



Digital Infrastructure Sector Strategy
AIIB's Role in the Growth of the Digital Economy of the 21st Century
June, 2020

1. Background

- 1.1. Digital technology is transforming the global economy. It has helped create new economic opportunities across countries, regions, and industries. It is a powerful driver of growth for economies and provides significant benefits for society. Digital applications are successfully lowering barriers posed by geography, solving market imperfections and connecting people both for trade and social purposes.¹
- 1.2. It is estimated that the digital economy footprint represents between 6 percent to 15 percent of global gross domestic product (GDP).² It contributes to about 25 percent of GDP growth in developing countries, 80 percent of which is accounted for in sectors other than Information Communication Technology.³ Between 2005 and 2016, 40 percent of jobs created globally were in digitally intensive sectors.^{4, 5} The scale of this sector is such that the market capitalization of Apple equals a third of the French GDP and that the research and development budget of Amazon exceeds the GDP of Cambodia.
- 1.3. Digital infrastructure provides critical solutions at times of crisis such as COVID-19. Quality internet access and digital platforms allow for remote work, distance learning, distance medicine and provision of social services. Now, the need for more and better digital infrastructure has become more prominent and the demand for broadband is higher than ever. In parallel, the pandemic has also exposed the limitations of the digital infrastructure network and revealed the vulnerability of the unconnected, who represent nearly half of the global population.
- 1.4. Linkages between digital technology and traditional infrastructure sectors such as transport, energy, water, and cities, are strong and mutually reinforcing. For instance, technology applications in traditional infrastructure sectors can help increase

¹ HM Treasury (United Kingdom). 2019. *Unlocking Digital Competition, Report of the Digital Competition Expert Panel*. <https://www.gov.uk/government/publications/unlocking-digital-competition-report-of-the-digital-competition-expert-panel>

² World Bank 2019, World Economic Forum 2019, EIU 2019

³ See Footnote 2.

⁴ OECD 2019.

⁵ See also Digital Infrastructure Sector Analysis: Market Analysis and Technical Studies. https://www.aiib.org/en/policies-strategies/operational-policies/digital-infrastructure-strategy/content/download/Full-DISA-Report_final-with-Appendix-2020-01-10.pdf.

efficiency and safety in the transport sector, optimize the use of scarce energy and water resources and increase the attractiveness of cities. Digital technologies are becoming an essential factor in the development, construction, and maintenance of all infrastructure sectors and contribute to new developments in health and education. There are still significant benefits to be achieved from applications of technology in infrastructure, particularly in Asia.

- 1.5. Given the economic impact of the digital economy and the role it will play in our future society, the Asian Infrastructure Investment Bank (AIIB or the Bank) sees a clear need to support its development and with it, the underlying Digital Infrastructure.
- 1.6. This is consistent with AIIB's mandate to "foster sustainable economic development, create wealth and improve infrastructure connectivity in Asia by investing in infrastructure and other productive sectors,"⁶ and AIIB's core values of "Lean, Clean and Green." Digital infrastructure is Green and Lean, with a comparatively lower carbon footprint than other traditional infrastructure sectors, and applications that help minimize the use of nonrenewable resources; and Clean, as its applications help increase transparency in processes.

2. Coverage of Digital Infrastructure in the Digital Infrastructure Strategy

- 2.1. Digital Infrastructure is no longer limited to hard physical assets, structures, and facilities. Today, it also extends to the architecture that connects it and to the technological applications to operate it—this is referred to as soft infrastructure.
- 2.2. In this Digital Infrastructure Strategy (the Strategy), AIIB's coverage of Digital Infrastructure will include both hard and soft infrastructure.
- 2.3. **Hard infrastructure** is defined as:
 - (i) **Transport and Connectivity.** This includes, *inter alia*, optical fiber networks, optical ground wires, satellite and towers, cross-border links and adjunct physical infrastructure. These elements help to establish the connectivity of the whole Digital Infrastructure ecosystem;
 - (ii) **Processing and Storage.** This includes, *inter alia*, data centers, data repositories, cloud computing providers, content delivery network providers and IXPs (Internet Exchange Points).

2.4. **Soft infrastructure** is defined as:

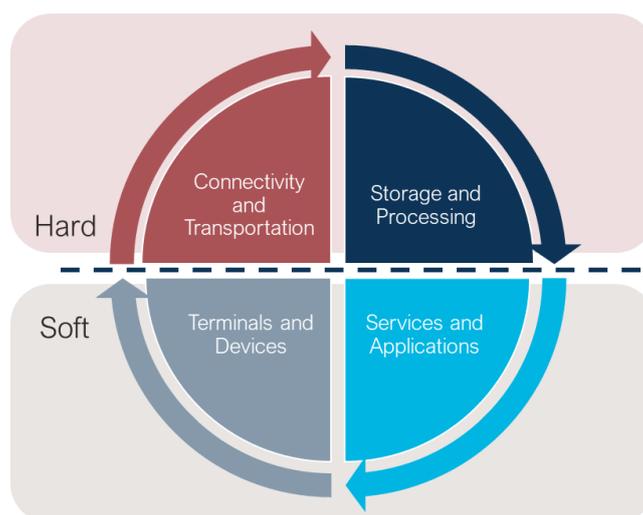
- (i) **Services and Applications.** This includes, *inter alia*, applications and services such as BIM (building information system), CERT (computer emergency response team) and SOC (security operations centers), as well as new categories of technology services including Fintech, digital identity and e-platforms. Services and applications allow systems and networks to operate, and infrastructure-specific

⁶ Asian Infrastructure Investment Bank. Articles of Agreement, Article 1. Purpose

applications to increase network efficiencies and drive sustainability and provide for technical support throughout the ecosystem.

- (ii) **Terminals and Devices.** This includes, *inter alia*, sensors and devices that are used to optimize all infrastructure sectors and enhance their efficiency and sustainability, such as smart grids, smart meters, as well as terminal devices used by the public such as cellphones or computers.

Figure: Definition of Hard and Soft Infrastructure



Source: AIIB

2.5. Hard and soft infrastructure are strongly interdependent. Hard infrastructure cannot be operated without the use of soft infrastructure; soft infrastructure cannot be deployed without the presence of hard infrastructure.

2.6. The providers of hard and soft infrastructure vary greatly, making it difficult to categorize the economic entities that compose the sector along strict clear-cut infrastructure lines. Entities that include mobile and fixed broadband providers, cable broadband operators, wholesale operators providing shared infrastructure services, data repository and cloud computing firms, terminal equipment manufacturers, and internet service providers are all part of a complex digital infrastructure eco-system where assets are often shared between operators. Therefore, financing this sector will require flexibility and agility.

3. Supporting the Growth of the Digital Infrastructure Sector in Asia

3.1. Digital infrastructure is generating important economic benefits. It has a direct association with productivity gains, which translate into competitiveness and economic growth. In developing countries, a 10 percent increase in broadband coverage results in 1.4 percent of GDP growth.⁷

⁷ International Telecommunication Union (ITU)/ UNESCO Broadband Commission for Sustainable Development. 2019. The State of Broadband : Broadband as a Foundation for Sustainable Development. <http://handle.itu.int/11.1002/pub/813c98f4-en>

- 3.2. The growth of the digital infrastructure sector has mostly been financed by the private sector. However, the pace of growth has been so fast that current private financing sources are no longer sufficient to cover needs. In low- and middle-income countries, the level of investment required to set up the basics of a modern digital infrastructure ecosystem by far exceeds available capital resources. In parallel, there has also been a slowing down of multilateral development banks' (MDB) financing for the information and communication technology sector (ICT) with less than 1 percent of their resources directed to it.⁸ Such a slowdown can be explained by several factors, including an information asymmetry between the expected demand for services and the supply of finance. The combination of these two factors has resulted in a growing financing gap in Asia,⁹ which is expected to amount to USD133 billion by 2025.¹⁰
- 3.3. In addition, as the digital infrastructure sector grows, so does the digital divide between urban and rural populations and income levels, and along gender lines. It is estimated that 49 percent of the global population does not have access to broadband.¹¹ In Asia, only 26 percent of the rural population have access to broadband. Women are 10 percent less likely to own a mobile, with this gap growing to 28 percent in South Asia.¹²
- 3.4. Finally, the adoption and mainstreaming of technological applications to traditional infrastructure lead to better allocation and management of resources, efficiency gains, and productivity increases. Technology, as diffused through digital applications, contributes to a more sustainable infrastructure sector.
- 3.5. The positive economic impact of digital infrastructure, the necessity to bridge the growing digital divide and reduce the financing gap, as well as benefits of technology applications in traditional infrastructure, justify the involvement of a multilateral institution like AIIB in the sector.

4. AIIB's Vision, Objectives and Comparative Advantages

- 4.1. AIIB's vision is to play a catalytical role in financing the growth of digital infrastructure in Asia, with the objectives of supporting the efforts of AIIB Members in bridging the digital divide, and increasing their economic competitiveness and the efficiency of infrastructure. To do so, AIIB will leverage and mobilize financing, develop its partnerships, manage risks, build knowledge for the financing of digital infrastructure, and foster the adoption of technology in infrastructure through the demonstration of its benefits.
- 4.2. This vision interfaces with and supports other Bank strategies. It reinforces the Bank's role as a facilitator of technology adoption across all infrastructure sectors, thus

⁸ Xalam Analytics

⁹ Financing gap is defined by the difference between investment needs (as defined by country strategy statements and firm-level capital expenditure projections) and the availability of finance (as defined by the sum of corporate finance, project finance, public sector budget projections and MDB financing).

¹⁰ G20. 2019. Global Infrastructure Outlook: Forecasting Infrastructure Investment Needs and Gaps.

<https://outlook.gihub.org/>

¹¹ See footnote 5.

¹² See footnote 5.

contributing to the objectives of the Transport, Energy, Water, and Sustainable Cities strategies.

4.3. AIIB's role in Digital Infrastructure is supported by several comparative advantages:

- (i) Private sector resources have fallen short of the digital infrastructure sector needs, both in terms of financing amounts, structure, standards, and breadth. AIIB can leverage its balance sheet to provide significant financial resources with longer maturities and appropriate financing instruments.
- (ii) AIIB's status as an MDB in Asia gives it an advantage in mobilizing finance from the private sector and other multilateral partners, to provide better financing terms and adequate risk-sharing arrangements.
- (iii) AIIB's status can help mitigate political risks. This is especially relevant in the context of a fast-changing regulatory environment for digital infrastructure, given AIIB's unique ability to reach out to government institutions and keep abreast of the latest policy changes, to ensure adequate compliance of its investments.
- (iv) AIIB's high-quality standards will support the healthy growth of the digital infrastructure sector. Its open procurement requirements will help to promote fair competition and enforce country-level regulations that are critical to the sector. Its Environmental and Social Framework and Corporate Strategy will help ensure and guide development outcomes of digital infrastructure investment.
- (v) AIIB's experience in financing traditional infrastructure is directly applicable to hard digital infrastructure such as cables, towers, and data centers. Beyond hard digital infrastructure, this experience also extends to managing regulatory issues, economies of scale and network effects, access issues, and environmental and social considerations.
- (vi) Soft digital infrastructure allows, *inter alia*, the increased efficiency of existing infrastructure sectors. Through its existing portfolio of investments, AIIB is uniquely positioned to understand how to bundle hard and soft infrastructure investments, and formulate optimal financing solutions;
- (vii) AIIB's physical proximity to a vibrant digital infrastructure market in Asia endows it with a natural ability to develop strong technical expertise in this sector.

5. Investments Areas

5.1. AIIB will invest in the following areas:

- (i) **Hard Digital Infrastructure.** AIIB will invest and foster the development and enhancement of hard digital infrastructure to bridge the digital divide.

- (ii) **Soft Digital Infrastructure.** AIIB will invest and foster the adoption of technology in traditional infrastructure sectors, including transport, energy, water and cities, and other productive sectors, to increase efficiency and sustainability.

5.2. For additionality purposes, AIIB will not invest in areas that are well-financed by the private sector, such as handheld devices sold as consumer goods.

6. Risks

6.1. Investment in digital infrastructure is often associated with new emerging risks that may be different from those faced in more traditional infrastructure sectors. At this stage, AIIB has identified four main risk categories: (i) regulatory risks, (ii) technology obsolescence risks, (iii) reputational risk and (iv) environmental and social risks.

(i) Regulatory Risks.

- a. *Privacy of information.* Data sharing and processing have led to risks associated with inappropriate use of personal information by third parties, public or private. These risks materialize in an infringement on people's fundamental rights through the use of certain technologies or in the way that the data is collected, stored and used over time. While the European Union's (EU) General Data Protection Regulation (GDPR)¹³ is often seen as one set of standards that provides citizens with more control of data, there is not yet any globally accepted standard associated with data privacy. Privacy of information safeguards are fast-evolving to reflect societal needs, general public acceptability, and country-specific conditions.
- b. *Competition, Price, and Fiscal Policy.* The dominance of a handful of firms in some market segments could lead to situations that would affect universal access and further increase the digital divide. Competition, price and fiscal policies are well-tested in other infrastructure sectors and are a viable response to these risks. In addition, the development of shared infrastructure between several operators (as with the emerging 5G technology) helps lower the risk to see a private firm engage in activities that would have negative consequences for users.
- c. *Cybersecurity.* Associated with the growth of the internet, cyberattacks on systems and networks may threaten firms, utilities, and services. Cybersecurity is enforced through law. It requires a regulatory framework consistent across regional borders.

AIIB will, in the first instance, manage regulatory risks by ensuring compliance of its investments with country-level regulations and laws. AIIB does not have a role in policy changes but understands that this sector is associated with evolving regulatory requirements that can differ quite significantly from country to country, and therefore lead to significant differences on social impact. To address the

¹³ The EU's General Data Protection Regulation was drafted in 2016 and enacted in May 2018.

complexity of multiple and fast evolving regulatory standards, the Bank commits, within the limitations of its mandate, to engage in a process to build its in-house capacity to specifically manage regulatory risks in digital infrastructure. In addition it will, in partnership with other international organizations that have more experience in this field, closely follow the changes and new developments at the international level and help share generally accepted principles at project and country level. Finally, at the transaction level, the Bank's investment will be based on solid regulatory risks analysis for digital infrastructure projects, which developments will be monitored over the life of the transaction. This analysis will allow AIIB to balance out data privacy risk with reputational risk and make good investment decisions.

- (ii) **Technology Obsolescence Risk.** Technology can become obsolete over the financing period or over project implementation. AIIB will manage this risk by adapting the maturity of its debt to the expected life expectancy of the asset, and by investing in technology-neutral assets, where universal access to the infrastructure is not restricted by defensive technological standards.
- (iii) **Reputational Risk.** Some firms or specific technology may be associated with a higher reputational risk that may affect the feasibility of the investment, its return, or possibly the reputation of the financier. Reputational risks may also arise from varying standards applied to data privacy or cybersecurity at the country level. For instance, less stringent safeguards do not take away the general acceptability of data collection by a third party. In these cases, the reputational risk associated with the transaction increases. It is important for AIIB to evaluate these risks within the specific transaction and country context, and manage them actively.
- (iv) **Environmental and Social Risks.** Digital infrastructure tends to be associated with a lighter footprint than more traditional infrastructure sectors. Nevertheless, there can be specific waste management issues associated with the disposal of towers, cables or devices. High electricity consumption has been multiplied by the increased use of data, sometimes leading to a higher carbon footprint. Risks to social inclusion include access inequalities according to gender, geographic location (urban vs rural), income levels and physical ability. AIIB recognizes that there are digital infrastructure-specific risks, especially on social inclusion, and will ensure that these are properly reflected and addressed as guided by the Bank's Environmental and Social Framework and Corporate Strategy.

6.2. AIIB recognizes that some of the risks posed by this sector might be too high or evolve too rapidly to be mitigated adequately; in such cases, AIIB will not finance the underlying projects.

7. Investment Principles

7.1. Investing in the digital infrastructure sector requires a selective, prioritized and progressive approach.

7.2. Given the nature of the sector, prudence will be the primary principle adopted by AIB in pursuing its investment in digital infrastructure. AIB will only consider those projects supported by good governance, regulatory standards and sound banking principles. To achieve its vision and objectives, the following three main principles will guide AIB's prioritization of investments:

- (i) **Inclusiveness.** The investment has a positive impact on inclusion, e.g., between urban and rural populations, along gender lines, or along income levels.
- (ii) **Competitiveness.** The investment is economically sound and contributes to the competitiveness of the economy.
- (iii) **Efficiency.** The investment enables efficiency improvements in traditional infrastructure with respect to cost reduction, value creation, resilience, longevity, etc.

7.3. These investment principles are supported by three processes: (i) investment progression, (ii) building partnerships, and (iii) building internal capacity.

(i) Investment Progression

- Given the surging demand in hard infrastructure plus AIB's current knowledge and expertise, it is expected that the Bank will focus first on hard infrastructure investments. This will be made easier as risk analysis and banking practices applicable to hard infrastructure are generally similar to that of traditional infrastructure sectors, including on regulatory, environment and social matters.
- While increased demand in hard infrastructure enables more demand for soft infrastructure, investing in soft infrastructure will require a more gradual and selective approach, given the complexity and associated risks. As its expertise and knowledge grows, AIB will then focus its financing efforts on applications, services, and devices that help mainstream technology innovations in traditional infrastructure sectors such as transport, energy, water, and cities, as well as in social infrastructure including health and education.

(ii) Building Partnerships

- Partnerships with private and public institutions will be crucial to implement this Strategy in order to crowd-in additional financing resources and facilitate access to knowledge. Specifically, these partnerships will:
 - (a) **Grow the Bank's Knowledge Base.** Partnerships with financiers that have a longer standing involvement in the sector, renowned firms in the digital economy, regulatory agencies, and other stakeholders will give the Bank access to a strong knowledge base. This will be critical to help build upstream knowledge, which then will be used to better structure financing solutions and manage risks.

- (b) **Mobilize Capital.** The Bank will work with other private financial institutions, institutional investors, MDBs, bilateral aid agencies, and organizations providing finance to identify and structure financing solutions.
- (c) **Share Risks.** Through cofinancing or other guarantee and syndication arrangements, the Bank will be able to share some of the commercial and political risks.
- (d) **Build Information-Sharing Platforms.** One of the biggest challenges of the sector resides in the uneven level of, and access to, information on available technologies, regulatory standards, and financing practices. Within the boundaries of its mandate, the Bank sees a role in promoting the adoption of internationally recognized regulatory standards at the country level. It also intends to promote an open-source information platform allowing infrastructure project sponsors access to comparative information on the benefits of applicable technologies.

(iii) Building Internal Capacity

- Acquiring new expertise and building required internal capacity is at the heart of the implementation of the Digital Infrastructure Strategy. AIIB will build a team with specific expertise in the digital infrastructure sector, from sector specialists to regulatory experts, to allow it to grow its digital infrastructure portfolio prudently.
- Partnerships with cofinanciers and other stakeholders will help accelerate the capacity building process, with the objective of transforming AIIB into a leading financier of digital infrastructure.

8. Results Monitoring Framework

- 8.1. Given the diversity of possible outcomes and evolving nature of the sector, the development of a portfolio level results framework proves to be challenging.¹⁴ However, general outcomes on competitiveness, digital divide, efficiency and capital mobilization are prominent in the Results Monitoring Framework.
- 8.2. The Results Monitoring Framework tries to capture progress in achieving objectives of investments at the portfolio level, noting that a variety of outcomes can be captured at the project level. For example, the applications of technology in traditional infrastructure sectors will lead to efficiency gains. However, it may not always be possible to measure and capture these outcomes solely through the digital infrastructure investment, as these will need to be considered together with the outcomes of the traditional infrastructure project. This reflects the cross-sectoral nature of the digital infrastructure sector with other key sector strategies. With the

¹⁴ Additionally, because of its broad economic impact, it is difficult to associate investments in digital infrastructure to one specific Sustainable Development Goal (SDG). SDG 17.6.2 does refer to broadband internet access.

fast development of the sector, it is expected that proposed portfolio indicators will be reassessed and refined as AIB gains more operational experience.

Table. Digital Infrastructure Sector Results Framework

Objectives	Portfolio Results Indicator	Investment Amount (in USD)
Bridging the digital divide	<ul style="list-style-type: none"> • Number of people with affordable access to internet and digital services^a 	<ul style="list-style-type: none"> • Amount invested in fixed and mobile access
Increased competitiveness	<ul style="list-style-type: none"> • Number of projects that lower the cost of access and digital services^b • Number of projects that improve quality of access^c • Number of projects that increase capacity of data processing 	<ul style="list-style-type: none"> • Amount invested in fixed and mobile access • Amount invested in data processing and storage
Increased efficiency ^d and technology application across infrastructure sectors	<ul style="list-style-type: none"> • Number of projects applying technology • Number of projects supplying technology to infrastructure sectors 	<ul style="list-style-type: none"> • Amount invested in technology components of infrastructure projects • Amount invested in technology providers
Increased private capital mobilization	<ul style="list-style-type: none"> • Cross reference to relevant indicators in the Strategy to Mobilizing Private Capital 	<ul style="list-style-type: none"> • Amount of private financing mobilized on Digital Infrastructure projects

Notes:

^a This can be disaggregated by gender, rural/urban, income levels, or disability.

^b Cost of access can be measured as, for example, average dollar spent per megabyte.

^c Quality can be measured, for example, as speed, reliability of network.

^d Efficiency is defined as cost reductions, value creation, resilience and longevity.