerging Asia is leading the growth of the digital economy in emerging markets worldwide. Growing connectivity and a rapid expansion of digital technologies such as e-commerce, digital financial services and e-governance have opened up numerous opportunities for businesses in the region, while public authorities can further improve the business environment through trade agreements, investment policies and regulatory frameworks.

This section features insights from representatives of the private sector who participated in the EMnet Asia meeting held in Paris on 2 March 2018. It explores business opportunities and challenges associated with digitalisation in the region, and provides policy recommendations to unlock more private investment.

Digital technologies can spur productivity growth and innovation

Businesses agree that digital innovation is expected to transform the global economy at large, but also the way the private sector operates. New technologies are transforming business operations and are pushing manufacturers towards the next production revolution, which will have a significant impact on productivity, skills, income distribution, well-being and the environment (OECD, 2017b). IoT, big data analytics, AI and blockchain (see Box 1 for definitions) are key components of this transformation (OECD, 2017a).

---

**Box 1: Terminology for digitalisation**

- **The next production revolution** refers to the use of recent, and often interconnected, digital technologies in industrial production that enable new and more efficient processes and which, in some cases, yield new goods and services (OECD, 2017b).

- **The Internet of Things (IoT)** comprises devices and objects whose state can be altered via the Internet, with or without the active involvement of individuals. It includes objects and sensors that gather data and exchange these with one another and with humans (OECD, 2017b).

- **Big data analytics** is a set of techniques and tools used to process and interpret large volumes of data that are generated by the increasing digitalisation of content, greater monitoring of human activities and the spread of the IoT (OECD, 2017b).

- **Artificial intelligence (AI)** is a technology that enables machines to perform human-like cognitive functions (OECD, 2017b).

- **Blockchain** is a decentralised and disintermediated technology that facilitates economic transactions and peer-to-peer interactions (OECD, 2017b).

- **Cloud computing** is a centralised provision of IT infrastructure and software to end users over a network (OECD, 2014). It is also a key underlying technology supporting the advance of the Fourth Industrial Revolution (IBM, 2018). One of the primary benefits of the modern public cloud – especially for companies in emerging markets – is the democratisation of IT effect, where small and start-up companies can benefit from accessing the same IT infrastructure that was previously only accessible to the largest multinationals with capacity to invest in large physical plants (Assante et al., 2016).
The OECD has calculated that the adoption of the Internet of Things can reduce production costs by more than 25% (OECD, 2017a). Moreover, a study by Microsoft and IDC Asia/Pacific predicts that the digital transformation could contribute more than USD 1 trillion to the GDP of the Asia-Pacific region by 2021 (Jimenez, D. Z. et al., 2018). The same study indicates that 60% of Asia-Pacific’s GDP will be derived from digital products by 2021 (Jimenez, D. Z. et al., 2018).

In the long term, three-dimensional (3D) printing, machine learning and enhanced connectivity are expected to have an even bigger impact, as they can further elevate business performance across functions (IEA, 2017). It has been estimated that digitalisation in inventory management, through 3D printing, deep learning and real-time supply chain optimisation, could decrease the cost of inventory holdings by 20-50%, while data analytics could increase forecasting accuracy by up to 85% in matching supply with demand (McKinsey, 2016c).

Finally, digitalisation can enable companies to optimise customer services towards immediacy, personalisation and convenience. E-government services present great potential for the public sector to improve the quality and efficiency of service delivery to businesses and individuals. Governments can take advantage of digital technologies to enhance the efficiency of administration and prevent tax fraud and corruption (OECD, 2016b). In the agriculture sector, agricultural training made available online can enhance the productivity of small farms in emerging markets (FAO, 2012). In India, for example, the government’s launch of the Digital Green project in several states, providing training videos and learning sessions online with the aim of improving agricultural practices, has reached 110 000 farmers in more than 1 100 villages (FAO, 2012). In addition, social benefits can be delivered directly to the bank accounts of citizens by way of digital platforms, as a means of enhancing efficiency and transparency (OECD, 2016b).

Asia is at the forefront of digitalisation

EMnet meeting participants highlighted the important progress made by the region in adopting digital technologies. Asia is home to many top AI technology companies. Research and development (R&D) corporations headquartered in Japan, Korea, Chinese Taipei and China have together contributed to about 70% of all AI-related patents obtained by the world’s 2 000 top corporate R&D investors and their affiliates, while US-based companies accounted for just 18% of the total (OECD, 2017c). Among Emerging Asian countries with influential AI start-ups, China is at the forefront of developments. The SenseTime Group, which focuses on facial recognition technology, has tripled its worth in less than a year, after raising USD 600 million initially, and was valued at more than USD 3 billion. It is now recognised as the world’s most valuable AI start-up (Bloomberg News, 2018).

Multinational companies are also increasing their investment in Asia. For example, Visa is to open a new global transaction processing facility in Singapore. The facility will increase the speed, resilience and geodiversity of the company’s infrastructure, and support rising demand for digital payments (Visa, 2017). Oracle plans to open a new data centre in India. The facility will help the company to expand its cloud services and meet customer demand (Oracle, 2017). Intel has opened a new data centre in the Zizhu Digital Creativity Hub in Shanghai, China, to focus on the growth of cloud services and IoT (Yiyao, 2016).
Digitalisation offers access to new markets

Digitalisation can substantially lower market entry barriers, enabling companies to tap into markets that would otherwise be inaccessible. Reduced transaction and delivery costs, greater proximity to consumers and greater diffusion of information allow firms to bring new products and services to new and untapped markets. E-commerce was particularly mentioned as a sector with significant opportunities for growth in emerging markets. The Asia-Pacific region is expected to achieve the fastest growth in e-commerce sales, with its share of the global market estimated to grow from 28% in 2013 to 37% in 2018. By comparison, the combined share of Western Europe and North America is forecast to decline, from 61% to 53% (OECD/WTO, 2017).

China, as the world’s largest business-to-consumer (B2C) e-commerce market and the third-largest business-to-business (B2B) market, has witnessed the emergence of world-leading e-commerce firms such as the Alibaba Group and JD.com (OECD/WTO, 2017). The Alibaba Group, especially, has expanded its international presence beyond China through large investments in both developed and emerging e-commerce platforms overseas. For instance, Alibaba has acquired and invested USD 4 billion in the Southeast Asian e-commerce giant Lazada, based on the prospect of strong regional growth (Hsu, 2018). In this deal, Lazada provides Alibaba with unrivalled access to Southeast Asian markets, which had a population of more than 600 million comprising of 230 million “online engaged consumers” in 2017 (OECD, 2017d), in countries such as Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam (GSMA, 2017a). In India, competition for the lucrative e-commerce market is heating up, especially after the traditional wholesale giant Walmart acquired Indian e-commerce company Flipkart in a deal valued at USD 16 billion, the world’s biggest e-commerce acquisition. Flipkart is a strong local competitor to Amazon. Walmart’s acquisition enables the retail giant to access Flipkart’s large Indian customer base and logistics system, while expanding its offline presence in the retail industry (Roy, 2018).
Cross-border e-commerce platforms provide opportunities for micro, small and medium enterprises and individuals to access foreign markets and participate in international trade (AliResearch, 2017). The share of cross-border e-commerce is estimated to be higher on average in emerging markets than in developed countries. In 2014, 42% of European enterprises selling online made cross-border sales to other European countries and 25% made online sales to non-European countries (OECD, 2017c). In 2013, more than half of all e-commerce in both India and Singapore was cross-border (OECD/WTO, 2017).
Box 2. China’s experience in cross-border e-commerce

Regulatory frameworks in oversight processes play a major role in the growth of e-commerce. China’s bonded model for cross-border e-commerce is an example of policy. In July 2014, China’s General Administration of Customs created a new customs supervision code for “Bonded Cross-border E-commerce” (Code 1210). So far, the bonded warehouse model and the direct shipping model have become the two most common ways of dealing with e-commerce logistics in exporting goods into China.

In the direct shipping model, the foreign merchants can deliver goods directly to Chinese consumers through international logistics. Quarantine inspection will take place as the goods arrive at the border. Consumers have to wait longer (usually 7-30 days) for delivery, as the goods have to go through more complicated customs clearance processes. Consumers have to pay duties when ordering goods.

Under the bonded warehouse model, foreign retailers can set up local warehouses in a “bonded zone” in China, a special trade zone with special duty and inspection approaches. The retailer can store a large quantity of goods without paying duties, giving more flexibility on duties than direct shipping. Once consumers place an order, the foreign sellers can declare the order to customs and ship the goods through local logistics platforms after inspection.

Currently, the bonded model is used by Chinese e-commerce platforms such as Tmall Global (Alibaba), JD.com, Kaola (NetEase) and Suning.com. Chinese cities such as Chongqing, Guangzhou, Shanghai and Hangzhou have accepted the bonded warehouse model. It is worth noting that some US e-commerce companies, such as Amazon, Gilt Groupe, 6PM and iHerb, prefer on the other hand to use the direct shipping model.


Digital technologies can help companies achieve productivity gains

EMnet meeting participants agreed that digital technologies can help companies improve efficiency and achieve productivity gains. There is evidence that businesses adopting advanced ICTs spur innovation and enhanced productivity, and increase their market share (OECD, 2016b). National economies benefit from digital technologies too. Digital finance serves as a key driver of productivity growth and competitiveness and has great potential to boost the GDP of emerging economies (McKinsey Global Institute, 2016a). It is estimated that more than two-thirds of the contribution to the predicted GDP growth from digital financial services will be attributable to increased productivity (McKinsey Global Institute, 2016a).

Both the public and private sectors can improve productivity by enhancing their capacity to adapt to, and utilise, digital transformation. Companies agree that transforming their business models from vertical integration to open structures with more collaboration with external partners can lead to an increase in R&D activity, while reducing operational costs. Global energy company Total, for example, launched a digital and innovation lab called Booster, a 700 m² space dedicated to encouraging synergy between the different business lines of Total and incubating innovative ideas from start-ups. Selected start-ups can come to the Booster lab to pitch and subsequently contact operators of industrial sites to put their innovating digital technologies into testing and implementation. French energy company, ENGIE, is incubating the ideas of internal employees,
launching calls for projects involving innovative solutions, and investing in technology start-ups, through a fund of EUR 165 million (ENGIE, n.d.). The public sector can also offer critical support in promoting digital innovation. The government of Singapore began rolling out Industry Transformation Maps (ITMs) in 2016, to help 23 key sectors of the economy explore new digital opportunities.

Digital finance is becoming increasingly critical for emerging markets

Mobile money, a mobile phone payment solution, is a key tool in the move towards cashless economies that provides a service for the unbanked, and promotes financial inclusion (GSMA/Deloitte, 2015). More people in Sub-Saharan Africa use mobile money than do traditional bank accounts (GSMA/Deloitte, 2015). Mobile money also has the potential to shape consumer behaviour and accelerate digitalisation. Emerging Asia is expected to lead the growth of digital banking, given its high growth rates and high user uptake (Ortiz, 2018). Furthermore, a recent study by Microsoft showed that 81% of financial service companies across the Asia-Pacific region agreed that going digital would lead to greater revenue growth for their businesses (Microsoft, 2017).

EMnet meeting participants agreed that Emerging Asia is likely to become a leader in blockchain development, due to government and regulatory support and the mobilisation of capital from both industry players and venture capitalists (IFC, 2019). The annual deal share of bitcoin and blockchain is shrinking in North America and Europe by comparison with Asia and Africa, where both continents have seen their share increase over recent years (Figure 5). The traditional banking sector has started experimenting with blockchain technology, motivated by the prospect of cost reductions. For instance, the Postal Savings Bank of China has tested a blockchain-based asset custody system in collaboration with IBM and Hyperledger (IFC, 2019). Large Internet players are incorporating blockchain into their business models. These include Ant Financial (a subsidiary of Alibaba) that is introducing a bitcoin mobile wallet (IFC, 2019), and Tencent, a Chinese multinational which launched the TrustSQL platform using blockchain technology to offer digital asset management, authentication and ‘shared economies’ (Tencent Cloud, 2018). In India, multinational Mahindra & Mahindra Group has developed a blockchain-based application with IBM to facilitate supply chain finance processes and enable more suppliers to access credit in India (Mahindra, 2016).
Progress is needed to promote inclusive digitalisation

Affordability and accessibility are critical elements in ensuring that the digitalisation process is inclusive, that it enhances ICT usability and that it attracts more private investment. For instance, e-commerce relies heavily upon affordable mobile communications and access to broadband Internet (OECD/WTO, 2017).

Facilitating access to financial services is key to the development and inclusive adoption of digital finance. In this context, creating national digital ID systems can be an important step in facilitating financial accessibility (GSMA, 2017b). India, for example, has successfully registered 94% of the total population through its national digital identity programme, Aadhaar (GSMA, 2017b). Based on a demand-driven model, the Aadhaar initiative (see Box 3) aims to provide a permanent identity number to all Indian residents without discrimination.
## Box 3: The Success of India's Aadhaar initiative

Aadhaar ID is a national digital identity programme designed and managed by the Unique Identification Authority of India (UIDAI). Established by the Indian government in 2008, its goal is to provide each citizen of India with an identity number, called an Aadhaar number. The success of Aadhaar was possible through the combined effort of the public and private sectors. The UIDAI mainly focuses on providing technical standards, while relying on third parties for data collection, including state governments, public services agencies, banks, telecom companies, insurance companies and others. After the collected biographical and biometric data are verified by the UIDAI, a digital identity is created and a unique Aadhaar number is assigned to the individual.

Aadhaar is used by the government to pay out subsidies and social welfare benefits. Private organisations are also taking advantage of Aadhaar to provide bank transaction services, activate new mobile phones, and facilitate many other processes in a manner that improves efficiency and reduces compliance costs. For instance, the Aadhaar-enabled e-KYC platform, which is used to digitally authenticate new customers, reduces the cost of the know-your-customer (KYC) process from INR 40 (Indian rupees) (USD 0.60) per customer to INR 5 (USD 0.07) for mobile providers. More than 1 billion bank accounts and mobile phones have been connected to Aadhaar. Aadhaar also promotes financial inclusion. In the state of Rajasthan itself, since the launch of Aadhaar, the proportion of women with bank accounts has increased from 44% to 90% in 2018.


On a global scale, the ID2020 Alliance is a partnership with a similar objective, namely to improve lives through digital identity. In this alliance, governments, non-governmental organisations (NGOs) and private sector parties collaborate to ensure that technology is used for birth registrations, vaccinations, voter registration and national ID cards, in line with the Sustainable Development Goals – specifically SDG 16.9 – providing legal identity for all by 2030 (ID2020, n.d.; UN, n.d.).

Finally, the absence of a legal identity among disadvantaged groups is a major obstacle in accessing digital services. This is due to the difficulty for financial institutions of achieving compliance with anti-fraud requirements when attempting to verify the identity of customers seeking to open an account. About 1 billion people worldwide still do not have a legal identity. Approximately 31% of these are based in South Asian countries, especially in India and Bangladesh (World Bank, 2018). Some ASEAN countries, including Indonesia, Myanmar, Thailand and the Philippines, also have large unregistered populations. In particular, 32% of the population of Myanmar lack a legal identity (World Bank, 2018).
Digital infrastructure is a key enabler of connectivity

EMnet meeting participants highlighted how infrastructure remains one of the main barriers to the development of the digital economy. Limited accessibility of enhanced mobile and fixed broadband infrastructure was singled out as a primary constraint, particularly in rural areas.

Upgrading infrastructure is necessary in order to accelerate digitalisation

Participants emphasised the need to develop and upgrade infrastructure to accompany the exponential growth of data traffic volumes, and boost connectivity (Figure 6).

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage above 4 Mbps</th>
<th>Percentage above 10 Mbps</th>
<th>Percentage above 15 Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>76 (71)</td>
<td>18 (68)</td>
<td>5 (69)</td>
</tr>
<tr>
<td>Malaysia</td>
<td>72 (80)</td>
<td>32 (52)</td>
<td>14 (52)</td>
</tr>
<tr>
<td>Philippines</td>
<td>39 (107)</td>
<td>11 (78)</td>
<td>6.2 (63)</td>
</tr>
<tr>
<td>Singapore</td>
<td>94 (17)</td>
<td>72 (4)</td>
<td>51 (6)</td>
</tr>
<tr>
<td>Thailand</td>
<td>97 (4)</td>
<td>72 (5)</td>
<td>43 (13)</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>86 (49)</td>
<td>37 (48)</td>
<td>11 (57)</td>
</tr>
<tr>
<td>China</td>
<td>81 (59)</td>
<td>20 (62)</td>
<td>5 (70)</td>
</tr>
<tr>
<td>India</td>
<td>42 (104)</td>
<td>19 (64)</td>
<td>10 (58)</td>
</tr>
<tr>
<td><strong>World average</strong></td>
<td><strong>82</strong></td>
<td><strong>45</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>

Note: The number in the brackets indicates the country’s global ranking.

Compared with urban areas, where market competition and infrastructure investments are concentrated, rural areas lag behind in terms of quality of ICT infrastructure and access to digital services such as e-government. This infrastructure gap can also limit Small and Medium Enterprises’ (SMEs’) access to e-commerce platforms and their trade expansion strategies (OECD/WTO, 2017).

ICTs have emerged as an important source of energy consumption

Inadequate power supply is also a common infrastructure bottleneck. ICTs, including data centres, data transmission networks and connected devices, have emerged as an important source of energy consumption, calling for a more efficient use of energy. The IEA estimated that data centres worldwide consumed about 1% of total electricity demand in 2014, while data centre workload is forecast to triple by 2020, related electricity use is expected to grow by 3%. The power consumption of data transmission networks, which it was estimated would take up 1% of worldwide electricity demand in 2015, could either increase by 70% or fall by 15% by 2021, depending on the efficiency of energy usage (IEA, 2017). By 2020, more than 20 billion IoT devices will be connected
and nearly 6 billion smartphones are expected to be online, demanding a significant additional supply of electricity (IEA, 2017).

Promoting the efficient use of energy is an important way to cope with rising electricity demand. Industry players – such as device manufacturers and network and data centre operators – and governments both have a role to play. For instance, outsourcing services to upgrade to larger cloud and hyper-scale data centres can lead to a more efficient distribution of energy (IEA, 2017). Governments can play a key role by developing policies, offering incentives or entering voluntary agreements with the private sector to encourage the efficient and sustainable development of ICTs and promote the use of renewable energy (IEA, 2017).

5G will create new opportunities

5G technology, the next generation of wireless mobile networks, has the potential to increase opportunities for IoT developments and to enhance the capacity and speed of mobile networks. Countries such as China and India are paving the way for 5G development, where leading telecom companies have been pushing the process to capture a first mover advantage. From a planned launch in 2020, the Global System for Mobile Communications Association (GSMA) forecasts that Chinese 5G connections will scale rapidly over time, reaching 428 million connections by 2025 (Dewar et al., 2017). China Mobile, China Telecom and China Unicom, the three largest mobile operators in China, target 2020 for the commercial launch of 5G services (Dewar et al., 2017). China Telecom has started trials in Guangdong province (Dewar et al., 2017). Huawei, a leading Chinese multinational telecom and consumer electronics company, has partnerships with European automobile manufacturers Audi, BMW and PSA to develop 5G-based connected car technologies (Huawei, 2017). The Indian multinational telecom company Bharti Airtel has successfully conducted India’s first 5G network trial with Huawei (Khan, 2018). It is estimated that the application of 5G technology can translate into USD 27.3 billion of revenues for India’s telecom operators by 2026 (Khan, 2018). In Southeast Asia, growth is accelerating in 4G markets in Malaysia, Indonesia, Myanmar and the Philippines; these countries will likely see future potential for the deployment of 5G (GSMA, 2017c).

The healthcare sector offers new applications for 5G technology. In the healthcare industry, life-critical medical functions often require high reliability, with downtime of no more than a few milliseconds. 5G technology can make this a reality, as it can allow for connectivity speeds of up to 10 gigabits per second. Microsoft believed, this will enable breakthrough innovation, such as continuous monitoring through multisensory environments, teleporting doctors to virtual environments for tele-interactions with their patients, the performance of technology-enabled remote robotic surgeries, or using AI to generate new medical insights.

Public-private dialogue to enhance digital infrastructure

EMnet meeting participants agreed that concerted efforts are needed between public and private sector actors in order to strengthen digital infrastructure. Governments in emerging countries are increasingly facilitating the deployment of digital networks, often through public-private partnerships, sometimes with finance derived from government revenues or loans from international financial institutions (OECD/WTO, 2017).
Infrastructure improvements need to be accompanied by market regulations which should be developed in consultation with the private sector. To accelerate the deployment of 5G networks, governments need to produce national and regional action plans with a specific time frame. They also need to act quickly to free up sufficient spectrum, and to facilitate investment in necessary infrastructure and wireless backhaul capacity (OECD, 2017d).

**Digitalisation places a great demand on human capital development**

The skills shortage has increasingly become a global issue, with 40% of employers worldwide reporting difficulty in filling job positions in 2016, the highest level since 2007. IT skilled employees have jumped to second position among talents that are hard to find (ManpowerGroup, 2017). EMnet meeting participants agreed that this digital talent shortage is an important challenge for Emerging Asia.

Companies highlighted how engineers and technicians with ICT skills are needed to develop cutting-edge digital technologies, and stressed that education and training should commence at school level. Evidence shows a correlation between how countries promote human capital development and the development of ICTs.

**Figure 7. Global Talent Competitiveness and ICT Development Index Scores**

A recent study among 1 500 business leaders across Asia showed that a lack of skills and resources is the premier barrier to achieving digital transformation (Jimenez, D.-Z., et al., 2018). It is estimated that 80% of the 54 million workers in Viet Nam lack adequate digital skills (Thuy, 2017). Thailand had an estimated 300-400 data scientists only, while the entire Asia-Pacific region had an estimated deficit of 1 million in total (Leesa-Nguansuk, 2017). In 2015, it was also estimated that China had a shortage of more than 1.5 million big data specialists (APEC, 2017).
Efforts are needed to increase the digital capabilities of employees

EMnet meeting participants highlighted the importance of increasing employees’ digital capabilities in both the public and private sectors, especially with respect to generic ICT skills. Digital capabilities and usage differ across firm size, and smaller firms tend to lag behind in the effective use of digital tools. In the public sector, employees may tend to stick to traditional working processes and have difficulty adopting new digital tools, such as e-government (OECD, 2017a).

Singapore provides a successful example of a partnership between the public and private sectors. Under the TechSkills Accelerator (TeSA) initiative, the government is teaming up with technology companies to enable 12,000 more people to acquire digital know-how (IMDA, 2018).

SMEs may need training support from the public sector to enhance their digital capabilities and seize business opportunities in digitalisation (ITC, 2016). This type of training may go beyond the use of digital tools and towards broader management skills and business strategies, especially in e-commerce. It could be useful for national and local governments to involve industry intermediaries, such as chambers of commerce and business associations, in providing training programmes for SMEs as well (ITC, 2016).

National education systems need to adapt to new job requirements emerging in the digital era, specifically in emerging markets. Continuous education and lifelong learning programmes on ICT skills can be used to help overcome job losses occurring during the phase of digital transformation, as employees and job seekers work to upgrade and develop competitive skills that advance human capital.

A culture of change and formal training are prerequisites for the spread of digitalisation

Supporting a culture of change within organisations is essential in order to advance the digitalisation of business processes. In this context, companies agree that it is necessary to help employees embrace the technological shift. Total, a global energy company, actively promotes digital transformation within the firm through various online training programmes, such as massive open online courses (MOOCs). Employees can also obtain “digital passports” to gain greater understanding and expertise in the latest digital trends (Total, n.d.). IBM has established a machine learning hub in Bangalore, India, to help data professionals, business analysts and engineers better understand and master the technologies and techniques needed to work with IBM data (IBM, 2017). Public organisations also need to manage the culture of digital transformation, push the adoption of digital tools, and offer training programmes for employees to enhance their digital working skills (Deloitte, 2015).

Regulatory reforms should keep pace with accelerating digital growth

EMnet meeting participants agreed that governments need to provide a stable and sound regulatory framework for private investment. The demand for pro-investment policy reforms with respect to digitalisation has never been greater. However, to date, regulations have struggled to keep pace with the converged, highly dynamic and evolving digital ecosystem (Gestrin and Staudt, 2018). In Emerging Asia, meeting participants discussed how regulations in the
telecommunications sector tend to be quite restrictive, and can negatively affect investment decisions (see Figure 8 for regulatory restrictiveness in various sectors).

**Figure 8. Regulatory restrictiveness towards FDI in selected sectors, 2016 (Index, score 0-1 from open to closed)**

![Figure 8: Regulatory restrictiveness towards FDI in selected sectors, 2016](chart)


Surging cross-border data flows are expected to create substantial economic value for multinationals and society, yet pose regulatory challenges. In 2014, all types of global trade flows, including goods, services and finance, were estimated to have added a value of USD 7.8 trillion to world GDP, whereas data flows represented about USD 2.8 trillion (McKinsey Global Institute, 2016b). As data become an increasingly critical strategic asset for multinational companies, regulations on their collection, storage, usage and security are having a significant impact on investment decisions and business performance. Lacking standards on regulating cross-border data flows, for example, could add to the cost and complexity of international operations, especially for technology-led multinationals heavily relying upon free data flows (Gestrin and Staudt, 2018).

**Regulatory barriers have a negative impact on the development of e-commerce**

Regulatory barriers are emerging alongside the expansion of international e-commerce. Stringent financial licensing agreements and restrictions on the ability of foreign e-commerce companies to enter and engage with new markets are among major legal barriers (OECD/WTO, 2017). In India, for example, foreign e-commerce companies are prohibited from selling their own
goods, limiting the market expansion of two of India’s largest online retailers, Amazon and Flipkart (OECD/WTO, 2017).

Burdensome customs procedures, a lack of adequate information, and tariff and non-tariff barriers are considered to be the most prominent obstacles for cross-border e-commerce (ITC, 2016). EMnet meeting participants highlighted how regulatory barriers have become a major policy concern, particularly for SMEs, noting that they generate high compliance costs related to e-commerce. In Southeast Asia, for instance, tariffs and non-tariff technical barriers can impede SMEs from accessing foreign markets through online platforms. Furthermore, Indonesia, the Philippines, Thailand and Viet Nam still lack tailored regulations for e-commerce and present difficult customs procedures and corruption problems (APEC Business Advisory Council, 2015).

EMnet meeting participants also stressed how unclear Value Added Tax (VAT) policies can potentially bring additional risks for e-commerce traders and reduce the competitiveness of domestic suppliers. The collection of VAT on B2C transactions is a pressing issue that needs to be addressed in order to create a level playing field among foreign and domestic suppliers, as traditional tax approaches based on domestic physical presence do not always apply to the context of international e-commerce (OECD, 2014).

According to EMnet meeting participants, in order to increase cross-border e-commerce, governments need to simplify customs procedures, particularly for low-value shipments, and cut duties and taxes. A cost-benefit analysis is needed to set an appropriate exception threshold for duties on low-value shipments, especially among SMEs. Evidence shows that the benefits and savings derived from raising the threshold on duties can be greater than the loss of tax revenue (ITC, 2016).

The WTO Trade Facilitation Agreement which came into force in 2017 can be a positive instrument in expediting the movement, release and clearance of goods, including goods in transit, and in encouraging co-operation between relevant authorities on trade facilitation and customs compliance issues (WTO, n.d.).

**Striking the right balance between data protection and usage**

Citizens are concerned about the privacy and security of data collected via digital technologies by companies and governments. Furthermore, the legal protection of personal data in a majority of emerging markets remains relatively limited (UNCTAD, 2016). Secure Internet servers are still rare in much of Emerging Asia (Figure 9).
In India, an independent data protection law has not yet been implemented, and existing rules governing security practices and procedures with respect to sensitive data are limited in scope and coverage (UNCTAD, 2016). A national strategy with legislation for cyber security is still absent in Lao PDR, Myanmar, Cambodia and Brunei Darussalam (Gerdemann et al., 2017). In the context of growing data flows and the penetration of e-commerce, breaches in security, such as fraudulent online payments and identity theft, can significantly reduce trust in, and use of, digital platforms and technologies (OECD, 2017a).

Although governments have a clear interest in protecting citizen information and data, EMnet discussions also noted the equal importance of choosing instruments that do not impose undue economic costs on business operators. Co-operation among regulators and better flows of information between businesses and public authorities can help to identify cost-effective regulatory alternatives with more flexibility (OECD, 2018d). For example, Asia-Pacific Economic Co-operation, a regional economic forum joined by 21 member countries, has developed the Cross-Border Privacy Rules (CBFR) system, where companies and member countries can join the scheme on a voluntary basis to allow transfer of personal data in compliance with standard privacy policies (UNCTAD, 2016).

EMnet meeting participants also agreed that the private sector should collaborate with public authorities to hedge cyber risks and regulate data flows. For example, Microsoft has opened a new cyber security engagement centre in New Delhi, India, which controls the spread of malware by monitoring Internet traffic in that country (Hansotia, 2016). It is the company’s seventh centre worldwide and it is intended to support Microsoft’s global efforts to promote collaboration between the public and private sector in combating cyber risk by monitoring the cyber environment, detecting cyber threats, and developing solutions for customers (Hansotia, 2016).
Trade agreements can play a critical role in promoting digital growth

Trade agreements can help manage potential conflicts between data protection laws in different countries and facilitate trade in the digital era. Types of agreements can range from simple bilateral treaties to more sophisticated regional and global arrangements (UNCTAD, 2016). EMnet meeting participants emphasised that trade agreements should keep pace with changing business models in the wake of digitalisation. This issue has been discussed already at the WTO, which offers several formats for trade agreements covering digital trade issues. However, they apply equally to the online and offline worlds. As digitalisation increases its impact on trade, some agreements have begun to include specific chapters on digital services, e-commerce and telecommunication (OECD, 2017a).

Multilateral trade agreements hold great potential to boost trade liberalisation in digital transformation (Asian Trade Centre, 2016). Alibaba has put efforts into providing multilateral support for e-commerce trade agreements, specifically based on the concept of establishing an Electronic World Trade Platform (eWTP), a private sector-led international agreement to remove trade barriers for SMEs already supported by the WTO. The initiative argues that the reduction of trade barriers and the creation of Digital Free Trade Zones can make it easier for SMEs to trade worldwide and access relevant information.

In addition to multilateral trade agreements, regional trade agreements have appeared as the essential laboratories for new rules and disciplines for the digital era. For instance, the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) has a dedicated chapter on electronic commerce, with provisions for online data protection and paperless trading (AANZFTA, n.d.). The signed Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) has separate chapters on telecommunications, e-commerce and cross-border trade in services (Government of New Zealand, 2018). Since 2012, the ASEAN-6 countries have been negotiating the Regional Comprehensive Economic Partnership (RCEP), which will include provisions to address digital trade-related issues (ICTSD/IDB, 2017).
CONCLUSION

The private sector can play a significant role in the development of the digital economy in Emerging Asia. The increasing adoption of digital technologies is expected to bring significant business opportunities. However, many countries still face bottlenecks. Inadequate infrastructure, a shortage of ICT skills, regulatory challenges, data security and privacy risks need close attention by public authorities and require efforts conducted jointly with the private sector.

Policy makers need to create a favourable and stable regulatory environment that promotes investment, encourages digital innovation and facilitates SME participation in the digital economy. Furthermore, regulators should maintain a balance between data protection and free data flows through effective instruments, such as international trade agreements.
Notes

1 Emerging Asia refers to Southeast Asia (ASEAN), India and the People’s Republic of China (hereafter ‘China’).
2 ASEAN-10 includes Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Viet Nam.
3 In UNCTAD’s definition, Developing Asia includes all nations in Eastern Asia, Southern Asia, South-Eastern Asia and Western Asia (excluding Israel and Japan).
4 ASEAN-6 includes Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand.

References

Boston Consulting Group (2012), Adapt and Adopt: Governments’ Role in Internet Policy, www.bcgperspectives.com/content/articles/digital_economy_public_sector_adapt_adopt_government_role_intern


