

**New
Development
Bank**

INDEPENDENT EVALUATION OFFICE

REPUBLIC OF INDIA
DELHI-GHAZIABAD-MEERUT
REGIONAL RAPID TRANSIT
SYSTEM

**PROJECT
PERFORMANCE
EVALUATION**

FULL DOCUMENT

JUNE 2026

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केवल महिलायें
Women Only

मोदीपुरम की ओर
Towards Modipuram

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पुनर्व्य स्थान
वेरठ दक्षिण

1 Modipuram की ओर
Towards Modipuram

PREFACE

This report presents the findings of the project performance evaluation undertaken by the Independent Evaluation Office (IEO) of the New Development Bank (NDB) for the Delhi–Ghaziabad–Meerut Regional Rapid Transit System (RRTS) project in India.


The RRTS aims to provide a fast, reliable, safe, and environmentally sustainable regional transport system connecting Delhi with Ghaziabad and Meerut in the neighbouring state of Uttar Pradesh. It addresses critical transport challenges in the National Capital Region (NCR), where rapid urbanisation and economic growth have driven rising travel demand, long commute times, heavy reliance on private vehicles, and severe air pollution, placing sustained pressure on existing transport infrastructure. As India's first high-speed regional rail corridor and the first of a planned RRTS network in the NCR, the project seeks to reshape regional mobility patterns, reduce travel times and vehicular emissions, and support more balanced and sustainable urban development across the region.

The NDB's Board of Directors approved the project on 29 September 2020, with a sovereign loan of USD 500 million becoming effective in December 2020. Proceeds from the NDB loan are being used to finance the cost of: (i) rolling stock; (ii) signalling and train control systems, including platform screen doors; and (iii) civil works for the construction of multi-storied staff quarters and associated facilities.

The evaluation finds the project to be strategically relevant to India's national transport and urban development priorities and technically sound in design. Operational sections have already demonstrated significant reductions in travel time and vehicular emissions, alongside improvements in safety and passenger comfort. The project has also generated employment, supported productivity gains and emerging polycentric development in the NCR, and introduced advanced rail technologies and institutional practices that are new to India's transport sector. However, projected ridership for 2025 was not fully achieved. This reflects slower-than-anticipated progress in operationalising multimodal integration, fare and ticketing interoperability, and first- and last-mile connectivity, which continue to constrain ridership growth.

The evaluation also finds that NDB added value in a timely manner by rapidly approving and processing financing during the COVID-19 pandemic and by relying on country systems for procurement, thereby contributing directly to the *Make in India* initiative. At the same time, it notes scope to strengthen NDB's design and monitoring framework and to deepen engagement beyond financing through greater use of non-lending instruments, including technical assistance and knowledge sharing. Together with the partial loan cancellation, these factors point to opportunities to enhance resource utilisation and developmental additionality in future multi-financier infrastructure operations.

I appreciate the constructive NDB Management Response to this evaluation, included in the report. I trust that this evaluation will help readers understand the lessons learned from this successful RRTS project and provide insights to inform future NDB-financed investments in urban transport and regional connectivity in India and beyond.


Ashwani K. Muthoo
Director General
Independent Evaluation Office



ACKNOWLEDGEMENTS

The Independent Evaluation Office of the New Development Bank expresses its gratitude to all those who have contributed to this evaluation. IEO is grateful to the National Capital Region Transport Corporation (NCRTC), the implementing agency, for its engagement and support throughout the evaluation process. IEO also extends its appreciation to the Government of India, including the Department of Economic Affairs (DEA) in the Ministry of Finance, the Ministry of Housing and Urban Affairs (MoHUA), and the Development Monitoring and Evaluation Office (DMEO) in NITI Aayog, for their engagement and for sharing institutional perspectives that helped situate the evaluation within India's broader urban transport and public policy framework and that informed its alignment with national evaluation priorities.

IEO thanks NDB's Board of Directors for its support and strategic guidance, which helped ensure that the evaluation was appropriately aligned with NDB's mandate. IEO also appreciates the engagement of NDB Management, especially staff from the Indian Regional Office, and other NDB colleagues, who provided relevant documentation, data, and critical insights and comments necessary for a comprehensive assessment of the Bank's contribution to the project.

IEO expresses its appreciation to the Asian Development Bank (ADB) and the Asian Infrastructure Investment Bank (AIIB) for serving as peer reviewers of this evaluation. Their comments at key stages of the process have contributed to strengthening the quality of the evaluation.

The evaluation was conducted under the overall leadership and oversight of Mr. Ashwani K. Muthoo, Director General, IEO. Ms. Nidhi Chaudhary, Evaluation Specialist, IEO, served as Lead Evaluator and was supported by Mr. Indranil Bose (Transport Specialist), Mr. Henrique Pissaia (Principal Professional), Ms. Prajna Naidoo (Evaluation Analyst), Ms. Preeti Prajapati (IEO Intern), and other IEO colleagues. Ms. Jaqueline Rabelo Souza, Evaluation Communication and Outreach Expert, contributed to mission coordination and to the preparation of communications and outreach products, while Mr. John Laird, Evaluation Editor, provided editorial support and quality assurance.

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
BIM	Building Information Modelling
CCTV	Closed-Circuit Television
DEA	Department of Economic Affairs
DMEO	Development Monitoring and Evaluation Office
DMF	Design and Monitoring Framework
DPR	Detailed Project Report
E&S	Environmental and Social
EIRR	Economic Internal Rate of Return
ETCS	European Train Control System
EWCD	Elderly, Women, Children, and Differently Abled
FIRR	Financial Internal Rate of Return
GDP	Gross Domestic Product
IEO	Independent Evaluation Office
INR	Indian Rupee
IRO	Indian Regional Office (NDB)
JFPR	Japan Fund for Poverty Reduction
LTE	Long-Term Evolution
MDB	Multilateral Development Bank
MoHUA	Ministry of Housing and Urban Affairs
MRTS	Mass Rapid Transit System
NCR	National Capital Region
NCRTC	National Capital Region Transport Corporation
NDB	New Development Bank
O&M	Operations and Maintenance
PPF	Project Preparation Fund
PPP	Public-Private Partnership
RRTS	Regional Rapid Transit System
SDG	Sustainable Development Goals
ToC	Theory of Change
TOD	Transit-Oriented Development
USD	United States Dollar
WACC	Weighted Average Cost of Capital

EXECUTIVE SUMMARY

Project background and design

The Delhi–Ghaziabad–Meerut Regional Rapid Transit System (RRTS) project aims to develop a high-speed regional rail corridor with a total length of 82.15 km, linking the National Capital Territory of Delhi with the cities of Ghaziabad and Meerut in Uttar Pradesh. The NDB's Board of Directors approved the project on 29 September 2020, with a sovereign loan of USD 500 million becoming effective in December 2020. The borrower of the NDB loan is the Government of India. The Ministry of Housing and Urban Affairs (MoHUA) is the executing agency, and the National Capital Region Transport Corporation (NCRTC) is the implementing agency. The project is co-financed under a parallel financing arrangement with the Asian Development Bank (ADB) and the Asian Infrastructure Investment Bank (AIIB). As India's first regional rapid transit corridor and a pilot for a larger NCR network, the project represents a high-visibility, high-complexity, multi-financier mega-investment. Its implementation experience therefore offers valuable insights not only for corridor-level mobility outcomes but also for the structuring, coordination and strategic engagement of MDB-supported urban transport operations in India.

Evaluation methodology and process

The evaluation followed internationally recognised evaluation criteria, including relevance, effectiveness, efficiency, impact, and sustainability. As the project is still under implementation, impact and sustainability were assessed but not rated; instead, early-stage evidence was used to assess the project's potential long-term benefits and future performance. In addition, IEO assessed NDB and borrower performance. Furthermore, IEO introduced "equity" as a complementary evaluation criterion, consistent with the development priorities of the Government of India and with the evaluation framework of the Development Monitoring and Evaluation Office (DMEO) of the Government of India. The evaluation employed mixed methods, including document review, semi-structured interviews with key stakeholders, and project site visits. The evaluation was conducted through a structured process comprising an inception phase with preparation of an approach paper, a field mission with stakeholder consultations and site visits, and a mixed-methods evidence review using a contribution-based framework. An interim report was shared with key stakeholders and peer reviewers (ADB and AIIB) to validate emerging findings. The final report was prepared following review of comments, with an audit trail maintained to ensure transparency and methodological rigour.

Project performance

Overall Project Achievement. *Successful*

Operational sections have already demonstrated substantial reductions in travel time and vehicular emissions, alongside improvements in safety, reliability, and passenger comfort. The project has also introduced advanced rail technologies, and the establishment of NCRTC as a capable and permanent implementing and operating entity provides a strong institutional foundation for delivery. However, overall achievement is moderated by limitations. The quality of the NDB's design and monitoring framework (DMF) constrained evaluability. In addition, projected 2025 ridership was not fully achieved. As economic, financial and environmental projections are closely linked to ridership growth, continued attention to demand-side performance will be important to fully realise the project's expected benefits. From an efficiency perspective, while the NDB demonstrated agility by making the loan effective rapidly during the COVID-19 period, its late entry constrained upstream influence on project design and procurement, and the partial loan cancellation reduced overall resource utilisation efficiency.

Relevance. *Successful*

The RRTS corridor is well aligned with India's national and regional transport strategies, sectoral policies, and the Government's broader agenda on sustainable, inclusive, and low-carbon growth. It is also closely aligned with NDB's General Strategies and contributes to the Sustainable Development Goals. The project design and institutional arrangements were technically sound and appropriate to achieving the project's objectives. However, the relevance of the results framework was weakened by shortcomings in NDB's DMF, particularly the absence of measurable indicators for NDB-financed outputs and a clear theory of change linking outputs to outcomes and impact.

Effectiveness. *Successful*

The physical implementation of NDB-financed components has largely progressed as planned. At the project level, approximately two-thirds of the corridor is operational. This provides early evidence of technical viability, replication potential, and institutional capacity-building benefits. However, projected ridership for 2025 was not fully achieved, reflecting slower-than-expected progress in multimodal integration, fare and ticketing interoperability, and first- and last-mile connectivity. As a result, full achievement of outcome targets by 2028 remains uncertain unless coordination among NCRTC, municipal bodies, and local transport agencies improves further.

Efficiency. *Moderately successful*

NDB processed and made the loan effective with exceptional speed during the COVID-19 pandemic, and disbursements broadly followed the semi-annual schedule. The project also maintained strong cost discipline, with no cost overruns. Revised the economic internal rate of return estimates remain above the threshold, although they are sensitive to ridership performance. At the same time, NDB's late entry limited its ability to influence project design, procurement, and financing choices, while the partial cancellation of USD 82 million reduced overall resource utilisation efficiency.

Impact. *Not rated.*

Early evidence points to substantial travel-time savings, productivity gains, improved safety, enhanced accessibility, and lower transport-related emissions through modal shift and energy-efficient operations. The project has also contributed to institutional strengthening within NCRTC, support for polycentric regional development, and advances in gender inclusion and social equity. However, the full realisation of these impacts will depend on corridor completion, stronger ridership growth, and effective multimodal integration. At the same time, localised construction-related disruptions for small businesses and informal vendors, as well as emerging risks of gentrification and displacement linked to transit-oriented development, warrant continued policy attention and appropriate safeguards.

Sustainability. *Not rated.*

Financially, while the project is not expected to be self-financing in the medium term due to subdued ridership during phased operations, it remains fiscally secure under strong sovereign and sub-sovereign support. Institutional sustainability is a major strength, supported by a capable permanent implementing entity, robust governance arrangements, performance-based Operations and Maintenance (O&M) contracts, and scalable systems for future corridors. Environmental and social sustainability are well embedded through mature management systems, regulatory compliance, renewable energy integration, climate-resilient design, and strong safeguards capacity. The main sustainability risks are demand-side, particularly ridership growth, multimodal and feeder integration, and continued public support.

NDB performance. *Moderately successful*

NDB added value in a timely manner by processing the loan rapidly during the COVID-19 period and by relying on country systems for procurement, which also supported the *Make in India* initiative. Supervision arrangements, including a structured mid-term review, helped ensure procedural continuity during implementation. However, NDB's late entry limited its ability to influence project design, and gaps in appraisal and in the results framework reduced evaluability and anticipatory risk management. Limited use of technical assistance and knowledge instruments constrained NDB's developmental additionality, while the restructuring of the Jangpura stabling yard into a public-private partnership—led to a partial loan cancellation, reducing the Bank's operational and strategic footprint.

Finally, comparatively less competitive financing terms and the absence of local or alternative currency options weakened NDB's positioning vis-à-vis co-financiers.

Borrower performance. *Successful*

The project benefited from strong institutional ownership and coordinated leadership by the Government of India, with effective stewardship by the Department of Economic Affairs in the Ministry of Finance, MoHUA, and participating state governments. NCRTC demonstrated high technical and managerial capacity, robust project readiness, strong safeguards and financial management, and the effective use of digital tools. However, physical progress was slower than expected, corridor-level commissioning timelines and explanations for slippages were not always clearly documented, and further improvements are needed in feeder integration, O&M readiness, reporting accuracy, and outcome-level monitoring.

Equity. *Moderately successful*

The RRTS demonstrates a strong commitment to equity in design and early implementation through its alignment with mixed-income catchments, universal accessibility features, gender-responsive safety measures, and targeted inclusion initiatives supported by the Japan Fund for Poverty Reduction grant. The project has also integrated women as active participants in operations and feeder services. However, important gaps remain in the systematic tracking of gender- and vulnerability-disaggregated ridership. In addition, affordability constraints, uneven feeder services, and incomplete multimodal integration may continue to limit access for poorer and more vulnerable users.

Conclusions

The project marks a pivotal moment in India's public transport evolution as the country's first regional rapid transit system. It demonstrates that complex cross-state transport infrastructure can be delivered through strong institutional ownership, coordinated governance, and a technically capable implementing agency. Early operations are already generating travel-time savings, improved safety and comfort, and environmental benefits, while providing a replicable model for future corridors, as well as for other emerging economies pursuing integrated urban-regional transport solutions.

At the same time, the experience also highlights areas requiring greater attention. Ridership is still below projections, mainly because multimodal integration, feeder connectivity, and planned service frequencies have progressed more slowly than required. Weaknesses in the design and monitoring framework, including the lack of a clear theory of change, also reduced evaluability, monitoring quality, and scope for adaptive management.

Although NDB joined the project at a critical moment during the COVID-19 pandemic and processed the loan rapidly, while supporting *Make in India* through the use of country systems for procurement, NDB's role was largely limited to financing pre-defined components rather than shaping the project more strategically. NDB's broader additionality was further constrained by limited use of technical assistance and knowledge support, less competitive financing terms, the absence of local or alternative currency options, and limited coordination among co-financiers. These gaps underscore the need to more tightly integrate financing with robust results frameworks, proactive engagement through non-lending instruments, and coordinated co-financier support in future regional transit investments. Overall, the RRTS illustrates that technically robust infrastructure and strong institutional arrangements provide a solid foundation for transformational mobility outcomes. The experience also highlights the importance of sustained multimodal integration, coherent results frameworks and structured co-financier coordination in maximising long-term development impact.

Recommendations

A. Immediate actions

Recommendation 1: Strengthen multimodal integration and feeder connectivity to enhance ridership performance. The project's economic and financial performance depends heavily on stronger ridership growth. Current ridership remains far below projections, indicating that core enabling conditions for demand generation are still not fully in place. In particular, there are delays in feeder connectivity, interchange readiness, and broader multimodal integration. NCRTC, together with municipal bodies and local transport agencies, should therefore prioritise coordinated action in these areas to unlock the corridor's full ridership potential.

Recommendation 2: Actively facilitate fare and ticketing interoperability through structured inter-agency engagement. Fare and ticketing interoperability is essential to reducing friction in multimodal journeys and improving the convenience of daily travel. NCRTC, in coordination with MoHUA and relevant state and city-level transport authorities, should therefore give greater priority to structured inter-agency engagement to advance practical progress on this front. Even limited pilots at major hubs ahead of full corridor commissioning would help strengthen user uptake even before full corridor commissioning.

Recommendation 3: Phase and prioritise non-fare revenue activation to support early operational cost recovery. The project's near-term financial profile remains sensitive to operational cost recovery during the ramp-up period. In this context, NCRTC could prioritise phased activation of non-fare revenue streams that do not require long-term lock-in. Overall, advancing these scalable and reversible revenue mechanisms during partial operations would help offset early operating costs.

B. Forward looking considerations

Recommendation 1: Mandate an explicit theory of change in project design reports to strengthen project evaluability. The absence of a clear causal logic linking NDB-financed components to project outcomes in the RRTS project significantly undermined evaluability, weakened accountability and obscured the Bank's specific developmental contribution. Future project design documents should clearly include indicators to monitor NDB-financed outputs and articulate how these outputs are expected to generate intermediate results and contribute to higher-level outcomes and impacts.

Recommendation 2: Enhance financial competitiveness through local currency financing and flexible product design. NDB's financing terms were less competitive than those of co-financiers, owing to higher interest margins and the absence of Indian Rupee or Japanese Yen (JPY) lending options. This reduced the Bank's attractiveness in a multi-financier operation. The Bank should therefore explore establishing rupee-denominated funding mechanisms and review its margin structure to ensure it reflects both market conditions and the competitive landscape in multi-financier arrangements.

Recommendation 3: Enhance NDB's technical and institutional support during implementation to strengthen developmental additionality, leveraging the project preparation fund (PPF) where appropriate. IEO recommends that NDB systematically integrate technical and institutional support into project implementation to strengthen developmental additionality beyond financing. This may include utilising the PPF to finance technical studies, innovations or advisory inputs required during implementation or providing targeted technical assistance to borrowers and implementing agencies on system optimisation.

Recommendation 4: Strengthen knowledge management and visibility to capture and disseminate lessons from flagship operations. IEO recommends that NDB institutionalise a knowledge management and visibility framework for flagship and first-of-their-kind projects. This should include:

- (i) systematic documentation of operational and developmental lessons from supervision missions and completion reports;
- (ii) preparation of knowledge products (e.g., case studies, technical briefs, learning notes) jointly with borrowers and co-financiers; and
- (iii) dissemination through public communication, regional seminars, and internal learning platforms.

Recommendation 5: Strengthen institutionalised coordination mechanisms and promote safeguards harmonisation and shared assurance in multi-financier transport projects.

The absence of structured coordination arrangements among MDBs during implementation limited opportunities for joint problem-solving, cross-learning, and strategic alignment on critical issues. In addition, parallel safeguards supervision processes resulted in fragmented documentation, separate review cycles, and missed opportunities for joint assurance and learning. In future multi-financier transport projects, NDB should seek stronger institutionalised coordination and greater alignment of implementation support and safeguards approaches, where feasible.

Recommendation 6: Strengthen upstream and adaptive risk management, including financing flexibility, in complex transport mega-projects.

Risks in mega-projects extend beyond traditional financial and construction risks to include evolving scope decisions, coordination risks across financiers, and demand-side risks linked to phased commissioning and multimodal integration. Going forward, NDB should strengthen both appraisal-stage risk assessment and the capacity to respond adaptively as projects transition from construction to operations. This would enhance the NDB's ability to safeguard resource utilisation and sustain relevance in complex infrastructure investments.

NDB MANAGEMENT RESPONSE¹

The New Development Bank (NDB) Management recognizes the initiative taken and efforts made by the Independent Evaluation Office (IEO) towards the mid-term project evaluation of the Delhi-Ghaziabad-Meerut Regional Rapid Transit System (RRTS) Project in India. The Management, however, notes that the project evaluation was premature since it was conducted even though the project was still under implementation. The Management is of a strong view that evaluation of projects should be done after adequate time has been allowed for projects to demonstrate their full operations and post submission of borrower's project completion report. Project evaluation conducted prior to project completion may lack crucial evidence based data, which may potentially cause inaccurate or inadequate measurement of the project outcomes.

The Management appreciates the IEO's assessments and largely agrees that the key factors for evaluating project performance were considered. Management agrees with the key findings, such as NDB's efficient participation in a landmark project in the country that would serve as a demonstration model, adoption by NDB of demand-driven approach based on "country systems plus" model, and swift loan processing during the COVID-19 pandemic. These findings affirm NDB's progress in establishing a robust project identification and implementation. The Management also agrees that NDB's financial offering may be less attractive than co-financier offerings and is cognizant of the need to identify appropriate measures for offering an enhanced value proposition to the borrowers and implementing agencies.

Please refer below for the detailed Management response.

Immediate actions

Recommendation 1: Strengthen multimodal integration and feeder connectivity to enhance ridership performance.

The project's economic and financial viability is strongly dependent on achieving ridership and system integration targets. Current daily ridership of 40,491 (June 2025) represents only about 21% of the 2025 projection, with uptake remaining concentrated in sections where interchanges with other modes have become operational. The evaluation finds that ridership increased sharply whenever multimodal links were completed — for example, a 151% surge following the Modinagar North extension and a 38% rise after integration with Delhi Metro at Anand Vihar. Strengthening multimodal integration at Sarai Kale Khan, the principal interchange hub linking the RRTS with Indian Railways, interstate bus services, and the Delhi Metro, is therefore critical. Likewise, first- and last-mile feeder connectivity — through organised e-rickshaw networks, shuttle services, and pedestrian facilities — remains incomplete and uneven across stations. Streamlining passenger transfers and coordinating feeder and bus timetables with RRTS services would directly enhance accessibility, reduce transfer times, and improve user convenience. Strengthened coordination among the National Capital Region Transport Corporation (NCRTC), municipal bodies, and local transport agencies to operationalise these measures, alongside timely completion of interchange infrastructure, will be pivotal to unlocking the corridor's full ridership potential and improving progress toward the project's targets by 2028.

Management Response

The NDB Management agrees that multimodal integration and feeder connectivity is necessary and notes that works towards integration of the Project with the existing network of Indian Railways, Metro rail, city bus, interstate bus and informal modes, are underway. Currently, the assessment of ridership performance and multimodal integration is too premature given that significant works are still in progress. This observation reiterates Management's view of the importance of conducting evaluations following the completion of projects, not before.

1 The Management Response to the evaluation recommendations for the Delhi-Ghaziabad-Meerut RRTS Project was received on 25 May 2026.

Recommendation 2: Actively facilitate fare and ticketing interoperability through structured inter-agency engagement.

Fare and ticketing interoperability is a critical enabler of seamless multimodal travel and sustained ridership growth. The evaluation recognises that NCRTC has adopted the National Common Mobility Card and implemented interoperability protocols on the Delhi–Meerut RRTS, thereby ensuring that the system is technically ready for integration with other public transport modes. However, the effective rollout of through-ticketing and interoperable fare arrangements remains dependent on coordination with multiple external transport operators and authorities. In this context, the recommendation is not directed at NCRTC's internal systems readiness, but rather at facilitating inter-agency operationalisation during the ramp-up phase. NCRTC, in coordination with the Ministry of Housing and Urban Affairs and relevant state and city-level transport authorities, should prioritise structured engagement with partner operators to advance revenue-sharing arrangements, backend system alignment, and pilot through-ticketing at key interchange stations. Even limited pilots at major hubs ahead of full corridor commissioning would help reduce user transaction costs, improve convenience for routine commuters, and strengthen early ridership growth. Such facilitative actions would support the project's outcome indicators on accessibility, affordability, and service integration, while recognising the shared governance nature of fare integration in the National Capital Region.

Management Response

The NDB Management notes that this suggestion is already under implementation by NCRTC along with a phased rollout of the corridor and planned to be put in place by the commissioning of entire network.

Recommendation 3: Phase and prioritise non-fare revenue activation to support early operational cost recovery.

The evaluation recognises that NCRTC engaged consultants early to develop corridor-level strategies for commercial development and that financial sustainability has been a core design consideration from project inception. It also acknowledges that the full revenue potential of commercial spaces and transit-oriented development (TOD) depends on corridor maturity and typically requires long-term contractual arrangements that are best concluded closer to, or after, full commissioning. At the same time, the project's near-term financial profile remains sensitive to operational cost recovery during the ramp-up period. In this context, NCRTC could prioritise phased activation of non-fare revenue streams that do not require long-term lock-in, such as interim commercial leasing, station-level retail kiosks, advertising rights, naming and branding opportunities, and temporary commercial uses at major stations including Anand Vihar, Meerut South, and Sarai Kale Khan. Advancing these scalable and reversible revenue mechanisms during partial operations would help offset early operating costs, generate performance data to inform longer-term TOD strategies, and strengthen financial resilience ahead of full corridor commissioning, while remaining fully aligned with extant regulations and planned long-term development pathways.

Management Response

The NDB Management notes that financial sustainability of the network is an integral part of the revenue streams from the project and this approach is appropriately embedded in NCRTC's strategy to maximize non fare box revenue. This is reflected in the IEO's observation about early engagement of consultants for supporting the formulation of strategies for commercial development along the corridor. It is also noted that commercial leasing at some of the stations along the corridor has begun. However, it is important to achieve corridor maturity for maximizing commercial value, as leasing out commercial spaces prematurely may result in sub optimal revenues.

Forward looking considerations

Recommendation 1: Mandate an explicit theory of change in project design reports to strengthen project evaluability.

The absence of a clear causal logic linking NDB-financed components to project outcomes in the RRTS project significantly undermined evaluability, weakened accountability, and obscured the Bank's specific developmental contribution. Future project design documents should clearly include indicators to monitor NDB-financed outputs and articulate how NDB-financed outputs are expected to generate intermediate results and contribute to higher-level outcomes and impacts, explicitly identifying assumptions, interdependencies with co-financed components, and critical enablers required for success. The theory of change should be developed during project preparation through consultative processes involving the borrower, implementing agencies, and co-financiers, and should be accompanied by a robust monitoring framework that includes time-phased milestones aligned with sectional commissioning schedules, gender- and vulnerability-disaggregated indicators, and regular performance reviews that enable adaptive management.

Management Response

The NDB Management does not agree with the above statement and recommendation. The project design and monitoring framework presented in the project document to the Board is logical, clear, robust and based on the theory of change. NDB's financed components alone (for example — rolling stock), cannot lead to achievement of overall project outcomes. Therefore, using results (even intermediary) linked to NDB's financing only, is not methodologically correct.

Recommendation 2: Enhance financial competitiveness through local currency financing and flexible product design.

The RRTS experience revealed that NDB's financing terms — with higher interest margins than co-financiers and no option for Indian rupee or Japanese yen-denominated lending — made the Bank a costlier and less attractive financing partner. This pricing disadvantage is not merely a technical concern but has strategic implications: NCRTC has indicated there is a tangible risk that the Bank may not be invited to finance subsequent RRTS corridors (Delhi-Karnal, Delhi-Bawal) where the Government of India will again seek more competitive co-financing packages. For a young institution seeking to establish credibility and build long-term partnerships in flagship sectors, being priced out of future tranches of a flagship project where it financed the pilot corridor would represent a significant reputational and strategic setback. The Bank should therefore explore establishing rupee-denominated funding mechanisms — potentially through domestic capital market issuances in India, currency swaps, or co-financing arrangements with Indian financial institutions — and should review its margin structure to ensure it reflects both market conditions and the competitive landscape in multi-financier arrangements.

Management Response

NDB agrees with the IEO recommendation regarding the need to improve NDB's pricing levels and expand Bank's financing offering and has already taken steps in this direction. NDB is planning to establish an Indian Rupee local bond programme, which is pending for approval by the relevant regulators. Japanese Yen sovereign pricing framework has been submitted to NDB Board of Directors for approval. But the discussion in BoD did not result in an approval. The guidelines for loan currency conversions are in process of being finalized.

Recommendation 3: Enhance NDB's technical and institutional support during implementation to strengthen developmental additionality, leveraging the project preparation fund (PPF) where appropriate.

Given NDB's late entry into the RRTS project, the Bank had limited influence during project design and appraisal. However, once financing was approved, opportunities remained for NDB to add technical

and institutional value during implementation — through analytical inputs, operational advice, and targeted support to the implementing agency. The Bank's engagement focused primarily on financial oversight and compliance, without mobilising its technical or advisory instruments to address emerging implementation challenges such as delays in multimodal integration, feeder connectivity, and service readiness. IEO recommends that NDB systematically integrate technical and institutional support into project implementation to strengthen developmental additionality beyond financing. This may include: (i) mobilising the PPF or other internal and/or external concessional resources/trust funds to finance technical studies or innovations or advisory inputs required during implementation; (ii) providing targeted technical assistance to borrowers and implementing agencies on system optimisation, operational management, or safeguards performance; and (iii) ensuring that supervision missions include sector or technical experts who can provide on-the-ground diagnostic support and contribute to adaptive problem-solving.

Management Response

The Management agrees with the recommendation of IEO and has taken steps to address it. For instance, the Management has proposed necessary changes to the rules of the NDB PPF allowing the use of the NDB PPF not only for preparation of new projects, but also for implementation of already approved projects (including hiring sector and technical experts), and has obtained their approval by NDB Board of Governors.

Recommendation 4: Strengthen knowledge management and visibility to capture and disseminate lessons from flagship operations.

The RRTS project represented a unique opportunity for NDB to showcase innovation, institutional learning, and South-South knowledge exchange in sustainable transport. However, limited attention was given to structured knowledge capture, lesson documentation, or dissemination during implementation. Despite the project's pioneering features — advanced signalling systems, digital project management, strong environmental and social governance, and successful public-sector delivery during a pandemic — no comprehensive effort has been made to consolidate and share insights across the Bank or with partners. IEO recommends that NDB institutionalise a knowledge management and visibility framework for flagship and first-of-their-kind projects. This should include: (i) systematic documentation of operational and developmental lessons from supervision missions and completion reports; (ii) preparation of knowledge products (e.g. case studies, technical briefs, learning notes) jointly with borrowers and co-financiers; and (iii) dissemination through public communication, regional seminars, and internal learning platforms.

Management Response

The Management agrees that greater efforts should be made to disseminate the project's results, innovative features, collaborative efforts for project implementation, etc. particularly for flagship projects. For instance, in addition to project-related information available through its official website and annual report, NDB is in the process of developing a BRICS–NDB Knowledge Portal in collaboration with Ministry of Finance, India, under India's BRICS Chairship 2026. The proposed Portal will be a comprehensive knowledge platform linked to NDB website and managed by the Bank on a continuous basis. Furthermore, in March 2026 NDB Board of Directors approved strengthening of Bank's Research Department by establishing two new divisions — Knowledge and Analytics Division and Data Statistics Division. Approved changes to the organizational structure greatly enhance the utilization of institutional and external data and statistics and improve the efficiency and productivity of the Bank's knowledge function.

Recommendation 5: Strengthen institutionalised coordination mechanisms and promote safeguards harmonisation and shared assurance in multi-financier transport projects.

IEO recommends that NDB institutionalise structured coordination and shared assurance mechanisms in multi-financier transport mega-projects to improve implementation coherence, reduce administrative burden on the borrowers, and strengthen system-level oversight, including on environmental and social safeguards. In large, co-financed projects such as the RRTS, the absence of

structured coordination arrangements among MDBs during implementation limited opportunities for joint problem-solving, cross-learning, and strategic alignment on critical issues. In addition, parallel safeguards supervision processes — though effective in ensuring compliance — resulted in fragmented documentation, separate review cycles, and missed opportunities for joint assurance and learning. Going forward, NDB should, where feasible, seek to: (i) agree upfront with co-financiers on periodic joint or back-to-back implementation support missions for system-level issues; (ii) promote harmonised progress and safeguards reporting formats to reduce administrative burden on implementing agencies; (iii) align safeguards supervision schedules and, where appropriate, rely on jointly agreed third-party monitoring or external verification for key environmental and social outcomes (such as resettlement completion and livelihood restoration); and (iv) jointly support knowledge products or learning events on cross-cutting themes such as private capital mobilisation, multimodal integration, and operational sustainability. Institutionalising these measures would enhance NDB's strategic engagement in complex, multi-financier infrastructure operations, strengthen safeguards oversight without duplicating processes, and improve borrower experience, while fully respecting each institution's policy framework and accountability requirements.

Management Response

NDB Management notes this recommendation and informs that such coordination arrangements are being put in place where other co-financiers agree on this.

Going forward, the Management will continue to explore opportunities to strengthen coordination with co-financiers in order to improve borrower experience and implementation efficiency.

Recommendation 6: Strengthen upstream and adaptive risk management, including financing flexibility, in complex transport mega-projects.

IEO recommends that NDB enhance its approach to risk management in large-scale transport projects by integrating more dynamic, system-level risk analysis at appraisal and during implementation. The partial cancellation of USD 82 million in the RRTS project — arising from the withdrawal of the Jangpura package and its subsequent shift to a PPP model — highlights the challenges NDB faces when entering complex, multi-financier projects at a late stage of preparation. By the time NDB appraised the operation, major contracts had already been committed, limiting the Bank's ability to influence scope design or adjust its financing focus as project circumstances evolved. While key risks were identified at appraisal, mechanisms to adapt financing structures and risk responses during implementation were limited, resulting in under-utilisation of NDB's resources in a flagship operation. The RRTS experience demonstrates that risks in mega-projects extend beyond traditional financial and construction risks to include evolving scope decisions, coordination risks across financiers, interface risks between civil works and systems, and demand-side risks linked to phased commissioning and multimodal integration. While these risks were identified at appraisal, mechanisms to adapt financing structures and risk responses during implementation were limited. Going forward, NDB should: (i) strengthen appraisal-level assessment of scope flexibility, interface risks, and demand uncertainty in multi-financier settings; (ii) incorporate explicit triggers and contingency options in loan design to respond to scope changes or implementation shifts; and (iii) use supervision missions more strategically to reassess system-level risks as projects transition from construction to operations. This would enhance NDB's ability to safeguard resource utilisation and sustain relevance in complex infrastructure investments.

Management Response

The NDB Management does not share IEO's views regarding this suggestion. As IEO notes, loan cancellations are not uncommon in large infrastructure operations, especially given the modest amount of the cancellation, i.e. 16% of the loan. The primary reason of the cancellation was cost savings, the secondary reason — an opportunity identified by the project entity to implement some project elements with private funds, without budgetary financing. Both reasons are considered by the NDB Management to be positive developments in the project and fully supported.

I. BACKGROUND

A. Introduction

1. In agreement with the New Development Bank's Board of Directors, the Independent Evaluation Office (IEO) undertook a project evaluation in 2025 of the Delhi-Ghaziabad-Meerut Regional Rapid Transit System (RRTS) in India. The Project Performance Evaluation (PPE) was undertaken jointly with the project's co-financiers - the Asian Development Bank (ADB) and the Asian Infrastructure Investment Bank (AIIB).
2. At the time of this evaluation, the project had achieved overall physical progress of approximately 85% and financial progress of about 82.5%, with more than 60% of the NDB loan already disbursed. This provides a sufficiently robust evidence base for a credible assessment, even though full project completion is pending. The transport sector is a key focus area for NDB's operations in India, accounting for about 51% of the total loans outstanding across nine projects. The Delhi-Ghaziabad-Meerut RRTS is not only India's first regional rapid transit initiative but also the pilot corridor of the broader National Capital Region (NCR) RRTS network, which will include the Delhi to Bawal and Delhi to Karnal corridors. Its successful implementation is expected to serve as a template for scaling up high-capacity rapid transit corridors across other urban agglomerations in India. Evaluating the pilot corridor at this juncture allows for early identification of lessons that can strengthen implementation quality during the remaining project period and inform the design and execution of forthcoming investments in the RRTS network. For NDB, the evaluation strengthens the Bank's knowledge base and demonstrates its capacity to generate insights in a flagship sector for the country, thereby enhancing its positioning for potential future engagement.

B. Country context

3. India, with an estimated Gross Domestic Product (GDP) growth rate of 7% for fiscal year 2024–25¹ continues to be one of the fastest-growing economies globally. With a population of over 1.4 billion,² India is also set to become the most populous nation in the world. Urban areas, which currently house approximately 34% of the population, are expanding rapidly: by 2036, nearly 600 million people – about 40% of India's population – are expected to live in urban areas.³ This urban expansion is anticipated to boost productivity and economic output, with cities projected to generate 70% of new jobs, more than 70% of India's GDP, and contribute to a near fourfold increase in per capita income by 2030.⁴

1 International Monetary Fund: https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/IND

2 Ibid.

3 Population projections for India and states 2011–2016, Census of India 2011, July 2020.

https://mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf

4 India's urban awakening: Building inclusive cities, sustaining economic growth, McKinsey Global Institute, 2010.

<https://www.mckinsey.com/featured-insights/urbanization/urban-awakening-in-india>

4. However, this rapid urbanisation presents a significant challenge: India's infrastructure is struggling to keep pace with the needs of its growing population.⁵ Specifically, urban transport is under significant pressure, which in turn strains the country's economy. The use of public transport as a share of overall transport use in cities with population sizes over 4 million declined from 69% to 38% between 1994 and 2007.⁶ Roads carry almost 85% of the country's passenger traffic and more than 60% of its freight, yet the infrastructure is struggling to keep pace with demand. This over-reliance on private transport has also contributed to many Indian cities being listed among the world's most polluted.
5. In the last decade, as India's urban population surged by 26%, the use of personal motor vehicles grew by 138%.⁷ India took 60 years (1951–2008) to reach 105 million registered vehicles and added the same number of vehicles in the subsequent six years (2009–2015).⁸ This shift has caused a sharp increase in private car ownership and heightened traffic congestion, with average vehicle speeds dropping to just 24 km/h.⁹ This over-reliance on private transport has contributed to many Indian cities being listed among the world's most polluted.
6. In response to this challenge, the Government of India is focused on transforming the nation into a USD 30 trillion economy by 2047, with plans to build 100 smart cities to accommodate the growing urban population and ensure seamless connectivity.¹⁰ While these initiatives are commendable, the infrastructure financing gap – estimated at more than 5% of India's GDP – remains a significant hurdle to achieving these goals.

C. Local and sector context

7. The NCR is the world's second-largest urban agglomeration,¹¹ covering a vast area of 55,083 sq km across Delhi and the three neighbouring states of Haryana, Rajasthan and Uttar Pradesh. It had a population that reached 46 million in 2011,¹² of which 62.5% was urban, and is projected to grow to 89 million by 2031,¹³ with the share of urban population expected to reach 98–100%.¹⁴ Delhi has been the primary centre for employment not just for its residents, but also for migrants from surrounding areas. The services and manufacturing sectors drive the economy, drawing a growing workforce. This rapid urbanisation, along with a thriving economy that contributes about 7% to India's GDP,¹⁵ places tremendous pressure on existing infrastructure, particularly transportation.

5 Athar, Sohaib; White, Roland; Goyal, Harsh. *Financing India's urban infrastructure needs: Constraints to commercial financing and prospects for policy action (English)*. Washington, D.C.: World Bank Group, 2022.

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099615110042225105>

6 World Bank (2011). "India Transportation." World Bank Feature Article.

<https://www.worldbank.org/en/news/feature/2011/09/23/india-transportation>

7 Institute for Transportation and Development Policy (ITDP), March 18, 2025. "Accelerating Urban Transport Reforms for Effective City Level Action."

<https://itdp.in/accelerating-urban-transport-reforms-for-effective-city-level-action/>

8 Ibid.

9 Prottoy A. Akbar et al, Mobility and Congestion in Urban India, November 2018. <https://www.nber.org/papers/w25218>

10 Bridging India's Vast Infrastructure Financing Gap, World Bank Blogs, 2025.

<https://blogs.worldbank.org/en/ppps/bridging-india-s-infrastructure-financing-gap>

11 United Nations, World Urbanisation Prospects 2018.

https://www.un.org/development/desa/pd/sites/www.un.org.development.desa.pd/files/files/documents/2020/Jan/un_2018_wup_report.pdf

12 Census 2011.

13 India: population NCR, by sub region | Statista <https://www.statista.com/statistics/1401515/india-population-ncr-by-sub-region/>

14 Population projections for India and states 2011–2016, Census of India 2011, July 2020.

https://mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf

15 NCR Planning Board, Functional Plan for Economic Development of NCR, June 2016.

https://ncrpb.nic.in/pdf_files/functionalplan_economicdevelopment.pdf

8. The region's transport network, which includes roads, metro rail, and suburban rail, has been unable to keep pace with this expansion. The road network is heavily congested, and while the Delhi Metro serves a large number of passengers, it is limited to intra-city travel. The railway network, primarily operated by Indian Railways, lacks dedicated corridors for commuter services, making daily commutes inefficient. As a result, in 2016, the daily passenger traffic along the Delhi-Ghaziabad-Meerut corridor reached 690,000, with 63% of commuters relying on private cars for their daily commutes and travel times extending from three to four hours for just an 80 km stretch during peak hours.¹⁶
9. This reliance on private vehicles has not only led to traffic jams but has also made the NCR one of the most polluted regions globally. Vehicular emissions account for nearly 40% of particulate matter of less than 2.5 micrometres in diameter (PM_{2.5}) emissions in Delhi.¹⁷ Air quality worsened across major cities of the NCR in 2023 compared to 2022, with only Ghaziabad recording an improvement in its annual PM_{2.5} concentration. Delhi, with an average PM_{2.5} concentration of 102.1µg/m³, was the third most polluted city in the world and the worst in the NCR. The escalating pollution, coupled with long commutes, reduces quality of life, hampers economic productivity and exacerbates stress levels for residents.
10. The Delhi-Ghaziabad-Meerut RRTS corridor will help to reduce congestion in Delhi by enabling people to commute to Delhi from neighbouring towns and cities through a fast, reliable, safe and comfortable public transport system. It will have a design speed of 180 km/h and a high frequency (five to 10 minutes during peak hours), reducing the journey time from Delhi to, for example, Meerut from three to four hours to about an hour. Road traffic congestion is expected to decrease as passengers shift from road to rail. Reducing vehicular traffic will improve air quality and reduce noise pollution. The share of public transport in overall transport use is expected to increase from 37% to 63% after the service commences on the 82.15 km RRTS corridor.
11. With the NCR projected to become the world's most populous urban agglomeration by 2030, demand for efficient transport solutions has never been greater. The development of the Delhi-Ghaziabad-Meerut RRTS corridor is essential to address these challenges, offering a sustainable, efficient and environmentally friendly transport option to meet the growing demands of the region.

16 Project Document to the Board on a proposed loan of USD 500 million to the Republic of India for Delhi- Ghaziabad-Meerut Regional Rapid Transit System.

17 World Air Quality Report 2023 by IQAir. <https://www.iqair.com/us/world-air-quality-report>

II. THE PROJECT

A. Background

12. The Delhi-Ghaziabad-Meerut Regional Rapid Transit System project comprises the construction of a rapid rail corridor connecting the National Capital Territory of Delhi with the cities of Ghaziabad and Meerut, passing through the towns of Sahibabad, Muradnagar and Modinagar, all located in the neighbouring state of Uttar Pradesh.
13. The project was approved by NDB's Board of Directors on 29 September 2020 and is being implemented under a parallel financing arrangement with ADB and AIIB.¹⁸ Proceeds from the NDB loan are being used to finance the cost of: (i) rolling stock; (ii) signalling, train control and telecommunications systems (S&T), including platform screen doors (PSD); (iii) civil works for the construction of multi-storied staff quarters and associated facilities. Proceeds from the ADB and AIIB loans are being used to finance the costs of civil works, tracks, and electrical and traction systems. In addition, the project also received a grant from the Japan Fund for Poverty Reduction (JFPR), administered by ADB, to promote improved mobility and economic opportunities for women and differently abled groups along the corridor. The borrower of the NDB loan for this project is the Government of India, with the Ministry of Housing and Urban Affairs (MoHUA) acting as the executing agency and collaborating with the National Capital Region Transport Corporation (NCRTC) on project implementation.
14. The RRTS project holds strategic significance for the Government of India, as it supports the Government's National Urban Transport Policy, which aims to provide safe, affordable, quick, reliable and sustainable mobility for the increasing number of residents in urban areas seeking access to quality jobs, education and recreational services. The project, along with forthcoming RRTS corridors, is included as a medium-term measure in the Comprehensive Action Plan for Air Pollution Control in Delhi and the NCR, and forms an integral part of the recommendations of the High-Powered Committee constituted by the Government of India on Decongesting Traffic in Delhi.
15. Upon operationalisation, the RRTS is expected to remove 100,000 vehicles from the roads and reduce CO₂ emissions by at least 250,000 tonnes annually, marking a significant advancement in climate mitigation efforts, particularly in a region where six of the ten most polluted cities in the world are located.¹⁹

B. NDB's initial engagement

16. The project was initially proposed to ADB for financing. Given the large funding requirement, the Department of Economic Affairs (DEA) in the Ministry of Finance of the Government of India decided to mobilise joint co-financing from ADB and AIIB, alongside parallel financing from NDB. The ADB-AIIB partnership followed a co-financing framework agreement under which ADB acted as the lead co-financier, partially administering AIIB's loan and applying ADB's safeguards and procurement policies across their jointly financed components.

18 ADB and AIIB are financing under a joint co-financing arrangement, with ADB partially administering the AIIB loan.

19 Broom, D. (2020, March 5). *India dominates the list of the world's most polluted cities*. World Economic Forum. <https://www.weforum.org/stories/2020/03/6-of-the-world-s-10-most-polluted-cities-are-in-india/>

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17. NDB's participation was first considered at a meeting convened by DEA on 11 March 2020, followed by a meeting on 14 April 2020 among NCRTC, ADB, AIIB and NDB to explore financing options. By this time, most major bids had been issued or were being finalised, and all major contract awards were expected by the end of 2020. In light of this, two options were discussed for NDB's engagement: (i) joining ADB-led co-financing arrangement; or (ii) extending a parallel loan to finance distinct packages not covered under ADB's scope, such as rolling stock, S&T systems and staff quarters at Jangpura in the south-east of Delhi. The latter approach was ultimately adopted, as it aligned with NDB's procurement policy of using the country systems.
 18. The project was formally proposed to NDB by DEA on 23 April 2020. NDB subsequently conducted a fact-finding mission via videoconference from 13 to 17 July 2020 – amid the peak of the COVID-19 pandemic – to review the project's technical, financial and economic aspects, along with environmental and social (E&S) safeguards, procurement and implementation arrangements. Loan negotiations were held on 3 September 2020, and the NDB Board approved the loan on 29 September 2020. The loan agreement was signed on 19 November 2020 and became effective on 22 December 2020.

C. Project objectives

19. The objective of the project is to provide safe, reliable and comfortable transport to residents in and around the NCR through the financing and construction of a regional rapid transit system. The project also envisages strong multimodal integration at major hubs – such as Sarai Kale Khan, Anand Vihar and Meerut South – where RRTS stations will directly interface with metro lines, interstate bus terminals and Indian Railways. In parallel, a feeder network of buses, shared mobility services and non-motorised transport facilities has been planned to strengthen first- and last-mile connectivity for commuters accessing the stations. By ensuring both seamless integration with existing networks and reliable local connectivity, the RRTS is expected to provide commuters with greater incentives to switch from private vehicles to public transport. The underlying rationale is that such improvements in mobility will reduce congestion, enhance productivity and deliver environmental co-benefits. The design and monitoring framework (DMF), presented in annex I, provides a detailed breakdown of outputs, outcomes and indicators against which progress is being measured.
20. **Overall project outputs.** The overall project outputs by 2027 entail the construction of an 82.15 km-long rapid rail corridor, linking Sarai Kale Khan in Delhi to Modipuram in Meerut, comprising 68.03 km of elevated structures and 14.12 km of underground tunnels; the development of 25 stations; the construction of two maintenance depots at Duhai and Modipuram; installation of overhead electrification, signalling and train control systems and the procurement of rolling stock.
21. **NDB's outputs.** The main outputs expected from the NDB loan include: (i) the procurement, testing and commissioning of rolling stock; (ii) the procurement and installation of the signalling, platform screen doors, train control and telecommunications systems; (iii) the civil works for the stabling yard, operational buildings, operations control centre, and associated facilities at Jangpura; and (iv) the construction of multi-storied staff quarters. However, output three – the civil works for the stabling yard, operational buildings, and the operations control centre – was subsequently taken out of NDB's financing scope. The Government of India and NCRTC decided in 2021–22 to implement the Jangpura stabling yard and associated facilities through a public-private partnership (PPP) modality, with NCRTC retaining responsibility for integration and oversight.

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22. **ADB's and AIIB's outputs.** The main outputs expected from ADB and AIIB loans include: (i) construction of the 82 km Delhi-Meerut RRTS corridor, including civil works, railway tracks, 25 station buildings – at least five of which are to be developed as major multimodal hubs – two maintenance depots, and traction and power supply; (ii) strengthening the institutional capacity of NCRTC; (iii) improving mobility and economic opportunities for women and the differently abled.
 23. **Overall project outcomes.** The project is expected to yield significant outcomes by 2028, including: (i) an increase in the daily passenger ridership to 0.74 million, up from zero in 2020; (ii) a reduction in average travel time to Delhi of one hour, compared to three to four hours by road as recorded in 2020; (iii) an annual reduction in CO₂ of 258,035 tonnes; and (iv) increased rider safety, reliability, affordability, connectivity and comfort, with at least 70% of surveyed commuters already expressing positive perceptions of the RRTS.
 24. **Overall project impact.** Enhancing the NCR's overall productivity, leading to greater economic activity and a more balanced economic development across the region. By enabling the growth of Tier-2 and Tier-3 cities within the NCR,²⁰ the project is expected to decentralise economic opportunities, reduce the over-concentration of activities in Delhi, and support the sustainable urbanisation of the region. A significant modal shift from road-based transport to rapid rail will ease chronic congestion, lower travel times, and substantially reduce vehicular emissions, thereby contributing to climate change mitigation and qualifying as a potential source of climate finance. Beyond its economic and environmental benefits, the project also carries strong social inclusion dimensions. By providing safe, reliable and affordable mobility, it will enhance the participation of vulnerable groups in the labour market and improve equitable access to education, healthcare, and employment opportunities across the corridor.
 25. Consequently, the project will contribute to advancing multiple Sustainable Development Goals (SDGs), notably SDG 8 (decent work and economic growth), SDG 9 (industry, innovation, and infrastructure), SDG 10 (reduced inequalities), SDG 11 (sustainable cities), SDG 12 (responsible consumption) and SDG 17 (partnerships for the goals), thereby reinforcing broader impacts on global sustainability.

D. Project design and components

26. The Delhi-Ghaziabad-Meerut RRTS corridor has been meticulously designed to meet the transportation needs of the NCR, ensuring both efficiency and sustainability. The key components funded by NDB for this project include:
 - **Rolling stock:** The RRTS employs electric multiple units (EMUs) measuring 22 meters in length and 3.2 meters in width, with stainless-steel bodies for durability and efficiency. Designed for high-speed operation, the trains have a top speed of 180 km/h. Each train set consists of six cars, with the option to expand to nine as ridership grows. The seating arrangements prioritise passenger comfort, offering ample space, overhead luggage racks and a high-end premium-class car for a premium travel experience.
 - **Signalling and control systems:** The RRTS employs the European Train Control System (ETCS), the first of its kind in India. This state-of-the-art technology enhances operational safety and efficiency by integrating Automatic Train Protection (ATP), Automatic Train Operation (ATO), and Automatic Train Supervision (ATS), enabling continuous supervision of train movements and real-time communication between trains and trackside systems via Long-Term Evolution (LTE) technology.

²⁰ Tier-2 and Tier-3 cities in India are medium-sized and smaller urban centres, respectively, typically classified by population size, infrastructure development, and economic activity. Tier-2 cities generally have populations between one and four million, while Tier-3 cities are smaller, with populations under one million.

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- **Multi-storied staff quarters and associated facilities:** The staff quarters are located near the Jangpura stabling yard. The civil works contract includes site development, architectural finishes, electrical and mechanical works, plumbing, firefighting works, external development, associated facilities and connectivity from nearby Mathura Road.

27. Key components funded in parallel by ADB and AIIB include:

- **Civil works:** The line has elevated structures (68.03 km) in most areas and a mix of underground and ramp sections (14.12 km) in small portions of the alignment passing through congested areas of the city. For the elevated viaduct, a precast post-tensioned segmental box girder has been used on a single cast-in-situ reinforced concrete pier (2 m in diameter) with pile foundations (well foundations for major river crossings). For the underground section, twin tunnels with a finished diameter of 6.5 m have been constructed using tunnel boring machines. Additionally, the corridor features 25 stations, several of which are integrated with local metro rail services to provide seamless connectivity across the NCR.
- **Permanent way:** The permanent way for any railway system is defined by the following features: track gauge, track structure, track centres, speed potential and axle load, ruling gradient, vertical and horizontal curves, rails, turnouts, track fittings, and buffer stops. The RRTS has a standard gauge (1,435 mm), and the tracks are ballastless on viaducts and in tunnels, and ballasted in depots (except washing, workshop and inspection lines). The use of head-hardened rails ensures the durability and reliability of the track structure, particularly in high-speed conditions. The alignment has been designed to minimise gradients and curves, ensuring efficient train operations.
- **Electrical and traction system:** The RRTS utilises 25 kilovolt (kV), 50 hertz (Hz) power supply for its traction system. Power is delivered to the trains via a flexible catenary system in elevated areas and a combination of flexible and rigid catenaries in underground sections. The project plans to install five power substations. Additionally, all elevated stations and depots will feature solar panels with net metering connected to the grid. Auxiliary power is supplied through 33 kV, three-phase ring-main cables running along the corridor, which will be converted to 415-volt alternating current at auxiliary substations located at each station.

28. The JFPR grant, fully administered by ADB, finances a range of pilot initiatives to promote inclusive mobility and community benefits along the RRTS corridor. These include: (i) capacity-building and training activities; (ii) provision of mobility aids for persons with disabilities; (iii) measures to ensure safe mobility for elderly persons, women, children and differently-abled persons; (iv) awareness campaigns on safe mobility, self-defence and employability enhancement for women living in informal settlements and female students residing along the corridor; and (v) installation of gender-responsive, socially inclusive and environmentally sustainable public sanitation facilities around RRTS stations.

29. ADB and AIIB financing also supports NCRTC's institutional strengthening. The scope includes: (i) development of an institutional strategy encompassing organisational, financial and technological plans; (ii) design and delivery of training programmes in project and contract management, financial management, procurement and safeguards; (iii) adoption of gender-friendly workplace policies; (iv) preparation of a transit-oriented development (TOD) action plan and value capture financing instruments to enhance financial sustainability; and (v) strengthening NCRTC's capacity to structure and manage PPP initiatives.

E. Project cost and financing

30. The total estimated cost of the RRTS project is USD 3,759 million. The funding is structured as follows:

TABLE 1:

Project financing plan

Source of funds	Amount (USD million)	% of total
ADB loan	1,049	27.9%
AIIB loan	500	13.3%
Government counterpart funding and other sources	1,707	45.4%
Grant from JFPR	3	0.1%
NDB loan	500	13.3%
Total	3,759	100.0%

Source: Project document submitted to the Board.

31. The NDB loan was later revised to USD 418 million, with the partial cancellation of USD 82 million. The cancellation resulted from project cost savings, currency depreciation and the withdrawal of a major package (output 3) covering design and procurement for the Jangpura stabling yard, control buildings and related facilities. These components are now planned under a public-private partnership (PPP) arrangement with alternative financing.
32. The lending modality of NDB financing is a sovereign project loan, in accordance with NDB's Policy on Sovereign Loans and Loans with Sovereign Guarantee. This loan has a 25-year tenor from the date of signing the loan agreement, with an eight-year grace period. The loan shall be repaid in 34 semi-annual instalments, commencing after the grace period, calculated based on an annuity type repayment method with a 10% discount rate per annum.
33. ADB and AIIB extended a multi-tranche financing facility for the project, comprising four tranches. The four-tranche structure reflects ADB's time-slicing approach for large-scale investment programmes, under which each tranche represents a financing slice of the same project rather than a specific stage, contract or component. Under this arrangement, ADB financed the first, third, and fourth tranches, amounting to USD 1,049 million, while AIIB financed the second tranche through a USD 500 million loan. Both the first ADB tranche and the AIIB loan carry a 25-year maturity with an eight-year grace period, and repayments are to be made semi-annually on an annuity basis, applying a 10% annual discount rate.
34. As of March 2025, 63% of the NDB loan had been disbursed (see table 2). Additionally, ADB had disbursed USD 581.32 million, representing 55% of its loan, while AIIB had disbursed USD 445.45 million, representing 89% of its loan.²¹

21 Based on the most recent NDB progress report available for the period October 2024–March 2025.

TABLE 2:

Status of NDB loan disbursement as of 31 March 2025 (in USD million)

#	Description	Allocated loan amount	Disbursed amount	Undisbursed loan balance
1	Rolling stock	268.47	156.41	112.06
2	Signalling, train control, platform screen doors and telecommunications systems	112.65	73.75	38.90
3	Multi-storied staff quarters	31.58	31.58	-
4	Front-end fee for NDB loan	1.25	1.25	-
5	Contingency	4.05	-	4.05
6	Escalation	-	-	-
	Total	418.00	262.99	155.01

Source: Project progress reports as of March 2025.

F. Project implementation arrangements

35. The executing agency is the Ministry of Housing and Urban Affairs (MoHUA), under which the National Capital Region Transport Corporation, a joint venture special purpose vehicle, serves as the project's main implementing agency.
36. Overall project management and coordination are conducted from the NCRTC corporate office in New Delhi. NCRTC has established four project management offices (PMOs), headed by chief project managers (CPMs) in Delhi, Ghaziabad, Modinagar and Meerut to implement the different sections of the project. A Group General Manager (GGM) under a director is responsible for implementing the rolling stock component. Similarly, a GGM under a director will be responsible for implementing the signalling and train control component. Annex II presents this organisational structure in a diagrammatic form, providing a clearer and more detailed understanding of the institutional arrangements. NDB's financing supported three major packages: (i) rolling stock (awarded to M/s Bombardier, now M/s Alstom); (ii) signalling, train control, telecommunications, and platform screen doors (awarded to Alstom Transport India and Alstom Ferroviaria, Italy); and (iii) staff quarters at Jangpura (awarded to SAM India Builtwell Pvt. Ltd.). A fourth package – civil works for the Jangpura stabling yard and operations control centre – was later withdrawn from NDB scope and planned to be financed separately under a PPP model.
37. For operations and maintenance (O&M), NCRTC engaged Deutsche Bahn Engineering & Consulting GmbH (DB E&C) as its O&M partner in May 2023. DB provides international expertise in preparing operational strategies, safety protocols, staff training, and maintenance systems for the RRTS.

III. EVALUATION OBJECTIVES, METHODOLOGY AND PROCESS

A. Objectives, scope and theory of change

38. **Objectives.** The main objectives of the evaluation are to: (i) promote accountability through an independent assessment of results; and (ii) generate lessons learned and recommendations for the remaining activities and operations of the project, as well as for improving the quality of similar ongoing and future operations in India and other NDB member countries.
39. **Scope.** As the project is implemented under a parallel financing arrangement with ADB and AIIIB, the evaluation will adopt a dual scope. First, it will assess the extent to which the NDB-financed components have been implemented as planned and whether they meet the intended quality, design and operational readiness standards. Second, it will examine the performance of the broader RRTS system, with a particular focus on the currently operational segments, and assess emerging results, including ridership trends, service reliability and reductions in travel time. The evaluation will also consider the likelihood of the project achieving its intended development outcomes and impacts as articulated at appraisal.
40. **Theory of change.** The evaluation is guided by a “nested” theory of change (ToC), developed to trace the causal logic linking NDB-financed inputs to project-level outcomes and impact within the broader Delhi-Ghaziabad-Meerut RRTS. While NDB-financed components are clearly linked to project outcomes, these outcomes are not attributable solely to NDB financing. Rather, they result from coordinated investments across multiple financiers. A nested ToC is used in this context to recognise the project’s integrated nature and clarify the role of NDB-financed components within the broader project framework. The detailed ToC is presented in annex III.

B. Evaluation methodology, questions and rating system

41. The core methodology of this evaluation is grounded in internationally recognised evaluation criteria, as outlined in the NDB’s Evaluation Manual (2024): relevance, effectiveness, efficiency, sustainability and impact (see definitions in annex IV), with a primary focus on evaluating the performance of the operational segments of the Delhi-Ghaziabad-Meerut RRTS corridor. While full assessments of impact and sustainability were not feasible given that the project has not yet been completed, early-stage data provided crucial insights into the project’s potential long-term benefits and its ability to meet future demands. In light of this, the evaluation team refrained from assigning ratings to these two criteria, opting instead to present an evidence-based assessment using the available data. While the inability to rate impact and sustainability arises from project timing and evaluability constraints rather than any shortcoming of the evaluation, it nonetheless constitutes an inherent limitation from an evaluation standpoint and is therefore explicitly acknowledged in the report.
42. Drawing on this assessment, together with the ratings assigned to relevance, effectiveness and efficiency, the IEO assessed and provided a rating to the composite evaluation criterion “overall project achievement.” Finally, as per established practice, the IEO assessed and rated the NDB’s and borrower performance, respectively.

43. **Customisation of evaluation methodology.** In addition to the five core criteria assessed by IEO, “equity” was introduced as a complementary criterion to align IEO’s evaluation framework with that of the Development Monitoring and Evaluation Office (DMEO) of the Government of India, thereby reinforcing NDB’s commitment to the use of country systems. NDB’s operational policies emphasise reliance on member countries’ own systems – in procurement, E&S safeguards and financial management – to ensure contextual relevance, national ownership and sustainability of results. In the same spirit, IEO applies country evaluation systems to strengthen alignment with national policy frameworks and institutional practices. The inclusion of this criterion therefore reflects IEO’s recognition that India’s national evaluation framework, led by DMEO, explicitly integrates equity as a cross-cutting dimension of project performance. Adopting this lens enables IEO to assess how well NDB-supported projects contribute to inclusive and balanced development outcomes in India.
44. The evaluation is summative and relies on mixed methods, including both quantitative and qualitative analyses. The evaluation applied a triangulation-based inferential approach to assess the likelihood of achieving project outcomes. This approach combined multiple early signals of performance, such as observed travel-time reductions on operational sections, ridership trends observed following phased openings and interchange activation, operational reliability and safety performance since the commencement of services, progress towards system readiness, including rolling stock availability, signalling capability and O&M preparedness, and institutional capacity development within NCRTC. These strands of evidence were assessed jointly, rather than in isolation, to form reasoned evaluative judgments about whether the causal pathways articulated at appraisal remain plausible under current implementation conditions. This inferential process supports outcome-level assessment without implying premature attribution of impact.
45. Based on the evidence collected and using triangulation techniques, the evaluation team assigned a performance rating to each evaluation criterion using a six-point scale (see table 3).

TABLE 3:

Rating scale

#	Rating	Score descriptor
6	Highly Successful	Under the concerned criterion, the project achieved or surpassed all main targets, objectives, expectations, and results and could be considered a model within its project typology.
5	Successful	Under the concerned criterion, the project achieved almost all (indicatively, over 80–95%) of the main targets, objectives, expectations, and results.
4	Moderately Successful	Under the concerned criterion, the project achieved the majority (indicatively, 60–80%) of the targets, objectives, expectations and results. However, a significant part of this was not achieved.
3	Moderately Unsuccessful	Under the concerned criterion, the project did not achieve its main targets (indicatively, less than 60%), objectives, expectations, and results.
2	Unsuccessful	Under the concerned criterion, the project achieved only a minority of its targets, objectives, expectations, and results.
1	Highly Unsuccessful	Under the concerned criterion, the project achieved almost none of its targets, objectives, expectations, and results.

46. Below are some key questions the evaluation covered (see annex V for the complete set).

- To what extent are the project's objectives relevant to national, provincial and municipal priorities, and how well do they align with national and regional transport policies (such as the National Urban Transport Policy) and urban mobility strategies? Additionally, how well does the project align with and contribute to NDB's General Strategies?
- Was the project's DMF sound, and to what extent were the performance indicators monitored and reported in a timely manner?
- What is the current status of the project's outputs, outcomes and impacts, and how likely is the project to achieve its intended targets by 2028?
- To what extent did the financing partners coordinate in managing interdependencies across components – such as ensuring readiness of ADB- and AIIB-funded civil infrastructure for NDB-funded rolling stock and systems – and in jointly supporting NCRTC's capacity to integrate and operationalise parallel investments?
- To what extent is the current operational segment of RRTS generating revenue from transit-oriented development and value capture financing? How well does the current operational model validate the likelihood of the project's long-term financial sustainability?
- To what extent has the operational segment of the RRTS improved accessibility (e.g. to schools and hospitals) and economic opportunities, especially in peri-urban areas?
- What were the environmental impacts of the project during construction, such as deforestation, land-use changes, and what mitigation measures were implemented to address them? What potential does the project have for promoting green building practices and the use of renewable energy, such as rooftop solar, in the context of multi-storied staff quarters and stations?
- How fairly have benefits – such as increased accessibility, employment, and TOD-related opportunities – been distributed across socioeconomic groups, especially peri-urban and informal communities?

C. Limitations

47. The evaluation faced a few limitations that constrained the depth of analysis. Although it was conducted prior to full project commissioning, the primary constraint was not timing, but rather the limited availability and systematic tracking of outcome level and operational indicators. Project reporting focused largely on construction progress, safeguards, and disbursements, while several strategically important datasets—such as disaggregated ridership trends, modal shift behaviour, station level passenger flows, first and last mile connectivity, and progress on transit oriented development (TOD)—were either unavailable, not collected consistently, or not integrated into standard monitoring systems. Regular tracking of such indicators is essential not only for evaluation but also for oversight of implementation and for enabling timely course correction. Their absence constrains the assessment of early operational performance and emerging developmental outcomes, including accessibility, inclusion and system uptake. While it is recognised that some outcomes cannot be fully observed before commissioning, systematic monitoring of key indicators from early implementation stages would strengthen both project management and evaluability.

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48. Given the above limitations, the evaluation sought, to the extent possible, to mitigate their effects through triangulation of multiple sources — cross-referencing available NCRTC documentation with co-financier reports (ADB and AIIB), publicly available data, and stakeholder consultations, and used sensitivity analysis where appropriate. However, certain developmental outcomes could only be assessed qualitatively or with partial evidence.
 49. A second limitation relates to the DMF established at appraisal. The DMF did not include indicators needed to measure progress on NDB-financed outputs, nor did it capture certain critical intermediate outputs central to the project's overall success. This limited the evaluation's ability to track NDB's contribution through a coherent results chain. To mitigate this, the evaluation reconstructed a theory of change using available project documentation and applied it as the analytical basis for assessing results. A detailed discussion of the DMF gaps and their implications is presented in the following section.
 50. A third limitation relates to the multi-financier structure of the project, which makes attribution inherently complex. NDB financed selected systems and rolling stock components, while ADB, AIIB and the Government financed large civil, utility, and integration-related elements. Key benefits—such as ridership, emissions reduction, and urban mobility improvements—emerge from the functioning of the entire corridor rather than from the NDB-financed packages alone. To address this, the evaluation adopted a contribution-based approach and triangulated co-financier documentation to form a coherent assessment without isolating or quantifying individual institutional contributions.

D. Evaluation process

51. This is a joint evaluation by IEO in collaboration with ADB and AIIB, the project's other financiers. In this case, the joint evaluation did not imply an assessment of co-financiers and adopted a more flexible model, with ADB and AIIB participating only as peer reviewers rather than full co-producers of the evaluation. Their role included actively contributing to shaping the evaluation methodology, providing substantive feedback on the approach paper and the evaluation report, and engaging in discussions on key findings. This arrangement ensured that the principles of joint evaluation – knowledge-sharing, methodological alignment and cross-institutional learning – were embedded in the process, making it a meaningful form of collaboration. This approach also strengthened the credibility of the evaluation findings and enhanced the overall quality of the assessment.
52. The evaluation comprised the following phases:
 - (i) **Desk review.** IEO conducted an initial literature review. The documents reviewed included, inter alia, the project design and appraisal documents, the loan agreement, project progress reports, project performance assessment and supervision reports, as well as other relevant material made available by NDB, ADB, AIIB and the implementing agency. In addition, the team examined publicly available policy documents and plans of the Government of India and the Government of Uttar Pradesh, together with NCRTC's corporate and expansion strategies. To complement these, extensive secondary data was consulted from multiple sources. These included the RRTS official website, the Ministry of Road Transport and Highways, the Ministry of Statistics and Programme Implementation and the Central Pollution Control Board. At the country and sectoral level, data was further drawn from World Bank databases and other international sources. This phase of the review was undertaken in preparation for the fieldwork and culminated in the preparation of an approach paper outlining the sector and project context as well as the overall evaluation methodology, process and timelines.

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- (ii) **Main mission.** The main mission was conducted for about 10 days in May 2025. During this period, the team engaged with key stakeholders,²² including the Ministry of Finance, DMEO, the ADB India Office, Indian Regional Office (IRO) of NDB, NCRTC, and Deutsche Bahn. A full-day session was held with the NCRTC’s departments – covering design, finance, operations, procurement, E&S safeguards and multimodal integration. Field visits were undertaken to selected operational segments of the RRTS, including Sahibabad station, Duhai station, and the Duhai depot, as well as NCRTC’s innovation centre “Aparimit”, the train simulator and the Operations Control Centre.
 - (iii) **Interim reporting.** Before drafting the evaluation report, IEO prepared an interim report to present emerging findings and obtain stakeholder feedback. The report was limited to critical issues and did not present the complete set of findings, performance ratings, conclusions or recommendations, as analysis of the collected data was still in progress. This report was shared with ADB, AIIB, NDB Management, NCRTC and other key in-country stakeholders to solicit feedback and clarify any technical or contextual aspects. This step ensured that the preliminary findings were grounded in operational realities and stakeholder perspectives, thereby strengthening the relevance and clarity of the final report.
 - (iv) **Drafting of the evaluation report.** Building on the desk review, fieldwork and feedback on the interim report, IEO drafted this main evaluation report. The draft was shared with the official peer reviewers –ADB and AIIB – as well as other stakeholders, including the Ministry of Finance, the Ministry of Housing and Urban Affairs, NCRTC, and NDB Management, for comments. The Ministry of Finance was also invited to circulate the draft report to other relevant government departments, as appropriate. IEO has carefully considered all comments received, and an audit trail has been prepared to illustrate how they were incorporated into the final version.
 - (v) **NDB Management Response.** Once the report was finalised, NDB Management prepared a written Management Response to the independent evaluation, which is included above.
 - (vi) **Knowledge sharing and outreach.**²³ In line with the NDB’s Evaluation Policy (2022) and Evaluation Strategy 2024–2026, the final evaluation report – including the NDB Management Response – will be published on the IEO’s webpages. Evaluation findings will also be shared through relevant communication and social media channels. An Evaluation Lens—a two-page brief—and an Evaluation Infographic—a visually structured summary—both highlighting the evaluation’s key findings, will be prepared and disseminated to a wider audience.

²² List of key persons met can be found in Annex IX.

²³ To strengthen utilisation and institutional learning, IEO is also supporting the development of an action plan for the effective update of lessons and recommendations from IEO evaluations, which should be formalised soon.

IV. PROJECT PERFORMANCE

A. Relevance

53. In line with internationally recognised definitions, the relevance criterion assessed the extent to which: (i) project objectives are aligned with government policies and the needs of the borrowing country, as well as with the NDB General Strategies and other relevant Bank policies and priorities; (ii) the design of the intervention is appropriate to meet project objectives; and (iii) the intervention has been adapted, as needed, to address changes in the context during implementation.

(i) Relevance of project objectives

54. **Alignment with government policies and strategies.** The objectives of the project are highly relevant to India's national transport priorities as articulated in the National Urban Transport Policy (2014), the Metro Rail Policy (2017), and the National Transit-Oriented Development Policy (2015), which focused on: (i) promoting safe, affordable, quick, comfortable, reliable and energy-efficient public transport systems to reduce road congestion and vehicular emissions; (ii) integrating land use and transport planning to promote compact and sustainable urban growth; (iii) improving multimodal connectivity and seamless mobility across metropolitan regions; and (iv) leveraging private sector participation and innovative financing for mass transit infrastructure. Around closing, the project remains consistent with India's ongoing policy thrust under "Gati Shakti" – the National Master Plan for Multimodal Connectivity (2021) and the National Infrastructure Pipeline – both of which emphasise regional connectivity, multimodal integration, and low-carbon transport solutions.
55. At the regional level, the project is anchored in the Integrated Transport Plan for the NCR-2032, which explicitly prioritised the Delhi-Ghaziabad-Meerut corridor as the first RRTS to decongest Delhi and promote balanced regional growth. The project is also included in the Comprehensive Action Plan for Air Pollution Control in Delhi and the NCR and supports the High-Powered Committee on Decongesting Delhi, both of which recognise sustainable mobility as essential for improving air quality and regional liveability.
56. Beyond transport-specific policies, the project also contributes to the Government of India's "Make in India" initiative, which seeks to promote domestic manufacturing, enhance self-reliance, and generate employment in key sectors. In line with this policy, the project procured its rolling stock domestically, with over 70% of train components manufactured in India, thereby creating skilled jobs and strengthening domestic supply chains. The contract for signalling, train control, and telecommunications systems was also awarded to Alstom India under the *Make in India* framework, with mandated local content requirements.
57. **Alignment with the NDB General Strategy and policies.** The project cannot be assessed against NDB's strategic objectives in India or against a sector strategy, as the Bank does not yet have an India country strategy or sector-specific roadmap. Nevertheless, the RRTS project is consistent with both of NDB's general strategies. It was approved and signed during the implementation of NDB's first General Strategy for 2017–2021, which prioritised financing infrastructure and sustainable development projects that drive economic growth, reduce inequalities and improve quality of life in member countries. By investing in a sustainable, large-scale transport system that enhances regional connectivity and productivity, the project directly contributed to these objectives. The project was implemented during NDB's second General Strategy for the 2022–2026 period, which focuses on scaling up sustainable infrastructure investments, enhancing

co-financing partnerships, and promoting climate-resilient, technology-enabled solutions. By adopting climate-resilient and energy-efficient systems, leveraging advanced signalling technology, and mobilising co-financing with ADB and AIIB, the project contributes to the objectives of the second strategy by demonstrating innovation, sustainability and partnership in delivering complex urban transport solutions.

58. **Alignment with the Sustainable Development Goals.** The project contributes directly to SDG 11.2 by providing safe, affordable and accessible transport systems. It also advances SDG 9.1 through the development of resilient infrastructure that supports economic growth and regional integration and SDG 13.2 by facilitating a modal shift from road to rail and reducing annual CO₂ emissions. In addition, the project promotes gender equality in line with SDG 5.5 by enhancing women's participation in operations and training initiatives and contributes to SDG 8.5 by generating employment and supporting skills development.

(ii) Relevance of project design

59. **Institutional and implementation arrangements.** The institutional and implementation arrangements established for the RRTS project were strong and well-conceived. The creation of NCRTC as a joint-venture special purpose vehicle (SPV) between the Government of India (50%) and the provincial governments of Delhi, Haryana, Rajasthan and Uttar Pradesh (each 12.5%) ensured both central leadership and state-level ownership – an example of cooperative federalism that enhanced commitment across jurisdictions. The institutional setup was further strengthened by NCRTC's specialised management team comprising domain experts and secondees from Indian Railways, supported by four functional directors covering projects, systems, finance and rolling stock. Dedicated project management units, the engagement of a general consultant and detailed design consultants, and the adoption of clear accountability lines reflected sound technical, financial and risk management, and project governance.
60. Furthermore, the institutional framework ensured that the three multilateral development bank (MDB) co-financiers – NDB, ADB and AIIB actively fulfilled their respective roles through joint co-financing arrangements, with financing packages aligned to each institution's comparative advantage and operational model. The packages allocated to NDB, for instance, were appropriate for its relatively lean technical supervision capacity, avoiding large civil works while still supporting critical systems.
61. **Coordination among the MDB co-financiers.** While each MDB fulfilled its financing responsibilities, coordination among the co-financiers during implementation was limited. No joint supervision missions were conducted to collectively review implementation progress, and the absence of harmonised progress reporting templates increased the administrative burden on NCRTC, which had to meet separate requirements for each financier. More critically, cross-learning on strategic dimensions was limited. Key themes such as private capital mobilisation for high-capex transit systems, multimodal integration to enhance last-mile connectivity, inclusive planning to address climate vulnerabilities (e.g., floods and heatwaves), health and safety standards, and sustainability of operations—both financial and technical—was not addressed through coordinated MDB efforts. This stands in contrast to emerging practices among other MDBs, which increasingly engage in shared implementation support missions, produce joint knowledge products and host learning seminars to generate operational insights and strengthen borrower capacity. There is clear value in generating and sharing knowledge across MDBs, jointly leveraging niche technical consultants to embed innovation, and incorporating best practices to strengthen systems resilience and ensure long-term operational sustainability.
62. **Design considerations.** The adoption of a dedicated, fully grade-separated standard-gauge rail system with design and operational speeds of 180 km/h and 160 km/h, respectively, ensured the travel-time objective of reducing the Delhi-Meerut journey to about one hour could be credibly achieved. The NDB-financed rolling stock – lightweight, aerodynamic, and equipped with regenerative braking, automatic train operation, and energy-efficient traction – directly supports this performance target while lowering life-cycle costs and emissions. The signalling

and telecommunication systems introduced ETCS Level 2 over an LTE backbone, integrated with Automatic Train Operation (ATO) and platform screen doors – a global first – enhancing reliability, throughput, and passenger safety. The design’s interoperable configuration enables seamless RRTS–Metro operation in Meerut, optimising infrastructure and achieving significant value-engineering savings. Strategic detours and station siting enabled multimodal integration with the Delhi Metro, Indian Railways, and interstate bus terminals, while planned first- and last-mile connectivity solutions (feeder buses, e-rickshaws and shared mobility) make the system accessible and inclusive. Design provisions for universal accessibility, gender-sensitive spaces, and safety systems such as closed-circuit television (CCTV), helplines and emergency communication further reinforced the project’s inclusivity objective.

63. **Adequacy of the design and monitoring framework.** The DMF in NDB’s project document to the Board includes all required elements as per the NDB Project Implementation Guidelines. However, there are certain evaluability limitations. In particular, the DMF does not include clearly specified indicators to track the achievement of the NDB financed outputs. For example, there is no dedicated indicator to monitor the procurement, testing, and commissioning of the RRTS trainsets financed by the NDB, nor for the Bank’s other key outputs. As a result, NDB’s contribution is not explicitly visible within the project’s results framework. Moreover, the DMF lacks a clear causal pathway linking NDB financed outputs to broader project outcomes and impacts. The absence of a project level theory of change further constrains the ability to explain how the NDB financed components were expected to contribute to overall project results—not in isolation, but in alignment and synergy with outputs financed by co-financiers.
64. By comparison, the results frameworks of co financiers demonstrate a clearer articulation of the outputs they financed and their linkage to project-level outcomes. For instance, ADB’s DMF specifies the ADB-financed output level indicators such as: (i) the construction and operationalisation of 25 stations integrating design features that are friendly to the elderly, women, children and differently abled (EWCD), with climate and disaster-resilient features; and (ii) the provision of at least one women only carriage in every RRTS train, which are explicitly linked to the project-level outcome indicator measuring users’ perceptions of accessibility, safety, and reliability of the RRTS. Such articulation helps evaluators assess the plausibility of contribution through a well-structured results chain, rather than seeking to attribute outcomes directly to individual financiers. It also enhances transparency and provides a stronger basis for learning and accountability.
65. A similarly defined output indicator for NDB, such as *27 RRTS trainsets procured, tested, and commissioned by 2025*, could have strengthened the visibility of the Bank’s contribution and its linkage to project-level outcomes. Importantly, these trainsets—designed for high-speed performance—are essential to realising one of the project’s core outcomes: *reducing travel time between Delhi and Meerut by train to one hour*. Without the rolling stock delivering the required performance, this travel time reduction would likely not materialise, irrespective of other corridor upgrades. Therefore, even in an integrated financing model, the contribution of NDB’s components can be substantiated if the DMF and a corresponding ToC are designed with that objective.
66. Furthermore, the DMF omits critical dimensions of social inclusion, with no gender- or vulnerability-disaggregated indicators or measures of employment generation, despite the project’s stated aim to enhance mobility for women, the elderly and persons with disabilities, and the presence of a dedicated JFPR grant supporting these objectives.
67. Several determinants of success, included as part of the project and financed by co-financiers – such as feeder services, multimodal integration, integrated ticketing, fare affordability and transit-oriented development – are treated as assumptions rather than measurable outputs, weakening the results chain between physical achievements and developmental impact. For instance, achieving the ridership targets is intrinsically linked to the timely completion of planned multimodal hubs and feeder networks. Without these, the project cannot realistically attain its intended modal shift, underscoring the need for specific monitoring indicators to track

their progress. In the absence of a coherent ToC, these assumptions remain untested, limiting the evaluability of developmental outcomes.

68. Finally, the DMF lacks time-phased milestones, setting single output targets for 2027 without interim benchmarks, despite the corridor’s phased implementation. MDB good practice typically includes sectional or phased targets to allow supervisors to monitor performance during implementation. For example, ADB has adopted phased output indicators for this project under its Multi-Tranche Financing Facility (MFF), which naturally lends itself to more granular progress tracking. ADB’s DMF specifies that the output indicators, such as the construction and operationalisation of 25 *stations* integrating design features that are friendly to the elderly, women, children and differently abled (EWCD), with climate- and disaster-resilient features are expected to achieve 32% by 2023, 40% by 2024 and 100% by 2027. While such detail stems in part from the MFF modality, the principle of incorporating intermediate milestones remains relevant across financing modalities, especially when project implementation is staged. In the absence of sectional or staged targets, NDB’s framework has limited utility as a monitoring and management tool during implementation.
69. **Risk and mitigation measures.** In accordance with the NDB Environmental and Social Framework, the project was classified as category “A” for its E&S impacts on project-affected people. The project document to the Board included a comprehensive risk mitigation table. Chapter VII of the project design report includes a comprehensive table with eight identified risks and corresponding mitigation measures. The plan covered different risks, including financial, operational, social, technical and environmental. These risks were relevant and well-specified.
70. **Changes in scope.** During implementation, package 9B – covering the Jangpura stabling yard, operations control centre, and associated buildings – was withdrawn from NDB financing and restructured for implementation under a public-private partnership. This adjustment was strategically relevant for the project, aligning with the Government of India’s broader policy objective of leveraging private capital and monetising land value in urban transport infrastructure. The facilities under package 9B were designed to serve the operational requirements of all future RRTS corridors, not just the Delhi-Ghaziabad-Meerut section; hence, their deferment has no adverse impact on the current corridor’s operations or outputs.
71. **Summary.** Overall, the project’s relevance is assessed as “**successful**”. The RRTS corridor is strongly aligned with India’s national and regional transport strategies, sectoral policies, and the Government’s wider agenda on sustainable, inclusive, and low-carbon growth. It also aligns closely with the NDB’s General Strategies for 2017–2021 and 2022–2026, and the Sustainable Development Goals. The project’s design was technically sound, institutionally well-structured and fully responsive to government priorities, demonstrating strong ownership and coherence with broader regional and environmental objectives. Although the absence of a ToC and measurable indicators for the NDB-financed outputs, as well as their causal link to project-level outcomes and impact, limits evaluability, this shortcoming does not detract from the project’s overall strategic alignment and policy relevance.

Criterion	Rating
Relevance	Successful (5)

B. Effectiveness

72. First, given that this is a multi-financier project, the evaluation assesses effectiveness in terms of progress achieved on NDB-financed outputs and NDB's contribution to project-level outcomes. Second, the evaluation assesses the effectiveness of the project as a whole by examining progress on project-level outputs, progress toward intended outcomes, and the likelihood of achieving the end targets set out in the DMF. Other areas that are assessed under this criterion are the extent to which the project supported innovations in response to stakeholder needs and whether the project achieved other objectives or had any unexpected consequence(s).
73. The overall project output includes construction of an 82.15 km rapid rail corridor with rail track and supporting structures (elevated and underground), 25 stations and two maintenance depots, overhead electrification, signalling, train control and telecommunications systems and rolling stock by 2027.
74. **Achievement of the NDB-financed outputs.** The NDB financed rolling stock, signalling and train control systems, and multi-storied staff quarters. Table 4 shows that the implementation of the NDB-funded packages remains on track to reach completion within a reasonable margin of delay. The package for the construction of multi-storied staff quarters (towers A, B and C) are complete, with towers A and B fully occupied by March 2025. The Rolling stock package covered the procurement, testing and commissioning of 30 RRTS trainsets and 12 mass rapid transit system (MRTS) trainsets. By March 2025, 27 RRTS trainsets had been delivered, of which 21 were in commercial operation and the remaining six were under final testing and commissioning (T&C). Out of the total 12 MRTS trainsets, 10 have been delivered, with T&C completed for seven trainsets, while T&C for the remaining three trainsets was in advanced stages. The package remains broadly on track, with full completion expected by December 2025, slightly beyond the scheduled January 2025 date. With respect to the third NDB-financed package, covering signalling and train control, platform screen doors, and telecommunications, it is progressing in tandem with phased commissioning of the corridor. At the time of evaluation, physical progress on this package stood at 68.2% against a planned 100%. This demonstrates that NDB's financing of signalling, telecommunications, and platform screen doors is pivotal in sustaining the commissioning of further sections, ensuring passenger safety, and enabling high-frequency services.

TABLE 4:

Progress of the NDB-financed packages as of March 2025

Package no.	Package description	Physical progress	Completion dates	
			Scheduled	Extended
P9A	Construction of multi-storied staff quarters and connectivity from Mathura Road to the Jangpura stabling yard complex	96.0%	31 October 2024	15 December 2024
P24	Design, supply, installation, testing and commissioning of signalling and train control, platform screen doors and telecommunications systems	68.2%	25 May 2025	-
P30	Design, manufacture, supply, testing, commissioning and comprehensive maintenance of RRTS and MRTS trainsets, and depot machinery and plant	81.1%	15 January 2025	31 December 2025

Source: Project progress reports.

75. **Contribution of the NDB-financed outputs to project-level outcomes.** The NDB-financed system components have played a critical role in delivering travel-time savings, enhancing operational safety and service reliability, improving passenger comfort, enabling operational scalability and contributing indirectly to emissions reduction through modal shift—outcomes that are central to the project’s intended development objectives.

- **Rolling stock.** Enabled the commencement of commercial operations over approximately 55 km of the corridor, thereby directly underpinning the project’s current ridership base. Through design specifications that support operational speeds of up to 160 km/h, the rolling stock has contributed to reduced travel time, a core project-level outcome. In addition, the rolling stock’s performance characteristics—such as rapid acceleration and deceleration, stable ride quality, and modern braking systems—support service reliability and punctuality, which are critical determinants of commuter mode choice for longer regional trips. And lastly, the use of energy-efficient electric multiple units, with regenerative braking indirectly contributes to lower emissions.
- **Signalling, train control, and telecommunications systems.** The deployment of signalling and train control systems—based on ETCS Level 2 and incorporating the Automatic Train Protection (ATP), Automatic Train Operation (ATO), and Automatic Train Supervision (ATS),—has directly contributed to operational safety, with no major safety incidents reported since the commencement of services. Importantly, the chosen signalling architecture provides a scalable and interoperable foundation for future reductions in headways and higher service frequencies as demand grows, thereby supporting longer-term ridership expansion and network efficiency.
- **Platform screen doors (PSD).** PSDs reduce the risk of accidents and trespassing, prevent objects from falling onto tracks, and support controlled boarding and alighting – thereby enhancing passenger safety and comfort. They also enable level boarding, which improves accessibility for elderly passengers and persons with disabilities, and contribute to better platform climate control—an important comfort factor for high-frequency regional services.
- **Multi-storied staff quarters.** By providing purpose-built accommodation close to operational facilities, the staff quarters reduce commute times for operations and maintenance personnel, support round-the-clock staffing arrangements, and improve workforce availability during early-morning services, peak periods and emergency situations. This strengthens the project’s capacity to deliver consistent and reliable services, enhances safety oversight, and supports sustained operational performance as the corridor transitions from partial to full operations.

76. **Achievement of the overall project output.** At present, Delhi-Meerut-Ghaziabad RRTS services are operational across approximately 55 km – or 67% – of the total corridor, covering 11 out of 25 stations from New Ashok Nagar to Meerut South. The elevated viaducts across most stretches are nearly finished, each recording close to 100% physical progress. The construction of the remaining elevated viaducts, including two stations between Sarai Kale Khan and New Ashok Nagar, is nearing completion at approximately 85%. The underground tunnel works in Delhi between New Ashok Nagar and Sahibabad are at 97.8%, while the Meerut underground sections are at 84%-85%, reflecting pending works on stations and internal systems. The Duhai depot and its training centre are substantially advanced, with 99.5% completion, while the Modipuram depot shows steady advancement. However, the design, supply, installation, testing and commissioning of receiving substations (RSS) and traction overhead equipment (OHE) – from Duhai (EPE) to Modipuram, including the Modipuram depot – is lagging behind structural and civil works, with only 68% completion. A detailed package-by-package account of physical and financial progress is presented in annex VII.

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77. The evaluation considers it essential to review the status of multimodal integration and feeder networks, recognising them as missing but indispensable outputs in the DMF. As discussed under the limitations of the DMF, multimodal integration and feeder networks are critical for achieving the project's intended outcomes – particularly daily ridership and, by extension, CO₂ reduction – since modal shift depends heavily on first- and last-mile connectivity.
 78. **Multi-modal integration.** The corridor's alignment was deliberately routed through major intermodal hubs—including Sarai Kale Khan, Anand Vihar, New Ashok Nagar, and Ghaziabad—to maximise regional connectivity. These nodes were selected to interface with four Delhi Metro lines, six interstate bus terminals, and two mainline railway stations. In addition, Meerut was envisioned as a model for regional-urban integration, leveraging shared infrastructure between the RRTS and the city metro system.
 79. According to recent reports, some of the operational RRTS stations are already integrated with metro services: New Ashok Nagar is linked with the Delhi Metro Blue Line, and Anand Vihar connects with both the Blue and Pink Lines, while Ghaziabad is aligned with the Red Line, enabling passengers to transfer between systems at these points. However, as the corridor is not yet fully operational, many supporting physical infrastructure components designed to enable seamless multimodal integration remain under implementation. These include foot overbridges (FOBs), travelators, escalators, paid-to-paid metro links, shared concourses, integrated ticketing arrangements, and common pedestrian plazas at key interchange stations. Their timely completion will be essential to fully realise the intended ease, safety, and efficiency of passenger transfers across systems. Additionally, access to the Hazrat Nizamuddin railway station and the Sarai Kale Khan interstate bus terminal remains limited, as the Sarai Kale Khan RRTS station is not yet operational. In Meerut, the planned relocation of the existing Bhainsali bus terminal—which is currently located in the city centre and contributes to traffic congestion—to sites near the RRTS stations at Modipuram and Meerut South, with the objective of developing an integrated multimodal complex, is also pending.
 80. **Feeder networks.** Ensuring first- and last-mile connectivity has been another central focus of the project. Recognising that the success of the RRTS hinges on convenient access to stations, the implementing agency has launched several feeder initiatives in collaboration with state and city transport authorities. In Delhi, DEVI electric feeder buses currently connect key stations such as New Ashok Nagar and Anand Vihar; in Ghaziabad, about 50 e-buses on 17 notified routes serve stations including Sahibabad, Guldhar and Duhai; and in Meerut, shared feeder infrastructure with the city metro has been established. In parallel, NCRTC has partnered with Rapido, ETO and Speed Trip to supplement short-haul connectivity. However, network coverage remains partial, with several stations still lacking reliable feeder or para-transit services, particularly in peri-urban segments. This is due to the limited mandate of NCRTC and dependence on the respective Urban Local Bodies for providing and regulating bus and other para-transit services. Strengthening route density, improving frequency, and integrating fare and information systems will be key to realising the project's full ridership potential.
 81. Achieving such integration is complex, involving multiple agencies, jurisdictions, and evolving urban infrastructure plans. Despite these challenges, the ongoing efforts illustrate clear recognition of the importance of multimodal integration and feeder connectivity as an operational priority, and demonstrate encouraging progress toward closing this critical gap in the system's access chain.
 82. **Achievement of project outcomes.** In line with the DMF, the evaluation reviews progress on four outcome indicators. As the project remains under implementation and the targets are defined for 2028, the assessment focuses on the plausibility of achieving the envisaged outcomes, considering current implementation status and emerging trends.

(i) Daily ridership: Average daily passenger ridership of 740,000 by 2028

83. The current average daily ridership of 40,707 passengers in June 2025 falls well short of the NDB's projection²⁴ of 190,000 for the same year. This projection was based on the assumption that the corridor would be only partially operational by 2025—which is indeed the case as of mid-2025. The shortfall in ridership can be attributed to five compounding factors identified during the evaluation mission: (i) network availability – the Delhi core section (including the Sarai Kale Khan hub) is not yet operational, and only a partial origin-destination matrix is currently in service, limiting network reach; (ii) service frequency – trains presently run at a 15-minute headway on the operational stretch – significantly higher than the 4-minute frequency assumed in planning (i.e. 15 trains per hour). Frequency-sensitive riders, particularly daily commuters, are less likely to adopt low-frequency services, reducing the modal shift potential at this stage; (iii) first- and last-mile connectivity and multimodal integration are not in place, constraining station accessibility and limiting catchment conversion; (iv) fare integration across modes through the National Common Mobility Card and through-ticketing is still underway, limiting convenience and interoperability with other systems; (v) passenger cost implications – incomplete interchange facilities and the absence of seamless transfers currently increase overall travel costs for passengers, as many rely on additional modes or multiple tickets to complete their journeys.
84. Despite these constraints, ridership has surged whenever new segments and multimodal hubs opened. For example, there was a 151% increase in March 2024 when the corridor reached Modinagar North, a 19% increase in August 2024 with the Meerut South-interstate bus terminal integration, and a 38% jump in January 2025 when Anand Vihar and New Ashok Nagar interchanges with Delhi Metro and inter-state bus terminal became available.

FIGURE 1:

Average daily ridership per month (October 2023–June 2025)



Source: "Namo Bharat" – the official brand name for the entire RRTS network in India – website.

24 The Public Transport Travel Demand Model for the RRTS corridors, prepared in 2019 by Delhi Integrated Multi-Modal Transit System Ltd., had been used as the base model by NDB for estimating the daily ridership numbers and average trip length.

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85. As highlighted by the implementing agency, the ridership potential of the Delhi-Ghaziabad-Meerut corridor is also closely linked to the phased development of the wider RRTS network. The Public Investment Board (PIB) has approved additional interoperable corridors—most notably Delhi-Bawal and Delhi-Karnal—with the RRTS conceived as an integrated regional system rather than a standalone corridor. The Detailed Project Report (DPR) and PIB approvals emphasise network effects, whereby through-services, shared assets, and interoperable systems are expected to support longer origin-destination trips and higher commuter uptake. In the absence of full multimodal and first- and last-mile integration on the current corridor, and prior to the operationalisation of these additional corridors, ridership growth is likely to remain constrained. On this basis, average daily ridership by 2028 is assessed to be in the range of 300,000–450,000, which, while representing substantial growth from current levels, would remain below the 740,000 daily ridership target envisaged in NDB’s appraisal.

(ii) Reduction in average travel time to one hour between Delhi and Meerut by 2028

86. On the currently operational stretch between Meerut South and New Ashok Nagar, travel time has been recorded at approximately 42 minutes. This performance is broadly consistent with the projected full end-to-end benchmark of one hour between Modipuram and Sarai Kale Khan.

(iii) Annual reduction in CO₂: 258,035 tonnes of CO₂ reduced annually by 2028

87. The project document to the Board (PDB) set out an ambition for the RRTS to achieve significant CO₂ reductions through modal shift, supported by energy-efficient design and a net-zero target for non-traction energy use in stations and depots. In practice, systematic reporting on this outcome has not yet been established. Preliminary estimates—based on current daily ridership of approximately 40,000–41,000 passengers and standard emission factors for avoided vehicle-kilometres—suggest annual CO₂ savings in the range of 24,000–32,000 tonnes. This represents roughly 9–12% of the 2028 target and is broadly proportionate to the corridor’s current ridership. Looking ahead, the project’s overall emissions reduction performance remains highly elastic to future ridership growth and operational frequency. Under a higher-ridership scenario—such as achieving 500,000 average daily passengers—and assuming progressive decarbonisation of the power grid, the project remains well-positioned to meet its long-term CO₂ reduction targets.

(iv) By 2028, at least 70% of surveyed commuters will have positive perceptions of the RRTS in terms of affordability, safety, reliability, connectivity and comfort.

88. Since the system is yet to be fully commissioned, perception surveys have not yet been conducted; nonetheless, the evaluation assesses the project’s likely performance against this indicator based on the system’s design features, operational experience to date, and progress in each of these dimensions.

- (a) **Affordability.** With updated 2025 fares, the RRTS – priced at Indian Rupee (INR) 150 rupees for standard class and INR 225 for premium class for a 42–60-minute journey – occupies a unique mid-tier bracket, offering high-speed travel at fares only marginally higher than the lowest-cost alternative. Pricing is regulated by a multi-agency fare regulation committee to maintain an appropriate balance between cost recovery and accessibility, reinforcing the project’s affordability proposition.

TABLE 5.

Comparison of RRTS fares with other modes of transport (2025 fares)

Mode + class	Fare (INR)	Time taken
RRTS		
• Standard	150	42 mins
• Premium	225	42 mins
Indian railways (trains)		
• Air conditioned (AC) chair car	270	1 hr 30 mins
• Shatabdi train (AC chair car)	405	1 hr 20 mins
• Express train (sleeper class)	150	1 hr 20 mins
• Vande Bharat Express (AC chair car)	399	46 mins
• Vande Bharat Express (executive)	785	46 mins
Bus		
• State-run (non-AC)	128	3 hr
• State-run (with AC)	256	3 hr
Car		
• Self-driven – petrol	505	2 hr 30 mins
• Self-driven – compressed natural gas	277	2 hr 30 mins
• State taxi	800	2 hr 30 mins

Source: Compilation based on publicly available information

- (b) **Safety.** In addition to what was highlighted in para. 75, safety performance has been commendable since operations began, with no major passenger-related incidents reported. During its field visit, the evaluation team travelled from Sahibabad to Duhai station and observed a strong on-ground safety presence: trained staff at stations, clear incident-reporting points with prompt response, extensive CCTV coverage and well-lit platforms. Women-only coaches and visible women security personnel further strengthen perceived safety for women passengers. The trains also feature side-evacuation doors for emergency safety. Fire detection and protection systems (hydrants, hose reels, extinguishers) were in place and subject to regular checks. Overall, operational safety standards are robust and actively maintained.
- (c) **Service frequency/headway.** Due to the corridor being only partially operational, trains currently run at 15-minute headways instead of the planned four minutes. While this frequency is acceptable during partial operations, it will need to be improved once the corridor becomes fully operational. Prolonged reduced frequency risks eroding passenger confidence—particularly among frequency-sensitive commuters—and may lead to greater variability in overall journey times.

(d) **Connectivity.** Multimodal connectivity has been a central consideration in the planning and implementation of the RRTS, which includes not only seamless integration with existing modes of transport but also alignment planning to link the maximum number of transport nodes. The system design also envisages interoperability across RRTS corridors to enable through movement once the wider network is commissioned. However, at the current stage of operations, the user experience of connectivity remains constrained, primarily due to the phased commissioning of stations and sections, ongoing systems integration, and dependence on parallel readiness and service alignment with other transit agencies. Consequently, first- and last-mile connectivity and seamless transfers are not yet consistently available across the operational stretch, leading some passengers to rely on intermediate modes and incur higher door-to-door travel times and costs.

(e) **Comfort.** The evaluation team’s journey between Sahibabad and Duhai confirmed that the RRTS provides a high level of passenger comfort. The trains are clean, quiet, and air-conditioned and equipped with automatic doors, Wi-Fi connectivity, on-board infotainment systems, mobile and laptop charging points, and a public address system for real-time announcements. They feature wide doors, level boarding, smooth acceleration and braking, and clear audiovisual information, providing ample seating and standing space across both premium and women-only coaches. Stations are spacious, well-ventilated, and efficiently managed, supporting smooth passenger flow. However, incomplete interchange facilities and limited escalator coverage at certain hubs continues to affect convenience.

89. **Demonstration and replication effects.** The Delhi-Ghaziabad-Meerut RRTS has established a pioneering model of high-speed regional mobility in India, demonstrating the feasibility of integrating intercity and intra-urban transport within a single operational framework. The project’s design, institutional setup, and early operational success have served as proof of concept for subsequent RRTS corridors under planning, including Delhi-Bawal and Delhi-Karnal, which are now adopting similar standards and digital systems. The project has thus catalysed replication of the regional rapid transit model as a scalable, low-carbon transport solution for India’s fast-growing metropolitan regions.

90. **Localisation and capacity-building in advanced rail systems.** The introduction of advanced signalling (ETCS level 2 over long-term evolution [LTE] systems), automatic train operation, and platform screen door integration required the development of new technical and operational capacities within India’s railway ecosystem. NCRTC collaborated with international suppliers and national training institutions to build a skilled workforce through simulation-based training and certification programmes, including young male and female university graduates. This has contributed to the localisation of advanced rail technology and established a domestic foundation for future corridors. As such, the project has strengthened institutional and human capital capacity within the transport sector – an enduring form of effectiveness that is beyond the DMF indicators.

91. **Summary.** The physical implementation of the NDB-financed components – rolling stock, signalling and train control systems, and staff quarters – has progressed gradually, with completion broadly on track. The corridor is partially operational and has demonstrated the system’s technical viability, safety, and passenger comfort, as well as early evidence of replication and institutional capacity-building benefits. However, the project’s ability to achieve its intended developmental outcomes remains constrained by delays in multimodal integration, incomplete feeder connectivity and reduced service frequency, all of which directly affect ridership and emissions reduction outcomes. With strengthened coordination among NCRTC, municipal bodies, and local transport agencies, progress on these aspects can be accelerated. Considering these achievements and shortfalls, IEO rates the project’s effectiveness as **“successful”**.

Criterion	Rating
Effectiveness	Successful (5)

C. Efficiency

92. The assessment of efficiency focuses on analysing the extent to which NDB's intervention delivered, or is likely to deliver, results in an economic and timely way. "Timely delivery" refers to the delivery of results within the scheduled time frame, or a time frame adjusted due to the evolving context. Efficiency also considers operational efficiency, i.e., how well the intervention was managed.
93. **Operational efficiency.** The project advanced through NDB's internal approval processes at a notable pace, particularly given the Bank's institutional youth in 2020. Following the Department of Economic Affairs' nomination in April 2020, NDB's concept note was prepared in June, a fact-finding mission was conducted in July, and the loan was approved by the Board in September 2020. The loan agreement was signed on 19 November 2020 and declared effective on 22 December 2020 — an interval of less than three months. This turnaround compared favourably with multilateral benchmarks and demonstrated high administrative efficiency and strong coordination between DEA, MoHUA, and NDB. The Bank's ability to secure swift approval during the COVID-19 pandemic, when field missions and inter-agency consultations were constrained, reflected institutional agility and effective virtual coordination.
94. **Due diligence.** NDB's due diligence was conducted efficiently once the project was brought into its pipeline, but the Bank's late entry significantly constrained the scope and depth of its appraisal. By the time NDB initiated its assessment in mid-2020, the project had already undergone extensive preparatory work by ADB—whose support dated back to 2018 through feasibility studies, technical and economic analyses, safeguard assessments, and multiple appraisal missions under the MFF framework. AIIB, though joining later, aligned its appraisal closely with ADB's process, conducting its concept review in March 2020 and approving the loan in October 2020 under a coordinated co-financing arrangement.
95. In contrast, NDB entered at a point when major procurement packages—including civil works, signalling, and rolling stock—had been finalised or were at advanced stages of tendering. As a result, NDB had limited room to conduct detailed option analysis, influence technical specifications, optimise procurement packaging, or assess alternative delivery models such as PPP arrangements that later emerged during implementation. Although NDB's appraisal mission was comprehensive and completed within a compressed timeline, the Bank's late entry into the project limited opportunities for substantive influence on project design. As a result, while NDB's due diligence was administratively robust and procedurally sound, it added only modest incremental value to overall project efficiency. From the borrower's perspective, procurement progress was timely; however, from NDB's standpoint, late-stage entry reduced its ability to proactively mitigate procurement risks.
96. **Loan cancellation.** NDB's USD 500 million loan accounted for roughly 15% of total project costs and focused mainly on signalling and train control systems and rolling stock procurement. However, in 2023, the NCRTC requested the cancellation of USD 82 million, reducing NDB's loan to USD 418 million. The request, endorsed by the DEA, cited project cost savings arising from reduced requirements for staff quarters, currency depreciation, and the withdrawal of the Jangpura stabling yard package, which was subsequently developed under a public-private partnership model. The DEA's official communication to NDB was sent in May 2023. Although a formal amendment to the loan agreement was not required, NDB confirmed the partial cancellation to the borrower in August 2023, and the revised financing allocations across expenditure categories were promptly updated thereafter. This reflects NDB's timely and efficient processing, in line with established procedures.

97. While the partial cancellation of USD 82 million from NDB’s original loan does not, in itself, indicate shortcomings in implementation, it raises broader efficiency concerns regarding resource utilisation and portfolio adaptability. The cancelled component—the Jangpura stabling yard—was intended to serve both current and future RRTS corridors. However, delays and uncertainties in the rollout of the future corridors led NCRTC to reconsider the financing modality and explore a PPP model, an approach aligned with evolving policy preferences. Although the uncertainty regarding future corridors may have been difficult to anticipate at the time of appraisal, a deeper engagement with sectoral policy trends and potential shifts in the borrower’s strategic direction—particularly around PPPs—might have strengthened NDB’s ability to identify and appraise financing-model risks.
98. The cancellation—without reallocation of funds to other eligible components—reduced the overall resource utilisation efficiency of the loan and created an opportunity cost, as the unused resources could have supported other priority operations in India or across other NDB member countries. The situation underscores the need for greater flexibility in financing design and enhanced upstream diagnostics to account for components linked to future phases of the project that may be subject to deferral or reprioritisation. It also highlights the importance of strengthening mechanisms for adaptive project management during implementation, particularly when early signs of restructuring emerge. While NCRTC’s intent to adopt a PPP model remains under consideration, the cancellation ultimately reflected a missed opportunity for the Bank to stay strategically engaged and demonstrate operational flexibility.

TABLE 6:

Allocation of NDB financing for the project (millions of USD)

Sr. no.	Expenditure category	NDB financing plans	
		Original	Revised
1	Rolling stock	230.90	268.47
2	Signalling, train control, platform screen doors and telecommunications systems	143.50	112.65
3	Civil works for Jangpura stabling yard, operational control centre*, multi-storied staff quarters and associated facilities	106.00	31.58
4	Front-end fee for NDB loan	1.25	1.25
5	Contingency	4.05	4.05
6	Escalation	14.30	-
	Total	500.00	418.00

*Removed from NDB financing.

Source: NCRTC’s letter to DEA for loan cancellation and revised allocation of NDB financing.

99. **Disbursement efficiency.** The disbursement schedule defined in NDB’s semi-annual progress reports had been broadly adhered to during implementation. Slight variances between targeted and actual disbursements are largely explained by the nature of the packages financed by NDB. Rolling stock, signalling, telecommunications, and platform screen door systems follow milestone-based payment structures under which the largest tranche of financing is released only after equipment has been delivered, installed, tested and formally accepted. As a result, NDB’s disbursements remained lower than planned in the early stages but rose sharply toward the later part of the implementation period. As of March 2025, USD 263 million of NDB loan had been disbursed, representing 63% of the total loan amount.

TABLE 7:

The NDB loan disbursement schedule (USD million)

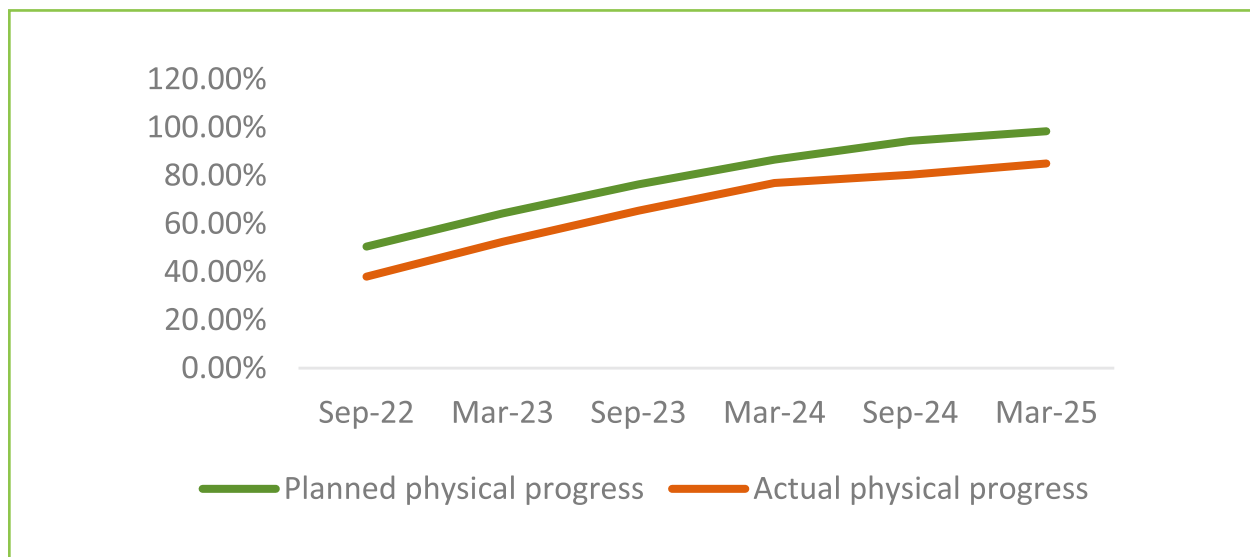
	Mar-23		Sep-23		Mar-24		Sep-24		Mar-25	
	Targeted	Actual	Targeted	Actual	Targeted	Actual	Targeted	Actual	Targeted	Actual
P9A	18.96	11.67	16.41	24.13	15.14	20.88	40.90	57.80	39.61	8.08
P24	14.82	9.12	5.19	7.63	7.34	10.12	12.92	18.53		
P30	8.82	5.43	2.20	3.24	4.13	5.70	1.88	2.70		

Source: Project progress reports.

100. **The project’s physical progress is marginally behind schedule.** Figure 2 illustrates the planned versus actual physical progress, as reported in NDB’s semi-annual progress reports submitted in March and September. As evident from the figure, the actual physical progress has consistently trailed slightly behind the planned trajectory. While the deviation is not substantial, it indicates a minor slippage in the project’s implementation schedule.

FIGURE 2:

Planned vs actual physical progress



Source: Project progress reports.

101. **Cost efficiency.** As of 31 March 2025, the cumulative project expenditure amounted to INR 24,993 crore (approximately USD 3,332.4 million, at an exchange rate of INR 75 to USD 1). This represents approximately 83% of the total approved project cost. Importantly, there is no evidence of cost overruns relative to the sanctioned envelope in the latest reports. Instead, the financial data highlight consistent discipline in cost categorisation and a coherent allocation of financing responsibilities across partners.

102. **Economic efficiency.** The revised economic analysis followed the methodology applied in the project document to the Board, updated with current expenditure and benefit data. The evaluation covers the full economic life of the project, from 2021 to 2054, consistent with appraisal assumptions. Costs include actual and projected capital expenditure up to 2027, together with operation and maintenance costs thereafter, converted to economic terms using standard conversion factors. Benefits include monetised travel-time savings, vehicle operating cost savings and environmental benefits from reduced CO₂ emissions, linked to observed ridership levels in 2025 and the projected ramp-up to 2028 and beyond. A 10% discount rate was used, with no residual value assumed, to ensure comparability with the base case in the project document to the Board.
103. The recalculated economic internal rate of return (EIRR), under conservative assumptions reflecting actual capital costs and current ridership trajectory, is estimated at 12–15%, remaining above the 12% threshold but sensitive to ridership performance. This reflects delays in achieving expected ridership. Switching-value analysis indicates that average daily ridership of approximately 500,000 passengers would be required to maintain the appraisal-stage EIRR, suggesting that the project's economic viability hinges critically on the timely completion of the full corridor, the restoration of planned service frequencies and the effective implementation of multimodal integration and feeder networks.
104. **Digital efficiency.** The project's efficiency was significantly enhanced through NCRTC's systematic use of digital technologies. Building information modelling (BIM) served as a backbone for integrated design, construction, and asset management, reducing design conflicts and expediting approvals. To further mitigate COVID-19 disruptions, BIM and other digital platforms enabled remote design validation, digital supervision, and inter-agency coordination, ensuring continuity of monitoring even when site visits were restricted. NCRTC's in-house SPEED platform provided real-time progress tracking, cost monitoring, and safety reporting, streamlining project management across multiple packages. The Aparimit Innovation Centre has institutionalised digital innovation, including full-scale train simulators for operator training. Together, these tools not only improved coordination and reduced errors but also helped maintain alignment with DMF targets despite disruptions, demonstrating that digitalisation directly strengthened implementation efficiency.
105. **Summary.** NDB processed and made the loan effective with exceptional speed during the COVID-19 period, and the project has maintained strong cost discipline with no overruns, supported by NCRTC's effective use of digital tools that strengthened design coordination and construction oversight. Disbursements broadly followed the semi-annual schedule, with variances largely driven by the milestone-based nature of rolling stock and systems contracts rather than weaknesses in financial management. The most significant efficiency concern, however, is the partial cancellation of USD 82 million of NDB's loan, without any reallocation to other eligible project components. This resulted in committed resources remaining unused despite the Bank's capacity to deploy them, representing a clear inefficiency in resource utilisation. The cancellation not only reduced NDB's contribution to this flagship operation but also reflected gaps in upstream appraisal depth and limited engagement during implementation to anticipate the borrower's evolving needs, including the decision to restructure the Jangpura package under a PPP model. Separately, the updated economic analysis indicates returns in the range of 12–15%, remaining above the 12% threshold but sensitive to ridership achievement. Based on the above, project efficiency is assessed as **"moderately successful"**.

Criterion	Rating
Efficiency	Moderately successful (4)

D. Impact

106. Impact is concerned with the extent to which the project has generated significant positive or negative, intended or unintended, higher-level effects. Given the multi-financier nature of the operation, impact is assessed at the system level rather than at the level of individual financing packages.
107. As this is a mid-term evaluation, at this stage only early evidence and emerging trends can be examined. As a result, for reasons of timing and evidence availability, the impact criterion has not been rated in this mid-term assessment.
108. **Impact on India's transport sector.** The project marks a transformational milestone in India's transport sector, being the country's first operational regional rapid transit system, designed for a maximum speed of 180 km/h and an operational speed of 160 km/h. It bridges the long-standing gap between inter-city rail and urban metro systems, introducing a new class of high-speed, high-frequency regional mobility. The project has demonstrated that such a system is technically and institutionally feasible within India's dense urban environments, setting new benchmarks for speed, safety and the commuter experience. The RRTS has also served as a demonstration model for modern rail technology and systems integration. Its introduction of ETCS level 2 signalling over an LTE backbone, platform screen doors, and interoperability between regional and metro services represents first-of-its-kind applications in the country. These innovations have directly informed the design and technical standards for upcoming RRTS corridors such as Delhi-Alwar and Delhi-Panipat, thereby shaping India's emerging national framework for regional rail development.
109. Institutionally, the project has strengthened the capacity of the National Capital Region Transport Corporation as a specialised implementing agency capable of managing large-scale, multi-jurisdictional and multi-financier infrastructure. The use of BIM-based project management, digital procurement, and integrated operations control systems has introduced a new model of data-driven governance and transparency in public transport delivery.
110. **Carbon emission reduction.** The RRTS is already demonstrating measurable potential to reduce transport-related emissions through a combination of: (i) modal shift; and (ii) energy-efficient operations. Partial operations are carrying approximately 40,000–41,000 passengers daily, with peak ridership reaching about 69,000 during diversions of road traffic from the nearby National Highway 58. This shows early signs of modal shift, as commuters substitute private vehicles and intercity buses with the RRTS. Because traction energy per passenger-kilometre on the RRTS is substantially lower than on mixed-traffic roads, and trains operate on fixed guideways with higher load factors, each additional rider contributes to lowering system-wide CO₂ emissions. Preliminary estimates—based on standard emission factors for avoided vehicle-kilometres—suggest annual CO₂ savings in the range of 24,000–32,000 tonnes. Once the full corridor and multimodal linkages are completed, the RRTS is expected to achieve an annual reduction of around 0.26 million tonnes of CO₂, positioning it as a key milestone in India's transition toward low-carbon regional mobility.
111. At the same time, the project is progressively reducing its own operational carbon footprint through renewable energy integration and efficient technologies. Approximately 4.7 MWp of rooftop solar capacity has been commissioned across stations and depots, generating approximately 5.3 GWh per year and avoiding about 4,900 tCO₂ annually based on current grid factors. In parallel, a 110 MW captive solar plant has been approved, which, once operational, will raise the share of renewable energy to nearly 60% of total electricity consumption, further reducing the system's carbon intensity. These initiatives are complemented by lightweight, energy-efficient rolling stock equipped with regenerative braking and optimised heating, ventilation and air conditioning systems, as well as station energy-management technologies that collectively minimise specific energy use as ridership increases.

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112. **Urban climate resilience.** The project enhances the resilience of the infrastructure in the NCR by providing an all-weather public transportation mode that works even during extreme weather. To address hydro-morphological risks and more extreme rainfall, deeper bridge foundations (e.g., on Yamuna River crossings) and enhanced scour protection were adopted; drainage has been designed with higher return-period storms in mind, and rainwater harvesting is integrated at stations, depots and along viaduct corridors to manage runoff and augment aquifers. Elevated guideways avoid frequent waterlogging on surface roads, protecting timetable integrity during heavy rain. Material and systems choices (ballastless track, platform screen doors that stabilise the microclimate on platforms, and equipment rooms with improved heat rejection) help maintain performance during heatwaves, which are expected to intensify with climate change. Collectively, these measures increase the likelihood that environmental benefits – especially reliable travel that sustains mode shift – are maintained under climate stressors.
113. **Minimal ground footprint.** The project has achieved notable E&S benefits through its corridor design, which deliberately minimises physical disruption and land-use pressures. By adopting elevated viaducts along most of the corridor, the RRTS has substantially reduced its ground footprint compared with conventional surface-based transport infrastructure. This design avoids the need for large-scale demolition, continuous land acquisition, or extensive resettlement, and limits direct interference with existing urban structures and ecosystems. The use of slender piers and raised guideways allows the system to “fly over” existing roadways and built-up areas with very limited permanent land-take. This approach significantly reduces the extent of direct land disturbance, lowering construction-related environmental pressures and avoiding habitat fragmentation by keeping overall displacement to a minimum.
114. **Positive socio-economic impact.** While it is not yet possible to establish a direct causal link between the corridor and increased regional economic activity or balanced economic development, the project has already generated meaningful socio-economic benefits at the system level.
- **Investment stimulus and employment creation.** As of March 2025, cumulative project expenditure stood at approximately INR 24,993 crore (around 83% of the project cost), reflecting substantial investment stimulus, employment generation and supply chain activity. At peak construction, about 1,800 workers were directly engaged across project sites, supported by several thousand more through subcontracting in materials, logistics and fabrication. The NCRTC’s workforce has also expanded to approximately 700 staff, including nearly 400 permanent personnel, ensuring institutional capacity for long-term operations and maintenance.
 - **Fiscal revenues, transit-oriented development and land-value uplift.** The corridor has catalysed fiscal revenues and local investment through transit-oriented development and value capture financing mechanisms. Revenues from the sale of additional development rights (floor area ratio) within the TOD zones of the project and a new fee termed ‘special amenity fee’, levied in Ghaziabad and Meerut, are expected to contribute to enhancing the financial sustainability of the project. Preliminary estimates from the Ghaziabad Development Authority indicate a potential 200% rise in TOD-zone receipts once operations stabilise. Meanwhile, land values within a two-kilometre radius of RRTS stations in Ghaziabad and Meerut have increased by 30–67% since 2023, expanding local tax bases and incentivising private investment in housing and commercial real estate.

- **Polycentric development²⁵ and regional economic restructuring.** The RRTS also represents a structural intervention in the NCR's spatial economy. By connecting Delhi with its major satellite cities through a one-hour end-to-end journey, the corridor supports a polycentric pattern of growth, enabling Ghaziabad, Modinagar and Meerut to emerge as viable economic and residential centres rather than dependent commuter towns. Firms can now operate outside Delhi while maintaining efficient access to its labour markets and logistics networks, thus spreading growth more evenly across the NCR and reducing urban congestion. Early market signals reinforce this trend: real estate developers in Ghaziabad and Meerut are already marketing "RRTS-connected" projects, reflecting the corridor's catalytic role in shaping investment flows and regional competitiveness.
- **Travel-time savings, productivity gains and improved accessibility.** The operational 55 km section has reduced travel time between Sahibabad and Meerut South to about 30 minutes, compared to around 2 hours by road in peak congestion. At the user level, the partial corridor is already generating measurable productivity gains. A commuter switching from road to rail saves 80–100 minutes per trip, resulting in a 63–70% reduction in travel time. For the current 40,000–41,000 daily riders, this translates into tens of thousands of productive hours gained per day. Enhanced labour productivity is therefore an early and visible benefit, as workers spend less time in traffic and more time in income-generating activities, education, or caregiving. In addition, greater travel-time predictability enhances labour reliability for employers and reduces absenteeism, an often-overlooked but important aspect of economic efficiency in congested urban regions.
- Beyond economic effects, improved accessibility has strengthened quality of life. It allows families to spend more time together, gives students more reliable access to schools and universities, and, for patients and caregivers, quicker access to Delhi's hospitals implies faster and safer medical treatment. Furthermore, households can reside in more affordable areas without losing access to urban opportunities. By shifting tens of thousands of commuters from the heavily congested National Highway 58 to a segregated rail corridor, the RRTS also helps reduce road congestion and the risk of traffic accidents, a major cause of fatalities in the NCR. Enhanced system safety and passenger security further contribute to quality of life. Features such as CCTV surveillance, platform screen doors, women-only coaches, and well-staffed stations have improved perceived and actual safety, particularly for women travellers.
- **Gender inclusion and social equity.** The project has generated important socio-economic benefits through improved gender inclusion and social equity, enhancing equitable access to mobility and participation in the transport workforce. Supported in part by the JFPR grant, targeted initiatives have strengthened safety, confidence and inclusion for women and vulnerable groups through sensitisation of last-mile service providers, outreach with transgender persons and self-defence training for women and girls (refer to paras. 163–168 for more details). Beyond ridership, the project has expanded economic participation. More than 500 women have been trained as mobility service providers, and women now account for over one-third of operations staff in the RRTS system—an unprecedented level in India's rail sector. In parallel, system design features such as women-only coaches, extensive CCTV coverage, platform screen doors, emergency communication points and well-staffed stations have improved perceived and actual safety. Universal-access infrastructure—compliant with the Harmonised Guidelines for Universal Accessibility (2021)—combined with the provision of assistive aids for persons with disabilities, has further reduced mobility barriers for the elderly, children and persons with disabilities.

25 A model where multiple urban nodes grow in tandem rather than being overshadowed by Delhi's primacy.

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115. **Negative socio-economic impact.** While the overall socio-economic effects of the RRTS are positive, some localised adverse impacts have been observed. During construction, small businesses and informal vendors operating along major stretches of the alignment, – particularly near National Highway 58 and in dense market areas of Ghaziabad and Meerut – experienced loss of access, reduced customer footfall, and temporary displacement due to road diversions, barricading and excavation works. The evaluation recognises that the NCRTC undertook extensive stakeholder engagement. The observed impacts therefore do not reflect gaps in compliance but rather highlight the inherent challenges of managing construction-related disruptions in dense urban settings. Going forward, strengthening advanced information sharing, improving the predictability of construction phasing and enhancing coordination with local commercial associations may help mitigate short-term livelihood impacts on small enterprises during similar large-scale infrastructure works.
116. Looking ahead, TOD around RRTS stations, while expected to stimulate investment and reinforce polycentric growth across the NCR, also carries a risk of gentrification. Land and rental prices in Ghaziabad, Modinagar and Meerut are rising faster than household incomes, potentially displacing lower-income residents and small traders from emerging high-value zones. The increase in land values within two kilometres of RRTS stations by 30–67% since 2023 reflects both the economic dynamism unleashed by improved connectivity and the equity challenges inherent in TOD-led growth.

E. Sustainability

117. Sustainability assesses whether the project benefits will last or are expected to last after completion. The evaluation examined several aspects of sustainability from the institutional, financial, operational and E&S perspectives. The salient aspects of the project's assessment are outlined in this section.
118. Given that this is a mid-term evaluation and the project is still under implementation, a full sustainability assessment is not feasible at this stage. The durability of benefits, such as financial self-sufficiency, institutional capacity to manage operations, and the persistence of environmental and social outcomes, can only be meaningfully judged once the system has been fully operational for several years. The present assessment therefore considers the likelihood that these benefits will last, based on current evidence and emerging trends, but does not assign a formal rating for this criterion.

(i) Financial sustainability

119. The financial sustainability of the project is assessed across three dimensions: the financial internal rate of return (FIRR), the fiscal capacity of the borrower and relevant public authorities to sustain operations and provide financial support as needed, and the project's debt service coverage ratio (DSCR) as an indicator of its capacity to meet repayment requirements from operating revenues.
120. At appraisal, the project's post-tax FIRR was estimated at 5.83% (real terms), marginally exceeding the weighted average cost of capital (WACC) of 5.22%. Based on the evaluation's updated financial analysis, the recalculated FIRR is estimated at approximately **5.6%**, remaining broadly comparable with the appraisal estimate and slightly above the WACC. The recalculation, presented in Annex VIII along with data sources and validation techniques, replicates the structure and assumptions of the NDB project document to the Board, while updating key inputs to reflect current operational realities. These updates include phased commissioning, observed ridership in 2025, revised ridership ramp-up trajectories consistent with partial corridor availability, the currently notified fare structure and conservative non-fare revenue assumptions, while retaining the appraisal framework for capital expenditure phasing and operating and maintenance (O&M) cost estimation.

121. From an operational cost recovery perspective, the analysis indicates that farebox and non-fare revenues are currently insufficient to cover full operating costs during the early years of partial operations, reflecting subdued ridership and incomplete network integration. Cost recovery improves progressively in later years as ridership scales up and non-fare revenues expand, but the project is not expected to achieve full operating self-sufficiency in the medium term. This trajectory is consistent with international experience for large urban and regional rail systems and underscores the project's continued reliance on public support during the ramp-up phase.
122. The ridership ramp-up pattern assumed in the financial model is explicitly non-linear, reflecting empirical evidence from observed ridership increases following sectional openings and multimodal integration within the Delhi NCR transport ecosystem. The evaluation therefore adopts a phased demand growth profile rather than a linear extrapolation, recognising that sustained ridership growth depends critically on completion of the remaining corridor sections, restoration of planned service frequencies, and effective first- and last-mile connectivity.
123. In terms of state-level support mechanisms, the project's financial sustainability is underpinned by strong sovereign and sub-sovereign backing. The MoHUA's consistent budgetary commitment to urban and regional transit—over INR 23,000 crore in the financial year 2024–2025²⁶—and the prudent fiscal indicators of the Government of Uttar Pradesh (debt-to-gross state domestic product \approx 29%, deficit $<$ 3%²⁷) demonstrate the capacity to sustain the project and provide viability-gap support if required.
124. However, the project's operational cash flow strength remains limited. At appraisal, the project's debt service coverage ratio (DSCR) averaged 1.47 (minimum 1.18), reflecting narrow liquidity margins. Based on updated projections, the average DSCR now at approximately 1.25, dipping below unity in the early years due to subdued ridership. While this indicates temporary revenue pressure, the risk to debt service remains minimal because of the sovereign guarantee framework.
125. In summary, the RRTS demonstrates moderate financial sustainability—not self-financing but fiscally secure under robust sovereign support. Key sustainability risks include: (i) ridership achievement—medium likelihood, high impact; (ii) non-fare revenue delays—medium likelihood, medium impact; (iii) fiscal support constraints—low likelihood, high impact.

(ii) Institutional and operational sustainability

126. The RRTS rests on a robust and enduring institutional framework. The National Capital Region Transport Corporation—a permanent joint venture of the governments of Delhi, Uttar Pradesh, Haryana and Rajasthan—ensures shared ownership, accountability, and continuity of operations beyond project completion. Its board-led governance, statutory obligations, and audited financial systems provide a sound corporate foundation. Federal oversight through MoHUA strengthens policy alignment, while co-financing by ADB, AIIB, and NDB has embedded international fiduciary and safeguard standards into NCRTC's systems. Over time, NCRTC has developed into a technically capable institution with nearly 700 staff, including railway professionals, engineers and domain specialists, and has institutionalised modern tools such as BIM-based project management, digital procurement, ERP-SAP and integrated asset-monitoring systems. This institutional architecture is not confined to the Delhi-Meerut corridor alone: the forthcoming Delhi-Karnal and Delhi-Bawal RRTS corridors will use the same operational standards, technologies, and management systems, ensuring skill retention, interoperability and economies of scale.

26 MoHUA total budget allocation for FY 2024–25 and transport sector provisions under the Ministry's Demand for Grants.

https://prsindia.org/budgets/parliament/demand-for-grants-2024-25-analysis-housing-and-urban-affairs?utm_source=chatgpt.com

27 Data on fiscal variables is sourced from the Reserve Bank of India, State Finances Report, as of December 2024.

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127. Furthermore, operational sustainability is reinforced through a long-term performance-based contracting model. A 12-year gross-cost contract with Deutsche Bahn Engineering & Consulting GmbH India, a subsidiary of Deutsche Bahn, governs train operations, station management, and systems maintenance under clearly defined key performance indicators, ensuring predictable service quality while insulating the operator from ridership volatility. Maintenance of rolling stock has been bundled into a 15-year original equipment manufacturer-backed service agreement, supporting lifecycle reliability and spare parts security. NCRTC retains strategic control through NCRTC Express Transit Limited, its dedicated subsidiary, which monitors compliance on service quality, safety and customer satisfaction. These contractual and monitoring arrangements collectively balance efficiency with accountability, preserving operational discipline while maintaining public-sector oversight. Furthermore, the codification of standard operating procedures for train control, safety, and incident response, alongside digital maintenance and energy-management systems, reduces reliance on individual expertise and ensures continuity of standards.
128. Despite these enablers, several risks affect operational sustainability. The most pressing is the slow build-out of multimodal integration: without reliable multimodal linkages, ridership may continue to lag, undermining the service plan and weakening cost recovery. The corridor's dependence on uninterrupted grid supply also creates an operational vulnerability, since a total grid failure halts traction, even though station operations can run on backup generators. Furthermore, while the gross-cost contract stabilises operator finances, the underlying revenue risk remains with NCRTC and the state governments, who must cover any operating deficits. In effect, efficiency gains alone cannot ensure sustainability unless demand strengthens.

(iii) Environmental and social sustainability

129. The environmental and social sustainability of the Delhi-Ghaziabad-Meerut RRTS is anchored in the institutionalisation of robust management systems and long-term compliance capacity.
130. On the environmental side, NCRTC has implemented comprehensive environmental management plans and a safety, health and environment framework across all contract packages. These are backed by periodic audits, internal inspections, and third-party monitoring by the National Accreditation Board for Testing and Calibration Laboratories, covering air, noise, water and soil quality. Monthly contractor reports and quarterly consolidated reports are reviewed by the general consultant and NCRTC's Environmental Cell, while findings are disclosed to the State Pollution Control Boards. Statutory clearances – such as Consent to Establish and Operate, forest and tree-felling approvals, and hazardous waste authorisations – have been secured and renewed on schedule. Corrective action plans are tracked systematically, ensuring compliance with environmental management plan provisions and adaptive management during construction and operation. These systems have matured through practice and are expected to remain active throughout the O&M phase.

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131. On the social side, sustainability is ensured through strong institutional arrangements for land acquisition, resettlement, and stakeholder engagement, aligned with the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (2013) and multilateral safeguard frameworks (from ADB, AIIB and NDB). A dedicated Social Management Unit oversees implementation with continuous supervision by the Resettlement Implementation Support Agency and regular validation by an independent external monitor. A two-tier grievance redress mechanism functions at both field and headquarters level, supported by complaint registers, e-mail access, and public consultations. Monitoring reports confirm that all grievances logged to date have been resolved, with the mechanism integrated into the government's Centralised Public Grievance Redress and Monitoring System portal to strengthen accessibility and transparency.
 132. NCRTC has also invested heavily in capacity-building and institutionalisation of safeguard expertise, ensuring continuity beyond external consultant contracts. Dedicated environmental and social specialists are embedded within each project management office, supported by a central team at headquarters that coordinates with contractors, the general consultant, and co-financiers. Regular safety, health and environment training, mock drills, HIV/AIDS and gender awareness campaigns, and community outreach programmes have been conducted to embed safety and social awareness across the workforce and surrounding communities. This ensures that E&S management is now an institutional function rather than a compliance-driven activity.
 133. Looking forward, the sustainability of these gains is reinforced by the structural features of the project. Environmental benefits such as low emissions, renewable energy integration, minimal ground footprint, and climate-resilient infrastructure are inherent in the corridor's engineering design rather than temporary mitigations. Similarly, social sustainability – achieved through limited displacement, transparent compensation, and inclusive design – has been embedded through participatory planning and institutional capacity. Together, these features ensure that both environmental and social gains are durable and replicable, not only in this corridor but also in upcoming RRTS lines such as Delhi-Karnal and Delhi-Bawal.

V. OTHER EVALUATION CRITERIA

A. NDB performance

134. **Background of the NDB's entry.** NDB's participation in financing the project was first considered by the DEA of the Government of India on 11 March 2020. By that stage, both ADB and AIIB had already been engaged, to varying degrees, in project preparation. Although ADB approved its first-tranche loan only in August 2020, it had supported the project's design and structuring since 2018 through feasibility studies, technical and economic analyses, safeguard due diligence, and appraisal missions that shaped the overall investment framework under the multi-tranche financing facility. In contrast, AIIB joined the process later, aligning its due diligence with ADB's framework. It held its concept review on 24 March 2020, followed by loan approval on 23 October 2020 under a joint co-financing arrangement led by ADB. NDB entered when the project had already advanced into early implementation. A virtual meeting convened by NCRTC on 14 April 2020 with ADB, AIIB and NDB to explore co-financing options confirmed that construction of the priority section had already commenced and that most major bids had either been invited or were under finalisation. The loan was negotiated with NDB on 3 September 2020, approved by the Board on 29 September 2020, signed on 19 November 2020, and became effective on 22 December 2020.
135. **Project design.** Building on the technical proposal submitted by the DEA, NDB conducted a fact-finding mission from 13–17 July 2020 during the peak of the COVID-19 pandemic. The mission was conducted virtually through videoconferencing and comprised a multidisciplinary team of seven members, including a technical consultant. It was undertaken promptly after DEA's proposal and was notably comprehensive, covering the project's scope and components, technical, financial, and economic appraisal, and a review of E&S aspects, procurement, and implementation arrangements.
136. Following this mission, NDB's swift and decisive engagement in the RRTS project – despite the absence of (at the time) a regional office in India and a country operations director general, and the constraints of the pandemic – reflected strong institutional agility, responsiveness and commitment. The Bank processed the loan application efficiently, moving from concept to Board approval within a few months, and aligned with country procurement systems – allowing advanced-technology rolling stock and signalling and train control packages to be financed without disruption.
137. That said, the Bank's entry into the project was when the project was at a more advanced stage – by the time its loan was approved, most major procurement packages, including rolling stock and signalling and train control, which ultimately fell under NDB financing, had already been tendered or were at advanced stages of preparation. This sequencing effectively limited NDB's ability to influence the scope, specifications or contracting approach of its own package, confining its role to a financier of pre-identified components. The absence of an India-NDB country strategy or sector-specific roadmap further constrained early engagement, leaving NDB reliant on external allocation decisions by the Government of India rather than proactive pipeline development. In comparison, co-financier ADB was able to position itself earlier and shape design features through following their established country and sector strategies.
138. Furthermore, the due diligence and appraisal of the project conducted by the NDB project design team could have been strengthened to identify issues in its design and monitoring framework, including the quality of selected indicators for performance assessment and the targets set up at design.

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139. Due diligence gaps were also evident in NDB's limited anticipation of downstream changes—particularly the restructuring of the Jangpura stabling yard and associated facilities into a PPP model. Although policy signals in favour of transit-oriented development and land-value capture were visible in the broader urban transport landscape, these were not fully analysed during appraisal. When NCRTC later shifted the package to a PPP structure, NDB was positioned only to process the cancellation procedurally, rather than to support or shape the restructuring. The cancellation of USD 82 million—without reallocation to other eligible components—meant that committed resources remained unused, reducing NDB's financial footprint and representing a missed opportunity to deploy funds efficiently within the project or across the Bank's wider portfolio. This outcome points to gaps in upstream sectoral analysis, and insufficient adaptive management during implementation to foresee changes that had material implications for NDB's resource utilisation.
140. **Supervision and monitoring.** NDB's supervision record shows clear strengths: the Bank conducted three missions between project approval and mid-2025 (a virtual fact-finding mission in 2020; a review in 2023; and a mid-term review in 2024). The fact that a structured mid-term review was completed and produced concrete recommendations and action plans for the NCRTC is commendable, reflecting institutional commitment and an increasing operational discipline. Additionally, on the positive side, given that the Bank financed primarily procurement and commissioning packages rather than large civil works, sending mission teams without dedicated transport-construction specialists was understandable. The supervision ensured alignment with procurement and disbursement systems and helped maintain oversight during a challenging environment (including the COVID-19 pandemic).
141. At the same time, the supervision approach could be slightly strengthened. The DMF gaps remained unaddressed – notably the missing indicators and targets relating to multimodal integration, feeder services, and TOD, as well as the absence of phased milestones for a project implemented in phases. An overall review of NDB's supervision documentation, including mission aide-memoires and the Mid-Term Review (MTR), indicates that the Bank's reporting is generally clear, well-structured and aligned with standard MDB practice. The reports summarise key discussions, document meetings with NCRTC, and systematically record agreements reached, thereby enhancing transparency and providing a traceable record of supervisory engagement. They also demonstrate consistency in tracking procurement, E&S compliance and implementation arrangements, reflecting an improving operational discipline. However, the quality of supervision documentation could be strengthened in certain respects. The reports tend to be largely descriptive rather than analytical, with limited use of performance data to assess risks or diagnose emerging implementation bottlenecks. For instance, the September 2023 aide-memoire documented progress on procurement milestones but did not flag the emerging PPP consideration for the Jangpura stabling yard, which materialised in the subsequent loan amendment. Similarly, trends in ridership performance were not systematically assessed against appraisal projections within supervision documentation. Additionally, and more generally, the reports did not articulate the underlying risks associated with the USD 82 million loan cancellation, limitations in the design of the DMF, or delays in the commissioning of critical systems packages. As a result, while the reports fulfil an administrative function, they could more effectively serve as strategic tools for risk management and developmental oversight through deeper analysis, clearer monitoring of DMF indicators, and stronger documentation of follow-up actions.
142. **Additionality and value addition.** NDB's participation brought meaningful value to the project by broadening the co-financing base and introducing flexibility within the overall financing structure. The Bank's procurement framework enabled *Make in India* localisation for rolling stock – an approach not permitted under co-financiers' procurement policies at that time, and its borrower-friendly commitment fee structure, applied only to deviations from agreed withdrawal schedules rather than the entire undisbursed loan, was a practical feature appreciated by NCRTC. In contrast, co-financiers such as ADB and AIIB applied commitment fees on the total undisbursed balance, irrespective of disbursement progress, making NDB's approach notably more responsive to borrower needs.

143. However, the Bank provided little technical assistance, capacity-building, training, or knowledge support. The Bank's project preparation fund (PPF), which could have funded feasibility work or capacity-building for NCRTC, remained unused. In contrast, ADB mobilised approximately USD 5 million in technical assistance grants²⁸ for NCRTC and USD 3 million in social assistance grants.²⁹ By not leveraging its PPF or providing grant-funded technical and social support, NDB has missed opportunities to strengthen project outcomes in strategically important areas such as TOD, last-mile connectivity, gender mainstreaming, technology transfer, O&M, and the inclusiveness of project design and implementation (in terms of engagement of the affected population, including most disadvantage groups) as required by NDB's general strategies. This also represents a missed opportunity to engage in preparatory analysis for the other phase 1 corridors (Delhi-Karnal and Delhi-Bawal), where early involvement could have positioned the Bank to shape project design, and to develop frameworks for non-sovereign lending and private capital mobilisation – both areas of high demand in India's urban transport sector.
144. That said, it is important to note that NDB was still in its institutional-building phase during this period, with the PPF relatively new and its operational modalities evolving. The Bank was simultaneously developing its own technical capacity and learning to integrate non-lending instruments into project operations. Against this backdrop, the limited use of the PPF is understandable and provides valuable lessons for upcoming operations – particularly on how early technical engagement, targeted capacity-building, and knowledge support can enhance developmental value and strengthen NDB's positioning in future infrastructure projects.
145. **Knowledge and learning.** Although the project is still under implementation, NDB has already planned forward-looking initiatives to capture and disseminate learning. Upon project completion, NDB's Indian Regional Office intends to organise a knowledge seminar on the urban transport sector, with NCRTC as its lead partner – an initiative that reflects growing attention to knowledge-sharing and sectoral learning within the Bank. While such activities are yet to materialise, there remains value in initiating them during implementation to strengthen cross-learning. Despite NDB's access to the rich international experience from its member states – such as the large-scale metro and high-speed rail projects it has financed in other member countries – its contribution to knowledge exchange during this project has so far been limited. Nevertheless, this is understandable given NDB's relatively recent establishment and evolving internal knowledge management frameworks. As the Bank continues to consolidate its regional presence and operational systems, embedding knowledge capture and learning activities more systematically – even during implementation – will strengthen NDB's visibility, institutional memory, and developmental value in future operations.
146. **Responsiveness and adaptability.** The Bank did show agility in processing the loan during the COVID-19 pandemic, when in-person field missions were not possible. However, it failed to adapt its engagement in response to major project shifts. The partial cancellation of USD 82 million from NDB's loan is a significant concern for multiple reasons that go well beyond the immediate reduction in financing. Strategically, it diminishes NDB's footprint in one of India's flagship infrastructure programmes, weakening the Bank's long-term positioning in a high-visibility sector where continuous engagement is critical for securing future corridor financing. Operationally, the cancellation arose from project cost savings, currency depreciation, and – most critically – the withdrawal of the Jangpura stabling yard and related facilities, now being pursued under a PPP arrangement.³⁰ This package represented the largest civil works component within NDB's scope, and its removal effectively erased the Bank's core physical contribution to the project. From a competitive perspective, the borrower's choice not to redirect the funds to other eligible NDB-financed activities also reflects the relative unattractiveness of the Bank's terms: higher pricing and the absence of local or other currency options as offered by the co-financiers.

28 The technical assistance supported a range of activities, including the adoption of BIM – a shared 3D platform integrating architectural, structural, mechanical, electrical, plumbing and safety components – allowing consultants and contractors to collaboratively refine designs, detect clashes, estimate costs and plan construction.

29 Social assistance grants funded community-level initiatives such as training female taxi and train operators, self-defence classes for students, and gender-sensitisation programmes for bus drivers, among others.

30 The decision to adopt a PPP model appears linked to NCRTC's broader objective of developing Jangpura as a TOD node, integrating commercial and mixed-use functions alongside the stabling yard. This approach is intended to leverage private-sector financing and expertise to maximise land value and generate non-fare revenues – factors that a sovereign loan structure was less well suited to address.

147. Reputationally, such a visible cancellation in a flagship, multi-partner operation can signal to other agencies and potential borrowers that NDB's financing is less adaptable to evolving project realities. Finally, the reduced stake curtails NDB's developmental and knowledge footprint, limiting opportunities to pair financing with innovation, lessons learned, and capacity-building – areas where the Bank was already contributing little beyond funding.
148. **Financing terms and competitiveness.** NDB's financing terms were less attractive than those of the co-financiers. With a margin of 1.78% over the secured overnight financing rate, compared to AIIB's 1.41% and ADB's 0.92%, the loan carried a higher cost without compensatory features such as concessionality, longer grace periods, or local/alternative currency tranches. ADB's structuring of Japanese yen-denominated tranches provided both cost savings and natural currency hedging advantages to the borrower, an option NDB has so far not offered, despite the DEA requests to all MDBs. These differences in pricing and structuring ultimately reduced the relative competitiveness of NDB's loan.
149. Based on these findings, the evaluation rates NDB's performance as **“moderately successful”**.

Criterion	Rating
NDB performance	Moderately successful (4)

B. Borrower performance

150. The borrower's performance has been central to the project's success. Strong institutional ownership and coordinated leadership by the Government of India – particularly the Ministry of Finance (through DEA), MoHUA and the State Governments of Delhi, Uttar Pradesh, Haryana and Rajasthan – ensured policy continuity, inter-agency coordination, and steady implementation momentum for this first-of-its-kind regional rapid transit project. NCRTC, as the implementing agency, played a pivotal role in translating this institutional vision into effective on-ground delivery through sound technical management, safeguards compliance, and timely execution.
151. DEA provided consistent leadership and strategic coordination throughout project preparation and implementation. It was instrumental in structuring the multi-partner co-financing arrangement with ADB, AIIB and NDB and ensuring harmonisation of terms, processes, and compliance frameworks. The DEA maintained close engagement with MoHUA and NCRTC, resolving inter-ministerial issues promptly and facilitating loan approvals, disbursements, and procedural clearances. Its proactive engagement during the COVID-19 pandemic – particularly in expediting NDB's entry – reflected agility, foresight, and effective stewardship in managing complex sovereign operations.
152. MoHUA provided strong policy oversight and operational guidance throughout the project cycle. It anchored the RRTS initiative within India's national sustainable mobility agenda and ensured close alignment with urban transport and transit-oriented development policies. The ministry played a crucial facilitative role in resolving bottlenecks in environmental management, land acquisition and utility shifting, and in coordinating cross-jurisdictional approvals involving the Ministry of Railways, the NCR Planning Board and the participating state governments. MoHUA's leadership in steering committees and high-level review meetings sustained implementation pace, strengthened institutional accountability, and helped maintain coherence among central and state agencies.
153. The participating state governments demonstrated strong ownership of, and effective collaboration in, the development and implementation of the Delhi–Ghaziabad–Meerut RRTS. The Governments of the National Capital Territory of Delhi, Uttar Pradesh, Haryana, and Rajasthan are equity partners in the NCRTC, each holding a 12.5% share, thereby institutionalising shared responsibility for project governance, financing, and risk allocation. This ownership was complemented by active state-level engagement in enabling project execution, notably through facilitation of land acquisition, resettlement, and utility relocation—critical preconditions for

maintaining construction continuity along a densely built and multi-jurisdictional corridor, as reflected in the DPR's treatment of land, utilities, and implementation arrangements.

154. Early and decisive action by the Government of Uttar Pradesh, including approval of the DPR in May 2017 and commitment of counterpart funding, supported early mobilisation and helped anchor the project within the broader NCR transport strategy. This momentum was subsequently reinforced at the federal level, with the Union Cabinet's approval in March 2019 constituting the Government of India's formal sanction of the DPR and authorisation for implementation of the corridor as a priority investment. Beyond statutory approvals and financing commitments, the participating states have remained actively engaged in advancing feeder services, multimodal integration, and transit-oriented development around major RRTS stations—elements explicitly envisaged in the DPR to maximise ridership, agglomeration benefits, and long-term economic and social impacts. Taken together, sustained coordination between the states, MoHUA, and NCRTC has provided a coherent framework for corridor development and future operational integration, exemplifying a practical application of cooperative federalism in the delivery of complex regional infrastructure.
155. As the implementing agency, NCRTC demonstrated exceptional technical and managerial capability in executing a complex, multi-stakeholder project. At appraisal, it entered the operation with a well-established institutional architecture – dedicated project management offices, specialist teams for engineering, E&S and procurement, and pre-mobilised consultants for design review, supervision and quality assurance. Land acquisition readiness was particularly strong, with most government and private land secured through transparent, negotiated processes prior to construction. During implementation, NCRTC maintained high performance across civil works, safeguards, and financial management. Construction of viaducts, stations, and depots progressed steadily, supported by rigorous quality control, systematic safety monitoring, and the use of digital tools such as the SPEED platform. The *Make in India* initiative was effectively implemented, with the project procuring its rolling stock domestically and achieving over 70% indigenous content in train components. In parallel, institutional capacity was strengthened through targeted training programmes, digitalisation initiatives, and the establishment of the Aparimit Innovation Centre. Collectively, these measures enhanced NCRTC's technical capabilities and reinforced its standing as a competent and institutionally mature transport agency.
156. Despite its strong performance, NCRTC encountered certain operational challenges. As of March 2025, overall physical progress stood at approximately 85% against a planned level close to full completion, and the corridor had not yet achieved full operationalisation. Progress across packages varied: while several civil works packages had reached advanced stages of completion, including near-completion of key station and viaduct components, progress on critical systems packages—particularly signalling, train control, telecommunications, and platform screen doors—stood at only 68.2%. While implementation continued to advance steadily, the available project progress documentation does not explicitly set out the reasons for the divergence between planned and actual physical completion, nor does it present a consolidated account of how the remaining civil and systems works map onto an updated corridor-level commissioning and operationalisation timeline.
157. Coordination with central and state authorities remained robust, but engagement with municipal bodies was slower, particularly on feeder connectivity, multimodal integration, and last-mile planning – areas crucial for maximising ridership and inclusivity. As the project transitioned toward operations, NDB review missions also identified areas requiring continued attention, including clearer articulation of O&M readiness arrangements, improved accuracy of disbursement and completion projections, timely closure of specific safety and environmental follow-up actions, and the progressive strengthening of reporting on operational and outcome-level indicators such as service readiness and daily ridership. Addressing these aspects in future corridors – through better sequencing of systems contracts, stronger city-level coordination, and outcome-based supervision – will enable NCRTC to further consolidate its role as a centre of excellence in regional transport delivery.

158. **Summary.** Based on these findings, the evaluation rates the borrower’s performance as “successful”.

Criterion	Rating
Borrower performance	Successful (5)

C. Equity

159. Equity has been introduced as a complementary criterion to align IEO’s evaluation approach with the Development Monitoring and Evaluation Office of the Government of India, thereby reinforcing NDB’s commitment to the use of country systems. Adopting this lens enables IEO to assess how well the NDB-supported projects contribute to inclusive and balanced development outcomes in India. The criterion assesses whether the project’s benefits are shared inclusively across social groups, with particular attention to vulnerable populations, including women, children, the elderly, persons with disabilities, and low-income commuters. It also considers whether the project addresses structural inequalities in access to transport and creates opportunities for disadvantaged communities to participate in and benefit from the system.
160. **Affordability and accessibility across income groups.** The RRTS fare structure, ranging from INR 25 for short trips to INR 180 for end-to-end travel, positions the system in a middle tier compared to other options (see table 5 for more information). While it is more expensive than state-run buses (INR 128 for non-AC services), it is significantly cheaper than private taxis or cars, and faster than conventional Indian Railways services. This makes the RRTS particularly attractive for middle-income commuters such as office workers, students and salaried employees. However, for low-income groups—including daily wage labourers, street vendors, and domestic workers—whose average daily earnings in the Ghaziabad–Meerut region range between INR 450 and 700 (as per the National Statistical Office’s Periodic Labour Force Survey 2022–23), the RRTS standard class fare of INR 150 for a 42-minute journey represents approximately 21–33% of their daily income. While this level of affordability is generally manageable for regular salaried commuters, it may constrain frequent or multi-trip use among daily-wage workers. In this sense, the project offers improved mobility for a large segment of the population, but its distributional impact will depend on whether subsidies, fare concessions, or multimodal passes are introduced to broaden affordability; however, such concessions do not currently exist.
161. In terms of physical proximity, the RRTS corridor’s spatial alignment demonstrates a deliberate effort to serve mixed-income, high-density urban belts along the Delhi–Meerut axis. Stations such as Sahibabad, Muradnagar, and Modinagar connect industrial, peri-urban, and residential zones characterised by a blend of micro, small and medium enterprise employment, informal livelihoods, and mid-income housing clusters. For instance, Sahibabad Station serves the 1,500-unit Sahibabad industrial area and adjacent low-income settlements in Vasundhara and Shalimar Garden, while Muradnagar and Modinagar include semi-urban populations commuting daily to Delhi and Ghaziabad. By placing stations within or adjacent to these catchment areas, the RRTS improves the physical proximity of high-speed public transport for diverse income groups that previously relied on overcrowded buses or unsafe mixed-traffic roads.
162. Over the longer term, the integration of the National Common Mobility Card will further enhance inclusivity by enabling seamless, multi-modal transfers without multiple fare burdens.
163. **Gender equality and safety.** The project has introduced gender-responsive initiatives supported in part by the Japan Fund for Poverty Reduction’s (JFPR) grant: (i) **Gender Equality and Social Inclusion (GESI) sensitisation programmes for public transport service providers** - NCRTC organised GESI sensitisation programmes for a total of 100 drivers and conductors of the Uttar Pradesh State Road Transport Corporation (UPSRTC) and plans to conduct such programmes periodically with other public transport service providers operating along the Namoo Bharat corridor. These initiatives aim to foster dialogue among last-mile service providers and

promote greater awareness of gender equality and social inclusion in public transport services; (ii) **Community outreach and engagement programme with transgender persons** - NCRTC organised a community outreach and awareness programme, engaging over 100 participants, aimed at promoting the inclusion of transgender persons and disseminating information on safe and secure commuting through the Namo Bharat system; (iii) **Self-defence trainings for women** - JFPR is regularly organising self-defence training sessions for girls studying in colleges across Meerut and Ghaziabad districts of Uttar Pradesh. With sustained, consistent efforts to train 900 girls in self-defence skills, JFPR has so far trained 184 girls.

164. Furthermore, through initiatives such as “Empowering Women Through Transport and Mobility” and the women-drivers’ “Pink Auto” pilot initiative in Ghaziabad, women have been integrated not only as users but as active participants in the mobility ecosystem. These initiatives focus on training women as e-rickshaw and taxi drivers, thereby improving employment opportunities and contributing to safer, more inclusive last-mile connectivity. More than 500 women have been trained under the NCRTC’s driving and technical skills programme, many of whom are now employed in feeder services through the Pink Auto pilot initiative. In addition, women now account for over one-third of operations staff in the Delhi-Meerut-Ghaziabad RRTS system, including train operators, controllers, and supervisors – an unprecedented share in India’s rail-based transport sector.
165. In parallel, the corridor incorporates multiple safety and security features that directly benefit women and other vulnerable groups: CCTV surveillance across all stations, platform screen doors, women-only coaches, emergency communication points, socially inclusive gender-neutral toilets, and trained staff present during peak hours. These elements have not only improved perceived safety but also boosted women’s confidence in using public transport for work and education.
166. **Accessibility for persons with disabilities, the elderly and children.** Persons with disabilities are often subjected to a multitude of challenges while using public transport systems because of a lack of differently-abled-friendly infrastructure as well as the inability of this section of the population to access assistive aids owing to a financial constraints. In this context, the JFPR grant supports the provision of assistive devices to persons with disabilities to enhance mobility and improve access to livelihood opportunities, aiming to reach at least 1,000 beneficiaries with hearing, visual, and/or physical mobility assistive aids under the project.
167. In parallel, all stations and trains are designed in compliance with the Harmonised Guidelines for Universal Accessibility (2021), ensuring barrier-free movement throughout the passenger journey. Each station includes elevators, escalators, wide concourses, tactile flooring for the visually impaired, and level boarding enabled by platform screen doors. The rolling stock provides reserved wheelchair spaces, priority seating for senior citizens, and adequate circulation areas. The design also allows for the carriage of stretchers for medical emergencies – a rare feature even among metro systems – further demonstrating sensitivity to passenger needs.
168. The JFPR grant has complemented these physical measures through awareness and behavioural initiatives, including station-area design improvements, child- and elderly-safety campaigns, and engagement with organisations representing persons with disabilities. As of March 2025, 45% of escalators and 12% of elevators were operational, with the remainder in advanced stages of installation. Together, these features mark a significant advancement toward barrier-free regional mobility and signal an institutional shift toward inclusive infrastructure standards in India’s transport sector.
169. **Balanced regional development.** The RRTS fosters polycentric growth by connecting Delhi with satellite cities – Ghaziabad, Modinagar and Meerut – reducing spatial inequality in access to employment and services. Real estate data show land prices near the RRTS stations have increased by 30–67% since 2023, reflecting investment stimulus and local economic dynamism. Preliminary data from Ghaziabad Development Authority suggest a potential 200% rise in TOD-

zone stamp-duty receipts, expanding fiscal space for municipalities. These trends indicate that the benefits of enhanced connectivity are beginning to extend beyond Delhi's core, supporting balanced regional development.

170. **Distribution of benefits and mitigation of adverse impacts.** The RRTS has been designed and implemented with a deliberate focus on minimising displacement and ensuring fair compensation. Approximately 1,098 households were displaced due to land acquisition across the corridor, most from private landholdings. Compensation was provided in full prior to relocation, following the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (2013) and state-level direct purchase policies. Vulnerable households – comprising about 11% of affected persons – received additional livelihood support and assistance for skill development and income restoration.
171. The project's elevated viaduct design substantially reduced its ground footprint compared to surface-based metro alignments, thereby limiting land-take and large-scale resettlement. Community engagement was continuous: public consultations were held in every major city along the corridor, and 100% of registered grievances were resolved through the Grievance Redress Mechanism. Through the Resettlement Implementation Support Agency, affected communities were regularly informed about their rights, compensation processes and employment opportunities.
172. Together, these measures demonstrate that while the project did impose short-term disruption, it also upheld social safeguards and shared its benefits more equitably – through fair compensation, livelihood support, and participatory mechanisms.
173. **Challenges and emerging gaps.** First, there has been no systematic tracking of equity-related outcomes, such as gender- or vulnerability-disaggregated ridership or usage patterns. While NCRTC has undertaken multiple initiatives to promote inclusion—particularly for women, persons with disabilities, and other vulnerable groups—the absence of formal metrics limits the ability to consistently assess their reach, utilisation, and effectiveness over time. Second, affordability may pose a barrier for the poorest households unless targeted measures, such as fare concessions or multimodal subsidies, are introduced. Third, feeder services and multimodal integration are uneven, and without reliable last-mile connectivity, the project risks serving primarily those who already own a form of private transport or can afford app-based mobility services to help complete their journeys. In such a scenario, the equity promise of the RRTS could be diluted.
174. **Summary.** On balance, the RRTS project has made credible advances in embedding equity into its design and implementation. Barrier-free station and rolling stock designs, targeted gender and community inclusion initiatives, and deliberate efforts to minimise land acquisition and displacement represent positive steps toward inclusive development. Women's participation in operations and the empowerment of youth and marginalised groups through skills training are particularly noteworthy achievements. However, the equity promise of the project will only be fully realised if fare affordability, feeder integration, and systematic monitoring of vulnerable groups are addressed in the coming years. Equity, therefore, remains partially fulfilled, and the evaluation rates it as **“moderately successful” (4)**.

Criterion	Rating
Equity	Moderately successful (4)

VI. SUMMARY OF EVALUATION RATINGS

175. The table below gives a summary of the evaluation ratings as presented in Sections IV and V.
176. Additionally, a composite criterion, Overall Project Achievement, is also computed, composed of ratings for the three core criteria used in this evaluation: relevance, effectiveness, and efficiency. As the project is still under implementation, Impact and Sustainability were assessed but not rated; instead, early-stage evidence was used to assess the project's potential long-term benefits and future performance.
177. The overall rating is not a mechanical average of the core criteria but a holistic judgement based on the evidence available of the project's achievements and room for improvement. In this case, the project demonstrates strong relevance as India's first RRTS corridor with high strategic value, and substantial effectiveness, with major physical works completed, strong borrower and implementing agency performance, and a clear demonstration of potential for future corridors. While the partial cancellation of USD 82 million from NDB's loan represents a major efficiency concern, reflecting missed opportunities for fuller resource utilisation; however, this issue does not undermine the broader development achievements of the project to date.
178. Accordingly, the overall project achievement is considered "successful" (5), in light of the findings outlined in the previous sections.

TABLE 8:

Summary of evaluation ratings

Criterion	Ratings
Core criteria	
Relevance	Successful (5)
Effectiveness	Successful (5)
Efficiency	Moderately successful (4)
Impact	Not rated
Sustainability	Not rated
Overall project achievement	Successful (5)
Other core criteria	
NDB performance	Moderately successful (4)
Borrower performance	Successful (5)
Equity	Moderately successful (4)

VII. CONCLUSIONS

180. **The project represents a landmark achievement in India's public transport transformation, serving as both the country's first regional rapid transit system and a demonstration model for forthcoming corridors under the National Capital Region Transport Plan.** It operationalises India's vision of high-speed, energy-efficient, and climate-smart regional connectivity, integrating urban centres across state boundaries under a unified mobility framework. The project has redefined how multi-state transport systems can be planned, financed, and implemented through strong institutional coordination and policy coherence between central and state governments. Its success offers a replicable model for future RRTS corridors – Delhi-Karnal and Delhi-Bawal – and a learning platform for other emerging economies pursuing sustainable urban-regional mobility.
181. **NDB's swift loan processing during the COVID-19 pandemic demonstrated institutional agility and responsiveness.** Its rapid engagement in the RRTS project – during the height of the pandemic and in the absence, at the time, of a regional office in India – reflected strong operational responsiveness and institutional commitment. Within months of the DEA proposing the NDB's participation, the Bank conducted a comprehensive virtual fact-finding mission and processed the loan from concept to Board approval, overcoming unprecedented logistical constraints. This timely action ensured continuity in project financing and signalled the Bank's capacity to adapt to evolving circumstances.
182. **NDB's financing advanced the *Make in India* agenda through domestic production and technology localisation.** NDB's reliance on country systems for procurement enabled NCRTC to undertake domestic manufacturing of high-speed rolling stock, directly contributing to the *Make in India* initiative, with 100% of the rolling stock manufactured at Savli in the state of Gujarat. This localisation not only built domestic industrial capacity but also strengthened India's supply chain resilience in high-speed rail technology. By supporting indigenous production, NDB's contribution extended beyond financial additionality – it aligned with India's national priorities on self-reliance, technology transfer and sustainable industrialisation. The success of the rolling stock procurement demonstrates how MDB financing can reinforce national manufacturing strategies while maintaining technical standards and efficiency.
183. **The absence of a coherent results framework linking inputs to outcomes significantly constrained the project's evaluability and strategic management.** The lack of specific indicators in the DMF to monitor the progress of NDB-financed outputs, as well as the absence of explicit causal logic, left the pathway from NDB-financed components to project-level results unclear and unmeasurable. Critical success factors – including feeder network, multimodal integration, transit-oriented development, service integration, and fare structure – were treated as external assumptions rather than monitored outputs, despite their fundamental importance to achieving intended outcomes. The framework also omitted disaggregated indicators for social inclusion dimensions (such as gender-based ridership data), lacked time-phased milestones aligned with staged implementation, and could not serve as an effective tool for real-time management or adaptive decision-making. These deficiencies weakened accountability, limited the ability to attribute results to specific financiers, and reduced opportunities for course correction during implementation. By contrast, both co-financiers – ADB and AIIB – incorporated in their design documents clearly defined indicators for their respective outputs and mechanisms for monitoring intermediate outcomes that logically link to project-level outcomes and impact.
184. **The project has adopted a broad set of community and gender inclusion initiatives, supported in part by the JFPR grant.** These include driver training programmes for women and youth from technical schools, gender sensitisation sessions for public transport service providers,

self-defence classes for women, and awareness campaigns for differently-abled and marginalised communities. Targeted efforts such as the “Empowering Women Through Transport and Mobility” campaign and the Pink Auto initiative have sought to expand women’s participation in public transport. These initiatives focus on training women as e-rickshaw and taxi drivers, thereby improving employment opportunities while also contributing to safer and more inclusive last-mile connectivity. NCRTC’s driving programme in Ghaziabad trained over 500 women, while women now account for over 35% of operations staff in Delhi-Meerut-Ghaziabad RRTS, including train operators and senior leadership roles.

185. **While physical construction has progressed substantially, the realisation of intended development outcomes remains contingent on completing critical enabling infrastructure and operational adjustments.** The corridor has advanced to partial operations covering a significant majority of its length, yet current passenger volumes remain well below projections. This reflects not infrastructure deficiencies but systemic gaps in elements necessary to convert built capacity into effective mobility – incomplete multimodal integration with existing transport networks, partial feeder connectivity, absence of affordability mechanisms, and service frequencies substantially short of design parameters. Without addressing these gaps through improved inter-agency coordination, accelerated integration work, expansion of complementary services, and restoration of planned operating frequencies, the corridor risks underperformance against its intended modal shift, emissions reduction, and productivity enhancement objectives.
186. **The project’s financial viability rests on institutional support mechanisms rather than standalone commercial returns, reflecting the inherent economics of urban rail infrastructure.** While calculated financial returns marginally exceed the cost of capital, current operational performance shows limited capacity for debt servicing from fare revenues alone, particularly during the initial years of gradual ridership build-up. However, the underlying fiscal position remains sound, underpinned by consistent budgetary allocations and the strong fiscal health of participating national and state governments. This pattern is consistent with international experience where economic and social benefits far exceed what can be captured through fare revenues alone. Long-term financial health will depend on achieving ridership targets, expanding non-fare revenues through land value capture and commercial development, and maintaining fiscal discipline in government support mechanisms.
187. **NDB’s ability to influence project design and add strategic value was fundamentally limited by its entry into an already advanced implementation process.** By the time the Bank’s participation was confirmed, most major procurement decisions were made, technical specifications finalised, and contracting arrangements set. This meant NDB effectively inherited a pre-packaged financing opportunity rather than engaging as a partner in project development. While this allowed for rapid mobilisation, it constrained the Bank’s role to that of a passive financier, unable to shape project scope, influence design features, or integrate institutional priorities into project planning. This sequencing limitation reduced NDB’s leverage in policy dialogue, limited opportunities for capacity-building support during critical preparation phases and weakened positioning for subsequent phases of regional rail expansion – reflecting a broader structural issue of reactive rather than proactive pipeline development.
188. **NDB’s contribution remained largely confined to financial intermediation, with minimal technical assistance, capacity-building support, or knowledge exchange.** Despite the availability of its project preparation fund, the Bank did not mobilise grant funding or technical support to complement loan financing or address critical capacity gaps. This stands in contrast to co-financiers who provided substantial technical assistance for project preparation, systems strengthening, and social development initiatives. The absence of such support meant NDB missed opportunities to influence critical aspects of project delivery and to build the implementing agency’s capacity for future corridor development. While partly attributable to NDB’s institutional maturity and the evolving operationalisation of non-lending instruments, this limitation constrained the Bank’s developmental footprint and underscores the need to complement financial resources with technical expertise and capacity-building support for maximum development impact.

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189. **Opportunities for knowledge capture, institutional learning, and technical exchange remained largely unexploited throughout the project cycle.** Despite the project's pioneering status and technical innovations, no systematic effort was made to document lessons, disseminate best practices, or facilitate knowledge exchange among stakeholders during implementation. This is particularly notable given NDB's access to international experience in high-speed rail and metro systems. The absence of knowledge management platforms also limited opportunities to position NDB as a convener of technical expertise and facilitator of cross-learning. While post-completion knowledge activities have been planned, embedding knowledge capture earlier would have strengthened institutional memory, enhanced the Bank's reputation, and provided value beyond financial resources. Integrating systematic knowledge management will be essential for building credibility, strengthening partnerships, and demonstrating thought leadership in priority sectors.
190. **NDB's financing structure proved less attractive than co-financier offerings, undermining the Bank's value proposition in a competitive co-financing context.** Higher interest margins, combined with the absence of alternative currency options, positioned NDB as a costlier financing source without compensatory advantages. For borrowers able to compare terms across multiple multilateral institutions, this pricing differential translated into concrete financial disadvantages. The absence of local currency lending options also exposed the borrower to foreign exchange risks. These structural disadvantages affect not only immediate project economics but also shape perceptions of institutional responsiveness, flexibility, and partnership value – factors critical to long-term client relationships and repeat business.
191. **The partial cancellation of USD 82 million—about 16% of NDB's approved loan—emerged as a major efficiency concern, not only because it reduced NDB's financial exposure in a flagship operation, but also because it reflected a missed opportunity to deploy scarce capital where it could have supported other priority projects in the Bank's pipeline.** While loan cancellations are not uncommon in large infrastructure operations, in this case, the cancellation stemmed from a combination of cost savings and the withdrawal of the Jangpura stabling yard package, which was subsequently shifted to a PPP modality. However, the absence of mechanisms for timely reallocation to other eligible components meant that committed resources remained idle and were ultimately returned, signalling gaps in upstream appraisal depth, adaptive project design, and ongoing engagement to anticipate the borrower's evolving financing needs. NCRTC's feedback on NDB's relative pricing competitiveness—further highlights the need for NDB to strengthen its pricing strategy and flexibility in co-financed operations. Enhancing these aspects would help ensure better utilisation of resources, preserve the Bank's operational footprint, and improve strategic relevance in future engagements.
192. **Limited coordination among co-financiers constrained opportunities for collaboration and knowledge-sharing.** The co-financing structure presented a strong opportunity to foster cooperation, knowledge-sharing, and joint problem-solving among MDBs. Because ADB, AIIB and NDB financed distinct but interdependent components, the arrangement could have facilitated complementary expertise and shared oversight through joint supervision, harmonised reporting, and coordinated technical engagement. However, these opportunities were not fully realised. No joint supervision missions were conducted to collectively review implementation progress, and the absence of harmonised progress reporting templates increased the administrative burden on NCRTC, which had to meet separate requirements for each financier. More critically, cross-learning on strategic dimensions was limited. Key themes such as private capital mobilisation for high-capex transit systems, multimodal integration to enhance last-mile connectivity, inclusive planning to address climate vulnerabilities (e.g., floods and heatwaves), health and safety standards, and sustainability of operations—both financial and technical—were not addressed through coordinated MDB efforts. For NDB, more proactive collaboration with its co-financiers could have provided access to accumulated sectoral experience, enhanced technical credibility, and supported the development of harmonised monitoring and knowledge frameworks.

VIII. RECOMMENDATIONS

A. Immediate actions

Recommendation 1: Strengthen multimodal integration and feeder connectivity to enhance ridership performance.

193. The project's economic and financial viability is strongly dependent on achieving ridership and system integration targets. Current daily ridership of 40,707 represents only about 21% of the 2025 projection, with uptake remaining concentrated in sections where interchanges with other modes have become operational. The evaluation finds that ridership increased sharply whenever multimodal links were completed – for example, a 151% surge following the Modinagar North extension and a 38% rise after integration with Delhi Metro at Anand Vihar. Strengthening multimodal integration at Sarai Kale Khan, the principal interchange hub linking the RRTS with Indian Railways, interstate bus services, and the Delhi Metro, is therefore critical. Likewise, first- and last-mile feeder connectivity – through organised e-rickshaw networks, shuttle services, and pedestrian facilities – remains incomplete and uneven across stations. Streamlining passenger transfers and coordinating feeder and bus timetables with RRTS services would directly enhance accessibility, reduce transfer times, and improve user convenience. Strengthened coordination among NCRTC, municipal bodies, and local transport agencies to operationalise these measures, alongside the timely completion of interchange infrastructure, will be pivotal to unlocking the corridor's full ridership potential and improving progress toward the project's targets by 2028.

Recommendation 2: Actively facilitate fare and ticketing interoperability through structured inter-agency engagement.

194. Fare and ticketing interoperability is a critical enabler of seamless multimodal travel and sustained ridership growth. The evaluation recognises that NCRTC has adopted the National Common Mobility Card (NCMC) and implemented interoperability protocols on the Delhi–Meerut RRTS, thereby ensuring that the system is technically ready for integration with other public transport modes. However, the effective rollout of through-ticketing and interoperable fare arrangements remains dependent on coordination with multiple external transport operators and authorities. In this context, the recommendation is not directed at NCRTC's internal systems readiness, but rather at facilitating inter-agency operationalisation during the ramp-up phase. NCRTC, in coordination with the Ministry of Housing and Urban Affairs and relevant state and city-level transport authorities, should prioritise structured engagement with partner operators to advance revenue-sharing arrangements, backend system alignment, and pilot through-ticketing at key interchange stations. Even limited pilots at major hubs ahead of full corridor commissioning would help reduce user transaction costs, improve convenience for routine commuters, and strengthen early ridership growth. Such facilitative actions would support the project's outcome indicators on accessibility, affordability, and service integration, while recognising the shared governance nature of fare integration in the NCR.

Recommendation 3: Phase and prioritise non-fare revenue activation to support early operational cost recovery.

195. The evaluation recognises that NCRTC engaged consultants early to develop corridor-level strategies for commercial development and that financial sustainability has been a core design consideration from project inception. It also acknowledges that the full revenue potential of commercial spaces and transit-oriented development (TOD) depends on corridor maturity and typically requires long-term contractual arrangements that are best concluded closer to, or after,

full commissioning. At the same time, the project's near-term financial profile remains sensitive to operational cost recovery during the ramp-up period. In this context, NCRTC could prioritise phased activation of non-fare revenue streams that do not require long-term lock-in, such as interim commercial leasing, station-level retail kiosks, advertising rights, naming and branding opportunities, and temporary commercial uses at major stations, including Anand Vihar, Meerut South, and Sarai Kale Khan. Advancing these scalable and reversible revenue mechanisms during partial operations would help offset early operating costs, generate performance data to inform longer-term TOD strategies, and strengthen financial resilience ahead of full corridor commissioning, while remaining fully aligned with extant regulations and planned long-term development pathways.

B. Forward looking considerations

Recommendation 1: Mandate an explicit theory of change in project design reports to strengthen project evaluability.

196. The absence of a clear causal logic linking NDB-financed components to project outcomes in the RRTS project significantly undermined evaluability, weakened accountability, and obscured the Bank's specific developmental contribution. Future project design documents should clearly include indicators to monitor NDB-financed outputs and articulate how NDB-financed outputs are expected to generate intermediate results and contribute to higher-level outcomes and impacts, explicitly identifying assumptions, interdependencies with co-financed components, and critical enablers required for success. The theory of change should be developed during project preparation through consultative processes involving the borrower, implementing agencies, and co-financiers, and should be accompanied by a robust monitoring framework that includes time-phased milestones aligned with sectional commissioning schedules, gender- and vulnerability-disaggregated indicators, and regular performance reviews that enable adaptive management.

Recommendation 2: Enhance financial competitiveness through local currency financing and flexible product design.

197. The RRTS experience revealed that NDB's financing terms – with higher interest margins than co-financiers and no option for Indian rupee or Japanese yen-denominated lending – made the Bank a costlier and less attractive financing partner. This pricing disadvantage is not merely a technical concern but also has strategic implications: NCRTC has indicated that there is a tangible risk that the Bank may not be invited to finance subsequent RRTS corridors (Delhi-Karnal, Delhi-Bawal), where the Government of India will again seek more competitive co-financing packages. For a young institution seeking to establish credibility and build long-term partnerships in flagship sectors, being priced out of future tranches of a flagship project where it financed the pilot corridor would represent a significant reputational and strategic setback. The Bank should therefore explore establishing rupee-denominated funding mechanisms – potentially through domestic capital market issuances in India, currency swaps, or co-financing arrangements with Indian financial institutions – and should review its margin structure to ensure it reflects both market conditions and the competitive landscape in multi-financier arrangements.

Recommendation 3: Enhance NDB's technical and institutional support during implementation to strengthen developmental additionality, leveraging the project preparation fund where appropriate.

198. Given NDB's late entry into the RRTS project, the Bank had limited influence during project design and appraisal. However, once financing was approved, opportunities remained for NDB to add technical and institutional value during implementation – through analytical inputs, operational advice, and targeted support to the implementing agency. The Bank's engagement focused primarily on financial oversight and compliance, without mobilising its technical or advisory instruments to address emerging implementation challenges such as delays in multimodal

integration, feeder connectivity, and service readiness. IEO recommends that NDB systematically integrate technical and institutional support into project implementation to strengthen developmental additionality beyond financing. This may include: (i) mobilising the PPF or other internal and/or external concessional resources/trust funds to finance technical studies or innovations or advisory inputs required during implementation; (ii) providing targeted technical assistance to borrowers and implementing agencies on system optimisation, operational management, or safeguards performance; and (iii) ensuring that supervision missions include sector or technical experts who can provide on-the-ground diagnostic support and contribute to adaptive problem-solving.

Recommendation 4: Strengthen knowledge management and visibility to capture and disseminate lessons from flagship operations.

199. The RRTS project represented a unique opportunity for NDB to showcase innovation, institutional learning, and South-South knowledge exchange in sustainable transport. However, limited attention was given to structured knowledge capture, lesson documentation, or dissemination during implementation. Despite the project's pioneering features – advanced signalling systems, digital project management, strong E&S governance, and successful public-sector delivery during a pandemic – no comprehensive effort has been made to consolidate and share insights across the Bank or with partners. IEO recommends that NDB institutionalise a knowledge management and visibility framework for flagship and first-of-their-kind projects. This should include: (i) systematic documentation of operational and developmental lessons from supervision missions and completion reports; (ii) preparation of knowledge products (e.g., case studies, technical briefs, learning notes) jointly with borrowers and co-financiers; and (iii) dissemination through public communication, regional seminars, and internal learning platforms.

Recommendation 5: Strengthen institutionalised coordination mechanisms and promote safeguards harmonisation and shared assurance in multi-financier transport projects.

200. IEO recommends that NDB institutionalise structured coordination and shared assurance mechanisms in multi-financier transport mega-projects to improve implementation coherence, reduce the administrative burden on borrowers, and strengthen system-level oversight, including of E&S safeguards. In large, co-financed projects such as the RRTS, the absence of structured coordination arrangements among MDBs during implementation limited opportunities for joint problem-solving, cross-learning, and strategic alignment on critical issues. In addition, parallel safeguards supervision processes—though effective in ensuring compliance—resulted in fragmented documentation, separate review cycles, and missed opportunities for joint assurance and learning. Going forward, NDB should, where feasible, seek to: (i) agree upfront with co-financiers on periodic joint or back-to-back implementation support missions for system-level issues; (ii) promote harmonised progress and safeguards reporting formats to reduce administrative burden on implementing agencies; (iii) align safeguards supervision schedules and, where appropriate, rely on jointly agreed third-party monitoring or external verification for key environmental and social outcomes (such as resettlement completion and livelihood restoration); and (iv) jointly support knowledge products or learning events on cross-cutting themes such as private capital mobilisation, multimodal integration, and operational sustainability. Institutionalising these measures would enhance NDB's strategic engagement in complex, multi-financier infrastructure operations, strengthen safeguards oversight without duplicating processes, and improve borrower experience, while fully respecting each institution's policy framework and accountability requirements.

Recommendation 6: Strengthen upstream and adaptive risk management, including financing flexibility, in complex transport mega-projects.

201. IEO recommends that NDB enhance its risk management approach for large-scale transport projects by integrating more dynamic, system-level risk analysis into appraisal and implementation. The partial cancellation of USD 82 million in the RRTS project—arising from the withdrawal of the Jangpura package and its subsequent shift to a PPP model—highlights the challenges NDB faces when entering complex, multi-financier projects at a late stage of preparation. By the time NDB appraised the operation, major contracts had already been committed, limiting the Bank's ability to influence scope design or adjust its financing focus as project circumstances evolved. While key risks were identified at appraisal, mechanisms to adapt financing structures and risk responses during implementation were limited, resulting in under-utilisation of NDB's resources in a flagship operation. The RRTS experience demonstrates that risks in mega-projects extend beyond traditional financial and construction risks to include evolving scope decisions, coordination risks across financiers, and demand-side risks linked to phased commissioning and multimodal integration. While these risks were identified at appraisal, mechanisms to adapt financing structures and risk responses during implementation were limited. Going forward, NDB should: (i) strengthen appraisal-level assessment of scope flexibility, interface risks, and demand uncertainty in multi-financier settings; (ii) incorporate explicit triggers and contingency options in loan design to respond to scope changes or implementation shifts; and (iii) use supervision missions more strategically to reassess system-level risks as projects transition from construction to operations. This would enhance NDB's ability to safeguard resource utilisation and sustain relevance in complex infrastructure investments.

ANNEXES

The annexes to the report (listed below) are available on the Independent Evaluation Office website at: https://www.ndb.int/wp-content/uploads/2026/04/Annexes-India-Delhi-Ghaziabad-Merut-RRTS_PPE.pdf

- Annex I. Project design and monitoring framework
- Annex II. Organisational structure of the National Capital Region Transport Corporation
- Annex III. Theory of change
- Annex IV. Evaluation criteria definition
- Annex V. Evaluation framework
- Annex VI. Schematic map of the RRTS corridor
- Annex VII. Physical and financial progress of other packages
- Annex VIII. Financial analysis
- Annex IX. List of key persons met
- Annex X. List of key documents reviewed
- Annex XI. Photos from the evaluation mission



INDEPENDENT EVALUATION OFFICE

New Development Bank
1600, Guozhan Road, Pudong New District,
Shanghai – 200126 China

E-mail: ieo@ndb.int

Website: <https://www.ndb.int/governance/independent-evaluation/>



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