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Conference Report

Infrastructure Provision in Developing Asia's Three Largest Countries: A Comparative Perspective on the People's Republic of China, India, and Indonesia

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For:

TA 9087-REG: A Framework for Effective Knowledge Management and Solutions

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Asian Development Bank



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Infrastructure Provision in Developing Asia's Three Largest Countries: A Comparative Perspective on the People's Republic of China, India, and Indonesia

Responding to demand from ADB member countries, this conference report provides a comparative perspective on infrastructure provision in Asia's three largest developing countries, to discuss their achievements and shortfalls in providing trunk infrastructure over the past two decades. It tells the story of three quite distinct development paths, and derives lessons on what institutional and policy factors, as well as economic aspects enabled or prevented progress in providing energy, transport, water, and telecommunications infrastructure. The report assesses future challenges for the three countries in providing infrastructure in a more integrated and sustainable way, ensuring environmental and social co-benefits for a broader population. It links these challenges with the global development agenda to which the three countries have committed. The concluding recommendations form a platform for further policy dialogue to advance country-based solutions of improved infrastructure provision for economic competitiveness, environmental sustainability, and social equity.

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Abbreviations

\$	United States Dollar
ADB	Asian Development Bank
ADB I	Asian Development Bank Institute
GDP	Gross domestic product
IMF	International Monetary Fund
Km	Kilometer
KPPIP	Committee for Acceleration of Priority Infrastructure Delivery (Indonesia)
NDRC	National Development and Reform Commission (PRC)
NITI	National Institution for Transforming India Commission
PPP	Purchasing power parity
PPPs	Public-private partnerships
PRC	People's Republic of China
TEU	Twenty foot equivalent unit

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The team drew on the remarks and discussions during the Infrastructure Provision Roundtable held 31 May 2016 at Asian Development Bank headquarters. Participants from the Asian Development Bank included: Bambang Susantono, vice-president for Knowledge Management and Sustainable Development; Diwakar Gupta, vice-president for private sector and cofinancing operations; Wencai Zhang, vice-president for Central and West Asia and South Asia; and Juan Miranda, Managing Director General; Ashok Bhargava, Director, Energy Division, East Asia Department; Chi Nai Chong, Senior Advisor, Southeast Asia Department; Diwesh Sharan; Deputy Director General, South Asia Department; and staff from headquarters and resident missions.

For their insightful inputs, the team thanks the Roundtable panelists: Chen Bingbo, Deputy Director, Budget and Audit Department, Ministry of Transport, People’s Republic of China; Han Bin, Deputy Director General, Public-Private Partnership Center, Ministry of Finance, People’s Republic of China; Jonathan Woetzel, Director, McKinsey Global Institute and Co-Chair of the Urban China Initiative; Santosh B. Nayar, Chairman and Managing Director, India Infrastructure Finance Company, Ltd.; Atul Joshi, Founder and CEO, Oyster Capital Group, India; Rajeev Uberoi, Director of the Board, Infrastructure Development Finance Company, Ltd., India; Wahyu Utomo, Deputy Minister, Infrastructure and Regional Development, Office of the Coordinating Ministry of Economic Affairs, Indonesia; Irawati Hermawan, CEO and Managing Partner, Hermawan Juniarto and Partners, Indonesia; and Mohammed Ali Berawi, Chairman, Infrastructure Task Force, Indonesia Chamber of Commerce.

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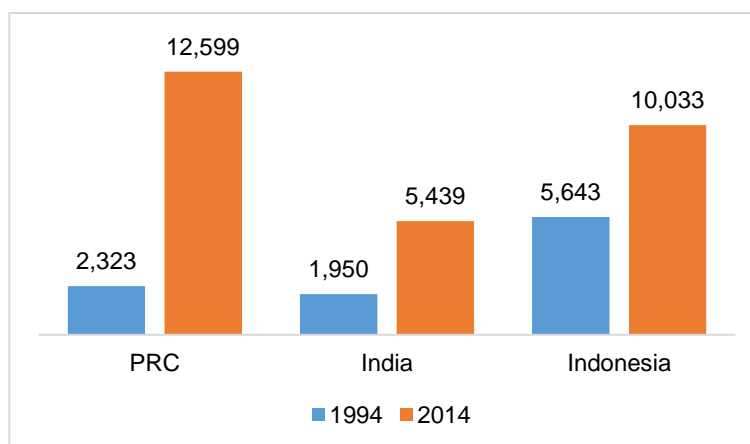
1. Infrastructure's Role in Two Decades of Development

The past two decades have witnessed dramatic changes in developing Asia, with the three largest countries—the People's Republic of China (PRC), India, and Indonesia—at the center of those shifts. This opening chapter provides context to the rest of the paper by documenting these changes. It begins by briefly summarizing the strides in economic development made by the three countries using a variety of social-economic indicators.¹ It then examines the evolution of the infrastructure in the three countries that enabled this development to take place. The analysis is comparative, highlighting both similarities as well as differences across the three giants. What emerges is a tale of three quite distinct development paths.

Differences in Development

Rapid growth has raised incomes in all three countries, but with the PRC far outpacing the other two giants (Figure 1.1). Between 1994 and 2014, per capita GDP almost doubled in Indonesia, and almost tripled in India. But it has risen more than five-fold in the PRC. This disparity in growth has meant that while India and the PRC had similar per capita incomes in the mid-1990s, incomes in the PRC are now more than twice those in India, and the PRC leapfrogged ahead of Indonesia in making the transition to upper-middle income status.

Figure 1.1: GDP per Capita, PPP (Constant 2011 International \$)



Note: GDP – gross domestic product; PPP – purchasing power parity

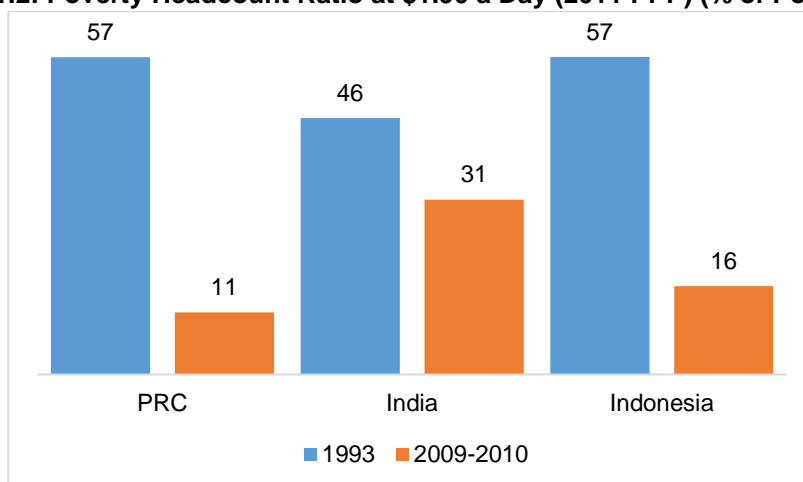
Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Despite this, poverty reduction in Indonesia has almost kept pace with that in PRC, with India lagging behind (Figure 1.2). In both the PRC and Indonesia, poverty incidence (as measured by the fraction of the population making less than \$1.90 per day) fell from near 60% to near 10% over the past two decades. India had lower poverty incidence in the mid-1990s but progress in poverty reduction has been slower, and more than 30% of the population still lives on less than \$1.90 a day.

¹ Main source (if not indicated otherwise) for referred figures: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Also see here: ADB. 2015. Key Indicators for Asia and the Pacific. Manila. <http://www.adb.org/publications/series/key-indicators-for-asia-and-the-pacific>

Figure 1.2: Poverty Headcount Ratio at \$1.90 a Day (2011 PPP) (% of Population)

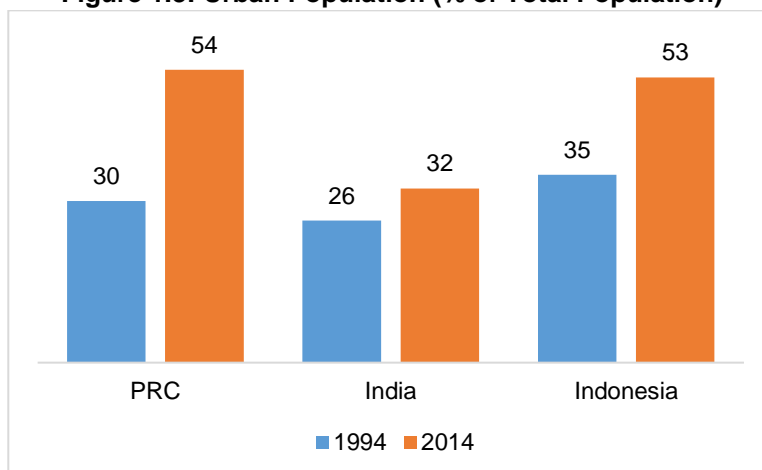


Note: PPP – purchasing power parity

Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Urbanization has also characterized development in all three countries, with India once again lagging (Figure 1.3). In the mid-1990s roughly a third of the population in the PRC and Indonesia, and a quarter of the population in India, lived in urban areas. Now, more than half of the population in the PRC and Indonesia live in cities, whereas the corresponding share in India is about one-third—roughly where the other two countries were two decades ago. Many of the environmental consequences of rapid economic development are most evident in the countries' urban areas, particularly its megacities. Box 1.1 analyzes urbanization in the three countries and its implications for both infrastructure provision and the environment. While sources on historic environmental data are scarce, aspects of resource-driven growth and environmental impacts of development are further discussed in Chapter 3.²

Figure 1.3: Urban Population (% of Total Population)

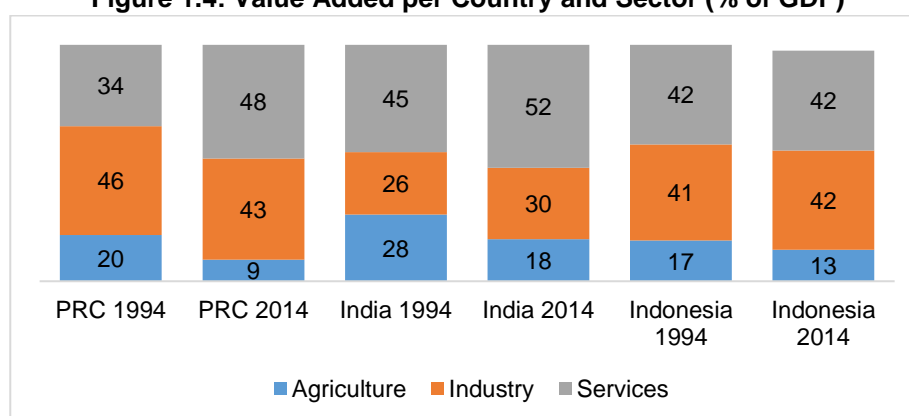


Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

² Also see: UNEP. 2011. Decoupling Natural Resource Use and Environmental Impacts from Economic Growth. Paris.

Structural transformation was an essential element in the development process in all three countries (Figure 1.4). Over the past two decades, all three countries saw a fall in the share of agriculture, both in its share of value-added and especially in its share of employment. In Indonesia's case the industrialization process started earlier, and so the sectoral shift in the past two decades is less discernible. Still, the shift of resources out of lower-productivity agriculture into higher-productivity industry (particularly manufacturing) and services was a fundamental driver of the growth process in all three countries.

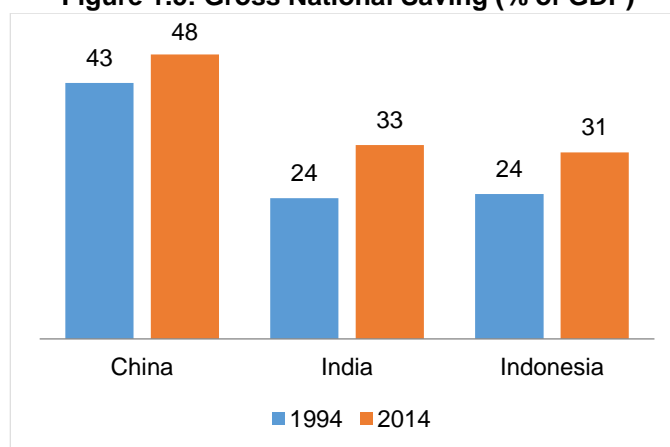
Figure 1.4: Value Added per Country and Sector (% of GDP)



Note: GDP – gross domestic product; original data was lacking 2.5% out of 100% for 2014 values for Indonesia.
Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

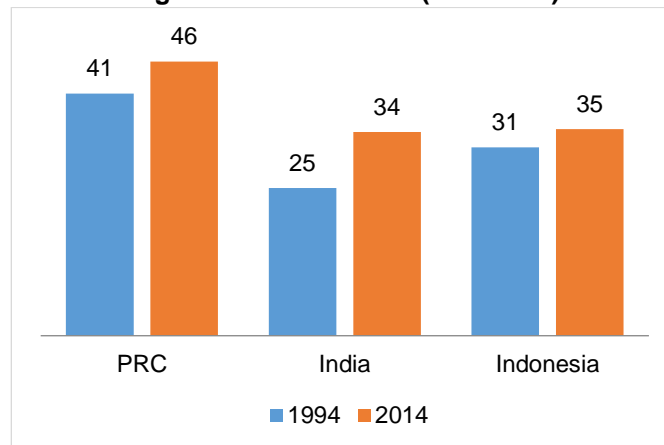
Stark differences in national saving and investment have also shaped growth in the PRC, India, and Indonesia (Figure 1.5 and Figure 1.6). The PRC's saving rates have always been high, in the range of 40-50% of GDP, and have exceeded those in India and Indonesia by a wide margin. These high saving rates have enabled very high investment rates in the PRC without recourse to external financing (indeed, the PRC has been a net creditor to the rest of the world). Contrast this with Indonesia, which had very high investment rates in the 1980s (even higher than the PRC's) and 1990s, but these were not supported by high domestic saving. The resulting current account deficits played a major role in Indonesia being the hardest-hit country during the Asian Financial Crisis of 1997-98. Investment fell as a result, and is only now recovering.

Figure 1.5: Gross National Saving (% of GDP)



Note: GDP – gross domestic product
Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.6: Investment (% of GDP)



Note: GDP – gross domestic product

Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Infrastructure investment, in particular, has been an important factor driving PRC growth over the past two decades. The use of infrastructure investment as a countercyclical policy lever goes back to at least the late 1990s, when it was an important part of the government's fiscal stimulus program. Central government increased transfers to local governments, and that period also saw the first issuance of state bonds to fund infrastructure, with much of it going to irrigation, transport, water and sanitation, and urban infrastructure.³ As a result, infrastructure investment more than doubled from under 6% of GDP in 1998 to over 13% of GDP by 2005, and the share of infrastructure in overall investment rose from less than one-fifth to more than one-third. Similarly, infrastructure investment was an important component of the PRC government's response to the global financial crisis.

These contrasting patterns of development have shaped the demand for—and the supply of—infrastructure in these three countries. Rapid growth, globalization, and industrialization have required the provision of adequate transport and power infrastructure. Rapid urbanization has also required that urban infrastructure be made available. And the availability of funds has shaped the three countries' ability to invest in infrastructure. The following subsection further documents these differences in infrastructure provision in the three countries.

Differences in Infrastructure Provision

Over the past two decades the PRC has consistently invested much more than India or Indonesia in infrastructure (Figure 1.7). The best available proxy of overall infrastructure investment over a two-decade period is based on public capital spending from the International Monetary Fund (2015) plus private infrastructure investment from the World Bank (2016).⁴ Based on this measure, the PRC has consistently invested more on infrastructure than India or Indonesia. Public investment plus private

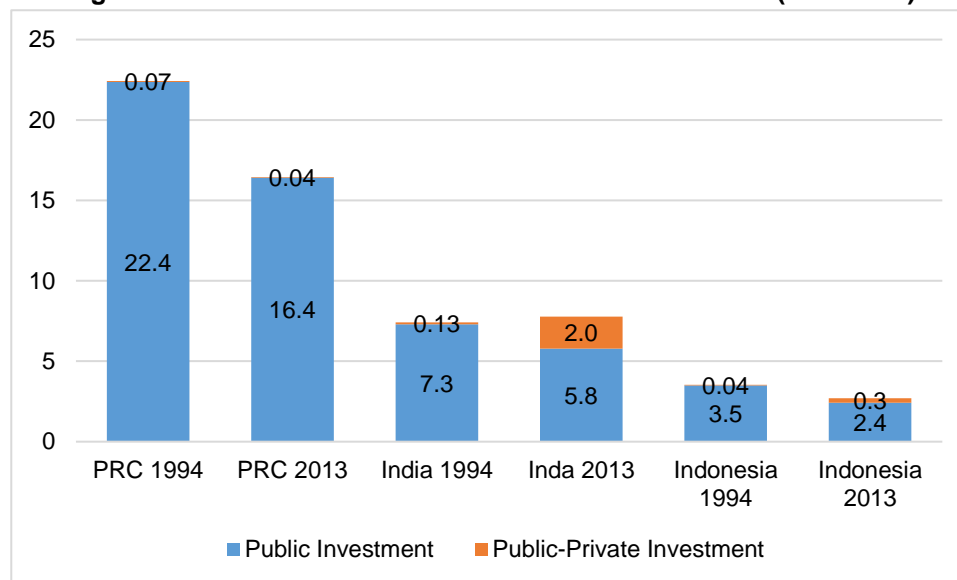
³ Liu, Zhi. 2004. Planning and Policy Coordination in China's Infrastructure Development. A Background Paper for the ADB–JBIC–World Bank EAP Infrastructure Flagship Study. Manila (ADB). <http://siteresources.worldbank.org/INTEAPINFRASTRUCT/Resources/855084-1137106254308/China.pdf>

⁴ International Monetary Fund. 2016. The IMF and Public Investment Management. Website: <https://www.imf.org/external/np/fad/publicinvestment/>; and World Bank. 2016. Private Participation in Infrastructure Database. Website: <http://ppi.worldbank.org/>. An important caveat is that this measure will provide an overestimate on the public side, since public capital spending includes investment in non-network infrastructure.

infrastructure investment has consistently exceeded 15% of GDP over the past two decades in the PRC. India had a lower infrastructure investment rate as percentage of GDP in 1994, but picked up, with its private sector share in infrastructure provision significantly increasing. Indonesia's overall combined public and private investment in infrastructure has lagged behind the other two countries and also decreased from 1994 to 2013 as a percentage of GDP.

The focus in the following sections shall be on so-called network infrastructure—transport, power, telecommunications, and urban infrastructure—as the key variables in understanding infrastructure provision in the three countries over the past two decades.

Figure 1.7: Public and Private Infrastructure Investment (% of GDP)



Source:

International Monetary Fund. 2015. Investment and Capital Stock Dataset, 1960-2013. Version: October 2015.

<https://www.imf.org/external/np/fad/publicinvestment/data/data.xlsx>

World Bank. 2016. Private Participation in Infrastructure Database. Website: <http://ppi.worldbank.org/>

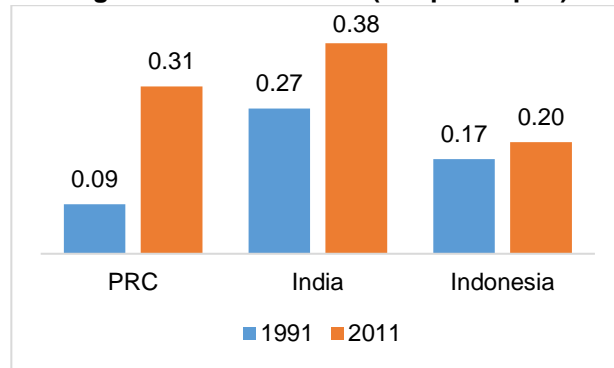
Transport

Substantial investment has allowed the PRC's road network to catch up significantly (Figure 1.8). The extent of the road transport network in India, as measured by road kilometers (km) per capita, was more advanced than in the PRC or Indonesia as of the mid-1990s.⁵ But over the past two decades PRC has made remarkable strides, surpassing Indonesia and basically equaling India in road km per capita, especially in paved roads (Figure 1.9). Quality has improved as well; the perceived quality of the PRC's road network now exceeds that of India and Indonesia, based on the survey-based indicator of quality of roads from the World Economic Forum's Global Competitiveness Report (Figure 1.10).⁶

⁵ The gap was even wider if measured by road km per square km of land area (not shown).

⁶ World Economic Forum. 2015. The Global Competitiveness Report 2015-2016. Geneva. <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

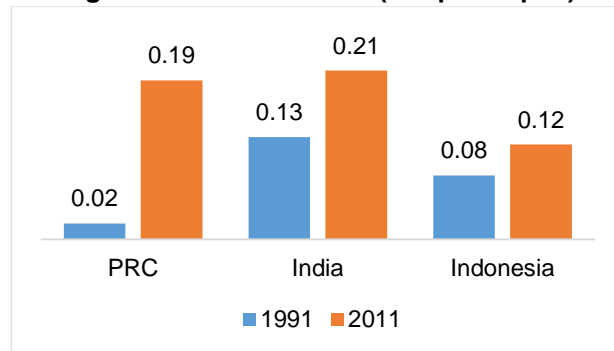
Figure 1.8: Total Roads (Km per Capita)



Note: Km – kilometers

Source: Calderon, Cesar, Enrique Moral-Benito, and Luis Servén. 2015. Is Infrastructure Capital Productive? A Dynamic Heterogeneous Approach". Journal of Applied Econometrics: 30-2. P. 177-198.

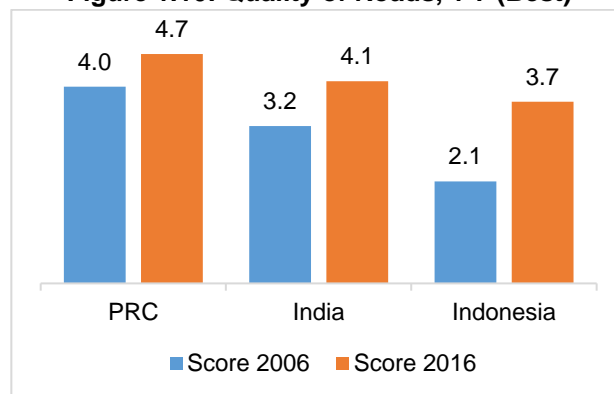
Figure 1.9: Paved Roads (Km per Capita)



Note: Km – kilometers

Source: Calderon, Cesar, Enrique Moral-Benito, and Luis Servén. 2015. Is Infrastructure Capital Productive? A Dynamic Heterogeneous Approach". Journal of Applied Econometrics: 30-2. P. 177-198.

Figure 1.10: Quality of Roads, 1-7 (Best)



Source: World Economic Forum. 2015. The Global Competitiveness Report 2015-2016. Geneva.

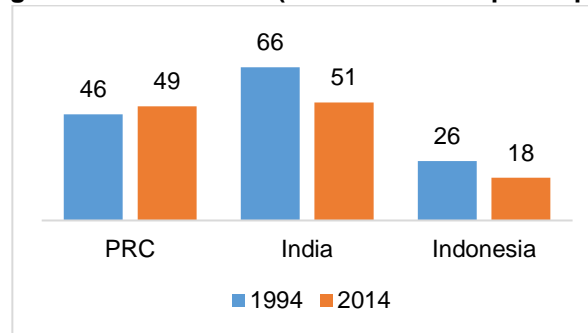
<http://reports.weforum.org/global-competitiveness-report-2015-2016/>

Similar progress can be seen in the PRC's rail network. Between 1994 and 2014, the PRC increased the length of its rail network (total route kilometers) by 24 percent, whereas India's rail network increased only by 5 percent and Indonesia's shrank by 7 percent.⁷ This implied a steady increase in

⁷ Indonesia also has a much less extensive rail network than India or PRC (whether measures in total km or total km per capita) because it is an archipelago.

PRC's rail km per capita, but a decline in both India (where population grew by 37 percent over the same period) and Indonesia (Figure 1.11). And much of the PRC's rail investments have not been in extending the network, but in increasing both capacity and quality (e.g., high-speed rail). As a result, the perceived quality of PRC's rail network now exceeds that in India and Indonesia (Figure 1.12).

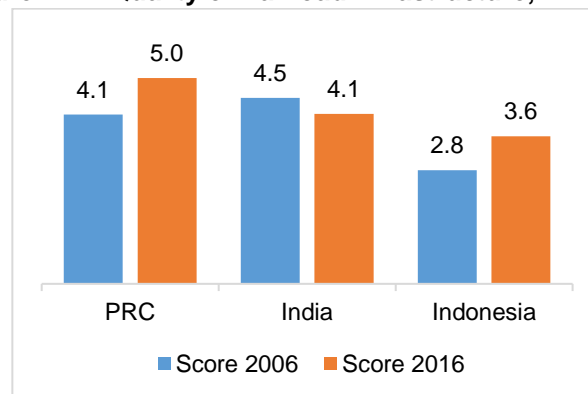
Figure 1.11: Rail Lines (Total Route-Km per Capita)



Note: Km – kilometers

Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.12: Quality of Railroad Infrastructure, 1-7 (Best)



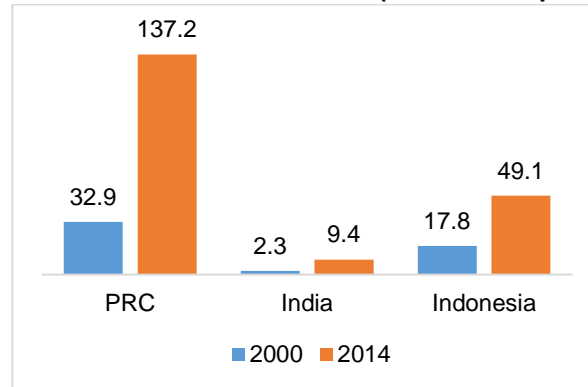
Source: World Economic Forum. 2015. The Global Competitiveness Report 2015-2016. Geneva. <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

The PRC's port infrastructure is also more developed and utilized, driven by the country's strong outward orientation.⁸ Container port traffic in the PRC far exceeds that in Indonesia and India (both in absolute terms and when scaled by population), a reflection of the country's strong reliance on exports and its integration into regional and global value chains (Figure 1.13). Indonesia also relies heavily on port infrastructure due to archipelagic nature, but while Indonesia's port traffic per capita was just over half of the PRC's in 2000, that ratio had fallen to close to one-third by 2014, reflecting the sharp rise in PRC's global trade following its accession to the WTO in 2001. India's relatively more domestic consumption-oriented economy (and especially the higher share of services in its exports) imply much less use of port infrastructure compared to developing Asia's two other giants. The perceived quality of port infrastructure in the three economies does not differ as much as for other types of infrastructure, with PRC's ports deemed to be slightly better than ports in the other two countries (Figure 1.14). The

⁸ Port and airport capacity would have been better proxies for infrastructure than indicators based on traffic, but only the latter is readily available. For more information on port capacity, see International Transport Forum (2016).

PRC's port infrastructure was critical in allowing its exports to grow by 16% a year on average between 2000 and 2014, compared to 10% for India and just 2% for Indonesia.

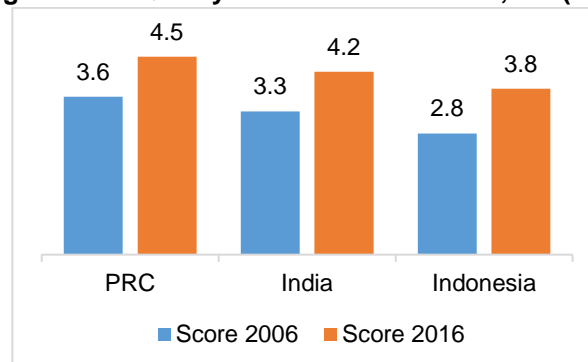
Figure 1.13: Container Port Traffic (Million TEU per Capita)



Note: TEU – Twenty Foot Equivalent Unit

Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

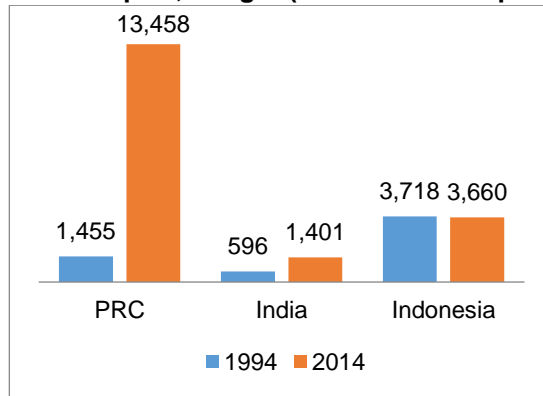
Figure 1.14: Quality of Port Infrastructure, 1-7 (Best)



Source: World Economic Forum. 2015. The Global Competitiveness Report 2015-2016. Geneva. <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

Air transport shows similar patterns. Air freight transport has increased more than ten-fold in the PRC over the past two decades, dwarfing the doubling in India and the stagnation in Indonesia where freight volumes remain close to where they were two decades ago (Figure 1.15). Air passenger transport has grown dramatically in all three countries, however, in per capita terms Indonesia still outpaces the PRC on this front, hinting at its archipelago nature in combination with a more widely deregulated airline sector, in which low-cost carriers from the region have since flourished, with visitor numbers rising particularly in the past decade (Figure 1.16). The quality of India's air transport infrastructure was judged to have been the best among the three countries in 2006, but perceptions of quality for India declined over the past decade and, here again, the PRC has taken the lead (Figure 1.17).

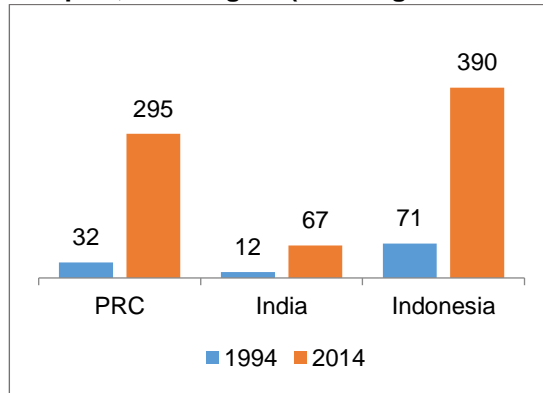
Figure 1.15: Air Transport, Freight (Million Ton-Km per 1,000 People)



Note: Ton-Km – metric tons times kilometers traveled

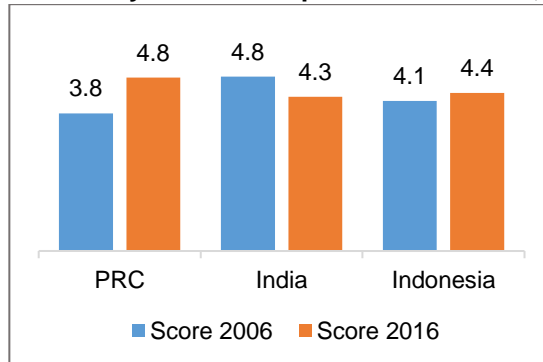
Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.16: Air Transport, Passengers (Passengers Carried per 1,000 People)



Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.17: Quality of Air Transport Infrastructure, 1-7 (Best)



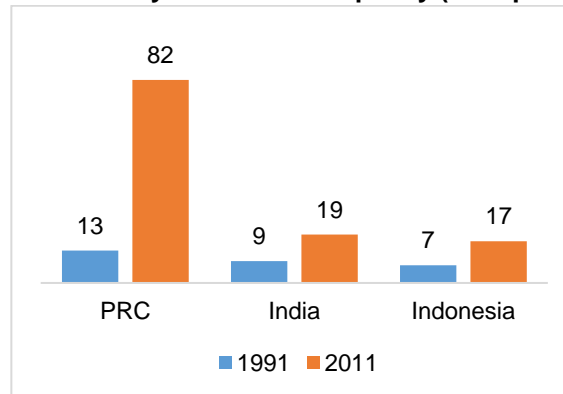
Source: World Economic Forum. 2015. The Global Competitiveness Report 2015-2016. Geneva. <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

Energy

Strong investments have pushed the PRC's energy infrastructure far ahead of India's and Indonesia's, in terms of quantity, access, and quality. In the early 1990s, electricity generation capacity per capita was relatively close for all three countries (Figure 1.18). Over the next two decades, the PRC's electricity generation capacity per capita increased six-fold, compared to the doubling in India and Indonesia.

Energy accessibility in the PRC has always been high, with 94% of its population already having access to electricity in 1990; by 2012 the whole population was on the grid (Figure 1.19). Indonesia has made substantial gains in this area, with access rising from 67% in 1990 to 96% in 2012. There has also been substantial progress in India, with access rising from 51% to 79%; but this still leaves one-fifth of the population without access to electricity.

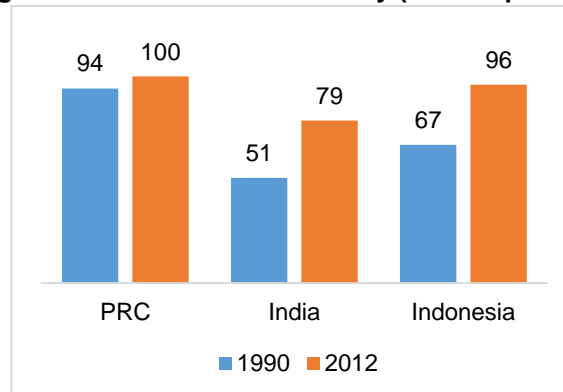
Figure 1.18: Electricity Generation Capacity (kWh per 100 People)



Note: kWh – kilowatt hour

Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.19: Access to Electricity (% of Population)

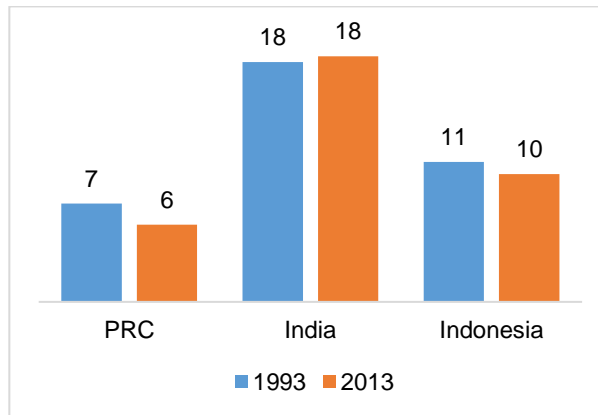


Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Distribution losses have always varied widely across the three countries (Figure 1.20). PRC has the most efficient grid, with transmission and distribution losses of 6-7% of output. Indonesia's transmission losses are slightly higher at 10-16% over the past two decades, while India's grid results in losses of

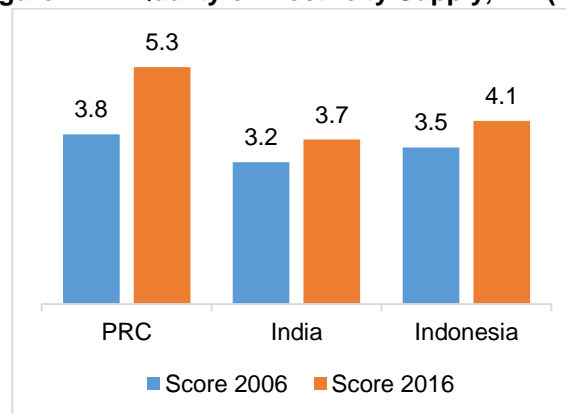
18-27% from 1993 to 2013, far higher than the other two countries. Taken together, the higher quantity, access, and efficiency of PRC's energy infrastructure is reflected in perceptions of much higher quality than in the other two countries (Figure 1.21).

Figure 1.20: Electric Power Transmission and Distribution Losses (% of Output)



Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.21: Quality of Electricity Supply, 1-7 (Best)



Source: World Economic Forum. 2015. The Global Competitiveness Report 2015-2016. Geneva. <http://reports.weforum.org/global-competitiveness-report-2015-2016/>

Telecoms

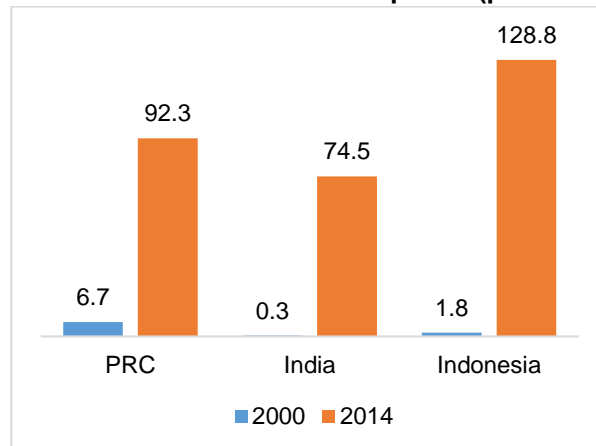
Mobile telecoms is one area where Indonesia takes the lead among the three countries. Information and communication technology (ICT) growth and technological advancements in the past two decades brought significant changes to telecommunications in all three countries, with all experiencing an explosion of mobile phone and internet users.⁹ Indonesia's mobile phone industry has been the most developed, with 325 million mobile cellular subscriptions in a country with a population of 250 million (or about 130 subscriptions per 100 people). This reflects Indonesia's vibrant and competitive telecoms

⁹ More than the other infrastructure sectors, telecoms with regard to services and usage rates has experienced rapid changes in recent years, with even the past two years having broad further increases in penetration rates, not yet reflected in the provided figures.

sector, where eight mobile operators make the market openly competitive. But India and the PRC are not far behind, with 75 and 90 subscriptions per 100 people, respectively (Figure 1.22).

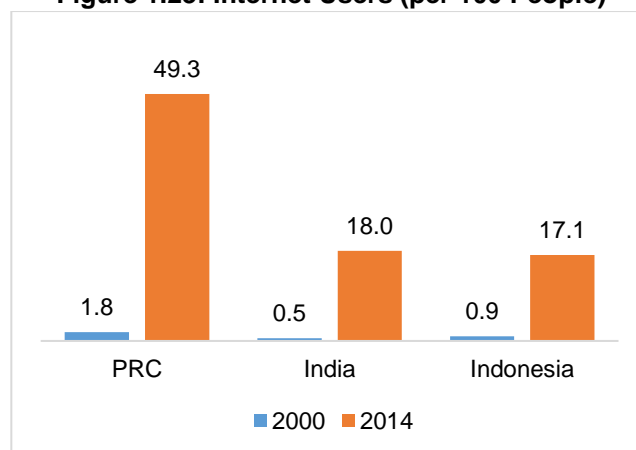
Indonesia lags when it comes to internet penetration, however (Figure 1.23). The country is third in terms of internet users per capita, with only 17 per 100 people using the internet. India is at similar levels, with 18 internet users per 100 people. In the PRC, by contrast, there are close to 50 internet users for every 100 people.

Figure 1.22: Mobile Cellular Subscriptions (per 100 People)



Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.23: Internet Users (per 100 People)



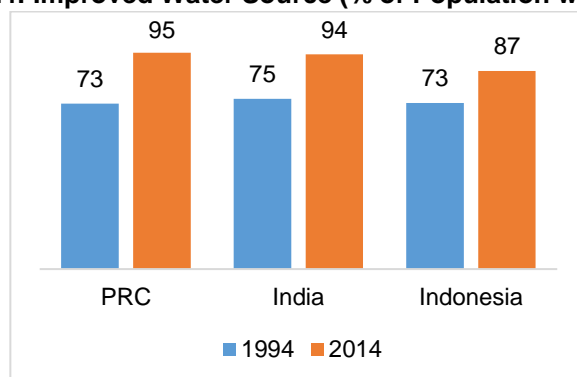
Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Water and Sanitation

Progress in water source access has been similar across the three countries, but the PRC is ahead when it comes to sanitation. All three countries had comparable access rates in 1994 of 73-75%, and their progress over the past two decades was similar, so that by 2014 water source access had reached 84% in Indonesia and 94-95% in India and the PRC. Differences are more evident when improved sanitation facilities are compared (Figure 1.24). While the ranking of the three countries did not change

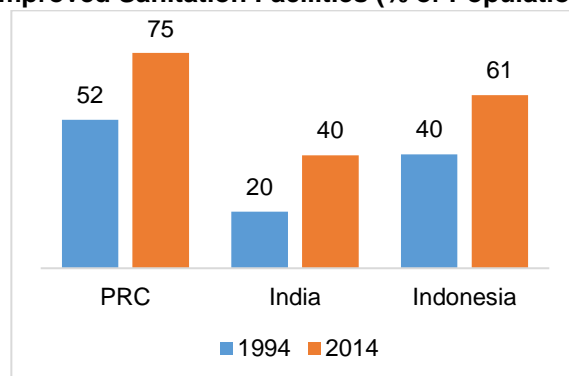
between 1994 and 2014 and all three countries improved sanitation access rates by about 20%, the PRC has always been several steps ahead, with access rates remaining more than 10 percentage points above those in Indonesia, and more than 35 percentage points, above those in India (Figure 1.25). Related to the infrastructure aspect of water provision, the topic of water security has gained significant importance, as all three countries have seen increasing challenges to their water resource uses for population and industries.¹⁰

Figure 1.24: Improved Water Source (% of Population with Access)



Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Figure 1.25: Improved Sanitation Facilities (% of Population with Access)



Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

Differing Patterns of Private Participation in Infrastructure

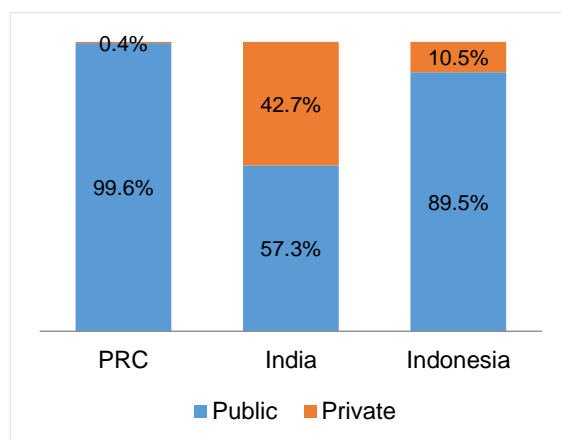
One distinctive characteristic of infrastructure provision in the PRC relative to the other two countries is the much limited involvement of private and foreign actors in the sector.¹¹ Over the past 20 years infrastructure investment with private participation in PRC has averaged about \$7 billion a year, a drop in the bucket relative to overall infrastructure investment in the country. Infrastructure investment with private participation in the PRC has accounted for less than 1% of overall infrastructure investment in recent years (Figure 1.26). The PRC has experimented with various models for private participation in infrastructure, including inviting foreign investors into power generation in the mid-1990s, but none has

¹⁰ ADB. 2016. Asian Water Development Outlook. Strengthening Water Security in Asia and the Pacific. Manila.

¹¹ ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila.. P.. 57-115.

been fully developed and implemented.¹² Instead, state-owned enterprises account for the bulk of investment in the infrastructure sector. One possible factor that limited involvement of the private sector in PRC infrastructure is the National Development and Reform Commission's (NDRC) strong centralized control of planning, while responsibility for building was devolved to local governments. Another factor has been the political risk and lack of certainty on tariff regulation, which may have also discouraged private infrastructure investment.¹³ Although, in recent years there have been initiatives to attract strategic investors, by making tariff regimes more market-based and transparent. This has helped to attract investors into airports, expressways, and ports.

Figure 1.26: Public and Private Infrastructure Investment Share (2011)



Source: ADB. 2017. Meeting Asia's Infrastructure Needs. Manila.

In India, previous heavy reliance on public provision of infrastructure delivered suboptimal results, so the Indian government has made a clear shift toward increased private sector participation. Across the three countries private participation in infrastructure is most evident in India, where about two-fifths of infrastructure investment in India was done by the private sector, accounting for about \$17bn of infrastructure investment annually over the past two decades.¹⁴

The Indonesian government has been similarly committed to increasing private participation in infrastructure. It legalized the concept of PPPs in 2005, and thereafter introduced various initiatives to attract private investment in telecoms, railways, ports, electricity, and water and sanitation. The Land Acquisition Law has been recently amended. Despite these efforts, however, relatively few PPPs have been able to finalize contract terms. As of 2011, Indonesia lies between PRC and India, with private participation in infrastructure accounting for one-tenth of overall infrastructure investment.¹⁵

Looking across infrastructure sectors and comparing the periods 1990-2002 and 2003-2015, the energy sector has accounted for a large share of the number of projects with private sector participation in all three countries throughout these periods (Figure 1.27). Also the share of the transport sector in the number of projects has been significant, although its role in the PRC has decreased during 2003-

¹² Bellier, Michel, and Yue Maggie Zhou. 2003. Private Participation in Infrastructure in China: Issues and Recommendations for the Road, Water, and Power Sectors. World Bank Working Paper No. 2. Washington, DC (World Bank).

¹³ Finlayson, B. 2007. FDI and PPPs Experience in the PRC. Presentation given at the Asian Development Bank Institute, 19–22 November 2016, Tokyo.

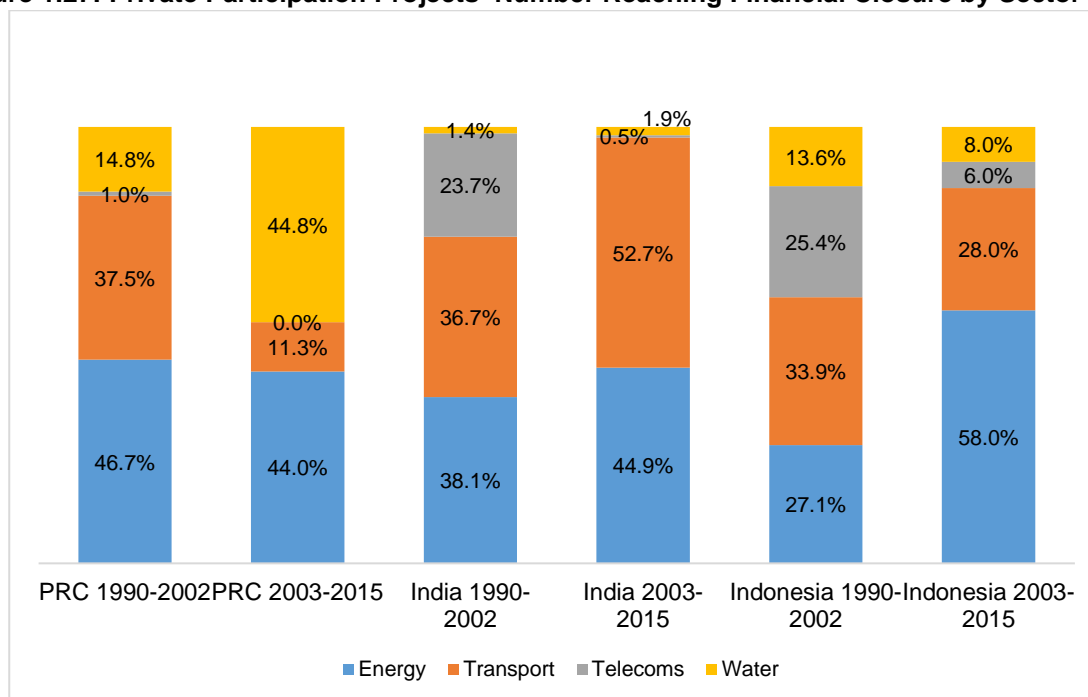
¹⁴ World Bank. 2016. Private Participation in Infrastructure Database. Website: <http://ppi.worldbank.org/>

¹⁵ ADB. 2017. Meeting Asia's Infrastructure Needs. Manila.

2015, while the share of water projects increased. Telecoms projects played a more relevant role in India and Indonesia during 1990-2002.

As a share of total investment amount, however, private participation in telecoms becomes more important, particularly in Indonesia (Figure 1.28), while the investment amount in transport projects significantly increased in the PRC and India.¹⁶ Again, private sector participation in the energy sector as a share in total investments remained high in all three countries throughout these periods. While the comparative analysis of the share of private sector in infrastructure projects remains a challenge, the factors that have played a role in shaping private participation in these economies are quite informative, as the discussion in Chapter 2 illustrates.

Figure 1.27: Private Participation Projects' Number Reaching Financial Closure by Sector Share

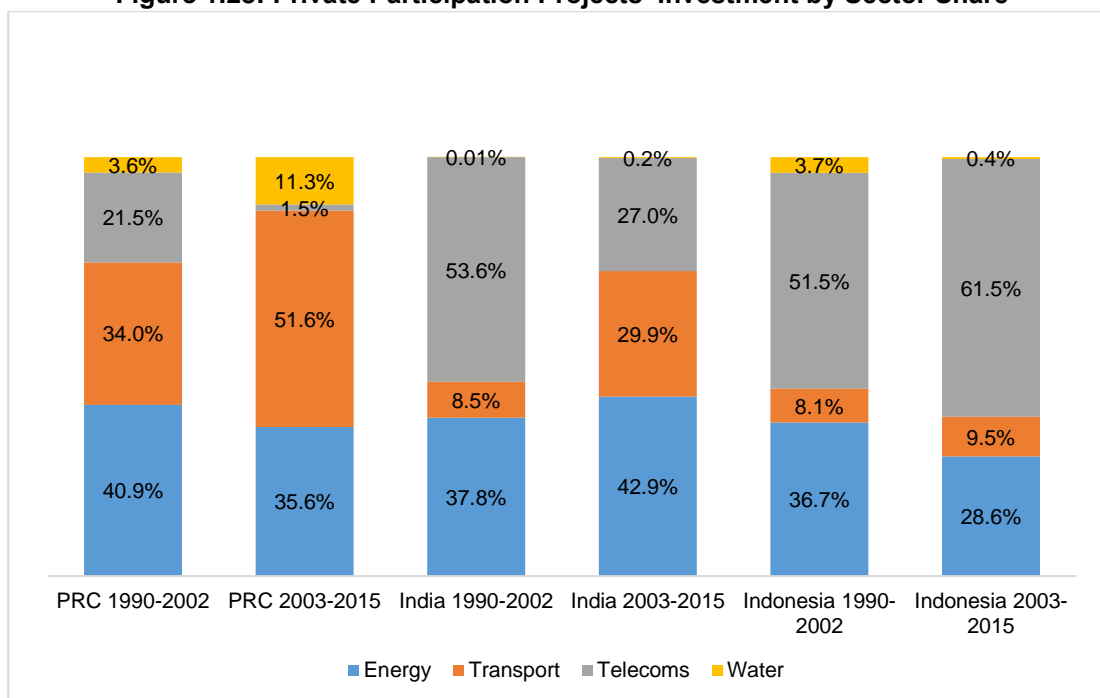


Source: World Bank. 2016. Private Participation in Infrastructure Database. Website: <http://ppi.worldbank.org/>

¹⁶ In allocating private infrastructure investment across years, the World Bank PPI dataset can contain multiple observations for a single project, if investments within a given project are decided on in multiple years. All entries for a given project will have the same financial closure year (which is when the contract is signed and financial arrangements secured) but can have different investment years. Thus, when analyzing the number of projects, one should use the financial closure year and ignore repeated observations. When analyzing investment amounts, one should use the dollar amounts in the specified investment years. Comparative assessments, thus, have to be treated with caution.

World Bank. 2016. Private Participation in Infrastructure Database. Website: <http://ppi.worldbank.org/>

Figure 1.28: Private Participation Projects' Investment by Sector Share



Source: World Bank. 2016. Private Participation in Infrastructure Database. Website: <http://ppi.worldbank.org/>

Summary and Conclusions

This chapter has provided a comparative view of infrastructure provision in the PRC, India, and Indonesia, and the broader development context in which this infrastructure was provided. While all three countries grew over the past two decades, growth was much more rapid in the PRC. Indonesia managed to keep pace when it came to poverty reduction and urbanization, while India lagged. Globalization and export orientation also played a much stronger role in the PRC, and its much higher rates of saving and investment were a crucial component in enabling higher levels of infrastructure investment.

The impact of the much higher levels of infrastructure investment in the PRC are evident across almost all sectors of infrastructure, in terms of quantity, quality, and access. The PRC now has almost as much roads and rail km per capita as does India despite having been far behind on this metric two decades ago. And the quality of PRC's road and rail infrastructure is perceived to be better. Port and airport freight volumes are much higher in the PRC reflecting its greater reliance on trade and integration into global production chains, and here too the quality of PRC's infrastructure is deemed to be higher. The PRC's electricity generation capacity per capita is higher, its transmission and distribution losses are smaller, and access to and perceived quality of electricity is also ahead. And the PRC also leads when it comes to water and sanitation. The only two areas where Indonesia is ahead are the areas of air passenger transport and mobile telecoms. Finally, private participation is most prevalent in India, followed by Indonesia; infrastructure remains overwhelmingly in the public domain (including through state-owned enterprises) in the PRC.

The following chapter will now examine more deeply the process and lessons learned of infrastructure provision and financing in these three countries in retrospect.

Box 1.1: Urbanization, the Environment, and Infrastructure Development

Taking the infrastructure lens and applying it to the urban sector in the three countries reveals some interesting differences in their achievements, but also the challenges they are dealing with (Table 1.1). The share of population living in large urban agglomerations of more than 1 million was about 10% in 1994 in all three countries, but PRC experienced a steep increase to nearly one quarter in 2014, underscoring the role of megacities in the country.

While the lack of data on the share of urban poor in PRC and its very low 2% figure from 1998 does not allow for much comparison, the data for India and Indonesia shows how both countries managed to decrease their urban poverty headcount ratio over the past years, in particular India from the highest 26% figure in 2004 to 14% in 2011. Figures for urban slum population shares have also been declining from above 40% values in all three countries in the mid-1990s to about or less than a quarter in 2014, with India achieving the strongest decrease by 24 percentage points.

Table 1.1: Country Development Indicators in Comparison

Category	Criteria	PRC				India				Indonesia			
		Year	Value	Year	Value	Year	Value	Year	Value	Year	Value	Year	Value
Population	Population in urban agglomerations of more than 1 million (% of total population)	1994	11.4	2014	23.2	1994	11.0	2014	14.2	1994	10.1	2014	10.1
Poverty	Urban poverty headcount ratio at national poverty lines (% of urban population)	1998	2	n.d.	n.d.	2004	25.7	2011	13.7	2004	12.1	2011	9.2
Housing	Population living in slums, (% of urban population)	1995	40.5	2014	25.2	1995	48.2	2014	24.0	1995	42.6	2014	21.8
Climate Change	Urban population living in areas where elevation is below 5 meters (% of total population)	n.d.	n.d.	2010	4.2	2000	1.1	2010	1.1	2000	3.6	2010	3.8
Basic Services Access	Access to electricity, urban (% of urban population)	1990	100.0	2012	100.0	1990	86.5	2012	98.2	1990	100.0	2012	99.1
	Improved water source, urban (% of urban population with access)	1994	97.1	2014	97.5	1994	90.3	2014	97.1	1994	90.2	2014	94.0
	Improved sanitation facilities, urban (% of urban population with access)	1994	70.8	2014	85.9	1994	51.1	2014	62.6	1994	63.0	2014	72.3

Note: n.d. – no data

Source: World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

It is worthwhile, however, to look also at the absolute changes to understand the achievements or shortcomings in the three countries. For instance in the housing sector from 1995 to 2014, India performed best by decreasing its number of urban slum dwellers by about 23 million (101 million in 2014), while Indonesia hardly progressed with a decrease of less than 1 million urban slum dwellers (29 million in 2014). PRC, on the other hand, saw its number of slum dwellers actually increase by about 36 million (187 million in 2014). These figures are caused by the rapid increase in urban population over the same time, which has been challenging these countries to keep up with urban infrastructure provision, such as secure housing, while natural population growth and rural-urban in-migration continue.

With climate change becoming an increasingly pressing issue, urban populations in the PRC, India, and Indonesia are facing threats from changes, for instance, with regard to sea-level rise.¹⁷ Urban population living in low-elevation areas are higher in PRC and Indonesia with about 4% in contrast to India's 1%. But it is clear that all three countries have to develop and put in place the infrastructure to increase the resilience of their cities and citizens.

Access to basic services in urban areas in the three countries is similar and better than the overall country access values. However, in contrast to nearly complete access rate for electricity and water, access rates to sanitation facilities remain a challenge for the urban population in PRC (86%), Indonesia (72%), and particularly India (63%).

The development trajectories of the PRC, India, and Indonesia have brought with them serious physical, environmental, and social implications. The example of the three capital cities of Beijing, Delhi, and Jakarta—all with populations in the metropolitan region exceeding 20 million—is used here for an illustrative city comparison (Table 1.2). The economic importance of the three capital cities in their countries is apparent: Beijing and New Delhi account for 4.5% and 3.4% share of GDP, respectively, and Jakarta accounts for 11% of Indonesia's GDP, as it also serves as the country's business center.¹⁸ This economic weight is of national importance with regard to development, and infrastructure provision and performance is directly interlinked with this.

As a proxy indicator about the cities' transport infrastructure, commute times indicate a similarly low performance in New Delhi and Jakarta with 42-43 minutes one-way, while Beijing's commute time amount up to a negative record high of 52 minutes. Air pollution measured in annual mean concentration of particulate matter of less than 10 microns of diameter (PM10) are high in New Delhi with 229 ug/m3, while Beijing shows a rate of 108 ug/m3 and Jakarta's value is 48 ug/m3. Another relative environmental indicator is CO2 emissions per capita, which are similarly low in New Delhi and Jakarta at 1.1-1.2 tons, while Beijing stands at 8.2 tons. While a combination of economic structure, geographic and weather conditions, energy efficiency, industrial standards and environmental regulations and their enforcement, as well as surrounding areas and their impacts all contribute to the three capital cities' environmental conditions, the scarcity of data and the differences in measurement methodologies require caution in cross-city comparisons.

Nevertheless, a variety of indexes and surveys paint a very clear picture of Beijing, New Delhi, and Jakarta as environmentally low performing places. For instance, Numbeo's crowd-sourced pollution index sees Jakarta rank slightly better than New Delhi and Beijing. Air pollution shows a similar ranking of Jakarta being somewhat better than New Delhi, with Beijing ranking last. In water pollution terms, the capital cities rank fairly even. However, all these values are in the upper ranges of high or very high pollution, allowing the conclusion that there has been significant environmental degradation as part of rapid urbanization and related infrastructure development in the urban realms of the PRC, India, and Indonesia. Other indexes and figures can be referred to as well, all pointing toward these challenges.¹⁹

Taking a more integrated perspective, the UN-Habitat's indexes of its City Prosperity Methodology reveal how Beijing outperforms New Delhi and Jakarta in terms of infrastructure development, quality of life, equity, and productivity (economy). Only in environmental aspects, Jakarta outperforms the

¹⁷ UN-Habitat. 2011. Global Report on Human Settlements 2011: Cities and Climate Change. Nairobi.

¹⁸ C40. 2016. C40 Cities. <http://www.c40.org/cities>

¹⁹ On the aspects of raw sewage disposal into surface water, groundwater contamination, unsafe drinking water quality, and water-related diseases, see for instance:

ADB. 2016. Asian Water Development Outlook. Strengthening Water Security in Asia and the Pacific. Manila.

WHO. 2016. Water Sanitation Hygiene. http://www.who.int/water_sanitation_health/en/

UN Water. 2016. Statistics. <http://www.unwater.org/statistics/en/>

other two cities. New Delhi ranks third in all aspects, except for infrastructure development, where Jakarta performs worse.

The countries can compare their cities performances in these economic, environmental, and social aspects and conclude where they see the most urgent need for action. It is though clear from the comparison that infrastructure provision has to be thought in a comprehensive way to bear positive results not just for the physical expansion of networks and utilities, but also with regard to sustainability, accessibility, and affordability. A livability framework can help here to approach infrastructure planning and urban development in an integrated fashion in rapidly urbanizing Asia.²⁰

Table 1.2: City Development Indicators in Comparison

Criteria	PRC: Beijing	India: New Delhi	Indonesia: Jakarta
Approximate One-Way Commute Time (minutes)	52 (Chen 2015)	43 (Beniwal 2015)	42 (Stenovec 2015)
CO2 Emissions (tons of CO2 equivalent per capita) (Siemens 2011)	8.2 (in 2009)	1.1 (in 2008)	1.2 (in 2007)
Annual mean concentration of particulate matter of less than 10 microns of diameter (PM10) [ug/m3] (Source: WHO 2016)	108 (in 2013)	229 (in 2012)	48 (in 2010)
Pollution Index (Source: Numbeo 2016a)	95.45	92.98	84.75
Air Pollution Index (Source: Numbeo 2016a)	91.67	88.85	77.00
Water Pollution Index (Source: Numbeo 2016a)	79.49	79.90	81.77
UN-Habitat Infrastructure Development Index (UN-Habitat 2016)	0.91	0.79	0.74
UN-Habitat Quality of Life Index (UN-Habitat 2016)	0.84	0.69	0.73
UN-Habitat Equity Index (UN-Habitat 2016)	0.97	0.71	0.89
UN-Habitat Environmental Sustainability Index (UN-Habitat 2016)	0.66	0.45	0.88
UN-Habitat Productivity Index (UN-Habitat 2016)	0.67	0.60	0.64

Sources:

Beniwal, Vrishti. 2015. Commuting Time in Mumbai the Maximum, Says Study. The Financial Express: 15 August 2015. <http://www.financialexpress.com/archive/commuting-time-in-mumbai-the-maximum-says-study/210620/>
Chen, Stephen. 2015. Beijing Workers Have Longest Daily Commute in China at 52 Minutes Each Way. Stenovec, Tim. 2015. The 20 Cities with the Longest Commutes in the World. Tech Insider: 5 October 2015. <http://www.techinsider.io/the-15-cities-with-the-longest-commutes-in-the-world-2015-10>
Numbeo. 2016a. Pollution. <http://www.numbeo.com/pollution/>
Siemens. 2011. Asian Green City Index. Munich.
South China Morning Post: 27 January 2015. <http://www.scmp.com/news/china/article/1692839/beijingers-lead-chinas-pack-longest-daily-commute>
UN-Habitat. 2016. UN-Habitat Urban Data. <http://urbandata.unhabitat.org/>
WHO. 2016. Global Urban Ambient Air Pollution Database. http://www.who.int/phe/health_topics/outdoorair/databases/cities/en/

²⁰ ADB. 2016. GrEEEn Solutions for Livable Cities. Manila.

2. Lessons Learned from Infrastructure Provision

Following the comparative perspective on different development indicators in the first chapter, the second chapter draws more qualitative lessons from the tale of the three giants with a particular focus on the context in which their development took place. A brief description of the institutional arrangements through which infrastructure planning takes place in the PRC, India, and Indonesia will be followed by lessons learned from infrastructure provision experiences in the three countries and a concluding comparison of the three experiences.

Institutional Arrangements for Infrastructure Planning

In the PRC, the National Development and Reform Commission (NDRC) plays a key role in providing the strategic direction for development planning and corresponding investment.²¹ Other national and sub-national plans must be aligned with NDRC's socio-economic five-year plans. Other country national plans, such as those for land use (the National Spatial Plan of the Ministry of Land and Resources) and urban system development (the Urban and Rural Plans of the Ministry of Housing and Urban-Rural Development) are more sector-specific. On sub-national levels, planning is correspondingly informed by national plans.. It is the ability to prioritize resources for particular geographic areas and economic sectors that make the NDRC's five-year plans a strong planning instrument. This is particularly so as socio-economic planning by the NDRC has meant strong interlinkages between the economic growth strategies and urbanization strategies—with local, metropolitan, and inter-regional infrastructure projects as the key focus of investment and development.²²

The Indian planning system utilized five-year plans developed by the Prime Minister's Planning Commission until 2015, when these were replaced with socio-economic guidance by the National Institution for Transforming India Commission (NITI).²³ Instead of the previous consolidation of various ministry, agency, and state government plans through five-year plans, NITI provides a federalist socio-economic development framework and guides toward high-relevance development areas of national interest. While national ministries/agencies continue to draft sector-specific plans and policies, India knows no central planning coordination by a single line ministry. Being set up as a federal country, India sees a stronger planning responsibility on the sub-national state levels. This concerns both five-year plans by state governments, as well as spatial development plans by Urban Planning Departments, Commissions, or Boards, which are however guided by the Housing and Urban Development Department of the national Ministry of Urban Development. In planning and regulatory terms, state governments are in the lead, and policies and plans vary from state to state, which explains the less stringent national-state guidance and coordination for planning and investment.

The national government of Indonesia provides national long-term development plans, which inform medium-term plans on the national level, as well as sector-specific development plans by each ministry

²¹ National Spatial Planning and Regional Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT). 2015. An Overview of Spatial Policy in Asian and European Countries: China. http://www.mlit.go.jp/kokudokeikaku/international/spw/general/china/index_e.html

²² Liu, Zhi. 2004. Planning and Policy Coordination in China's Infrastructure Development. A Background Paper for the ADB–JBIC–World Bank EAP Infrastructure Flagship Study. Manila (ADB). <http://siteresources.worldbank.org/INTEAPINFRASTRUCTURE/Resources/855084-1137106254308/China.pdf>

²³ National Spatial Planning and Regional Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT). 2015. An Overview of Spatial Policy in Asian and European Countries: India. http://www.mlit.go.jp/kokudokeikaku/international/spw/general/india/index_e.html

or agency.²⁴ In a rather hierarchical planning system, regional plans and local implementation plans also have to derive from their corresponding national plans. The National Development Planning Agency (BAPPENAS) has the lead in the socio-economic planning, while the Department of Finance directs the budgeting process. Regarding the national spatial plan, BAPPENAS coordinates with other ministries, such as the Ministry of Home Affairs. Likewise, provincial spatial plans, followed by sub-provincial spatial plans, are guided by the national level.

The key difference between the three countries is the strong planning and guidance role of NDRC in PRC for both planning and investment – a role unmet by other national planning entities in India or Indonesia.²⁵ This plays out both in coordinating different sectoral ministries and agencies, as well as guiding sub-national entities in their planning. However, it goes beyond a simple top-down planning approach, as it builds up on inputs by sub-national governments and sectoral departments. In addition, NDRC enjoys a strong role also in the implementation stage for infrastructure programs, thus ensuring efficiency in managing typically cross-sectoral, integrated projects.²⁶ When comparing the three countries' spatial planning and governance systems, it is important to take into account the role (or dominance) of the public sector in infrastructure development, which is more pronounced in PRC and lesser in Indonesia and India. This underscores differences in the linking-up of government planning with public or private investment.²⁷

In India, the absence of strong national-level power and coordination in planning and execution has led to gridlock. The national government has recognized the stronger role of state governments in socio-economic planning and has opted for a less directive, more strategic role in supporting initiatives toward key development objectives. The diversity and size of these states has brought various pathways for different planning and investment priorities with mixed results depending on the state government's capacities and strategic foresight.²⁸ Furthermore, the varying legal and regulatory systems between states have made infrastructure provision a complex endeavor. General requirements for broad consultations combined with a myriad of bureaucratic procedures, multi-agency clearance and approval responsibilities, and related risk adversity in administrations have impacted on the development and execution of infrastructure projects.²⁹ As an additional feature, India's multiparty set-up should not be underestimated as a defining feature impacting on the cooperative or conflictive style for medium and long-term political directions and corresponding planning and investment priorities.

In the case of Indonesia, the national planning approach has been based on a much longer-term strategic perspective and has evolved in more spatially oriented plans for the medium term. Its effectiveness, however, can only be evaluated in light of the 'shock therapy' of the 1999

²⁴ National Spatial Planning and Regional Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT). 2015. An Overview of Spatial Policy in Asian and European Countries: Indonesia. http://www.mlit.go.jp/kokudokeikaku/international/spw/general/indonesia/index_e.html

²⁵ Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 1-37.

²⁶ Liu, Zhi. 2004. Planning and Policy Coordination in China's Infrastructure Development. A Background Paper for the ADB–JBIC–World Bank EAP Infrastructure Flagship Study. Manila (ADB). <http://siteresources.worldbank.org/INTEAPINFRASTRUCTURE/Resources/855084-1137106254308/China.pdf>

²⁷ Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 57-115.

²⁸ Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 57-115.

²⁹ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

decentralization and phases when planning powers were further devolved or re-centralized.³⁰ Shifting significant powers to the sub-national levels meant that aspects of socio-economic development planning were partially decentralized as well. However, with capacities on these lower levels of government not yet up to necessary levels, performance in strategic planning and related infrastructure provision have varied widely. The process of decentralization resulted in less efficient structures, as higher-level agencies were obligated to monitor lower-level plan-making, while ongoing changes to planning laws redistributed powers across government levels and ministries, resulting in a fragmented, not yet effectively devolved planning system.³¹ The government has, however, reacted to the flaws and set up the Committee for Acceleration of Priority Infrastructure Delivery (KPPIP), which within one year of operations managed to successfully address various bottlenecks in infrastructure provision for projects of national importance.³² In how far this committee can continue its role in cross-ministerial and multi-stakeholder coordination for infrastructure projects remains to be seen.

Lessons Learned from PRC

Looking at the PRC's development, one can identify three stages from a more chaotic period from 1978 to early 1990s, followed by a booming stage from early 1990s to around 2007, resulting in a systematic stage of development since then.

The first stage was characterized by a deep planned economy in light of vast absence of infrastructure. Economic development was strongly inhibited by poor networks, but still, the 1978 reforms resulted in steep economic growth. PRC's development benefitted much from its large domestic market, which allowed for economies of scale at a comparatively early point of development.³³ PRC had a demographic dividend with the age dependency ratio falling rapidly, transforming PRC into a labor-abundant, low-cost country and providing the comparative advantage needed to develop the manufacturing industry.³⁴ During these decades, PRC turned to international markets and implemented numerous reforms to encourage trade and investment. In order to understand the continued and in many regards comparatively accelerated infrastructure growth rates in the second stage from the late 1990s onward, it has to be pointed out that PRC maintained its high level of infrastructure investments through the Asian financial crisis, as well as later on during its third development stage and the global financial crisis, while other countries in the region saw cutbacks in their infrastructure investment rates.³⁵ In implementing reforms, PRC applied a gradual approach with regard to reforms being phased over time, and sequentially implemented across different sectors and regions. Thereby, the geographic focus of PRC's infrastructure and economic growth was characterized by a clear urban bias, in which coastal areas and special economic zones, as well as their infrastructure linkages were strongly

³⁰ Moeliono, Tristam Pascal. 2011. Spatial Management in Indonesia: From Planning to Implementation. Cases from West Java and Bandung. A Socio-Legal Study. Leiden University.

³¹ Moeliono, Tristam Pascal. 2011. Spatial Management in Indonesia: From Planning to Implementation. Cases from West Java and Bandung. A Socio-Legal Study. Leiden University.
<https://openaccess.leidenuniv.nl/bitstream/handle/1887/18242/Proefschrift%20Tristam%20Moeliono%2021%20november%202011.pdf?sequence=1>

³² ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

³³ Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 57-115.

³⁴ Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 1-37.

³⁵ World Bank. 2016. World Development Indicators. Database. <http://data.worldbank.org/data-catalog/world-development-indicators>

avored.³⁶ Thereby, urbanization was made a socio-economic development concern of high priority, correspondingly linked with extensive infrastructure investment, guided by national-level policies and plans. Local governments were encouraged to take a lead role, boosting infrastructure provision, and developing crucial planning and implementation capabilities. It could be identified as a crucial factor that PRC tended to implement its reforms first in such selected localities before implementing them countrywide, thus providing opportunities for experimentation in developing market-based systems and related mechanisms and tools from scratch. During these ten years of the second stage, the testing of different growth models by thousands of cities did not only result in successes. Furthermore, ‘booming, glooming, and dooming’ cycles underscored how sub-national governments in the PRC faced difficulties in finding sustainable development policies.³⁷

It was only during the third stage after the 2007 financial crisis that a more harmonious approach evolved to plan different sectors and geographic areas to improve the balance both in spatial and economic terms. This stage also marked the inclusion of more strategic planning approaches.³⁸

As the central body in PRC’s development planning system, the role of the National Development and Reform Commission cannot be underestimated. In a planning process, which is driven from bottom to top through several iterative consultations and field inspections, it has effectively planned and implemented infrastructure projects, providing top-down guidance, coordination, and high capacity for executing, trouble-shooting, and monitoring in the infrastructure sector. In relation to this, the one-stop window role played by local governments has also supported swift project implementation.³⁹

Although often misperceived, local governments played a crucial role in PRC’s growth and related infrastructure upsurge. With the ownership of state-owned enterprises being transferred to the local level, the 1980s onward saw local governments developing an entrepreneurial sense in scaling up their enterprises and in boosting infrastructure development.⁴⁰ This decentralization was accompanied by fiscal decentralization, which further elevated the role of provincial and local governments. While local governments themselves were not allowed to borrow money directly, they used their SOEs to do so, while other off-budget resources provided necessary means to shoulder increasing infrastructure investments. These resources included SOE revenues, user charges and fees, and land leasing deals.

What has been identified as remarkable in PRC’s infrastructure expansion has been the wide application of user charges with cost recovery levels in most infrastructure sectors being comparatively higher and direct budget subsidies being comparatively lower.⁴¹ Through this, governments were able to both recover the construction cost of infrastructure and ensure their maintenance, with tax revenues providing resources for current expenditures, and partly even adding to capital expenditures. One possible reason that people accepted the levying of such cost-recovery charges could have been the concomitant increase in wages.⁴²

³⁶ Liu, Zhi. 2004. Planning and Policy Coordination in China’s Infrastructure Development. A Background Paper for the ADB–JBIC–World Bank EAP Infrastructure Flagship Study. Manila (ADB).

<http://siteresources.worldbank.org/INTEAPINFRASTRUCT/Resources/855084-1137106254308/China.pdf>

³⁷ Iwasaki, Yoshihiro. 2010. Lessons from the People’s Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People’s Republic of China and India. Manila. P. 1-37.

³⁸ Based on comments received from specialists of ADB East Asia Department and People’s Republic of China Resident Mission.

³⁹ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

⁴⁰ Iwasaki, Yoshihiro. 2010. Lessons from the People’s Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People’s Republic of China and India. Manila. P. 1-37.

⁴¹ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

⁴² Iwasaki, Yoshihiro. 2010. Lessons from the People’s Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People’s Republic of China and India. Manila. P. 1-37.

With regard to land leasing, provincial and local governments have greatly benefited from all land belonging exclusively to the state. This enabled governments to benefit from land-use rights as a revenue source for infrastructure development and to use it as collateral in debt-raising for infrastructure project companies.⁴³ At the same time, the government facilitated the limited bond and equity market access for some SOEs to broaden the investment options to meet growing financing needs.

A downside of the decentralization has been the provision of infrastructure based on high estimates of capacity needs, as local governments saw their infrastructure SOEs as one way to ensure the achievement of targeted economic growth rates and related government performance indicators.⁴⁴ Such high estimates have partly been exceeded in growth hubs, while more far-flung areas have experienced largely under-utilized infrastructure.⁴⁵ With macroeconomic concerns rising, the central government has become more wary of the need to balance high economic growth with limiting macroeconomic and financial vulnerabilities.⁴⁶ Furthermore, concerns around stark regional imbalances and heavy environmental degradation due to a mostly coal-based growth required serious policy shifts to address growing challenges (see chapter 3).⁴⁷

Lessons Learned from India

Similar to PRC, India also benefitted from its large domestic market and possible economies of scale at an early development stage.⁴⁸ With demographic dynamics developing favorably in the 1980s and 1990s, India opened up to international markets and invited trade and investment to particularly boost its labor-intensive industries in information and communication technologies. Its transformation into a center for outsourcing of IT-related services has supported India's robust economic growth.

Following a round of gradual reforms toward economic liberalization before and especially during the 1990s, the government increasingly took the role of facilitator and regulator in economic development, even though state (provincial) governments kept their managing role for existing SOEs.⁴⁹ A focus on attracting FDI and devising Special Economic Zones helped to form an effective environment to make India part of an increasingly globalizing value chain.

⁴³ Liu, Zhi. 2004. Planning and Policy Coordination in China's Infrastructure Development. A Background Paper for the ADB–JBIC–World Bank EAP Infrastructure Flagship Study. Manila (ADB).
<http://siteresources.worldbank.org/INTEAPINFRASTRUCTURE/Resources/855084-1137106254308/China.pdf>

⁴⁴ Liu, Zhi. 2004. Planning and Policy Coordination in China's Infrastructure Development. A Background Paper for the ADB–JBIC–World Bank EAP Infrastructure Flagship Study. Manila (ADB).
<http://siteresources.worldbank.org/INTEAPINFRASTRUCTURE/Resources/855084-1137106254308/China.pdf>

⁴⁵ Langfitt, Frank. 2015. China's White Elephants: Ghost Cities, Lonely Airports, Desolate Factories. NPR: 15 October 2015.
<http://www.npr.org/sections/parallels/2015/10/15/446297838/chinas-white-elephants-ghost-cities-lonely-airports-desolate-factories>

⁴⁶ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁴⁷ World Bank and The People's Republic of China Development Research Center of the State Council. 2014. Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization. Washington.

⁴⁸ Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. Resurgent Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 1-37.

Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. Resurgent Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 57-115.

⁴⁹ Ahluwalia, Montek S. 2002. Economic Reforms in India since 1991: Has Gradualism Worked? Journal of Economic Perspectives: 16/3. P. 67-88.

With national savings relatively low, the government turned to a liberalization of the financial market since the 1990s to open up different investment finance options to boost infrastructure provision.⁵⁰ Although not sufficient, a regulatory framework was put in place for credit and risk management, as well as protection of investors.⁵¹ India installed numerous regulatory bodies that enabled private participation in the development of infrastructure in a variety of sectors. Together with the development of capital and long-term investment markets, India enabled a finance diversification. Its foreign exchange and corporate debt markets were also more developed than, for instance, in PRC. Nevertheless, private financing was insufficient, and infrastructure financing continued to depend heavily on budgetary contributions in the form of grants, while local governments did not have many tools at hand to raise other revenues for infrastructure financing.⁵² For example, one big difference has been the inability of governments in India to monetize land value by selling of public land, as has been the case in PRC, since land has been predominantly private in India.

Both excess capacity and implementation delays have resulted from uncoordinated planning and policy-making processes in the Indian system. Even though with crucial positive aspects for a somewhat more inclusive development, the characteristically participatory processes in policy formulation and project implementation have not been very conducive to effective infrastructure development. Land acquisition has been problematic and environmental clearances have been difficult to obtain. In addition, few projects were ready for tendering and implementation, with many others stuck in consultations and land acquisition and environmental clearance processes.⁵³

The politicization of the bureaucracy and planning resulted in inefficient outcomes where subsidies were used for particular groups or mismanaged SOEs, which impacted on fiscal revenues, limited investments into infrastructure, and prevented the expanded commercial provision of infrastructure services.⁵⁴ The significant amount of inefficient, low-quality public utilities has impinged on the overall performance of the infrastructure sector. Subsidies have been flowing into these enterprises to cover up their losses and inefficiencies in resource use. These constraints increased the burden on existing infrastructure capacities, explaining the increasingly less dynamic improvements in India's infrastructure over the past decades.⁵⁵ Overall, India's federalism in combination with a multi-party system usually resulted in central and provincial governments being from different coalitions of various (opposing) political parties, which exacerbated the lack of cooperation.⁵⁶ The complexity of ministries on different levels has also been less conducive to expanded infrastructure provision.

⁵⁰ Ahluwalia, Montek S. 2002. Economic Reforms in India since 1991: Has Gradualism Worked? *Journal of Economic Perspectives*: 16/3. P. 67-88.

⁵¹ Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. *Resurging Asian Giants. Lessons from the People's Republic of China and India*. Manila. P. 1-37.

⁵² Ahluwalia, Montek S. 2002. Economic Reforms in India since 1991: Has Gradualism Worked? *Journal of Economic Perspectives*: 16/3. P. 67-88.

⁵³ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁵⁴ Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. *Resurging Asian Giants. Lessons from the People's Republic of China and India*. Manila. P. 57-115.

⁵⁵ Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. *Resurging Asian Giants. Lessons from the People's Republic of China and India*. Manila. P. 57-115.

⁵⁶ Lall, Rajiv, Ritu Anand, and Anupam Rastogi. Developing Physical Infrastructure: A Comparative Perspective on the Experience of the People's Republic of China and India. In: ADB. 2010. *Resurging Asian Giants. Lessons from the People's Republic of China and India*. Manila. P. 57-115.

Lessons Learned from Indonesia

Infrastructure provision in the past decades in Indonesia can only be understood if political and economic events are taken into account, which have profoundly impacted on the development of the country.⁵⁷ On the political side, the change from Suharto's regime to a democracy in the late 1990s and the ensuing "big bang" decentralization have to be mentioned. On the economic side, the boom and crisis phases of the oil price and the Asian Financial Crisis in 1997 are key factors.⁵⁸

Following a phase of inward-looking import substitution, export-led industrialization kicked off in the 1970s.⁵⁹ Indonesia saw increased infrastructure development in the 1970s and 1980s as the oil boom brought in high revenues and the mining sector expanded rapidly. However, with the oil price fluctuating, the growth momentum could not be sustained. In the late 1980s increased FDI brought improvements, and there was much private sector investment in infrastructure development until the mid-1990s, as the energy sector was booming and the telecommunications industry had been privatized. Indonesia saw rapid growth in some sectors, but expansions, for instance in air transport or electricity, were not comprehensive and not system-wide, thus preventing significant scale and quality improvements.⁶⁰

In the aftermath of the Asian Financial Crisis, the political changes from the Suharto regime to democracy in the late 1990s impacted again on the economic development.⁶¹ The government enacted a number of reforms to achieve a better investment climate and to increase the competitiveness of its economy, but distortions remained, as reforms have, once again, been focused on only selected industries. Indonesia struggled to find macroeconomic stability, as the relatively good fiscal discipline was contrasted by a varying, high inflation rate.⁶² The implementation of a "big bang" decentralization in 1999 left institutional structures and government services in a weak state.⁶³ Jurisdictions overlapped and coordination between subnational governments was mostly ineffective. This phase also saw the fragmentation of corruption to subnational levels, which seemed to be more difficult to get a hold on. Subnational governments enacted their own, jurisdiction-specific regulations and laws, which opened up further rent-seeking opportunities.⁶⁴

Infrastructure financing did not offer many options, with only limited project bonds. In the run-up to the Asian Financial Crisis, Indonesia had rather unsophisticated banking practices. Infrastructure projects were not perceived as yielding sufficient returns on investment, as social tariff setting was below cost-recovery levels. SOEs continued to dominate in many infrastructure sectors, holding quasi-monopolies, and being predominantly rent-seeking. Subsidies further distorted the infrastructure sectors, and various barriers to trade and the import/export markets resulted in economic distortions. Domestic credit had difficulties recovering after the Asian Financial Crisis, and while short-term financing has

⁵⁷ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

⁵⁸ Touwen, Jeroen. 2008. The Economic History of Indonesia. EH.Net Encyclopedia. <http://eh.net/encyclopedia/the-economic-history-of-indonesia/>

⁵⁹ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

⁶⁰ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

⁶¹ Touwen, Jeroen. 2008. The Economic History of Indonesia. EH.Net Encyclopedia. <http://eh.net/encyclopedia/the-economic-history-of-indonesia/>

⁶² ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

⁶³ Moeliono, Tristram Pascal. 2011. Spatial Management in Indonesia: From Planning to Implementation. Cases from West Java and Bandung. A Socio-Legal Study. Leiden University.

⁶⁴ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

Also see: ADB Independent Evaluation Department. 2010. Asian Development Bank Support for Decentralization in Indonesia. Special Evaluation Study: July 2010. Manila.

been available, limited long-term financing has hindered a scaling up of infrastructure investments, including expanded private-sector engagement.⁶⁵

Overall, there have been many hurdles to overcome in the implementation of infrastructure projects, as potential investors had to deal with much uncertainty in project schedules and potentially low return rates on their investments due to limited government capacities, a myriad of overlapping regulations, and a lack of legal enforcement.⁶⁶ Continued project risks regarding political and legal matters were not conducive, as were complicated, long restructuring processes in the private sector in Indonesia. In order to address these, a number of legal changes were initiated, but they took much time and thus slowed down much needed improvements in infrastructure sectors. Although several legislative changes in 2004 have brought some progress, the situation still resembles a transition period.⁶⁷

The government budget allocations have mostly continued to favor particular sectors, while infrastructure overall saw chronic underinvestment, with needs far outstripping supply.⁶⁸ Subsidies fostered wrong practices, and hardly any efficiency gains could be achieved in energy and natural resources use, putting further stress on the existing infrastructure supply, already operating at or beyond limits, thus resulting in shortfalls, disruptions, and damages. With these deficiencies also being pronounced in strong regional disparities persistent across the peninsula, infrastructure shortages or lack of access have impacted on economic growth and social development, particularly in the poorest parts of Indonesia.⁶⁹

Similarities and Differences in Lessons Learned

Although each of the three countries can tell its unique story of what factors influenced infrastructure provision in the past decades, some broader conclusions can be drawn.⁷⁰

Seeing the different performances of PRC, India, and Indonesia, the role of a coordinating planning body is underscored. Infrastructure provision depends on proper coordination among many actors, including national and subnational governments as well as private sector. Therefore, guidance and holistic planning requires an enabling framework in which investment can be planned for the long-term, properly prioritized, and coordinated between different sectors and jurisdictional areas. Decentralization can make subnational governments committed actors in infrastructure provision, but regional competition, lack of inter-jurisdictional cooperation, and potential over-supply of infrastructure capacity can also emerge from this process.

In relation to political decentralization, fiscal transfers play a crucial role in providing subnational governments with the necessary means for infrastructure investment. In addition, governments have benefitted from having different financing options at hand to ensure cost-recovery of infrastructure projects. The diversification of infrastructure investment instruments, for instance through issuing

⁶⁵ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

⁶⁶ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁶⁷ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁶⁸ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

⁶⁹ World Bank and Australian Aid. 2016. Indonesia's Rising Divide. Washington, D.C.

⁷⁰ ADB Country Operations Business Plans for PRC, India, and Indonesia: <http://www.adb.org/documents/series/country-operations-business-plans>

ADB Country Partnership Strategies for PRC, India, and Indonesia: <http://www.adb.org/documents/series/country-partnership-strategies>

ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila.

bonds, also supported expanded infrastructure provision to meet rising demands. However, regulatory and legal framework were partially still missing to prevent speculative/over-optimistic activities by subnational governments or private sector investors and to secure project-related risks of refinancing or default.

Reforming their systems over time, the three countries had different experiences with regard to the phasing and application of reforms. A gradual approach across sectors and across geographic regions – as found in PRC – seemed effective, as it also allowed for experimentation before scaling-up reforms. All three countries had certain degrees of focusing investments on specific infrastructure sectors and geographic regions. However, they all encountered the challenges of disadvantaging other sectors, distorting markets – particularly for private investors – and falling short of inclusive, regionally balanced development.

Similar distortions emerged with regard to the role of SOEs. They were crucial for the economic growth in PRC, India, and Indonesia, but they also hindered expanded private sector participation in certain infrastructure sectors, as cost-recovery was distorted through social tariff setting, and market entrance was distorted through special subsidies and monopolistic behavior by SOEs. The liberalization of infrastructure sectors proved most successful where corresponding independent regulatory bodies were installed to protect customers from special interest of SOEs or private investors.⁷¹

Due to differences in their political system, land was dealt with differently by PRC in contrast to India and Indonesia. In the PRC's case, subnational governments could use land as a financial asset in infrastructure development, while India and Indonesia saw more challenges in access to land and laws and regulations around land acquisition. The differences due to varying forms of participatory political and planning processes should also be highlighted.

One key issue is that budget allocations and political priorities are often not supportive of ensuring adequate maintenance to sustain the capacity and quality of the existing infrastructure stock.⁷² Furthermore, politically motivated tariffs or subsidies promote environmentally unsustainable use of natural resources, dependence on more polluting technologies and resources, and the missed chance to avail of readily available efficiency gains as one measure to respond to growing demands for infrastructure services, which is further discussed in the following chapter 3.

⁷¹ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁷² McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai.

3. Future Challenges Emerging from Past Development

Building on the backward-looking focus in Chapters 1 and 2, this chapter provides a comparative look at the infrastructure challenges the three countries are now facing based on their current development trajectories. The chapter will conclude by discussing the international development agenda, in particular the role of the Sustainable Development Goals with regard to the future of infrastructure provision in the three countries.

Country-Specific Challenges: PRC

Key challenges:

- Increasing effective enforcement of laws and regulations
- Leveling the playing field for public and private sector
- Mitigating the damaging development impact on the environment

With regard to public sector-led infrastructure provision, PRC is facing the challenge of putting in place a sound financial management system at both the provincial and municipal level to improve the use, accountability, and transparency of funds, particularly with regard to extra-budgetary revenues.⁷³ PRC authorities have taken steps to address this, including through restrictions on local government off-budget spending.⁷⁴ With land leasing—a major financing instrument for subnational governments—reaching its natural limits, financing options need to be diversified. Private and foreign investments remain modest, and bank lending margins and their profitability are low.⁷⁵ As part of reforming the financial sector, the privatization of state-owned banks will pose a key challenge. PRC faces much financial repression.⁷⁶ Macroeconomic turbulences and risks call for more stability to encourage private sector investment.⁷⁷

If infrastructure is to be planned and operated in a more efficient way, coordination between different departmental sectors has to improve and asset management practices have to be professionalized. With the central government still having a strong and guiding role in policy making and planning, its policy formulation can lead the way toward more sustainable and resilient development. At the same time, cooperation with the private sector and civil society bears much potential in the planning, financing, and implementation of infrastructure and related policies and plans.⁷⁸

In line with further liberalization of infrastructure sectors, effective regulatory bodies need to be put in place or strengthened to safeguard consumer interests from those of private enterprises and the

⁷³ ADB. 2014. Money Matters. Local Government Finance in the People's Republic of China. Manila.

ADB. 2014. Local Public Finance Management in the People's Republic of China. Challenges and Opportunities. Manila.
Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 1-37.

⁷⁴ International Monetary Fund. 2016. Article IV Consultations: 27 July 2016.
<http://www.imf.org/external/np/sec/aiv/index.aspx>. P. 24.

⁷⁵ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

Castalia Strategic Advisors. 2016. People's Republic of China: Financing Public-Private Partnerships. Business Case for the Public-Private Partnership Credit Enhancement Facility. Technical Assistance Consultant's Report for ADB Project 48377-001. Manila.

⁷⁶ Campanella, Miriam L. 2016. Financial Repression and the Debt Build-Up in China: Is There a Way Out? ECIPE Policy Brief: No. 5/2016. http://ecipe.org/app/uploads/2016/06/PB_05_2016_V3.pdf

⁷⁷ Prasad, Eswar. 2016. China's Economy and Financial Markets: Reforms and Risks. Testimony before the United States China Economic and Security Review Commission Hearing on "China's 13th Five-Year Plan": 27 April 2016. Washington, D.C.

⁷⁸ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

government.⁷⁹ Existing and new regulations and legal frameworks only have an impact when they are effectively enforced. More private sector engagement is currently also limited due to an uneven playing field, where state-owned and collective enterprises are dominating, approval processes are complex and often nontransparent, access to finance is limited, and tax burdens are high. With regard to the PPPs model, 2015 changes from the previous concession template for PPPs to a unified template applicable to all sectors (“Administrative Measures on Concession of Infrastructure and Public Utilities Projects”) provide an opportunity for increased efficiency in infrastructure provision.⁸⁰ Nevertheless, a ‘cultural’ change is required by the government to change perception and approach from an operational model to a procuring model, where more trust is put into the innovation ability and technical capacity of private actors.⁸¹

With environmental degradation covered widely in the news, it is clear that PRC faces an urgency to curb detrimental environmental practices, particularly in its industries, and to provide infrastructure that is environmentally cleaner and less resource-consumptive.⁸² Currently, PRC’s economic structure is energy and carbon-intensive.⁸³ The coal-dominated power system prevents the wider rolling-out of renewable energies, for which also smaller grid systems and related regulatory and pricing mechanisms need to be put in place.⁸⁴ Although some good practices, particular in urban areas have recently emerged, demand-side management, carbon pricing, or pollution taxation are still mostly absent or ineffective.⁸⁵ Related environmental impacts have already taken their toll on society and the cost of pollution damages is estimated at 6-9% of PRC’s GDP.⁸⁶

Poor air quality, insufficient water quality, and severe soil contamination are all related to existing infrastructure and infrastructure to be built in the near future. These aspects will put further burden on PRC’s economic and social development when the increasing resource and infrastructure demands by a larger population and growing middle class are taken into account.⁸⁷ Rapid motorization is just one example of this likely phenomenon, which contributes to increasing greenhouse gas emissions.⁸⁸ Climate change has already led to worsening floods and droughts impacting on economic growth and

⁷⁹ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

Tsai, Chung-min. 2015. Market Development and the China Dream: State-Business Relationship and Regulatory Capacity in China. Chapter 8 in: Liou, Chih-Shian, and Arthur S. Ding. Editors. China Dreams. China’s New Leadership and Future Impacts. Singapore (World Scientific Publishing). P.197-222.

⁸⁰ Based on comments received by specialists from ADB Private Sector Operations Department.

⁸¹ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

Castalia Strategic Advisors. 2016. People’s Republic of China: Financing Public-Private Partnerships. Business Case for the Public-Private Partnership Credit Enhancement Facility. Technical Assistance Consultant’s Report for ADB Project 48377-001. Manila.

⁸² World Bank and The People’s Republic of China Development Research Center of the State Council. 2014. Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization. Washington.

⁸³ Sun, Guodong. 2010. Coal in China: Resources, Uses, and Advanced Coal Technologies. Coal Initiative Reports. White Paper Series. Arlington (Pew Center on Global Climate Change).

⁸⁴ ADB. 2016. Country Partnership Strategy: Transforming Partnership: People’s Republic of China and Asian Development Bank, 2016-2020. Manila.

⁸⁵ Environmental Defense Fund, Energy Foundation China, Institute for Sustainable Communities, Natural Resources Defense Council, and World Resources Institute. 2014. Climate Change and Urbanization: Challenges and Progress in China. Beijing. <http://www.nrdc.cn/phpcms/userfiles/download/201412/09/International%20LL%20EN-compressed.pdf>

⁸⁶ ADB. 2012. Toward an Environmentally Sustainable Future – Country Environmental Analysis of the People’s Republic of China. Manila.

⁸⁷ World Bank and The People’s Republic of China Development Research Center of the State Council. 2014. Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization. Washington.

⁸⁸ Gordon, Deborah, and Yuhang Zhang. 2011. Driving Force: Energy and Climate Strategies for China’s Motorization. Carnegie Endowment for International Peace. Policy Outlook: 14 April 2011. Washington, D.C.

social development, as infrastructure gets damaged, businesses disrupted, water and food security threatened, livelihoods put at risk, and lives are lost.⁸⁹

Safeguards can be further improved to achieve more socially inclusive infrastructure provision to extend their advantages to all stakeholders. It will be interesting to see in how far PRC can translate existing disparities between different regions, as well as between rural and urban areas into an opportunity for improving access to infrastructure and services, and extending the benefits of economic growth and social development across the country and population.⁹⁰

Country-Specific Challenges: India

Key challenges:

- Massively extending infrastructure and basic services across regions and population under environmental sustainability aspects
- Redefining effective financial regulatory frameworks and social and environmental safeguards
- Consolidating structural reforms for increased private sector participation

With a large infrastructure gap remaining in India, much needs to be done with regard to the integration of different regions and the more inclusive access to and quality of basic services.⁹¹ Population and rapid urbanization will continue to put further pressure on urban areas, sidelining environmental sustainability even more.⁹² With outdated maintenance systems and inadequate maintenance funding, the existing infrastructure networks would deteriorate further, impacting more on service reliability and, thus, daily lives of citizens and businesses. Aging assets are underperforming and possible efficiency gains remain unused. Recognizing the current under-utilization of demand-side management measures and learning from PRC's hard lessons with coal dependence can inform India about the relevance to carefully manage natural resources and environmental assets before reaching critical tipping points.

While the government is anticipating nearly half of the needed infrastructure investment being shouldered by the private sector, the capital intensity and complexity of such projects, together with insufficient political consistency and tedious approval processes makes this appear far from realistic.⁹³ If models such as PPPs are to be further promoted, corresponding capacity and skills in governments are needed to properly assess bids. India is currently witnessing over-aggressive bidding with inadequate due diligence and insufficient resources, capacities, and scales of private actors, who lack specialization and focus on particular sectors and instead assemble a broad debt-funded (over-leveraged) portfolio.⁹⁴ In order to attract more private sector participation, one-stop windows and e-governance services for clearances and approvals are advisable. On the other hand, SOEs could be designed differently to provide infrastructure services at higher economic rates of return, even though

⁸⁹ ADB. 2016. Country Partnership Strategy: Transforming Partnership: People's Republic of China and Asian Development Bank, 2016-2020. Manila.

Lai, Elisa Chih-Yin. 2009. Climate Change Impacts on China Environment: Biophysical Impacts. A China Environmental Health Project Research Brief. USAID. <https://www.wilsoncenter.org/publication/climate-change-impacts-chinas-environment-biophysical-impacts>

⁹⁰ Ye, Yumin, and Richard LeGates. 2013. Coordinating Urban and Rural Development in China. Learning from Chengdu. Cheltenham & Northampton (Edward Elgar).

⁹¹ ADB. 2013. Country Partnership Strategy: India 2013-2017. Manila.

⁹² Ellis, Peter, and Mark Roberts. 2016. Leveraging Urbanization in South Asia: Managing Spatial Transformation for Prosperity and Livability. Washington, D.C. (World Bank).

⁹³ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁹⁴ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

the financial return rates remain modest. Currently, they are a tool of political patronage, with utilities being overstaffed and underperforming.⁹⁵

Looking for instance at the market for renewable energy, the divisions and dependencies of service providers make generation and transmission services depend on distribution services' payments in light of poor bill collection, thus creating risks that constrain private sector investment in the energy sector more widely. At the same time, it prevents India from shifting to more environmental-friendly energy and, thereby, contributing to its climate change agenda.⁹⁶ Resembling the general infrastructure situation, cost recovery mechanisms do not attract sufficient private sector engagement, particularly as instruments such as tariffs are highly politicized.⁹⁷

Another challenge emerges from the fragmented banking system. The privatization of state-owned banks will be difficult but necessary to address the dire state of commercial banks, which are already active infrastructure financiers, but which are reaching their lending limits, concentrating too many risks, and assembling a dangerous mismatch of assets and liabilities.⁹⁸ Current requirements in the legal and regulatory framework prevent insurance and pension funds to engage more broadly in infrastructure financing, while corporate bonds are limited due to, for instance, the absence of a robust bankruptcy law. A more holistic revamping of the current regulatory framework is required to enable the entry, exit, and operation in infrastructure development.⁹⁹

These aspects are linked to safeguards and the myriad of policies regulating land acquisition, environmental clearances, and related concerns.¹⁰⁰ While their general intent is laudable, they currently cannot create a setting in which social interests and environmental concerns are protected, while infrastructure expansion can meet rising demands.

Structural reforms have already been initiated, but need to be expanded and consolidated. Improved decision-making and governance structures could address the current dysfunctional interaction or lack of coordination between the multiple agencies engaged in infrastructure provision. Various state regulations still need to be aligned more clearly with national government guidelines. And independent regulatory bodies are required to safeguard and monitor the liberalization of various infrastructure sectors.¹⁰¹

Country-Specific Challenges: Indonesia

Key challenges:

- Geographically interconnecting infrastructure networks and services across regions
- Advancing a clear planning horizon, bankable projects, and varied financing options

⁹⁵ Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 1-37.

⁹⁶ Iwasaki, Yoshihiro. 2010. Lessons from the People's Republic of China and India. In: ADB. 2010. Resurging Asian Giants. Lessons from the People's Republic of China and India. Manila. P. 1-37.

⁹⁷ Ahluwalia, Montek S. 1997. Financing Private Infrastructure: Lessons from India. In: Harinder Kohli, Ashoka Mody, and Michael Walton (eds). Choices for Efficient Private Provision of Infrastructure in East Asia. Washington, D.C. (World Bank). <http://planningcommission.nic.in/aboutus/speech/spemsa/msa009.doc>

⁹⁸ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

⁹⁹ Walsh, James P., Chanho Park, and Jiangyan Yu. 2011. Financing Infrastructure in India: Macroeconomic Lessons and Emerging Market Case Studies. IMF Working Paper: 11/181. Washington, D.C. P. 1-32.

¹⁰⁰ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

¹⁰¹ Walsh, James P., Chanho Park, and Jiangyan Yu. 2011. Financing Infrastructure in India: Macroeconomic Lessons and Emerging Market Case Studies. IMF Working Paper: 11/181. Washington, D.C. P. 1-32.

➤ Breaking up monopolistic structures and improving implementation of reforms and regulations

Indonesia continues to face regional and rural-urban growth imbalances and related infrastructure underinvestment, which impose significant logistics costs and social inequality. It has to move away from resource-based economies, while ensuring a higher inclusion and geographic balance in its development.¹⁰² If the operations and maintenance regime is not professionalized and sufficiently funded, Indonesia risks to see its already underperforming infrastructure stock further deteriorating. A re-balancing of capital investments and recurrent expenditures is needed.¹⁰³

Still addressing the gaps and weaknesses caused by the “big bang” decentralization in 1999, Indonesia’s subnational government system continues to have overlapping jurisdictions and legislation, governments competing against each other in areas where coordination and joint infrastructure development would be recommendable.¹⁰⁴ This corresponds to the limited capacities in subnational governments to plan and execute large-scale infrastructure projects.¹⁰⁵

With the government anticipating about two thirds of the needed infrastructure investments to come from non-public sources, infrastructure provision would benefit from a deeper financial market and a wider variety of and easier access to financing options.¹⁰⁶ Likewise, modes such as PPPs require better institutional and technical capacities in concerned government agencies (particularly with regard to project structuring) and a solid set of regulations for proper risk management. Government decision makers also need to be empowered to take on certain project risks by the public sector, as the private sector alone cannot bear all risks related to large-scale infrastructure projects.¹⁰⁷ Furthermore, surveying of and access to land, frequent legislation changes at both the national and subnational levels, bureaucratic planning processes, and implementation delays entail uncertainties and discourage private sector engagement.¹⁰⁸

Although project development has recently seen improvements, a lack of bankable projects, for instance in toll roads, remains and prevents a broader engagement by the private sector.¹⁰⁹ Competition and efficiency have to be promoted in all infrastructure sectors. Tariff setting has to move above cost-recovery levels, and risk-sharing mechanisms need to be adjusted, for instance in the energy sector. Indonesia has not yet succeeded in breaking up monopolistic settings in some infrastructure sectors with regard to state-owned enterprises and their entitlements, which has hindered efficiency gains and expanded provision, slowed down the implementation of ambitious programs and reforms, and prevented larger private sector participation.¹¹⁰ In relation to this, rampant corruption on national and subnational levels remains a burden and related oversight bodies need to be firmly and independently established.¹¹¹

¹⁰² ADB. 2012. Country Partnership Strategy: Indonesia 2012-2014. Manila.

¹⁰³ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

¹⁰⁴ Moeliono, Tristram Pascal. 2011. Spatial Management in Indonesia: From Planning to Implementation. Cases from West Java and Bandung. A Socio-Legal Study. Leiden University.
<https://openaccess.leidenuniv.nl/bitstream/handle/1887/18242/Proefschrift%20Tristam%20Moeliono%2021%20november%202011.pdf?sequence=1>

¹⁰⁵ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

¹⁰⁶ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

¹⁰⁷ Based on comments received by specialists from ADB Private Sector Operations Department.

¹⁰⁸ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

¹⁰⁹ Tabor, Steven R. 2015. Constraints to Indonesia’s Economic Growth. ADB Papers on Indonesia: 10. Manila.

¹¹⁰ ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

¹¹¹ ADB Independent Evaluation Department. 2010. Asian Development Bank Support for Decentralization in Indonesia. Special Evaluation Study: July 2010. Manila.

The formulation and enforcement of laws and regulations has to target the ongoing loss of valuable natural resources with related socio-economic impacts.¹¹² Subsidies schemes in the energy sector have fostered the use of fossil energy, while renewable energies such as geothermal, solar, and wind are abundantly available in Indonesia.¹¹³ The limited network for generation, transmission, and distribution has prevented a larger-scale extension. At the same time, the inefficient operation of existing infrastructure has impacted on service reliability and shortened the lifespan of facilities, while inefficient, outdated technologies and industrial practices continue to cause environmental impacts, such as air pollution in Indonesia and even neighboring countries.¹¹⁴

The International Development Context

The future development challenges of the three countries with regard to infrastructure provision should be seen in relation to larger development objectives, as identified in the Sustainable Development Goals (SDGs) (Figure 3.1). Quintessentially, growth or progress in infrastructure provision in that sense is not an end to itself, but has to be the means to achieve positive impacts in the economic and social development of the PRC, India, and Indonesia. While this report does not attempt to relate future development challenges of the three countries to all 17 goals of the Sustainable Development Agenda 2030, some key interlinkages can be highlighted.¹¹⁵

Looking specifically on trunk infrastructure-related development goals, the following ones are most relevant: SDGs 6 – “clean water and sanitation”, 7 “affordable and clean energy”, 9 “industry, innovation, and infrastructure”, 11 “sustainable cities and communities”, and 13 “climate action”. These can be used as a reference to understand that future infrastructure development in the three countries will have to be more holistic and of higher quality to achieve sustainable development targets.

Access to infrastructure and basic services needs to reach the remaining parts of society that still lack sufficient affordable and safe water and sanitation. Investing in related infrastructure is not only a matter of equitable access, but also of development and growth, as better water and sanitation bring down negative health impacts and their related costs, and indirectly contribute to economic productivity.¹¹⁶ Energy reliability needs to increase, electricity affordability aspects have to be addressed, renewable energy supply calls for rapid expansion, and conventional energy sources require cleaner and more efficient technologies.¹¹⁷

¹¹² ADB, ILO, and IDB. 2010. Country Diagnostics Studies. Indonesia: Critical Development Constraints. Manila.

¹¹³ ADB. 2012. Country Partnership Strategy: Indonesia 2012-2014. Manila.

¹¹⁴ Asia Pacific Foundation of Canada. 2014. Cross Border Air Pollution in Asia. Vancouver.

https://www.asiapacific.ca/sites/default/files/cross-border_pollution_v4.pdf

Dominguez, Gabriel. 2015. Why Southeast Asia's Haze Problem Persists. Deutsche Welle: 15 September 2015.

<http://www.dw.com/en/why-southeast-asias-haze-problem-persists/a-18715535>

¹¹⁵ For further information: ADB. 2016. Sustainable Development Goals. <http://www.adb.org/site/sdg/main>

¹¹⁶ ADB. 2016. Asian Water Development Outlook. Strengthening Water Security in Asia and the Pacific. Manila.

¹¹⁷ ADB. 2013. Asian Development Outlook 2013: Asia's Energy Challenge. Manila.

Figure 3.1: Asia's Post-2015 Development Agenda



Source: ADB. 2015. Asia's Post-2015 Development Agenda. Manila. <https://www.adb.org/news/infographics/asias-post-2015-development-agenda>

Development paths of PRC, India, and Indonesia have to be scrutinized as economic growth and related infrastructure development have to be decoupled from the currently increasing use of natural resources.¹¹⁸ With rapid urbanization characterizing all three countries, sustainable and resilient solutions have to be found to house millions of additional urban dwellers, while – at the same time – improving living conditions for those already living in cities (also see Box 1.1).¹¹⁹ This setting in light of expected hazards and natural disasters emerging from changing climate conditions, underscores how infrastructure has to be resistant enough to support each society's resilience against destructive impacts.¹²⁰

In addition to the 2030 Sustainable Development Agenda, PRC, India, and Indonesia have also participated in other international development agendas and agreements, such as the Paris Agreement in December 2015, which relates to the reduction of emissions to curb climate change impacts.¹²¹ Such agreements provide another challenge to developing countries, as they will have to find the right development strategies to promote a less resource-dependent economic growth.¹²² At the same time, such commitments can nudge governments to formulate national policies that provide conducive legislation and additional funds for sustainable and resilient infrastructure development.¹²³

Latest estimates for developing Asia peg the infrastructure investment needs at \$1.5 trillion per year from 2016 to 2030, and the financing gap would further increase if investment needs related to the SDGs are taken into account; accounting for climate change, for example, raises investment needs to \$1.7 trillion per year.¹²⁴ Therefore, the question has to be answered on how the shift to more climate-friendly development paths can succeed, how financing is attached to enable such a shift, and how budgetary allocations are aligned with related development goals (also see Box 3.1).¹²⁵

¹¹⁸ Sachs, Jeffrey. 2016. New Sustainable Development Goals. Speech given at ADB: 12 September 2016. Interview: <https://www.adb.org/news/videos/sustainable-development-humanitys-future>

¹¹⁹ UN-Habitat. 2016. State of the World's Cities 2016. Urbanization and Development. Nairobi.

¹²⁰ Also see: Casier, Liesbeth. 2015. Why Infrastructure Is Key to the Success of the SDGs. International Institute for Sustainable Development: 9 September 2015. <https://www.iisd.org/blog/why-infrastructure-key-success-sdgs>

¹²¹ UNEP. 2015. COP21 Paris. <http://www.cop21paris.org/>

¹²² UNEP. 2011. Decoupling Natural Resource Use and Environmental Impacts from Economic Growth. Paris.

¹²³ See, for instance: ICLEI. Melaka Call for Action. ICLEI 2nd Resilient Cities Asia-Pacific Congress: 4 March 2016. Melaka. http://resilientcitiesasiapacific.iclei.org/fileadmin/user_upload/Melaka_Call_for_Action/Melaka_Call_for_Action_Final_4_Mar_2016.pdf

¹²⁴ ADB. 2017. Meeting Asia's Infrastructure Needs. Manila. <https://www.adb.org/publications/asia-infrastructure-needs>

McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai. P. 7.

Schmidt-Taub, Guido. 2015. Investment Needs to Achieve the Sustainable Development Goals: Understanding the Billions and Trillions. SDSN Working Paper: Version 2, 12 November 2015. Paris/New York (SDSN).

<http://unsdsn.org/resources/publications/sdg-investment-needs/>

¹²⁵ ADB. 2015. Making Money Work: Financing a Sustainable Future in Asia and the Pacific. Manila.

Box 3.1: ADB's Engagement in PRC, India, and Indonesia

PRC.¹²⁶ ADB's engagement in the PRC goes back to 1986 and the overall amount of loans, grants, and technical assistance in the past three decades has totaled more than \$34 billion in 2015 (Table 3.1). The sector of energy, transport and telecoms, and water and other urban infrastructure services account for more about 81% of this amount, with transport and telecoms having a 51% majority share. With new focus lying on sustainable growth and innovation, aspects such as climate-resilient development and reforming public and private market actors and institutions have gained importance. As part of ADB's cofinancing operations in PRC, funds have been provided also in the form of concessional and commercial cofinancing, including, for instance, B loans, parallel loans, risk transfer arrangements, equity, and guarantee cofinancing. The share of nonsovereign financing stands at 17% of total in 2015.



Photo Credit: ADB.

Table 3.1: ADB's Engagement in PRC

Category / Country	PRC		
	No.	Total Amount (\$ million)	%
<i>Cumulative Lending, Grant, and Technical Assistance Approvals</i>			
Energy	175	5,128.8	15.0
Transport and Telecoms	244	17,396.7	50.9
Water and Other Urban Infrastructure Services	114	5,025.9	14.7
Combined	533	27,551.4	80.7
In Comparison to Total	1090	34,154.9	
Other Largest Sector Share: Agriculture, Natural Resources, Rural Development	213	4,148.4	12.2
<i>Cumulative Nonsovereign Financing by Project - Total</i>	41	5,801.3	17.0
<i>Loans</i>		2,575.5	44.4
<i>Equity Investments</i>		404.3	7.0
<i>Guarantees</i>		107.0	1.8
<i>B Loans</i>		2,714.5	46.8

Source: ADB. 2015. Asian Development Bank Member Fact Sheet – People's Republic of China. Manila.

India.¹²⁷ With India as one of ADB's founding members, the engagement goes back to 1986 and has reached more than \$37 billion in loans, grants, and technical assistance approvals in 2015 (Table 3.2). The energy sector and the transport and telecoms sector have had a similar share of each one third of the overall amount. Together with the 10% share of the water and other urban infrastructure services, these three sectors account for nearly three fourth of the total. Growth is targeted to be faster, sustainable, and more inclusive, which requires projects that infuse good practices and innovation. In order to boost private investments in India, direct financial assistance of ADB goes into nonsovereign transactions to both the public and private sector, offering trade finance, guarantees, B loans, and equity investments in addition to direct loans. Similar instruments are applied in ADB's cofinancing operations. The share of nonsovereign financing stands at 12% of total in 2015.



Photo Credit: ADB.

¹²⁶ ADB. 2015. Asian Development Bank Member Fact Sheet – People's Republic of China. Manila.

¹²⁷ ADB. 2015. Asian Development Bank Member Fact Sheet – India. Manila.

Table 3.2: ADB's Engagement in India

Category / Country	India		
	No.	Total Amount (\$ million)	%
<i>Cumulative Lending, Grant, and Technical Assistance Approvals</i>			
Energy	164	12,014.4	32.2
Transport and Telecoms	153	11,962.5	32.1
Water and Other Urban Infrastructure Services	79	3,676.5	9.9
Combined	396	27,653.3	74.1
In Comparison to Total	624	37,309.1	
Other Largest Sector Share: Finance	64	4,708.0	12.6
<i>Cumulative Nonsovereign Financing by Project - Total</i>	57	4,618.3	12.4
<i>Loans</i>		3,713.0	80.4
<i>Equity Investments</i>		547.3	11.9
<i>Guarantees</i>		128.0	2.8
<i>B Loans</i>		230.00	5.0

Source: ADB. 2015. Asian Development Bank Member Fact Sheet – India. Manila.

Indonesia.¹²⁸ Indonesia is one of ADB's founding members and the bank's engagement goes back to 1966. Until 2015, loans, grants, and technical assistance have totaled nearly \$32 billion distributed fairly equally over a variety of sectors (Table 3.3). Following the 18% share for public sector management, the energy sector with 17%, transport and telecoms sector with 12%, and water and other urban infrastructure services with 7% account for more than one third of the total amount. The impact of insufficient infrastructure on the country's economic growth and the role of food security have become focus areas in Indonesia's development. Similar to ADB's engagement in PRC and India, there is also an array of direct financial assistance to nonsovereign transactions for public and private sector, as well as through cofinancing operations, including risk transfer arrangements, direct, B and parallel loans, guarantee and trade cofinancing (as part of ADB's Trade Finance Program), and equity investments. The share of nonsovereign financing stands at 5% of total in 2015.



Photo Credit: ADB.

Table 3.3: ADB's Engagement in Indonesia

Category / Country	Indonesia		
	No.	Total Amount (\$ million)	%
<i>Cumulative Lending, Grant, and Technical Assistance Approvals</i>			
Energy	84	5,391.5	16.9
Transport and Telecoms	89	3,701.0	11.6
Water and Other Urban Infrastructure Services	91	2,208.9	6.9
Combined	264	11,301.4	35.4
In Comparison to Total	905	31,932.4	
Other Largest Sector Share: Public Sector Management	108	5,800.5	18.2
<i>Cumulative Nonsovereign Financing by Project - Total</i>	19	1,529.2	4.8
<i>Loans</i>		1,067.0	69.8
<i>Equity Investments</i>		63.9	4.2
<i>Guarantees</i>		9.8	0.6
<i>B Loans</i>		388.5	25.4

Source: ADB. 2015. Asian Development Bank Member Fact Sheet – Indonesia. Manila.

¹²⁸ ADB. 2015. Asian Development Bank Member Fact Sheet – Indonesia. Manila.

4. Policy Guidance for Infrastructure Provision in Growing Asia

The previous chapters have provided a comparative overview of infrastructure provision in the PRC, India, and Indonesia with respect to development performance (Chapter 1), lessons learned (Chapter 2), and future challenges (Chapter 3). The final Chapter 4 synthesizes findings from the tale of the three Asian giants and provides policy guidance for the way forward in providing integrated and sustainable infrastructure in PRC, India, and Indonesia. The conclusion is informed by the Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”, held 31 May 2016 at ADB in Manila, Philippines. The following seven recommendations are meant to form a platform for further policy dialogue to advance improved infrastructure provision for economic competitiveness, environmental sustainability, and social equity.

1) Recognizing interlinkages between infrastructure provision and social and environment externalities

Infrastructure provision has both a quantitative and a qualitative dimension. The latter is strongly related to aspects of sustainability when the use of natural resources is considered in the development of infrastructure and its maintenance. While rising infrastructure demands in PRC, India, and Indonesia have to be met, social and environmental concerns are equally relevant.¹²⁹ Thus, infrastructure development has to include solutions that realize co-benefits and mitigate negative externalities, possibly thinking toward concepts such as adaptable multi-purpose/functional infrastructure.¹³⁰ This is particularly relevant with regard to natural resource depletion and widely common disparate access to basic services, which are not affordable to the whole population. A basic needs approach should inform infrastructure planning and prioritization to ensure the well-being of every citizen.

2) Technology transfer for low-carbon, climate-resilient infrastructure solutions

In addition to rising infrastructure demands and their social dimension, PRC, India, and Indonesia need to find ways to drastically lower their resource dependency and increasing their resource use efficiency with regard to the nexus of water, energy, and land.¹³¹ Both globally and within the Asia-Pacific region, innovative technologies in various sectors have been developed to achieve these objectives. The three countries could benefit much from engaging more intensively with each other and within their region to learn from each other, encourage the transfer of good practices and technologies for low-carbon, climate-resilient infrastructure solutions, and collaborate on demonstration projects. This exchange and transfer could form the knowledge element in enabling the implementation of measures toward broader development agendas, such as the Sustainable Development Agenda 2030, the Paris Agreement on fighting climate change, or the New Urban Agenda for sustainable cities. As the complementary element to low-carbon, climate-resilient technologies, governments also need to revisit possible demand-side management measures to encourage higher efficiency and environmentally-aware usage of resources and infrastructures services by residents and businesses. Performance-based

¹²⁹ ADB. 2016. GrEEEn Solutions for Livable Cities. Manila.

¹³⁰ European Commission. The Multifunctionality of Green Infrastructure. Science for Environment Policy. In-depth Reports: March 2012. Brussels.

¹³¹ GIZ and ICLEI. 2014. Operationalizing the Urban NEXUS: Towards resource-efficient and integrated cities and metropolitan regions. Eschborn (GIZ).

DFID. 2015. Mitigating Risks and Vulnerabilities in the Energy-Food-Water Nexus in Developing Countries. Stellenbosch (Sustainability Institute).

contracts could help to improve efficiencies and quality in the construction sector by triggering productivity growth.¹³²

3) Maintaining infrastructure assets with a life cycle approach

Extending infrastructure provision is the first step in improving the state of infrastructure in PRC, India, and Indonesia. An equally important aspect concerns the operation and maintenance of infrastructure assets. In order to put in place an effective asset management system, an informed overview of the existing assets is needed, combined with a monitoring system that allows to respond with timely actions to possible infrastructure deteriorations.¹³³ A funding mechanism is crucial to sustain the maintenance of infrastructure over its whole lifespan. When a life cycle approach is already applied at the planning stage, infrastructure can be better designed and budgeted for, and becomes a more viable asset class for investors, particularly with respect to social capital investment and corporate social responsibility.¹³⁴

4) Moving beyond a simple binary public-private actor perspective

Differentiating infrastructure provision only in public and private sector does not represent the diversity of planning, financing, implementation, and operations modes that can be found or could be applied in the PRC, India, and Indonesia. No single model needs to be labeled as the best option to realize increased and improved infrastructure provision. Instead, it is important to understand that such models require an enabling platform for different actors to join forces. Much trust building amongst actors of both the public and private sector sides is required to increase confidence in each sector's strengths.¹³⁵ Although state-owned enterprises have achieved much project delivery in the three countries, the participation of private actors has brought professional project preparation, infrastructure design innovation, and more efficient implementation.¹³⁶ Such value-add becomes increasingly important with regard to the need for more efficient use of both financial and natural resources. With the actor base broadening, it becomes more important to upscale capacities of national and subnational agencies to effectively manage different project types. Particularly the pre-feasibility stage does not yet receive sufficient attention and resources, for instance through project development funds, with regard to identifying and critically assessing various project ideas and pushing through viable options until project readiness to develop better pipelines of bankable infrastructure projects that also provide corresponding risk-adjusted return on investment.¹³⁷

¹³² McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai. P. 31-34.

¹³³ ADB. 2016. GrEEEn Solutions for Livable Cities. Manila. P. 139-147.

¹³⁴ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

OECD. 2006. Local Capital Markets for Environmental Infrastructure: Prospects in China, Kazakhstan, Russia and Ukraine. Paris. P. 67-108.

Ernst & Young LLP. 2013. Corporate Social Responsibility in India: Potential to Contribute Towards Inclusive Social Development. Global CSR Summit 2013 – An Agenda for Inclusive Growth. Kolkata.

ILCAN. 2016. Indonesian Life Cycle Assessment Network. Website: <http://www.ilcan.or.id/>

¹³⁵ ADB. 2016. Roundtable Discussion "Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries". ADB: 31 May 2016. Manila.

¹³⁶ McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai.

¹³⁷ Cities Development Initiative for Asia (CDIA). 2016. Guidelines. Website: <http://cdia.asia/resources/guidelines/>

Ehlers, Torsten. 2014. Understanding the Challenges for Infrastructure Finance. Bank for International Settlements (BIS) Working Papers: 454/August 2014. Basel (BIS).

McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai.

5) Recalibrating financing options to meet market demands

Disregarding the private sector, governments in PRC, India, and Indonesia can already achieve improved financing of infrastructure projects by introducing longer-year budgeting to account for long-term project planning and implementation phases. They can apply user charges, land value capture, and the monetization of existing assets, such as through PPPs models for the operations and maintenance phase.¹³⁸ Their role is also crucial with regard to viability gap financing to help infrastructure projects to take-off. On the other hand, there is no lack of other funds to enhance infrastructure investment – however, investors and projects are disconnected. Risks related to implementation delays, foreign exchange flows, capital expenditure, securitization of assets, and refinancing have to be carried by institutional actors or re-packaged to become financial products.¹³⁹ With different types of bonds offering access to capital markets, it is often first up to governments to “make the market” by issuing debt or equity on their assets.¹⁴⁰ Also building specific infrastructure-related bonds markets, standardizing risk categories, and pooling risks or assets could be useful. For longer-term financing, guarantee funds, as well as equity and mezzanine financing are needed.¹⁴¹ Credit enhancement facilities are one instrument to enhance such financing.¹⁴² In addition, local currency lending and currency swaps will play an increasing role.¹⁴³ Multi-lateral development banks such as ADB can support client countries’ understanding and knowledge of the availability of these instruments and provide for their broader and more time- and process-efficient application in their services beyond the current rate of nonsovereign financing at about 16%.¹⁴⁴ Also, results-based and policy-based lending can be scaled-up to encourage countries in strengthening high impact infrastructure development and related policy-making.¹⁴⁵ This is directly linked to the challenge that capital productivity will only be achieved through well-implemented projects. Regulations have to be checked for allowing different types of investors to access infrastructure financing.¹⁴⁶ And knowledge sharing and capacity building are of crucial importance to expand the knowledge base of public and private actors on the available financing options, including more innovative modalities through green bonds, social impact bonds, carbon tax, or cap-and-trade funding.¹⁴⁷

¹³⁸ McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai.

For financing related to land as an asset class, see: World Bank. 2016. Regenerating Urban Land: A Practitioner’s Guide to Leveraging Private Investment. Chapter 1 – Process: Phase 3: Financing. Washington, D.C. P. 37-68.

¹³⁹ OECD. 2015. Infrastructure Financing Instruments and Incentives. Paris.

¹⁴⁰ ADB. 2015. Local Currency Bonds and Infrastructure Finance in ASEAN+3. Manila.

¹⁴¹ AFME & ICMA. 2015. Guide to Infrastructure Financing. Bank Loans, Debt Private Placements and Public Bonds – Smoothing the Pathway for Effective Funding. London (AFME).

¹⁴² Castalia Strategic Advisors. 2016. People’s Republic of China: Financing Public-Private Partnerships. Business Case for the Public-Private Partnership Credit Enhancement Facility. Technical Assistance Consultant’s Report for ADB Project 48377-001. Manila.

For a regional overview see: Deutsche Bank Research. 2016. Asia Infrastructure Financing: Getting It Right Would Lift Medium-Term Growth. Current Issues – Emerging Markets: 8 January 2016. Frankfurt.

¹⁴³ Verdouw, Wim, David Uzsoi, and Carlos Dominguez Ordonez. 2015. Currency Risk in Project Finance. IISD Discussion Paper. Winnipeg and Geneva (International Institute for Sustainable Development).
<https://www.iisd.org/sites/default/files/publications/currency-risk-project-finance-discussion-paper.pdf>

¹⁴⁴ In addition, different vehicles and mechanisms need to be developed or restructured to provide technical support and finance for accelerated infrastructure provision, such as through dedicated funds, facilities, and initiatives.

ADB. Forthcoming (2017). Green Finance Catalyzing Facility. Manila.

¹⁴⁵ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

¹⁴⁶ Inderst, Georg. 2016. Infrastructure Investment, Private Finance, and Institutional Investors: Asia from a Global Perspective. Asian Development Bank Institute (ADBI) Working Paper Series: 555/January 2016. Tokyo (ADBI).

¹⁴⁷ New Cities Foundation. 2016. Handbook on Urban Infrastructure Finance. Paris.

6) Collaborative infrastructure development for regional integration

With a few examples emerging from the sub-regions of East Asia, South Asia, and Southeast Asia, much more benefits can be realized through the collaborative planning of infrastructure networks that recognize already existing or potential interlinkages between countries.¹⁴⁸ With inter-regional trade exchanges and migration flows becoming more important, PRC, India, and Indonesia can make higher-impact infrastructure investments when they holistically plan infrastructure of different sectors together with neighboring countries and connect the dots of such infrastructure with those developments happening across national borders. Corridor towns development and cross-border planning are two examples to encourage a wider perspective on infrastructure provision in an inter-regional context.¹⁴⁹

7) Policy reform for more effective legal and regulatory frameworks

The planning, financing, implementation, and operation of infrastructure is underpinned by institutions and structures. As the examples of PRC, India, and Indonesia show there is much room for improvement to formulate and enforce effective legal and regulatory frameworks.¹⁵⁰ This concerns, for instance, enabling policies and rules for public-private partnerships, the design of cost-recovery tariff systems, procedures for socially inclusive and timely processed land acquisition, and mechanisms for dispute resolutions or bankruptcy. Another key action area is the standardization of models and forms to streamline the process of appraising and approving PPPs, special-purpose vehicles (SPVs), and other project models.¹⁵¹ There is much opportunity for the three countries, as well as other actors in the Asia-Pacific region, to come together to exchange experiences and lessons learned, and to use these to develop context-specific legal and regulatory frameworks. Institutions such as ADB provide the platforms to enable such dialogue and to infuse good practices that have been practice-tested in a variety of projects and contexts.¹⁵²

¹⁴⁸ ADB and ADBI. 2009. Infrastructure for a Seamless Asia. Manila.

ADBI. 2016. Connecting Asia: Infrastructure for Integrating South and Southeast Asia. Tokyo.

¹⁴⁹ ADB. 2016. Corridor Towns Development Projects. Website:

<http://www.adb.org/search/type/project?keywords=Greater%20Mekong%20Subregion%20Corridor%20Towns%20Development%20Project>

ADB. 2016. Central Asia Regional Economic Cooperation (CAREC) Program. Website:

<https://www.adb.org/countries/subregional-programs/carec>

¹⁵⁰ ADB. 2016. Roundtable Discussion “Infrastructure Provision in Developing Asia: Experiences and Lessons from the Three Largest Countries”. ADB: 31 May 2016. Manila.

¹⁵¹ McKinsey & Company. 2016. Bridging Global Infrastructure Gaps. Brussels/San Francisco/Shanghai.

ADB. 2013. Country Partnership Strategy: India 2013-2017. Manila.

¹⁵² In addition to ADB’s Sector and Thematic Groups, for instance for energy, transport, urban, or water infrastructure, as well as topical areas such as climate change and governance, ADB provides specialist advice through its regional departments, resident missions, and units such as the Office of Public-Private Partnerships and the Private Sector Operations Departments. Also see: ADB. 2016. Departments and Offices. <http://www.adb.org/about/departments-offices>

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