Beyond Unicorns
Harnessing Digital Technologies for Inclusion in Indonesia
ndonesia has seen a rapid rise in the number of people connected to the internet over the last decade. A variety of sources – including new ones documented in this report – show that Indonesians connected to the internet use it quite intensively, spending as many as six hours a day on average to communicate with each other, participate in social media, stream content for leisurely consumption and increasingly also engage in commercial activity. This growing base of consumers of internet and internet enabled services has made Indonesia the largest and the fastest growing digital economy in South East Asia. The country is home to many of the sub-region’s largest digital platforms that are not only attracting large volumes of investments into the country but are also providing new and innovative solutions that are increasingly transforming the economic and social lives of Indonesians.

Across the world, effective and smart use of digital technologies such as the internet and digital platforms, has emerged as a key marker of resilience for coping with the devastating impact of the COVID-19 pandemic on economic and social life. The same is true also for Indonesia. Firms have adopted these technologies at unprecedented rates to ensure the continuity of their operations. Households and individuals have increasingly relied on these technologies to work from home when they can, purchase con-
sumer goods online, help children stay connected with schoolwork and even carry out medical consultations remotely. Government agencies have used these technologies not only to try and address the public health challenges associated with the pandemic but also to maintain the continuity of their services and, importantly, to channel social assistance and other support to those most affected.

As Indonesia’s economy recovers, the accelerated utilization of digital technologies can have a big impact on the country’s development. Firms can become more productive, which can drive growth. Workers can be productive and see their earnings grow. The Government too could utilize these technologies in various ways to improve the quality and coverage of services it provides to its citizens, which would be instrumental in reducing inequality of opportunities. For instance, mechanisms established to identify, target and channel assistance to vulnerable citizens during the pandemic could become the basis for a permanent digitally powered upgrade on social assistance targeting and delivery.

A growing digital economy does not necessarily imply an inclusive one. As this report shows, the benefits of the digital economy cannot be taken for granted by all segments of the population. Some will thrive, some may be left behind and some in fact may stand to lose as well. For example, the country has made remarkable achievements in expanding digital connectivity. Yet, almost half of the adult population is still without internet access and, as such, automatically excluded from the country’s digital dividends. Even for the given level of connectivity, the quality of the internet experience in Indonesia is poorer than in neighboring countries, which makes it a shaky foundation for more productive, high bandwidth applications, especially by firms but also by schools and medical facilities.

But digital divide does not have to be destiny. Taking stock of the current stage of digital technology adoption in Indonesia and identifying the various dimensions along which these technologies could in fact widen gaps instead of closing them, the report identifies some crucial fronts on which policymakers could prioritize action to ensure that the risks of these gaps could be mitigated. Universalizing internet is a key starting point and should include interventions not just to address the hard infrastructure part, especially along the last mile, but also softer interventions related to competition and sector regulation which have a major bearing on quality and affordability of internet. These would need to be complemented with policies and regulations that enable the digital economy to grow and active interventions to ensure that the workers across the country are equipped with the skills they need to make the most of the opportunities.

All of this would also require the Government to lead from the front and not only become more digital itself but also put guardrails for a responsible digital economy. Taking a whole of government approach to digitally integrate and streamline systems and to create common and interoperable service platforms, especially for the use and re-use of data, could generate payoffs across the whole society. For instance, developing a digital identification framework to equip Indonesians with the ability to securely prove their identity when transacting online would boost trust in the digital economy, reduce fraud, and enable more public and private sector services to be delivered end-to-end remotely. This would allow any Indonesian with internet, no matter how far away from the nearest government office or bank branch, to access such services. Similarly, the Government would benefit from strengthening safeguards for digital economy transactions and Indonesian in cyberspace by putting in place strong regulations and independent enforcement regimes related to data privacy, cybersecurity, and consumer protection.

Our hope is that this report will present a novel lens to look at this exciting landscape of digital technologies in Indonesia and inform a broader public dialogue, especially on what is needed to make the country’s digital future more inclusive.

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<td>Second Generation (basic mobile for SMS)</td>
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<td>Third Generation</td>
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<td>4G</td>
<td>Fourth Generation</td>
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<td>5G</td>
<td>Fifth Generation</td>
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<tr>
<td>AI</td>
<td>Artificial Intelligence</td>
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<td>ASEAN</td>
<td>Association of South East Asian Nations</td>
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<td>ASN</td>
<td>Indonesian Public Officials (Aparatur Sipil Negara)</td>
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<td>B2C</td>
<td>Business-to-Consumer</td>
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<td>Bappenas</td>
<td>Ministry of National Development Planning (Kementeri Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional)</td>
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<td>BEPS</td>
<td>Base Erosion and Profit Shifting</td>
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<td>BIG</td>
<td>Geospatial Information Agency (Badan Informasi Geospatial)</td>
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<td>BPNT</td>
<td>Non-Cash Food Subsidy (Bantuan Pangan Non-Tunai)</td>
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<td>BPPT</td>
<td>Agency for Assessment and Implementation of Technology (Badan Pengkajian dan Penerapan Teknologi)</td>
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<td>BSA</td>
<td>Basic Saving Account</td>
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<td>BSSN</td>
<td>National Cyber and Crypto Agency (Badan Siber dan Sandi Negara)</td>
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<td>BTS</td>
<td>Based Transceiver Station</td>
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<td>C2C</td>
<td>Consumer-to-Consumer</td>
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<td>CDP</td>
<td>Collection-and-Delivery Point</td>
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<td>CHIP</td>
<td>Connect, Harness, Innovate and Protect</td>
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<td>CIT</td>
<td>Corporate Income Tax</td>
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<td>CMEA</td>
<td>Coordinating Ministry for Economic Affairs</td>
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<td>COVID-19</td>
<td>Coronavirus Disease 2019</td>
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<td>DEHS</td>
<td>Digital Economy Household Survey</td>
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<td>DFS</td>
<td>Digital Financial Services</td>
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<td>DGT</td>
<td>Directorate General of Taxes</td>
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<td>DKI</td>
<td>Special Capital Region (Daerah Khusus Ibukota)</td>
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<td>DSL</td>
<td>Digital Subscriber Line</td>
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<td>DTIA</td>
<td>Digital Transformation Implementation Agency</td>
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<td>DTKA</td>
<td>Unified Social Welfare Database (Data Terpadu Kependudukan dan Pencatatan Sipil)</td>
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<td>Digital Transformation Taskforce</td>
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<td>Directorate General for Population and Civil Registration (Direktorat Jenderal Kependudukan dan Pencatatan Sipil)</td>
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<td>EdTech</td>
<td>Education Technology</td>
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<td>EU</td>
<td>European Union</td>
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<td>FSP</td>
<td>Financial Service Provider</td>
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<td>FTTH</td>
<td>Fiber to the Home</td>
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<td>G2P</td>
<td>Government-to-Person</td>
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<td>GB</td>
<td>Giga Byte</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GMV</td>
<td>Gross Merchandise Value</td>
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<td>GNI</td>
<td>Gross National Income</td>
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<td>GoI</td>
<td>Government of Indonesia</td>
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<td>HealthTech</td>
<td>Health Technology</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>ID</td>
<td>Identification</td>
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<td>Acronym</td>
<td>Definition</td>
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<td>IDR</td>
<td>Indonesia Rupiah</td>
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<td>IIGF</td>
<td>Indonesia Infrastructure Guarantee Fund</td>
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<td>IMT</td>
<td>International Mobile Telecommunications</td>
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<td>IoT</td>
<td>Internet of Things</td>
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<tr>
<td>Kabupaten</td>
<td>District</td>
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<td>Kartu Pra Kerja</td>
<td>Pre-Employment Card</td>
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<td>Kecamatan</td>
<td>Subdistrict</td>
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<td>KK</td>
<td>Family Card (Kartu Keluarga)</td>
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<td>Kota</td>
<td>City</td>
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<td>KPK</td>
<td>Anti-Corruption Commission (Komisi Pemberantasan Korupsi)</td>
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<td>KTP</td>
<td>Indonesian Identity Card (Kartu Tanda Pendaftaran)</td>
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<td>KTP-el</td>
<td>Indonesian Electronic Identity Card (Kartu Tanda Pendaftaran Eletronik)</td>
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<tr>
<td>KYE</td>
<td>Know-Your-Customer</td>
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<td>LAN</td>
<td>State Administration Institution (Lembaga Administrasi Negara)</td>
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<td>LKD</td>
<td>Digital Financial Services (Layanan Keuangan Digital)</td>
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<td>LP</td>
<td>Branchless Banking (Laku Pandai)</td>
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<td>LSP</td>
<td>Logistics Service Providers</td>
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<td>LTE</td>
<td>Long-Term Evolution</td>
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<td>Mbps</td>
<td>Megabits Per Second</td>
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<td>Menkominfo</td>
<td>Ministry of Communications and Information</td>
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<td>MenPAN-RB</td>
<td>Ministry of Administrative and Bureaucratic Reform (Kementerian Pemberdayaan Aparatur Negara dan Reformasi Birokrasi)</td>
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<tr>
<td>MHz</td>
<td>Mega Hertz</td>
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<td>MNE</td>
<td>Multi-National Enterprise</td>
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<td>MNO</td>
<td>Mobile Network Operators</td>
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<td>MoEC</td>
<td>Ministry of Education and Culture</td>
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<td>MoF</td>
<td>Ministry of Finance</td>
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<td>MoHA</td>
<td>Ministry of Home Affairs</td>
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<td>MOOCs</td>
<td>Massive Open Online Courses</td>
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<td>MRT</td>
<td>Mass Rapid Transit</td>
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<td>MSME</td>
<td>Micro, Small and Medium Enterprises</td>
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<td>NIK</td>
<td>Unique Identity Number (Nomor Induk Kependudukan)</td>
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<tr>
<td>O2O</td>
<td>Online-to-Offine</td>
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<td>OER</td>
<td>Open Education Resources</td>
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<td>OKJ</td>
<td>Financial Services Authority (Otoritas Jasa Keuangan)</td>
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<td>OTP</td>
<td>One-Time Password</td>
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<td>Pembina Data</td>
<td>Data Steward</td>
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<td>PIT</td>
<td>Personal Income Tax</td>
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<td>PKH</td>
<td>Conditional Cash Transfer Program (Program Keluarga Harapan)</td>
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<td>PLN</td>
<td>State-Owned Electricity Utility (Perusahaan Listrik Nasional)</td>
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<td>PMO</td>
<td>Project Management Office</td>
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<td>PSTN</td>
<td>Papua New Guinea</td>
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<td>PPP</td>
<td>Private-Public Partnership</td>
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<td>PNS</td>
<td>Civil Servant (Pegawai Negeri Sipil)</td>
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<td>PSTN</td>
<td>Public Switched Telephone Network</td>
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<td>QoS</td>
<td>Quality of Service</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>QoS</td>
<td>Quality of Service</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>RAN</td>
<td>Rural Access Network</td>
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<td>Raskin</td>
<td>Subsidized Rice Program (Beras Miskin)</td>
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<td>Ro-Ro</td>
<td>Roll-on, Roll-off</td>
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<td>SAKERNAS</td>
<td>Indonesia Labor Force Survey (Survei Angkatan Kerja Nasional)</td>
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<td>SEA-US</td>
<td>Southeast Asia–United States</td>
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<td>SFH</td>
<td>Studying from Home</td>
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<td>SIAK</td>
<td>National Population Registry System (Sistem Informasi Administrasi Kependudukan)</td>
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<td>SIM</td>
<td>Subscriber Identification Module</td>
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<td>Sislognas</td>
<td>National Logistics System (Sistem Logistik Nasional)</td>
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<td>SME</td>
<td>Small and Medium Enterprises</td>
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<td>SMPCS</td>
<td>Sulawesi-Maluku-Papua Cable System</td>
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<td>STEM</td>
<td>Science, Technology, Engineering and Mathematics</td>
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<td>SUSENAS</td>
<td>Indonesia Socioeconomic Survey (Survei Sosial Ekonomi Nasional)</td>
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<tr>
<td>Tbps</td>
<td>TeraBits Per Second, or Trillion Bytes per Second</td>
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<tr>
<td>Telco</td>
<td>Telecommunications Service Provider</td>
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<tr>
<td>TVET</td>
<td>Technical and Vocational Education and Training</td>
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<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<td>USO</td>
<td>Universal Service Obligation Fund</td>
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<td>VAT</td>
<td>Value-Added Tax</td>
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<td>VoLTE</td>
<td>Voice over LTE</td>
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<td>Wali Data</td>
<td>Data Custodian</td>
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<td>Waring</td>
<td>Street food vendor</td>
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<td>WFH</td>
<td>Working from Home</td>
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Executive Summary

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Similar to many other countries around the world, the COVID-19 pandemic has hit Indonesia hard. Latest estimates suggest that about 5.1 million people—equivalent to 2.4 percent of the working-age population—have lost their jobs, while an additional 24 million have had to work reduced hours due to the pandemic. As many as 50 percent of workers have experienced a reduction in earnings. The impact on living standards has been devastating, with more than 2.2 million Indonesians estimated to have been pushed into COVID-19-induced poverty in 2020.

One unexpected silver lining from the crisis, however, has been the turbo-charged adoption of digital technologies. Businesses, both large and small, have flocked to digital technologies to try to ensure the continuity of their operations. School closures have forced students and teachers to adapt and explore digitally enabled remote learning options, including the adoption of a variety of EdTech solutions. HealthTech apps enabling remote consultations and the delivery of medicine have seen unprecedented growth in adoption rates. Confined at home due to mobility restrictions, Indonesians have switched to the internet for their entertainment and social needs, driving sharp growth in the usage of digital media (music and video streaming) and communications applications.
With this pandemic-induced flight to digital expected to be permanent to a large extent, there is excitement about an even greater acceleration in what was already the fastest growing digital economy in Southeast Asia. But at the same time questions have also emerged about the possibility of the differential access to and adoption of digital technologies compounding existing inequalities. For a country that considers achieving balanced development one of its key priorities, this is an important new challenge.

This report conducts an in-depth assessment of digital technologies in Indonesia, examining the scale and extent of their current applications. Focusing specifically on how these technologies are touching, shaping and influencing the lives of Indonesians, the report also identifies some policies that the Government of Indonesia (GoI) could adopt to ride the momentum of digital adoption generated by the pandemic, not only to power economic recovery in the short run but also to bring about greater inclusion and resilience in the medium run.

Indonesia has made rapid progress in internet connectivity over the past decade but, despite this, half of the adult population is still without access. Moreover, the inequality in access to the digital medium mirrors existing dimensions of inequality—across groups, regions and income classes. While Indonesia compares well with its regional peers on mobile broadband penetration (at slower speeds), it is significantly behind on 4G/LTE and fixed broadband rollout. Issues of availability and affordability constrain the adoption of fixed broadband, while network congestion impinges on the quality of available mobile broadband. Limited spectrum, unavailability of specific bands—particularly the 700mHz digital dividend band—limited regulatory clarity on infrastructure sharing and the lack of competition, especially in the provision of fixed broadband services, are the main barriers to universalizing access to good-quality internet throughout Indonesia.

Indonesians who are connected to the internet use it intensively, with communication, social media and leisure applications dominating usage. On average, Indonesians spend around 6 hours a day online, with the younger and more educated segments more digitally engaged than the relatively older and less educated demographic. Intensity of internet engagement is highest for the 16 to 25 age group, which on average spends 9.7 hours a day online. Digital ride-hailing services provided by companies such as Gojek—Indonesia’s homegrown decacorn that epitomizes the country’s digital potential for policy makers—and its regional competitor, Grab, are commonly used. And not only for their mobility services to connect the otherwise fragmented labor markets in Indonesia’s large and sprawling metropolitan areas, but also for several other conveniences, such as food delivery and logistics. Buying and selling online is also growing and, while still only prevalent among a small share of the population, it is already enhancing consumer welfare by providing cheaper options, and greater product variety and convenience.

In addition to consumers, these technologies are also beginning to reshape the economic opportunity landscape for workers, generating newer forms of jobs in some cases and enhancing productivity of existing jobs in others. However, not all workers are positioned to capitalize on these opportunities. For example, the higher skilled workers, who as a group were already better rewarded in the labor market have edged further ahead relative to lower skilled workers. One of the reasons for this is that, despite the pandemic-induced increase in the adoption of digital technologies, the overall level of digital adoption by firms remains low and of limited intensity, which has naturally limited productivity gains for most workers. Another reason is that, while low-skill biased applications of digital technologies such as e-commerce and digital gig work are enabling certain segments of the workforce to boost income, their reach is also limited.

“Indonesia has made rapid progress in internet connectivity over the past decade, but half of the adult population is still without access”
Digital gig work is largely concentrated among urban men. E-commerce is providing an income diversification pathway, particularly for women temporarily dislocated from labor markets and youth. However, e-commerce penetration and intensity are both constrained by issues of trust in online transactions and payments, logistics and internet connectivity.

The ability of governments around the world to harness digital technologies to deliver services is perhaps one area on which the COVID-19 pandemic has focused the strongest spotlight. Just as people and businesses have had to adapt to various measures taken to contain the spread of the virus, so too have governments. And the ability to use digital technologies to curb and manage the pandemic, as well as to ensure the continuity of essential services, has emerged as a key marker of resilience.

Indonesia’s nascent EdTech and HealthTech scene has received a major boost and, though these applications have clearly filled a void during the pandemic, their overall reach is limited to the more affluent clientele in urban centers, mostly within Java. Specifically, on education, the lack of complementary inputs such as supporting ICT devices (smartphones and computers), and limited access to good-quality internet has limited the ability of students to access online learning during the pandemic. Experiences from around the world suggest that while some of these digital innovations help enrich the menu of available solutions, the truly transformative impact can only come from the Government experimenting with, internalizing and eventually adopting some of these innovations at scale to enhance the delivery of services. In addition to the low connectivity in key service delivery nodes (e.g., schools and hospitals), two key challenges that Indonesia faces on this front are: (i) the absence of an officially-recognized and universally accessible digital ID for online transactions; and (ii) transitioning from a siloed structure of multiple, incompatible government information and data management systems to a platform-based whole-of-government approach to digital transformation, which has emerged as best practice in many economies globally.

What can Indonesia do to address these challenges and effectively leverage digital technologies to achieve greater inclusion? The report emphasizes three key priorities for policy.

The critical first priority is improving digital connectivity and universalizing access to the

Indonesians who are connected to the internet use it quite intensively, with communication, social media and leisure applications dominating usage.
This will require better management of the telecom spectrum, regulatory clarity on passive infrastructure sharing and improved competition in the fixed broadband space. Under recently enacted Law No. 11/2020 on Job Creation (the so-called “Omnibus Law”), reform of spectrum management is on the right track for the optimization of spectrum allocation. The Omnibus Law also imposes a mandatory two-year plan to convert analog television to digital television, in order to secure a digital dividend in the 700 MHz spectrum band. This measure would be crucial in lowering capital costs required to provide affordable connectivity to remote parts of the country. Release of the 2.6 GHz band, currently used for satellite TV, would add capacity in urban centers and alleviate congestion. The Ministry of Communication and Information (Kominfo) should consider accelerating its plans for the reallocation of this band from satellite broadcasting to mobile broadband by the end of 2024.

The Omnibus Law also mandates passive infrastructure sharing and the next step for the GoI in this regard is to create an implementing regulation. This will require effective leadership to coordinate the government agencies involved, including, among others, Kominfo, the Ministry of Home Affairs, the Ministry of Public Works and Housing, and local government agencies. Indonesia should also consider transitioning toward the unified licensing of service providers to enable each one to deliver a larger portfolio of services. A fixed broadband provider should be able to deliver a full portfolio of services, not only broadband internet but also telephony, TV, and other value-added services. Appointing an independent regulator is critical to improving the overall competitiveness in the sector.

The second priority is ensuring that the digital economy works for all. This will require investing in and facilitating key enablers of the digital economy while at the same time unlocking citizen capabilities to seize the opportunities that are generated. To achieve this, Indonesia will need to make progress on financial inclusion, facilitate trust to promote greater take-up of digital payment services, improve logistics and scale up investment in digital skills as well as a broader set of skills to thrive in the digital economy. The variety of efforts underway to improve financial inclusion remain important entry-points. One promising digital solution is the reduction in verification costs that could come from widespread availability of an e-KYC option underpinned by a strong and reliable digital ID system. For those already banked, including some of the more sophisticated users, trust in online transactions and issues related to data privacy, cyber security and financial integrity represent another barrier that needs to be overcome. In this regard, the passing of the draft Law on Personal Data Protection will be critical for promoting the adoption of digital financial services in Indonesia.

On citizen skills, modern tertiary education needs to cultivate in students a minimum threshold of foundational “transferable” higher-order skills for the 21st century digital economy, even in STEM fields. Technology and integration have increased the demand for higher-order general cognitive skills—such as complex problem-solving, critical thinking, and advanced communication—that are transferable across jobs. Incorporating more general education in tertiary programs is one way to do this. An additional year of general education was added to undergraduate programs in Hong Kong and China in 2012 to focus on problem-solving, critical thinking, communication, leadership, and life-long learning skills and that seems to have yielded some positive results. Another way is through innovative pedagogy that adopts learning strategies, including open-ended assessments, feedback opportunities, and a progressive curriculum that balances academic challenges with student support.

The third policy priority is harnessing the medium to provide better services and upgrade the quality of citizen-state interactions. This will re-
quire, among others, a whole-of-economy national digital ID initiative and a whole-of-government approach to digital transformation driven by an agency sufficiently empowered to resolve crucial inter-agency coordination challenges. A national digital ID initiative would enhance and harness the existing strong national ID system managed by the Ministry of Home Affairs to introduce an official digital ID for online transactions and could recognize other forms of digital IDs, such as those issued by the private sector, for interoperability purposes. In order to boost trust in online transactions and digital government, the passage of the draft Law on Personal Data Protection would be important to provide safeguards and accountability for the collection, use and sharing of personal data, as well as formalizing the rights of data subjects. An essential feature for the credibility and strength of such a law would be independent oversight, similar to the Office of the Australian Information Commissioner and the Singaporean Personal Data Protection Commission.

Beyond digital IDs, Indonesia could also consider reorienting from a narrow focus on e-government to a comprehensive national digital transformation agenda. Given the complexities, this can be implemented in phases. Strengthening the role of the Ministry of State Apparatus and Bureaucratic Reform (MenPAN-RB) to orchestrate and deliver on the existing mandate on e-government could be coupled with parallel efforts to create an institutional and regulatory framework or apparatus necessary for a more integrated and centrally managed transformation agenda. This could be in the form of an agency that has multi-ministerial oversight and is attached to the Office of the President. Such an agency could be tasked with the articulation of the vision as well as the formulation and implementation of policies to drive the transformation agenda in an integrated manner. The Government Digital Service, or GDS in the United Kingdom and GovTech in Singapore are successful examples of this model. There could be other models as well but success in this transformative agenda will rest crucially on the adoption of a coordinated whole-of-government strategy as opposed to a siloed one.

In addition to these three fronts there is a crucial fourth area that should not be forgotten. In order to truly make the digital economy more inclusive, efforts to universalize the digital medium and stimulate digital innovations must be embedded in a broader ‘bricks-and-mortar’ reform agenda that includes greater openness and competitiveness, stronger regulations, more comprehensive social protection and investments in skills for the future. The long-standing non-digital challenges that Indonesia has faced in its efforts to make growth inclusive continue to remain important constraints on how effectively Indonesia is able to harness the digital dividends for its poor. For example, the high cost of logistics, which has always prevented far flung markets in eastern Indonesia from being integrated with thicker markets in Java, is precisely also one of the key binding constraints on growth of e-commerce in these areas. Digitization of the logistics sector itself can, and indeed is, already beginning to chip away at this. But a bigger challenge lies in the analog domain and relates to the large deficit of connectivity infrastructure and the regulatory environment that keeps transit times long and costs high.

Likewise, a whole host of other factors that are binding constraints on the overall productivity of the economy are also relevant. It has been well documented elsewhere, for example, that restrictive trade policies limit access to key inputs and markets, restrictions on investments depress commercial performance, a weak competition framework shields incumbents from potentially more productive market entrants, while the unpredictable regulatory environment further weakens the business environment, inhibiting competition and depressing investments. The super-efficiencies associated with digital technologies in an economic environment in which domestic firms, both large and small, are shackled in this manner, and workers lack the skills required to thrive in the second industrial revolution, let alone the fourth, could potentially amplify distortions and accentuate inequalities. Thus, doubling down on reforms to strengthen the analog foundations of the digital economy will be equally critical in ensuring that digital dividends benefit all Indonesians.
What can Indonesia do to ensure an inclusive digital future for all?

**Improve Digital Connectivity to Universalize Access**

1. **Optimize spectrum allocation for mobile broadband**
   - Implement the "Analogue Switch Off" by the end of 2022 in accordance with the Omnibus Law so as to free up the 700MHz band for greater rural connectivity using 4G and future 5G networks
   - Optimize the higher frequency capacity bands, starting with the freeing up of the 2.6 GHz band, followed by the 3.4-3.8 GHz band and potentially the broader 3.3-4.2 GHz band to facilitate 5G deployment in urban areas. Consideration should be given to the release of the mmWave spectrum bands for 5G in urban areas

   **RESPONSIBLE AGENCIES:**
   - Kominfo

2. **Strengthen mechanisms to ensure sharing of active and passive infrastructure**
   - Update the Telecom Law, PP 52/53, to allow for sharing of active infrastructure on a B2B basis
   - Implement through regulations the passive infrastructure sharing mandated under the Omnibus Law

   **RESPONSIBLE AGENCIES:**
   - Kominfo
   - MoHA
   - Ministry of Public Works

3. **Strengthen competition along the broadband value chain**
   - Review current licensing regime and transition toward international best practice of single/unified licensing to allow a larger number of providers to deliver the full portfolio of services
   - Appoint an independent regulatory body for the telecom sector consistent with exemplar practice and Indonesia's RCEP commitments

   **RESPONSIBLE AGENCIES:**
   - Kominfo
Support the development of logistics

- Continue to develop basic physical infrastructure to improve connectivity through strengthened and/or rehabilitated infrastructure (roads, ports, and electricity), leveraging private sector capital and expertise as appropriate through PPPs

RESPONSIBLE AGENCIES:
- Ministry of Transport
- Directorate General of Highways
- Ministry of Public Works and Housing

- Deepen reforms to reduce entry barriers to logistics and transportation services and build long-term investor confidence, to expand warehousing outside of large metropolitan areas

RESPONSIBLE AGENCIES:
- Ministry of Transport, with support from Ministries of Trade and Finance and the Coordinating Ministry of Maritime Affairs and Investments

- Continue to modernize the National Post Service; standardize addresses and postcodes

RESPONSIBLE AGENCIES:
- Ministry of Communication and Informatics

Nurture digital skills and skills for the 21st century digital economy

- Align non-formal education services and lifelong learning with needs of the working-age adult population, adopting a modular approach to course offerings with an emphasis on soft skills in addition to technical digital skills, incorporating employment-specific digital skills relevant for Indonesia, emphasizing a mindset of continuous learning, and offering opportunities to practice “self-managed” learning

RESPONSIBLE AGENCIES:
- Ministry of Education and Culture
- Ministry of Manpower

- Ensure that tertiary education offers a minimum threshold of foundational “transferable” higher-order skills such as critical thinking, problem-solving and communication, even in STEM fields

RESPONSIBLE AGENCIES:
- Ministry of Education and Culture

- Build partnerships between tertiary institutions and the private sector to train vocational students in high-tech areas using practice-based curricula, practitioner-led instruction, and professional certification

RESPONSIBLE AGENCIES:
- Ministry of Education and Culture/Private Sector

- Incentivize employers to offer internships and off-campus learning to students

RESPONSIBLE AGENCIES:
- Ministry of Education and Culture/Ministry of Manpower

- Continue to develop data systems that allow for identification of occupations and skills in demand, monitor educational institutions’ compliance with quality standards, and ensure that information on employability of individuals with various degrees, wage profiles, and occupation-specific courses is available to jobseekers and workers

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RESPONSIBLE AGENCIES:
- Ministry of Education and Culture/Ministry of Manpower
Make the Digital Economy Work for All CONT'D.

3. Promote supply of DFS/digital payment solutions that cater to the unbanked and the underbanked

- Streamline the licensing and registration processes required to become a provider of digital financial services
  RESPONSIBLE AGENCIES: Bank Indonesia

- Incentivize the private sector to innovate and develop new DFS products that cater to the rural population
  RESPONSIBLE AGENCIES: Bank Indonesia

- Increase use cases of DFS products in the delivery of government services (including Government-to-person payment) to sustain the commercial viability of DFS agents
  RESPONSIBLE AGENCIES: CMEA (Financial Inclusion Council)

- Standardize rules and procedures to enable interoperability of payment schemes
  RESPONSIBLE AGENCIES: Bank Indonesia

4. Use tax policy instruments to ensure a level playing field

- Complete the design of measures to reform tax policy and modernize tax administration in relation to DE transactions, ensuring adoption and communication of consistent rules, institution of efficient IT systems to administer registration, filing, payment and use of digital transaction data with other third-party data and taxpayer data for strengthened compliance risk management
  RESPONSIBLE AGENCIES: Ministry of Finance (Directorate General of Taxes, Directorate General of Customs and Excise, and Fiscal Policy Agency)

- Lower the overly generous VAT threshold to expand the digital economy tax base
  RESPONSIBLE AGENCIES: Ministry of Finance (Directorate General of Taxes, Directorate General of Customs and Excise, and Fiscal Policy Agency)
Use Digital Technologies to Provide Better Services and Upgrade Citizen-State Interactions

**1. Develop a national digital ID framework**

- Pass the draft Law on Personal Data Protection
  RESPONSIBLE AGENCIES:
  - Kominfo
  - MoHA

- Launch a whole-of-economy national digital ID initiative to define the optimal model for Indonesia, bringing together government, private sector and civil society
  RESPONSIBLE AGENCIES:
  - Office of the President
  - MoHA
  - Kominfo

- Close the coverage gaps in the national population registry database (SIAK), streamline the new registration and update processes, and introduce biometric-based e-KYC processes
  RESPONSIBLE AGENCIES:
  - Office of the President
  - MoHA

- Introduce a national digital ID system or federated ecosystem fit-for-purpose for online transactions in the Indonesia context, building on the SIAK
  RESPONSIBLE AGENCIES:
  - Office of the President
  - MoHA
  - Kominfo

**2. Reorient from a narrow focus on e-Government to a comprehensive national digital transformation agenda**

- Strengthen the political and bureaucratic influence needed to move the agenda by placing a central government authority like the Office of the President in the driving seat
  RESPONSIBLE AGENCIES:
  - Office of the President

- Adopt a whole-of-government approach to digital transformation, coordinated and spearheaded by an agency that has multi-ministry oversight.
  RESPONSIBLE AGENCIES:
  - Office of the President

**3. Implement a whole-of-government data management policy**

- Implement the One Data Policy comprehensively, in priority sectors relevant for managing the post pandemic recovery (e.g., education, health, social protection or MSMEs).
  RESPONSIBLE AGENCIES:
  - Bappenas
  - BPS
  - and other line agencies

- Build alliances with key institutions such as MenPAN-RB, Kominfo, and MoHA to instill One Data principles into the implementation of the digital government and digital ID initiatives.
  RESPONSIBLE AGENCIES:
  - Bappenas
  - BPS
  - and other line agencies

**PRIORITY OBJECTIVE III**
Overview

1.1 Access to the Medium: Who is connected, who is not and why?

1.2 Harnessing the Medium to Boost Income: Who is winning, who is behind, and why?

1.3 Using the Medium to Deliver Better Services: What holds Indonesia back?

1.4 Policies to Leverage DTS for Greater Inclusion: What can Indonesia do?
similar to many other countries around the world, the COVID-19 pandemic has hit Indonesia hard. The global slowdown in economic activity, combined with domestic measures to contain the spread of the virus, dragged down the economy, which is estimated to have shrunk by around 2.2 percent in 2020. Latest estimates suggest that about 5.1 million people—equivalent to 2.4 percent of the working-age population—have lost their jobs, while an additional 24 million have had to work reduced hours due to the pandemic. As many as 50 percent of workers have experienced a reduction in earnings. The impact on living standards has been devastating, with more than 2.2 million Indonesians estimated to have been pushed into COVID-19-induced poverty in 2020.

One unexpected silver lining from the crisis, however, has been the turbo-charged adoption of digital technologies. Businesses, both large and small, have flocked to digital technologies to try to ensure the continuity of their operations. Adoption of e-commerce has soared, with online purchases proving a viable way of securing uninterrupted access to essential consumer goods, including even basic groceries. School closures have forced students and teachers to adapt and explore digitally-enabled remote learning options, including by adopting a variety of EdTech solutions. HealthTech apps enabling remote consultations and the delivery of medicine have seen unprecedented growth in adoption rates. Confined at home due to mobility restrictions, Indonesians have switched to the internet for their entertainment and social needs, driving sharp growth in the usage of digital media (music and video streaming) and communications applications. A recent industry estimate shows that 37 percent of all digital service consumers in Indonesia in 2020 were new COVID-induced users and more than half (56 percent) were from conventionally weaker markets such as non-metro areas.

This digital pivot is expected to be permanent and, as such, promises to provide a major boost to what is already the largest and the fastest growing digital economy in Southeast Asia. The behavioral change that has accompanied this accelerated adoption of digital technologies can be expected to be enduring. Estimates from industry indicate that 93 percent of new adoptees expect to stay with at least one of the new digital services post-COVID-19. If true, this would imply a major boost to Indonesia’s internet economy which, at an estimated US$44 billion in gross merchandise value, is not only the largest in Southeast Asia, but also the fastest growing.

At the same time, the pandemic has also focused a spotlight on Indonesia’s inequalities. One enduring challenge of Indonesia’s development experience over the past two decades has been making economic growth more inclusive. While remarkable progress has been made in terms of poverty reduction, persistent welfare disparities remain across regions, and growth in living standards experienced by those in the bottom 40 percent of the income distribution has persistently lagged average growth. By disproportionately hitting the poor and the vulnerable harder, the pandemic threatens to widen

Indonesia has made rapid progress in expanding internet access over the past decade, but half of the adult population is still without access.
As school closures pushed students toward remote learning, around 60 percent of students were found to be unable to participate in online classes due to the lack of reliable internet and limited ownership of internet-enabled devices. A remedial measure was introduced in the form of an IDR 7.2 trillion data package for students and teachers. But, given how costly mobile broadband data is for high bandwidth applications such as video streaming, this is likely to only be a stop-gap solution to the real problem: namely, that only 10 percent of Indonesian public schools are connected to fixed broadband internet and around half of the population is still not connected to any kind of internet.

The pandemic has also put a spotlight on the importance of digitized, integrated and interoperable data systems in achieving resilience. With quarantines and the scaling-down or shutdown of many government and commercial operations, countries have had to try rapidly shifting services to digital channels in order to keep them going. Countries that had, for instance, invested in and built strong digital identification (ID) systems before the pandemic were by and large better able to do this than those countries that had not. For example, Estonia, Singapore, the United Kingdom, and other digitally advanced countries were able to reduce disruption for their public service delivery, as well as enable the private sector to shift to trusted online transactions. But the difference was particularly telling in terms of whether countries were able to deploy quick, accurate and effective social protection measures to mitigate shocks and safeguard livelihoods, including being able to reach populations such as informal workers. These workers were

Differential access to and adoption of digital technologies could compound these inequalities. Meanwhile, the susceptibility to infection, and the burden of disease among the poor and vulnerable in the most directly affected urban areas have been more intense than among the non-poor, likely due to risk factors such as poorer diets, lower access to quality health services, higher prevalence of smoking, poorer hygiene and sanitation practices, and the inability to afford inputs to preventive behaviors (e.g., masks, hand sanitizers, etc.). At the same time, sectors and forms of work that have been most affected, especially in urban areas of the country, are also the ones in which the poorer and less skilled segments of the population are more likely to be working. As a result, while the pandemic has affected everyone, uninsured income and welfare losses in the bottom parts of the income distribution have been the highest.

Similarly, as school closures pushed students toward remote learning, around 60 percent of students were found to be unable to participate in online classes due to the lack of reliable internet and limited ownership of internet-enabled devices. A remedial measure was introduced in the form of an IDR 7.2 trillion data package for students and teachers. But, given how costly mobile broadband data is for high bandwidth applications such as video streaming, this is likely to only be a stop-gap solution to the real problem: namely, that only 10 percent of Indonesian public schools are connected to fixed broadband internet and around half of the population is still not connected to any kind of internet.

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especially difficult to target because they were not present in either databases of people living in poverty or databases of people contributing to social security.

Thailand, for example, built a website to allow informal workers to apply for emergency payments online, using its national ID system to verify the identity of applicants, establish their uniqueness and determine their eligibility by cross-checking government databases. Since national IDs were already linked to bank and mobile money accounts, there was added assurance that cash transfers would reach the intended beneficiaries. Within just a few weeks, more than 28 million Thai citizens had applied, with 15 million deemed to be eligible. Payments began for some within days of applying. In Chile and Peru, social registries were used to expand existing social assistance programs and citizens could use their digital ID to access a portal that allowed them to check if they were included. In contrast, although Indonesia introduced significant fiscal measures, there were critical delays in getting a couple of similar programs off the ground on account of challenges related to the updating and cross-checking of databases and the verification of identities.

Looking ahead, one key question policymakers in Indonesia are facing is how to ride the momentum of digital adoption generated by the pandemic not only to power the recovery in the short term but to also bring about greater inclusion and resilience in the economy in the medium term. The crisis is clearly far from over, but some signs of economic recovery are beginning to appear on the horizon. As the economy restarts and adjusts gradually to the new post-pandemic equilibrium, questions about ways in which Indonesia could leverage digital technologies to better prepare for similar shocks in the future and address some of its long-term development challenges have become highly pertinent.

The promise exists. Digital technologies significantly reduce economic costs related to search, replication, transportation, tracking and verification. Lower costs for finding and comparing information can help reduce price dispersion, improve matching, boost efficiency, and deepen financial, labor and retail markets. The non-rival nature of information (one person’s consumption does not lower the amount available for consumption by another) encoded digitally lowers the replication cost; once the upfront cost of developing an application has been incurred and the product tested, it is costless to replicate it as many times as needed. Digital technologies also render moot place-based constraints on economic activities. Near costless transmission of information and digital services helps unlock opportunities for buyers and sellers anywhere in the country, leading to both the deepening, as well as the stronger integration, of markets. Lower tracking costs, or costs of connecting individuals with information about them, facilitates the design and delivery of services better customized to personal needs (e.g., government-to-person payments, credit provided based on information on consumer behavior, etc.). Finally, by lowering verification costs, digital technologies can enable individuals and firms to build up reputations and trust and participate in markets assured of reasonable contestability. Evidence, primarily from high-income countries, suggests that the efficiency gains brought about by the adoption of these technologies can boost aggregate productivity and growth.8

But there are risks as well. Without strong laws on personal data and consumer protection, the lowering of tracking and verification costs could lead to price discrimination, fraud, and violations of privacy. The lack of trust in government institutions and regulations to protect and safeguard citizen interests could retard the adoption of digital technologies. Furthermore, the introduction of digital super-efficiency in an environment in which there are significant structural inefficiencies in the bricks-and-mortar world could potentially accentuate inequalities. This could play out in several ways. First, failure to universalize access to reliable and good-quality internet could result in the benefits of digitization being concentrated among a small segment of the population, while a significant share gets left behind. Skill premia may rise, and labor markets could get polarized. Access to digitally enhanced learning experiences and opportunities may be limited to students of certain backgrounds, further widening intergenerational inequalities.

Second, distributional tensions could arise also among online and offline domains on the one hand, and domestic and foreign players on the other, with gains for one coming at the expense of the other. Or between larger players and smaller ones, and between owners of capital and owners of labor. Most platform-based applications of these technologies are often propelled by strong network effects (or demand-side economies of scale); the larger the number of users, the greater the value of the product for the users. This positive feedback loop generates advantages for the first mover and can accord significant market
power to the incumbent by making it difficult even for more productive newcomers to enter the market. As the market begins to mature, this concentration of some firms within an industry can slow down innovation, hurt consumers and workers, and lead to the redistribution of rents to the platforms themselves.

This report conducts an in-depth diagnostic of digital technologies, and the scale and extent of their current applications in Indonesia. Fully exploiting Indonesia’s rich data landscape, new survey data collected specifically for this report, as well as anonymized data shared with the World Bank in confidence by some of the major digital platforms in the country, this report: (i) investigates the key challenges that Indonesia faces in maximizing its digital dividends in an inclusive manner; and (ii) identifies some actionable entry-points for investments and policies. The report is fundamentally about how digital technologies touch, shape and influence the economic and social lives of people, and the diagnostic as well as policy thrust of the report is organized around three main dimensions along which the risks of ‘digital exclusion’ are the most pronounced: (i) access to the medium (digital technologies); (ii) ability to harness the medium in private capacity to enhance incomes; and (iii) ability to benefit from public sector adoption of the medium to provide services more effectively and efficiently.

"Digital technologies significantly reduce economic costs related to search, replication, transportation, tracking and verification."
Access to the Medium
→ Who is connected, who is not and why?

Indonesia has made rapid progress on internet connectivity, but about half of the adult population is still without access and the inequality in the access to the internet mirrors patterns of other inequalities between demographic groups, regions and income classes over the past decade, Indonesia has sustained steady growth in internet connectivity, driven primarily by rapid investment in network infrastructure by the private sector. The share of the adult population connected to the internet increased almost four-fold, from 13 percent in 2011 to 51 percent in 2019. This impressive growth notwithstanding, 49 percent of Indonesian adults are still not connected to the internet and a significant digital divide persists across various spatial, economic and social dimensions. For example, the urban-rural divide in connectivity is large and appears to have been increasing over the years. In 2019, 62 percent of Indonesian adults in urban areas were connected compared with just 36 percent in rural areas. Urban and rural internet connectivity was 20 and 6 percent, respectively, in 2011 (Figure O.1).

The Government of Indonesia (GoI) has made major efforts to close the digital divide, most notably with the implementation of the Palapa Ring project, which aimed to extend the fiber-optic backbone infrastructure of the country to the outer eastern islands. With the completion of the Palapa Ring project in 2019, all of Indonesia’s 314 kota/kabupaten (cities/districts) are now connected to the national backbone. This has led to a remarkable increase in the proportion of adults connected to the internet in all major island regions of the country. But there are still sizeable gaps across regions. For example, only about one-third of the adult population in Papua is connected, compared with about 55 percent in Java-Bali (Figure O.2). At the same time, the fact that almost half of the population, even in regions with relatively better infrastructure, remains without internet access points to major challenges in the middle and last mile connectivity segments.

Income gaps in access are similarly huge. Adults in families in the top decile of the income distribution are over five times more likely to be connected to the internet than adults in the poorest decile, only 14 percent of whom are connected (Figure O.3). This sharp income gradient points to a possible affordability constraint in the access to internet. Likewise, there is also a sharp generational, education and gender divide. Younger adults are significantly more likely to be connected, as are adults who are better educated. Men are 8 percentage points more likely to be connected than women, suggesting possible inequalities in device ownership within households.
The share of the adult population with access to the internet has been increasing over the past decade. Some parts of the country are still lagging. Richer Indonesians have better access.

**FIGURE 0.1**
The share of the adult population with access to the internet has been increasing over the past decade.

**FIGURE 0.2**
Some parts of the country are still lagging.

**FIGURE 0.3**
Richer Indonesians have better access.

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Source: World Bank staff calculations based on various years of Susenas.

Note: Connection to the internet is defined based on whether adults reported having access to the internet in the past three months (including accessing social media apps such as Facebook, YouTube, Instagram, Twitter, and WhatsApp).
Most Indonesians connect to the internet using mobile devices, and private sector investment growth in mobile broadband infrastructure has powered the increase in internet connectivity over the past decade. Major players, such as Telkomsel, Indosat, XL Axiata, Tri and Smartfren, have accelerated the deployment of base stations focusing increasingly on 4G/LTE stations. An estimated 95 percent of the population lives within reach of the fastest, i.e., 4G/LTE networks, though the number of actual 4G/LTE subscribers with access to those networks is significantly lower (just over 50 percent). Moreover, fixed broadband, or fiber-to-the-home (FTTH) service—particularly important for large volumes of data usage, for instance by schools, medical facilities, government offices and businesses—is used by a very small segment of the population. Latest estimates from the industry put the total estimated number of fixed broadband subscribers at about 97 million. This translates to fixed broadband penetration of just 4 percent of the population, or 16 percent of households. Thus, while Indonesia performs relatively well compared with some of the regional peers in terms of mobile broadband penetration (particularly at slower speeds), it performs distinctly more poorly compared with some of the regional peers such as Singapore, Malaysia, Thailand and Vietnam on the fastest mobile broadband (4G/LTE) and fixed broadband rollout (Figure O.4).

Adults in families in the top decile of the income distribution are over five times more likely to be connected to the internet than adults in the poorest decile.

Connecting people is not just about network coverage. Internet must be affordable as well, especially for the poorer and less affluent segments of the population to be able to access and adopt it. Indonesia ranked 61st out of 100 countries analyzed by the Economist Intelligence Unit’s annual Inclusive Internet Index in 2020. Compared with its regional peers, Indonesia outperforms Cambodia and the Philippines, but lags Thailand, Singapore, Malaysia and Vietnam in terms of overall internet affordability.
Affordability of mobile data is not a major concern, particularly for relatively small volumes of data use. While mobile service providers in Indonesia adopt differential tariff-pricing to cover higher service provision costs in more sparsely populated and geographically challenging areas, there is a wide range of mobile data packages for different budgets and needs, making internet mobile data relatively affordable for every segment of the population. Even for poor households, the average price per GB in a mobile data plan of US$0.64 is less than 1 percent of their monthly per capita expenditure, suggesting that mobile data costs should not prevent Indonesians from connecting to the internet. The price of mobile prepaid data in Indonesia—1GB at an average of 0.95 percent of GNI per capita—is lower than the ASEAN average of 1.4 percent and the global average of 5.5 percent. This is also well within the affordability criteria set out by ITU-UNESCO (1GB at 0.95 percent of GNI per capita).

In contrast to mobile broadband, setting up a fixed broadband service entails a wide array of costs that can include the cost of modem rental, an installation fee and the monthly subscription fee. In Indonesia, the price of a monthly broadband subscription currently ranges from IDR 250,000 to IDR 800,000 (US$20 to US$55). The cost of installation and the first-month subscription of a fixed-line internet connection using even the cheapest internet package is estimated to be equivalent to around 1.2 times the monthly per capita expenditure of a typical poor household. Indeed, Indonesia ranked 131st out of the 200 countries in the 2019 ITU rankings on fixed-line subscription fees, suggesting that cost could be a clear binding constraint for the adoption of fixed broadband.

Data from a survey conducted specifically for this report confirm this. Over 40 percent of households reported fixed broadband subscription costs to be prohibitive. This is distinctly higher than the proportion of households whose reasons for non-adoption were the use of mobile broadband as substitutes for fixed broadband (24 percent) and the proportion of households that reported not having access to a provider (14 percent) (Figure O.5). From a regional perspective, cost is the most salient barrier to adoption in places such as Sumatra, Sulawesi and Maluku, while availability of services is the bigger barrier in Papua and West and East Nusa Tenggara. In contrast, Java-Bali stands out with the highest proportion of households that treat mobile broadband as a satisfactory enough substitute for the fixed broadband internet experience (Figure O.5).
Both fixed and mobile broadband speeds in Indonesia are among the lowest in ASEAN, and the poorer quality in the more populous parts of the country suggests that network congestion is a major challenge.

Quality of service (QoS), or the overall quality and reliability of internet services, is also another challenge in different parts of the country. QoS impacts the speed of data transmission (uploads, downloads), the quality of phone calls, and hence the ability of users to access online services, be it e-commerce or video streaming, for example, for remote healthcare or learning services that have become integral during the COVID-19 pandemic. This is also an area in which Indonesia lags critically behind some of its regional peers. Average mobile broadband download speed experienced by Indonesian consumers is about 9.8 Mbps, the lowest speed in all of ASEAN. The mobile download experience in Indonesia is not just a mere one-quarter of the average speed available to Singaporean consumers but also a little over half of what is enjoyed by consumers in Myanmar. Incidentally, Myanmar is also the only country in the ASEAN region that Indonesia outperforms on fixed broadband download speeds. But the overall level is almost one-tenth of market leaders in the region such as Singapore (Figure O.6).

There is considerable variation in download speeds within Indonesia as well, with, somewhat interestingly, places in West Papua (Sorong), Maluku (Ambon) and Papua (Jayapura) registering the best mobile download speeds. In contrast, more populous places particularly in the periphery of large metropolitan areas, such as Cimahi outside Bandung, and Tangerang and Bogor, just outside Jakarta, are the places with the poorest internet experience as measured by download speed. QoS is determined by several factors, including network congestion (linked to the availability of spectrum for data transmission), availability of cell sites, weather and geographic location. This observed pattern on the variation in the QoS across the country clearly points to network congestion being a key impediment to high quality download experience in the higher population density places in Indonesia.
Limited spectrum, unavailability of specific bands, limited regulatory clarity on infrastructure sharing and lack of competition, especially in the provision of fixed broadband services, are the main drivers of limited access to good quality internet in Indonesia.
All Mobile Network Operators (MNOs) need a spectrum portfolio, and the availability and overall quality of mobile broadband hinges crucially on having adequate spectrum. Currently, Indonesia has allocated a total of 467 MHz in total IMT spectrum to its active MNOs. In global and regional terms, this quantum of available spectrum in Indonesia is low and has not increased for some time except for some small additional spectrum being made available in the 2.3 GHz band. Before the introduction of 5G services, 100-150 MHz in total IMT spectrum may have been enough for a successful MNO. However, this is unlikely to remain the case in the future. Potentially, MNOs will need more than 1,000 MHz of spectrum (including 3.5 GHz and mmWave spectrum), although prices for spectrum cannot increase by that same factor as this would crowd out investment. Three Indonesian MNOs do not have enough spectrum to be viable in the long term, with Hutchison (Tri) having no low band spectrum at all.

At about 1.71 MHz per million people, Indonesia’s total IMT spectrum allocation is on the lower side compared with other emerging countries. This lack of usable IMT spectrum available to the MNOs has a direct negative impact on the quality of mobile internet services in Indonesia. This manifests itself in a number of ways, such as poor latency, call drops, inability to do voice over LTE (VoLTE), etc. However, the most important way is how it negatively affects broadband speeds as discussed above, especially download speeds as traffic to consumer mobile devices is typically asymmetrical. Higher spectrum prices also result in less capital being available for MNOs to invest in the network. With heightened additional demands for bandwidth due to larger share of population working from home (WFH) and studying from home (SFH) due to the COVID-19 pandemic, the need for further usable spectrum is more acute.

In addition to quality issues, this spectrum scarcity also contributes directly to the digital divide by constraining further rollout of mobile broadband. The crucial 700 MHz band, which has propagation characteristics that are particularly well suited for remote connectivity, is currently occupied by analog television. If the 700 MHz spectrum were to be made available to the MNOs in Indonesia, then 4G and/or 5G services could be provided to remote communities at significantly lower capital cost and therefore with lower ongoing operating costs. This would result in more affordable services to Indonesian consumers.

While the unavailability of low-frequency bands limits coverage expansion, the unavailability of specific high-frequency capacity bands retards the preparation for 5G rollout. Indonesia has recently made the 2,100 MHz and the 2,300 MHz bands available through an auction process. But the continued unavailability of higher-frequency capacity spectrum, including particularly the 2.6 GHz and the 3.5 GHz bands, has meant that the MNOs have been doing their best with their existing spectrum allocations. Arguably, they are over-investing in additional cell sites for 4G/LTE services when they could be investing in new 5G technology.

As 5G is more efficient, it offers a much lower cost per unit (and higher speed, better QoS and can be used for other innovations, such as 5G IoT), instead of continued capacity growth on current 4G/LTE systems. The sector needs clarity, perhaps in the form of a spectrum roadmap, in order to be able to plan and direct investment in the network in the most optimal way. Without such clarity, investment becomes significantly less efficient, and does not result in improved broadband speeds and lower latency offerings to Indonesian consumers. In addition, it is necessary to consider the future switch-off of legacy 2G and 3G networks as other Asian and ASEAN markets are doing or have done in order to free up legacy spectrum for 4G and 5G services. For example, Singapore’s 2G services are already switched off, Malaysia’s 3G networks are scheduled to be switched off by the end of 2021, and Vietnam is scheduled to switch off legacy 2G services in early 2022.

Major investment is required to expand fixed broadband rollout in Indonesia. However, typically 70 to 80 percent of the investment in fixed broadband is in the form of passive infrastructure, such as ducts, poles, rights of way, and civil works. Mobile broadband deployment across Indonesia has relied instrumentally on tower-sharing, which has been well-established since the 2009 Regulation on Tower Sharing. Independent tower-sharing companies have brought efficiency to tower deployments. Cross-sectoral passive infrastructure sharing between (rail)roads and fiber-optic and electricity poles has also occurred to some extent. But sharing between the telecom operators is not yet well established and lacks regulation. Duplication of passive infrastructure is costly
and unnecessary, and therefore making regulatory provisions to avoid such duplication would be a significant step toward expanding fixed broadband access networks.

Sharing of active network will also increase competition in mobile broadband in rural areas. This takes the sharing a step beyond the current (passive) tower-sharing arrangements. The more remote areas of the country often have a single provider while, if active rural access network (RAN) sharing were to be allowed, this would create more options for competition. This could be in the form of a single shared RAN in the most remote areas, or two competing RANs in rural areas that, through sharing, enable three or more mobile providers to offer services without requiring a fully duplicated RAN rollout.

Unlike the mobile broadband market, the fixed broadband market is very concentrated, with the current FTTH rollout dominated by PT Telkom (IndiHome), with some smaller providers such as Biznet, MNC, My Republic, etc. in some major cities (Figure O.7 and Figure O.8). In most places there is no real competition for fixed broadband. This lack of competition in the fixed broadband space constrains rollout and affects the quality of services, as well as the affordability of tariffs, as it limits the incentive to upgrade networks in a timely manner and remain competitive in terms of pricing.

**FIGURE O.7**
While the mobile broadband space is competitive...

**FIGURE O.8**
...the FTTH market is more concentrated, with Telkom dominating market share

<table>
<thead>
<tr>
<th>Subscription Shares of Various Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telkom</td>
</tr>
<tr>
<td>Telkom</td>
</tr>
<tr>
<td>My Republic</td>
</tr>
<tr>
<td>Biznet</td>
</tr>
</tbody>
</table>

Source: Subscription data various sources.
A fixed broadband provider should be able to deliver a full portfolio of services, not only broadband internet but also telephony, TV and many other value-added services. However, the current regulatory regime limits this by requiring providers to bid for service-specific licenses instead of a single uniform license for all services. Local telephone licenses are still formally limited to Telkom, Indosat and Batam-Bintan Telekomunikasi, with Telkom effectively being the only provider outside a specific area of Batam-Bintan. This is a major hurdle for fixed broadband competition since customers are forced to keep a Telkom connection to maintain their telephony service. Number portability is another issue. Even if another provider were to be allowed to offer fixed telephony services over the broadband connection, customers would have to change telephone number to migrate to another provider. Not being able to take their numbers to another provider locks in users with Telkom, as changing numbers can be a disincentive, especially for institutional users (such as schools and businesses).

Although (fixed) telephony is a service under pressure, the restrictive licensing regime reduces the competitiveness in the broadband market and limits entry for other providers, since they cannot offer a full-service proposition to customers who remain locked in with the incumbent provider.

“The lack of competition in the fixed broadband space not only constrains rollout but also affects quality and affordability of internet as the incentive to upgrade networks and remain competitive in terms of pricing is limited”
Harnessing the Medium to Boost Income

Who is winning, who is behind, and why?

Indonesians who are connected to the internet use it quite intensively, with communication, social media and leisure applications dominating usage. On average, Indonesians spend around six hours online, with the younger and more educated segments more digitally engaged than the relatively older and less educated demographic. Intensity of internet engagement is highest for the 16 to 25 age group, which on average spends 9.7 hours a day online. There are no significant differences between men and women in terms of intensity of internet use. Among the various online activities, communication, social media and leisure applications dominate usage (Figure O.9). According to industry estimates, Indonesia is the fifth most internet engaged country in the world, behind the Philippines, Brazil, Thailand and Colombia. The average intensity of internet usage in Indonesia is 28 percent above the global average, making it an attractive market for content developers and advertisers. Another industry estimate suggests that daily time spent on the internet in Indonesia could have spiked by 31 percent during the peak of the pandemic and leveled off at around 20 percent more than pre-pandemic levels more recently, suggesting that as Indonesia emerges from the crisis its population could have become even more intensively engaged on the internet.

Being an internet user in Indonesia is almost synonymous with being a social media user. Over 85 percent of internet users were also users of social media, with the most popular platforms being WhatsApp, Facebook and Instagram. WhatsApp is principally used for communication and sharing information while on other platforms (Facebook, Instagram and Twitter), users are active in seeking out news and information. Social media platforms are increasingly also important for commerce in Indonesia, with a sizeable proportion of users (about 20 percent) using Facebook, Instagram and WhatsApp for buying and selling. The most common topics of discussion across all platforms relate to hobbies and lifestyles. However, religion, public policy and politics are also widely discussed, highlighting the importance of social media as a channel of communication and influence on these topics.

Though seemingly unproductive, social media and other digital applications used for leisure also generate value and can be stepping stones to more sophisticated and ‘productive’ uses. A key question that is often asked is whether the consumption of these largely free digital services generates any value to the users, or are the services a form of social surplus?
hours spent browsing pictures of friends on Instagram and watching cat videos on YouTube simply time away from other more productive endeavors. If there is value generated, it is not clear how this value can be measured. Therefore, these benefits are often also not captured in statistics on national accounts. Yet, the fact that so many consumers voluntarily choose to spend so much time consuming these services must imply that there is some consumer surplus that they derive from it. There have been some efforts, primarily in advanced economies, to try to estimate the value of this consumer surplus and, depending on the methodology used, the numbers range from 3 to 25 percent of income in one estimate, and close to US$100 billion over the 2007–11 period in another. Using one of the approaches from the literature, we estimate that consumer surplus of free internet services in Indonesia averages around 19 to 21 percent of per capita income for users.
Digital ride-hailing services provided by companies such as Gojek—Indonesia’s homegrown decacorn that epitomizes the country’s digital potential for policy makers—and its regional competitor, Grab, are potentially among the most frequently experienced digital transactions for many Indonesians. The green jackets worn by the motor-cycle taxi drivers of both companies are a distinctive feature of almost all Indonesian cities. And this is not without reason: these platforms not only provide efficient mobility services to connect the otherwise fragmented labor markets in Indonesia’s large and sprawling metropolitan areas, but also offer several other conveniences such as food delivery and logistics. While the pandemic and the associated decline in mobility has temporarily hit this segment hard, one-quarter of all Indonesians and around 36.5 percent of urban dwellers reported using the ride-hailing service provided by these companies before the pandemic. A striking 18.4 percent of users of these ride-hailing services used them for their daily commutes. Other reasons for use included circumstances when private vehicles could not be used (52 percent), a travel option for odd hours (41 percent), and to travel to areas where public transportation services are not available (26.6 percent). Without the availability of these digital ride-hailing options, journey times would be longer for 55 percent of users but travel costs higher for a negligible 1.9 percent of users. In addition to ride-hailing services, these companies have also been providing a whole host of other services through their apps. Chief among these is food delivery through their complementary Go-Food and Grab-Food services. Survey results show that around 21 percent of the urban population ordered food using these apps.
Buying and selling online is growing, and while still only prevalent among a small share of the population, it is already enhancing consumer welfare by providing cheaper options, greater product variety and convenience.
Price and convenience are the most dominant reasons for buying online...

...FOR THE COUNTRY AS A WHOLE

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Non-availability</td>
<td>12%</td>
</tr>
<tr>
<td>Product Variety</td>
<td>15%</td>
</tr>
<tr>
<td>Price</td>
<td>41%</td>
</tr>
<tr>
<td>Convenience</td>
<td>27%</td>
</tr>
<tr>
<td>Online Reviews</td>
<td>2%</td>
</tr>
<tr>
<td>Others</td>
<td>1%</td>
</tr>
</tbody>
</table>

...AND, WITH SOME HETEROGENEITY, FOR THE MAIN ISLAND REGIONS AS WELL

[Bar chart showing proportions for different regions.]


40% of e-commerce transactions in Papua entail purchase of goods not available in local markets.
While most workers have benefited from digital technologies, the more educated ones have benefited more than others.
rowth of the digital economy has clearly generated some benefits for the Indonesian consumers who are connected and able to avail themselves of these services. A key question of interest is whether the applications of these technologies can also bolster income-earning opportunities. This can be both at the extensive margin by creating more jobs of a certain type, and at the intensive margin by enhancing the returns to labor in the form of higher wages and salaries. Greater availability and access to fast internet has been found in the literature to have a positive impact on broader employment outcomes, including increased (female) labor force participation and employment rates, net firm entries and improved productivity. There is also evidence from Nigeria to suggest that increased mobile broadband coverage has led to an increase in labor force participation and employment, particularly among women, and this has enabled households to realize higher income and attain higher living standards. Greater mobile broadband penetration is associated with lower aggregate poverty rates.

The evidence from Indonesia, however, is somewhat mixed. In a sample of districts that were not connected to the fiber optic backbone until 2010 - 33 percent of all districts and ones disproportionately outside of Java-Bali and Sumatra - being connected to the national backbone infrastructure increased the number of internet users but did not fundamentally alter the structure of the economy. Patterns of overall labor force participation, female labor force participation, total employment and youth employment were similar before and after the arrival of the fiber optic links. It is true that a dominant share of Indonesia’s industrial activity is concentrated in Java-Bali. Close to 90 percent of jobs in manufacturing, and 84 percent of all jobs in high-value or modern services, for example, are in Java-Bali and Sumatra, while the more recently connected parts of the country remain more dependent on agriculture and natural resources, etc. Yet, evidence suggests that specific applications of digital technologies are benefitting some population sub-groups. For example, e-commerce provides a viable pathway for Indonesian women re-entering the labor market after leaving jobs due to pregnancy/maternity or domestic work. Similarly, digital gig jobs, including those in the ride-hailing industry, are providing economic opportunities that appear slightly better than other informal options, especially to young, relatively better educated, male adults in urban areas.

In an aggregate sense, however, we find that higher skilled workers have perhaps benefited more than the lower skilled ones from the expansion in internet access that Indonesia has experienced in recent years. Specifically, over the 15-year period between 2005 and 2019, educated Indonesians have consistently enjoyed higher earnings relative to their less educated peers. For example, average earnings for the most educated group (those with a college or university degree) have been almost 80 percent higher than those for the uneducated group (less than six years of schooling) (Table O.1). Looking at the differential impact of internet penetration on these skill premia, we see that while greater internet penetration benefits all types of workers except the very low educated, the benefits are higher for the more skilled. The magnitude of the coefficients implies that, if internet penetration (measured by the proportion of individuals having access to internet at home) increases by 10 percentage points in a particular district, the earnings premium enjoyed by a college educated worker will, on average, go up by 6 percentage points. Thus by benefiting higher-skilled workers more relative to lower-skilled ones, the pattern of diffusion of digital technologies in Indonesia is potentially contributing to an increase in overall inequality.
Greater internet access is benefiting higher-skilled workers more than the lower skilled ones

<table>
<thead>
<tr>
<th></th>
<th>return to education w.r.t. &lt;6 years of schooling</th>
<th>additional average return of 1 percentage point increase in internet penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary school</td>
<td>18.50%</td>
<td>0.00%</td>
</tr>
<tr>
<td>lower secondary school</td>
<td>32.80%</td>
<td>0.10%</td>
</tr>
<tr>
<td>higher secondary school</td>
<td>49.70%</td>
<td>0.30%</td>
</tr>
<tr>
<td>college/university degree or higher</td>
<td>79.40%</td>
<td>0.60%</td>
</tr>
<tr>
<td>non-production workers (relative to production workers) in manufacturing</td>
<td>12.70%</td>
<td>0.20%</td>
</tr>
</tbody>
</table>

Source: Jacoby et al. forthcoming.
Note: Reported marginal returns to internet are coefficients on the interactions between education levels of individual workers and average internet connectivity within a district in fixed-effect panel data models that also control for all relevant individual characteristics, level of urbanization and economic development of the districts, as well as year effects to capture secular trends in returns to skills. A separate specification is used for the non-production worker result. The analysis uses data from Sakernas (Indonesia Labor Force Survey) (1990-2019), Susenas (Indonesia Socioeconomic Survey) (1990-2019) and the Medium and Large Manufacturing Survey (1995-2015). The unit of the analysis is individual worker (production/non-production worker by sector-district in the case of the Manufacturing Survey).

→ One of the reasons for this is that despite the pandemic induced increase in the adoption of digital technologies, overall digital adoption by firms and workers is still quite low.

The need to ensure business continuity in a period of limited mobility during the COVID-19 crisis has forced many Indonesian firms to initiate and intensify their digital transformation. A survey conducted by the World Bank in June 2020 showed that only 36 percent of firms had managed to remain continuously open since March 2020. The same survey also showed that only about 40 percent of firms had temporarily closed but had reopened by June 2020, while roughly one in five firms had closed and continued to remain temporarily closed. Of the 46 percent of firms that reported having to make some adjustments in their business processes to either remain open or to reopen after a hiatus, 42 percent reported adoption of the internet, social media, specialized apps or digital platforms as having been the main coping strategy (Figure O.11). The pandemic induced uptake of digital technologies was found to be higher among larger firms (90 percent), but also not entirely negligible for SMEs (58 percent) and micro firms (32 percent) (Figure O.12).
In addition to general business administration, marketing and sales have been the functions that have seen the strongest pivot to digital. Larger and more formal firms with a more conducive enabling environment (e.g., access to internet, digital knowhow) would have certainly been better positioned to take advantage of these opportunities. Businesses that were already online before the pandemic also intensified their online activities. For example, digital merchants with an online and offline presence were found to increase their online activities during the pandemic. Industry estimates suggest that e-commerce volumes soared by as much as a factor of 2.1 during the pandemic and are expected to settle at around 1.7 times the levels relative to pre-pandemic levels. This soaring of demand can naturally be expected to draw more suppliers into the digital ecosystem.

However, any increase in digital adoption that the pandemic brings will be from a very low base, especially for micro and small enterprises. Though somewhat dated now, the economic census from 2016 reveals that only 5 percent of all Indonesian non-agricultural enterprises used the internet, with significant heterogeneity by firm size. Larger establishments were significantly more likely to have adopted the internet (67 percent) to buy and sell, as well as to conduct other activities over the internet, while the adoption rate among micro-enterprises was significantly lower (4 percent) (Figure O.13). More recent data suggest that internet adoption, especially by household enterprises, could have increased to about 11.1 percent in 2018 and 12.8 percent in 2020. However, even among household enterprises, the richer ones exhibit a much higher level of adoption relative to the poorest ones (Figure O.14).

The low level of internet adoption by enterprises—especially micro and small enterprises—also translates into low adoption among workers. This is especially true given the fact that these micro and small enterprises jointly account for almost 75.3 percent of Indonesia’s non-agricultural employment. In 2019, only 27.2 percent of all workers reported using the internet at their work. This was the highest among tertiary educated workers (78.1 percent), followed by much lower use among workers with just lower secondary education (17.7 percent). Thus, on the one hand, the overall level of internet adoption among workers and firms is low. On the other hand, there are sharp heterogeneities in adoption between different types of workers and firms, with the higher skilled workers, and larger and more formal establishments having greater adoption rates.
Another reason is that while low-skill biased applications of digital technologies such as e-commerce and digital gig-work are enabling certain segments of the workforce to boost income, their reach is limited. Digital gig work is largely concentrated among urban men and e-commerce growth is severely constrained by issues of trust, logistics and internet connectivity.

Unlike the narrative surrounding digital economy jobs in more industrialized countries, we see that digital gig jobs in Indonesia are, on average, relatively better paying than many informal jobs, though certainly not as well-paying as wage jobs. For example, internet-using gig workers make 6.2 percent more per hour in earnings than otherwise identical informal workers in the same sector of employment. But they also work the longest hours among all other types of workers. Indonesians work 39 hours a week on average and informal workers typically work 38 hours a week. In contrast, digital gig workers average 49 hours a week. About 33 percent of digital gig jobs were being performed by workers for whom this was their first ever job, suggesting that these were new opportunities being created by the digital economy. Among the low-skilled workers who had a job before, “unsatisfactory income” was the most common reason for switching to digital gigs. However, these opportunities are largely limited to select demographic: men (85 percent of all digital gig workers), living in urban areas (87 percent) and working in the transportation, storage and communications sector (69 percent). In sum, digital gig workers in Indonesia work significantly harder than all other workers but earn slightly better on average in comparison to informal workers. Digital gigs are also a stepping-stone into the labor market and a perceived ticket to higher incomes for many, but these opportunities are concentrated among a specific sub-group of the population.

E-commerce is another promising source of employment and income. In 2019, around 13.2 million out of a total of around 127 million employed workers (10.4 percent) in
Indonesia were engaged in e-commerce activities as either their primary or secondary job. In terms of its contribution to overall employment, this number is higher than in China, where e-commerce accounts for 5 percent of total employment. A peculiar aspect of e-commerce in Indonesia is the dominance of social media and chat apps in the e-commerce landscape. Among those engaged in e-commerce, about 71 percent reported selling exclusively via social media and chat messaging apps, 3 percent sell via a platform only, while 26 percent use a blend of the two. This means that e-commerce in Indonesia remains dominated by consumer-to-consumer (or C2C in industry parlance) business, which makes it more similar to TaoBao Marketplace, as opposed to the business-to-business (B2B) ecosystem similar to Alibaba, or even a business-to-consumer (B2C) one, such as TMall. These C2C digital merchants are generally regarded as more casual market participants than the B2B or B2C ones. They also operate on a smaller scale and potentially also at a lower level of productivity.

Although Indonesian men are almost twice as likely to be using the internet at work, internet-using women are slightly more likely than men to be engaged in e-commerce activities. Among women who use the internet at work in their primary jobs, 37.8 percent of them are active online sellers (as opposed to 34.8 percent of men). E-commerce is more common as a secondary job, suggesting that it plays a useful role in supplementing family income, especially by women and youth. Among all women, e-commerce engagement (selling) is highest especially among those who are primarily engaged in housework. Moreover, e-commerce also appears to be providing a pathway for women re-entering the labor market by providing opportunities to those who may not be in their previous jobs for a variety of reasons. About 58.1 percent of internet-using women who had to leave their previous jobs because of pregnancy/maternity or to return to domestic work were engaged in e-commerce, suggesting that e-commerce provides one avenue for women to stay productively engaged, given that they exit other forms of work to take on greater responsibilities at home.

The female labor force participation rate in Indonesia has been persistently low, hovering at around 50 percent for the past three decades. This has been identified as one of the key challenges in meeting Indonesia’s development aspirations of becoming a high-income country. By expanding opportunities for women in the labor market, e-commerce could help Indonesia to at least partially address this challenge.

However, the opportunity to engage in and benefit from e-commerce is not currently available to all Indonesians. While e-commerce has increased and spread to all parts, its intensity remains concentrated in more populous and affluent parts of the country (Figure O.16). Analyzing the spatial and temporal evolution of e-commerce over the past five years, we find that, in addition to income and
population, internet connectivity and the cost of logistics have also played an important role in explaining e-commerce growth. E-commerce penetration (the proportion of buyers and sellers in the population) has increased more rapidly in provinces in which internet access expanded and the cost of logistics declined over this period. E-commerce intensity (value and volume of transaction per buyer and seller), on the other hand, is constrained more significantly by the cost of logistics. In other words, while expanding internet access has drawn more people into the ecosystem, the cost and ease of logistics constrain how intensively they are able to buy and sell online.

Logistics as a bottleneck for e-commerce is consistent with the broader challenges that Indonesia faces in moving goods and commodities across its far-flung geography. The availability and reliability of transport infrastructure is the first, and perhaps the major, impediment to a smooth logistics chain. There are considerable imbalances of land, sea and air connectivity, for example, between well-developed cities around Jakarta, Surabaya, Medan and Denpasar (Bali), and to secondary, tertiary and rural areas, resulting in high variability in logistics costs. A 2017 World Bank survey of manufacturers on logistics performance in Indonesia showed that companies located in the Jabodetabek area (Greater Jakarta) managed to receive their goods in full and in good condition, and to maintain logistics costs at around 12 percent of the cost of sales, whereas companies in Kalimantan incurred up to 30 percent of cost of sales in logistics costs. In addition to direct logistics costs, delays in receiving or sending products are another source of indirect logistics cost for manufacturers.

Indonesia’s entire logistics performance is hampered by bottlenecks from the first to the last mile. In addition to weaknesses in transport infrastructure, the availability and competitiveness of logistics service providers (LSPs) is a challenge, especially outside of the main economic areas. On maritime connectivity, the lack of regular inter-island maritime routes affects the timeliness of goods transit, with domestic shipping lines channeling regular calls mostly on the most lucrative shipping lanes (between the main ports) and the development of roll-on roll-off shipping (ro-ro), which has proven cost effective in several maritime countries, being constrained. On air connectivity, airlines usually give priority to passengers rather than goods, which reduces the likelihood of goods being delivered on time to the next destination. On land connectivity,
Adoption of digital financial services is extremely low

the lack of temperature-controlled trucks and quality warehousing services across Indonesia prevents expansion to secondary and tertiary cities, especially for perishable goods. More specifically on the last mile, a key challenge is also the lack of standard addresses and precise postcodes in Indonesia. This prevents the implementation of productivity enhancement tools, such as the automation of sorting facilities to speed up routing of goods, and the utilization of route optimization software to map the most efficient routes for the courier. A complex regulatory framework on logistics services and an uneven distribution of population across the archipelago drive these logistics challenges.

Another key bottleneck in the expansion of e-commerce and the digital economy more broadly in Indonesia is the lack of trust in digital transactions and the consequent low adoption of digital financial services (DFS). Trust can have multiple dimensions and can, specifically in the context of e-commerce, also include issues related to whether a purchased item will be delivered in good condition and whether a return will be accepted in case the customer is not satisfied. Trust could also relate to having to make online payments, and often in advance of the package being received. The general lack of trust in online transactions is among the most frequently cited reasons for not engaging in digital transactions in Indonesia. Even among those who buy online, 50 percent still prefer to pay cash on delivery. Lack of access to bank account is a binding constraint to participation in the digital economy for those in the bottom 20 percent of the distribution. With only 52 percent of all households having access to a bank account, financial inclusion is a recognized challenge in Indonesia (Figure O. 16). While 9 percent of households are users of DFS (which we define here as having access to online banking and mobile money services), a much smaller proportion of households (0.5 percent) are users of more advanced DFS products, which would include credit, remittances, insurance, etc.33

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FIGURE O.16

Adoption of digital financial services is extremely low

50%

Even among those who buy online, 50 percent still prefer to pay cash on delivery.
For more sophisticated would-be users, issues of trust could also be rooted in the understanding of the risks related to data governance and privacy, cyber security and operational risk, financial integrity, and several others. Concerns regarding unauthorized data disclosure by any of the several entities involved could discourage this segment from adopting DFS. And these are not entirely misplaced concerns; complaints coming from financial consumers, as well as the banking sector itself, on these breaches have been increasing lately. While Indonesia’s Financial Services Authority (Otoritas Jasa Keuangan, OJK) has been trying to develop a stronger legal and regulatory framework for this, consumers still regard the disclosure of personal ID to financial service providers as a major risk. Provision of a legal basis, such as passing the current draft of the Law on Personal Data Protection in the legislature is necessary to promote DFS adoption in Indonesia.

There is a significant knowledge and awareness deficit which, somewhat surprisingly, is almost as prevalent among the financially excluded as it is among traditional bank account users. Roughly half of banked, as well as unbanked, households report not fully understanding the benefits of DFS, or not knowing how to use them, or more surprisingly, especially for those already with bank accounts, never even having heard of these services. This highlights the key role for agent networks in helping to reach the unbanked, as the face-to-face personal interactions are ideally suited to overcome the trust and knowledge gaps.

In addition to universalizing the medium by expanding access to reliable and high-quality internet at affordable prices to all Indonesians, maximizing economic inclusion benefits of digital technologies will also require enabling the population—especially those at the lower parts of the income distribution or living in less populous and prosperous parts of the country—to harness the medium to boost their incomes. Some of these efforts could be purely in the digital domain. For example, officially recognized digital IDs backed by strong consumer and privacy protection mechanisms to foster greater trust in digital transactions, greater adoption of digital payments and other digital financial services.

But if the objective is to not just promote the digital economy for its own sake but to also maximize its impact on the population, then these efforts must be nested in a broader reform agenda that includes the analog, or the conventional bricks-and-mortar parts of the economy as well. Logistics is one example. Though there are several digital innovations disrupting the logistics landscape, the bigger challenges of logistics in Indonesia are the ones related to the fundamental difficulty of moving physical goods and commodities across the vast sprawling archipelago. These relate to the availability and quality of transportation infrastructure (air, land and sea), as well as the organization of these markets, which has a bearing on the cost structure. But a whole host of other factors that
are binding constraints on the overall productivity of the economy are also relevant. It has been well documented elsewhere, for example, that restrictive trade policies limit access to key inputs and markets, restrictions on investments depress commercial performance, a weak competition framework shields incumbents from potentially more productive market entrants, while the unpredictable regulatory environment further weakens the business environment, inhibiting competition and depressing investments. The introduction of super-efficiencies associated with digital technologies in an economic environment in which domestic firms, both large and small, are heavily shackled in this manner could amplify existing distortions and accentuate inequalities.

One concrete example is cross-border trade on e-commerce which, in the current business environment, could make importing significantly easier than exporting. Consumers would benefit from cheaper consumer goods from abroad entering the domestic market. But if the economic landscape forces domestic firms—especially the smaller ones—to compete effectively with a hand tied behind their backs then this could end up eroding the country’s manufacturing base and compounding inequalities. Indeed, with inbound e-commerce transactions increasing more than eight-fold from 6.1 million to 49 million in just two years between 2017 and 2019, this is an area that the Government is acutely concerned about. And there has been some effort to address the issue as well. For example, Minister of Finance Decree No. 199/2019, effective as of January 2020, lowered the taxable threshold on inbound shipments from US$75 to US$3 per consignment, significantly increasing taxes on commodities such as foreign-produced textiles, apparel, bags, and shoes. Lowering the de minimis threshold to deal with low-value shipments puts Indonesia in the company of other early movers in this reform space. However, another complementary approach could be doubling down on addressing some of the critical issues that constrain the productivity of Indonesian firms.

Another relevant distributional tension is the one between online and offline players. If not all online purchases are catering to new demand, digital transactions will be displacing analog ones. More goods bought online necessarily implies fewer goods are bought from bricks-and-mortar stores. A comprehensive welfare calculus needs to consider not only the benefits for consumers and producers who can partake in these digital transactions but also the potential losses incurred by the bricks-and-mortar sellers who are slower to adapt. Ensuring that the policy and regulatory environment strikes the right balance between not according undue advantages to the first movers in the new economy, while at the same time also not stymying innovation, is an important consideration from the perspective of equity. Policy makers in Indonesia are cognizant of this issue and have recently put in regulation on e-commerce requiring digital merchants active on platforms to be eligible for value-added tax. However, Indonesia’s overly generous VAT threshold also needs to be reviewed, not only to expand the digital tax base, but also to make this an effective instrument for leveling the playing field.

Finally, the third distributional tension is between workers and firms. Business models that rely on platforms characterized by network effects essentially generate value by matching customers with complementary needs. The value of the platform to the marginal customer depends on the number of vendors and service providers already on board. Similarly, the value of the platform to a marginal vendor also depends on the number of customers already on board. Thus, to grow and become successful, platforms need to build a critical mass on both sides of the market. But once a platform becomes dominant, it could become too large for potential competitors to dislodge, giving rise to a winner-takes-all market structure. In developed countries, this network effect has given rise to giant technology companies, such as Google, Facebook, Apple, Amazon, Uber and Airbnb, where just a few firms capture a dominant part of the market.

The large amount of data these digital businesses collect, and the increasing use of automated machine-learning and artificial-intelligence (AI) driven analytics to power continuous improvements in the products and services that they provide, on pricing, personalization, and the targeting of ads, could further entrench their position. Data collection and sharing across platforms belonging to the same company could give rise to an exponentially higher benefit to the company compared with those companies operating only under one platform. And once this is established, there is a risk that they could exploit monopsonist power vis-à-vis vendors to extract a larger share of value added of the product. This increase in market concentration may lead to greater inequality, as labor receives a smaller share of value added in these segments. Some have found these consequences of the digital economy to be the most important reason behind the recent increase in inequality in the United States.
The level of digitization in Indonesia has perhaps not reached levels where these effects would begin to manifest themselves and more work will be required specifically in the Indonesian context to see how these dynamics play out as the digital economy grows. Nonetheless, it is a potential risk with consequential distributional implications and a front to already start acting on. Boosting digital entrepreneurship, including by addressing the glaring gaps in high-end digital talent (developers, AI and machine-learning specialists), leveling the uneven playing field for innovation and preempting policies that protect players, while not being too restrictive on the growth of what is still a nascent digital economy, can be some elements of strategies to address this issue. Similarly, Indonesia does not currently regulate working conditions and contracts of digital platforms and their workers and the platforms themselves set working conditions through their terms of service agreements. However, as the digital economy grows, and more and more workers enter these work arrangements, Indonesia may need to regulate this form of work to provide workers the protection they need.

Finally, digital innovations can generate opportunities, but the extent to which workers can grasp these opportunities to move up the economic ladder will ultimately depend on worker skills; digital skills specifically, as well as a broader set of skills necessary to survive and thrive in the digital economy. Indonesian firms routinely identify the shortage of specialized professionals and managers in the local labor market as one of the most important bottlenecks in fostering innovation within firms. The share of firms reporting inadequate skills as the top constraint in hiring professionals and managers is the highest in the ASEAN region. A shortage of qualified talent to develop new products and services has prompted well-funded digital platforms to look elsewhere for R&D capabilities. For example, Gojek has established an off-shore R&D division by acquiring three Indian tech companies, and its regional rival, Grab, has also set up an R&D center in India for similar reasons.42

This skill gap not only stunts innovation but also represents a major lost opportunity; these are good jobs going unfilled in a labor market in which millions are looking for a pathway to the middle class. It also explains the digital technology-induced widening of the skill premia discussed above (Table O.1). But just as a nation filled with smartphone-wielding micro-entrepreneurs all selling their wares through digital platforms is far from a realistic portrayal of the inclusive digital future Indonesia wants, so is a nation filled with data scientists, cloud-solution architects and AI experts. Thus, in addition to low digital literacy and the severe shortage of digital talent at the high end, investments in skills for a digital future should also include a broader-based effort to develop a pipeline of workers who are generally better at problem-solving, communication, teamwork and adaptability (i.e., high-order cognitive and social skills).
“In addition to low digital literacy and the severe shortage of digital talent at the high end, investments in skills for a digital future should also include a broader-based effort to develop a pipeline of workers who are generally better at problem-solving, communication, teamwork and adaptability.”
Using the Medium to Deliver Better Services

→ What holds Indonesia back?

The ability of governments around the world to harness digital technologies to deliver services is perhaps one area on which the COVID-19 pandemic has focused the strongest spotlight. Just as people and businesses have had to adapt to various measures taken to contain the spread of the virus, so too have governments. And the ability to use digital technologies to curb and manage the pandemic, as well as to ensure the continuity of essential services, has emerged as a key marker of resilience. Digital technologies have also been useful in the rapid deployment of social assistance responses. In countries with extensive mobile phone or internet penetration, as well as strong existing social protection systems, digital technologies related to digital ID and digital financial services have helped to facilitate the identification and registration of benefit recipients. Since it is the poorer segments of the population that have been most affected by the pandemic—by job losses and income reductions, as well as by the disruption of education—countries that have been able to better harness digital technologies in this manner have also been successful in laying a more robust foundation for inclusive recovery.

For Indonesia, the pandemic has laid bare the lack of readiness to fully capitalize on these digital opportunities. Over 530,000 schools had to be closed, affecting 68 million students from pre-primary through tertiary levels. While all students still reported engaging in some form of learning activities at home, 64 percent of them faced critical constraints related to the lack of reliable connections and supporting devices. In the early stages of the pandemic, Indonesia also struggled to obtain consistent data of COVID-19 cases due to challenges in integrating information systems across the various tiers of government, slowing down the response. The lack of digital and other alternatives caused widespread disruptions in non-COVID health care across the country. Some emergency social assistance that was approved by the Government, such as Kartu Prakerja (pre-employment card, repurposed as temporary cash assistance to unemployed workers), faced critical delays in deployment due to difficulties in verifying the identities of recipients. More recently, efforts to accelerate vaccine rollout have also been hamstrung by lack of reliable data.
Indonesia’s nascent EdTech and HealthTech scene has received a major boost and though these apps have clearly filled a void during the pandemic, their overall reach is limited to the more affluent clientele in urban centers, mostly within Java. For digital technologies to make a dent on the root causes of long-term inequalities, they need to be adopted and applied at scale by the Government.

Discussions about the role of digital technologies in sectors such as education and health often begin and end with overwhelming optimism about the power of these technologies to inspire a disjunctive break with the past. In the context of developing countries that typically face complex and deep-rooted challenges in delivering quality services, the “disruptive” promise of these technologies can be especially appealing. Indonesia is no different and, over the years, as the digital economy has grown, so has the number of new entrants in the EdTech and HealthTech scene. A World Bank study estimated that close to 160 EdTech startups in Indonesia mostly established in the 2013–18 period. Of these, 60 companies were still operational and offering a variety of products and services before the pandemic struck.\(^45\) Similarly, the Indonesian HealthTech Association reports that around 250 registered firms are operating in the HealthTech space.\(^46\)

Indonesian EdTech companies provide a range of services and products: (i) targeted at students to help them with learning and upskilling; (ii) targeted at educators to assist them with student management, communication and teaching; and (iii) targeted at educational institutions to help them with administration. For example, companies such as Ruangguru, Zenius and Quipper develop and provide self-e-learning content, interactive learning platforms and study tools that help K-12 students expedite the learning process, along with interactive online services that help students with their assignments and test preparation. Companies such as Arsa Kids, Digikids and Educa Studio develop game-based and blended-learning experiences, including interactive storybooks and educational mobile apps, to help improve early childhood educators’ effectiveness. These products and services are typically disseminated using several approaches, such as web-based and mobile-based applications.

On the HealthTech side, innovative products and services are geared toward providing health services remotely (telemedicine) through apps and websites, as well as cloud-based solutions for hospital information management systems. While telemedicine generally covers various health services, including consultations with doctors, the provision of diagnosis, treatment and preventive care, telemedicine in Indonesia is relatively new and still limited primarily to teleconsultation. For example, companies such as Halodoc and Alodokter—considered the most well-funded firms in the market—connect patients to medical doctors to do online consultations.\(^47\) Hospital information management systems have traditionally been offered by software developers and vendors catering for tailored solutions for hospitals. However, more recently, new firms such as Medico and Periksa.id have started to offer cloud-based services (software-as-a-service).

The interest in these applications has soared after the COVID-19 outbreak. In the second quarter of 2020, the number of new users on Zenius jumped 12-fold over the previous year.\(^48\) Ruangguru, which had been growing steadily even before the pandemic, reported a jump in web-hits from around an average of 7.5 million to over 11 million per month. Industry estimates suggest that the usage of telemedicine apps in Southeast Asia increased by a factor of 4.5 in March 2020 (at the peak of the COVID-19 outbreak) compared with January 2020 usage. The number is consistent with growth seen by some of the prominent players in Indonesia. Halodoc reported its monthly active users increasing by a factor of 10 during the pandemic compared with the fourth quarter of 2019, while Alodokter claimed to have experienced a 1.5-times increase compared with the pre-COVID-19-outbreak period.\(^49\)

However, while these apps have clearly filled a void during the pandemic, their overall reach is limited to the more affluent clientele in urban centers, mostly within Java and usage is higher among the relatively better off.
to be providing some form of learning activities using mobile apps and/or online learning to their children. The number was significantly lower in other parts of Java (43 percent), and even lower outside of Java (38 percent). While on average 54 percent of all Indonesian families took up some form of digital learning to minimize the disruption in the education of their children, the option was available to only 38 percent of families in the bottom 40 percent of the income distribution. Lack of complementary inputs such as supporting ICT devices (smartphones, computers) and limited access to good-quality internet were reported to be the main reasons behind this observed pattern.

One interesting trend that has been observed throughout the world is how even with the widespread pivot toward online education induced by the pandemic, the specific technologies that have been adopted for the purpose have sought to replicate the classroom environment instead of deviating from it. Relatively better endowed schools have taken to Zoom-classrooms, while across the country WhatsApp has provided a medium for student-teacher interactions. Even as education has moved online, the pandemic has ended up underscoring the inherent irreplaceability of student-teacher interactions. Likewise, in health, in-depth interviews with some doctors providing teleconsultations reveal that telemedicine is likely to be most useful for early-stage diagnosis and educating patients. It is also likely to be useful for certain areas of medicine (e.g., mental health) that carry a certain stigma in Indonesia and on which patients may feel more comfortable discussing matters through the digital medium. But for a broad range of other medical consultations, doctors regard being able to physically examine patients as an indispensable part of the diagnostic process.

The EdTech and HealthTech sectors in Indonesia face several challenges to their growth. These include difficulties with financing, lack of digital talent in the marketplace, and poor regulatory clarity, including on sensitive topics such as consumer protection and personal data protection, etc. However, as experience from the more developed parts of the world shows, and Indonesia’s own recent experiences confirm, these innovations should not be thought of as tools to displace the traditional modes of service delivery, but ones to help enhance them. Especially from the perspective of using digital technologies to reduce intergenerational inequalities, bigger gains will come from the Government’s readiness to experiment with and internalize some of these digital solutions to chip away at bricks-and-mortar challenges to enhance service delivery. In fact, given the differential adoption of digital technologies induced by the pandemic in sectors such as education, with wealthier children in better endowed schools having leapfrogged their peers from less affluent backgrounds, it has become even more urgent for the Government to catch up. In that sense, a vibrant innovation ecosystem that extends the frontiers of these solutions is something Indonesia should certainly strive for as these innovations expand the menu of options available for the Government to experiment with broader applications.

A key challenge with all these efforts is to move away from ad-hoc solutions to a more comprehensively thought out whole-of-government approach to the broader digital transformation of government and service delivery. Another foundational challenge is connectivity. As discussed above, fixed broadband penetration in Indonesia is very low compared with regional peers. This is an especially binding constraint for institutional users such as schools, hospitals, and other health facilities, which may want to intensify their use of digital technologies to enhance service delivery. For example, of all the 219,000 schools under the Ministry of Education and Culture (MoEC), just 10 percent had access to fixed broadband connections in 2019, 42 percent had some form of mobile broadband connectivity, while a significantly large share (45 percent) was not connected at all. Closing these connectivity gaps, not just in schools but also in other important service delivery nodes, will be a crucial step in harnessing digital technologies for greater inclusion in post-pandemic Indonesia.
Indonesia does not yet have any officially-recognized digital IDs, but has a relatively strong national ID system that represents a significant asset on which to build a national digital ID ecosystem.

For people to be able to fully participate in the digital economy and carry out official and high-value transactions online, countries need to introduce digital ID systems—a need that has been accentuated by the COVID-19 pandemic. Digital ID systems for online transactions are a natural progression from national ID systems, which have been used predominately for in-person transactions, including in Indonesia, because a physical ID card cannot be used remotely over the internet.

Digital IDs make use of technologies such as smartphones and cryptography to provide such security and assurance for remote interactions. They can be issued by a single entity (centralized) or by multiple entities in an ecosystem (federation). Emerging standards are also creating opportunities for decentralized models where the digital ID is stored on a personal device or digital wallet.

Well-designed and implemented digital ID systems can unlock an enormous amount of economic value for countries, estimated by the McKinsey Global Institute to be between 3 and 13 percent of GDP by 2030. The largest gains will be experienced in the digital economy. First, digital ID systems can promote inclusion when they are universally accessible and useable because they allow all people to do transactions, whether that means opening a bank account or applying for a social protection benefit, online.55 Second, they enable services to be expanded through online channels and made more efficient. Third, they are part of a ‘digital stack’ of platforms that promote innovation and value added services, such as electronic signatures, digital payments, and allowing people to exercise control over their personal data. Fourth, they facilitate cross-border digital transactions. In the European Union, for example, the eIDAS regulation and proposed regulation for decentralized digital identity wallets enable a digital ID issued by one member state to be used in others, without needing to be physically present.

But there are also risks related to digital ID. Exclusion prevents people not just from registering for a digital ID but also using a digital ID, such as by using technologies or processes that are not compatible with the local context. Data protection and privacy breaches require a dual approach of developing comprehensive legal frameworks that ensure accountability, including independent oversight. Vendor and technology lock-in can be mitigated somewhat through the adoption of open standards and open-source software, competitive procurement, and strong contract and vendor management.

While Indonesia does not yet have an official digital ID system or ecosystem that would allow Indonesians to securely verify their legal identity online, the existing national ID system is an asset that could be leveraged to create one relatively easily. The national ID system, which is managed by the Directorate General for Population and Civil Registration (Direktorat Jenderal Kependudukan dan Pencatatan Sipil, Dukcapil), is well-established, its database (Sistem Informasi Administrasi Kependudukan, SIAK) has been digitized, and nearly the entire population has a unique identity numbers (Nomor Induk Kependudukan, NIK). In 2011, a new ID card (Kartu Tanda Penduduk Elektronik, KTP-el) was introduced and biometric recognition (fingerprint, iris and faces) was added to assist with removing duplicates in the SIAK, as well as to enable identity verification. The national ID system offers a strong foundation on which an official digital ID system or ecosystem should be built on. Therefore, digital ID is a ‘low hanging fruit’ for Indonesia to make services more inclusive, to promote trust in the digital economy and society, and to create new drivers of economic growth. Doing so will also allow Indonesia to join all its fellow middle and high income ASEAN Member States who have launched whole-of-economy digital ID frameworks.

Both the Ministry of Home Affairs and Ministry of Communications and Information (Kominfo) have expressed strong interest in designing and launching an official digital ID system or ecosystem. In the absence of such a system, online service providers are using unreliable and insecure mechanisms to verify the identity of Indonesians online, such as requesting customers to...
take selfies holding the national ID card (KTP-el). While this is a practical workaround, some fintech providers have reported that as many as 60 percent of customers provide selfies that are unreadable or require manual intervention, such as a video call, creating unnecessary expense and challenges. More recently, licensed e-signature providers have begun offering basic digital ID authentication services (i.e., going lower in their value chain), but these are based on commercial relationships with the service providers and require the charging of higher fees in order to make a profit. Other third parties have emerged offering ID authentication services, but again these charge substantial fees. For example, the Kartu Prakerja website had to purchase facial recognition services from a private company when it rolled out applications during the COVID-19 pandemic. Similar constraints exist for face-to-face transactions, as Dukcapil has not yet launched biometric authentication or electronic know-your-customer (e-KYC) services at a national scale.

There is substantial demand for digital ID in Indonesia across the public and private sectors. E-KYC and digital ID remains one of the priority issues for the financial sector, from banks to fintech companies. Likewise, government agencies such as BPJS Employment and BPJS Health are trying to transform the way they offer services to citizens, including by shifting to online channels, but are hampered by the absence of an accessible and affordable digital ID system. At the regional level, there is an opportunity for mutual recognition arrangements to enable cross-border transactions as a stepping-stone toward a broader ASEAN-level arrangement, as has been alluded to in the ASEAN Digital Masterplan for 2025. Beyond ASEAN, there is also an opportunity for mutual recognition arrangements with the European Union (eIDAS), Australia, the United States and Canada, among others.
Digital upgrade of government can fundamentally transform the quality of citizen-state interactions.

Another important and broader pathway to harnessing digital technologies for greater inclusion is by enabling these technologies to fundamentally transform the quality of citizen-state interactions. This could be for specific services, such as education, health and social protection as discussed above, but also for a whole host of other services that could be improved significantly by a broader digital transformation of government. The key challenge will be to transition from the current siloed structure of multiple, incompatible government information and data management systems to a whole-of-government, platform-based approach, which has emerged as best practice in many economies globally. Related to that is the need to establish clear leadership and coordination for government digital services.

Over the years, the Government has made several efforts to digitize government services. While some of these first-generation efforts have been moderately successful in their respective objectives, they have been limited in terms of their scope and often ad hoc in nature. These attempts to digitalize, often at the behest of an agency-head or a subnational entity lead championing the effort, have resulted in a proliferation of information systems, websites, apps and platforms that have very limited interoperability at the front end and create significant duplication of effort and investment at the back end.

In the past two years, the Government has made efforts to address these digital government issues. One concrete step in this direction is the issuance of Presidential Regulation No. 95/2018 on e-Government and Presidential Regulation No. 39/2019 on One Data. The objective of the regulation on e-government is to implement an integrated e-government system by, among others, getting all government agencies to adopt a common and interlinked enterprise architecture, co-using IT systems and establishing a national coordination team. The thinking on digital transformation as embodied in the e-government initiative focuses to a large extent on the digitization of existing internal government processes. However, the journeys taken by countries such as the UK and Singapore, among others, suggest a fundamental reimagining of processes, procedures and structures considering what digital technologies make possible may be needed for transformation to be realized.

Global experience also shows that digital transformation of government is a complex undertaking involving multiple stakeholders. In Indonesia the public sector’s institutional structure is particularly complex and highly fragmented with multiple agencies having overlapping mandates. This fragmentation naturally also makes coordination a major challenge, which increases the complexity of completing even the simplest of tasks that require cooperation among different stakeholders. For example, in more than two years since the e-Government Regulation was promulgated, the e-government coordination team, which consists of seven-line agencies with MenPAN-RB in the coordinating role, has been unable to convene and agree upon the shared vision of e-government implementation. In the absence of coordinating body such as the Government Digital Service (GDS) in the UK or GovTech in Singapore with authority over all relevant stakeholders to overcome these coordination challenges, the digital transformation agenda in Indonesia has not been able to take any concrete shape and form, much less gather any real momentum.

Similarly, Indonesia does not have a clear whole-of-government data management policy. Presidential Regulation No. 39/2019 on One Data goes some of the way toward addressing this, but fragmentation remains an issue and several implementation challenges remain to be worked out. Each sector is responsible for its own data management, and guidance on cross-sectoral data sharing and utilization is often missing. The One Data regulation grants Bappenas greater authority to regulate, monitor, and enforce data governance across all government agencies. Recently issued implementing regulations also shed some light on the intersectionality of this regulation with other initiatives, such as the Regulation on E-Government/Digital Government (Presidential Regulation No. 95/2018), the Electronic Transaction Law and its implementing regulation (PP No. 82/2012 and its revision PP No. 71/2019), the forthcomin Personal Data Protection Law, the Population Administration Law, the Digital Payment Regulation, and the Omnibus Law. However, some of the key strategic datasets are maintained by various government institutions and the One Data regulation is ambiguous on the role of these administrative entities.
“Presidential Regulation No. 39/2019 on One Data goes some ways in strengthening Indonesia’s data management policy, but fragmentation remains an issue and several implementation challenges remain to be worked out”
What can Indonesia do?

→ Policies to Leverage DTs for Greater Inclusion

The analysis presented in this report points to three key policy principles to ensure that no one is left behind: (i) improving digital connectivity and universalizing access; (ii) enabling the medium to generate economic opportunities for all and unlocking citizen capabilities to seize these opportunities; and (iii) harnessing the medium to upgrade the quality of citizen-state interactions and improve service delivery. Some specific and actionable reforms to implement these principles are discussed below.
addressing the digital divide and making affordable and high-quality internet available to all Indonesians will require regulatory reform in three key areas: (i) spectrum management, specifically sequential freeing up of spectrum in specific bands; (ii) greater regulatory clarity on provisions for active and passive infrastructure sharing; and (iii) greater competitiveness and regulation of the telecom industry more broadly.

**Optimize spectrum allocation for mobile broadband.**

Under the recently enacted Omnibus Law on Job Creation No. 11/2020, reform of spectrum management is on the right track for optimization of spectrum allocation. The law also imposes a mandatory two-year plan to convert analog television to digital television in order to secure digital dividend in the 700 MHz spectrum band. Release of the 2.6 GHz band, currently used for satellite TV, would add capacity in urban centers and alleviate network congestion. Menkominfo should consider accelerating its plans for reallocation of this band from satellite broadcasting to mobile broadband before the current end of the spectrum license in 2024. Securing 3.5 GHz band spectrum will require consultation with current C-Band satellite users. Over time, some form of sharing should be considered with use of this band for mobile services in urban centers and for satellite services in those rural areas that still require C-band connectivity. This would add further capacity and enable introduction of 5G. Finally, the GoI should prepare to make available the mmWave spectrum in the 24-29 GHz band to enable immediate deployment as soon as the industry is ready for 5G mmWave services.

Consistent with International Telecommunications Union (ITU) recommendations, Indonesia should endorse an overall target for available IMT spectrum of at least 840 MHz plus allocations of mmWave spectrum as soon as possible and certainly no later than 2024. Such allocations should be made in larger contiguous blocks in accordance with future best practice. MNOs should also have the flexibility to use their allocated IMT spectrum for mobile broadband and/or fixed wireless access (FWA) services. High speed FWA services using 4G/5G technologies are proving globally to be a very competitive product with fixed broadband services.

**Strengthen mechanisms to ensure sharing of active and passive infrastructure.**

Tower sharing for mobile broadband networks was mandated in 2009 and has been deployed at a large scale but sharing other passive infrastructure, such as ducts, poles, etc. (required for fiber optic networks) between providers will likely remain limited without further regulatory reform. The 2009 Tower Sharing Regulation brought efficiency improvements to deployment of towers with some sharing of passive infrastructure across sectors, between (rail)roads and fiber optic, and electricity poles and fiber optic. But sharing between telecom operators lags behind, despite a joint letter issued by Menkominfo and MoHA in 2018. The Omnibus Law mandates passive infrastructure sharing through a change to the Telecom Law Article 34A and B, but implementation of the associated provisions will require inter-agency coordination among national agencies and local governments. Separately, active infrastructure sharing would promote competition in mobile broadband services in rural/remote areas but is currently not allowed under Telecom Law PP 52/53. The Law requires in many cases separate
Several crucial interventions will be required to make the digital economy work for all.

Support the development of logistics.

Reducing the cost of logistics to enable an efficient and cost-effective movement of goods across the archipelago will enhance the impact e-commerce can have on boosting the productivity of small and micro-entrepreneurs, especially those in the lagging places of the country. Continuing to develop basic physical infrastructure to improve connectivity through strengthened and/or rehabilitated infrastructure such as roads, ports and electricity will remain a crucial foundation of this effort. This may also require leveraging private sector capital and expertise, as appropriate through public-private partnerships. Separately, fostering an innovation environment that is conducive to the scaling of the several e-logistics that are emerging to provide customized solutions to connect enterprises to market will also be important.

Nurture digital skills and skills for the 21st century.

Institutional action and policies also need to recognize that digital skills are a subset of a broader skillset needed for the 21st century digital economy. The exponential pace of technological change today makes it hard to anticipate which job-specific technical, digital and other skills will thrive and which will become obsolete in the near future. As a result, the ability to adapt quickly to changes is increasingly valued by the labor market. As such, the most sought-after trait globally is adaptability—the ability to respond to unexpected circumstances and to unlearn and relearn quickly. This trait requires a combination of certain cognitive skills (critical thinking, problem-solving) and socio-behavioral skills.
(curiosity, creativity). Indeed, the top five skills and skill groups that executives in Indonesia’s largest companies see as rising in prominence in the lead-up to 2025 are creativity, originality and initiative, complex problem-solving, active learning and learning strategies, emotional intelligence, and analytical thinking and innovation.64

Modern tertiary education needs to cultivate in students a minimum threshold of foundational “transferable” higher-order skills for the 21st century digital economy, even in STEM fields. Technology and integration have increased the demand for higher-order general cognitive skills—such as complex problem-solving, critical thinking, and advanced communication—that are transferable across jobs. Therefore, the combination of general and technical skills is becoming highly valued (World Bank 2019). Tertiary education systems should therefore guarantee a minimum threshold of transferable cognitive skills, which are also the best inoculation against job uncertainty. Incorporating more general education in tertiary programs is one way to do this.

An additional year of general education was added in 2012 to undergraduate programs in Hong Kong and China, focusing on problem-solving, critical thinking, communication, leadership, and life-long learning skills and with early assessments showing positive results.65 Another way is through innovative pedagogy. The Faculty of Architecture and Environmental Design at the College of Science and Technology, University of Rwanda, has promoted learning strategies that include open-ended assessments, feedback opportunities, and a progressive curriculum that balances academic challenges with student support. These approaches have improved the critical-thinking skills of students. Forward-looking universities are finding ways for adult students to acquire a broad set of socio-behavioral skills. Vocational colleges in the Netherlands are providing entrepreneurial courses aimed at improving noncognitive skills such as teamwork and self-confidence. Tunisia has introduced an entrepreneurship track that combines business training with personal coaching to reshape the behavioral skills of university students.66

Close collaboration between industry and tertiary education is critical. The low quality of TVET and tertiary education in Indonesia has been linked to, among other factors, lack of competency frameworks developed in consultation with the private sector. Inadequate labor-market information and intermediation make it hard to align curricula and teaching with the occupations and skills that are most needed. Private sector participation in tertiary education planning and policy is thus a requisite both at a strategic and technical, curricular level. In China, for example, Lenovo is working with tertiary institutes to train vocational students in high-tech areas, such as cloud computing, that feature practice-based curricula, practitioner-led instruction, and professional certification.67 The GoI also needs to incentivize employers to offer internships and off-campus learning to students. Second, filling in information gaps during the job-search process enables students to make better choices between and within different paths. Chile is establishing online platforms where students can access information on the employability of individuals with various degrees, wage profiles, and courses to take for certain occupations. Colombia’s Jóvenes en Acción (Youth in Action) program combines classroom instruction with on-the-job training at private companies. Indonesia needs to continue to develop data systems that allow for the identification of occupations and skills that are most in demand, monitor educational institutions’ compliance with quality standards, and ensure that the information on employability of degrees, wage profiles, and occupation-specific courses is available to both jobseekers and workers.

Promote the use of digital financial services/payments, including among the unbanked and the underbanked.

Financial exclusion and low uptake of digital payments impedes the growth of the digital economy and locks out a significant propor-
ation of the population from participating and benefiting from it. For many Indonesians, especially those in the lower parts of the distribution, not having a bank account is already a major setback. The variety of efforts underway to improve the supply of digital payments and a broader suite of financial services remain important entry-points. One promising digital solution is the reduction in verification costs that could come from widespread availability of e-KYC option and a strong and reliable digital ID system. Second, for those already banked, including some of the more sophisticated users, trust in online transactions and issues related to data privacy, cyber security and financial integrity represent another barrier that needs to be overcome. While the Financial Services Authority (Otoritas Jasa Keuangan, OJK) has been trying to strengthen the legal and regulatory framework for DFS, consumers still regard the disclosure of personal ID to service providers as a major risk. In this regard, the passing of the draft Law on Personal Data Protection will be critical for promoting the adoption of DFS in Indonesia. Third, improving the interoperability of payment systems can stimulate use cases and increase transactions volume. An incidental benefit of this could also be an improvement in the viability of the agent-based model, which is crucial to expanding DFS access, especially among the underserved demographic for whom this model has shown to help overcome knowledge and trust deficits. Finally, investments in financial literacy programs should continue to remain shared responsibilities of the regulator as well as market participants and should cover material on the variety of financial products and services but also of the risks: financial risks such as online fraud, digital footprint, overborrowing; digital financial risks associated with protection of personal information; and consumer risks and associated redress procedures.

Use tax policy instruments to ensure level playing field.

A well-designed system of taxation for the digital economy can help level the tax playing field between conventional and online businesses; within online businesses, between goods and services; and between resident and non-resident businesses. This will reduce the distortive impact taxation may have on the economy, helping to ensure that sales, profits, and investment decisions in the digital sector are driven by market dynamics and efficiency improvements, and not by advantages gained through uneven taxation policy or taxpayer avoidance. In the Indonesian context, two incidental benefits are equally relevant. First, taxation of the digital economy will bring in a small but growing amount of revenue as digitalization accelerates within the Indonesian economy, especially in the context of COVID-19 pandemic. E-commerce in Indonesia, for example, is projected to have grown by 54 percent during 2020, reaching US$32 billion, at a time when private consumption in the overall economy has suffered, falling by an estimated 2.7 percent overall. Second, taxation of the digital economy presents Indonesia with a unique opportunity to boost formalization of businesses, particularly that of MSMEs. Registered businesses will enjoy the benefits of having easier access to credit from the financial system, and of potential future fiscal support from the Government.

Indonesia is taking measures to reform its tax policy and modernize its tax administration to deal with the challenge of intangible transactions for VAT. Indonesia’s broad policy position was reflected in Law No. 2/2020, which provided the legal umbrella for imposing VAT on digital goods and services provided by foreign suppliers. Minister of Finance Regulation No. 48/PMK.03/2020 (hereafter PMK-48) and DGT Regulation PER-12/PJ/2020 (hereafter PER-12) provided the next levels of policy and implementation details. They applied the ex-
isting VAT statutory rate of 10 percent on all intangible taxable goods and all taxable services that are provided by foreign suppliers through an electronic system. Both foreign and domestic digital platforms are required to collect the VAT on behalf of foreign suppliers, subject to being appointed as “VAT Collectors” by the DGT. To date, companies that have been asked by the DGT to serve in this capacity include Amazon, Facebook, Google, LinkedIn, McAfee, Netflix, Skype, Spotify, Twitter, and Zoom. The qualifying criteria for being appointed a VAT Collector are based on: (i) annual sales volumes of at least IDR 600 million for digital goods and services in Indonesia (or IDR 50 million in a month); or (ii) online traffic volumes involving at least 12,000 users within Indonesia in 12 months, or 1,000 users in one month. To support compliance with the reforms, the DGT has introduced several administrative measures. Likewise, to deal with the challenge of low-value shipments Indonesia has lowered its minimum threshold from US$75 to US$3. In so doing, Indonesia has become an early mover in this reform space, following on from Australia, which was the first to slash its GST threshold from AU$1,000 to zero from July 2018. The EU has followed suit, with its previous exemption of consignments of less than €22 abolished from January 2021 onwards. To allow VAT to be levied, all imports into the EU now must be declared using an electronic customs declaration. To ease the implementation burden, the EU has also introduced a simplified customs declaration form for all declarations of goods up to €150. In Indonesia, implementing the new rules without overwhelming the customs administration or creating unnecessary burdens on business will be more challenging, requiring effective risk management. Experience from Australia and the EU may provide the GoI with some useful lessons.

The effectiveness of these instruments—in generating additional revenue, as well as in leveling the playing field—will depend on its ability to effectively manage compliance with the new requirements. Two measures can help in this regard. First, the GoI will need to ensure adoption and communication of consistent rules, leverage an efficient IT system to administer registration, filing, and payment, and combine digital transaction data with other third-party data and taxpayer data to enhance compliance risk management. Second, Indonesia’s overly generous VAT threshold needs to be reviewed to expand the digital economy tax base. Indonesia’s VAT threshold of IDR 4.8 billion stands out in international comparisons of VAT thresholds to GDP per capita, a metric commonly used to compare the generosity of VAT thresholds worldwide. Less-developed economies tend to have higher thresholds, in part because of weaknesses in tax administration and in part because they have larger informal economies. However, even when compared against low-income economies, Indonesia’s VAT ratio stands out as being too generous. A high threshold means that a vast share of businesses whose annual turnover is below the VAT threshold are excluded from the VAT system, narrowing the base and distorting the tax. This distortion is even greater when the threshold is applied to e-commerce in Indonesia, which is characterized by a large share of small companies. Overall, design and implementation of digital economy taxation reform must be geared around the core principles of equity, efficiency, and simplicity, so that Indonesia’s economy and society can share in the benefits of digitalization. Over time, as digitalization expands, the demarcation between the digital economy and the economy at large will become increasingly blurred and eventually dissolve. This evolving reality makes it ever more important that the GoI gets taxation reform right. This means ensuring that tax policy and administration meet the principles of good taxation. Create an uneven playing field of taxation, for example, by having different tax rates on online and offline businesses, or by enforcing rules on cross-border businesses but not on domestic ones, and Indonesia will end up with a tax system that detracts from the organic, healthy growth of the digital economy. Revenue lost to special incentives that favor the select few
will mean less financing for the critical public investments need to enable inclusive growth of digitalization. Ultimately, taxation must not distort business decisions on how to operate, and it should not alter consumer choice on what and where to buy—whether it be from a supermarket or a hypermarket, an online marketplace or via an online social media app. Taxes imposed must be fair and equal, and administered with a minimum burden on all.

Overall, design and implementation of digital economy taxation reform must be geared around the core principles of equity, efficiency, and simplicity, so that Indonesia’s economy and society can share in the benefits of digitalization.

This can start with a (i) concerted push on a whole-of-economy national digital ID initiative; (ii) a thorough re-imagination of whole-of-government approach to digital transformation driven by an agency empowered to resolve interagency coordination challenges; and (iii) a special recognition and focus on the question of data integration which is an essential bedrock of any effort to digitally modernize government functions and services.

Develop a national digital ID framework.

Indonesia needs to launch a national digital ID initiative, bringing together various government stakeholders, the private sector and civil society to chart out the optimal path for Indonesians to be able to prove their identity over the internet and thus carry out trusted online transactions. The status quo constrains growth of the digital economy and introduces additional costs and risks for service providers interacting with customers over the internet, including identity fraud. Thailand offers a useful example: its National Digital ID initiative was born out of the National Digital Economy Committee chaired by the Prime Minister. Similar digital ID initiatives have been launched out of agencies attached to heads of government, such as SingPass by the Singapore Government Technology Agency (GovTech) and United Kingdom’s Verify by the Government Digital Service (GDS). An initiative in Indonesia would ideally be spearheaded by the Kantor Staf Presiden (KSP).
with central roles for the Ministry of Home Affairs as the authority responsible for population data (i.e., the legal identity of Indonesians), and the Menkominfo as the authority responsible for regulating electronic transactions, and also involving the Ministry of National Development Planning (Bappenas), the Coordinating Ministry for Economic Affairs, Bank Indonesia and OJK.

Improvements to the national ID system will create a strong base on which to introduce a digital ID system or ecosystem. It contains the population data on which digital IDs can be issued — by the Government and/or the private sector — with high levels of assurance. This seamless onboarding simplifies and significantly reduces the costs of introducing digital IDs in Indonesia. For the national ID system to realize its full potential to support service delivery and underpin a new digital ID system throughout Indonesia, the GoI will need to decide whether to build a centralized digital ID system implemented exclusively by the GoI (likely Dukcapil), or a federated, multi-stakeholder ecosystem implemented by multiple digital ID providers but still regulated by the Government through a trust framework of laws, rules and standards, with the possibility of limiting public sector transactions to a digital ID issued by Dukcapil.

One area that requires urgent attention is that Indonesia does not yet have a comprehensive data protection law with general applicability. This undermines trust in any kind of collection, processing and sharing of personal data, which are core functions of a digital ID system, as well as the digital economy more broadly. A draft Law on Personal Data Protection was submitted by the President to Parliament at the end of 2019 — a bill that was largely modelled on the EU’s General Data Protection Regulation (GDPR). An essential feature for the credibility and strength of such a law would be an independent oversight entity, similar to the Office of the Australian Information Commissioner and the Singaporean Personal Data Protection Commission. Such a law will help to ensure public trust and confidence in the existing national ID system, as well as any future digital ID system and the digital economy more broadly, by providing safeguards and accountability for the collection, use and sharing of personal data, as well as formalizing the rights of data subjects.

Reorient from a narrow focus on e-Government to a comprehensive national digital transformation agenda.

The GoI is strongly recommended to consider a fundamental transition from the current narrow focus on e-government to a comprehensive National Digital Transformation agenda. Given the complexities, this can be implemented in phases. The current e-government initiative that is chaired by the Ministry of Administrative and Bureaucratic Reform (MenPAN-RB) focuses on the digitization of internal government processes. Looking at the scope in the e-Government regulation, the role fits the main duties and responsibilities of MenPAN-RB, which includes the management of government business processes. However, if the GoI aims to achieve truly comprehensive digital transformation of the nation, it will need to shift the paradigm towards digital government and rearrange its vision, governance, and delivery model to better suit that aspiration. Such a commitment would reorient Indonesia in the same direction as that taken by digitally advanced countries, such as Singapore, the United Kingdom, Australia, Estonia, the Republic of Korea and Canada. The digital government platforms would serve as the foundation of digital services in the economy such that both public sector institutions and private enterprises can take advantage of these platforms to deliver services to every citizen.

A short-term priority may be to continue to strengthen the role of MenPAN-RB in orchestrating and delivering the existing e-government mandate. However, in parallel, Indonesia needs to create the regulatory and institutional frameworks necessary to imagine, articulate and imple-
ment a comprehensive transformation agenda. To start with, a presidential regulation could be prepared to mandate: (i) the development of a National Digital Transformation strategy; (ii) the establishment of a policy-making entity; and (iii) the establishment of an implementation entity. The policy-making entity—a Digital Transformation Taskforce (DTT)—would ideally be attached to the Office of the President, overseeing and, if possible, consolidating and streamlining the governance structure of existing digital initiatives, such as the e-Government agenda led by MenPAN-RB, One Data led by Bappenas, Online Single Submission, and the One-Map Policy led by CMEA. This would reduce the fragmentation that characterizes the governance structure of these initiatives, which has led to ineffective and unnecessarily complex implementation at a high cost to coordination. Finally, the implementation arm of the DTT would be a Digital Transformation Implementation Agency (DTIA), similar to agencies in Singapore (GovTech) and the United Kingdom (GDS). DTIA would be responsible for delivery of cross-sectoral digital services, i.e., platforms and supporting technologies for sectoral ministries to host and operate their digital services. It would also serve as the ecosystem builder for the delivery of sector-specific digital services, coaching and assisting sectoral ministries to develop quality, and standardized digital services for citizens. Both DTT and DTIA need not be newly established entities. Existing entities within the public sector could be empowered to play the role. Irrespective of the model that is chosen, the most crucial part of the reform would be to ensure that the institutional arrangement facilitates a whole-of-government approach and eliminates fragmentation.

**Transition towards a whole-of-government data management policy.**

To this end, Bappenas could strategize to effectively to develop and implement subsidiary regulations and also rally support for the One Data agenda. Specifically, Bappenas could apply the One-Data policy comprehensively in priority sectors relevant in managing the COVID-19 pandemic and revitalizing the economy (education, health, MSMEs, and social protection). Appointing a data steward in each sector, assisting the stewards to develop a master data reference for each sector and data standards, and to enforce the standards, and assisting policy makers in these sectors to draw insights from improved data management, which can then be used for expansion to other sectors could be some concrete steps. Building alliances with key institutions such as MenPAN-RB, Menkominfo and MoHA, to instill One-Data principles into implementation of the Digital Government and Digital ID initiatives could be other measures. Bappenas could also work closely with MoF during the execution of shared planning and budgetary roles to identify and/or filter out programs and activities that lead to duplication or inefficient production of data.

Finally, doubling down on reforms related to the analogue foundations of the digital economy is crucial to ensuring that digital technologies do not end up accentuating existing inequalities. A key finding of the report is that inequality in access to the digital medium and the ability to benefit from this medium mirrors existing dimensions of inequality—across groups, regions, income classes and skill levels. This implies that the non-digital structural constraints that have long been realized as key barriers to inclusive development continue to remain important determinants of how effectively Indonesia is able to harness the digital dividends for its poor. Investments and reforms directed toward a stronger economic integration of the country, reforms related to trade, competitiveness and the overall business environment, investments to improve the quality of Indonesia’s human capital, reforms to improve the effectiveness of the state will not only enhance Indonesia’s digital dividends but also ensure that these are shared equitably across the population. In that sense, digital technologies should not be seen as tools that can be used to leapfrog and circumvent conventional development challenges, but rather as complementary tools to effectively address some of them.
The digital divide does not have to be Indonesia’s destiny.
Summary of Policy Recommendations

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<thead>
<tr>
<th>Priority Objective</th>
<th>Improve Digital Connectivity to Universalize Access</th>
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<tr>
<td>1</td>
<td>Optimize spectrum allocation for mobile broadband</td>
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<tr>
<td>Implement the “Analogue Switch Off” by the end of 2022 in accordance with the Omnibus Law so as to free up the 700MHz band for greater rural connectivity using 4G and future 5G networks.</td>
<td>RESPONSIBLE AGENCIES: Kominfo</td>
</tr>
<tr>
<td>Optimize the higher frequency capacity bands, starting with the freeing up of the 2.6 GHz band, followed by the 3.4-3.8 GHz band and potentially the broader 3.3-4.2 GHz band to facilitate 5G deployment in urban areas. Consideration should be given to the release of the mmWave spectrum bands for 5G in urban areas.</td>
<td>RESPONSIBLE AGENCIES: Kominfo</td>
</tr>
<tr>
<td>2</td>
<td>Strengthen mechanisms to ensure sharing of active and passive infrastructure</td>
</tr>
<tr>
<td>Update the Telecom Law, PP 52/53, to allow for sharing of active infrastructure on a B2B basis.</td>
<td>RESPONSIBLE AGENCIES: Kominfo, MoHA, Ministry of Public Works</td>
</tr>
<tr>
<td>Implement through regulations the passive infrastructure sharing mandated under the Omnibus Law</td>
<td>RESPONSIBLE AGENCIES: Kominfo, MoHA, Ministry of Public Works</td>
</tr>
<tr>
<td>3</td>
<td>Strengthen competition along the broadband value chain</td>
</tr>
<tr>
<td>Review current licensing regime and transition toward international best practice of single/unified licensing to allow a larger number of providers to deliver the full portfolio of services.</td>
<td>RESPONSIBLE AGENCIES: Kominfo</td>
</tr>
<tr>
<td>Appoint an independent regulatory body for the telecom sector consistent with exemplar practice and Indonesia’s RCEP commitments</td>
<td>RESPONSIBLE AGENCIES: Kominfo</td>
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### PRIORITY OBJECTIVE II

#### Make the Digital Economy Work for All

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<td><strong>1</strong></td>
<td>Support the development of logistics</td>
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<td><strong>2</strong></td>
<td>Nurture digital skills and skills for the 21st century digital economy</td>
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**1. Support the development of logistics**

- Continue to develop basic physical infrastructure to improve connectivity through strengthened and/or rehabilitated infrastructure (roads, ports, and electricity), leveraging private sector capital and expertise as appropriate through PPPs

**RESPONSIBLE AGENCIES:**
- Ministry of Transport
- Directorate General of Highways
- Ministry of Public Works and Housing

- Deepen reforms to reduce entry barriers to logistics and transportation services and build long-term investor confidence, to expand warehousing outside of large metropolitan areas

**RESPONSIBLE AGENCIES:**
- Ministry of Transport, with support from Ministries of Trade and Finance and the Coordinating Ministry of Maritime Affairs and Investments

- Continue to modernize the National Post Service; standardize addresses and postcodes

**RESPONSIBLE AGENCIES:**
- Ministry of Communication and Informatics

**2. Nurture digital skills and skills for the 21st century digital economy**

- Align non-formal education services and lifelong learning with needs of the working-age adult population, adopting a modular approach to course offerings with an emphasis on soft skills in addition to technical digital skills, incorporating employment-specific digital skills relevant for Indonesia, emphasizing a mindset of continuous learning, and offering opportunities to practice “self-managed” learning

**RESPONSIBLE AGENCIES:**
- Ministry of Education and Culture
- Ministry of Manpower

- Ensure that tertiary education offers a minimum threshold of foundational “transferable” higher-order skills such as critical thinking, problem-solving and communication, even in STEM fields

**RESPONSIBLE AGENCIES:**
- Ministry of Education and Culture

- Build partnerships between tertiary institutions and the private sector to train vocational students in high-tech areas using practice-based curricula, practitioner-led instruction, and professional certification

**RESPONSIBLE AGENCIES:**
- Ministry of Education and Culture/Private Sector

- Incentivize employers to offer internships and off-campus learning to students

**RESPONSIBLE AGENCIES:**
- Ministry of Education and Culture/Ministry of Manpower

- Continue to develop data systems that allow for identification of occupations and skills in demand, monitor educational institutions’ compliance with quality standards, and ensure that information on employability of individuals with various degrees, wage profiles, and occupation-specific courses is available to jobseekers and workers

**RESPONSIBLE AGENCIES:**
- Ministry of Education and Culture/Ministry of Manpower

- Continue to develop basic physical infrastructure to improve connectivity through strengthened and/or rehabilitated infrastructure (roads, ports, and electricity), leveraging private sector capital and expertise as appropriate through PPPs

**RESPONSIBLE AGENCIES:**
- Ministry of Transport
- Directorate General of Highways
- Ministry of Public Works and Housing

- Continue to modernize the National Post Service; standardize addresses and postcodes

**RESPONSIBLE AGENCIES:**
- Ministry of Communication and Informatics

- Deepen reforms to reduce entry barriers to logistics and transportation services and build long-term investor confidence, to expand warehousing outside of large metropolitan areas

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- Continue to modernize the National Post Service; standardize addresses and postcodes

**RESPONSIBLE AGENCIES:**
- Ministry of Communication and Informatics

#### Beyond Unicorns: Harnessing Digital Technologies for Inclusion in Indonesia
Promote supply of DFS/digital payment solutions that cater to the unbanked and the underbanked

- Streamline the licensing and registration processes required to become a provider of digital financial services

RESPONSIBLE AGENCIES:
Bank Indonesia
OJK

- Incentivize the private sector to innovate and develop new DFS products that cater to the rural population

RESPONSIBLE AGENCIES:
Bank Indonesia
Directorate General of Taxes

- Increase use cases of DFS products in the delivery of government services (including Government-to-person payment) to sustain the commercial viability of DFS agents

RESPONSIBLE AGENCIES:
CMEA (Financial Inclusion Council)
Ministry of Social Affairs

- Standardize rules and procedures to enable interoperability of payment schemes

RESPONSIBLE AGENCIES:
Bank Indonesia

- Strengthen the legal and regulatory framework for managing risks related to data governance and privacy, cyber security and operational risk, and financial integrity, in order to build consumer trust in DFS products

RESPONSIBLE AGENCIES:
Bank Indonesia
OJK

Use tax policy instruments to ensure a level playing field

- Complete the design of measures to reform tax policy and modernize tax administration in relation to DE transactions, ensuring adoption and communication of consistent rules, institution of efficient IT systems to administer registration, filing, payment and use of digital transaction data with other third-party data and taxpayer data for strengthened compliance risk management

RESPONSIBLE AGENCIES:
Ministry of Finance (Directorate General of Taxes, Directorate General of Customs and Excise, and Fiscal Policy Agency)

- Lower the overly generous VAT threshold to expand the digital economy tax base

RESPONSIBLE AGENCIES:
Ministry of Finance (Directorate General of Taxes, Directorate General of Customs and Excise, and Fiscal Policy Agency)
Use Digital Technologies to Provide Better Services and Upgrade Citizen-State Interactions

1. Develop a national digital ID framework

- Pass the draft Law on Personal Data Protection
  RESPONSIBLE AGENCIES:
  Kominfo
  MoHA

- Launch a whole-of-economy national digital ID initiative to define the optimal model for Indonesia, bringing together government, private sector and civil society
  RESPONSIBLE AGENCIES:
  Office of the President
  MoHA
  Kominfo

- Close the coverage gaps in the national population registry database (SIAK), streamline the new registration and update processes, and introduce biometric-based e-KYC processes
  RESPONSIBLE AGENCIES:
  Office of the President
  MoHA
  Kominfo

- Introduce a national digital ID system or federated ecosystem fit-for-purpose for online transactions in the Indonesia context, building on the SIAK
  RESPONSIBLE AGENCIES:
  Office of the President
  MoHA
  Kominfo

2. Reorient from a narrow focus on e-Government to a comprehensive national digital transformation agenda

- Strengthen the political and bureaucratic influence needed to move the agenda by placing a central government authority like the Office of the President in the driving seat
  RESPONSIBLE AGENCIES:
  Office of the President

- Adopt a whole-of-government approach to digital transformation, coordinated and spearheaded by an agency that has multi-ministry oversight.
  RESPONSIBLE AGENCIES:
  Office of the President

3. Implement a whole-of-government data management policy

- Implement the One Data Policy comprehensively, in priority sectors relevant for managing the post-pandemic recovery (e.g., education, health, social protection or MSMEs).
  RESPONSIBLE AGENCIES:
  Bappenas
  BPS
  and other line agencies

- Build alliances with key institutions such as MenPAN-RB, Kominfo, and MoHA to instill One Data principles into the implementation of the digital government and digital ID initiatives.
  RESPONSIBLE AGENCIES:
  Bappenas
  BPS
  and other line agencies
References


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World Bank (2019)

Google, Temasek and Bain (2020). The same report also shows that two segments that have been affected negatively are online travel and transport, and ride-hailing services.

Indonesia’s internet economy measured by this metric grew five-fold between 2015 and 2019—a pace unmatched by any other country in the region. The estimated size of this economy, at US$44 billion in 2020, is roughly four times as large as Malaysia and five times as large as the Philippines and Singapore.

World Bank (2020a).

Tiwari et al. (2020).

World Bank (2020b).

Goldfarb and Tucker (2019).

Minges (2016).

There are various other statistics on the overall level of connectivity in Indonesia. Most estimates from the industry tend to rely on mobile and fixed-line subscription data coming from GSMA and ITU. Although there is some effort made to identify multiple connections, multiple SIM cards, etc., arriving at this statistic from subscription data alone appears quite challenging. For example, the January 2020 edition of Hootsuite reports internet penetration at 64 percent of the population. The data used here and throughout the report are based on what is perhaps the most comprehensive socioeconomic survey Indonesia conducts on an annual basis, interviewing around 300,000 households across the country for each round.

This is a decision open to the MNOs, as all IMT spectrum is now technology neutral. Indonesia’s neighbors Malaysia and Singapore will use the 700 MHz band for 5G services.

Refer to www.gsma.com/spectrum/resources/legacy-mobile-network-rationalisation/


Hootsuite We Are Social (2019).

Google, Temasek and Bain (2020) “e-Conomy SEA 2020”.

Goolsbee and Klenow (2006) and Brynjolfsson and Oh (2012)

The methodology essentially entails using the time value of leisure to estimate the opportunity cost and value of internet use. We use data from Indonesia’s labor force survey to estimate the earnings function and the time spent on the internet from the Digital Economy Household Survey conducted for this report.

Ride hailing suffered in the early days of the pandemic, but as social distancing also intensified e-commerce and food delivery services, some of the “ride-partners” in these platforms adapted by switching to delivery.

See Brynjolfsson et al. (2003) and Dolfen et al. (2017), for example.

Hjort and Poulsen (2018); Bahia et al. (2020).

Income-earners include wage employees, casual workers and self-employers whose income data are available. Income data are not available for employers with workers and unpaid workers.

Note that this is just the average increase for all workers for that type. The actual increase based on other worker characteristics, such as the industry, occupation, and whether the worker herself also uses the internet at work, could be much higher.
World Bank (2020a). The first round of the World Bank COVID-19 Business Pulse Survey (COV-BPS) was conducted in June 15 to 23 with phone interviews on a nationally representative sample of 850 formal sector firms.

World Bank (2020b). This is based on data from the first round of the World Bank-Bukalapak Digital Merchants Survey conducted between May 20 and June 27, 2020, with a total sample of 1,020 respondents.

Google, Temasek and Bain (2020).

The 2018 number is based on the national labor force survey of that year, while the 2020 number is based on the Digital Economy Household Survey, a special purpose survey conducted specifically for this report during February and March 2020.

SAKERNAS (2019).

Around 12.2 million workers alone were engaged in e-commerce activities as their primary job (SAKERNAS 2019). However, Indonesia’s National Social-Economic Survey 2019 (SUSENAS 2019) shows only 5.9 million online sellers (SUSENAS, March 2019).

Alibaba Group and World Bank (2019).

SAKERNAS (2019).

World Bank (2020c).

LSPs include transportation companies (shipping lines, ferry lines, airlines, trucking companies), as well as third-party logistics companies that coordinate multiple transportation modes, together with warehousing and other value-added activities such as packaging and sorting.

There are other measures of financial inclusion, including in Indonesia. These numbers from the World Bank Digital Economy Household Survey appear to align well with these numbers. For example, the Global Findex Database, 2017 found that 49 percent of Indonesian adults had transaction accounts. Similarly, the Financial Inclusion Insight (FII) Survey in 2018 found that 56 percent adults were owners of a bank account. Likewise, the Global Findex Database also showed that 3 percent of Indonesian adults owned mobile money accounts and there were at least 7 percent of adults who used some form of mobile banking. The numbers from the DEHS—which are based on households—appear to be in a reasonable ballpark of these numbers and, as such, provides a useful updated triangulation on the picture of financial access in Indonesia.

Pazarbasioglu et al. (2020).

Under this new regulation, foreign-produced textiles, clothes, bags, and shoes that cost a minimum of US$3 will be subject to a range of taxes and import duties with a total rate of 32.5 to 50 percent of their value. For other products worth at least US$3, the taxes and import duties will be lowered from 27.5 to 37.5 percent of their value to 17.5 percent. Goods worth below US$3 will be exempted from import duties but still be subject to some other taxes, such as value-added tax.

Australia was the first to slash its GST threshold from AUD1,000 to zero from July 2018. The EU is set to follow suit, with its current exemption of consignments of less than euro 22 to be abolished from 2021 onwards. Indonesia is among the early movers in this space. But implementing these new rules without overwhelming the customs administration or creating unnecessary burdens on business will also be challenging and require effective risk management.

Existing roadmaps on e-commerce recognize the need to promote local products, catered both to the domestic as well as overseas market. However, currently these efforts are limited to co-branded promotion campaigns by the Government in partnerships with e-marketplaces to encourage Indonesians to buy local.
For example, data from the Digital Economy Household Survey show that 77 percent of app-based food deliveries in Indonesia are found to be substituting physical restaurant experiences. This was a survey that was done before the onset of the pandemic in March 2020.

Indonesia’s VAT threshold of IDR 4.8 billion stands out in international comparisons of VAT thresholds to GDP per capita, a metric commonly used to compare the generosity of VAT thresholds worldwide. Less-developed economies tend to have higher thresholds, in part because of weaknesses in tax administration and in part because they have larger informal economies. However, even when compared against low-income economies, Indonesia’s VAT ratio stands out as being too generous. A high threshold means that a vast share of businesses whose annual turnover is below the VAT threshold are excluded from the VAT system, narrowing the base and distorting the tax.

Frank et al. (2019), Banerjee and Duflo (2019).

Autor et al. (2017). See also Weil (2018), p.9: “Where lead companies once shared gains with their internal workforce, fissuring leads to growing inequality in how the value created in the economy is distributed.” And Banerjee and Duflo (2019) p.242: “The increase in concentration (among superstar firms) thus helps explains a part of why wages are not keeping pace with GDP. The rise of superstar firms also offers an explanation for why overall wage inequality has been rising...”

The human capital gap is magnified by restrictive government policy in hiring foreign workers, limiting the ability of employers to fill the skills gap with global talent in areas where local skills are in short supply. The recently promulgated Law on Job Creation (the “Omnibus Law”) includes a provision to relax this.

Tempo (2020).

Between April and May 2020, almost 80 percent of Posyandu (integrated maternal and child health and nutrition posts at the village level) were closed. Community-based outreach activities also reported significant disruptions with more than XXX percent ceasing operation. It is also reported that 86 percent of child growth monitoring activities, 55 percent of immunization services, 46 percent of Vitamin A distribution and ante-natal services were suspended or ceased due to these health posts closing down.

Bhardwaj, Yarrow, and Cali (2020).

Asosiasi Healthtech Indonesia (2020)

The most updated data on health-tech funding was prepared in September 2019 by Tracxn. (https://tracxn.com/explore/HealthTech-Startups-in-Indonesia). Since then, there has not been any major announcement of health-tech funding, except for Alodokter’s follow-on funding by MDI Ventures in November ‘20 (https://theinsidestories.com/indonesias-alodokter-raises-series-c-funding-from-mdi-ventures/). In October 2019, Grab and Ping An announced a joint venture to launch Grab Health / Good Doctors Indonesia, but the value of the investment to Indonesia was never disclosed.

Katadata (2020a).

Katadata (2020b).

World Bank conducted mobile phone based high frequency survey of households to track the evolving impact of the COVID-19 pandemic.

Education experts and practitioners argue that online learning cannot replace offline face-to-face learning. To avail of it one requires sufficient means and technology, which can be exclusive in some countries, and there are psychological and social factors that prevent online interactions from being as effective as offline (Dhawan 2020).
The experience of massive-open-online-courses (MOOCs) provides one illustrative example. Once regarded as one of the groundbreaking educational innovations of the past decade, they have had very limited success. Completion rates have remained below 5 percent for many years now, with lack of coordination and direction considered to be among the main contributing factors (Kop, 2020).

Indeed, the Government has been experimenting with several of these efforts in both education and health. Portal Rumah Belajar is an online learning platform equipped with complete multimedia education content managed by MoEC. Universitas Terbuka, a state university focused on distance learning also offers extensive open education resources. Similarly, in health, Sehatpedia is a Government tele-consultation platform.


Aadhar, India’s digital ID system, contributed to significantly expanding financial inclusion (from 35 percent in 2011 to 80 percent in 2017), by making it cheaper and easier for people to satisfy know-your-customer (KYC) requirements for bank account opening.

Although the law does not significantly affect One Data, it will provide guidance to data stewards in particular when managing personal information. Bappenas as the coordinator of One-Data implementation is expected to monitor closely the development and incorporate elements of the Personal Data Protection Law in the One-Data technical implementation guidance.

Although there is no specific mention of One Data in the Omnibus Law, there are several provisions regarding data that are relevant. For example, the decision on wages for MSMEs is mandated to be based on consumption aggregates calculated by BPS. This means that data published by one GoI agency, BPS, will be used to set wages. Lack of clarity on due process and transparency in data production may weaken the legitimacy of official statistics and leave them vulnerable to being politicized.

For example, institutions such as the Directorate General of Civil Registry of MoHA and the Directorate General of Tax of MoF traditionally control and establish relatively more mature data management for civil registry and taxpayer datasets.

ITU (2019).


ASEAN and Plum Consulting (2021).

ASEAN (2021).

World Bank (2019).

World Economic Forum (2020).

World Bank (2019)

Ibid

Ibid

The indirect revenue gains are potentially much greater, as data from the digital economy can be combined with other third-party data and used by the revenue authority, the Directorate General of Taxes (DGT), to boost compliance and raise higher revenues across Indonesia’s main taxes, i.e., value-added tax (VAT), corporate income tax (CIT) and personal income tax (PIT).

World Bank (2021a).
For some of the companies covered, see: “Indonesia adds Twitter, Zoom to tech companies that must pay 10% VAT”, Reuters (September 8, 2020), accessed online at: https://www.reuters.com/article/us-indonesiap-tax-digital-idUSKBN25Z2CU

The newly appointed VAT Collectors are provided with a VAT Collector ID and a tax registration letter. These VAT Collectors are required to create VAT collection slips providing information on VAT collection and payment, which can take the form of a commercial invoice, billing, or order receipt to ease the burden of complying. VAT payment is made electronically using a billing code that is provided by the DGT, and can be made using IDR, USD dollar, or all other foreign currencies accepted by the DGT system. VAT Collectors are required to file quarterly reports, with at minimum data on: (i) number of users in Indonesia; (ii) amount of payments (excluding the VAT); (iii) amount of VAT collected; and (iv) amount of VAT settled to the government. The DGT is permitted to request further detailed filings on an annual basis with transaction-level data.

Australian Taxation Office (2019).

The large number of 'informal' MSMEs, not registered with government entities, and/or entrepreneurial households increasingly active on e-commerce represent significant challenges in the Indonesia context. Data from digital platforms can be a very powerful enabler of enhanced risk management when combined with customs data. Indonesia’s Directorate General of Customs is looking to do this, with an ongoing pilot involving several digital platforms focused on using e-commerce transactions data to tackle compliance risks including under-invoicing and missed declarations.

Revenue authorities with limited capacity to handle large numbers of monthly VAT filings (e.g., because they remain reliant on manual filing, and/or have limited ICT capacities to manage VAT e-filing nationwide) may set a higher VAT threshold so that fewer companies would need to register and file. An informal economy may be defined as one with characterized by firms that are not registered, and/or whose employees work without a formal contract. Informal companies have been traditionally hard to tax, since they are often 'hidden' from government reach.

“Box B.1: Why is Indonesia’s tax-to-GDP ratio so low?” in The Indonesia Economic Quarterly: Towards Inclusive Growth” (March 2018), pp. 50.


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