

SECTOR ASSESSMENT (SUMMARY): TRANSPORT

Sector Road Map

1. Sector Performance, Problems, and Opportunities

1. **Urban transport.** Efficient and sustainable urban transport systems and mobility are critical for the smooth functioning of Indian cities. India's urban population has been projected to grow to about 473 million in 2021 from 285 million in 2001.¹ Rapid urbanization has intensified demand for transport in India. From 1981 to 2011, the number of total registered vehicles per annum grew at a rate of 11.7% as compared to 2.0% per annum population growth.² The combination of this rapid urbanization and the increase in the number of registered vehicles has led to serious urban issues, including severe congestion and air pollution.

2. **National Capital Region.** The National Capital Region (NCR), covering 58,000 square kilometers (km), is a coordinated planning region centered around Delhi, a city with nearly 16 million residents. The region encompasses the entire city of Delhi and the surrounding districts from the states of Haryana, Rajasthan, and Uttar Pradesh. The main NCR cities are Delhi, Faridabad, Ghaziabad, Gurgaon, Meerut, and Noida. The NCR is the fastest growing urban agglomeration in India, with a population projected to reach 64 million and an urbanization rate expected to reach 71% (45 million) by 2021.³ The National Capital Territory of Delhi, accounting for 37% of the total NCR population, covers only 4.4% of the NCR area, has rapidly urbanized, and decongestion is needed for harmonized and sustainable development across the NCR.⁴

3. **Traffic demand in the National Capital Region.** Delhi, as the center of the urban agglomeration, sees more than 1 million vehicles cross its borders every day. About a quarter of this traffic is transient (travelling between two locations in the NCR, transiting through Delhi), with 45% being cars and 28% being two-wheelers. The number of cars entering Delhi daily from other cities of the NCR is more than the number of cars registered in the city. It is estimated that the total trips will rise to 28 million per day by 2021. The traffic has increased not only with the rise in per capita trip rate but also with the increase of vehicles. About 537 cars and 1,158 two-wheelers are added every day on the roads.⁵

4. **Existing transport network.** The transport system of the NCR consists of a variety of modes, including private and public road transport, a suburban rail system, and metro rail. The existing road network in the region features the convergence of five national highways at Delhi and two at Ghaziabad in Uttar Pradesh. These national highways mostly have four lanes. The rail network of the NCR covers three zonal railways (Central, Northern, and Western Railways) that converge at Delhi. The origin–destination characteristics by mode indicate that public transport commands a total share of 71.5%.

5. Rapid growth and the associated population increase have put severe strain on the transport infrastructure in the NCR. Public transport systems in particular have not kept pace with

¹ Government of India, Ministry of Housing and Urban Affairs, 2006. *National Urban Transport Policy*. New Delhi.

² Government of India, Ministry of Housing and Urban Poverty Alleviation. 2016. [India Habitat III National Report](#). New Delhi.

³ Government of India, Ministry of Housing and Urban Affairs, National Capital Region Planning Board. 2005. [Regional Plan 2021 for NCR](#). New Delhi. The NCR had a population of about 46 million and an urbanization rate of 62.5% in 2011.

⁴ National Capital Region Transport Corporation–National Institute of Urban Affairs. India: Detailed report on Value Capture Financing: Implementation of Transit Oriented Development along Delhi–Ghaziabad–Meerut Regional Rapid Transit System Corridor. Unpublished.

⁵ A. Roychowdhury. 2017. [Congestion on Delhi roads has worsened – says new analysis by CSE of latest Google map data](#). *Centre for Science and Environment*. 10 July.

the rapid and substantial increases in demand over the past few decades, resulting in heavier dependence on private vehicles and paratransit. The level of mobility is very low throughout the NCR. The average mobility index is greater than 1.9 for all the traffic zones.⁶

6. The rapidly growing size of the capital, along with the increasing influx of people from the surrounding areas and inadequate investment in public transport systems, is leading to serious road congestion and urban and environmental issues in Delhi. Delhi's traffic congestion has continued to increase by 7% annually. Congestion has been estimated to annually cost the city \$9.6 billion (approximately 12% of its gross domestic product) in fuel waste, reduced productivity, air pollution, and accidents, as shown in the table below.⁷ Severe congestion has also led to road safety issues. There were 1,591 recorded fatal road accidents in Delhi in 2016, the highest among cities in India with more than 1 million people.⁸ Extreme congestion and lack of space for development have led to skyrocketing property prices and forced the poor and middle-income residents out of central Delhi. This has also brought about the worst air pollution levels globally.⁹ To address these challenges, the NCR Regional Plan has proposed the accelerated development of towns in the region designated as metro and regional centers.

Total Cost Projections of Congestion per Vehicle Mode
(\$ million)

Year	Car	Bus	Two-Wheeler	Total
2015	1,033	7,233	331	8,597
2018	1,288	7,746	493	9,527
2020	1,486	8,282	630	10,398
2023	1,809	8,540	896	11,245
2025	2,074	8,809	1,120	12,003
2027	2,354	9,138	1,410	12,902
2030	2,857	9,731	2,070	14,658

Source: N. Davis et al. 2017. [Congestion costs incurred on Indian Roads: A case study for New Delhi](#). Chennai: Department of Electrical Engineering, Indian Institute of Technology Madras.

7. **Connectivity between Delhi and metro centers.** Meerut, about 77 km northeast of central Delhi, has a population of over 3.5 million and is one of the biggest metro centers within the NCR along with Duhai, Ghaziabad, and Sahibabad. All these cities lie on the northeast corridor on National Highway 24 (Delhi–Ghaziabad), which has the highest traffic volume on the boundary of the National Capital Territory.¹⁰ Most of the existing rail track capacity is dedicated to running long-distance express trains, which cannot serve commuters between Delhi and Meerut. Eight daily passenger train services that commuters can use have very low frequency and suffer from considerable delays because of the low priority accorded to them versus express trains. The travel time from Meerut to Delhi with the existing railway services is more than 2 hours and the line is operating at over 170% of design capacity. National and state highways also connect Meerut and Delhi but are congested and slow, and travel by road takes 3–4 hours each way.

⁶ Government of India, Ministry of Housing and Urban Affairs, National Capital Region Planning Board. 2013. [Functional Plan on Transport for National Capital Region—2032](#). New Delhi. Mobility index is defined as the ratio of travel time (speed determined by the conditions) by the physical route between an origin and a destination and the travel time by distance at the desired speed. A mobility index below 1.5 can be considered as good interregional connectivity. An ideal network is one which provides the most direct route between an origin and destination at the desired speed.

⁷ N. Davis et al. 2017. [Congestion costs incurred on Indian Roads: A case study for New Delhi](#). Chennai: Department of Electrical Engineering, Indian Institute of Technology Madras.

⁸ Government of India, Ministry of Road Transport and Highways. 2017. [Road Accidents in India—2016](#). New Delhi.

⁹ World Health Organization. [Global Ambient Air Quality Database](#) (accessed 15 August 2018).

¹⁰ Government of India, Ministry of Housing and Urban Affairs, National Capital Region Planning Board. 2005. [Regional Plan 2021](#). New Delhi.

8. Thus, the bottleneck for smooth movement of people and goods between Delhi and Meerut has caused the continuous concentration of the NCR's population and economic activities in Delhi, resulting in deteriorating living conditions in the capital. There is urgent need to improve the regional transport system and encourage people to stop migrating to Delhi by offering them the alternative of settling in surrounding cities, especially in the designated metro and regional centers. A fast public transport system is being envisioned as a measure for enhancing connectivity between Delhi and regional centers to help guide the dispersal of urban development to outside of the capital, thus easing urban issues and leading to more balanced development of the NCR as a whole.

2. Government's Sector Strategy

9. **Transport institutions.** In India, while the states and union territories plan, execute, and develop urban transport, in the rail subsector, suburban railways are within the purview of the national railway administration.¹¹ Nevertheless, the Ministry of Railways intends to exit from suburban rail services and plans to have joint participation with state governments through a special purpose vehicle. Therefore, the future of urban transport, including rail, will be entirely the prerogative of the respective state or city administration. In the NCR, the NCR Planning Board, among the statutory and autonomous bodies of the National Ministry of Housing and Urban Affairs, is the overall planning body.

10. **National Urban Transport policy.** The National Urban Transport Policy (2006) of the Government of India has the objective of ensuring safe, affordable, quick, comfortable, reliable, and sustainable access to economic opportunities for the growing population of urban India. For this objective, the policy advocates integrated land use and transport planning, and greater use of public transport. The policy also recognizes the following as key issues for achieving a shift to public transport: (i) quality and pricing of public transport; (ii) integrated public transport systems; and (iii) suitable transport technologies, including heavy rail systems, light rail systems, and bus rapid transit, sourced from across the world for particular situations.

11. **Three-Year Action Agenda.** The Government of India's Three-Year Action Agenda, 2017–2018 to 2019–2020 affirms the centrality of transport and connectivity to the country's economy and society, stating that the transport sector facilitates trade and migration, thereby raising productivity in other parts of the economy.¹² Its recommendations for specific actions include building additional railway infrastructure to augment capacity and connectivity, and enhancing regional connectivity through the development of semihigh-speed trains such as regional rapid transit systems (RRTS) with potential speeds of 160–200 km per hour (km/h) to improve connectivity.

12. **Metro Rail Policy (2017).** This policy lays down norms and guidelines for the development of metro rail projects including regional rail, such as the proposed project which caters to passenger services within a large urban agglomeration or metropolitan area connecting the outskirts to the center of the city. The policy points to the need to explore alternative ways to fund metro rail projects to supplement budgetary resources in view of the rapid urbanization and the imminent need for enhancing urban mobility through rail transport. Specifically, it lists the four prevalent models of financing: (i) 50:50 joint venture between the central and state governments; (ii) full funding by the central government; (iii) complete funding by state governments; and (iv) public–private partnership.

¹¹ Indian Railways operates suburban rail services in Chennai, Delhi, Hyderabad, Kolkata, and Mumbai.

¹² Government of India, National Institution for Transforming India Aayog. 2017. [Three Year Action Agenda 2017–2018 to 2019–2020](#). New Delhi.

13. **Value capture finance policy framework.** Since April 2017, the government has been implementing its value capture financing (VCF) policy for all infrastructure projects to recover the premium that public investments generate for private landowners.¹³ The government has decided that the VCF will be an integral part of the detailed project report for all central government projects. The VCF, which is in use in several countries, is based on the premise that the government makes large investments in developing public infrastructure, which leads to rapid economic development in those areas and a sharp increase in land prices. The VCF policy will enable the government to recover a portion of this value, including through additional taxes and by acting as a realtor, and use the revenue to fund future infrastructure projects in the same area.

14. **National Transit Oriented Development Policy.** The National Ministry of Housing and Urban Affairs issued the policy in May 2017 as a guideline for the central government as well as states and cities for promoting transit-oriented development. Its vision is to transform the current dependence of cities on private vehicles into focusing on public transport, making public transport accessible, and achieving compact walkable communities.¹⁴ Among the principles of transit-oriented development, the policy advocates multimodal integration, last-mile connectivity, universal accessibility to public transport, and high-quality transit systems.

15. **National Capital Region Urban Transport Sector Policy.** The NCR Planning Board prepared the Regional Plan 2021 in 2005, which aims at promoting the economic growth and balanced development of the NCR (footnote 10). To achieve these goals, the plan recognized and reaffirmed the need to address the worsening transportation problem by developing settlements outside the NCT–Delhi metropolis at appropriate distances and providing interconnection between Delhi and the settlements, thus reducing pressure on Delhi’s transport infrastructure. Accordingly, it proposed, among others, connecting the metro and regional centers with the capital through an efficient and effective transport network to facilitate faster movement of traffic among such centers and the NCT–Delhi.

16. **The Functional Transport Plan for NCR-2032.** The plan was prepared by the NCR Planning Board and approved on 11 November 2009 to elaborate on recommendations of the Regional Plan 2021.¹⁵ The plan reaffirmed the importance of efficient and economic transport networks to support balanced regional development through an integrated multimodal transport plan for the NCR, which mainly consists of (i) a hierarchical road network plan with regional expressways and arterial, subarterial, collector, and access roads; (ii) eight RRTS corridors to connect Delhi to its suburbs; (iii) nine other regional rail lines; and (iv) a mass rapid transit system with 14 metro lines in the regional and subregional centers.

17. **Regional rapid transit system.** The RRTS is a rail-based high-speed transit system running on a double-line standard gauge, with a design speed of 180 km/h and an average speed of 100 km/h. Eight corridors have been identified for creating the RRTS network in the NCR, of which three—Delhi–Meerut, Delhi–Alwar, and Delhi–Panipat—share the terminus station at Sarai Kale Khan in New Delhi and are being taken up in the first phase. Asian Development Bank (ADB) financing will be used to develop the Delhi–Meerut RRTS corridor, including railway tracks, station buildings, multimodal hubs, maintenance depots, traction and power supply, and signaling and telecommunications systems.¹⁶ About 20 km of the RRTS line from Partapur to Modipuram will

¹³ Government of India, Ministry of Urban Development. 2017. *Value Capture Finance Policy Framework*. New Delhi.

¹⁴ Government of India, Ministry of Urban Development. 2017. *National Transit Oriented Development Policy*. New Delhi.

¹⁵ Government of India, Ministry of Housing and Urban Affairs, National Capital Region Planning Board. 2013. [Functional Plan on Transport for National Capital Region—2032](#). New Delhi.

¹⁶ ADB financing will not include rolling stock.

be used to run the proposed Meerut metro, originally planned as a parallel line to the RRTS. This section will have six dedicated stations exclusively for Meerut metro operations.

18. The Functional Transport Plan has recommended intense and dedicated management of the RRTS. Subsequently, the National Capital Region Transport Corporation (NCRTC), a joint venture company, was established on 21 August 2013 with equity investment of the Government of India (50%) and the states of Delhi, Haryana, Rajasthan, and Uttar Pradesh (12.5% each). The NCRTC is mandated to implement the RRTS project across the NCR, including supervising its design, construction, and operation and maintenance.

3. ADB Sector Experience and Assistance Program

19. **Urban public transport (rail).** In India, ADB has supported the Jaipur Metro Rail Line 1-Phase B Project to help the city extend its first metro train line and to draw up plans to build a second line.¹⁷ ADB is also financing the Mumbai Metro Rail Systems Project to expand the metro network in the country's largest city.¹⁸ Outside India, ADB has supported and financed the development of railway lines in Ha Noi and Ho Chi Minh City, the two largest cities in Viet Nam.¹⁹ ADB is also financing the Malolos–Clark Railway Project, a new railway connecting Metro Manila and the emerging regional center, Clark City in Pampanga in the Philippines.²⁰ In Bangkok, ADB has extended loans to the private sector proponents for the extension of the metro lines in Thailand's capital.²¹

20. **Rail transport (nonurban).** ADB has financed the Railway Sector Investment Program in India.²² ADB is also supporting electrification of the existing railway tracks across 13 states in the country through its private sector operations.²³ In the People's Republic of China, ADB has supported and financed enhancing energy efficiency and safety of railway lines, developing new lines, as well as improving the capacity of the existing ones. ADB has supported the South Asia Subregional Economic Cooperation Railway Connectivity Investment Program and financed capacity enhancement projects of existing railways as well as a series of tranches of the Railway Sector Investment Program in Bangladesh, while in Sri Lanka, ADB is financing the Railway Efficiency Improvement Project.²⁴

¹⁷ ADB. 2013. [*Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Jaipur Metro Rail Line 1-Phase B Project*](#). Manila.

¹⁸ ADB. 2019. [*Report and Recommendation of the President to the Board of Directors: Proposed Loan to India for the Mumbai Metro Rail Systems Project*](#). Manila.

¹⁹ ADB. 2010. [*Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility to the Socialist Republic of Viet Nam for the Ho Chi Minh City Urban Mass Rapid Transit Line 2 Investment Program*](#). Manila; ADB. 2014. [*Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Loan to the Socialist Republic of Viet Nam for the Ha Noi Metro Rail System Project \(Line 3: Nhon–Ha Noi Station Section\)*](#). Manila.

²⁰ ADB. 2019. [*Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility to the Republic of the Philippines for the Malolos–Clark Railway Project*](#). Manila.

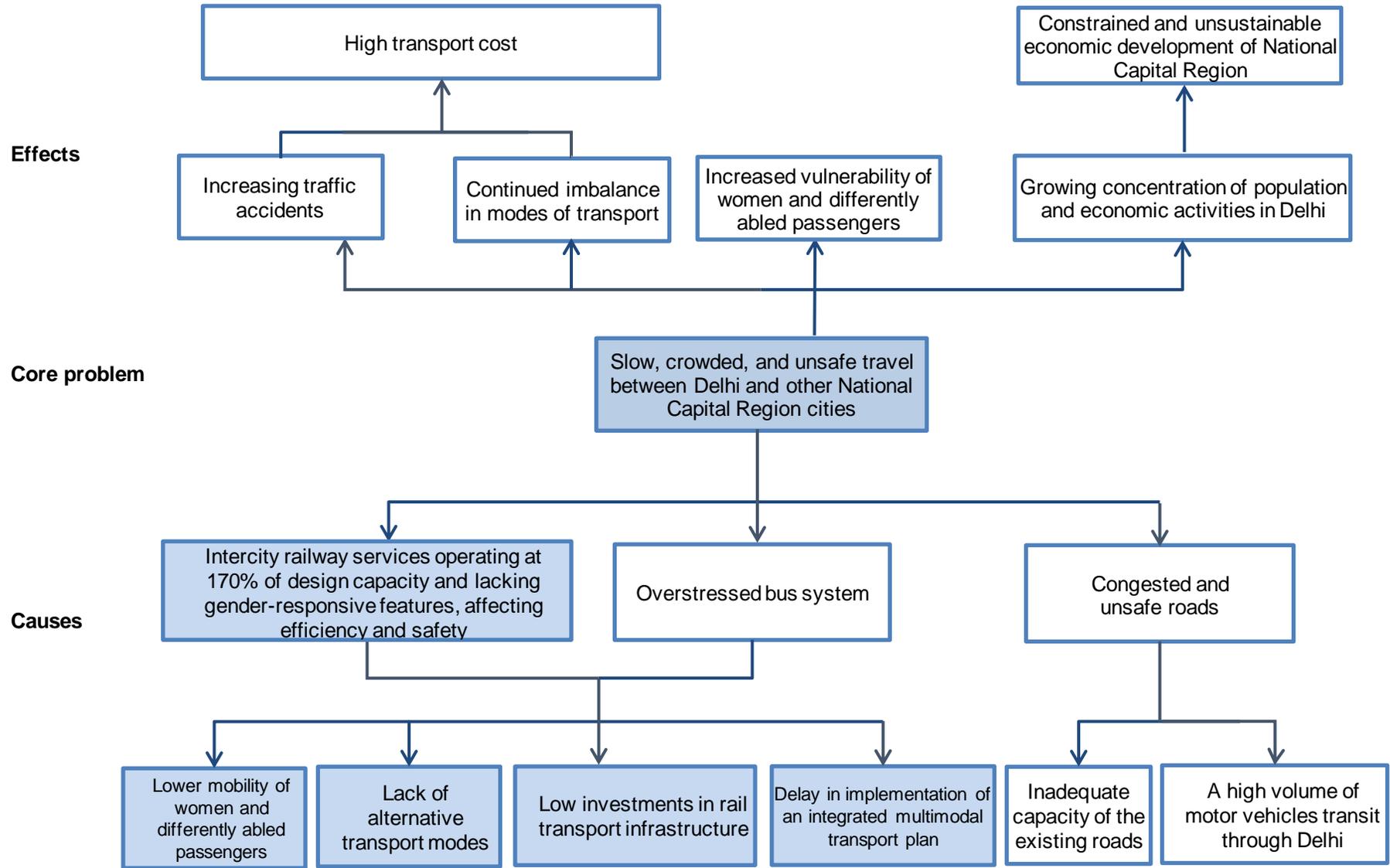
²¹ ADB. 2018. [*Report and Recommendation of the President to the Board of Directors: Proposed Loans to the Northern Bangkok Monorail Company Limited and the Eastern Bangkok Monorail Company Limited for the Bangkok Mass Rapid Transit Project \(Pink and Yellow Lines\)*](#). Manila.

²² ADB. 2011. [*Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility to India for the Railway Sector Investment Program*](#). Manila.

²³ ADB. 2018. [*Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Indian Railway Finance Corporation for the Railways Track Electrification Project*](#). Manila.

²⁴ ADB. 2006. [*Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility and Technical Assistance Grant to the People's Republic of Bangladesh for the Railway Sector Investment Program*](#). Manila; ADB. 2019. [*Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant to the Democratic Socialist Republic of Sri Lanka: Railway Efficiency Improvement Project*](#). Manila.

Problem Tree for Urban Public Transport in the National Capital Region



Directly addressed by the project

Source: Asian Development Bank.