



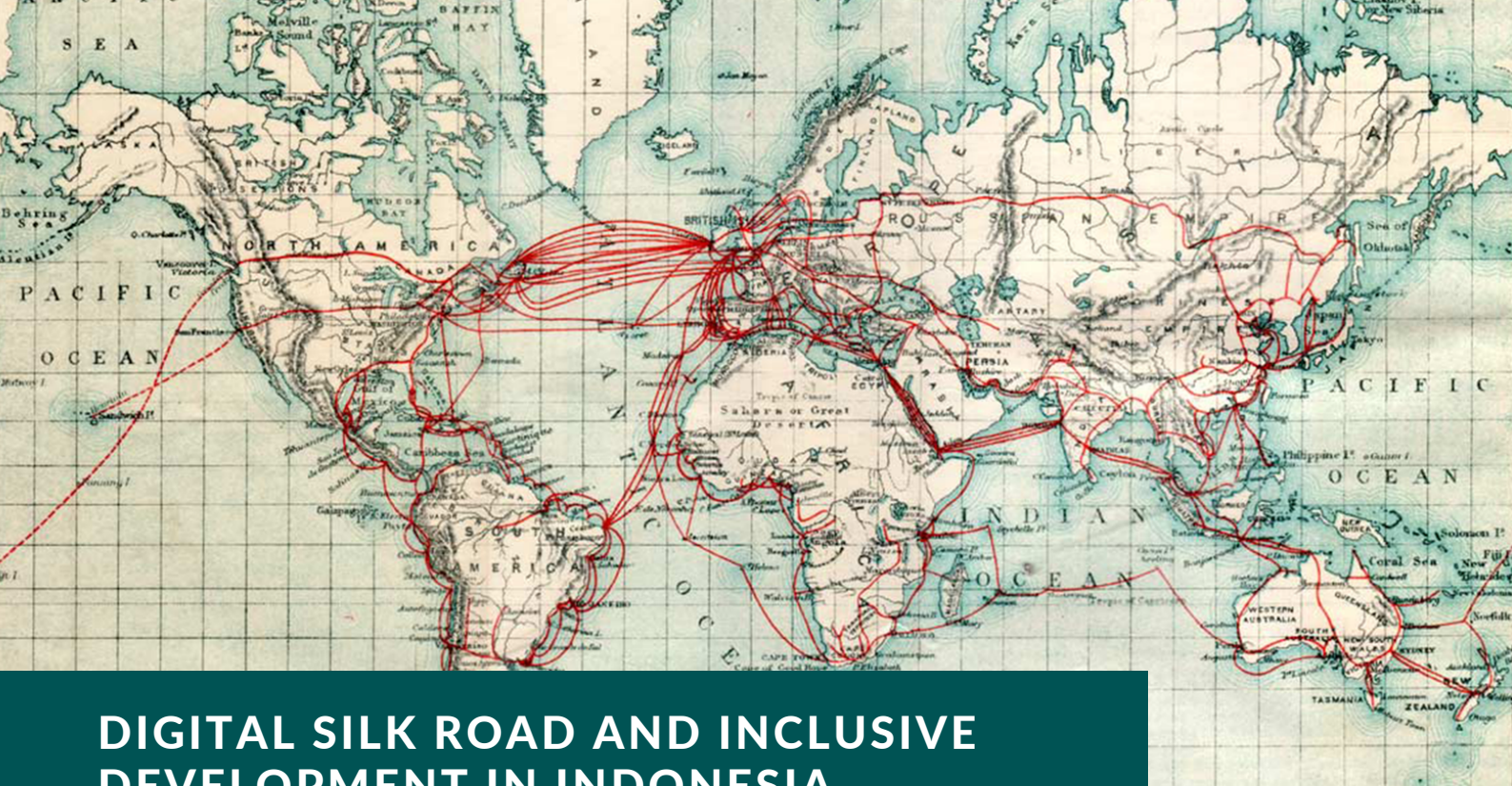
CENTRE FOR
STRATEGIC AND
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RESEARCH REPORT

DIGITAL SILK ROAD AND INCLUSIVE DEVELOPMENT IN INDONESIA



Fajar B. Hirawan, Raymond Atje, Veronika Saraswati, and Rania Teguh



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A Research Report by CSIS Indonesia

- [1] Fajar B. Hirawan
- [2] Raymond Atje
- [3] Veronika Saraswati
- [4] Rania Teguh

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- [1] Head, Department of Economics, CSIS Indonesia.
- [2] Senior Research Fellow, Department of Economics, CSIS Indonesia.
- [3] Researcher and Convenor at China Studies Research Unit, CSIS Indonesia.
- [4] Research Assistant, Department of Economics, CSIS Indonesia.

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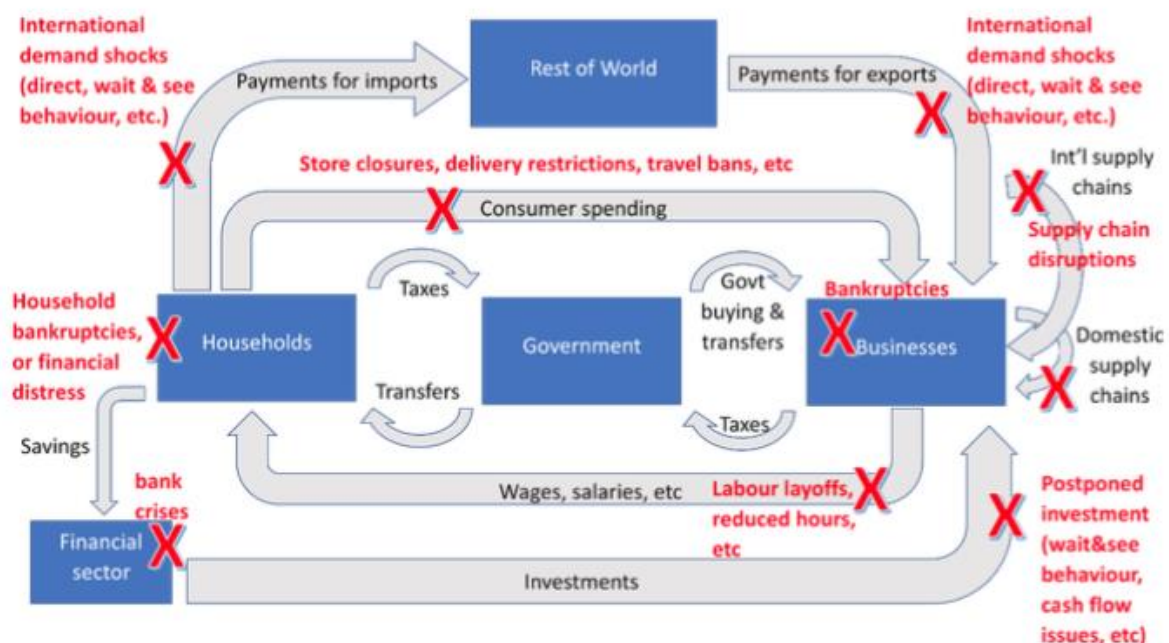
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INTRODUCTION

The world has faced several trends in the last ten years. These trends are well-known as megatrends. Megatrends, popularized in 2016 by PricewaterhouseCoopers (PWC), consists of five aspects, including the rise of technology, demographic change, rapid urbanization, climate change, and shifts in global economic power. Those five aspects then morphed into four, involving shifts in geopolitics, rise of middle-class income, rise of emerging economies, and international trade/financial integration. At the end of 2019 and early 2020, COVID-19 successfully distorted the circular flow of income in almost all sectors, from households, governments, and businesses to the rest of the world. However, Baldwin (2020) points out that even though all sectors of the economy have been affected by a flow disruption, the impact is not equally distributed throughout the system (see **Figure 1**). In addition, technology disruption during the pandemic has forced all stakeholders to innovate and be creative. In this situation, every country in the world should be able to adapt and adopt this digital transformation as one of the efforts to accelerate economic recovery and realize economic resilience.

Figure 1. COVID-19's multiple strikes in the circular flow of the income diagram



Source: Baldwin (2020)

The high level of innovation and acceleration of internet penetration in Indonesia is the backbone of the growth of the digital ecosystem in Indonesia. Google and Temasek (2021) estimate that the economic value generated by the digital economy sector will reach US\$ 70 billion in 2021, an increase of 49% from the previous year. The COVID-19 pandemic has also provided momentum for expanding Indonesians' use of digital services. There were at least 21 million new digital consumers during the pandemic in Indonesia. Data from the Ministry of Communication and Information Technology shows that at least 202.6 million Indonesians were using the internet in 2021.

In May 2017, during the opening ceremony of the Belt and Road Initiative (BRI) Cooperation Summit Forum in Beijing, President Xi Jinping highlighted the need for cooperation in innovation-driven areas such as the digital economy, artificial intelligence (AI), nanotechnology, quantum computing, big data, cloud computing and smart cities. These activities are parts of what he called a “Digital Silk Road” of the 21st century.⁵ This Digital Silk Road (DSR) is embedded in the BRI and is part of the second component of the BRI — facilities connectivity. Hence, the term digital connectivity is often used to describe how China, through digital technology, can positively promote inclusive development in BRI partner countries, including Indonesia.

Foreign investment in developing Indonesia's digital sector is prominent. The lack of access to funding from domestic sources has increased need for funding from outside Indonesia. One of the most significant funding sources is Chinese tech companies, which have been expansive in recent years in Asian countries, including Indonesia. For example, in 2017, Tencent invested US\$ 150 million in the Indonesian digital giant, Gojek. In addition, Alibaba, another technology giant from China, holds 12.6% of GoTo's shares, resulting from the merger of two Indonesian companies, Gojek and Tokopedia. Previously, Alibaba Group had also injected US\$ 4 billion into the Indonesian e-commerce platform, namely Lazada.

Not only does China invest in the form of funds for start-up companies in Indonesia, but China also invests heavily in infrastructure. Huawei is one of the players which is quite active in developing ICT infrastructure. Huawei even plays a role in the Palapa Ring Indonesia project and will build 1,600 km of fiber optic in the Kalimantan, Sulawesi, and North Maluku. The Palapa Ring is a priority infrastructure project for the government that aims to improve the availability and quality of internet infrastructure, especially in rural areas of Indonesia. In addition to supporting the development of the digital industry in Indonesia, the construction of data centers is also a priority, given the increasing importance of data in supporting digital transformation. Data is considered a new currency and is believed to shape the economy's structure and geopolitical conditions. Tencent built a data center in 2021. This followed in Alibaba's footsteps, which built its third data center in Indonesia in June 2021.

Seeing the increasing role and expansion of China tech companies in Indonesia, including those under the Digital Silk Road, it will be interesting to see the extent of their influence and to map out the investments made by China's tech companies in Indonesia, especially focusing on their impact on the development of the digital ecosystem in Indonesia. Additionally, it is interesting to assess the challenges that Indonesia faces in further developing its digital industry. For example, the challenges faced by Indonesia today include limited access to infrastructure, a regulatory framework that is broadly unsupportive of innovation, and poor digital capabilities. Indonesia's success in overcoming these problems will also be the key to attracting further investment from China and other countries.

Against this backdrop, this report primarily aims to expound on the Digital Silk Road's role in inclusive development in Indonesia. This research focuses on three related research questions: First, how the Digital Silk Road contributes to digital connectivity. Second, how the Digital Silk Road and improved

⁵ See *Xinhua*, 14 May 2017. “Full text of President Xi's speech at opening of Belt and Road Forum”, available at http://www.xinhuanet.com/english/2017-05/14/c_136282982.htm, accessed December 16, 2021. Two years earlier, in March 2015 the Chinese government published a white paper titled ‘Information Silk Road’.

digital connectivity contributes to employment, particularly youth employment. Third, how the Digital Silk Road and improved digital connectivity contributes to basic public services in Indonesia.

Digital Connectivity in Indonesia: Current Condition and Progress

Indonesia is one of the emerging economies predicted to become a new global economic power in 2045. The country is expected to become one of the five largest economies globally. Indonesia's economic growth was maintained at 5% (yoy) from 2015 to 2019. However, in 2020, the country's economy started to slow down due to the COVID-19 pandemic. Thus, the economy experienced a contraction of 2.07% (yoy). For the first time in 22 years, the economy sustained three straight quarters of negative economic growth in 2020, placing Indonesia in recession, i.e., -2.19% in the Q4, following -3.49% in the Q3, and -5.32% in the Q2. In 2021, the Indonesian economy grew by 3.69% (yoy) after implementation of expansionary fiscal policy (fiscal stimulus). Of course, this growth was still below the target and far from pre-pandemic growth.

On the expenditure side, household consumption (55-57%) and investment (28-30%) make up a large contribution of Indonesia's economy. Meanwhile, from the value-added perspective, Indonesia's Gross Domestic Product (GDP) is formed by four main sectors covering 56-58% of the economy: manufacturing, agriculture, wholesale and retail trade, and construction. Unfortunately, due to the COVID-19 outbreak, Indonesia's economy contracted by -2.07% (yoy) in 2020. Nevertheless, during that contraction, due to the shifting from physical to online activities, some sectors managed to perform better amid the COVID-19 pandemic, such as information and communication, which grew more than 10%. This signals an opportunity to develop new economic sectors that tend to have resilience amidst a pandemic, especially those related to the digital economy.

Indonesia can be the digital economy leader in Southeast Asia for two reasons: its people and businesses. Indonesia's internet user base is the largest in the region (Google and Temasek, 2018). This provides vast headroom for all digital sectors in Southeast Asia's largest and fastest-growing internet economy. Based on research reports conducted by Google, Temasek, and Bain & Company (2020), Indonesia's digital economy is estimated to reach US\$ 124 billion in 2025. In 2020, the digitalized sector was relatively more resilient amid the COVID-19 crisis since the social restrictions that were implemented in various regions encouraged adaptation to digital tools.

The main driver of the digital economy in Indonesia is e-commerce which had the most significant growth from US\$ 21 billion in 2019 to US\$ 32 billion in 2020, or equivalent to 54%. In addition, new frontiers, such as health technology (healthtech) and education technology (edutech), are expected to continue budding until 2025. Funding for these two sectors has grown in recent years as investors see momentum in their development. An example of increased investment is the US\$ 150 million funding that Ruangguru, an Indonesian startup focused on online learning platforms, received in 2019. This is one of the prime grounds for an edutech company in Southeast Asia.

This shows that the digital economy sector has excellent potential to encourage creativity and innovation in the country, contributing to job creation and economic growth. However, the digital economy needs to be supported by adequate digital infrastructure and broad stakeholder support. Digital infrastructure is critical as a foundation for computing systems, including networks, data,

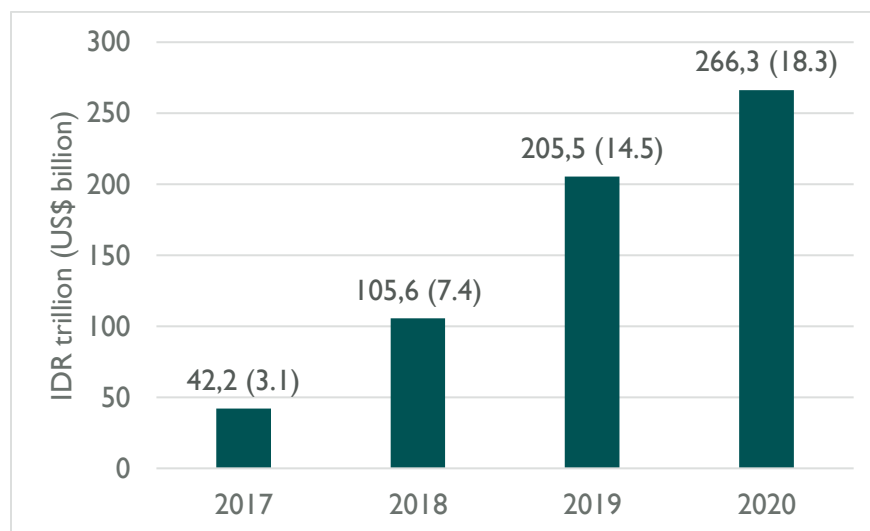
protocols, devices, services, and storage. Meanwhile, the collaboration of different stakeholders in the digital economy ecosystem plays a vital role in influencing Indonesia's digital economy.

The recent signing of the Regional Comprehensive Economic Partnership (RCEP) could also boost the country's digital economy development since it covers almost 30% of the world population, global GDP, and global trade (ASEAN, 2020). Digitalization is one of the issues raised in the RCEP agreement that has been listed as a top major topic to be realized. It will become a challenge and an opportunity for the countries joining RCEP, including Indonesia, to facilitate and manage e-commerce and digital trade policies more efficiently and effectively at national, regional, and international levels.

Digital Economy

E-commerce transactions in Indonesia have been multiplying in recent years (see **Figure 2**). In 2020, Indonesia's value of e-commerce transactions reached IDR 266 trillion (US\$ 18 billion⁶). This represents a doubling of the 2018 value of IDR 105 trillion (US\$ 7 billion). The driving factor is the increasing number of digital consumers in Indonesia, which is supported by expanding internet penetration and the acceleration of digital transformation during the pandemic. Facebook and Bain & Company (2020) reveal that Indonesia has the highest growth of digital consumers in Southeast Asia, at 15% in 2020. In contrast, neighboring countries grew in the range of 5% to 9%. Indonesia's digital consumers are estimated to reach 68% of the total population. This relatively large proportion strengthens the role of e-commerce in the Indonesian economy, especially in supporting economic growth.

Figure 2. E-commerce Transaction Value in Indonesia



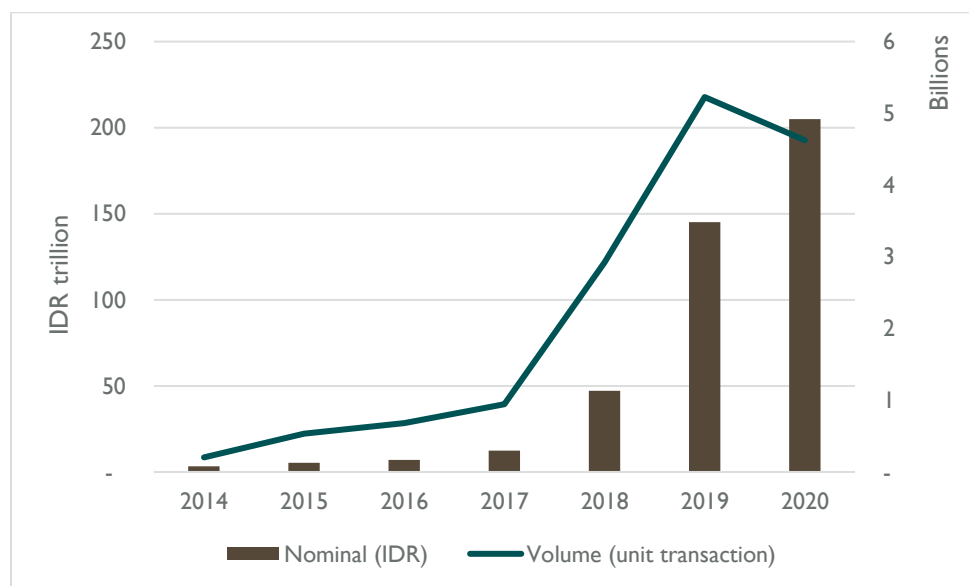
Source: Adapted from Damuri, Fauri, and Rafitrandi, 2020

⁶ 1 US\$ = 14.582 IDR, average exchange rate in 2020

Augmenting the benefits of e-commerce development in Indonesia should not be alienated from the government's crucial role, both as an accelerator and a regulator. The government has not yet achieved its role as an accelerator since—in fact—technological innovation moves faster than the government's ability to adapt. In other words, the government is presently in the stage of balancing regulation and innovation.

Digital payment usage is also massively growing in Indonesia, in particular because of social restrictions due to the COVID-19 pandemic. **Figure 3** below illustrates the value and volume of electronic transactions in Indonesia. The value of Indonesian electronic transactions in 2018 was only IDR 47 trillion (US\$ 3 billion) and soared drastically to IDR 145 trillion (US\$ 10 billion) in 2019. The number continued to increase in 2020, up to IDR 204 trillion (US\$ 14 billion), as the social restriction policy hindered mobilization. Specifically, in April 2020—a month after the implementation of Indonesia's lockdown—electronic transaction value reached IDR 17 trillion (US\$ 1 billion).

Figure 3. Electronic Transactions in Indonesia



Source: Bank Indonesia, 2021

Growth occurred not only in terms of transaction value and volume but also in the number of fintech platform users. Boston Consulting Group (2020) found that, based on active user data, the leading players of e-wallet applications in Indonesia were Gojek, OVO, DANA, LinkAja, and Jenius. One of the factors explaining the rapid adoption of payment systems is the underdevelopment of conventional financial services and friction between consumers and banking services. The reason behind underdeveloped financial services is that the credit bureau⁷ does not have creditworthiness data for low-income citizens, and banks have difficulty in verifying the creditworthiness for consumers. A

⁷ Credit scoring is the responsibility of each lender (such as conventional banking). None of these financial regulators (Ministry of Finance, Bank Indonesia, and Financial Services Authority) is responsible to provide this data, thus hindering the development of payment system.

common problem that often occurs in developing countries is the complicated process of creating a bank account, as it requires various documents—which discourages people from registering.

Digitalization brings opportunities to accelerate the development of MSMEs. As in other ASEAN countries, the Indonesian economy is primarily supported by micro, small and medium enterprises (MSMEs). In 2018, MSMEs contributed 61% to Indonesia's GDP, covered more than 99% of total enterprises, and absorbed more than 97% of the workforce. Technological progress brings opportunities to further advance MSMEs through digitalization, in which online trade can expand market access for businesses. However, based on the 2016 Economic Census, most companies in Indonesia are large firms, and only about 34% of MSMEs are operating online.

The digital transformation of MSMEs in Indonesia is still at an early stage, where digital devices tend to be limited to communication and operational tools. It seems that Indonesian MSMEs have not yet optimized digital technology to increase their capabilities (Bank Indonesia, 2020). Implementing digitalization encounters several obstacles, from both business and government. Businesses think digitalization requires more effort since time and energy must be spent to learn online features. They also consider that the costs of adopting digital technology to be relatively expensive. The government can play a role in reducing this barrier. Meanwhile, the challenge in adopting internet use by MSMEs is also coming from the government's side, specifically in terms of digital infrastructure. Stability, speed, and availability of internet connections, among other issues, are not evenly distributed throughout Indonesia, hindering the adoption of technology (CSIS, 2018).

Digital Technology

In the context of data classification, Indonesia does not seem to have an updated, overarching data management framework in place. The outdated ICT Governance General Guide by the Ministry of Communication and Information Technology (Kominfo) in 2007 is not adequate to facilitate the current needs of digital business communities. The General Guide mentioned technical specifications, budget guidelines, and human resources for data management, but the scope is limited to government institutions. There is also no measurement mechanism that can inspect the level of compliance in each institution.

While there are relevant regulations, such as Presidential Regulation 95/2018 on e-Government and Presidential Regulation 39/2019 on One Data Indonesia, those regulations were formulated in separated working groups under different initiatives (Nugroho, 2020). Some elements of data management might also be found in the controversial Electronic Information and Transactions (ITE) Law. There is currently an ICT ministerial regulation being drafted on data interoperability to standardize data-sharing platforms and mechanisms across government institutions (Ministry of Communication and Information Technology, 2020). Members of the public were invited to provide input on the regulation draft in mid-2020. The draft has not gained much traction. Moreover, it does not address the absence of a data management framework that can be implemented for both government and private actors alike. As a result, government institutions might produce their own data management regulation independently and disharmonized from other institutions. An example is the Law and Human Rights' Ministerial Decree on Electronic Data Management Standard (Ministry of Law and Human Rights, 2017).

Data harmonization has also been a persistent problem across government institutions. Due to the lack of standardization in data collection, the output produced by different agencies on a similar dataset might be different (Ristianto, 2019). The issue with unsynchronized data also often happens between government agencies on the national level and local level. Some cases also point to data differences *within* a government institution between its Information and Data Centre (Pusdatin) and other directorates. Consequentially, confusion and miscoordination within government frequently occur. This lack of data harmonization might also hinder the advancement of data-driven decision-making and policy formulation.

A welcomed regulation to address this issue within the bureaucracy is the issuance of Presidential Regulation (Perpres) 39/2019 on One Data Indonesia, aimed to harmonize and centralize all government data—national and local alike—in one portal (data.go.id). This Perpres was preceded by the One Data initiative from the Executive Office of the President. Since 2019, the secretariat was helmed by the National Development Planning Agency (Bappenas). The regulation also intends for both data protection and open data principles. All data presented in the portal are accessible to the public, while confidential or personal data integration across agencies is regulated by the Perpres. The implementation of the Perpres is supported by the Open Government Indonesia initiative (also attached to Bappenas), which aims to implement pilot projects on One data at the provincial level (NTB, Riau, East Java) and regency level (Semarang, Banggai, Brebes) (Ministry of National Development Planning of the Republic of Indonesia, 2021).

The necessity of a regulatory framework to onboard the use of new technologies in public and private sectors in Indonesia is intensifying. In 2018, a survey from the International Data Corporation had placed Indonesia as the highest Artificial Intelligence (AI) adopter in Southeast Asia at 25%, significantly higher than Thailand's 17%, Singapore's 10%, and Malaysia's 8%, and in the context of Indonesia being the most populous country in the region. The top uses of AI were algorithmic market forecasting and automated asset and infrastructure management. Business is clearly the top driver for Indonesia's leading AI adoption, and most of it can be credited to the private sector. 52% of the respondents said that their reason for adopting AI was to "discover better business insights." Other drivers include "improving productivity" and "enhancing processes automation." Not only does the private sector adopt AI earlier than the public sector, it also uses it more broadly, as evinced by the result of 2018 Appier's survey on AI usage in Asia. According to the survey, AI in Indonesia is mostly used in retail, information technology, telecommunications, financial services, and insurance companies.

The public sector has only recently adjusted its pace to be on par with the private sector in AI adoption. The first major step to enhance institutional and business preparedness in adopting new technologies was in the form of the National AI Strategy, issued in August 2020. The national strategy was designed with the good intention of being an inclusive document, engaging not only government actors but also universities, tech communities, telco and e-commerce platforms, and AI start-ups. Through series of Focus Group Discussions (FGDs) and analysis, the strategy focuses on five priority areas: health, bureaucracy reform, education and research, food security, and mobility/smart city. The strategy is a vital starting point towards a multistakeholder approach in AI governance. The strategy incorporated a short-term plan (yearly), medium-term plan (3-5 years), and long-term plan (5-10 years). It covers the issues of talent development, AI ethics, AI policy research, infrastructure and data, research and innovation, priority programs, quick win in AI implementation, and nationally determined target for AI implementation.

Challenges in Developing Digital Connectivity in Indonesia

The digital economy continues to experience significant growth, making it an essential source of economic development and job creation. However, there are at least three main challenges that Indonesia should deal with in its effort to develop digital connectivity in Indonesia: infrastructure, literacy, and competition.

Digital Infrastructure

Overall, Indonesia's market value reached US\$ 44 billion, the largest in ASEAN. However, Indonesia ranks fourth when viewed from the digital economy per capita. This means that the digital economy inclusively, both per capita and across the regions, is not evenly distributed. One of the main reasons is the lack of evenly distributed digital infrastructure. This problem is caused by the digital divide between urban and rural communities. Information technology infrastructure, such as telecommunications and internet access, currently only reaches urban areas.

In aggregate, the average internet speed in Indonesia is still relatively low. Based on Speedtest Global Index data in January 2020, Indonesia has the speed of mobile broadband internet access with an average download speed of 14.16 Mbps and upload of 9.50 Mbps, placing Indonesia 120th in the world. This speed is below the world's average access speed, with download speeds of 31.95 Mbps and uploads of 11.32 Mbps. For fixed broadband speed, Indonesia is ranked 115th with a download speed of 20.60 Mbps and an upload speed of 12.53 Mbps, which is also far below the world average fixed broadband speed of 74.32 Mbps for downloads and 40.83 Mbps for uploads. On the other hand, cellular penetration is already more than 80% of the population. Moreover, of Indonesia's 265.4 million citizens, 59% (or 130 million) are active social media users.

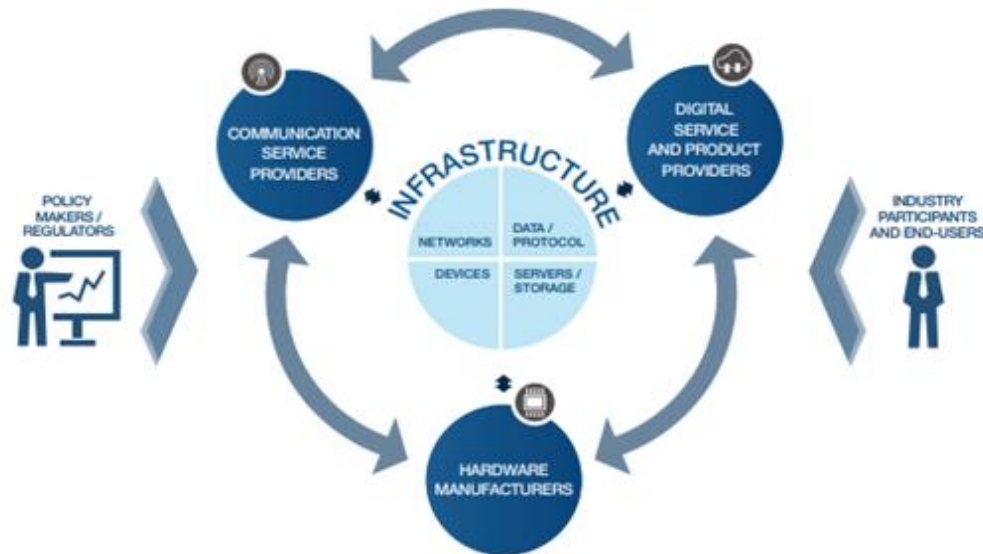
Based on data from the Ministry of Communication and Information in 2019, the national fiber optic cable network has reached 342,239 km, of which 224,453 is inland and 117,786 is part of the Marine Cable Communication System (SKKL). The 4G signal and fiber optic distributions are still concentrated on the islands of Java and Sumatra, with Central and Eastern Indonesia being the areas with the lowest telecommunication service coverage. The contour and topography of the areas not yet covered by telecommunication service poses a significant challenge, as does a low population distribution, leading to low commercialization potential.

As a result, several issues must be resolved immediately, including the distribution of the broadband area, the acceleration of analog switched off, the provision of incentives and ease of doing business for the telecommunications industry, as well as unifying the vision of digital infrastructure development between the central government and local governments. Equitable coverage of national broadband services is also constrained by licensing, excavation, and placement of long and complicated cables for deployment and maintenance purposes. Infrastructure maintenance faces its own challenges because theft and vandalism are still common in the infrastructure and telecommunications networks.

Based on a study conducted by the World Economic Forum (2014), many parties have invested in building infrastructure that supports the running of the digital economy. These parties include communications service providers (wireless telecommunications companies, cable companies, and

bandwidth providers), digital services and content providers, and hardware and software manufacturers.

Figure 4. The Role of Stakeholders in Digital Infrastructure



Source: World Economic Forum (2004)

The government has a vital role in setting policies and regulations. But other parties, such as non-governmental organizations, associations, and users, also have roles in establishing digital infrastructure. **Figure 4** above emphasizes that the development of digital services is very dependent on digital infrastructure and vice versa. Digital infrastructure will have no added value without digital services.

In Indonesia, the government planned to accelerate the development of digital infrastructure by focusing the APBN allocation on the ICT sector until the end of 2021. Related to this, there are several priority developments, namely the construction of base transceiver stations (BTS), expansion of 4G internet networks, construction of government data centers, the construction of the National Data Center in the Greater Jakarta and Batam areas, as well as the operation of the Greater Indonesia Satellite (Satria).

Digital Literacy

The digital revolution of the last decade has changed the behavior of economic actors. The digitalization trend has permeated the economy, and digital utilization is increasing. The accessibility of digital infrastructure that is getting easier and cheaper and the strong digital literacy of the Indonesian population have also accelerated digitalization in Indonesia. Even so, the digital literacy of the Indonesian population has not yet reached the "good" level. On a scale of 1 to 5, Indonesia's digital literacy index is slightly above 3.47 (Katadata 2020). Of the four sub-indices that are taken into account to form the digital literacy index, namely: 1) Information and Data Literacy, 2) Communication and Collaboration, 3) Security, 4) Technology Capability, it was found that the sub-index of information and

data literacy has the lowest score. In other words, the ability of Indonesians is still quite limited in searching, filtering, and storing data, and directing data searches.

The internet is mainly used to communicate short messages, use social media, and find information. Social media is the primary source of information, while television is the most reliable source. The reason is that the information and data provided are clear and complete. However, in terms of digesting news, both negative and positive habits tend to decrease. Most respondents disseminate and obtain information using WhatsApp, Facebook, and Tiktok to their family or close friends. Moreover, some activities that are still being carried out on social media by a small part of the community are adding up-to-date location information, trying to download applications, and uploading photos of ID cards.

Indonesia's digital literacy index is analyzed based on several factors related to the respondents' characteristics and profiles. Men tend to have a digital literacy index above women. Younger people tend to have a digital literacy index above older age group. Indonesian with a higher socio-economic status is more likely to have a digital literacy index above the national average than those from a lower socio-economic status. Those with a higher level of education are more likely to have a digital literacy index above the national average than those with a low level of education. Finally, urban areas tend to have a digital literacy index above rural area.

However, limited mobility during the pandemic has encouraged people who had previously not used digital services, to engage with them. As a result, 37% of consumers of new digital services emerged due to the pandemic. This figure will continue to increase or at least persist. The same study states that 93% of new digital consumers in Indonesia will continue to use digital services even after COVID-19. In addition, individuals are spending more and more time online. Before the pandemic, the average time spent online was 3.6 hours per day. During the pandemic it was up to 4.7 hours.

The increase in consumption of new digital services and longer online time extends beyond urban areas and marks a significant first step towards future penetration and digital literacy. More and more residents outside of urban areas in Indonesia are becoming new digital consumers. As a result, the proportion of new digital consumers from outside urban areas has reached 56%, while in urban areas only reached 44% (Google, Temasek, Bain & Company, 2021). In other words, the use of digital services in Indonesia is increasingly inclusive and is starting to spread evenly because it is not concentrated in urban areas only.

Competition

Competition in the digital economy is dynamic because of the innovative nature of the industry. As a result, the market structure will continue to evolve if it is not limited. According to the Business Competition Supervisory Commission's (KPPU) 2020 Economic Competition and Recovery working paper, there are several challenges in digital economy competition in Indonesia. The first challenge is that start-up companies continue to compete to innovate in creating efficiencies in transactions, thus ultimately creating new market models.

The business model is currently experiencing a shift to data-centrism, where companies manage their users' data. Unfortunately, this shift in business model risks making companies adopt a predatory

pricing strategy, setting a meager price for a product or service, making the market more vulnerable to monopoly. In addition, this strategy will corner established companies with inadequate capabilities in utilizing user data.

The second challenge, giant e-commerce, will close the opportunity for smaller-scale e-commerce players to enter the market or acquire smaller-scale e-commerce firms to eliminate competition in the market. The third challenge is when a platform locks in its users, a situation where the platform prevents customers from leaving even though they want to stop using the product. Finally, one imposed obstacle is a transfer fee, which will be charged when a user wants to switch from one platform to another.

The fourth challenge is that companies can play a dual role as providers and users of the platform. In other words, there will be vertical integration, which has the potential to give rise to tacit collusion, where companies enter into informal agreements or collude without communicating this to their competitors.

DIGITAL SILK ROAD

In 2011, Dunhuang.com proposed to build the 21st century "Online Silk Road" and establish a global e-commerce platform. Shaanxi was the first to practice the Digital Silk Road. On October 24, 2014, at the 8th China International Software Services Outsourcing Conference, the Shaanxi Provincial Government proposed "leading the digital silk road and building the Western Silicon Valley." Zhejiang established the "Digital Silk Road (Online) International Industry Alliance" to promote the digital economy and the development of the Digital Silk Road.⁸ The Alliance has established cooperative relationships with more than 30 countries and regions, involving big data, the Internet of Things, cloud computing, new smart cities, and other vital projects in the digital economy.

The development of the Digital Silk Road in Guangdong Province focuses on connecting the Digital Silk Road with the "Maritime Silk Road." The development of the digital economy in the Yangtze River Economic Belt region, such as Hubei, has become a benchmark force on the Digital Silk Road. In terms of regulating the governance of the Digital Silk Road, China's central government plays a key role in building the soft power of the Digital Silk Road. Local governments think tanks, universities, scientific research institutes, and industrial organizations support this idea by actively engaging in broad sectors.

At the same time, pragmatic cooperation between China and its partner countries in the digital field continues to advance. For example, China has made positive progress in constructing cross-border optical cable information channels with Russia, Pakistan, and other countries. In addition, China and ASEAN countries promote the construction of information ports and have held four China-ASEAN Information Port Forums. Furthermore, China has cooperated with 22 countries to create a cooperation platform, "Silk Road E-commerce."⁹ As a result, between 2018 and 2019, the total volume of cross-border e-commerce imports and exports between the platform's participating countries and China increased by 87.9%.¹⁰

China has become one of the great AI powers. According to the plan, by 2025, the government will implement a 2-step intelligent manufacturing support system¹¹. First, significant industries will achieve intelligent transformation; most manufacturing companies (which comply with the specified rules) will reach the digital network; backbone companies in critical industries will also apply intelligence. By 2035, manufacturing enterprises (according to the specified size) will thoroughly popularize digital networks, and major enterprises in key industries will achieve intelligence. In addition, more than 100 colleges and universities in China have added artificial intelligence majors, adding hundreds of thousands of new enrollment places to achieve this goal. These specific measures have achieved the expected results. Currently, 17 of the 20 universities with the most Artificial Intelligence disciplines globally are in China.

⁸王毅强调“数字丝绸之路”有何深意

http://www.fjlib.net/zt/fjstsgjcx/yqsj/202005/t20200526_432442.htm

⁹我国已经与 22 个国家签署了“丝路电商”合作备忘录

https://www.sohu.com/a/449492802_696946

¹⁰“丝路电商”成国际经贸合作新渠道和新亮点 <https://baijiahao.baidu.com/s?id=1677271500220056114&wfr=spider&for=pc>

¹¹从蓝图到现实 以数字力量开拓智能制造业新格局 <http://www.xsd315.cn/xin/aab5e2f21d36cc562861f786f4bdede2.html>

Digital Silk Road as part of the Belt and Road Initiative: Direct Objectives

In 2015, China's National Development and Reform Commission published the first official blueprint on the Belt and Road Initiative (BRI). The blueprint calls for, among other things, the creation of 'an information Silk Road,' which will include building bilateral and transcontinental cable networks, as well as improving satellite passageways (Sheng, 2018).¹² The idea was elaborated upon further by President Xi Jinping in his address at the opening ceremony of the Belt and Road Initiative Cooperation Summit Forum in Beijing in May 2017. In his speech, he emphasized the need for cooperation in innovation-driven areas such as the digital economy, AI, nanotechnology, quantum computing, big data, cloud computing, and smart cities. These activities are parts of what he called a 'digital silk road' of the 21st century.¹³

This marked the official launching of the Digital Silk Road (DSR), embedded in the BRI. It is part of the second component of the BRI, namely facility connectivity. Hence, the term digital connectivity is often used to describe the same thing. It is a future-oriented objective since most of the domains mentioned by President Xi are still at the early stage of development, albeit evolving rapidly. Implicit in the term DSR is a notion that it is designed to transport a new type of silk, namely, data (Ghiassy and Krishnamurthy, 2020).¹⁴

Digital Silk Road is a combination between digital economic development and the Belt and Road Initiative (BRI), which also has technological support for the BRI. From this, what kind of spark could result from the collision of 'one belt, one road' and digital technology? The last couple of years or achievement and recognition of the "Digital Silk Road" construction have given us a glimpse of the beauty of these sparks.

To implement high-quality collaborative construction from BRI, China and its BRI partners have suggested a series of initiatives and new measures that has shifted the relevant consensus to concrete action. Besides formulating the Health Silk Road and Green Silk Road, one of the most important initiatives that answers the current complexity of human issues is the Digital Silk Road. The development of the Digital Silk Road is an essential synthesis, especially in the context of the emergence of the COVID-19 pandemic that could not be predicted. The pandemic has disrupted the global economy and shifted the overall lifestyle of every human in the world.

To seize the opportunities in the digital age, in 2017, China, Egypt, Laos, Saudi Arabia, Serbia, Thailand, Turkey, and the United Arab Emirates, jointly launched the "One Belt, One Road" digital Economic International Cooperation Initiative. In addition, 16 countries, including Egypt, Kazakhstan, South Korea, and Hungary, signed a memorandum of understanding with China to jointly build the "Digital

¹² See Hong Shen, 2018. "Building a Digital Silk Road? Situating the Internet in China's Belt and Road Initiative," *International Journal of Communication*, no 12 (2018): 2683 – 2701.

¹³ See *Xinhua*, 14 May 2017. "Full text of President Xi's speech at opening of Belt and Road Forum", available at http://www.xinhuanet.com/english/2017-05/14/c_136282982.htm, accessed December 16, 2021. Two years earlier, in March 2015 the Chinese government published a white paper titled 'Information Silk Road'.

¹⁴ See e.g., Ghiassy, Richard and Rajeshwari Krishnamurthy. 2020. "China's Digital Silk Road: Strategic Implications for the EU and India," A Special Report prepared for Institute of Peace and Conflict Studies, India, and Leiden Asia Centre, The Netherlands.

Silk Road." The second summit successfully held the "Digital Silk Road" sub-forum. Senior officials from partner countries expressed their willingness to cooperate in the fields of cloud computing, big data, the Internet of Things (IoT), and artificial intelligence. The sub-forum released a report entitled "Digital Lighting the Silk Road," and 15 companies from 8 partner countries signed a cooperation agreement on digital projects. In 2020 at the high-level BRI Conference on international cooperation, member states reached a new consensus to jointly build the "Digital Silk Road." All participants agreed to strengthen cooperation in the field of the digital economy, foster new economic growth in e-commerce, smart cities, artificial intelligence, and in the application of big data technology, and expand new spaces for economic development.

At the same time, pragmatic cooperation in the digital field has progressed steadily. China and ASEAN countries are promoting the construction of the information port and have held four China-ASEAN Information Port Forums. Positive progress has been made in constructing cross-border optical cable information channels between China, Russia, Pakistan, and other countries. China and 22 countries have jointly built the "Silk Road E-commerce" cooperation platform. China's cross-border e-commerce continues to maintain a vigorous development trend. In 2019 the total import and export volume through the customs cross-border e-commerce management platform increased from CNY 36.02 billion in 2015 to CNY 186.21 billion in 2019, with an average annual growth rate of 50.8%; the growth rate of imports and exports in 2019 was 38.3%.¹⁵ In 2020, the "One Belt, One Road" high-level video conference on international cooperation reached a new consensus on the "Digital Silk Road" joint construction. Technology application and other fields will foster new economic growth points and expand new space for economic development.

The Digital Silk Road debuted in 2015 as a part of the Silk Road. The BRI has attracted the most political and commercial attention concerning the advancement of China and other partners' technological engagements. Large-scale infrastructure development projects have become the focus of BRI, and the "Digital Silk Road" dominates the use of technology as a primary developer for a new digital economy. Many developing countries will start to implement digital technology and consider the next 5G network generation when China's technology company improves its global business expansion. President Xi Jinping has thoroughly paid attention to independent research and development in the sector of primary technology, and the "Digital Silk Road" will become so core that is more important than the BRI.

The Digital Silk Road is an important step for China's economic diplomacy in a new era and a significant attempt by China to participate in global economic governance. Digital Silk Road is based on equality and openness and is believed to be a pathway to every goal. China has built a collaborative platform with the world through the Digital Silk Road development. Many countries, including Indonesia, are promoting, and executing research on the development of the Digital Silk Road and have found that it has created room for digital economic development and international cooperation.

Digital Silk Road has noted the importance of promoting better human development in the digital era and is an integral part of the "Belt and Road" initiative. Its vision and mission are increasing the

¹⁵我国跨境电子商务继续保持蓬勃发展态势·2019年跨境电商进出口总额为1862.1亿元
<https://bg.qianzhan.com/wuliu/detail/616/201202-e8aa33e9.html>

interconnectedness of international communication, smoothing silk road information, and expanding the exchange of information and cooperation. By May 2017, President Xi Jinping delivered his idea at BRI Forum for International Cooperation and stated the need to conform to innovation-based development, strengthen cooperation in critical sectors such as the digital economy, AI, nanotechnology, and quantum computing, promote the development of big data and smart cities, and connect the Digital Silk Road to the 21st of century.

During the opening ceremony of the second BRI Forum for International Cooperation in 2019, President Xi Jinping stressed the importance of adapting to the development trends of the fourth industrial revolution along with catching opportunities for developing digital, network, and intelligence, together with exploring new technologies in a new form of model, exploring the momentum for growth and development pathways, and building an innovative Silk Road and Digital Silk Road. Furthermore, the Digital Silk Road is also essential in supporting the Health Silk Road in terms of strengthening the availability, accessibility, and affordability of vaccines, medicines, and health supplies, investing in building resilient health infrastructure and developing telemedicine.

In March 2015, an article from state-regulated Xinhua News defined the connectivity of the Digital Silk Road as “five attachments and three commons.” The “five attachments” are policy communication, interconnected facility, trade without barriers, finance integration, and people-to-people communication. The “three commons” are the same interest-based community, future community, and shared responsibility community. The Digital Silk Road is an important contribution in the speeding up of the implementation of Agenda UN 2030. During the pandemic, the digital silk road has been proven to positively impact the handling of the pandemic, help stabilize economies, and ensure that livelihoods can support development and prosperity. The BRI encompasses many aspects of community life, from the path to cooperation, the path to health, the path to economic and pandemic recovery, and the path to economic growth. Digitalization has been seen as a necessity in establishing cooperation in many critical sectors through these aspects.

A Bird’s Eye View of the Digital Silk Road: Indirect Objectives and Scope

The Digital Silk Road (DSR) attempts to digitally link China with BRI participating countries by building digital infrastructure networks between China and those countries using Chinese technology (Shen, 2018). For this reason, some scholars describe the DSR as a China-centric transnational digital infrastructure network. China aims to achieve two goals, reduce its dependence on foreign technology and enhance its technological capacity. First, China wants to leverage the BRI, and in particularly the DSR, to gain first-mover advantage in the digital domains mentioned above and propel China to the forefront of global digital technology development. Put it differently, the DSR is China’s quest for technological supremacy. China has enlisted large Chinese technology corporations, both public and private, to participate in the DSR endeavor to achieve this goal. Second, China realizes the economic and military advantages of attaining technological supremacy. Its technological dominance will enhance its economic and military power.

Another objective of the BRI and the DSR that has received little attention is the support for the internationalization of the Renminbi. The same objective has prompted China to establish the Asian Infrastructure Investment Bank (AIIB), to which China has injected US\$50 billion, and the Silk Road Fund, into which it has injected US\$ 40 billion. To facilitate this endeavor, it has also established an

international financial clearing system and the Cross-border Interbank Payment System (CIPS) (Shen, 2018).

The DSR, by nature, is a physical infrastructure project in the digital sphere. China's efforts to play a pivotal role in setting the global digital order include producing as many digital-related patents as possible and setting digital technology standards (e.g., 5G standards) and global cyber governance. To achieve that goal, China is seeking a first-mover advantage in digital technology development, particularly advanced digital development. This includes a dominant role in developing digital backbone infrastructure: terrestrial and submarine data cables, 5G (and, for that matter, 6G) cellular networks, data storage centers, and global satellite navigation systems worldwide.

Thus far, the DSR has received enthusiastic support from Chinese ICT manufacturers, partly because the DSR offers tangible benefits to Chinese companies, particularly ICT companies. Firstly, it facilitates the export of Chinese goods, especially ICT products. Before the pandemic, China experienced serious industrial overcapacity, including in the ICT sector. Meanwhile, its domestic market has a limited capacity to absorb the large quantity of ICT-related products, such as the optical fiber and cable it manufactures. Secondly, it facilitates Chinese companies to go abroad. In other words, the Chinese government wants to ensure that leading Chinese platform players such as Alibaba, Tencent, and Baidu—as well as Huawei and state-backed telecom carriers such as China Mobile, China Telecom, and China Unicom—can take advantage of the DSR umbrella and the market access provided by BRI projects to compete in emerging markets with leading US companies (Sheng, 2018, Cheney, 2019).¹⁶

Developing Digital Backbone Infrastructure

Under the auspices of the DSR, Chinese corporations have invested heavily in developing digital backbone infrastructure abroad, most notably submarine and terrestrial fiber optic cables. In return, these companies receive favorable financing terms from Chinese banks, subsidies, and other incentives, as well as political support from the government. According to one estimate, China has invested around US\$ 70 billion in digital infrastructure projects, including terrestrial and submarine fiber optic cables, 5G cellular networks, and data centers in approximately 80 countries worldwide (Cheney, 2019, Ghiasy and Krishnamurthy, 2020).

Among Chinese companies, Huawei and ZTE are the most active in ICT infrastructure projects, particularly installing fiber optic cables in Southeast Asia. Huawei Marine, for example, has completed over a dozen submarine cable projects, and nearly 20 more are under construction, mainly in Indonesia and the Philippines. Meanwhile, Chinese companies have also been involved in developing the next generation of mobile internet connectivity, namely, 5G networks and cloud computing in the region. Recently, Huawei launched its first 5G in Southeast Asia in Thailand, while Alibaba Cloud opened a second data center in Indonesia (Harding, 2019).¹⁷

¹⁶ Clayton Cheney. 2019. "China's Digital Silk Road: Strategic Technological Competition and Exporting Political Illiberalism," Pacific Forum Working Paper, vol. 19, WP8, July 2019.

¹⁷ Brian Harding. "China's Digital Silk Road and Southeast Asia," Center for Strategic and International Studies, February 15, 2019, available at: <https://www.csis.org/analysis/chinas-digital-silk-road-and-southeast-asia>

The 5G cellular networks will significantly increase transmission speeds and reduce latency. These features are essential to developing applications around these networks, such as driverless cars, IoT, and smart cities. Chinese firms such as Huawei also play a significant role in setting technology standards for 5G in addition to participating in mobile infrastructure in many BRI countries. Other Chinese firms are eager to follow suit to contribute to the standards-setting process to promote the adoption of Chinese-centric technology.

Advanced Technology and Artificial Intelligence

As hinted by President Xi in his opening speech of the Belt and Road Initiative Cooperation Summit Forum mentioned above, China intends to use the BRI, and the DSR in particular, as a platform to develop China's indigenous advanced digital technology. The Oxford English Dictionary defines AI as "the theory and development of computer systems able to perform tasks normally requiring human intelligence." Most studies regarding AI suggest that it will have a significant impact on economic growth. First, it will significantly increase labor productivity due to more efficient work-related time management. Second, AI will create a new, virtual workforce capable of solving problems and self-learning. Third, there will also be benefits from the diffusion of AI-related innovation to various sectors of the economy (European Parliament Briefing, 2019).¹⁸

China recognizes the importance of AI in shaping the global economic, military, and geopolitical environment in the future. The ability to master it will determine a country's power on the global stage. Hence, in 2017 China unveiled the country's "Next Generation Artificial Intelligence Development Plan." The plan aims at transforming China into the global leader in AI by 2030. To achieve this goal, China has enlisted its tech giants, including Baidu, Tencent, Alibaba, and iFlytek. Alibaba, for instance, has been tasked to build Xiongan New Area, a new economic zone some 60 miles southwest of Beijing, into an AI 'smart city' modeled after the city of Hangzhou. In Hangzhou, Alibaba is absorbing data from thousands of street cameras and using it to optimize traffic flows in the city through AI (Bremer and Thompson, 2018; Cheney, 2019).¹⁹

According to Bremer and Thompson (2018), China has two advantages over the US, its main rival, in building AI infrastructure. First, it has access to a huge amount of data generated by Chinese tech companies. AI can be used to sift through the extremely large amount of data, which can be used, among other things, to project sharp power.²⁰ Meanwhile, data privacy protection is weaker in China than in the US; hence, data aggregators are virtually free to do what they can with the data they collect. Second, there is a close relationship between tech companies, including private companies, and the state. In recent years, Communist Party committees within companies have expanded. The

¹⁸ European Parliament. "Economic impacts of artificial intelligence (AI)." European Parliament Briefing, available at: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI\(2019\)637967_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/637967/EPRS_BRI(2019)637967_EN.pdf)

¹⁹ Ian Bremer and Nicholas Thompson. "The AI Cold War that Threatens Us All," Wired Magazine, October 23, 2018, available at <https://www.wired.com/story/ai-cold-war-china-could-doom-us-all/>, accessed December 20, 2021.

²⁰ Sharp power is defined as the use manipulative diplomatic policy by a country to influence and undermine the political system of a target country (Wikipedia).

government encourages tech companies to research, develop and invest in AI ventures. The government will ensure that their products have a market in China and abroad.²¹

Satellite Navigation System

China is investing heavily in building its own satellite navigation system. As of 2020, China's Beidou Navigation Satellite System had 35 satellites in operation and competes with America's Global Positioning System (GPS) and Europe's Galileo. The Beidou system is perceived as more advanced and offers higher precision than GPS. Furthermore, it is said that the Beidou system and GPS, to some extent, are compatible with others, implying there is room for interoperability and, hence, eventual replacement.

China encourages countries participating in the BRI to adopt the Beidou system to enhance integration and interdependence among BRI countries. Thus far, some BRI countries in Asia, including Pakistan, Laos, Brunei, and Thailand, have linked up to the Beidou system. China's influence will increase with the number of countries that hooks up with the system. Equally important is China focuses on creating a broader ecosystem around the Beidou system, including supply chain manufacturers and service providers. In other words, the real benefit will be reaped by the country's industrial complex (Trivedi, 2020, Cheney, 2019).²²

Quantum Computing

Quantum computing is another advanced technology that China deems necessary to rise as a global superpower. For that reason, China has established a National Laboratory for Quantum Information Science and invested billions of dollars in quantum computing R&D. Quantum computing is still in embryonic development. However, it is expected to have substantial economic impacts in the future. For example, in industry, production and logistics activities, such as industrial production and process optimization, require better planning and design tools in a wide range of areas. In healthcare, medicine, pharmaceutical, and biotechnologies, such as quantum imaging and quantum sensing, will significantly improve patients' diagnosis and monitoring. In finance and insurance, accelerating electronic payment transactions and identifying potential savings could be done by analyzing spending patterns (Rapp, 2021).²³

There are also some potential applications of quantum computing in the military sphere. One example is quantum sensing. Quantum sensors could be used to detect submarines and stealth aircraft. It could also be used as a reliable inertial navigation system. Such devices, known as quantum Position,

²¹ Meanwhile, in the US, Google has recently pulled itself out of the Pentagon's Project Maven, a collaborative project to develop AI image recognition in Defense Department missions due to the pressure from Google's employees on the company to withdraw from the project (Bremer and Thompson, 2018).

²² Anjani Trivedi. "GPS, Watch Out. Here Comes China's System," *Washington Post*, August 12, 2020, available at: https://www.washingtonpost.com/business/gps-watch-out-here-comes-chinas-system/2020/08/10/539bb022-db5d-11ea-b4f1-25b762cddb4_story.html

²³ Hermann P. Rapp. "Economic-technological revolution through Quantum 2.0: New super technologies are within reach," *Germany Monitor*, Deutsche Bank Research

Navigation, and Timing (PNT) devices, enable navigation without needing external references such as GPS.²⁴

E-Commerce

Another area China recognizes as essential in sustaining its effort to become an economic superpower is e-commerce. To this end, the DSR provides a channel through which China's tech corporations enter new markets in South and Southeast Asia. Prominent Chinese tech corporations invest heavily in these regions, including Thailand, India, and Singapore. China also actively promotes the establishment of e-commerce free trade zones in these regions. Alibaba, for instance, has established a digital free trade zone in Malaysia. It comprises a regional logistics center serving Southeast Asia, an e-commerce platform, digital payments, and financial services (Shen, 2018; Cheney, 2019).

E-commerce and cross-border transactions are also supporting the internationalization of the Renminbi. As noted, China has deemed the Renminbi's internationalization as one of its top priorities, and the BRI is expected to serve as a stimulus for the global use of the Renminbi through infrastructure investments and international transactions. In addition, China expects that the DSR, as a digital transactional financial data network, will boost the global circulation of the Renminbi and utilize the Cross-border Interbank Payment System (CIPS), a China-centered international financial clearing system. In this regard, CIPS is seen as an alternative to the Society for Worldwide Interbank Telecommunication (SWIFT) system as the global international clearing system (Shen, 2018).

5G Technology

The development of 5G networks is one of the most complex and expensive projects ever undertaken. Unlike the previous generations of mobile networks developed with consumer data and voice services, 5G networks will offer faster video download speeds. However, their high capacity and ultra-low latency features are the more important features. These two features will allow the deployment of autonomous vehicles, factory automation, the Internet of Things (IoT), and many more. 5G networks have three primary network sections with distinct primary functions. First, enhanced mobile broadband (eMBB), which enable much higher download speeds for smartphone and other devices; second, ultra-reliable, low-latency communications (uRLLC), designed for such application as autonomous vehicles that require as few gaps as possible for mission-critical applications such as road obstacle sensing and command-and-control; and third, massive machine-to-machine communications (mMTC) designed to handle billions of sensors and other devices that communicate among themselves and other parts of the network, known as the Internet of Things (Triolo, Allison and Brown, 2018).²⁵

²⁴ See e.g., Michiel van Amerongen. "Quantum technologies in defense and security," *NATO Review*. June 3, 2021, available at: <https://www.nato.int/docu/review/articles/2021/06/03/quantum-technologies-in-defence-security/index.html>, accessed December 27, 2021

²⁵ Paul Triolo, Kevin Allison and Clarise Brown. "Eurasia Group White Paper: The Geopolitics of 5G," Eurasia Group, November 15, 2018.

According to one estimate, 5G technology could bring US\$ 1.3 trillion through 2030 to the global economy, with healthcare applications contributing a lion's share of the benefit, estimated to be around US\$ 530 billion to global GDP, followed by smart utility management (US\$ 330 billion, consumer and media applications (US\$ 254 billion), industrial manufacturing applications (US\$ 134 billion), and financial services applications (85 billion).²⁶

Big Data

As noted above, data has become the new silk. Big data can significantly improve the socio-economic condition of a country in many ways. Corporations worldwide have been using big data to introduce innovative products and services and more efficient operations. Additionally, it helps corporations develop a better understanding of consumer behavior and improve management. Big data analytics also improves provisions of healthcare by way of, among other things, improving personalized healthcare. In addition, it helps governments fight poverty and locate people in dire need of development assistance and aid, such as finance, education, and healthcare services.

China has declared that big data is a fundamental strategic resource. It is for this reason that China has opted for data localization. Gupta (2021) defines data localization or data sovereignty as "restrictions placed on the ability of companies to move, store, process, or otherwise handle their users' personal data."²⁷ Data localization has both economic and strategic importance to China. From an economic point of view, data localization provides an advantage to Chinese companies over foreign ones. From a strategic point of view, it helps ensure that foreign governments cannot access Chinese data. As noted earlier, the availability of an extremely large amount of data can also be used in AI development with its potentially large economic and military advantages (Roberts, Moraes, and Ferguson, 2019).²⁸

Cloud Computing

Some Chinese companies, e.g., Alibaba, have developed and offered cloud computing services abroad. Cloud computing refers to the practice of using an online network ('cloud') of remote servers, typically accessed over the internet. It offers economies of scale, the flexibility of large computing capacity, operational efficiencies, and cost-effectiveness. A cloud may be public or private. A single entity owns a private cloud. A third party owns and operates the public cloud on behalf of the government and offers on-demand computing services with scale, efficiency, and flexibility and delivers over the internet. Typically, a vendor can offer several different cloud services on a pay-as-

²⁶ For a more detailed description of 5G economic benefits, see "The global economic impact of 5G," PwC 2021, available at: <https://www.pwc.com/gx/en/tmt/5g/global-economic-impact-5g.pdf>, accessed January 10, 2022.

²⁷ Deepak Gupta. "Data localization is now a big part of doing business globally," *Brinknews*, October 21, 2021, available at: <https://www.brinknews.com/data-localization-is-now-a-big-part-of-doing-business-globally/>, accessed December 30, 2021.

²⁸ Anthea Roberts, Henrique Choer Moraes and Victor Ferguson. "The US – China trade war is a competition for technological leadership," *Lawfare*, May 21, 2019, available at: <https://www.lawfareblog.com/us-china-trade-war-competition-technological-leadership>

you-go basis. Such services include Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), Business Process as a Service (BPaaS), and Data as a Service (DaaS).²⁹

Table 1. Cloud Service Models

Infrastructure as a Service (IaaS)	Platform as a Service (PaaS)	Software as a Service (SaaS)	Business Process as a Service (BPaaS)	Data as a Service (DaaS)
Supplies customers with IT infrastructure, provided and managed over the internet on a pay-as-you-go basis, e.g., server and storage	Supplies customers with an on-demand environment for developing, testing, delivering and managing software applications over the internet	Allows customers to connect to and use cloud-based apps over the internet on a subscription basis, e.g., Microsoft office 365	The automated business process is delivered from a cloud service. BPaaS usually has a well-defined interface which makes it easy to be used by different enterprises	Uniting the data and the software needed for its interpretation into a single consumer product made available to customers over a network, typically the internet

Source: Adopted from Financial Stability Board (FSB, 2019), Annex 1, Table 1.

Digital Silk Road to Promote Economic Integration and Digitalization

The COVID-19 pandemic caused a global recession of 4.4% in 2020.³⁰ However, digital technology has played a significant role in assisting the fight against the pandemic, supporting jobs and production, and ensuring livelihoods were as stable as possible. The digital economy has become an economic recovery machine during the post-pandemic period. The pandemic has also become a catalyst and a touchstone to verifying the development of China's digital economy.

The digital economy has become a new stimulus for recovery. This marks a new step forward in the revolution in science and technology and the hastened development of digital technology accompanied by internet, big data, artificially intelligent, among others. Influenced by the pandemic in 2020, digital technology has been implemented in online medical treatment, pandemic observation, online consumption, increased jobs and production, and other areas. The digital economy transformation in many countries has deepened significantly and will be the primary stimulus for the world's economic recovery and transformation to newer kinetic energy post-pandemic.

Digital economy refers to a series of economic activities that utilize digital knowledge and information as the main factor of production, the modern information network as the crucial operating system, and effective use of information, communication, and technology to improve efficiency and optimization in economic structure. A digital revolution is a new form of economic and social development after the agricultural and industrial revolutions. To a certain extent, it is also a product

²⁹ FSB. "Fintech and market structure in financial services: Market developments and potential financial stability implications," February 14, 2019. See also Bank for International Settlements. "Fintech and digital transformation of financial services: Implications for market structure and public policy," BIS Papers no 117, July 2021.

³⁰2020 年，世界经济“疫路”艰难前行 <https://baijiahao.baidu.com/s?id=1688176606766440027&wfr=spider&for=pc>

of information technology and digital technology development. A fundamental change has brought the digital economy to an organizational production system that offers the opportunity to speed up transformation and development in the economy.

Nowadays, robust development in the digital economy brings growth to global digital trade and opens new space for global trade development. According to the 2019 UN digital economy report, the digital economy contributes to between 4.5% and 15.5% of global GDP. The sustained expansion of the digital economy has propelled all sectors in the world into a new era of digitalization and has contributed to a new stage to globalization. With the acceleration of the digital economy, this latest development has become a top priority in national strategies. Most countries worldwide are committed to developing the digital economy and internet infrastructure, expanding network coverage, and introducing policies to boost research and development in digital technology and the digital industry.

In the past few years, digital technology has developed rapidly in China. This has contributed to China's digital economy's value-added of CNY 35.8 trillion in 2019, or 36.2% of GDP.³¹ On top of that, between 2014 to 2019, the digital economy has contributed to about 50% of GDP growth. By 2019, the contribution of the digital economy to GDP growth has increased to 67.7%.³²

The strategy "Made in China 2025" released in 2015 stressed the need for China to modernize its domestic manufacturing industry. This policy aimed to shift China's economic model from lower-class manufacturing that is labor-intensive to a science-based industry that is technologically dense and boosted by innovation. This shift is needed to push Chinese corporations to become pioneers of global innovation.

The past years have shown that the digital economy in China has grown rapidly and become the leading force in boosting its economic growth. China keeps promoting digital technology in administration and social governance. The digital economy has become important for economic development within the education system, from elementary school to middle school, university, local businesses, small-to-medium enterprises, smart homes to smart cities, and smart manufacturing within regional digital projects. The success of the digital economy in China is upheld by the intensification of research and development of digital technology for the real economy. Technology and industry have come together to support industry digitalization and aim for new economic growth.

Major countries have been aware of the urgency of developing a digital economy and have invested in information technology and significant support from policies within the pandemic's impact. For instance, on February 19, 2020, the European Commission launched a data strategy that listed a step-by-step core policy for data and an investment plan to support the digital economy for the next five years. The digital economy can be predicted to open a new economic cycle and become a machine for economic recovery. As one of the significant pathways to realize the digital silk role, Chinese companies such as Huawei have played a significant role in standardizing the technological specificities of 5G and cellular infrastructure in countries within the BRI corridor. Other Chinese

³¹<https://baijiahao.baidu.com/s?id=1671196721016613060&wfr=spider&for=pc>

³²数字经济贡献水平显著提升 2019 年数字经济对 GDP 增长的贡献率为 67.7%
<https://baijiahao.baidu.com/s?id=1671456603768219513&wfr=spider&for=pc>

companies will actively follow Huawei and promote the adoption of a standardization that centers on Chinese technology.

The Chinese government's full support of technology is shown clearly by the advancement of high technology in China. On the 16th and 17th of May 2016, during "International Conference One Belt One road on Spatial Recognition," Guo Huadong, a lead of the conference and notable scientist for remote sensing in the Chinese Academy of Social Sciences, discussed the Digital Silk Road International Scientific Plan Initiative (DBAR) based on space observation. The first stage of the construction of the Digital Silk Road Earth Big Data Platform promoted by DBAR has begun, and the work is expected to be finished by 2026.

The main benefit of DBAR is to collect data for research under the United Nations Sustainability Development 2030 initiative. The data will undoubtedly be credible as it is based on Big Earth Data. The credibility of the data is important to ensure it accurately supports research in the agricultural sector, food security, climate change and environment, coastal and marine zone, disaster risk, high mountains and cold polar region, culture and natural heritage, cities and infrastructure, and water resources.

Table 2. Countries Signed Special Memorandum on the "Digital Silk Road."³³

Region	Country		Region	Country
Africa	Egypt		Europe	United Kingdom
Asia	Laos		Central Europe	Kazakhstan
Asia	Bangladesh		Eastern Europe	Czech Republic
Asia	South Korea		Eastern Europe	Serbia
Asia/Middle East	Saudi Arabia		Eastern Europe	Hungary
Asia/Middle East	United Arab Emirates		Eastern Europe	Poland
Asia/Europe	Turkey		Latin America	Cuba
Europe	Estonia		Latin America	Peru

Source: Eurasia Group, Fudan University

At this point, there are two main aspects to expanding the Digital Silk Road. First is digital facilitation (computation), such as the technology of Alibaba Cloud Feitian. The second is digital trade. For example, JD's big data showed that China's e-commerce commodities are being sold to 54 countries including Russia, Ukraine, Poland, Thailand, Egypt, and Arab Saudi. Moreover, through the China-Europe express train route that began functioning in 2016, the transport relationship among BRI countries has been strengthened. As a result, the logistics capacity in several regions in China will be stronger, and the number of participating corporates will increase and expand in the future.

In the past couple of years, the merger and acquisition of technology companies, the establishment a new network and communication infrastructure, flights facility, OTT facilities, and smart city development have been important parts of the Digital Silk Road. Two Chinese companies, Huawei,

³³数字丝绸之路——扩大中国的数字足迹
<https://www.163.com/dy/article/FE21M4K60511B355.html>

and ZTE, are involved in developing a 5G network in third-world countries. Huawei promoted the smart city projects with many countries in Central Asia, Southeast Asia, and Africa. Most companies focus on the public security concern through “safe cities” that involve China’s artificial intelligence and surveillance technology. Alibaba Cloud has also expanded its cloud computation facility to foreign countries. It will cooperate with Sena Traffic Systems, a smart transportation system controller from Malaysia, to build traffic system management set to be completed this year.³⁴ Alibaba has 22 primary data sources in foreign countries, most of which cooperate with the main local data operator to avoid data localization issues. Last year, Alibaba discussed cooperating with BT Cloud England, Singtel, and SK group from South Korea.

Huawei and ZTE have participated in the establishment of several sea-line communication cables, terrestrial, and information technology infrastructure projects worldwide and have won construction projects for 5G in 28 countries in Europe. By 2020, despite US sanctions, Huawei signed several smart city project contracts and data center contracts worth US\$175 million with Kenya, the development of a cloud data center in Pakistan.³⁵ In April 2020, Huawei launched a cloud innovation and invested more than US\$10 million to establish the first 5G Artificial Intelligence laboratory in Singapore that is aimed at integrating into the Smart Nation Singapore strategy.³⁶ The laboratory is focused on talent training, innovative research, and Sino-Singapore cooperation.³⁷ Huawei cloud emphasizes cooperative development between Singapore and the Asia-Pacific Region.

Apart from digital infrastructure, China Mobile, a telecommunications company, supplied and operated 5G to build the Digital Silk Road in bordering countries of BRI. In 2019, China Mobile announced a pilot program to develop a city-scale road network in Wuhan to support mobility and smart transportation services. China Mobile committed to building 300,000 5G technology stations by the end of 2020.³⁸

³⁴阿里云携手马来西亚公司将在吉隆坡建智能交通管理系统

<https://baijiahao.baidu.com/s?id=1634331637122861199&wfr=spider&for=pc>

³⁵华为启动泰国 5G 项目 <http://tc.people.com.cn/n1/2019/0214/c183008-30670516.html>

³⁶华为云新加坡峰会发布 Cloud&AI 创新实验室，四大优势助力智能升级 <https://zhuanlan.zhihu.com/p/63620926>

³⁷华为在新加坡开设 5G 人工智能实验室

<http://5g.idcquan.com/5Gzixun/172694.shtml>

³⁸中国移动：2020 年建设 30 万个 5G 基站目标不变 用户已达 673.6 万户

<https://baijiahao.baidu.com/s?id=1660007339732514772&wfr=spider&for=pc>

DIGITAL SILK ROAD AND INCLUSIVE DEVELOPMENT IN INDONESIA

Positive progress has been made in the development of the Digital Silk Road and digital economy cooperation between China and BRI countries. For example, the increasingly close cooperation between China and ASEAN in the digital economy has become a new highlight of China-ASEAN cooperation. 2020 was the 'Year of China-ASEAN Digital Economic Cooperation,' China-ASEAN Information Port, 'China-ASEAN Digital Business and Trade Platform,' and many other projects that provide a strong impetus for digital economy cooperation between China and ASEAN countries (see **Figure 5**). According to the "Belt and Road" Digital Trade Index Development Report released at the China International Trade in Services Fair in 2020, digital trade between Belt and Road countries and China has driven the development prospects of in goods trade.

Figure 5. Smart City Infrastructure Development in the ASEAN Region³⁹



Source: ASEAN

Yang Xiaowei, Deputy Director of the Cyberspace Administration of China, revealed at the Digital Silk Road sub-forum of the Second Belt and Road Forum for International Cooperation that 16 Belt and Road countries have committed to the construction of the Digital Silk Road by signing a memorandum of understanding. Previously, China jointly launched the Belt and Road digital economic cooperation initiative with seven countries. In addition, the China-ASEAN Information Port and the construction of the China-Afghanistan Online Silk Road have been comprehensively promoted.

Indonesia has become one of China's most important BRI countries over the past few years. Its large population and mobile commerce market, responsible for US\$7.1 billion of Indonesia's US\$1 trillion GDP are among the reasons the country is attractive to China.⁴⁰ From 2018 to 2019, the sales of Chinese mobile phones in Indonesia dominated smartphone sales, growing by more than 33%.⁴¹

³⁹ 数字丝绸之路——扩大中国的数字足迹 <https://www.163.com/dy/article/FE21M4K60511B355.html>

⁴⁰ Martinus, M. (2020), as cited in Rakhmat, Z. (2022) *China's Digital Silk Road in Indonesia: Progress and implications*. LSE IDEAS Strategic Update: London. Available at: <https://www.lse.ac.uk/ideas/publications/updates/Chinas-digital-silk-road>

⁴¹ Rakhmat, Z. (2022) *China's Digital Silk Road in Indonesia: Progress and implications*.

However, in the first half of 2022, Huawei's revenue dropped by 6% due to the pandemic and the US-China tech war. Nonetheless, according to Ken Hu, Huawei's rotating chairman, despite the negative impact on its smartphone business, Huawei's ICT infrastructure business maintained "steady growth."⁴²

Huawei has more than 2,000 employees in Jakarta and has partnered with more than 200 companies in Indonesia, responsible for more than 40,000 jobs across the archipelago. Moreover, it has been building thousands of kilometers of fiber-optic cable networks and band transceiver stations which can provide wireless communication in many regions across Indonesia for access to 5G technology.⁴³ Huawei supports the country in realizing digital transformation by building Smart Cities projects.⁴⁴ Indonesia is rapidly adopting 5G technology. Its full implementation and use could be a game-changer for smart cities, governance, transportation, mining, and healthcare. With comprehensive research and development in 5G technology since 2009, Huawei can support Indonesia in realizing this goal. In addition, Huawei will continue to provide added value to Indonesia's digital ecosystem by strengthening 5G and cloud infrastructure, preparing digital talent, and other initiatives.

The growth and expansion of Chinese technology is generally warmly welcomed by Indonesia. Even during the US suspension of Huawei operations, the President of Indonesia's largest telecommunication company, PT Telkom Indonesia, stated that Telkom's operation would cooperate with a vendor from any country, including China. In 2019, Chinese tech giant ZTE became Telkom and Smartfriend's 5G provider.⁴⁵

Furthermore, other Chinese companies like Alibaba have also expanded into Indonesia. Daniel Zhang, CEO of Alibaba, said that Indonesia's e-commerce market would be very lucrative in the future.⁴⁶ Alibaba has made investments in Indonesian e-commerce firms such as Lazada, Bukalapak, Dompot Digital Indonesia (DANA), and Tokopedia. Over 2016 and 2017, Alibaba injected US\$2 billion into the Indonesian economy. In 2017, Alibaba invested a further US\$ 1.1 billion in Tokopedia (F Series) and US\$ 1.1 with Japan's SoftBank Vision Fund in 2018. Alibaba also owns 12.6% of GoTo – a joint venture of two Indonesian most prominent startups, Gojek and Tokopedia – the second largest share after SoftBank Vision Fund. Through Ant Group, API (Hong Kong) Investment Limited, Alibaba also owns 13.05% of BUKA (or Bukalapak).⁴⁷

⁴² Rakhmat, Z. and Purnama, Y. (2021) 'For Indonesia, Chinese 5G Cooperation Brings Promise and Peril', *The Diplomat*, 20 January. Available at: <https://thediplomat.com/2021/01/for-indonesia-chinese-5g-cooperation-brings-promise-and-peril/>.

⁴³ Rakhmat, Z. (2022) *China's Digital Silk Road in Indonesia: Progress and implications*.

⁴⁴ Kembangkan Kota Pintar di IKN Nusantara, Kominfo Siapkan Infrastruktur 5G <https://ekbis.sindonews.com/read/703547/34/kembangkan-kota-pintar-di-ikn-nusantara-kominfo-siapkan-infrastruktur-5g-1646427806>

⁴⁵ Martinus, M. (2020) 'Southeast Asia a contested venue for telecommunication superpowers building 5G networks', *Think China*, 19 November. Available at: <https://www.thinkchina.sg/southeast-asia-contested-venue-telecommunication-superpowers-building-5g-networks>

⁴⁶ Fauzan, H. A. and Margrit, A. (2020) 'Jejak Alibaba di Indonesia', *Bisnis.com*, 30 December. Available at: <https://infografik.bisnis.com/read/20201230/547/1337043/jejak-alibaba-di-indonesia>.

⁴⁷ Fernando, A. (2021) 'Royal Bakar Duit', Begini Gurita Bisnis Alibaba di Emiten RI', *CNBC Indonesia*, 01 September. Available at: <https://www.cnbcindonesia.com/market/20210901084306-17-272763/royal-bakar-duit-begini-gurita-bisnis-alibaba-di-emiten-ri>.

Additionally, Alibaba has contributed to the development of one of Indonesia's digital wallets or e-wallets, DANA. In 2018, through PT Elang Andalan Nusantara (PT EAN), Emtek cooperated with Alipay Ant Financial (now Ant Group) to establish DANA. Alibaba has also expanded into Indonesia's fintech market by investing in Akulaku, through Ant Group. According to data from Crunchbase, through 8 rounds of investment, Akulaku received US\$ 218 million and in January 2019, Akulaku received a further US\$ 100 million. Ant Group was involved in all of these investments.⁴⁸

The construction of the Digital Silk Road will help mitigate the pandemic's impact on economic and trade relations and provide new momentum for international economic cooperation. It is urgently necessary to promote cooperation in the fields of big data, internet, and smart city building, through cross-border e-commerce, online exhibitions, remote investment promotion, cloud video, and other new economic and trade methods.

It should be noted that in the process of the global fight against the pandemic, China's digital enterprises have demonstrated their technical strength and responsibility to the world. DingTalk software, for example, is recommended by the United Nations to teachers and students around the world for distance learning; The digital logistics scheduling system "World Electronic Trade Platform" set up by Alibaba worked with the Liège region of Belgium to coordinate China-Europe air and express rail transport to transport large quantities of COVID-19 anti-pandemic medical supplies to Europe. The remainder of this report intends to examine the nexus between Digital Silk Road and inclusive development, particularly in three main areas: digital connectivity, employment, and public services.

Digital Silk Road and Indonesia's Digital Connectivity

Indonesia is a participating country in the BRI. As a result, Indonesia may participate in the DSR as well, although the government has not decided whether it will. Nevertheless, some Chinese companies such as Huawei and ZTE have been involved in multiple ICT projects in Indonesia. For instance, it has been reported that Huawei Marine and PT LEN Telekomunikasi Indonesia have agreed to a portion of the Palapa Ring Project. Palapa Ring is a broadband network project to increase broadband penetration in remote areas in Indonesia. Huawei Marine will supply and lay around 1,600 km of undersea fiber-optic cable to connect Kalimantan, Sulawesi, and North Maluku. The system will connect multiple locations and will be equipped with Huawei's unified WDM/OTN backbone equipment OSN 8800, which has a capacity of 960 Gb/s.⁴⁹

Huawei and ZTE entered Indonesia's market around two decades ago and were involved in developing the country's early internet infrastructure networks, from 2G to 4G. The Indonesian government plans to build the new capital city in East Kalimantan as a 5G smart city. If the construction of the new city starts, some analysts say that Huawei has a very good chance of winning the 5G contract, mainly because it offers a better price than its rivals. Due to Chinese government incentives, Chinese ICT companies involved in the DSR can offer lower-cost digital infrastructure equipment and attractive financing from Chinese banks (Lewis, 2018).⁵⁰ However, many of the activities that Huawei has been

⁴⁸ Fernando (2021) 'Royal 'Bakar Duit', Begini Gurita Bisnis Alibaba di Emiten RI', *CNBC Indonesia*, 01 September.

⁴⁹ See "Huawei, LTI partner on Middle Package of Palapa Ring Project," *Offshore Energy*, October 14, 2016, available at: <https://www.offshore-energy.biz/huawei-lti-partner-on-middle-package-of-palapa-ring-project/>, accessed December 31, 2021.

⁵⁰ James A. Lewis. "How 5G will Shape Innovation and Security: A Primer," Center for Strategic and International Studies, 2018.

involved with in Indonesia have raised concern that Indonesia might be too reliant on Huawei as its sole source of their technology supply and the associated risks.⁵¹

Meanwhile, Alibaba Cloud, a subsidiary of Alibaba Group, has recently built its second data center in Indonesia, only ten months after the launch of its first. Alibaba is not the only firm interested in Indonesia's cloud computing market. Amazon, Microsoft, and Google are also trying to gain a foothold in the Indonesian market. As pointed out by the Jakarta Post, there is big money in cloud computing in Indonesia, the country's cloud computing market is estimated to be around US\$ 400 million.⁵²

Chinese companies' involvement in building digital infrastructure in Indonesia, as a part of the DSR or otherwise, will certainly benefit the country's IT sector. Given Java has a far better digital infrastructure than the rest of the country, particularly eastern Indonesia, Huawei's participation in Palapa Ring Project mentioned above would help ameliorate digital divides. Moreover, the need for extensive digital connectivity has been increasingly important in recent years, especially during the COVID-19 pandemic when businesses went online to deliver their services. Similarly, the entire education system went online. This was made possible by digital infrastructure that enabled connectivity.⁵³

Likewise, the availability of cloud computing infrastructure in the country will help to significantly reduce the cost of computing. Consequently, firms may decide to move to cloud computing. By doing so, they can economize by maintaining and managing their own IT systems. For example, they will not need as many expert IT staff. In addition, moving to the cloud is also considered more secure from a cyber security perspective.

Digital Silk Road and Indonesia's Employment

Unemployment and the fragility of youth employment remains a major concern in Indonesia. Digital transformation presents many opportunities but also generates new risks for economies, requiring the implementation of adequate policies. Despite a high rate of mobile phone penetration, significant internet service coverage, and progress in e-commerce, the country still lacks infrastructure, human capital, innovation, and deregulation to exploit the full potential of its digital environment. This section discusses how the digital silk road and improved digital connectivity might increase employment, particularly youth employment.

A big digital divide still exists in Indonesia, one of the fastest-growing digital economies globally. The disparities between the rapidly growing digital ecosystem in Indonesia's urban and remote areas shows that Indonesia's digital adventure has only just begun. Most Indonesians are ready to adopt digital services because so many people have smartphones and internet access. However, not all Indonesians use technology to open businesses or improve productivity due to human resources and entrepreneurship constraints. The digital divide also shows that the booming internet-based companies operating in the Indonesian market only serve a fraction of the Indonesian economy. Thus,

⁵¹ See "Is Indonesia becoming too reliant on Huawei?" *South China Morning Post*, December 4, 2020, available at: <https://www.scmp.com/week-asia/economics/article/3112634/indonesia-becoming-too-reliant-huawei>, accessed December 31, 2021.

⁵² *The Jakarta Post*. "Alibaba steps up cloud game in Indonesia," January 16, 2019.

⁵³ We do not have information of the exact coverage of the country's digital connectivity.

these companies can seize a huge opportunity to grow their business by developing and expanding their services throughout the archipelago.

Reports by Google and Temasek (2021) estimate that by 2025, Indonesia's digital economy is projected to reach US\$ 124 billion and contribute 10% of Indonesia's GDP. Indonesia must take advantage of the momentum because it has a large market and the world's fourth-largest population, with 70.72% of the population of productive age. Indonesia needs 17.5 million technology-savvy workers by 2034. This need is urgent amid today's technological disruption. Indonesia needs to base its economic growth on human capital, creating a knowledge-based economy.

The growth of the digital economy creates a more competitive talent market that produces a pool of qualified personnel. However, regions that are highly competitive in digital terms tend to integrate a greater number of these professionals and skilled workers into their economies. Jobs such as administrative functions, machine operators, and laborers, are expected to be the most affected by digitization. Although it is undoubtedly in the ICT, finance, and transport sectors that these workers have seen the steepest decline, all sectors and geographical regions will be affected, with a growing number of workers needing reskilling and upskilling. Digitalization and automation create new types of jobs but, at the same time, also eliminate jobs with routine and manual tasks. It is estimated that 9 out of 10 jobs will require digital skills in the future.

Indonesia's youth need to be equipped with adequate digital skills to respond to the rapid pace of technological advancement, which is changing the economy's job landscape. This requires the government to improve the adaptability of the workforce by providing high-quality, digitally focused vocational and tertiary education that teaches the skills needed by the digital industry. Reducing the cost of quality vocational training and systematic on-the-job training is imperative to improve the digital skills of the economy's workforce, especially for those who cannot access higher formal education. In addition, more intensive collaboration between the government, formal and non-formal education institutions, and industries will be required to promote occupation-based learning. Notably, the world faces a massive gap between the demand for digital skills and the supply of workers who possess them. The main driver of the digital skills gap is a growing chasm between the pace of innovation and static educational models. Without a significant boost to digital skills, economies cannot fill their digital needs, create new opportunities, or reduce long-term unemployment and underemployment rates.

Capital development is an inevitable aspect of Indonesia's digital connectivity. Improving digital literacy is critical for the workforce to be ready to face industry 4.0. Moreover, community understanding, and competent human resources are crucial in the internet ecosystem. This includes the readiness of the network infrastructure. In relation to this, efforts have been made by Huawei, including in collaboration with the Agency for the Assessment and Application of Technology (BPPT), to hold training for 400 employees covering 5G, Cloud, Big Data, and Artificial Intelligence (AI). In addition, in 2020, Huawei began collaborating with the Indonesian Presidential Staff Office to put 100,000 Indonesian officials through a five-year vocational training course in digital literacy. This five-year collaboration is expected to improve Indonesian human resources in the IT sector to an international standard.

As of 2022, Indonesia's Ministry of Manpower is working with Huawei to build the foundation for Indonesia's digital future. This collaboration covers three main areas: improving the quality of human

resources through vocational training and certification and training for trainers. HR development and coaching are implemented in job training, occupational safety, and health. With this collaboration, Huawei developed a series of training programs for facilitators (training for trainers) to ensure that the transfer of knowledge and skills is carried out consistently. Huawei is also developing a syllabus for national competencies to encourage link-and-match between the human resources produced by educators and industry demands. Integrating the Digital Silk Road into these initiatives could help Indonesia improve its digital connectivity development and contribute to its digital economy transformation.

Digital Silk Road and Indonesia's Basic Public Services

The COVID-19 pandemic has presented challenges and opportunities for growth. The opportunities are evident in the digital economy—such as e-commerce, payment system, or the ICT sector—which enjoy growth in value and new customers. Start-ups have also enjoyed increased funding, especially in the edutech and healthtech sectors. Fintech, for example, has helped many small and medium-sized enterprises, which, for one reason, have been denied loans (credit rationed) from banks to obtain financing. This is made possible by, among other things, the rise of peer-to-peer (P2P) lending, marketplace lending, crowdfunding, and other fintech credit platforms. However, the size of fintech lending in Indonesia is relatively small, especially compared to China. Indonesia, therefore, can learn from China's experience as to how to promote fintech development.

The other example is the rise of e-commerce platforms and the increased use of mobile payment services. Merchants can settle payments faster and more cheaply through mobile payments by, for example, displaying quick response (QR) codes and, hence, forgoe the need to rent a point-of-sale (PoS) terminal. Again, Indonesia can learn from China's experience in this respect. E-commerce and mobile payment services are more prevalent in China. In Indonesia's public services context, e-commerce and fintech could promote the government's implementation and execution of public services, especially regarding the distribution of social assistance programs for low-income households.

The use of digital technology will facilitate convenient and faster distribution of social assistance. Mapping the digital technology available is needed. The government then can consider which distribution mechanism to use: money transfers or vouchers that can be directly cashed or spent through a mobile application (smartphone), or tools that require beneficiaries to come to the office of PT Pos Indonesia or State-Owned Banks that have the most extensive branches all over Indonesia (for example Bank Rakyat Indonesia (BRI)). In essence, the distribution of social assistance must be practical, easy, and simple so that the delivery of social assistance can be quick and accurately reach target groups. Hopefully, the Digital Silk Road can support the realization of this goal.

As mentioned in the previous section, Indonesia has a productive age population of more than 191 million people. Most of them are Generation Z. Digital skills development is estimated to contribute 16% to Indonesia's GDP in 2030. Indonesia is estimated to need as many as 9 million digitally talented employees by 2030. In the digital era, Indonesia's young generation must be able to take advantage of their digital talents so that they not only act as job seekers but can also become job creators. Entrepreneurship was one of the pillars of economic growth during the pandemic. Once these digital skills have been created, perhaps the development of Indonesia's public sector can be improved.

Several emerging sectors that appear to fill Indonesia's digital economy landscape are edutech and healthtech. Before the pandemic, edutech and healthtech did not seem to be the most immediate sectors for investors. However, in early 2020, with the closing of schools and increased demand for health services as a result of the pandemic, edutech and healthtech start-ups in Indonesia began to build momentum. One example is Ruangguru, an edutech start-up that enjoyed a 46% increase in user growth throughout 2020. Ruangguru secured a US\$ 55 million investment from Tiger Global Management in April 2021. Healthtech player Halodoc, enjoyed an average of around 40 million visits per month. To better seize the momentum, healthtech needs to continuously innovate to provide health services that can be provided fully remotely as well as services that can be done in tandem with in-person consultations.

Rapid digital development in Indonesia in recent years has reduced some economic frictions. For instance, the rise of online transportation services or ridesharing has spread to more and more cities and towns across the country. Two companies dominate this business in Indonesia, namely, Gojek and Grab. Together they have enabled thousands of people to participate in their e-hailing services. As a result, their presence has generated a substantial benefit, directly and indirectly, to the country's economy. This could trigger the government to improve its public services, especially in the transportation sector.

THE WAY FORWARD

Conclusion

The construction of the Digital Silk Road is an absolute necessity to strengthen infrastructure development, promote "soft connectivity," build interconnected corridors, promote innovation and industrialization, accelerate regional and global economic integration zones, and safeguard stability and smoothness of the industrial chain supply chains, all of which are mainly aimed at economic development. Experience has shown that the digital economy's contribution to the national economy is extraordinary. Developing the Digital Silk Road can drive new economic growth points for countries participating in the BRI, promote employment, and raise living standards.

Although the global digital economy has experienced rapid growth, its development has shown a clear imbalance. A clear gap in the development of the global digital economy still exists. Due to the differences between developing and developed countries in terms of the existing economic conditions and the foundation of digital technology innovation, there is a large gap in investment and development of digital economy infrastructure. The digital economy has not yet reached a sufficient level of inclusivity.

Considering the large gap between the infrastructure levels of developing and developed countries, the development of the BRI with developing countries will improve the quality of these countries' infrastructure. Despite the remarkable results achieved, China and its partner countries, including Indonesia, are still in the early stages of jointly building the Digital Silk Road and are facing formidable challenges. However, looking forward to a new stage of high-quality development of the Belt and Road Initiative, the Digital Silk Road is equipped to play a significant role.

Policy Recommendation

To further promote the development of the Digital Silk Road in the post-pandemic era, and in particular its ultimate goal of promoting inclusive development in Indonesia, creating new sources of economic growth for accelerating economic recovery, it is necessary to strengthen cooperation in the following aspects:

First, strengthen cooperation in digital infrastructure development. Digital infrastructure is one of the main elements of the Digital Silk Road. We must vigorously promote the development of digital infrastructure, especially in internet and telecommunications, and promote interconnection in the infrastructure of all countries. China's high-tech enterprises can actively use their technology and capital advantages to support the joint construction of national facilities projects.

Second, strengthen cooperation in digital governance. To promote the digital economy and achieve a higher level of inclusivity and orderly development, China and other countries should negotiate and formulate data security and privacy protection rules that are acceptable to the whole world and build a vital policy foundation for the development of the digital economy. Furthermore, we can actively promote China's digital governance concept and practical measures to relevant countries and help these countries formulate regulations and policies in information security fields such as intellectual property rights, protection of personal privacy, and cross-border data flows.

Third, cooperate intensively in e-commerce and e-services. Indonesia is critical to global economic digitization. The digital economy is one sector that has experienced significant growth during this pandemic. Therefore, the Indonesian government continues to accelerate Indonesia's digital economy. One current strategy is to develop digital skills among Generation Z and Millennials. During the pandemic, several sectors have increased in digitization, including education and health. This provides a great opportunity for Indonesia's digital economy to be utilized for the welfare of all Indonesians. Economic transformation requires coordination and synergy with all parties, including universities.

Fourth, strengthen cooperation in personnel training. As digital transformation deepens, the demand for digital talent is also growing rapidly. Talent issues have become an important factor limiting the development of the digital economy. China can help developing countries build their own professional, technical, and management teams in talent training. In recent years, China and related countries have explored the joint training of digital talent and accumulated certain experiences. Guided by intergovernmental cooperation projects, further development of diverse talent training models can increase the level of international standard digital talent training. The establishment of joint research and development centers, joint school-enterprise projects, and targeted training projects, guided by intergovernmental cooperation projects, should focus on supporting the development of new digital disciplines, cooperative research, and building a practical training base.

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2020 年，世界经济“疫路”艰难前行
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2019 年，中国数字经济增加值规模达 35.8 万亿元
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数字经济贡献水平显著提升 2019 年数字经济对 GDP 增长的贡献率为 67.7%
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**Centre for Strategic and
International Studies
(CSIS Indonesia)**

Jl Tanah Abang III No 23-27
Gambir, Jakarta Pusat 10160
Indonesia