



ASIA'S DIGITAL REVOLUTION

A new wave of digital innovation is reshaping Asia, raising the region's growth potential

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Asia is embracing the digital revolution. Companies such as Alibaba, Tencent, and Baidu are providing a wide range of services from e-commerce to fintech and cloud computing for customers in China and elsewhere. In Indonesia, GO-JEK offers services including ride-hailing, logistics and digital payments.

These and other Asian companies are exploiting recent advances in artificial intelligence, robotics, cryptography, and big data that promise to reshape the global economy and fundamentally alter the way we live and work in the same way that the steam engine and electricity did in centuries past. In Asia as elsewhere, the digital revolution is rippling across industries from retailing and banking to manufacturing and transportation.

Southeast Asia will face distinct challenges as the new technologies disrupt global value chains—the network of interlinked stages of production for the manufacture of goods and services—and undermine the model of labor-intensive, export-led manufacturing that has powered the region's growth. But the new technologies will also open opportunities for small businesses and offer the potential of enhanced productivity, something that Southeast Asia will need

in order to move beyond middle-income status. For frontier economies like Cambodia, Lao P.D.R., and Myanmar, digital technologies can be powerful new tools in the struggle to end poverty.

Asia at the forefront

Asian players are in the lead in nearly every aspect of digitalization, but some economies lag significantly behind. Asian economies lie all along the income spectrum, and correspondingly, the region has the highest dispersion in terms of the adoption of digital technologies, with Japan, Korea, Hong Kong SAR, and Singapore being global trendsetters. But at any given income level, Asian economies are at the frontier relative to their global peers. Moreover, even for relatively poor Asian economies, such as Cambodia and Nepal, digitalization is accelerating.

E-commerce and fintech are other areas in which Asia leads. For instance, China accounted for less than 1 percent of global e-commerce retail transaction value about a decade ago, but today, that share has grown to more than 40 percent. The penetration of e-commerce, as a percentage of total retail sales, now stands at 15 percent in China, compared with 10 percent in the United States. E-commerce

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penetration is lower in the rest of Asia but is growing fast, particularly in India, Indonesia and Vietnam. In Indonesia, e-commerce platforms such as Bukalapak, Lazada, and Tokopedia are competing for the largest e-commerce market in Southeast Asia.

In fintech, too, Asian economies have made significant progress, in many cases leapfrogging into new types of technology. For example, in 2016, mobile payments by individuals for goods and services totaled \$790 billion in China, 11 times more than in the United States.

Technological progress can bring enormous benefits by boosting productivity and growth and creating new jobs. In most of Asia, the share of information and communications technology (ICT) in GDP has increased substantially faster than economic growth. During 2005-15, ICT growth averaged 15.9 percent in India, 13.7 percent in China and 7.1 percent in Thailand, far above their economic growth rates of 7.7, 9.7 and 3.5 percent. In Japan, ICT growth was almost quadruple GDP growth.

And digitalization is becoming a larger component of GDP in many Asian economies. Among the world's top 10 economies with the largest ICT to GDP ratio, 7 are in Asia, including Malaysia, Thailand, and Singapore. Digitalization can also boost the productivity of other sectors. Our empirical work shows that a 1 percentage point increase in the digitalization of China's economy is associated with 0.3 percentage point of GDP growth. Importantly, innovation in Asia is tilted toward the digital sector: if we rank countries according to the ICT share of total patents, Asian economies take up the top five slots—further highlighting the potential of digitalization to boost future growth.

E-commerce has the potential not only to support growth, but also to make it more sustainable. For consumers, e-commerce may translate into better access to a wider range of products and services at lower prices, ultimately boosting consumption. A study by McKinsey & Company shows that while 60 percent of internet spending in China is diverted from traditional retail, close to 40 percent represents new consumption.

For firms, e-commerce provides new business opportunities and access to larger markets, and thus supports investment. Our analysis shows that, at the

firm level in Asia, participation in online commerce is associated with a more than 30 percent increase in total factor productivity, or the portion of output not explained by traditionally measured production inputs of labor and capital. Innovation, human capital, and to some extent access to finance seem to support online firms' better performance. Finally, we find that firms engaged in e-commerce also export 50 percent more.

Financial technologies can also support potential growth and poverty reduction by strengthening financial development, inclusion, and efficiency. Fintech can help millions of individuals and small- and medium-sized enterprises leapfrog access to financial services at an affordable cost, particularly in poor countries. These technologies may also drive substantial efficiency gains in the financial sector. For example, they can provide cross-border payments that reduce both risk and cost for participants. If all Asian economies with low financial inclusion were to move to the level of Asia's emerging-market frontier, Thailand, 20 million people could be brought out of poverty, our analysis suggests.

Finally, digitalization presents opportunities for improving public finance. Adoption of digitalization by governments can, through better reporting of transactions, increase revenue from value-added taxes (VAT), tariffs, and other sources. If Asian economies were to move halfway to the global frontier, our analysis shows, VAT revenue could rise by 0.6 percent of GDP. For countries that belong to the Association of Southeast Asian Nations, the gains are estimated at 1.2 percent of GDP, and for small Asian states, which are typically further from that frontier, they are on the order of 2.5 percent of GDP.

These new technologies are automating increasingly complex activities that could previously be performed only by people. Major transitions lie ahead that could match the scale of historical shifts out of agriculture and manufacturing, creating new challenges for policymakers. This new wave of creative destruction will transform jobs and skills, with old jobs and firms disappearing and new ones emerging. Historically, adjustment to change has been difficult, and gains have been spread unevenly. The new wave of automation also risks raising structural unemployment, especially

for older and unskilled workers, if there are no new alternative opportunities for displaced labor with the potential to increase inequality.

Automation via industrial robots is one area in which Asia is clearly at the forefront, with fully two-thirds of the world's industrial robots employed in the region. In our study, we analyze the impact of robot usage on employment across a large sample of countries in Asia, Europe, and the Americas. Contrary to some observers' worst fears, we find that the productivity-enhancing (and thus job-creating) effects may have offset the destruction of old jobs.

Focusing only on Asia, however, there is a slight negative impact on overall employment, particularly in heavily automated sectors like electronics and automobiles. Furthermore, like others, we find that workers with medium-level education are more vulnerable to displacement than those with either low or high education levels, since jobs that are most susceptible to automation tend to involve routine tasks performed by workers with mid-level skills. In Japan, with its shrinking labor force, increased robot density in manufacturing is associated not only with greater productivity but also with local gains in employment and wages (see "Land of the Rising Robots," in the June 2018 *F&D*). Japan's experience suggests that countries such as China, Korea, and Thailand that will face similar demographic trends in the future may also benefit from automation.

Looking ahead, some of the latest digital technologies could reshape global value chains, in which Asian economies have been key players. Traditionally, Asian manufacturing has been based on the supply of relatively low-cost and low-skilled labor. But artificial intelligence, robotics, and 3D printing are expected to decrease competitiveness based on wages, transforming the nature of manufacturing and leading possibly to the reshoring of production to advanced economies. Anecdotal evidence suggests that reshoring is already happening, and economies with large pools of low-skilled labor may face pressure to devise radically new growth models.

Fintech also poses risks to the financial sector if it undermines competition, monetary policy, financial stability and integrity, and consumer and investor protection. These technologies may disrupt the business models of established financial institutions and lead to a migration of activities outside the regulated sector. We find that countries with a greater propensity for technological leapfrogging have also tended to see falling levels of traditional financial

infrastructure, particularly bank branches. Unlike their US counterparts, Asian tech giants, especially in China, have become key providers of financial services, putting competitive pressures on traditional financial institutions. Crypto-assets, an area in which Asia has been a leader, may pose risks related to money laundering, tax evasion, circumvention of capital controls and other forms of illicit activity.

And while digital platforms may magnify the benefits of e-commerce, they raise competition issues. Economies of scale may lead to winner-take-all dynamics and pose anti-competition concerns, particularly when e-commerce platforms become large. Network effects also make it challenging for retailers and vendors to switch platforms, reinforcing their market power. Digital platforms can also pose risks of tax base erosion. For example, peer-to-peer platforms such as Airbnb and Uber (or Asian competitors such as GO-JEK, Grab and Tujia) allow transactions normally carried out in highly taxed and regulated sectors, like taxi service or hotels, to avoid or evade taxes.

Striking the right balance

While the digital revolution is inevitable, the outcome—utopian or dystopian—will depend on policies. Policy responses should strike the right balance between enabling digital progress and addressing risks. Policies to harness digital dividends include: revamping education to meet the demand for more flexible skill sets and lifelong learning, as well as new training, especially for the most adversely affected workers; reducing skill mismatches between workers and jobs; investing in physical and regulatory infrastructure that spurs competition and innovation; and addressing labor-market and social challenges, including income redistribution and safety nets.

Considering the inherent global reach of these technologies, regional and international cooperation will be key to developing effective policy responses. The more willing society is to support those who are left behind, the faster the pace of innovation that it can accommodate and still ensure that everyone ends up better off. With the right policies, the digital revolution could be a new engine of growth and prosperity for Asia and the world. **FD**

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This article is based on a chapter in the IMF's forthcoming Regional Economic Outlook: Asia Pacific.