Special Feature A

The Promise Of Digital Transformation In ASEAN[1]

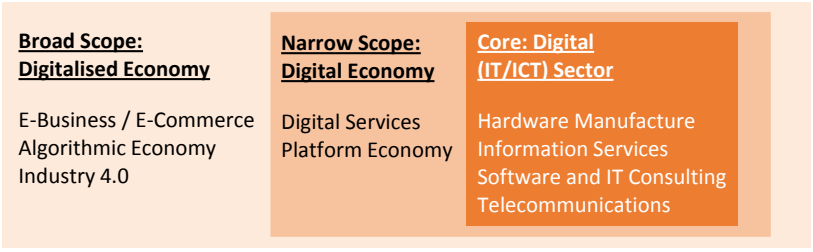
Introduction

Since the 1990s, information and communications technologies (ICT) have been exerting an increasingly important impact on the way people live and work around the world. With the proliferation of mobile technology and the advent of the Internet of Things (IoT), ICT holds the promise of offering seamless and intelligent interconnectivity between people, firms and governments globally. By improving connectivity and facilitating access to information and services, the 'digital economy' is upending current ways of organising activities and transforming how firms reach out to consumers.

Given its great potential, the digital economy can play a key role in fostering economic development in the ASEAN[2] region, and more fundamentally, serve as a driver of productivity growth. The digital transformation is already leading to important sectoral shifts in GDP and employment patterns. The biggest winners of these changes include the ICT-producing sectors, such as electronics and communications, as well as major ICT-using sectors, such as e-commerce and transport. However, digital technologies have also allowed new and more nimble firms to enter other contestable markets, such as the domestic services industries, in the process disrupting existing business practices, exposing incumbents to competition and benefiting consumers.

This Special Feature begins with an overview of notable developments in the digital economy in the ASEAN region and an assessment of its quantitative importance. It then proceeds to discuss the benefits of digital transformation, with an emphasis on the potential efficiency, productivity and welfare gains that can accrue from digitalisation. Finally, it highlights the challenges arising from the greater adoption of digital technologies in the ASEAN region.

Figure 1
A Representation of the Digital Economy



Source: Bukht and Heeks (2017)

[1] This feature is a collaborative project between EPG, MAS and the ASEAN+3 Macroeconomic Research Office (AMRO). The views expressed in this paper do not necessarily represent those of AMRO, its Executive Board, AMRO management, or the MAS.

[2] The focus of this study is the following ASEAN member countries: Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam (ASEAN-6). Where available, data on Brunei, Cambodia, Lao PDR and Myanmar are included.

Measuring The Digital Economy

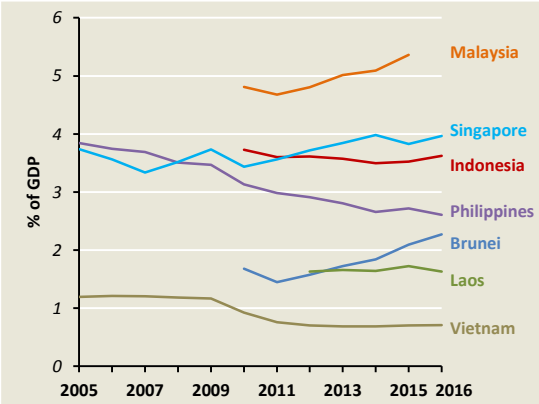
Although there are various definitions of the digital economy, it fundamentally refers to economic processes, transactions, interactions and activities that are based on digital technologies. The core IT/ICT digital sector itself (ICT-producing activities) and a wider range of digital applications (ICT-using activities) fall within the scope of activities considered. (Figure 1) In addition, the digital economy subsumes the production and application of novel technologies such as artificial intelligence, robotics, cloud computing, 3D-printing and big data analytics.

In recent years, the expansion of the digital economy has provided an important source of economic growth for the ASEAN economies. Major global players in the digital economy such as Facebook, Apple, Microsoft, Google and Amazon have established a presence in the region. Similarly, their Asian counterparts such as Baidu, Alibaba and Tencent in China, Softbank and Rakuten in Japan, Naver in Korea, and Grab, Go-Jek, Traveloka and Lazada in ASEAN are transforming the region into a digitally-connected economic powerhouse.

Recognising the critical importance of digital adoption for revenue growth, firms in ASEAN have been relatively quick to adopt ICT, and have done so at a faster pace than the global average, although there are inter-country variations, as discussed later. The World Economic Forum's *Executive Opinion Survey* conducted in 2016–17 shows that firms in the region have made commendable efforts to adopt new technologies, which can be partly attributed to their strong participation in global value chains (World Economic Forum, 2016). These regional production networks greatly facilitate access to the latest manufacturing technologies, thus helping firms to effect the digital transformation (Chen, 2017). Nevertheless, there remains considerable scope for digital technologies to diffuse more broadly and penetrate more deeply into the operations of a wide range of firms in other non-manufacturing and services industries.

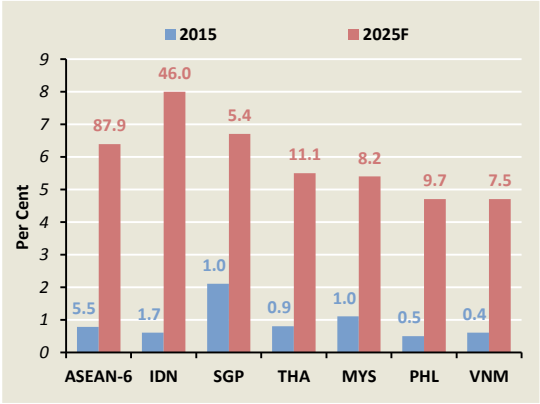
While reliably measuring the size of the digital economy is a challenging task, it is undoubtedly growing rapidly in importance. For example, Huawei and Oxford Economics (2017) have estimated its size at US$11.5 trillion globally (or 15.5% of global GDP). Moreover, it is reckoned to have expanded two-and-a-half times faster than global GDP over the past 15 years. According to UNCTAD, which employs a narrower definition that does not account for digital spillovers, the production of ICT goods and services currently

Chart 1
ASEAN ICT Value Added as a Share of GDP



Source: National Authorities

Chart 2
Size of the ASEAN E-Commerce Retail Market (% of Retail Market)



Source: Google-Temasek (2017), McKinsey
Note: Figures are in US$ billions.

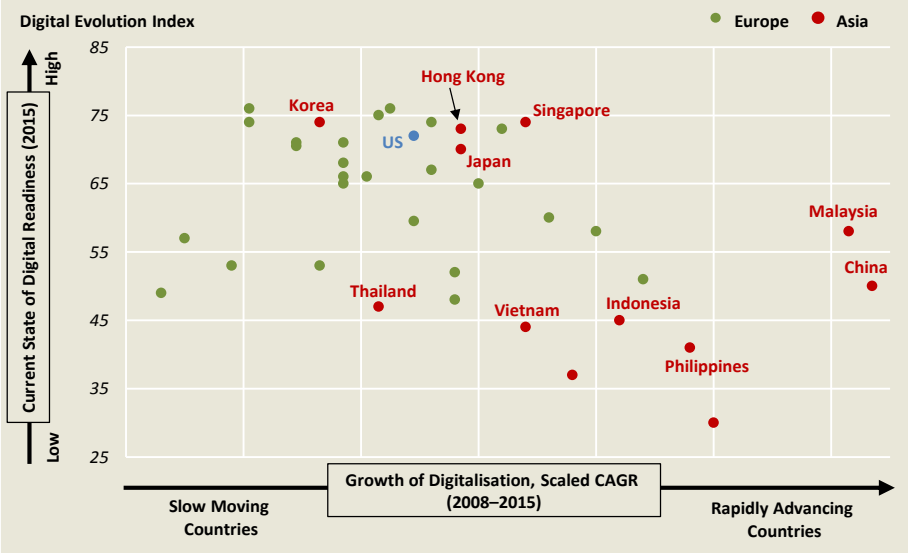
accounts for a smaller 6.5% of GDP globally, with the services sub-sector alone employing some 100 million people (UNCTAD, 2017).

In the ASEAN economies, the ICT sector is also growing fast, albeit from a lower base—it is estimated to account for about 3% of total value added in the region currently. However, there is considerable variation between countries, with ICT value-added shares ranging from 0.7% to 5.4%. (Chart 1) The increasing heft of the ICT sector is most discernible in major ASEAN economies such as Indonesia, Malaysia and Singapore. At the same time, ICT investment in ASEAN, which amounted to more than US$100 billion in 2014, is now growing by more than 15% annually (AT Kearney and Axiata, 2015).

At the industry level, economic activities that utilise ICT have also grown progressively over the past several years. For instance, new industries such as e-commerce have sprouted. The e-commerce market in the ASEAN-6 was valued at more than US$5 billion in 2015. (Chart 2) By 2025, it is estimated that the overall size of the regional market will increase to approximately US$90 billion, with Indonesia poised to be the largest sub-market (US$46 billion), while Vietnam, Malaysia, the Philippines, Thailand and Singapore will also see e-commerce accounting for a significant share of retail transactions.

The Digital Evolution Index compiled by Chakravorti and Chaturvedi (2017) is a summary measure that gauges how much progress economies have made in terms of digitalisation. Chart 3 shows the current state of digital readiness of countries around the world (vertical axis) against the growth of digitalisation (horizontal axis). A negative relationship is discernible among the Asian economies, with the economies at a relatively advanced state of digital readiness (such as Korea) experiencing slower growth in digitalisation than those at an earlier stage of digital development (such as Indonesia and the Philippines). Malaysia and China are notable outliers—despite having a higher level of digital readiness compared to most of the ASEAN region, both countries outperformed in terms of digitalisation growth. This could reflect early successes in their efforts to accelerate the digital transformation and catch up with countries at the forefront of digital readiness.

Chart 3
Current State of Digitalisation versus Growth of Digitalisation



Source: Chakravorti and Chaturvedi (2017)

The Promise Of Digital Transformation

Efficiency and Welfare Gains

ICT can be considered to be a general purpose technology. Similar to how the steam engine and electricity generated positive productivity spillovers across multiple industries and thereby reshaped economies in the 18th and 19th centuries, the proliferation of ICT promises to dramatically reconfigure the current economic landscape (Brynjolfsson and McAfee, 2016).

First, ICT can greatly reduce the cost of acquiring information and increase its availability at the same time, thus engendering transactions that were not possible before and fostering economic growth. The ability of digital technologies to transcend information and transport barriers may be especially impactful in previously remote regions with poor infrastructure and limited access to services. By creating new markets and rendering existing ones more efficient, ICT can play a central role in broadening access to goods and services in under-served regions. For example, mobile payments have allowed farmers in the region to reliably send and receive payments at affordable rates, allowing them to overcome the 'tyranny of distance'. In Indonesia, portable ultrasound devices operated by trained midwives (rather than radiologists) have helped increase access to pre-natal care (McKinsey Global Institute, 2014).

Second, digital technologies can help manufacturers lower costs and increase profitability. For instance, the use of big data analytics can aid firms in better forecasting demand, while enabling them to manage their inventories more efficiently. On the production front, a network of sensors embedded in factory floors would help firms to identify bottlenecks, reduce wastage and optimise production. As supply chains are highly fragmented across the region, there are outsized benefits to deploying sensors across the entire length of the supply chain to track shipments on a real-time basis.

Third, by infusing ICT into the manufacturing sector, countries that embrace digital technologies can quickly move up the value chain, and even leap-frog forerunners, which followed a conventional export-led strategy as suggested by the 'flying geese' model of development (Akamatsu, 1962). With the proliferation of cross-border production networks in the region since the 1990s, ASEAN, with its relatively low labour costs, is well-placed to serve as a base for ICT producers to manufacture tech products such as smartphones. Multinational firms such as Intel and Panasonic are major players in Malaysia's electrical and electronics industry, having established extensive operations there. More recently, Samsung has set up production facilities in Vietnam to take advantage of its educated workforce and relatively lower factor costs.

Fourth, the non-rivalrous nature of ICT has brought broader welfare gains to societies, by allowing a single provider to reap enormous internal economies of scale and expand its product offerings to new users at negligible marginal cost. The lower cost of provision is often passed on to consumers through reduced prices, thus enhancing consumer welfare. Another more indirect way in which ICT can enhance welfare is through facilitating market entry and promoting competition. Internet businesses are often labour- and capital-light, with low barriers to entry. Many online firms in e-commerce, telecommunications, media and FinTech compete directly with offline ones, reducing corporate pricing power and rents. The dampening impact of technology-related supply-side developments on prices is popularly known as the 'Amazon effect', after the prominent online retailer.

Fifth, the digital economy can play a critical role in enhancing ASEAN economic integration, as well as promoting financial inclusion. For this reason, policymakers are making a concerted effort to position ASEAN for digital transformation under the ASEAN Economic Community (AEC) Blueprint 2025 (ASEAN, 2015). In February 2018, ASEAN leaders underlined their support for a Smart Cities Network across the region. This would help to further connect and integrate regional supply chains, and foster digital trade in products and services. There is also great potential in bringing previously unconnected SMEs 'online' into the

regional marketplace, hence stimulating intra-regional consumption and investment. On the financial front, innovations in mobile banking, e-payments and remittances services will help promote financial inclusion and benefit the 'unbanked' population in ASEAN.

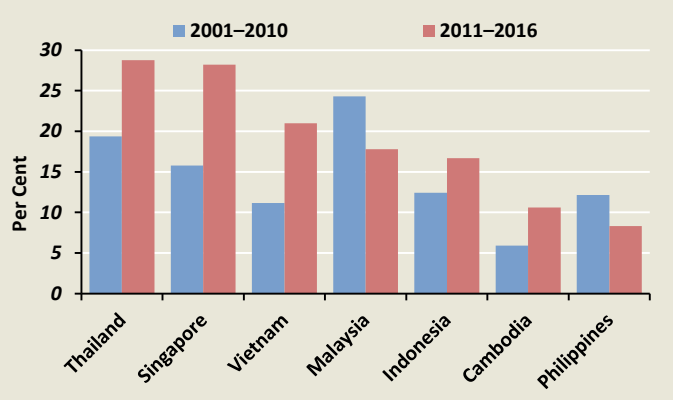
Impact on Productivity

From the supply-side perspective, ICT raises GDP growth, productivity and real wages through three main channels: (i) the ICT-producing sector itself is a source of growth; (ii) ICT investments add to the capital stock that is available to workers and thus raise labour productivity; and (iii) ICT enables firms to combine labour and capital inputs more efficiently, enhancing total factor productivity (TFP).

To assess the impact of ICT on economic growth and productivity in recent years, a growth decomposition framework pioneered by Jorgenson *et al.* (2003) is applied to seven major ASEAN economies. The supply-side analysis conducted here draws on data from the Total Economy Database (TED) provided by The Conference Board, which decomposed the aggregate GDP growth rate of each economy into ICT and non-ICT capital inputs, labour input and TFP (The Conference Board, 2017). Jorgenson *et al.* (2008) have shown ICT to be quantitatively important for output and productivity growth in the US, accounting for one-third of GDP growth over 2000–05.

As seen in Chart 4, the contribution of ICT capital to GDP growth has increased significantly in Thailand, Singapore, Vietnam and Indonesia from 2011 onwards, compared to the preceding decade. This reflects the growing importance of ICT capital deepening in driving economic growth across the region. It should be noted that these findings are likely to represent a lower bound for the aggregate contribution of ICT to GDP growth, since the salutary effects of ICT on TFP are difficult to measure directly.

Chart 4
Contribution of ICT Capital to GDP Growth in ASEAN



Source: The Conference Board

Looking ahead, there is considerable scope for boosting productivity growth in the ASEAN region through increasing ICT capital inputs and accelerating the diffusion of ICT into the broader economy. This is especially true for services industries, such as wholesale trade & retail and food & accommodation, where productivity levels have remained low. Further, digitalisation offers a novel solution to the 'cost disease' in the provision of education and healthcare services. Digital transformation can be disruptive, and both individuals and firms need to stay on top of rapidly shifting digital trends (Dahlman *et al.*, 2016). According to a market survey by IMD and Cisco (2015), the four industries most susceptible to disruption or displacement are: (1) technology products and services (since this sector represents the foundation for digital disruptions); (2) media and entertainment; (3) retail; and (4) financial services. To address the impact of disruption,

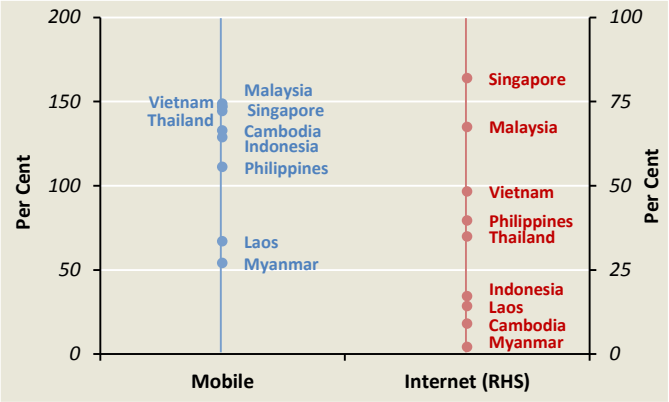
firms in these sectors will have to obtain new digital capabilities, by investing more heavily in R&D and by acquiring technology companies. If they can reinvent their business models to exploit emerging technological trends, they can create new market opportunities and find success in the new digital economy.

Challenges To Greater Adoption Of Digital Technologies

Emerging and developing economies are at very different phases of their digitalisation journey, partly as access to ICT infrastructure is a basic prerequisite for participation in the digital economy. ICT infrastructure encompasses the physical hardware necessary for digital activities to be carried out, such as fibre optic cables, computers, routers and servers.

According to the *World Bank World Development Report 2016*, eight in ten individuals in the developing world own a mobile phone, but only three in ten have internet access. Similarly, internet penetration is lagging mobile penetration across ASEAN. (Chart 5) With the exception of Singapore and Malaysia, a majority of the population in ASEAN countries does not yet have internet access. Ensuring that access to digital technologies becomes more widespread will ensure that their benefits are shared more widely and equitably.

Chart 5
ASEAN Mobile and Broadband Penetration



Source: World Development Indicators, World Bank

Besides the 'hardware' of ICT infrastructure, ASEAN needs to pay attention to developing 'software', namely to nurture a skilled and educated populace to fully harness the benefits of digital transformation. Technology can only make workers more productive if they are trained and equipped to fully exploit the possibilities that digital technologies bring. Indeed, automation is already rendering many jobs in low- and mid-skilled routine occupations obsolete, generating significant job losses in some sectors (Acemoglu and Restrepo, 2017). Education and training systems need to be reconfigured to imbue people with the skills required in the digital economy. In ASEAN, the main priority should be to create a strong pipeline of ICT talent to meet the needs of the fast-growing ICT sector, while promoting digital literacy among the general population.

For firms to maximise the benefits of digital adoption, investment in IT needs to be accompanied by the adoption of complementary organisational practices at the firm level (Brynjolfsson and Hitt, 2003). Not surprisingly, recent studies have found positive causal effects between firms' technology adoption and employment and earnings, but these effects are only seen when business processes and organisational structures are revamped to take advantage of IT investments (Gaggl and Wright, 2014). Therefore, it is essential to raise awareness

and boost implementation capacity especially among smaller firms, so that they too can reap the benefits of new digital tools. A survey conducted by IDC Asia/Pacific on behalf of Microsoft (2018) has shown that firms with fully-developed digital transformation strategies will gain the lion's share of economic opportunities, at the expense of other firms.

On the regulatory front, policymakers in ASEAN economies will need to adopt policies that are supportive of the fast-growing ICT sector, while facilitating the digital transformation process. ASEAN's regulatory policies would need to serve as an enabler—promoting a level playing field, maintaining legal and security safeguards, while at the same time not stifling innovation. Given that the digital economy is effectively borderless, closer collaboration and exchange of experiences amongst ASEAN member states is key. For example, Singapore has launched the National Trade Platform (NTP), a national trade information management platform that forms the backbone of Singapore's trade and logistics ecosystem, while Malaysia has developed a National E-Commerce Strategic Roadmap, aimed at promoting easy access to cross-border information, including information on Harmonized System Codes, export requirements and product certifications. Such supportive policies help to expedite cargo clearance, harmonise export processes and safeguard consumers' interests. In Singapore, the SMEs Go Digital Programme aims to help SMEs exploit digital technologies and take a more structured and inclusive approach to building strong digital capabilities.

Conclusion

Much of ASEAN is still in the early stages of digital transformation. This implies greater opportunities for ICT-driven growth in the region, compared to more developed economies. As long as the right complementary factors and policies are in place, alongside a supportive regulatory environment, emerging ASEAN has the potential to leap-frog its forerunners and converge faster to the global technology frontier.

Despite the real progress made by the ASEAN economies in embracing the digital economy, challenges remain. If the region can collectively foster the development of ICT infrastructure, promote ICT skills, drive greater adoption of ICT in firms and adopt forward-looking regulations and policies, it will be able to harness technology to reap substantial productivity gains and realise the promise of digital transformation.

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