EXPLORING STRATEGIES FOR PLANNED URBAN CLUSTER DEVELOPMENT IN SOUTH ASIA

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ASIAN DEVELOPMENT BANK

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ABSTRACT

Most cities in South Asia have developed as unconnected centers of growth with unplanned urbanization. Limited fiscal resources and lack of collaborative planning expose their municipal bodies to great challenges. City governments must battle urban sprawl and increasing congestion while ensuring quality public services and maintaining their fiscal health. In contrast, urban clusters—that is, a core city surrounded by other cities—benefit from agglomeration effects, network externalities, and economies of scale, giving them a competitive edge over stand-alone cities.

Clusters are seen as potential drivers of economic growth as they harness the economic potential of neighboring cities and towns upstream, and support the growth of domestic and regional corridors downstream. They could be financial centers like Tokyo, Shanghai, and Mumbai; technology hubs like Singapore and Bengaluru; or primate cities like Dhaka and Jakarta. Regardless of the form they take, clusters have influenced the location of industries, allocation of national resources, development of transportation networks, and international trade dynamics.

For South Asia to become a leading economic power, development of its cities as prospective centers of growth and dynamism holds great promise. Economically successful clusters are expected to house advanced technology companies and research centers, provide high-quality education facilities, and offer a wide variety of jobs and good living conditions.

We identify Mumbai, Delhi, and Dhaka as mature cities in the region; and Pune, Bengaluru, Ahmedabad, Chennai, Colombo, and Kathmandu as emerging cities that display the potential for growth and transition into clusters. To succeed, these cities must avoid lock-in to inefficient urban sprawls; exploit the economic capacity of cities, towns, and villages developing around them; and ensure quality public services to citizens. Based on an examination of the status of development of these cities and assessment of key challenges they face, we develop a list of strategic options for urban cluster development.

ABBREVIATIONS

ADB	–	Asian Development Bank
GDP	–	gross domestic product
ICT	–	information and communication technology
MMR	–	Mumbai Metropolitan Region
MMRDA	–	Mumbai Metropolitan Region Development Authority
MUTP	–	Mumbai Urban Transport Project
NCRPB	–	National Capital Region Planning Board
PRC	–	People's Republic of China
PRD	–	Pearl River Delta
RTP	–	Research Triangle Park
SDP	–	spatial development plan
ULB	–	urban local body

INTRODUCTION

1.   Cities attract people from smaller towns and rural areas alike, offering the hope for a better and more prosperous life. Larger cities are more diverse in size and scope, have more establishments and functions, and offer more jobs and better amenities. Resource sharing, more learning opportunities, innovative activities, ability to attract and retain talent and financial capital, and better matching of jobs with workers drive productivity and the well-being of citizens. These benefits come at a cost, however. The flow of workers increases population density and causes congestion in cities. Production of mature, sophisticated products does not relocate to secondary specialized cities, which are forced to produce basic, simple products. The presence of a large informal sector and lack of land titling add to the problems. Cities in South Asia have generally developed as unconnected centers of growth with unplanned urbanization around them. Inadequate levels of proactive and collaborative planning expose them to great challenges. City governments must battle urban sprawl and increasing congestion while ensuring quality public services and maintaining their fiscal health.

2.   It is beneficial to develop cities in urban clusters, the second layer of the urban hierarchy—the first layer being cities themselves governed by local governments. These clusters, developed around a core city, factor in significant spillover and multiplier effects of urban development such as spatial distribution, connectivity, productivity, industrial linkages, and competitiveness. Clusters benefit from agglomeration effects, network externalities, and economies of scale, giving them a competitive edge over stand-alone cities (World Bank 2009b). Increasingly, clusters are being regarded as potential drivers of economic growth as they harness the economic potential of neighboring cities and towns upstream, and support the growth of domestic and regional corridors downstream. When an industrial cluster gathers a critical mass of interconnected companies and institutions, and a pool of workers with specialized skills, it results in a concentration of specialized activities or 'thick markets'. The pressure from competition and customers and easy availability of input suppliers in such markets stimulates innovative activities which facilitate geographical concentration of new high-technology industries and services. That is why, for example, neurosurgeons are rarely found outside large cities. By being part of an urban cluster, cities have a greater chance to grow and develop their economy. To succeed, cities must avoid lock-in to inefficient urban sprawls, harness the economic potential of neighboring cities and towns, and ensure quality public services to citizens.

3.   For South Asia to become a leading economic power, development of its cities as prospective centers of growth and dynamism holds great promise. By being centers of economic activity, urban clusters both define and influence the economic geography of countries and regions. Taking the form of financial centers like Tokyo, Shanghai, and Mumbai; technology hubs like Singapore and Bengaluru; or primate cities like Dhaka, urban clusters have influenced location of industries, allocation of national resources, development of transportation networks, and international trade dynamics. With the growing role of information technology (IT), economically successful clusters are expected to house advanced technology, services, and research companies and to have modern smart cities at their urban core. Concentration of high-quality education facilities, employment opportunities, and availability of good living conditions will likely lead to further gravitation of financial and human capital, making the clusters critical players in defining the direction of national economic growth.

4.   In this paper, we analyze the state of the region's cities, the stage of their development, and key challenges with the objective of identifying cities that hold the potential of developing as core centers of urban clusters. Based on the analysis, only three city regions (Mumbai, Dhaka, and Delhi) can be categorized as mature future urban clusters (with significant levels of urbanization around the core), while six others (Pune, Ahmedabad, Bengaluru, Chennai, Colombo, and Kathmandu) are categorized

as emerging urban clusters (with urbanization beginning to develop around the core). Drawing from international experience, we assess the needs of these potential clusters to grow and explore alternative avenues for financing their development. Investment needs for the mature urban clusters are examined in five areas: general economic development, urban infrastructure and services, governance, finance, and climate and environment.

I. URBAN CLUSTERS: THE CONCEPT

5. The term urban cluster does not have an established definition and has been used interchangeably with urban agglomeration, metropolitan region, etc. However, a combination of three key factors is representative of a cluster: (i) economic and social influence of the city core on the entire cluster; (ii) spatial distribution across political and/or administrative boundaries of urban and rural local bodies; and (iii) available transport modes affecting configuration and spread of the cluster. There are many advantages of clustered urbanization (Box 1).

Box 1: Advantages of Clustered Urbanization

- **Integrated urban infrastructure and services:** Provision of urban infrastructure for a compact region of high economic activity with multiple cities causes less strain on financial resources compared to development of individual cities. Additionally, the infrastructure generates a higher value for money as it is shared and utilized by a greater number of people. Therefore, projects that require a massive amount of investment (e.g., dams, power plants, metro rail) could become viable when planned for an urban cluster rather than for a stand-alone town or city.

- **Increased private sector interest and investment:** Local governments planning for large cluster-wide development are more likely to be successful in attracting private sector investment as the investors have greater confidence in the availability of human resources, efficient connectivity, and other industries of similar scale in the region.

- **Collaborative and participatory governance:** Local governments generally depend on central and state governments for assistance (more so in South Asia) as they have a weak tax base and poor collection efficiencies. Local governments in an area also compete among themselves and therefore attract less investment individually. Clustering gives the governments the option to set up joint fund-raising mechanisms by adopting uniform tax rates as well as standardized collection and tax reporting systems. This enhances the creditworthiness of the cluster and increases the chances of securing financing for cluster-wide infrastructure projects. Besides enhanced financial strength, intercity collaboration helps regional planning agencies undertake participatory planning exercises in alignment with the needs of the local governments and the residents of the urban cluster.

- **Balanced and inclusive development of the region:** Leveraging the synergies of all cluster components significantly increases the economic capacity and consequently employment opportunities in the region, benefiting a larger section of the population. Growth and development are not concentrated only in the largest city but are spread out more evenly, reducing the likelihood of development of squatter settlements and slum colonies.

- **Better environmental protection:** As local governments compete for investments, they often neglect the environment and allow entry to polluting industries, which can cause great harm to ecologically sensitive areas or fail to regulate indiscriminate use of natural resources. A region-wide outlook toward planning helps urban clusters develop in an environmentally sensitive and sustainable manner.

Source: K. Choe and A. Laquian. 2008. *City Cluster Development: Toward an Urban-Led Development Strategy for Asia.* Manila: Asian Development Bank.

6.   Urban clusters are formed by balancing the opposing forces of agglomeration and dispersion (Fujita and Thisse 2002). The force of agglomeration works when, as the urban core grows, it attracts economic activity, population, and investments. The value addition generated by economies of agglomeration provide firms with lowered production costs, increased business opportunities, and high-quality skilled labor while the migrants get better employment opportunities (Schwartz 2009). Meanwhile, the diseconomies of agglomeration in the form of excessive competition, shrinking profits, and increased crowding and congestion operate in parallel (Schwartz 2009). When the value generated by economies of agglomeration outweighs the diseconomies, it leads to the formation of dense but economically successful cities. However, as the diseconomies increase beyond a point, the core begins to get saturated, overcrowding and high real estate prices trigger dispersion, and the migrant population is forced to settle in peri-urban areas and/or suburbs around the core.

7.   The concept of New Economic Geography took shape following noted economist Paul Krugman's pathbreaking finding about a quarter of a century ago. He showed how a phase transition from dispersed activity to a "core-periphery" pattern emerges when transport costs fall, economies of scale grow, or the share of manufacturing in the economy expands (Krugman 1991). While agglomeration leads to intense congestion, uncontrolled and unplanned dispersion results in the formation of urban sprawls (World Bank 2005). Both these issues are major challenges that mature urban clusters (Mumbai, Dhaka, and Delhi) are grappling with.

8.   International experience (discussed in the next section) shows how the forces of agglomeration and dispersion can be channeled in a manner that benefit the growth of an urban region. While the agglomeration forces help tap into economies of scale and network effects, the forces of dispersion can be guided toward the development of compact economic centers around the core, instead of a low density, thinly spread sprawl over the entire region (Figure 1). To facilitate such urban cluster development, it is also important to have buy-in of local governments as well as the state government (Box 2).

Figure 1: Uncontrolled Organic Growth vs. Proactive Planning and Development around the Urban Core

Low density sprawl

Core

Uncontrolled organic growth

Compact and well-connected cluster nodes

Core

Proactive urban cluster development

Source: Asian Development Bank.
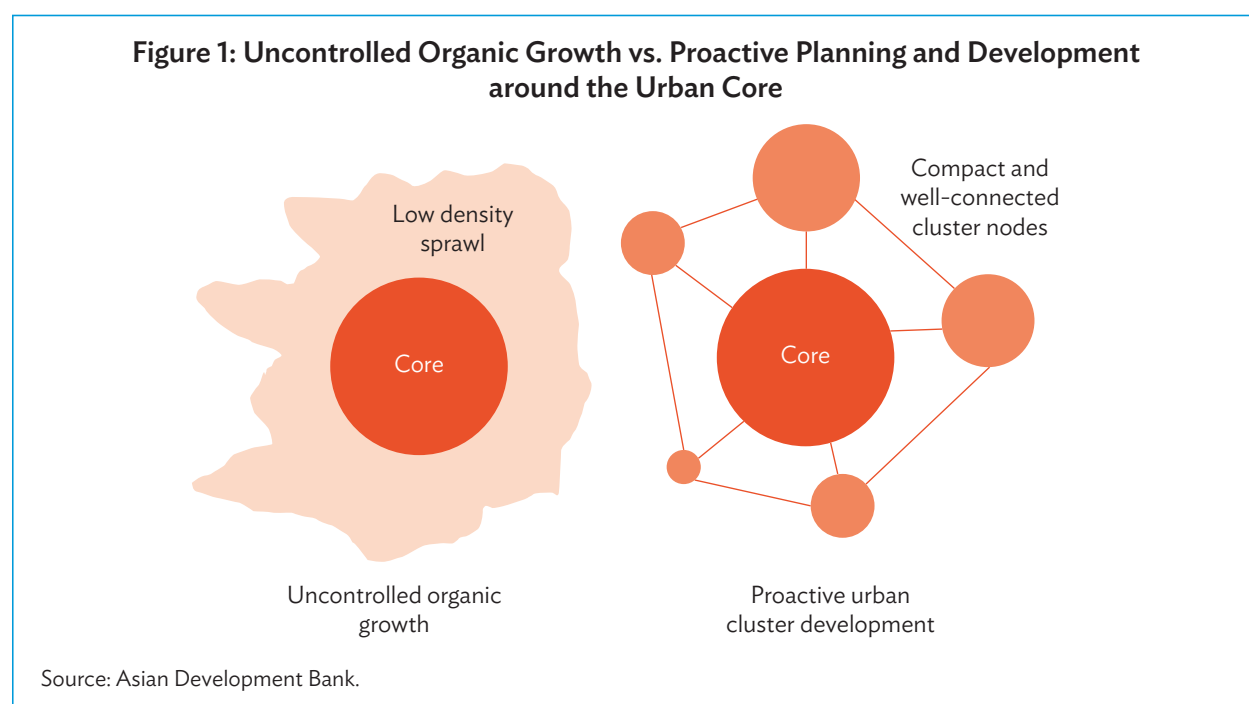
Box 2: Improving Governance in Urban Clusters

Political partisanship as well as administrative fragmentation at the state and city levels greatly hinder interagency coordination and collaboration. Coordination among local governments in enacting ordinances, zoning codes, tax regulations, and land-use regulations is essential in ensuring a uniform and positive cluster-wide business environment. Therefore, enterprising city officials with the political will to pursue cluster-wide reforms are critical in ensuring the success of such endeavors.

Comprehensive development planning can help overcome political and administrative barriers to coordination by emphasizing the interlinkages and untapped synergies among cities in the cluster. While city clusters of Mumbai, Delhi, and Dhaka have formulated regional development plans, metropolitan areas such as Manila have not been able to do so despite several attempts. Coordination among city authorities is pivotal for formulation of a regional development plan. Development planning must be a participatory process incorporating inputs from all key stakeholders such as cluster residents, government agencies, the private sector, and civil society groups. The local government bodies should not consider these regional master plans as merely indicative but must play a proactive role in implementing them. Active participation of civil society through nongovernment organizations and civic associations can further help make the governance of urban clusters more effective.

Finally, lack of transparency and accountability breeds mistrust and can act as a major barrier to cluster-wide development efforts. Enacting public disclosure and community participation laws, making audit reports available online, conducting citizen satisfaction surveys, and constituting strong grievance redressal mechanisms and institutions such as an ombudsperson can help enhance transparency and accountability of local governments in an urban cluster.

Source: Asian Development Bank.

II. INTERNATIONAL EXPERIENCE

9. We now consider five diverse international case studies from across the world: Australia, Denmark, Japan, the People's Republic of China (PRC), and the United States (US). These cases help us draw lessons on various aspects related to development of urban clusters—for example, development of strategic centers, importance of connectivity, impact of economic reforms, relevance of research and innovation, cross-border cooperation, and leadership in planning and governance. However, these lessons should be tailored to the context of South Asia to be relevant. This is because South Asian nations have primarily focused on economic planning with planned urbanization coming into focus in the last 2 decades, which is in contrast to the countries represented in the case studies where spatial planning has historically been a part of economic planning. Moreover, in Australia, Denmark, Sweden, and the US, urban centers have developed in a regulated manner and at a slower pace compared with Asian counterparts. Rapid and unregulated urbanization is therefore a steep challenge that countries in South Asia need to tackle urgently through policy and regulatory interventions.

A. Sydney, Australia: Strategic Centers and Effective Leadership

10. The Sydney metropolitan area houses a population of over 5 million and spans an area of 12,367 square kilometers. Sydney's 2005 Metropolitan Strategy established a new structure of governance and management which was based on a hierarchy of cities. Global Sydney, the core of the cluster comprising the City of Sydney and North Sydney, was the focus for national and international business, professional services, specialized health and education, commercial centers, and tourism. Three major

cities in the cluster (Liverpool, Parramatta, and Penrith) were defined as "regional cities." These were focal points for regional transport and jobs and had a full range of business, government, retail, cultural, entertainment, and recreational activities. The strategy also outlined several "major centers," which were full-scale business centers with a minimum of 8,000 jobs, and "specialized centers," which performed vital economic and employment functions across the metropolitan area.

11.   With increasing fuel prices and travel time to work (especially from the cluster periphery to the urban core), the New South Wales Government's State Plan identified a key priority: jobs closer to home. Under the Six Cities Project, it established a Cities Taskforce mandated to work closely with the councils of six cities (Gosford, Liverpool, Newcastle, Parramatta, Penrith, and Wollongong). The taskforce developed new city center plans with four planning documents for each city: a vision document (outlining the role of the city center), a local environmental plan (with statutory requirements), a development control plan (which modelled the character of the city), and a civic improvement plan.

12.   A detailed economic and demographic analysis of each city was undertaken to determine targets for jobs and population growth. The development growth potential was assessed, and over 6 million square meters of floor space were added across the six cities. The Cities Taskforce used this increased development potential to fund civic improvements. A small levy of around 3% was applied to the city center development sites where a significant increment in floor space had been given. Funds generated from the levy were allocated for civic improvement works defined in the civic improvement plan to ensure holistic growth of the city.

13.   The Six Cities Project was developed with a high degree of local involvement and received extensive media coverage. Also, the project won the 2007 Urban Development Institute of Australia (UDIA) Award for Excellence in public sector leadership for urban development.

B.   Pearl River Delta, People's Republic of China: Exponential Growth through Economic Reforms

14.   The Pearl River Delta (PRD) is the most dynamic and innovative region in the PRC. PRD witnessed the most rapid urban expansion in human history, transforming from an agricultural region into the world's largest continuous city with 66 million residents, surpassing Tokyo. The World Bank declared it the world's biggest megacity. This polycentric urban cluster is comprised of nine cities in the province of Guangdong (Dongguan, Foshan, Guangzhou, Huizhou, Jiangmen, Shenzhen, Zhao Qing, Zhongshan, and Zhuhai) as well as the two special administrative regions of Hong Kong, China; and Macau, China. PRD is one of the world's most successful economic regions with a gross domestic product (GDP) of $1.2 trillion, which has been growing at the rate of 12% for the last decade. Although the region accounts for less than 1% of the PRC's land and 5% of its population, PRD attracts more than 20% of the country's foreign direct investment and generates more than 10% of its GDP and 25% of its exports.

15.   The PRD region is a manufacturing-led growth story. The central government of the PRC, in 1979, allowed Guangdong province to set up special economic zones with several features to attract foreign investment. These included incentives such as a 15% tax rate, tax holidays (of up to 5 years), repatriation of corporate profits and capital investments (after a contracted period), duty-free imports of raw materials and intermediate goods for manufacturing exported products, and exemption from export taxes.

16. Guangdong and the special economic zones were provided greater political and economic autonomy than other provinces or manufacturing regions in the PRC. This autonomy (in fiscal matters, foreign trade and investment, commerce and distribution, allocation of materials and resources, labor, and prices) played a major role in triggering its rapid investment and growth. In addition, the PRD region was economically successful because the government incentives and autonomy were supplemented with quality infrastructure and other amenities (utilities, commercial, and social infrastructure) for the manufacturing companies, which helped strengthen the value proposition of the investment region.

17. In 1988, the province was designated a "comprehensive economic reform area" with powers to set its own economic direction. This helped create the Shenzhen Stock Exchange and an attractive land lease system. The economy of the region took off on the back of these reforms, with the area registering double-digit growth year after year, making it a world leader in the field of manufacturing and exports.

18. In 2008, the PRC announced plans to weave the nine PRD cities into a single megacity. Large-scale infrastructure projects have since been underway to merge transport, energy, water, and telecom networks across these nine cities. An intricate rail transport network featuring three circular and eight outbound routes will be built by 2020 forming a "one-hour intercity circle." Furthermore, a 50-kilometer long bridge and tunnel is under construction to link Zhuhai to Macau, China; and Hong Kong, China.

19. The PRD region's economy is made up mostly of private companies. It houses only four of the more than 100 giant state-owned enterprises controlled by the central government. Currently, the PRC is struggling with an economic slowdown (the annual GDP growth rate of 6.7% reported by the government in 2016 was the slowest in 26 years). The PRC is gradually losing its advantage of cheap labor, with businesses moving to even cheaper Southeast Asian countries. To counter the threat, Guangdong province has implemented a series of reforms, such as upgrading its economic industrial structure and enhancing urban infrastructure to raise the economy from labor-intensive, high-energy consumption manufacturing to high-tech industries such as telecommunication, biomedicine, and renewable energy.

C. The Øresund Region, Denmark and Sweden: Transnational Collaboration

20. The Øresund region with a population of 3.6 million is a transnational metropolitan area spanning Denmark and Sweden. It was developed through the construction of a road and rail bridge in 2000 linking Copenhagen in Denmark to Malmö in Sweden. The increased accessibility offered by the link enabled people to commute across the region within an acceptable journey time. Copenhagen as a capital city has greater employment opportunities, so commuting is highly one-directional, with around 95% of all commuters living in Sweden and working in Denmark.

21. Øresund is one of the most well-known examples of European cross-border collaboration. It used transnational connectivity to integrate the metropolitan area around Copenhagen and southern Sweden (with the cities of Helsingborg, Lund, and Malmö) into an urban cluster.

22. The main rationale for this endeavor was to achieve greater critical mass for tapping into the benefits of agglomeration economies by creating a larger metropolitan region with an integrated labor market, somewhat minimizing the effect of Copenhagen's peripheral location in global terms.

23. Copenhagen was particularly attractive to Swedish job seekers as it offered a diverse labor market with higher salaries and greater job opportunities compared to Malmö. In 2005, due to a booming Danish

economy, many employers recruited Swedish nationals and some companies moved their production to the Swedish side to get the required workforce (OECD 2012, p. 43).

24.   The Øresund region has developed into a technology hub with a world-class environment and scientific infrastructure for start-ups. Additionally, industry-specific corridors in the region such as Medicon Valley (a biotech, med-tech, and pharmaceutical companies cluster) have also significantly contributed to its growth.

D.   The Triangle, United States: Research and Innovation-Led Development

25.   The Triangle is a region in North Carolina comprising the cities of Raleigh and Durham and the towns of Chapel Hill and Cary. The name "Triangle" comes from the three world-class universities that anchor the region, Duke University in Durham, North Carolina State University in Raleigh, and the University of North Carolina at Chapel Hill. The Triangle is home to the 7,000-acre cross-boundary Research Triangle Park (RTP), the largest and leading high-technology research and science park in North America.

26.   RTP was established in 1959 when the economy of North Carolina was stagnating as it depended primarily on agriculture and three failing industries—tobacco, textiles, and furniture. Since only low-paying manufacturing jobs were available, the state faced a significant brain drain. RTP thus aimed at reversing the brain drain of graduates from the top research universities at the three corners of the Triangle. It helped the universities move from destructive rivalries to cooperation, coordination, and cross-pollination of ideas and best practices. The Triangle region now has a population of 2.4 million, of which 44.3% are college graduates.

27.   The development of RTP substantially impacted the region's economic growth. Besides creating approximately 40,000 high-paying research and technology-related jobs, there were many indirect benefits such as an increase in construction jobs, as well as real estate, sales, and income tax yields.

28.   Moreover, the region is home to about 1,500 companies. The area also fares high on innovation with Durham–Chapel Hill and Raleigh–Cary, both in the top 20 metropolitan statistical areas of the country in terms of number of patents per million residents.

29.   The Triangle has won many accolades, including best place in the US to live and work (Employment Review and MSNBC), best place for business climate (Site Selection), best high-tech region (Silicon Valley Leadership Group), best place for business and careers (Forbes), and best place for biotechnology (Milken Institute).

E.   The Tōkaidō Shinkansen Urban Corridor, Japan: Public Transport-Driven Growth

30.   The Tōkaidō Shinkansen (or "bullet train" as it is popularly called) was inaugurated in 1964 and runs at a speed of 240–320 kilometers (km) per hour, connecting Tokyo with the cities of Yokohama, Nagoya, Kyoto, and Osaka (and other smaller cities), originally covering 515.4 km. The Shinkansen network has since then spread across the country and currently covers 2,764.6 km. The region from Tokyo to Osaka is a nearly unbroken stretch of urbanization with few parallels in the world. The agglomerated impact achieved through city cluster development along this corridor has been the major factor behind Japan's meteoric economic growth since the 1960s. Led by Tokyo, the whole urban corridor has become a global region with offices and factories of several Japanese multinational companies (Toyota, Suzuki, Canon, Yamaha, Mitsubishi, Honda, etc.).

31.   The purpose of the train was to connect regional areas with Tokyo. The national Shinkansen network has changed the face of Japan. Shorter travel times and less vibration have resulted in more convenient business and pleasure trips. The train brings the country's workforce into the capital city, increasingly rendering a major part of the country little more than a bedroom community for Tokyo. By relieving housing pressures from Tokyo, these dormitory cities have ensured housing costs and salaries of the workforce are kept under check, further enhancing global competitiveness of the urban cluster.

32.   Besides reduced travel times, incentives like employers paying their workers' commuting costs and such reimbursements being tax-free (up to ¥100,000) have further encouraged people from far-flung areas to seek employment in Tokyo. This funneling of population into the capital has made Tokyo denser and more vertical (both upward and downward). The latest incarnation of the bullet train is the Maglev, which is being built 40 meters underground and expected to be completed by 2027. With speeds dwarfing those of the bullet train, it will shrink the travel time from Tokyo to Nagoya from 100 minutes to 40 minutes, virtually making the city a suburb of Tokyo. The extension of the Maglev to Osaka is expected to be completed by 2045.

III.   SOUTH ASIAN CITIES AS POTENTIAL URBAN CLUSTERS

33.   The development of clusters in South Asia has been a reactive and organic process. High rentals and space constraints have led to the expansion of industrial clusters in peri-urban areas that have eventually grown into urban settlements with their own municipal administration. Uncontrolled urbanization has caused several challenges for these regions to realize their full potential (Box 3).

Box 3: Major Challenges Facing Urban Clusters in South Asia

Imbalanced economic growth: Employment opportunities are generally concentrated in the urban core, resulting in underdevelopment of other cluster components. Due to lack of incentives and resource availability, industries avoid investing in areas far from the urban core. This causes economic imbalance in the region with very high congestion in the core and lack of facilities and opportunities in other cities.

Poor infrastructure and service delivery: Due to the lack of an organized cluster-wide approach, South Asian urban clusters struggle with dilapidated infrastructure and inadequate urban service delivery, which reduce the overall quality of life in the region. Lack of resources (on an individual city level) and lack of collaborative planning have led to ad hoc development in these city regions, causing them to lose out on the benefits of agglomeration (e.g., economies of scale) while suffering from its drawbacks (e.g., congestion).

Weak and nonparticipatory governance: Urban clusters in South Asia are not governed as a single entity but as individual cluster components that often end up competing. Though metropolitan region development authorities exist, their role is limited to planning and they often lack the power to enforce their plans. Local governments lack decision-making powers and seldom engage citizens in the planning process. This leads to a skewed understanding of the real needs of the region.

Deteriorating environment and vulnerability to climate change: Due to increased vehicular traffic in the urban cores and presence of unregulated industries that discharge untreated effluents, urban clusters in South Asia are grappling with a deteriorating environment, primarily due to air and water pollution. Also, the city regions are becoming increasingly vulnerable to climate risks such as flooding. Lack of a concerted effort in planning for resolving these issues has worsened the problems in the last few decades.

Source: Asian Development Bank.

34.   While there is a need for major policy interventions, capacity building and financing of essential infrastructure in all urban centers of South Asia, limited fiscal resources demand a strategic approach for selecting cities that hold the promise for growth and transition into urban clusters.

35.   For the purpose of this study, we identified existing and emerging urban clusters in South Asia. Given the size and complexity of India, we selected cities from India and the rest of South Asia using separate parameters (these have been detailed in the Annex). Based on the assessment, Mumbai, Delhi, and Dhaka were shortlisted as existing urban clusters, while Pune, Bengaluru, Chennai, Ahmedabad, Kathmandu, and Colombo were identified as emerging urban clusters.

IV.   KEY URBAN CLUSTERS IN SOUTH ASIA

36.   The main objective of this section is to identify urban clusters as major investment areas in South Asia. The following describes the development status, key challenges, and emerging prospects in the shortlisted urban clusters (Mumbai, Delhi, and Dhaka). Based on this assessment, we identify investment needs in five major categories: economic development, infrastructure, governance, finance, and climate and environment. As a precursor to the descriptions that follow, an overview of the state of municipal finances and suggestions for fiscal strengthening is described in Box 4.

A.   Mumbai

37.   The Mumbai Metropolitan Region (MMR) spans an area of 4,312 square kilometers and is comprised of 8 municipal corporations, 9 municipal councils, 35 census towns, and 994 villages. Considering the principles of proximity and functional dependency described above, we define the Mumbai urban cluster as the agglomeration of the urban core (Greater Mumbai), seven adjacent municipal corporations (Thane, Kalyan–Dombivli, Vasai–Virar, Navi Mumbai, Mira-Bhayandar, Bhiwandi–Nizampur, and Ulhasnagar) as well as the municipal councils of Panvel, Ambernath, and Uran. The cluster components are depicted in Figure 2.

1.   Development Challenges

38.   Mumbai is a significant driver of economic growth of the state of Maharashtra as well as India. MMR contributes over 40% of the state domestic product of Maharashtra and accounts for 40% of its secondary sector and 45% of its tertiary sector net district domestic product (at 2003–2004 constant prices).

39.   Over the last few decades, the population of this cluster has increased and the settlements have expanded toward the hinterland. Cities such as Greater Mumbai, Bhiwandi, and Ulhasnagar with population densities exceeding 30,000 persons per square kilometer seem to be saturated. The extent of developable areas permitted by the development plan of each city will govern future densification.

Economic Development

40.   The secondary sector in the region has seen a decline in the past 2 decades with a reduction in employment from 878,325 in 1998 to 867,058 in 2005. Textile manufacturing and manufacturing of transport equipment, chemicals and chemical products, and fabricated metal products have faced a major reduction in financial and human capital in MMR. In addition, policies encouraging conversion of industrial lands to residential use spurred the growth of real estate markets at the expense of the

Box 4: Strengthening Municipal Finances: The Case of India

India's cities are unable to provide basic services to their residents.

Cities in India contribute about 60%–65% of gross domestic product (GDP), and this figure is projected to rise to 95% by 2021 (Mohanty 2016). About 70% of new jobs and 80% of total tax revenue in the country also come from cities. This means that municipalities and city administrations can play a central role in providing urban infrastructure capital for land-use planning, transport services, affordable housing, and environmental sustainability. But the reality is quite different: needs of urban local bodies (ULBs) far outweigh their capacity, which is constrained by limited revenue sources, inadequate fiscal transfers, and meager fiscal autonomy. Urban infrastructure requirements in India are about 2% of GDP as against total municipal revenue of barely 1% of GDP (Mohanty 2016). In contrast, municipalities generate as much as 6% of GDP in South Africa and over 7% in Brazil. Given such a hard budget, India's municipalities can meet only 20% of basic service needs such as water and sanitation.

What ails urban local bodies in India?

ULBs have been assigned many revenue sources including local taxes (land and property, trade, professions, vehicles, etc.), user charges (for water, electricity, sewerage, solid waste collection, public transport, tolls, etc.), and benefit charges for maintenance of public properties. However, in practice, the revenue potential of ULBs is limited because a key source, octroi duty (a local tax levied on goods entering the city), was abolished without a replacement, while others accrue to state governments (e.g., profession tax, motor vehicle tax, entertainment tax, and stamp duty on transfer of property). Further, local bodies do not have access to goods and services tax nor to formula-based sharing of national and state taxes, unlike Brazil, the People's Republic of China, and South Africa, among the BRICS countries.

Many ULBs rely on state governments to pay even for basic operational expenses like provision of essential public services and employee salaries. Their weak fiscal health results in a self-perpetuating cycle of low investment and poor infrastructure services (Figure B4.1). The vicious cycle is aided by budget constraints faced by state governments which limit their capacity to fund ULBs. Moreover, inadequate transfer of sharable tax revenues through central and state finance commissions, inability of banks to take on long-term exposure to urban projects, and balance sheet weaknesses for municipalities to access capital markets make the situation worse.

Figure B4.1: Vicious Cycle of Inadequate Municipal Revenues and Poor Public Service Quality
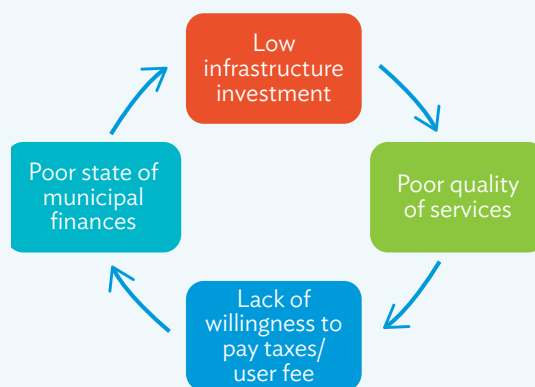
Source: Asian Development Bank.

What should the urban local bodies turn to?

The High-Powered Expert Committee (2011) for Estimating the Investment Requirements for Urban Infrastructure Services laid out standard expenditure norms for municipal infrastructure services, their financial requirements, and a pattern of

financing with a pivotal role for municipalities. Without effective, predictable generation of internal revenues, however, it will not be easy to attract external sources of funds such as bank loans, bonds, or other capital market instruments.

Taxes on land and physical properties represent "the largest source of untapped municipal revenue for developing cities" (International Growth Centre). These taxes can provide self-sustaining returns on investment (Figure B4.2). Moreover, they are also fairer and strengthen municipal finance more efficiently than other forms of tax. The Thirteenth Finance Commission of India (2009) recommended establishing state-level property tax boards to make the system of property assessment uniform. Even relatively minor reforms associated with political and administrative challenges to land and property taxes can substantially boost municipal finances.

Borrowing or debt financing is an attractive proposition to finance urban infrastructure since it requires lumpy, long gestation, capital-intensive investments. Further, it is suitable for financing through long tenor debt over an extended period; and its benefits accrue to populations beyond the current generation of taxpayers. Examining the supply-side constraints to municipal borrowing, the World Bank (2011) emphasized the need to simplify local government frameworks and to remove the ambiguities in regulations governing municipal borrowing.

Cities' lack of fiscal powers can be traced, among other things, to country systems and institutional constraints in many developing countries. For example, political, administrative, and fiscal institutions together with lack of participation and accountability can restrain the capacity of municipalities to provide essential public services to their residents (Roth and Malik 2016). This is another area where reforms are required as a priority for urban clusters to take off and flourish. Without revamping the fiscally fragile municipal system, it will be highly challenging for South Asia to meet the large and growing infrastructure needs of its expanding urban conglomerations.

Figure B4.2: Land and Property Taxes: Self-Sustaining Returns on Public Investment

Higher public infrastructure services investment

Higher value of nearby properties

Higher land and property taxes

More productive cities

Source: Asian Development Bank.
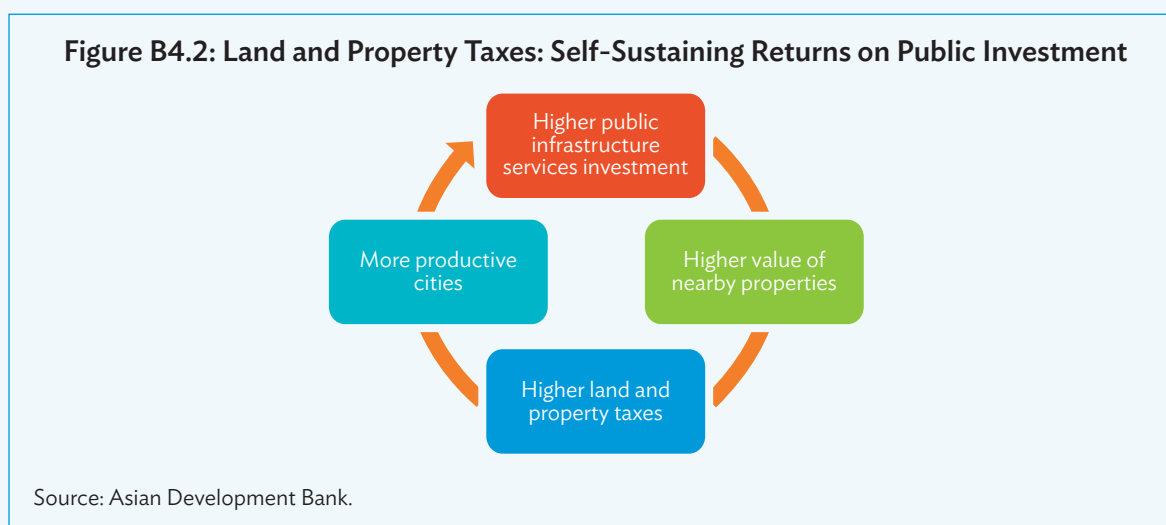
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**Figure 2: Mumbai Urban Cluster: Cluster Core and Major Cluster Components
with Population and Distance from the Core**
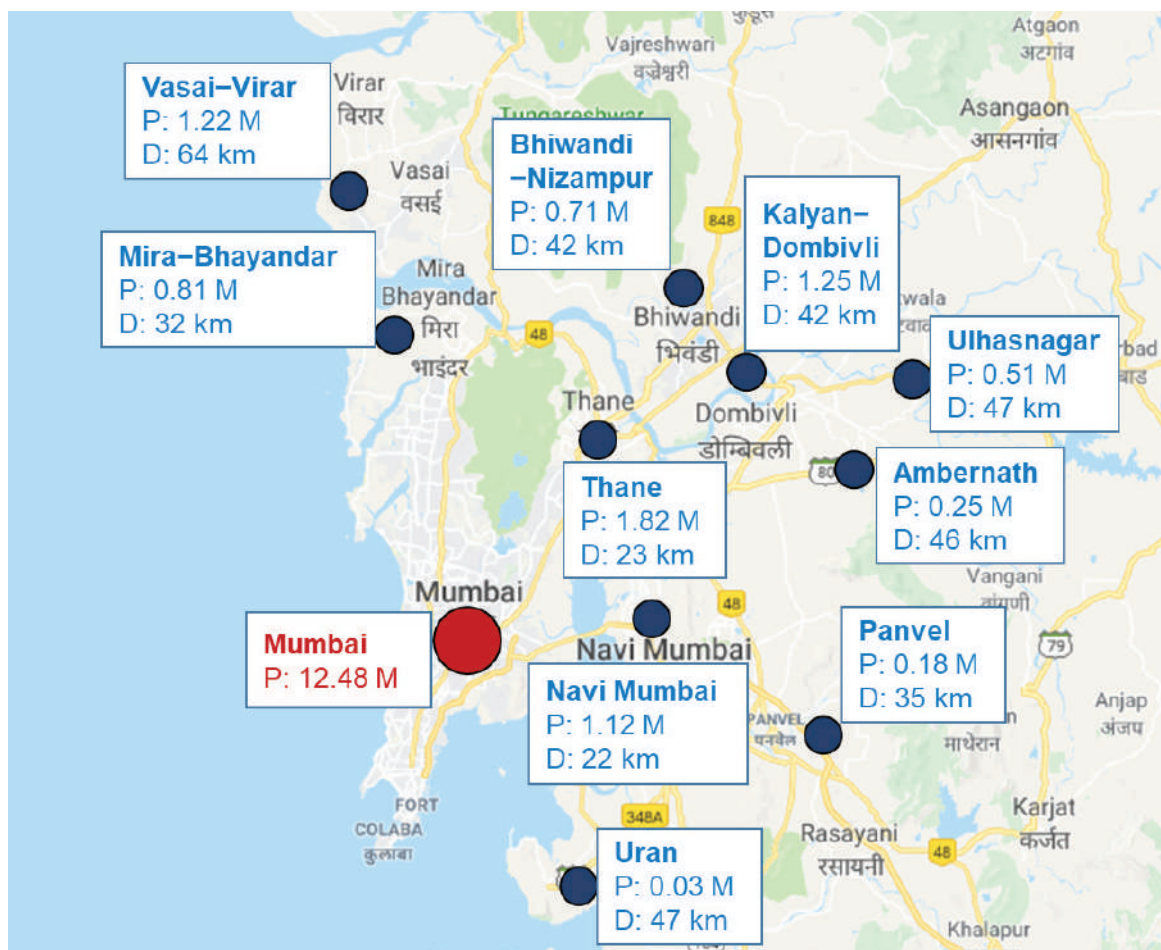
D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

secondary sector. In terms of employment opportunities, most of the formal jobs are concentrated in Greater Mumbai (in the business districts of Cuffe Parade, Lower Parel, Bandra–Kurla, Andheri, and Powai) leading to a polycentric pattern within the urban core with few employment opportunities outside the core. However, the opportunities are gradually spilling over outside the urban core to Thane and Navi Mumbai (for IT-enabled services and other services) and Bhiwandi (for manufacturing and warehousing) in an organic manner. Therefore, adopting a proactive approach is necessary for undertaking planned economic development of the region.

Infrastructure Services

41.   Mumbai's suburban railway system forms the backbone of the cluster's transportation, accounting for 7 million trips per day. It is supplemented by its bus services, with 3.5 million trips per day. The average trip length of commuters by trains is about 24 kilometers. Extreme levels of crowding in the suburban rail system—trains carrying twice their capacity of 1,800 passengers—and slow bus transport

are major transport bottlenecks. East–west connectivity as well as integration and interchanges across transport modes including taxis and auto rickshaws need improvement.

42.   The housing situation is grave. According to the 2011 Census, about 80% of households of Greater Mumbai (1.1 million households) live in slums. Severe lack of affordable housing options and lack of access to housing finance for those employed in the informal sector have led to informal housing in slums and sprawl.

43.   Overall, MMR faces a water deficit of 1,245 million liters per day. The large population living in slums lacks proper access to safe sanitation. The coverage of the sewerage system is inadequate. Septic tanks are the predominant disposal method but sewage treatment plants in the cluster do not run to peak capacities due to insufficient coverage, improper collection systems, poor operation and maintenance, and so on.

44.   The Mumbai urban cluster generates more than 11,300 tons of solid waste per day with Greater Mumbai accounting for about 66% of this. Most ULBs follow centralized systems of solid waste management, which pose hindrances to waste segregation and decentralization of treatment and disposal. Efficient management of recyclable waste is impeded by inefficient waste transport, processing and disposal systems; inadequate recycling plants; and lack of cataloguing of agencies involved in recycling.

Governance and Public-Sector Management

45.   While Mumbai is the financial center of the country, there is scope for improving its ease of doing business vis-à-vis comparable countries like Mexico, the PRC, and the Russian Federation (Table 1). The World Bank's *Doing Business 2017* report rates Mumbai poorly, particularly in dealing with construction permits, paying taxes, enforcing contracts, and resolving insolvency.

46.   The Annual Survey of India's City-Systems 2016 ranks India's top 21 cities on urban governance according to four parameters: urban planning and design; urban capacities and resources; empowered and legitimate political representation; and transparency, accountability, and participation. Mumbai, ranked fourth, leads Indian cities in investment in infrastructure, public services, and availability of skilled labor. However, it lags international benchmarks on almost all parameters and Indian counterparts on some parameters. Effectiveness in deterring plan violations and encouraging participatory planning are major areas for improvement for all Indian cities. Mumbai also fares poorly in providing adequate powers to city leaders, successful implementing spatial development plans (SDPs), and addressing citizen complaints.

47.   The Mumbai urban cluster is governed by a complex amalgam of authorities—central and state government agencies, planning authorities, urban local bodies, and so on. They are statutorily constrained, overlap in their jurisdictions, and are often politically divided, which hamper the development and implementation of a common agenda for the cluster. Complex institutional ownership and bureaucratic hurdles impede fund disbursement and consequently project implementation. Vertical management of sectors with no cross-sector interaction among the bodies and lack of a regional and/or cluster-wide leadership with vision and stature lead to conflict in investments and policies. They also give rise to coordination issues during execution of large projects as well as fragmented identity and goals of the cluster components.

48.   Pressure of tackling immediate problems prevents local leaders from adopting a holistic future-oriented outlook of the region. Although MMR contributes about a third of national income tax,

Table 1: Mumbai: Doing Business Scores across Major Indicators
(on a scale of 100)

Indicator	Mumbai	People's Republic of China (Beijing and Shanghai)	Mexico (Mexico City and Monterrey)	Russian Federation (Moscow and St. Petersburg)	Best Performer Globally
Starting a business	72.41	81.02	85.74	93.57	99.96 (New Zealand)
Dealing with construction permits	35.06	48.52	69.79	65.86	87.40 (New Zealand)
Getting electricity	85.16	68.73	68.32	84.37	99.88 (Republic of Korea)
Registering property	51.73	76.15	61.05	90.55	94.46 (New Zealand)
Getting credit	65.00	60.00	90.00	65.00	100.00 (New Zealand)
Protecting minority investors	73.33	45.00	60.00	60.00	83.33 (New Zealand)
Paying taxes	46.58	60.46	65.81	82.96	99.44 (United Arab Emirates)
Trading across borders	57.98	69.13	82.09	57.96	100.00 (10 economies)
Enforcing contracts	35.19	77.98	67.01	74.96	84.15 (Republic of Korea)
Resolving insolvency	32.75	55.82	73.11	56.69	93.89 (Finland)

Source: World Bank *Doing Business 2017,* 14th edition.

40% of foreign trade and 70% of state tax revenue, the Municipal Corporation of Greater Mumbai has an annual budget of only about $5 billion. Other ULBs have deficient revenue collection capacities. The fiscal difficulties of local agencies have not been addressed by the Maharashtra State Finance Commission and finance reforms proposed by the commission have usually been declined/ revised by the state government.

Finance

49.   In the context of financing urban cluster development, the role of the state government and the regional development authorities assumes greater importance compared to individual ULBs of each city in the cluster. This is because a state and/or regional authority is better placed to raise and repay the loans to raise financing for a regional and/or cluster-wide project, circumventing the need of collaboration among financially diverse municipal authorities.

50.   In the case of the Mumbai urban cluster, the Mumbai Metropolitan Region Development Authority (MMRDA) is involved in developing and financing projects of regional significance. It finances projects from own funds along with funds received from the state and central governments, as well as donor agencies. It is involved in the development of several important projects such as the Mumbai Metro, Mumbai Trans Harbour Link, Mumbai Urban Infrastructure Project, regional water supply scheme, regional landfill project, and eGovernance solutions.

51.   In terms of utilizing innovative financing mechanisms, Mumbai has been successful in implementing value capture financing in the Bandra–Kurla Complex, a suburban commercial and office node created to relieve congestion in south Mumbai. In the Bandra–Kurla Complex, MMRDA used an 80-year long-term lease of land for private developers with permission for high-density development. The land was sold while capturing the premium that the node generated during its development (1 square meter of land sold in 1993 cost ₹30,000 compared to ₹504,000 in 2007).

52.   Building on its successes, Mumbai needs to further strengthen the role and authority of MMRDA and utilize innovative financing mechanisms to attract private sector investment such that the benefits of growth of the region are distributed in a more equitable manner.

Climate and Environment

53.   Mumbai was made a single landmass by reclaiming land to bring together seven islands. Therefore, it is particularly susceptible to flooding and rising sea levels as many reclaimed areas are just 5 meters above low-tide sea level. The railway lines are typically 10 meters above low-tide sea level and the subways are at high-tide sea level. There are 57 slum settlements within the high-tide line making them extremely vulnerable to the effects of excessive rainfall.

54.   An unprecedented rainfall in 2005 brought the city machinery to a standstill, exposing its unpreparedness, and economic and social vulnerability. Since then, several initiatives have been undertaken by the government including an annual "monsoon preparedness" meeting and disaster management plans by ULBs like the Municipal Corporation of Greater Mumbai, Thane Municipal Corporation, and Navi Mumbai Municipal Corporation. The Municipal Corporation of Greater Mumbai has also set up a disaster management control unit. However, the urban cluster does not have an overall disaster management plan; the ULBs are deficient in capacity and adequately trained response personnel; public awareness about actions to be taken in the event of a disaster is low; storm-water drainage facilities are inadequate; and a large proportion of the slum population remains vulnerable to disasters.

55.   Chembur, Dombivli, and the TTC industrial area in Navi Mumbai are critically polluted. Ambernath and Dombivli in the Kalyan region have over 1,400 chemical and dye companies, fabrication units, and so on. They have recorded the maximum number of polluted sites in the cluster. Efforts to identify the sources of pollution by emission inventory have rarely been undertaken. The cluster has inadequate and inefficient pollution monitoring and redressal mechanisms. The sites that are monitored are not representative and do not consider timed activities (building construction, quarrying, etc.). Lack of an institutional mechanism for centralized data collection, verification, and validation leads to data duplication between ULBs and the Maharashtra Pollution Control Board. The lack of information integration leads to data gaps and poses hindrances in undertaking focused analysis and timely corrective measures.

2.   Evolving Priorities

56.   With a design like the Australian case presented earlier, MMRDA has proposed the development of four growth centers and seven industrial zones. The four growth centers (Vasai, Kharbao, Nilje, and Shedung) are envisaged to provide tertiary sector employment opportunities, education, research and development, and recreational and housing facilities. The seven industrial zones (Virar, Angaon, Sape, Taloja, Khalapur, Khopta, and Amba) would provide investment incentives to companies to spur the growth of the secondary sector.

57.   Based on these objectives and the analysis in the previous section, the critical areas for investment in economic development, infrastructure, governance, and climate and environment in the Mumbai urban cluster are summarized in Table 4 toward the end of this paper.

58.   Encouraging manufacturing and balancing economic growth are two major priorities of the Mumbai urban cluster. Seamless city connectivity and affordable housing with well-functioning water and

sanitation practices, and a climate resilience plan will be key for this. Integrated economic development of the cluster will require a strategy and implementation plan, capacity development of state authorities, greater financial responsibilities for MMRDA, use of innovative financing instruments, and policy and/or regulatory reforms. An independent supervisory institution at the urban cluster level such as a Mumbai metropolitan chief executive officer can generate synergies among the multitude of organizations. It can work better with an urban cluster information system, providing authentic and current data.

B.   Delhi

59.   The National Capital Region, one of the world's largest urban agglomerations, is centered on the National Capital Territory of Delhi surrounded by 13 districts in the neighboring state of Haryana, 7 in Uttar Pradesh, and 2 in Rajasthan. Based on the principles of proximity and functional dependency, we define the Delhi urban cluster as the agglomeration of the urban core of the National Capital Territory; five municipal corporations of Gurugram, Ghaziabad, Faridabad, Noida (Gautam Buddha Nagar), and Sonipat; and the municipal council of Bahadurgarh. The cluster components are depicted in Figure 3.

1.   Development Challenges

60.   The National Capital Region accounts for 7%–8% of India's GDP, which is largely contributed by Delhi. The Delhi region overtook the Mumbai region as the economic center of India, reporting the highest GDP in the country at $350 billion in purchasing power parity (Oxford Economics 2014).

61.   There are 53 industrial clusters in Okhla, Noida, Gurugram, and Faridabad, spanning auto components, textiles, general engineering, power looms, carpets, and others. They employ more than 1.5 million people and generate an annual turnover of over ₹1 trillion. Delhi, Gurugram, and Noida have several business parks and special economic zones for IT and IT-enabled services.

Economic Development

62.   Due to growth bottlenecks like congestion and high real estate prices, the population in the cluster has seen a radial expansion over the last 2 decades: outward from the core toward the newer cities of Gurugram and Noida, and inward toward the core from the older cities of Faridabad and Ghaziabad, making the cluster densely populated.

63.   Industrial areas generally face the following issues:

- unreliable quality of power supply;
- deficient infrastructure for effective treatment and disposal for polluting industries;
- limited availability of skilled labor and a general shortage of labor;
- lack of critical support system (such as common facilities) for micro, small, and medium-sized enterprises (MSMEs); and
- lack of effective policies for technological upgradation affecting the competitive advantage.

64.   Emergence of a strong tertiary sector in Delhi but domination of other cluster components by the primary and secondary sectors is resulting in heterogeneous development. Overall, the cluster has a higher concentration of primary sector activities compared to the national average against the natural movement from the primary to secondary and finally to the tertiary sector.

Figure 3: Delhi Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core
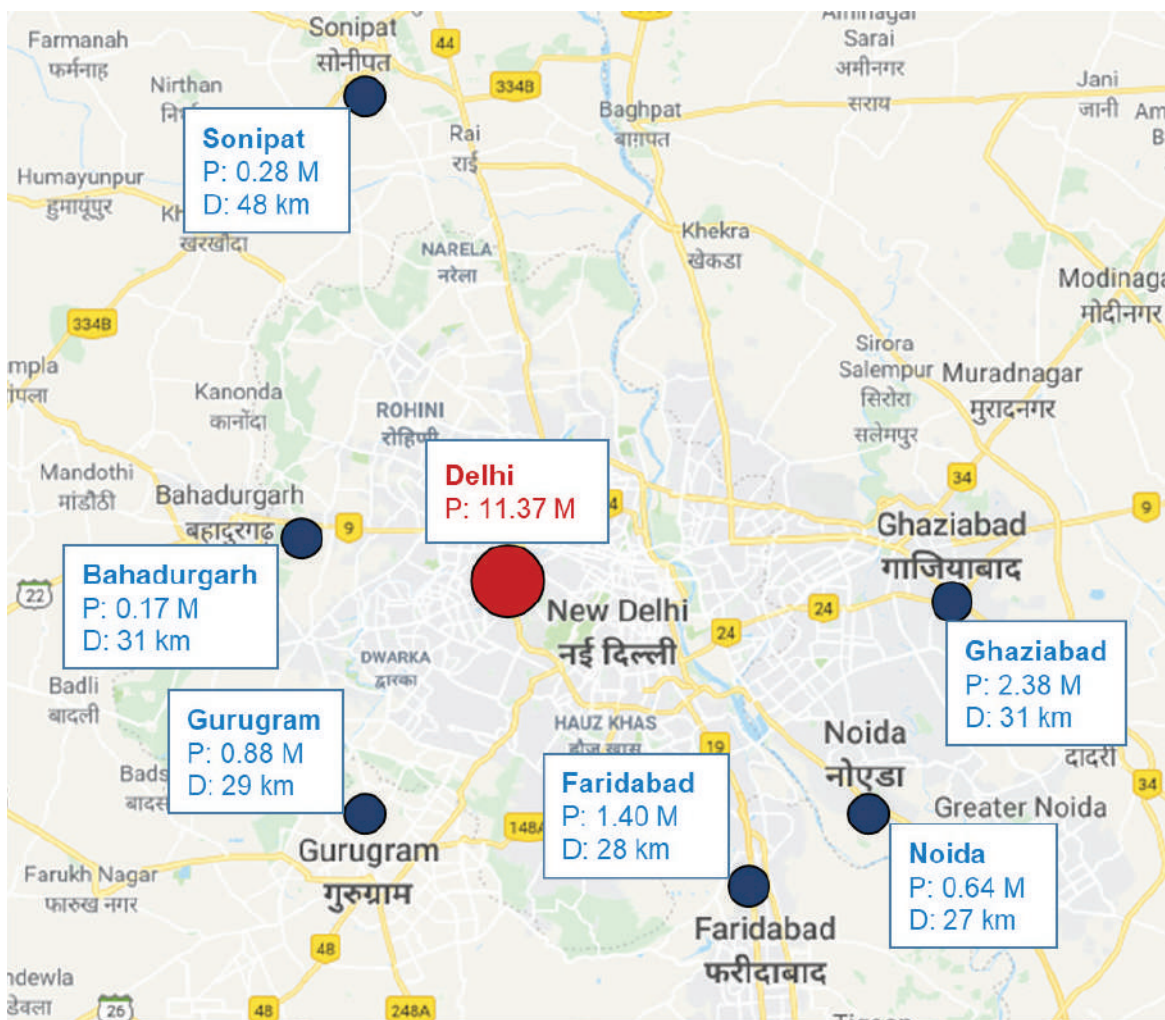
D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

Infrastructure Services

65.   The National Capital Region boasts large road, rail, and metro networks. Their connectivity has been boosted by metro feeder services launched by the Delhi Metro Rail Corporation. Delhi Metro's Phase III network of 136 kilometers is under execution. The average daily ridership of the metro has increased from about 80,000 passengers in 2002 to about 2.6 million passengers in 2016, leading to overcrowding during peak hours. With private vehicles growing at 7% per annum and commercial vehicles at close to 10%, roads are severely congested. On average, Delhi adds 1,400 vehicles to its roads every day and has more vehicles than Mumbai, Chennai, and Kolkata put together, making it one of the most polluted cities in the world.

66.   Cluster components outside Delhi such as Ghaziabad and Gurugram suffer from lack of adequate housing, power, water supply, and sanitation. In Ghaziabad, around 500,000 people reside in unplanned colonies while only 60% of its population is covered by the sewer network. Municipal waste is disposed of in undesignated or saturated landfills. Similarly, Gurugram is short of capacity for sewage treatment and water supply. About 17% of its population lives in slums. Power supply to the National Capital Region by the northern grid is insufficient to meet the demands of the growing population and economic activities in the region. Consequently, power cuts have become a norm that impacts daily life and economic productivity of the cluster.

Governance and Public Sector Management

67.   The Delhi urban cluster is unique from the governance point of view as it is composed of cities from three Indian states (Delhi, Uttar Pradesh, and Haryana). Although these cities bring in different strengths to the cluster, thereby contributing to synergistic effects, the multiplicity of organizations makes collaborative and coordinated action difficult. New Delhi, being the seat of the Government of India, adds another layer of complexity. The major organizations operating in the cluster span central, state, and local governments.

68.   Among India's top 21 cities, the Annual Survey of India's City-Systems 2016 placed Delhi at rank 9 based on an assessment of four parameters of urban governance: urban planning and design, urban capacities and resources, empowered and legitimate political representation; and transparency, accountability, and participation. Although Delhi leads Indian cities in decentralization of spatial development planning, it lags international benchmarks on almost all parameters as well as Indian counterparts on some parameters. Effectiveness in deterring plan violations and encouraging participatory planning are major areas for improvement for all Indian cities. Apart from these, Delhi fares poorly in successful implementation of SDPs, information dissemination, facilitation of citizen participation, and addressing citizen complaints.

69.   While Delhi is growing as a major economic center of India having overtaken Mumbai in terms of generating the most GDP, there is a lot of scope of improvement with regard to ease of doing business when compared to Mexico, the PRC, and the Russian Federation, or the best in the world (Table 2). Delhi lags on most business indicators of the World Bank's *Doing Business 2017* report. Compared with other countries, it fares poorly, particularly in dealing with construction permits, registering property, paying taxes, enforcing contracts, and resolving insolvency.

Finance

70.   The National Capital Region Planning Board (NCRPB) is responsible for arranging and overseeing financing of select development projects in the region through central and state plan funds, and other sources of revenue. The projects are undertaken across areas such as basic infrastructure development, water supply, sewerage, drainage, solid waste management, power, transport, and hospitals. As of 31 March 2016, the NCRPB has supported 295 projects with an estimated cost of ₹273 billion and disbursed loans of more than ₹72 billion.

71.   The NCRPB provides a 25:75 pattern of loan assistance, where 25% is the contribution of the borrowing agency and up to 75% of the project cost is a loan from the planning board. In addition, the NCRPB has been providing grant-in-aid of up to 15% of the project cost for water supply, sewerage, and drainage projects in the region. The board's financial operations have been rated AAA by CRISIL, a rating agency, with a stable outlook for its bond issues.

Table 2: Delhi: Doing Business Scores across Major Indicators
(on a scale of 100)

Indicator	Delhi	People's Republic of China (Beijing and Shanghai)	Mexico (Mexico City and Monterrey)	Russian Federation (Moscow and St. Petersburg)	Best Performer Globally
Starting a business	75.99	81.02	85.74	93.57	99.96 (New Zealand)
Dealing with construction permits	30.86	48.52	69.79	65.86	87.40 (New Zealand)
Getting electricity	85.03	68.73	68.32	84.37	99.88 (Republic of Korea)
Registering property	48.48	76.15	61.05	90.55	94.46 (New Zealand)
Getting credit	65.00	60.00	90.00	65.00	100.00 (New Zealand)
Protecting minority investors	73.33	45.00	60.00	60.00	83.33 (New Zealand)
Paying taxes	46.58	60.46	65.81	82.96	99.44 (United Arab Emirates)
Trading across borders	57.28	69.13	82.09	57.96	100.00 (10 economies)
Enforcing contracts	35.19	77.98	67.01	74.96	84.15 (Republic of Korea)
Resolving insolvency	32.75	55.82	73.11	56.69	93.89 (Finland)

Source: World Bank, Doing Business 2017, 14th edition.

72.	While the NCRPB has done well, it needs to be empowered to graduate from its current role of planning for development and facilitating loans for various implementing agencies and transform into a proactive regional development authority that utilizes innovative financing mechanisms for ensuring private sector participation and equitable development across the urban cluster.

Climate and Environment

73.	Delhi, Gurugram, and Faridabad are among the cities with the worst air quality in the world. As per the Central Pollution Control Board's Air Quality Index Survey Report released in February 2017, Gurugram was the only city in India where the air quality index was categorized as "severe," while those for Delhi and Faridabad were categorized as "very poor." In November 2016, in an event known as the Great Smog of Delhi, the government had to declare air pollution as an emergency as the levels of 2.5 particulate matter (PM) and PM 10 hit 999 micrograms per cubic meter (the safe limits are 60 and 100, respectively).

74.	About 80% of PM 2.5 air pollution is caused by emissions from vehicular traffic. Other causes include dust and construction debris, burning of crop stubble in surrounding rural regions, exhaust from diesel generators, and burning garbage in the city. Industrial pollution from thermal plants in Delhi is also a major concern. Badarpur Thermal Power Station (built in 1973), despite producing less than 8% of the city's electric power, accounts for 80%–90% of particulate matter pollution from the electric power sector in Delhi.

2.   Evolving Priorities

75.   The key components of the Delhi urban cluster—Gurugram, Faridabad, Noida, and Ghaziabad—have the potential to act as strong growth nodes. Development of high-quality infrastructure, robust transport and communication linkages, high-quality residential areas, and industrial and commercial complexes can unleash this potential. This in turn can attract capital, disperse population from the urban core, and develop the urban cluster as a powerful global economic center.

76.   Based on these objectives and the analysis in the previous section, the critical areas for investment in the Delhi urban cluster and the tools that can be deployed for their implementation are depicted in Table 4.

77.   Integrated MSME cluster development in line with the Make in India program's zero defect–zero effect perspective can foster efficient growth and development in textiles, auto component, and general engineering. Good connectivity across the cluster and development and implementation of a vehicular decongestion plan are important elements of homogeneous economic development. Controlling air pollution will require devising strategies and a comprehensive action plan that can achieve quick wins by raising citizen awareness; adopting modern technologies; implementing appropriate regulations; and building staff capacity. It is also essential to improve the overall business environment by designing and implementing required policy, regulatory, and/or institutional reforms; strengthen the NCRPB; as well as utilize innovative financing mechanisms like development financing, value capture financing, and pooled finance bonds.

C.   Dhaka

78.   The Dhaka Metropolitan Region spans an area of 1,432 square kilometers and has a population of 18.9 million. Considering the principles of proximity and functional dependency, the Dhaka urban cluster is an agglomeration of the urban core (Dhaka city), two municipal corporations (Gazipur and Narayanganj Sadar), and four *upazila parishads* or municipal councils (Savar, Kaliganj, Rupganj, and Keraniganj). The urban cluster is depicted in Figure 4.

1.   Development Challenges

79.   Intense migration to the urban core has led to proliferation of slums, which house a third of Dhaka city's population and increased the pressure on services delivery. Other cluster components too have seen high population growth rates. During 2001–2011, the highest annual growth rates were recorded in Savar (9.26%) and Gazipur (7.43%).

Economic Development

80.   Dhaka shoulders a major responsibility for the economic development of Bangladesh. It accounts for 36% of the total urban population, 36% of national GDP, 32% of total employment, 44% of total formal employment, and 66% of total informal employment of the country. Close to 80% of the population works in the informal sector. Limited growth of manufacturing jobs and widespread use of subcontracting practices, coupled with inability to acquire formal education or training, compel incoming migrants to opt for informal income-earning opportunities.

Figure 4: Dhaka Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core
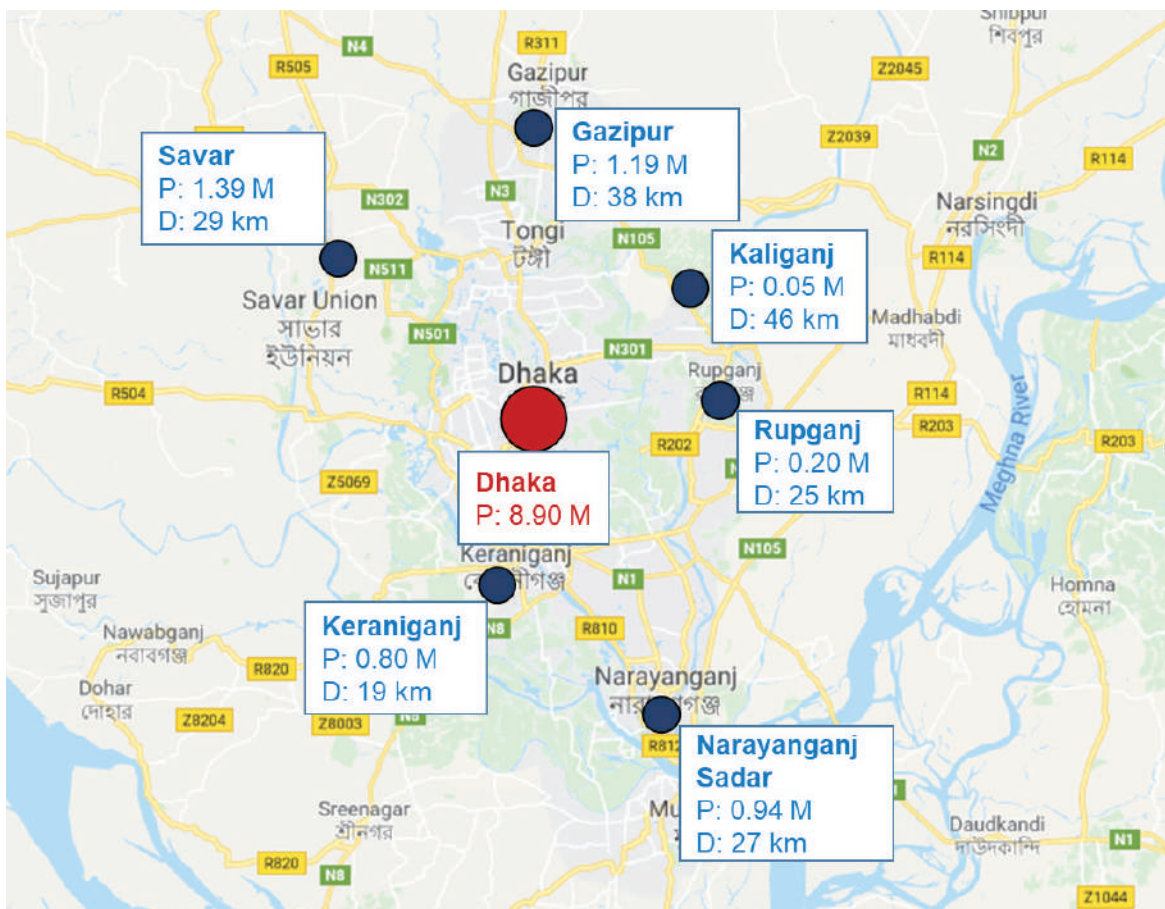
D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

81.   Woven garments, leather, and information and communication technology (ICT) are the most important sectors to the urban cluster's economy. The share of cluster components other than the urban core in woven garments' formal jobs increased from 18% in 2001 to 50% in 2011. Footwear and leather is the highest priority sector due to its high value added, employment of 850,000 people (with many women), and fourth-largest foreign exchange earnings. However, the lack of a clustering strategy for joint production and retailing for the SMEs has prevented the sector from realizing its potential. Dhaka is the national hub for ICT with more than 100 ICT firms exporting software and services to around 30 countries. The ICT sector had the fastest formal employment growth at 11% per annum from 2001 to 2009. However, industrial growth instead of local competitiveness has been the growth driver for the sector in the cluster.

Infrastructure Services

82.   About 500,000 commuters pass through the Dhaka urban cluster daily by rail, road, air, and river. About 70% of containers passing through the Chittagong port originate from or are destined for Dhaka city or Narayanganj. The total handling capacity of Hazrat Shah Jalal International Airport in Dhaka of 8 million passengers is expected to reach saturation by 2026. About 500,000 manually operated rickshaws are the major mode of transport, accounting for 37% of daily trips in Dhaka city. Congestion and slow traffic cost $3 billion a year and a daily loss of over 8 million working hours. The Dhaka Transport Coordination Authority, formed in 2001, has not been able to function as a coordinating body due to lack of a superior authority over the agencies.

83.   Migrants make up about 65% of the urban core's population. At the current migration rate every year, more than 120,000 housing units will be needed. The private sector caters to 93% of the demand, of which 55% is supplied by individual (informal) developers. The government fulfills the remaining 7% of demand. Low-income groups receive a minimal share of government projects. The approval process is lengthy and cumbersome. Housing finance is also underdeveloped and has limited reach in the cluster.

84.   Cluster components outside Dhaka have inadequate water supply and sanitation facilities. The urban core sources 80% of its water supply from groundwater aquifers, with a quarter system loss. Only 20% of the population is covered by the underground sewerage network, 30% rely on drainage networks and open channels, and the remaining areas rely on septic tanks and soak pits. The only sewage treatment plant in Dhaka city moves barely 15% of the sewage. Apart from Dhaka North and South City corporations, there is no structured form of solid waste management in the cluster, aggravating flooding and increasing health hazards. Many ecologically fragile areas are used as dumpsites. The lack of an integrated approach has failed to curb the harmful effects of improper solid waste management.

Governance and Public Sector Management

85.   There is large scope for improving the ease of doing business in Dhaka in comparison with India, Mexico, the PRC, and the Russian Federation, or the best in the world. Per the World Bank's *Doing Business 2017* report, Dhaka lags on most business indicators (Table 3). It fares relatively poorly in getting electricity, registering property, getting credit, trading across borders, enforcing contracts, and resolving insolvency.

86.   The Dhaka urban cluster is governed by a host of government authorities and organizations including city corporations, municipal councils, and many specialized institutions under the central government. The urban institutions lack resources and autonomy and face a high level of fragmentation. The most pressing governance issue is the lack of coordination in decision-making, planning, implementation, and maintenance of public services. This has led to unplanned development, duplication of activities, and incomplete development projects.[1]

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[1]   In 2003, the World Bank withdrew nearly 50% of the $220 million allocated for the development of transport infrastructure in Dhaka due to lack of coordination between the Dhaka City Corporation and the Roads and Highways Department.

Table 3: Dhaka: Doing Business Scores across Various Indicators
(on a scale of 100)

Indicator	Dhaka	India (Mumbai and Delhi)	People's Republic of China (Beijing and Shanghai)	Mexico (Mexico City and Monterrey)	Russian Federation (Moscow and St. Petersburg)	Best Performer Globally
Starting a business	81.74	74.31	81.02	85.74	93.57	99.96 (New Zealand)
Dealing with construction permits	61.6	32.83	48.52	69.79	65.86	87.40 (New Zealand)
Getting electricity	16.17	85.09	68.73	68.32	84.37	99.88 (Republic of Korea)
Registering property	27.58	50.00	76.15	61.05	90.55	94.46 (New Zealand)
Getting credit	25.00	65.00	60.00	90.00	65.00	100.00 (New Zealand)
Protecting minority investors	56.57	73.33	45.00	60.00	60.00	83.33 (New Zealand)
Paying taxes	55.56	46.58	60.46	65.81	82.96	99.44 (United Arab Emirates)
Trading across borders	34.86	57.61	69.13	82.09	57.96	100.00 (10 economies)
Enforcing contracts	22.21	35.19	77.98	67.01	74.96	84.15 (Republic of Korea)
Resolving insolvency	27.02	32.75	55.82	73.11	56.69	93.89 (Finland)

Source: World Bank, *Doing Business 2017,* 14th edition.

Finance

87.   The Rajdhani Unnayan Kartripakkha or the Capital Development Authority was established in 1987 to develop, improve, and manage the city of Dhaka along with its peripheral areas through a process of development planning and development control. Although it is the development planning agency for the metropolitan region, sectors like water and sanitation, transport, power, telecommunication, law and order, and export promotion have their own implementing authorities.

88.   The Dhaka urban cluster lacks a regional and/or metropolitan development authority that can plan and aid financing of large-scale cluster-wide development projects, utilize innovative mechanisms for raising finance from the private sector and donor agencies, as well as capture value from the development brought about in the region.

Climate and Environment

89.   The Dhaka urban cluster is prone to erratic rainfall, flood and waterlogging, and waterlogging-induced health outbreaks. More than 60% area of Dhaka is a flood-risk zone. Low-lying floodplains in the eastern part of Dhaka, where most of the urban expansion is taking place, are submerged during the monsoon. Filling of water retention areas and drains, encroachment of rivers and canals, and internal drainage congestion complicate matters further.

90.   Air quality of the Dhaka urban cluster is also a major concern. During the dry season from November to March, the density of airborne particulate matter averages as high as 463 micrograms per cubic meter. Vehicular emissions and brick making account for about 40% of Dhaka's fine-particle air pollution. Other sources of air pollutants include burning of biomass, combustion during industrial processes, construction sites, and tanneries. An estimated 15,000 premature deaths and several million respiratory illnesses can be attributed to poor air quality in the metropolitan region.

1.   Evolving Priorities

91.   The Dhaka urban cluster holds the potential for developing into a successful metropolitan region. Expanding the core area of investment beyond Dhaka to include regional centers, especially Gazipur, Narayanganj, and Savar, can help realize potential synergies to benefit from agglomeration economies. Boosting the development of these areas as economic and industrial centers will require planning for urban and industrial infrastructure projects along with an implementation road map.

92.   Based on these objectives and the analysis in the previous section, the critical areas for investment in economic development, infrastructure, governance, and climate and environment in the Dhaka urban cluster are summarized in Table 4 toward the end of this paper.

93.   Special incentives for regional and subregional specialized centers identified by the government as nodes for development and high-skilled employment could include the creation of exclusive economic zones, tax holidays and/or exemptions, duty-free imports, and credit facilities. Focusing the urban core on ICT and other services industry, and locating woven garments, leather and footwear, and other manufacturing in the cluster components will disperse the core's load, provide greater agglomeration economies, and reduce enterprise costs. Other crucial support could come from reducing traffic congestion; improving cluster connectivity; providing affordable housing; redeveloping slums; improving water, sanitation, and solid waste management; green vehicles; and integrated disaster management. A strong and democratic regional and/or metropolitan institution, an integrated governance strategy, utilization of innovative financing mechanisms, and an improved business environment will attract investment and promote growth.

V.   OTHER EMERGING URBAN CLUSTERS

94.   Besides the relatively mature urban clusters of Mumbai, Delhi, and Dhaka, six other agglomerations in South Asia have the potential to develop as urban clusters in the next decade—with Pune, Bengaluru, Chennai, Ahmedabad, Colombo, and Kathmandu as their relatively well-developed cores.

95.   Compared to stand-alone cities of similar size and population, these emerging cluster cities are surrounded by one or smaller but fast-growing cities, which make up the cluster components.

A.   The Core Cities

1.   Pune

96.   The Pune urban cluster is comprised of the city of Pune as the urban core, well complemented by the city of Pimpri-Chinchwad as a cluster component, 15 kilometers apart. The total population of the cluster is about 5 million (Figure 5). Pune has emerged as a strong hub for manufacturing and services. Pimpri-Chinchwad has developed as an industrial city in the last 2 decades. The two components are governed by their respective municipal corporations: Pune Municipal Corporation and Pimpri-Chinchwad Municipal Corporation.

Figure 5: Pune Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core
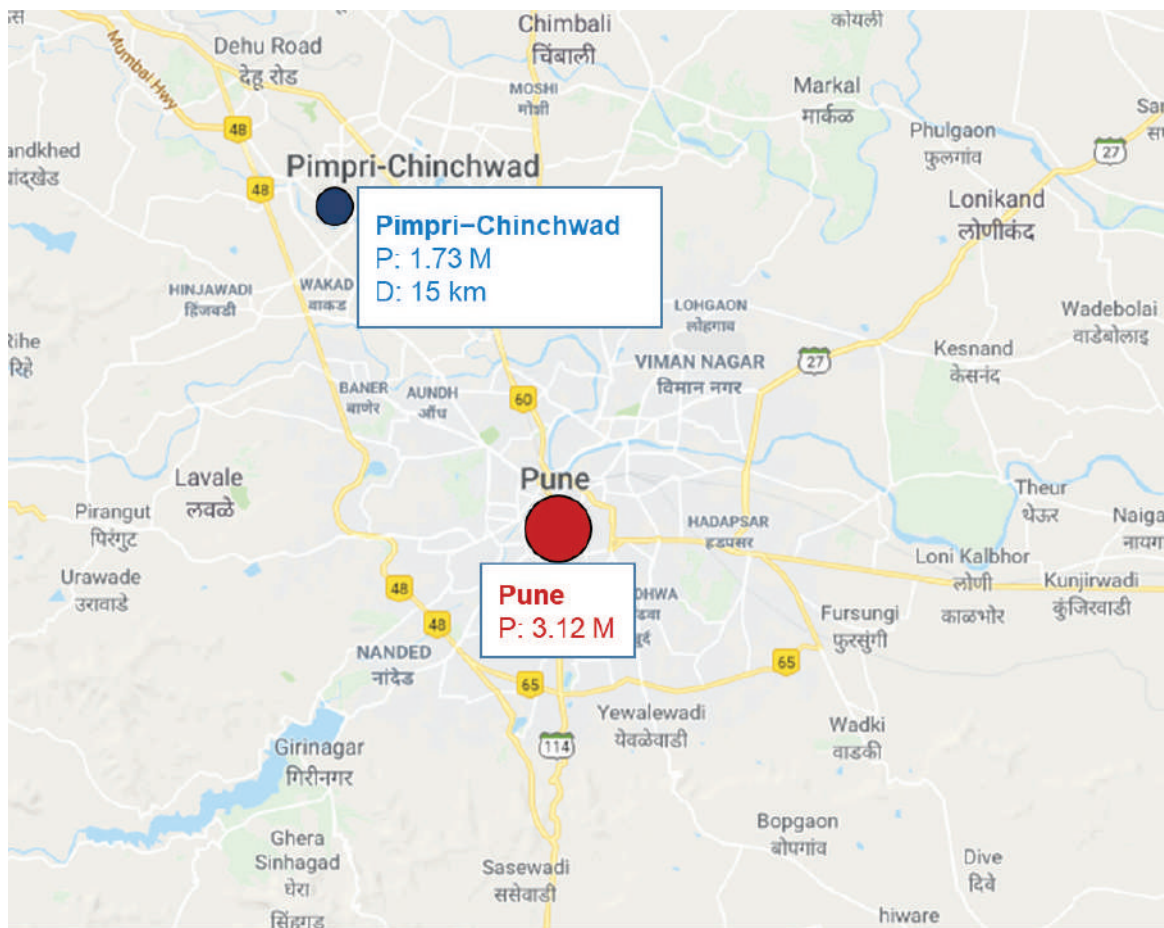
D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

2.   *Bengaluru*

97.   The Bengaluru urban cluster is comprised of Bengaluru (as the urban core), which is surrounded by the seven municipal councils of Doddaballapura, Devanahalli, Hoskote, Hosur, Anekal, Ramanagara, and Nelamangala (Figure 6). This cluster is heavily dominated by the core (both in terms of population and economic growth) while the cluster components serve as satellite cities.

Figure 6: Bengaluru Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core

D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

3.   Ahmedabad

98.   The Ahmedabad urban cluster is comprised of Ahmedabad city (as the urban core) and the cities of Gandhinagar (Municipal Corporation) and Sanand (municipality). The Gujarat International Finance Tec City (GIFT City), which is under construction, has also been included in the urban cluster as it has the potential to contribute to the economic growth of the cluster in the next decade (Figure 7).

Figure 7: Ahmedabad Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core

D = distance by road, GIFT City = Gujarat International Finance Tec-City, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

4.   *Chennai*

98.   The Chennai cluster has a population of close to 8 million and is comprised of Chennai city as the urban core (governed by the Greater Chennai Municipal Corporation), which is surrounded by the five municipalities of Avadi, Poonamallee, Pallavaram, Tambaram, and Tiruvallur. Like the Bengaluru urban cluster, the Chennai cluster is heavily dominated by the urban core (both in terms of population and economic development) with the other cities in the cluster serving as satellite cities to Chennai (Figure 8).

**Figure 8: Chennai Urban Cluster: Cluster Core and Major Cluster Components
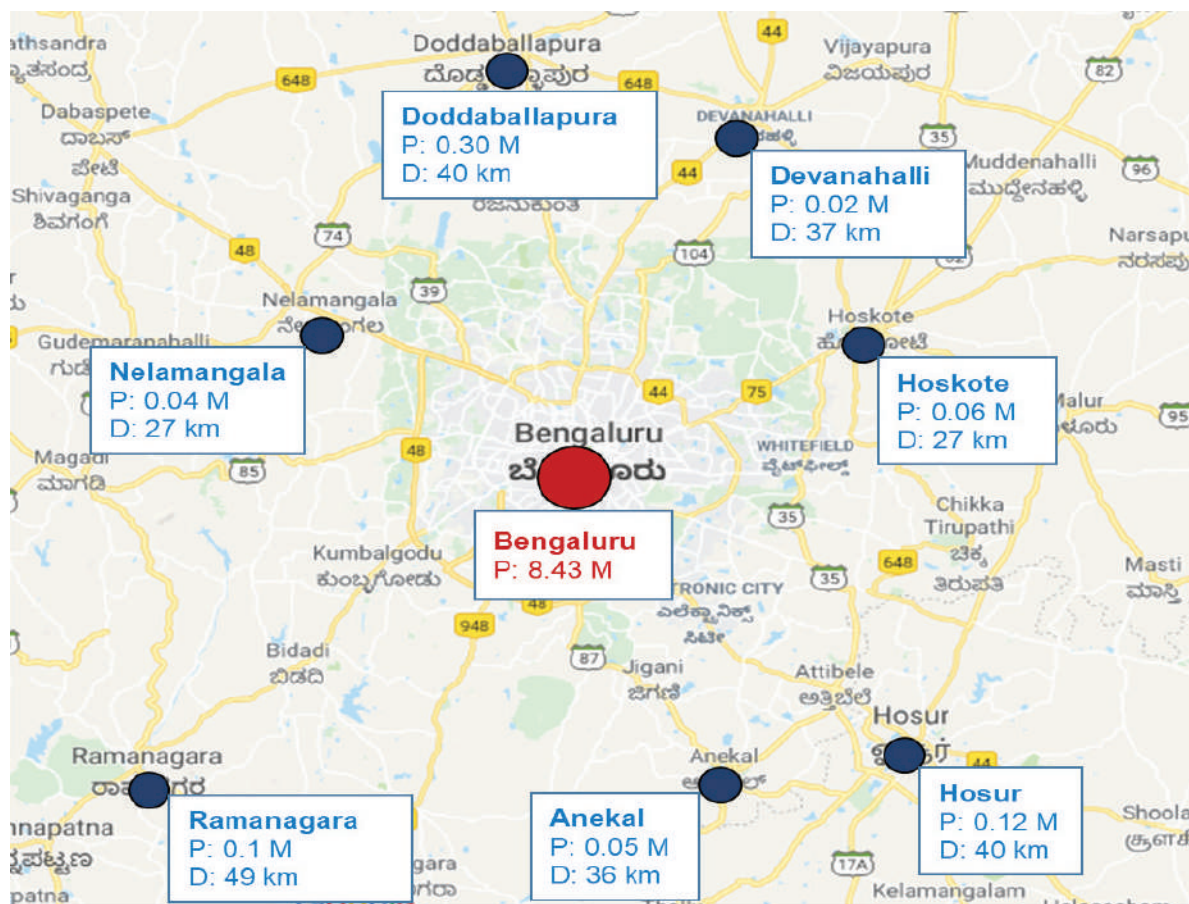with Population and Distance from the Core**

D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

5.   Colombo

100.   The Colombo urban cluster is comprised of the city of Colombo as the urban core (municipal council) surrounded by the municipal councils of Sri Jayawardenepura Kotte, Dehiwala–Mount Lavinia, Kaduwela and Moratuwa as well as the urban councils of Kolonnawa and Maharagama (Figure 9). The Colombo Metropolitan Region is the most densely populated urban region of the country. The high-density western part of the Colombo district is categorized as the Colombo urban cluster in this paper.

Figure 9: Colombo Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core
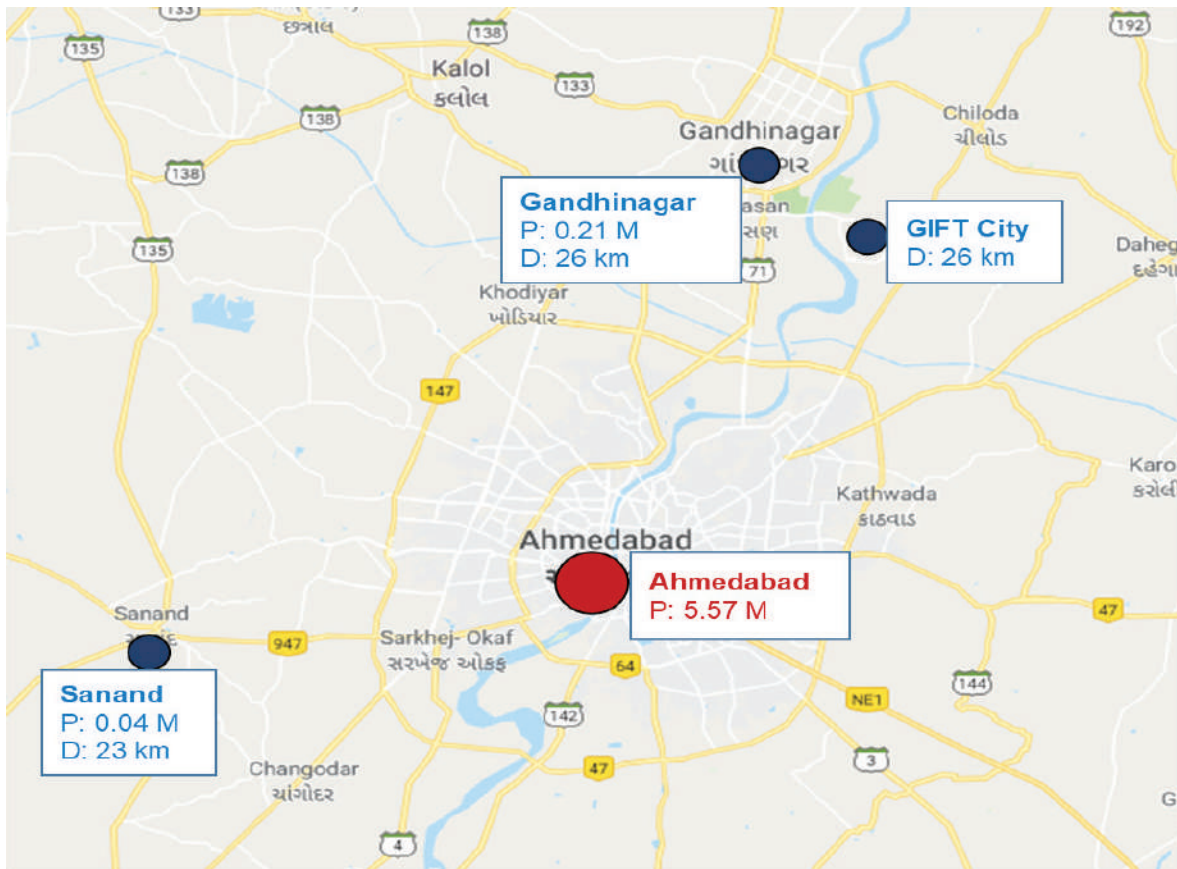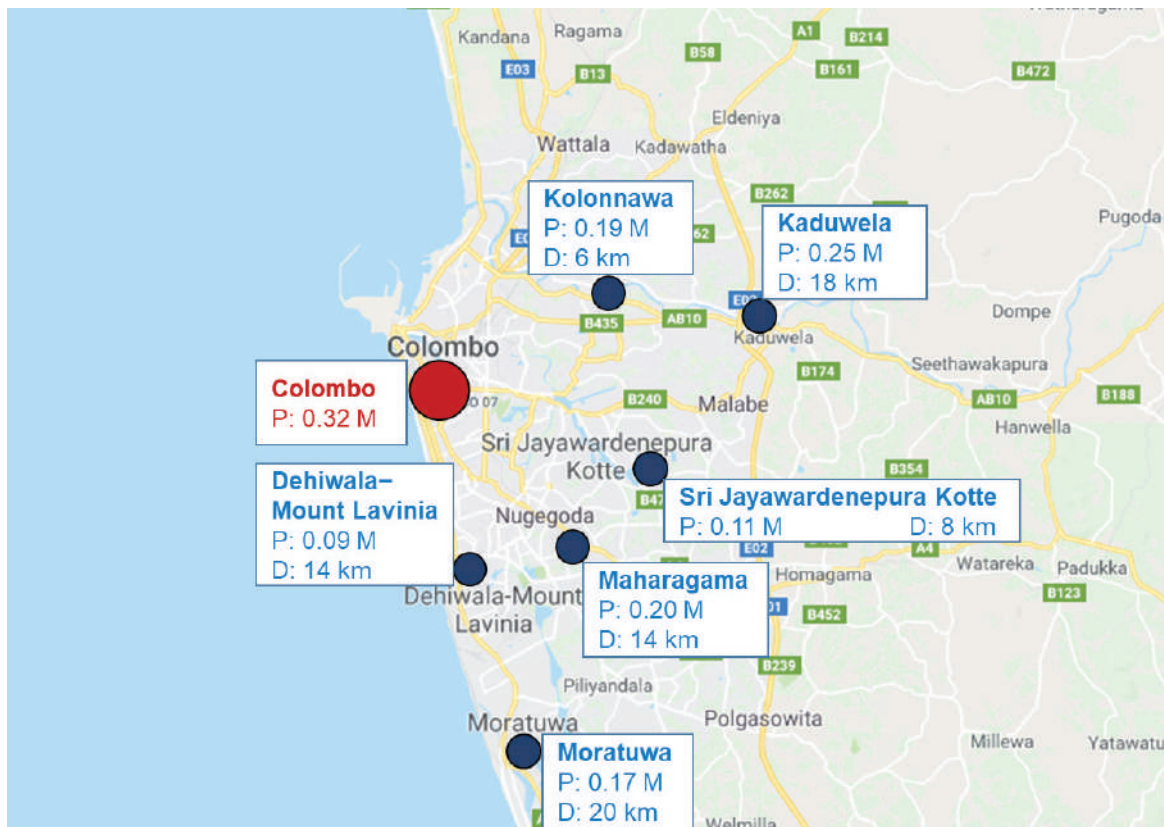

D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

6.   Kathmandu

101.   The Kathmandu urban cluster is in a nascent stage and is comprised of the Kathmandu Metropolitan City (as the urban core) and the Lalitpur Metropolitan City as a cluster component (Figure 10).

Figure 10: Kathmandu Urban Cluster: Cluster Core and Major Cluster Components with Population and Distance from the Core
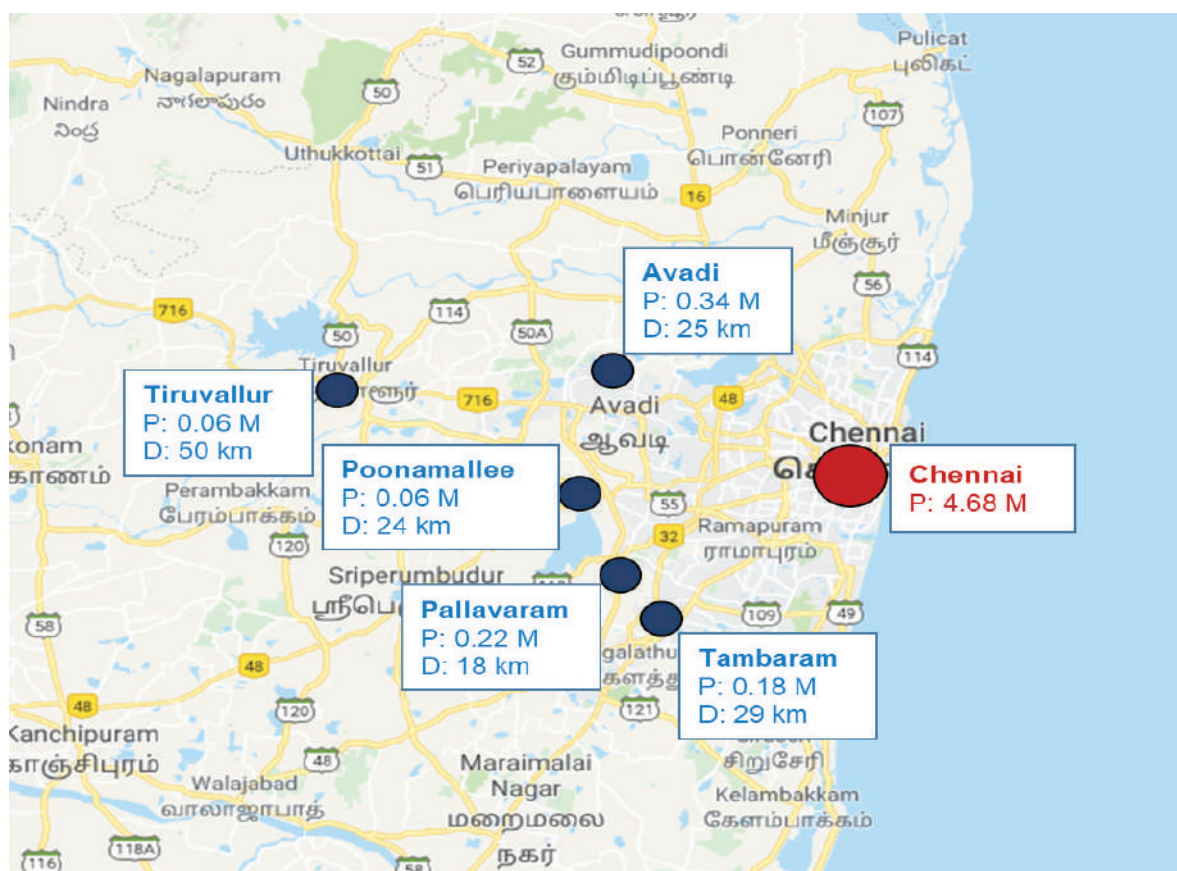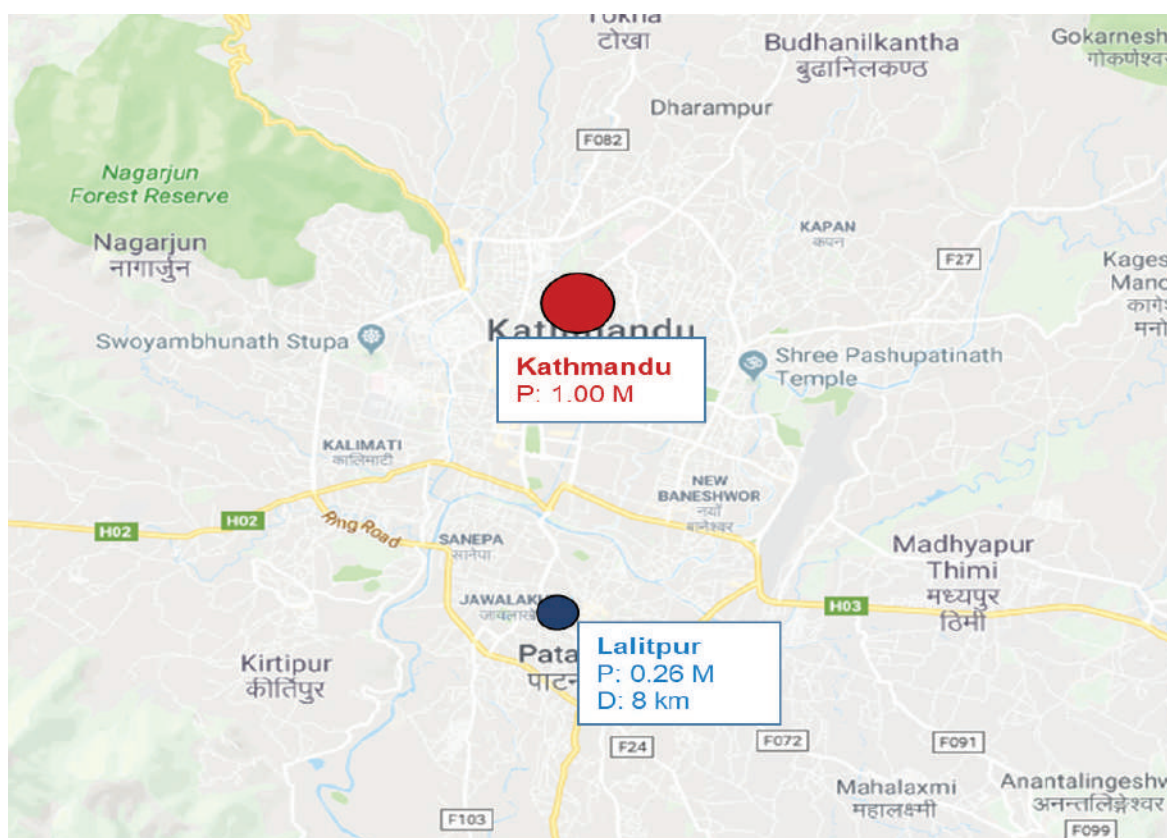
D = distance by road, M = million, P = population.
Map data: Google (extracted on 25 May 2018).

B.   Evolving Development Priorities

102.   Clusters thrive where sufficient resources and competencies amass and reach a critical threshold giving them a decisive sustainable competitive advantage over stand-alone cities. To realize the full benefits of agglomeration economies, the cluster components need to complement each other, attract a diverse labor pool, and be well connected to tap into these network effects.

103.   Unlike the corrective measures proposed for mature urban clusters (Mumbai, Delhi, and Dhaka), strategic investment in the emerging urban clusters should focus on facilitating proactive and preventive measures. For this, we consider the broad themes of (i) economic development; (ii) connectivity and urban infrastructure and services; (iii) governance; (iv) environmental protection, climate resilience, and disaster preparedness; and (v) finance. A summary of investments needed in emerging urban clusters is presented in Table 4 toward the end of this paper.

Economic Development

104.   In an urban context, population density can be considered a parameter for gauging the level of economic opportunities available. Except for Pune and Colombo, the core tends to have a population concentration of at least 80%. This implies that most investments, economic activities, and development are concentrated in the core. However, the pattern of economic development needs to be well balanced with employment opportunities spread out across the cluster. This implies a focus on development of growth nodes around the core city by making the best use of local resources to generate economic activity. For example, the tertiary sector, which is generally less land intensive, can be concentrated in the urban core while the secondary sector can be supported in the cluster components around the core.

105.   More broadly, the emerging clusters need to take proactive steps for attracting human capital and investments based on the unique strengths of each cluster component:

- location;
- primary economic activity;
- public and private sector investments;
- level of rail, road, port, and air connectivity;
- level of urban infrastructure and services;
- skilled labor availability;
- reliability of power supply;
- availability of internet and telecommunication services;
- landownership (government or private) and land costs;
- available natural resources; and
- growth potential.

106.   Once the strengths of each component are mapped, an economic plan aimed at generating positive synergies by integrating the strengths of each component can be prepared. For example, the land allocation strategy of the cluster should be aligned to the economic plan because effective land-use policies can facilitate the spatial spread of economic activities. The local economic development policy for each cluster component can then be developed keeping the overall cluster development strategies and growth plans in perspective. Regulatory changes will be required, and incentive schemes launched to attract industrial investment outside the core.

107.   The travel and tourism sector accounts for 7.5% of the GDP of Nepal and more than 11% of the GDP of Sri Lanka. Kathmandu and Colombo act as tourist destinations themselves and are major ports of entry into their respective countries. Therefore, initiatives related to enhancement of tourism infrastructure can be undertaken, such as accommodation facilities, fast and convenient connections to major points of interest, and effective marketing of tourist destinations.

108.   Setting up a regional database in each emerging cluster to provide transparent, accessible, and updated data would be an attractive option for private industries and investors. These databases

could house data across regions and over time, including demographic data (population, workforce, and socioeconomic characteristics), economic data (existing and upcoming investment destinations in the cluster, sectoral employment trends, and types of industries), cluster connectivity details (rail, road, water, and air), and availability of natural resources and physical data (region topography, hydrology, soil characteristic, etc.).

Infrastructure Services

109.   Good quality infrastructure and service delivery are important for attracting investments and human capital to the core and the cluster components. Seamless connectivity through, for example, an efficient public transportation system, can ensure the success of economic centers around the urban core. Construction of urban infrastructure such as dams, water treatment plants, and sewage treatment plants would have a positive impact on the socioeconomic conditions in the entire cluster. An integrated solid waste management plan for each urban cluster can be combined with increasing public awareness, collaborating with the private sector, and eliciting support of community-based organizations for decentralized small waste treatment. Affordable housing, coupled with other urban services, would create an economic pull factor for human capital toward the prospective growth centers.

Governance and Public Sector Management

110.   Weak governance structures and lack of citizen participation have been the defining features of local governments of most South Asian cities. Key governance issues in urban clusters like Colombo and Kathmandu are lack of capacity and implementation bottlenecks in providing participatory and transparent governance to the residents. The emerging urban clusters of India have much larger core cities and therefore face more complex governance issues with multiple government agencies: poor implementation of SDPs; inadequate powers in the hands of city leaders in addressing citizen complaints (Pune, Bengaluru, Chennai and Ahmedabad); lack of decentralization of SDPs (Pune); inadequate investment in public infrastructure and services (all except Ahmedabad); insufficient application of IT for information dissemination and facilitation of citizen participation (Ahmedabad); and lack of skilled human resources (Bengaluru and Chennai).

111.   Some of these issues can be addressed with a robust framework designed to measure the success of the SDPs against quantitative benchmarks, ensuring adequate institutional capacity to implement and enforce SDPs; monitoring, preventing, and penalizing plan violations; and encouraging participation of both citizens and elected representatives at various government levels. An integrated financial management information system can serve as an urban cluster resource–planning platform to explore outsourcing of tax and fee collections as well as leverage digital platforms for citizen engagement, measuring citizen satisfaction levels and complaint redressal.

112.   An umbrella urban cluster development authority with adequate resources and decision-making powers could be established for undertaking cluster-wide planning and implementation. For clusters that already have such an authority—for example, Bengaluru Metropolitan Region Development Authority and Pune Metropolitan Region Development Authority—studies and discussions can help improve their effectiveness.

Finance

113.   Among emerging urban clusters, Pune and Bengaluru have a taken a lead in financing urban cluster development. Not only have they established regional development authorities, the cities also lead by example in utilizing innovative financing mechanisms.

114.   Recently, Pune successfully raised ₹2 billion for a ₹23 billion water supply project in the country's first municipal bond issue in the last 14 years. The Magarpatta Township Model of Pune is an example of development financing (land consolidation) that developed a self-contained township by making rural farmers a partner in urban development. Similarly, Bengaluru has adopted mechanisms like levying special taxes for capturing the value from its mass rapid transit system and raising beneficiary capital contribution to part-finance the Greater Bengaluru Water and Sanitation Project.

115.   It is important for other emerging urban clusters to constitute regional and/or metropolitan development authorities to plan, oversee, and finance the development of the clusters as well as use instruments such as value capture and development financing mechanisms along with bond issues and tax credits for funding projects.

Climate and Environment

116.   Uncontrolled urbanization often leads to encroachment of ecologically sensitive areas by squatter settlements and economic and domestic activities that cause irreparable damage to the city and its surrounding ecosystem. The economic and infrastructure planning for the clusters along with their land-use strategy should adopt proactive measures to ensure that such areas are protected and that strict regulations place a check on polluting industries and other activities.

117.   Proactive measures for environmental protection can be along the lines of decentralization and relocation of congestion- and pollution-generating activities (e.g., moving wholesale trade markets and polluting industries toward the city periphery), ecologically sensitive planning of industrial estates, regulations for protection of surface water bodies, pollution reduction and active rejuvenation of lakes (e.g., in Bengaluru) and tanks, strict controls on groundwater extraction, initiatives for the reduction of vehicular congestion in the urban cores, and integrated watershed management for the cluster.

118.   Climate risks and natural disasters affect most emerging clusters: Kathmandu is highly susceptible to earthquakes, while Pune, Chennai, and Colombo face severe flooding and waterlogging issues. The Pune and Chennai clusters are also susceptible to public health risks, as outbreaks such as H1N1 influenza, dengue, malaria, and chikungunya spread during floods due to waterlogging. Integrated climate risk and disaster vulnerability assessment studies can identify susceptible areas and estimate potential losses from climate-induced or natural disasters. An action plan with resilience and preparedness initiatives can include a flood monitoring and warning system, effective stormwater management, sensors for weather forecast and rainfall reporting, water level monitoring at critical reservoirs, and flood alert systems.

119.   For climate-resilient infrastructure, cluster special purpose vehicles can raise financing through innovative instruments like green bonds. Financial losses from catastrophic climate risks can be mitigated with pooled insurance and parametric insurance (payout based on agreed parameters on occurrence of an event instead of indemnifying pure loss). Measures to prepare better for climate risks can include raising awareness to insure private properties through voluntary participation; integrating insurance into property taxes or utility bills of vulnerable properties; providing incentives such as premium subsidies and tax deduction benefits to firms that adopt climate risk insurance; mandating insurance of public utilities that have their own revenue-generating streams; insuring critical government-owned assets such as school buildings, hospitals, roads, and flyovers; and providing parametric insurance cover for low-frequency high-impact disasters.

Table 4: Evolving Development Priorities of Identified Urban Clusters in South Asia

Themes/Urban Clusters	Mumbai Urban Cluster	Delhi Urban Cluster	Dhaka Urban Cluster	Emerging Urban Clusters
Economic development	• Development of growth centers and industrial nodes • Improving ease of dealing with construction permits, paying taxes, enforcing contracts, and resolving insolvency	• Development of investment regions • Industrial infrastructure projects • MSME cluster development • Improving ease of dealing with construction permits, registering property, paying taxes, enforcing contracts, and resolving insolvency	• Development of industrial/economic centers • Improving ease of getting electricity, trading across borders, getting credit, registering property, enforcing contracts, and resolving insolvency	• Development of industrial infrastructure for balanced economic development • Encouraging MSME development • Tourism development
Urban infrastructure and services	• Transit network loops development • Affordable housing for low-income groups • Improvement of water supply and sanitation	• Development of mass rapid transit system • Jewar International Airport • Decongestion strategies	• Development of ring roads • Affordable housing finance mechanisms • Improving effectiveness and coverage of water supply sewerage and solid waste management systems	• Development of efficient public transportation system, multimodal interchange hubs, freight terminals, and arterial and radial roads • Construction of dams and treatment plants • Solid waste management plans • Affordable housing
Governance and citizen engagement	• Increase coordination and collaboration • Measures for deterring plan violations, encouraging participatory planning, providing adequate powers in the hands of city leaders, successful implementation of SDPs, and addressing citizen complaints • Mumbai metropolitan chief executive officer • Urban cluster information system	• Measures for deterring plan violations, encouraging participatory planning, providing adequate powers in the hands of city leaders, successful implementation of SDPs, information dissemination, facilitation of citizen participation, and addressing citizen complaints	• Creation of a strong metropolitan development authority • Measures for capacity building of urban institutions, encouraging participatory planning, raising public awareness, and strengthening accountability of service delivery	• Measures for successful implementation of SDPs, provision of adequate powers in the hands of city leaders, addressing citizen complaints, investing in public infrastructure and services, decentralization of spatial development planning, optimum utilization of technology, and facilitation of citizen participation • Regional databases
Finance	• Strengthen regional development authorities/metropolitan development authorities by enhancing their financial responsibilities and capacities to undertake cluster-wide projects • Utilize innovative financing mechanisms like value capture financing, development financing mechanisms, municipal bonds, green bonds, pooled finance bonds, mezzanine funds, etc.			
Environmental protection and climate resilience/ disaster preparedness	• Contour mapping and stormwater management • Integrated climate resilience plan	• Cluster-wide plan for improving air quality	• Improving air quality • Building disaster management capabilities	• Preventive measures to check water pollution and air pollution • Integrating climate resilience and disaster preparedness in development strategy

MSMEs = micro, small, and medium-sized enterprises; SDP = spatial development plan.

Source: Asian Development Bank.

VI. FINANCING URBAN CLUSTER DEVELOPMENT

120.   As discussed throughout this paper, urban clusters benefit from economies of scale and network externalities. Large-scale urban infrastructure projects generally require a wide user base to become economically viable. Adopting an urban cluster approach provides investors the advantage of generating a higher value for money as the infrastructure is shared by a large number of people. In addition, urban clusters can also facilitate industrial infrastructure development in economic corridors where they function as critical nodes on the spine of the corridor by serving as consumption markets, as well as a source of skilled labor and innovation. Therefore, it is important to encourage the development of urban clusters.

121.   To leverage finance for developing urban clusters, governments in South Asia should consider actively involving the private sector as an investor (through bond issuance) and/or as a partner (through public–private partnership arrangements). While local governments of cities comprising the urban cluster are critical partners in conceptualizing and implementing the projects, they may not be the ideal candidates for raising finance. Besides being fiscally weak and constrained, ULBs in a cluster might vary significantly in capacity and influence leading to coordination issues during financing. It is suggested that parastatal agencies of the state governments (in the case of India) or the central government (in the case of Bangladesh, Nepal, and Sri Lanka) should be involved in overall planning, financing, and implementation of the projects envisioned on a cluster-wide scale.

122.   As mentioned previously, some agencies operating in South Asian urban clusters such as MMRDA and the NCRPB are involved in financing projects in the region. However, they are not yet actively involved in tapping into domestic capital markets. Backed by the state or central government, parastatals can raise finance by issuing revenue bonds (for specific projects) and general obligation bonds (at later stages). The Tamil Nadu Urban Development Fund and the Karnataka Urban and Sanitation Pooled Fund are examples of states raising finance in the past for water and sanitation projects spanning multiple ULBs (14 municipalities in the Chennai metropolitan area and 8 in the Bengaluru Metropolitan Area, respectively). Besides bond issuance, urban clusters can collaborate with donor agencies or multilateral organizations for blended financing of projects, which can boost credibility of the project and/or agency. Associating urban clusters with such organizations will also help generate private sector interest by crowding in both investment and expertise, further triggering the development of these clusters.

123.   However, it should be pointed out that the urban clusters are governed by a complex amalgam of authorities that may be politically divided or face jurisdictional and sectoral overlaps. For example, in the Mumbai urban cluster, besides MMRDA, the state government has several other agencies operating with different mandates (e.g., Maharashtra State Road Development Corporation, Maharashtra Industrial Development Corporation, Maharashtra Housing and Area Development Authority, and Maharashtra Jeevan Pradhikaran – Water Supply and Sanitation Department). Lack of a cluster-wide leadership leads to policy conflicts and suboptimal investment decisions. Initiatives at the cluster level have been attempted (like the Mumbai Metropolitan Planning Committee and the Unified Mumbai Metropolitan Transport Authority), but they have not been very effective as the agencies created generally lack resources for financing and implementing the projects that are envisioned.

124.   Therefore, as a long-term reform measure, it is suggested that an additional tier of governance (besides central, state, and local) at the metropolitan level be introduced. This two-tier model of urban governance (city and metropolitan) has been successfully implemented in Tokyo and Seoul, and was also introduced in Barcelona in 2010. This new tier of governance may have its elected representatives

and bureaucracy like the local governments, but with clearly delineated functions and authorities for decision-making (and the power to execute decisions) that benefit the entire cluster or metropolitan region. These metropolitan governments can also leverage private sector finance like local governments through creation of special purpose vehicles. This will ensure holistic development of the entire urban cluster instead of using local governments and state-level agencies as indirect tools to achieve the same objective.

125.   Such a change in the federal structure of a country involves multiple layers of complexity and might not be possible in the short to medium term. Therefore, it is suggested that governments consider giving more powers to regional development authorities and make efforts toward improving their fiscal strength, administrative and implementation capacity, and coordination with other parastatals. Creation of a metropolitan-level database (recording land use, urban services in the region, real estate development, etc.) can be the first step toward more effective governance at the metropolitan level, which can also facilitate infrastructure financing (e.g., reliable land data are required for using land value capture financing tools).

126.   Similar to the Smart Cities Mission, the central government can consider an urban cluster development scheme where seed capital is provided by the central and state governments in the form of grants, and the remaining finances required to meet the shortfall are raised by the metropolitan region development authorities from donor agencies and the private sector. Such a central government-led national program would ensure that urban clusters are proactively identified, guidance is provided to the states for undertaking cluster-level initiatives, clusters compete with each other to attract private sector finance, development progress is effectively monitored, and new urban clusters learn from the experience of mature ones.

VII.   CONCLUDING REMARKS

127.   This paper highlights the importance and advantages of clustered urbanization. It identifies Mumbai, Delhi, and Dhaka as mature urban clusters while Pune, Bengaluru, Ahmedabad, Chennai, Colombo, and Kathmandu are emerging urban clusters in South Asia. These clusters hold the potential to become engines of growth, transforming South Asia into a strong global economic region.

128.   Based on the challenges faced by the identified mature and emerging urban clusters, the paper suggests several investment and reform measures, covering the themes of economic development; infrastructure services; governance and public sector management; finance; and climate resilience and environmental protection. Alternative financing mechanisms include municipal bonds and partnership with the private sector. Upcoming strategies like raising finance via cluster special purpose vehicles and promoting climate risk insurance products are also suggested.

129.   In clusters where umbrella metropolitan development authorities do not exist, state governments should consider establishing them. Where such authorities do exist (e.g., in the Mumbai, Pune, and Bengaluru urban clusters), the state government via these authorities can consider raising capital for financing cluster-related projects. Constructive collaboration and cooperation will be required on the part of the municipal bodies of the cluster cities to successfully implement the projects. To succeed, the state governments would need to equip metropolitan development authorities with enough powers to implement cluster-wide projects.

ANNEX: SHORTLISTING URBAN CLUSTERS

1.   This annex details the process undertaken to shortlist existing and emerging urban clusters in India and other countries in South Asia.

A.   India

2.   We followed a four-step procedure to identify cities in India that hold the promise of successfully developing into urban clusters: (i) cities with populations exceeding 1 million, (ii) cities from the above list that belong to the Government of India's Smart Cities Mission, (iii) the smart cities from this list that fall under any of the five economic and/or industrial corridors, and (iv) shortlisted cities from this list with high-quality educational institutions.

3.   The first step was to identify cities in India with a population of greater than 1 million. Cities with a smaller population were assumed to be too small to qualify as urban clusters. As per the Census of India 2011, there are 53 urban agglomerations in India with a population of 1 million or more. These cities were classified into four groups based on their population (Table A1).

Table A1: Group Classification Based on Population

Group	Population Range
Group I	Greater than 10 million
Group II	5 million to 10 million
Group III	2 million to 5 million
Group IV	1 million to 2 million

Note: Information classification based on population done for the purpose of this study.

4.   The second step was to shortlist the smart cities from the above selection. The government has identified 99 cities to be developed under its Smart Cities Mission by the Ministry of Housing and Urban Affairs. As part of this initiative, the central government would provide around ₹5 billion per Smart Cities Mission city over a period of 5 years. State governments and/or urban local bodies would also be required to match an equal amount, taking the total government allocation for each city to ₹10 billion. The city can generate additional funding by convergence of other central and state government schemes such as Atal Mission for Rejuvenation and Urban Transformation, Swachh Bharat Mission, Heritage City Development and Augmentation Yojana, Digital India, Skill India, Housing for All, and so on. Such a vertical fiscal transfer by central and state governments lends credibility and makes these cities attractive propositions for external financing. Of the 53 cities with more than 1 million population, 35 belong to the Smart Cities list.

5.   The third step was to further narrow the selection of cities to those under the government's ongoing projects on five major industrial and/or economic corridors to boost manufacturing in line with its Make in India mission (Box A1):

- East Coast Economic Corridor (ECEC),
- Amritsar–Kolkata Industrial Corridor (AKIC),
- Delhi–Mumbai Industrial Corridor,
- Bengaluru–Mumbai Economic Corridor (BMEC), and
- Chennai–Bengaluru Industrial Corridor (CBIC).

> **Box A1: Economic Corridor Development Approach**
>
> Economic corridors are conceptualized along a spine formed by a highway or a railway line, and involves the development of industrial and urban nodes in the influence area of the spine. Therefore, economic corridors have three complementary components: a transport corridor, industrial production clusters, and urban centers. The urban centers that develop in such corridors serve as markets for goods manufactured in the industrial clusters as well as act as a source of labor, knowledge, technology, and innovation for them. If **proximate** to thriving industrial centers, such urban centers have the possibility of transforming into urban clusters in the future.
>
> Economic corridors work on the principle of linking production centers, urban centers, and international gateways for export, thereby facilitating efficient trade and investment. Improving access to markets by easing bottlenecks helps enhance overall productivity and competitiveness of a region. Development of economic corridors presents an opportunity to synchronize the process of urbanization and industrialization.
>
> Economic corridors are a critical component in the development of the secondary sector in India. Taking this into consideration, this study shortlisted only those urban agglomerations that fall under the influence area of a proposed economic corridor. All the urban clusters that were analyzed (Mumbai, Delhi, Pune, Bengaluru, Chennai, and Ahmedabad) are critical nodes in the proposed corridors and are expected to play a major role in the success of the program. Additionally, Dhaka falls under the influence area of the Bangladesh–People's Republic of China–India–Myanmar Economic Corridor. Therefore, financing the development of urban clusters will be in harmony with development of the economic corridors. As these urban clusters develop and reap the benefit of economies of scale, they will strengthen their position as critical nodes and international gateways and contribute to the success of economic corridors.
>
> Source: Asian Development Bank, Scaling New Heights: Vizag–Chennai Industrial Corridor, India's First Coastal Corridor (2016).

6.   Industrial and/or economic corridors catalyze industrial clustering, increased employment, and expansion of agglomeration economies. Such development in and around the cities falling under the influence of these corridors would trigger migration leading to both economic and demographic expansion of the clusters. To be successful, regional economic corridors need strong domestic roots.

7.   The fourth step to finalize the shortlist of cities was the presence of high-quality educational institutions. These institutions can facilitate investment in the clusters as they act as sources of highly skilled human capital as well as research on advanced technologies and patents. For this study, the top 50 institutions as per the National Institutional Ranking Framework 2017 published by the Ministry of Human Resource Development, Government of India, were considered. The methodology of the ranking framework considers five key parameters: (i) teaching, learning, and resources; (ii) research and professional practices; (iii) graduation outcomes; (iv) outreach and inclusivity; and (v) perception.

8.   The steps described above yielded a shortlist of nine cities from India. Table A2 summarizes the preliminary shortlist.

Table A2: Shortlisting of Indian Cities (Preliminary)

No.	Group	Urban Agglomeration	State	Population in Millions (Census 2011)	Part of Smart Cities Mission	Economic Corridor Influence Area	Presence of Top 50 Educational Institution(s)	Shortlisted
1	Group I	Mumbai	Maharashtra	18.41	X	✓	✓	Yes*
2		Delhi	Delhi	16.31	✓	✓	✓	Yes
3		Kolkata	West Bengal	14.11	X	✓	✓	No
4	Group II	Chennai	Tamil Nadu	8.70	✓	✓	✓	Yes
5		Bengaluru	Karnataka	8.50	✓	✓	✓	Yes
6		Hyderabad	Telangana	7.75	X	X	✓	No
7		Ahmedabad	Gujarat	6.35	✓	✓	✓	Yes
8		Pune	Maharashtra	5.05	✓	✓	✓	Yes
9	Group III	Surat	Gujarat	4.59	✓	✓	X	No
10		Jaipur	Rajasthan	3.05	✓	✓	X	No
11		Kanpur	Uttar Pradesh	2.92	✓	✓	✓	Yes
12		Lucknow	Uttar Pradesh	2.90	✓	✓	X	No
13		Nagpur	Maharashtra	2.50	✓	X	X	No
14		Ghaziabad	Uttar Pradesh	2.38	X	✓	X	No
15		Indore	Madhya Pradesh	2.17	✓	X	✓	No
16		Coimbatore	Tamil Nadu	2.14	✓	X	✓	No
17		Kochi	Kerala	2.12	✓	X	X	No
18		Patna	Bihar	2.05	✓	✓	X	No
19		Kozhikode	Kerala	2.03	X	X	X	No
20	Group IV	Bhopal	Madhya Pradesh	1.89	✓	X	X	No
21		Thrissur	Kerala	1.86	X	X	X	No
22		Vadodara	Gujarat	1.82	✓	✓	X	No
23		Agra	Uttar Pradesh	1.76	✓	X	X	No
24		Visakhapatnam	Andhra Pradesh	1.73	✓	✓	X	No
25		Malappuram	Kerala	1.70	X	X	X	No
26		Thiruvananthapuram	Kerala	1.68	✓	X	✓	No
27		Kannur	Kerala	1.64	X	X	X	No
28	Group V	Ludhiana	Punjab	1.62	✓	✓	✓	Yes
29		Nashik	Maharashtra	1.56	✓	✓	X	No

Table A2 *continued*

No.	Group	Urban Agglomeration	State	Population in Millions (Census 2011)	Part of Smart Cities Mission	Economic Corridor Influence Area	Presence of Top 50 Educational Institution(s)	Shortlisted
30		Vijayawada	Andhra Pradesh	1.48	X	✓	X	No
31		Madurai	Tamil Nadu	1.47	✓	X	X	No
32		Varanasi	Uttar Pradesh	1.43	✓	✓	✓	Yes
33		Meerut	Uttar Pradesh	1.42	X	✓	X	No
34		Faridabad	Haryana	1.41	✓	✓	X	No
35		Rajkot	Gujarat	1.39	X	X	X	No
36		Jamshedpur	Jharkhand	1.34	X	X	X	No
37		Jabalpur	Madhya Pradesh	1.27	✓	X	X	No
38		Asansol	West Bengal	1.24	X	✓	X	No
39		Vasai-Virar	Maharashtra	1.22	X	X	X	No
40		Allahabad	Uttar Pradesh	1.21	✓	✓	X	No
41	Group IV	Dhanbad	Jharkhand	1.20	X	✓	X	No
42		Aurangabad	Maharashtra	1.19	✓	X	X	No
43		Amritsar	Punjab	1.18	✓	✓	X	No
44		Jodhpur	Rajasthan	1.14	X	X	X	No
45		Raipur	Chhattisgarh	1.12	✓	X	X	No
46		Ranchi	Jharkhand	1.12	✓	X	X	No
47		Gwalior	Madhya Pradesh	1.12	✓	X	X	No
48		Kollam	Kerala	1.11	X	X	X	No
49		Durg-Bhilainagar	Chhattisgarh	1.06	X	X	X	No
50		Chandigarh	Chandigarh	1.06	✓	X	X	No
51		Tiruchirappalli	Tamil Nadu	1.02	✓	X	✓	No
52		Kota	Rajasthan	1.00	✓	X	X	No

* Mumbai, initially part of the Smart Cities Mission withdrew its candidature. However, two cities in the Mumbai urban cluster (Thane and Kalyan–Dombivli) are part of the mission. Moreover, considering its strategic and economic importance, the urban cluster has been shortlisted for the purpose of this study.

Note: Kolkata was not part of the Smart Cities Mission and therefore did not meet the shortlisting criteria. However, given the historical and economic importance of the city, a preliminary analysis was undertaken by the authors. It was found that the governance framework of the Kolkata Metropolitan Region is highly fragmented. The area is composed of 41 urban local bodies which does not make it a conducive environment with regards to development of a thriving urban cluster. Coordination and collaboration among local governments is pivotal to the success of an urban cluster as every cluster level initiative needs to bring all the affected city governments on board. In addition, unlike Mumbai, none of the component cities of the metropolitan region were part of the Smart Cities Mission.

Sources: Ministry of Housing and Urban Affairs, Government of India; Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India; and Ministry of Human Resource Development, Government of India.

B.   Rest of South Asia

9.   Except India, all the other countries of South Asia (Bangladesh, Bhutan, Maldives, Nepal, and Sri Lanka) demonstrate elements of urban primacy—that is, one large city dominates the urban and economic landscape of the country. Therefore, the largest and most populated city of each country in the rest of South Asia was considered (Table A3).

Table A3: Largest and Most Populated City of Each Country, Rest of South Asia

Country	Largest Urban Agglomeration	Population
Bangladesh	Dhaka	18.9 million[a]
Sri Lanka	Colombo	1.32 million[b]
Nepal	Kathmandu	1.74 million[c]
Bhutan	Thimpu	99,000[d]
Maldives	Malé	133,000[e]

Sources:
[a] Population of Greater Dhaka; Population and Housing Census – 2011, Bangladesh Bureau of Statistics, Government of Bangladesh.
[b] Census of Population and Housing – 2011, Department of Census and Statistics, Government of Sri Lanka.
[c] Population of Kathmandu district; National Population and Housing Census – 2011, Central Bureau of Statistics, Government of Nepal.
[d] Population and Housing Census of Bhutan – 2005, Office of the Census Commissioner, Royal Government of Bhutan.
[e] Population and Housing Census – 2014, National Bureau of Statistics, Republic of Maldives.

10.   Of the abovementioned cities, Dhaka, Colombo, and Kathmandu were shortlisted for the scope of this study as they are rapidly growing urban agglomerations (more than 1 million population) and have significant populations making them strong candidates for urban cluster development. Thimpu and Malé, though important urban centers for their respective countries, are stand-alone cities with relatively small populations and were therefore not considered for the study.

C.   Potential Urban Agglomerations

11.   Combining cities from India and the rest of South Asia, 12 potential urban agglomerations were shortlisted for further analysis. These were grouped into four categories based on their population. The preliminary list of cities is presented in Table A4.

12.   The final shortlist was arrived at by screening the shortlisted 12 cities that satisfy the definition of urban clusters for this study. That is, agglomerations that have

- a core urban center with one or more surrounding urban administrative units (urban settlements),
- urban settlements that are within commuting distance of the core urban center (proximity), and
- urban settlements that demonstrate functional dependency on the urban core center.

13.   The 12 urban agglomerations in the preliminary shortlist were assessed for their level of urbanization. The presence of a municipal corporation and/or municipality around the urban core within 50 kilometers by road with some level of dependency on the core center was chosen as the criterion for

Table A4: Shortlisted Urban Agglomerations (Preliminary)

Category	Cities
Group I	Mumbai
	Delhi
	Dhaka
Group II	Chennai
	Bengaluru
	Ahmedabad
	Pune
Group III	Kanpur
Group IV	Ludhiana
	Varanasi
	Kathmandu
	Colombo

Note: This is a shortlist based on this study.
Source: Authors.

determining the level of urbanization. This helped distinguish urban clusters from stand-alone cities. Urban clusters were found to have urban cores surrounded by one or more urban settlements, while stand-alone cities were isolated urban cores surrounded by semi-urban or rural settlements.

14.   Three cities from the preliminary list of 12 were found to be relatively mature urban clusters having a wide expanse in terms of area and housing a very large population. These were the Mumbai, Delhi, and Dhaka urban clusters. These urban clusters were chosen for in-depth analysis for this study. Additionally, six other cities in South Asia (Pune, Bengaluru, Chennai, Ahmedabad, Colombo, and Kathmandu) formed the core of urban clusters that were relatively nascent (Table A5). However, these clusters have well-developed economic cores with a significant population and are surrounded by small but rapidly growing cities, thereby having potential to generate positive synergies among cluster components (i.e., surrounding urban settlements). Additionally, they have a high likelihood of attracting private sector participation compared to smaller and/or stand-alone cities.

Table A5: Shortlisted Urban Clusters

Urban clusters in South Asia	1. Mumbai urban cluster
	2. Delhi urban cluster
	3. Dhaka urban cluster
Emerging urban clusters in South Asia	1. Pune urban cluster
	2. Bengaluru urban cluster
	3. Ahmedabad urban cluster
	4. Chennai urban cluster
	5. Colombo urban cluster
	6. Kathmandu urban cluster

Note: This is a shortlist based on this study.
Source: Authors.

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Exploring Strategies for Planned Urban Cluster Development in South Asia

This paper examines the concept of urban clusters and explores its application in South Asia. Drawing lessons from international case studies, it highlights the advantages of clustered urbanization. It identifies developments around core cities Delhi, Dhaka, and Mumbai as mature clusters; and Ahmedabad, Bengaluru, Chennai, Colombo, Kathmandu, and Pune as emerging clusters. This paper discusses evolving development priorities for these core cities with regard to economic development, urban infrastructure and services, governance and citizen engagement, finance, and environmental protection and resilience. It also explores strategies for financing cluster development. Planned development of these clusters has the potential to drive regional economic growth.

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