ADB

Project Number: 53326-001
TA Number: 6659
June 2022

India: Bengaluru Metro Rail Project

Workshop Proceedings: High Level Convening and Roundtable Discussion on Enabling Transit-Oriented Development and Multimodal Integration Along Mass Rapid Transit Corridors in Bengaluru

Asian Development Bank

DIRECTORATE OF URBAN LAND TRANSPORT
UDD, Government of Karnataka
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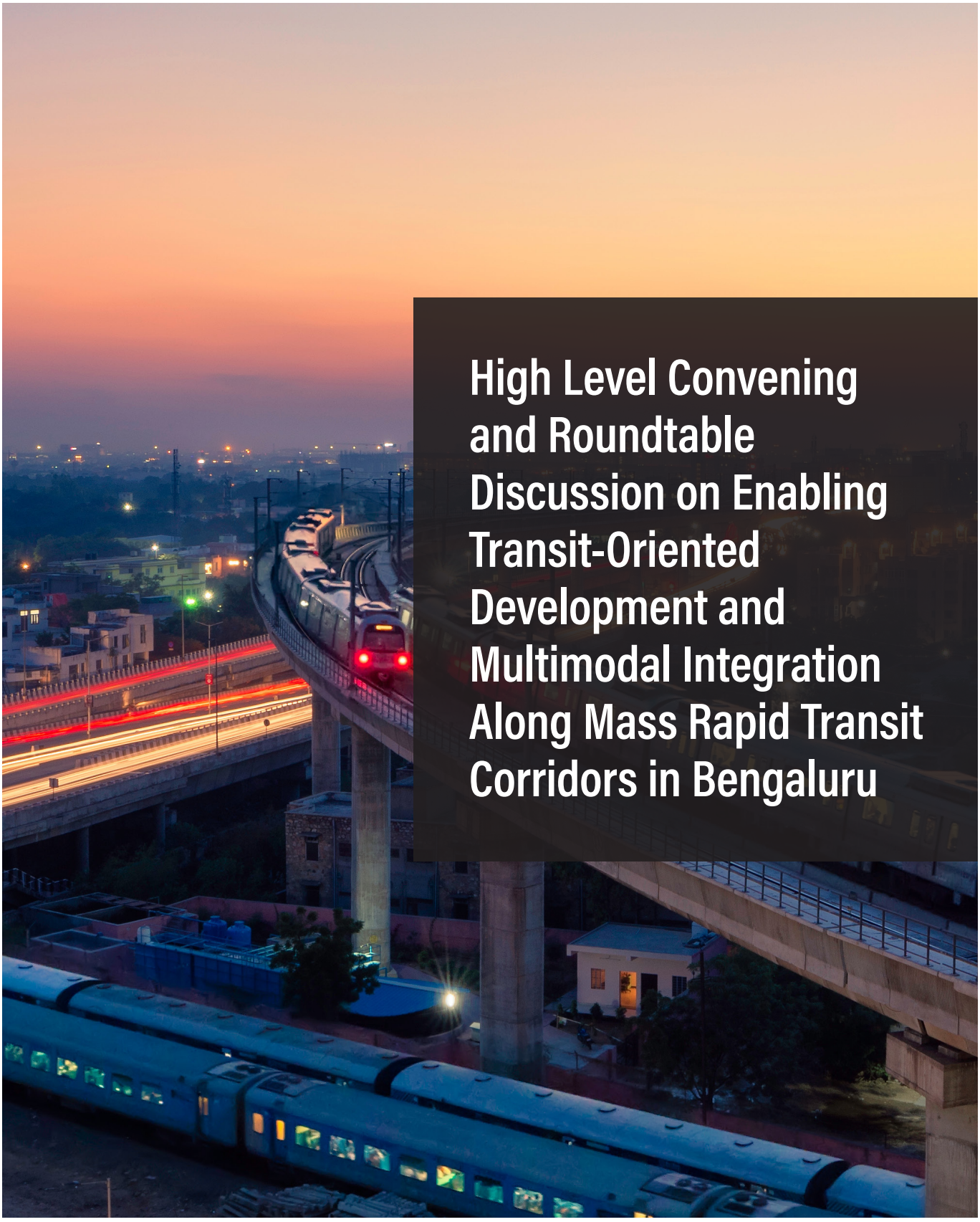

High Level Convening and Roundtable Discussion on Enabling Transit-Oriented Development and Multimodal Integration Along Mass Rapid Transit Corridors in Bengaluru

WRI INDIA
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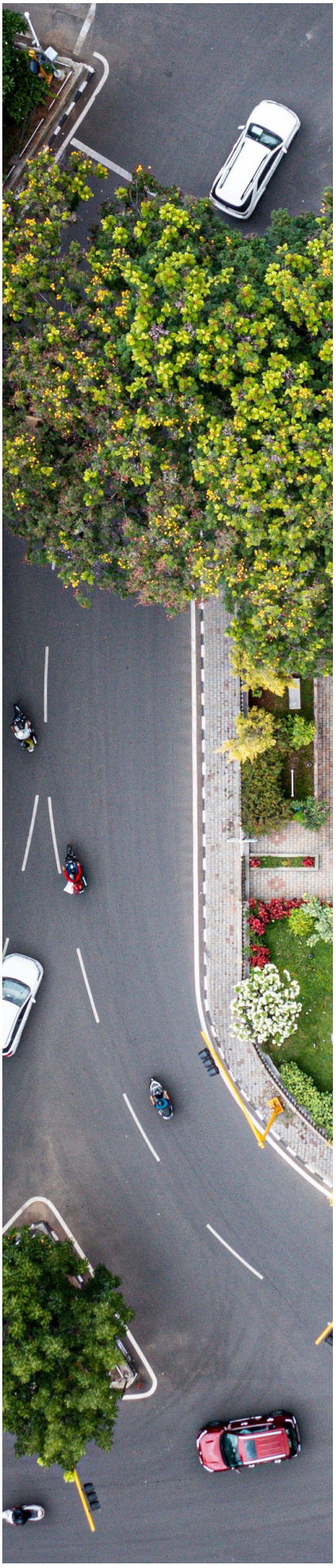


1. INTRODUCTION

Bengaluru, the capital of Karnataka State, is India's fourth most populous city and one of the four largest technology clusters worldwide. Known as India's 'Silicon Valley', this vibrant city attracts people from across the country. However, it is continuously challenged to provide its residents with good-quality infrastructure and a conducive living environment.

The Government of Karnataka (GoK) is currently developing public mass transport systems for Bengaluru – including expansion of metro rail, introduction of suburban rail, and upgradation of the city bus system to enable a shift toward sustainable, low-carbon modes. The Asian Development Bank (ADB) is providing financial aid for the construction of two new metro lines, Phases 2A and 2B. These will provide interconnectivity along the Outer Ring Road (ORR), where several existing and emerging tech hubs are located, and connect the city to its international airport.

The GoK also plans to prioritize:

- Integrated urban planning to manage growth and catalyze strategic renewal of neighborhoods to enhance competitiveness, sustainability, and inclusiveness
- Creation of a ridership base that improves the economic and financial viability of mass transit investment
- Accessibility benefits of a comprehensive public transport system for all city residents
- Using land as a revenue source to finance long-term investment needs of the city
- Addressing complex and intertwined economic and technological needs.

To meet these objectives, ADB is providing Technical Assistance (TA) for planning and implementation of Transit Oriented Development (TOD) and Multimodal Integration (MMI) along the Phase 2A and 2B metro alignments. The intent is to set new benchmarks for sustainable growth and restructuring and to enable systematic improvements in physical infrastructure and operational structures, to bring about the desired shift towards low-carbon modes along these corridors. Additionally, the TA would undertake capacity building for state agencies to enable effective execution.

As a preparatory activity, ADB supported the Directorate of Urban Land Transport (DULT), GoK and Bangalore Metro Rail Corporation Limited (BMRCL) in hosting a virtual High-Level Convening and Roundtable Discussion for policy and decision makers in Bengaluru, with an aim to:

- Highlight the importance of a common city vision, land use-transport integration and a multimodal transport system, for urban revitalization and transformation
- Learn from global best practices and experiences
- Explore approaches to planning and implementing TOD and MMI, and addressing challenges encountered
- Highlight the importance of good governance and robust regulatory and implementation frameworks
- Build consensus on the need, and roadmap, for enabling TOD and MMI in Bengaluru.

ADB engaged World Resources Institute, India (WRI India) as a knowledge partner to facilitate the virtual event.

1.1 The Event

The High-Level Convening, conducted on the 26th and 27th of August 2021, convened leaders and domain experts from cities around the world, and key stakeholders from government, civil society and private-sector businesses in Bengaluru. The event was also attended by other ADB partners from India and abroad, involved with metro rail development, TOD and MMI implementation.

The Roundtable Discussion, conducted on 31st August 2021, convened technical experts from different Indian cities, department heads of government agencies in Bengaluru, along with select technical/operational staff from these agencies.

The three-hour sessions on each day had talks or presentations by invited speakers on select themes, followed by a moderated Q&A discussion with the panel. A brief overview of each session is below.

Speakers:
4 heads of government agencies
8 non-government/citizen representatives
1 international leader
1 ADB regional head

Participants:
363

Day 1 (26th Aug): Visioning Session – City Vision, Challenges and Opportunities

This session engaged key government and non-government stakeholders in Bengaluru to dialogue on the vision for the city, challenges and opportunities, and perspectives on TOD and MMI. The vision of the ADB TA project and its objectives were also presented. In addition, the session showcased the inspiring story of Bogota's revitalization through long-range, visionary ideas for transformation and the lessons for Bengaluru.

~ Experience of Bogota, Columbia

Speakers:
5 international domain experts

Participants:
245

Day 2 (27th Aug): Technical Session - Planning and Implementing TOD and MMI

Through case examples, this session presented exemplar approaches to successfully planning and implementing TOD and MMI at the city and project levels. It also discussed the challenges, opportunities and key lessons for Bengaluru from various initiatives around the world.

~ Experiences from London, Mexico City, Seoul, examples of other Asian, European and American cities

Speakers:
14 heads of government agencies
6 technical experts/technocrats from Delhi, Mumbai, Ahmedabad

Participants:
173

Day 3 (31st Aug): Roundtable Discussion - Operationalizing TOD and MMI in Bengaluru

This session provided an opportunity for government agencies in Bengaluru to discuss – with each other and a panel of technical experts – key priorities and challenges with operationalizing TOD and MMI in Bengaluru. In this context, the approach, initiatives and experiences of Bengaluru and other Indian cities were deliberated upon.

~ Experiences from Delhi, Mumbai, Ahmedabad and Bengaluru

Metropolitan area (BMA):
1294 sq. kms.

Population:
12.8 million (2021 estimate)
> 20 million (Draft RMP 2031 estimate)

Population growth rate:
3.7% CAGR (2001-2021)

Gross population density:
9864/sq. km. (98 pph)

GDP:
USD 110 billion (Business World, June 2017)

Ranked **8** in a global list of leading tech innovation hubs (*KPMG study 2021*)

Voted **1** "most dynamic city in the world" (*JLL City Momentum Index 2019*)

Ranked **149** (of 231) in QoL (*Mercer's Quality of Living Index 2019*)

Ranked **83** (of 113) in economic and social inclusivity (*PICSA Index 2019*)

Annual growth rate of new urbanized areas between 1990-2015 (*WRI India analysis*):

Municipal limits (BBMP):
13 sq. kms.

Metropolitan limits (BDA):
16 sq. kms.

Metropolitan region (BMRDA): 26 sq. kms.

Public Transport - Average Ridership in 2018

Bus:
4.5 million daily passenger trips

Metro:
0.4 million daily passengers

1. Reference: https://worldpopulationreview.com/world-cities
2. https://www.wricitiesindia.org/content/unlock-bengaluru-driving-next-wave-urbanisation
3. Comprehensive Mobility Plan (CMP) for Bengaluru 2020

2. BACKGROUND

2.1 About Bengaluru

Bengaluru is the prime economic driver, centre for education and healthcare, and socio-cultural hub of Karnataka. The city accommodates nearly 40% of the state's total urban population and is India's fourth most populous city as per 2021 estimates[1]. Home to nearly 40% of India's start-up ecosystem and software/technology exports, Bengaluru is also ranked among the top ten global tech innovation hubs. A favorable mix of science, research and industry; a conducive environment for business, entrepreneurship and innovation; a vibrant, cosmopolitan culture; and availability of amenities associated with modern urban living – give the city its competitive edge, making it a sought-after global destination for investment and talent alike. Contributing a third of the state's gross domestic product, it is India's fourth largest metropolitan economy and expected to be among the world's fastest growing economies in the years to come.

Today the city adds about 500 families and 80,000 sq. mts. of built-up area within its limits, per day.[2] This trend is expected to continue, with the Bengaluru Metropolitan Area (BMA) population projected to exceed 20 million by 2031. Large-scale projects, such as the Bengaluru International Airport, Special Economic Zones and the metro rail, continue to reshape and resize the city.

2.2 Key Challenges

The rapid urbanization of Bengaluru has posed several challenges for the city, primarily in the form of sprawl, longer commutes and growing traffic congestion, worsening access to destinations and mobility, strained essential infrastructure, and environmental degradation. These problems in turn reduce productivity, inhibit resource and economic efficiencies, and consistently lower quality of life.

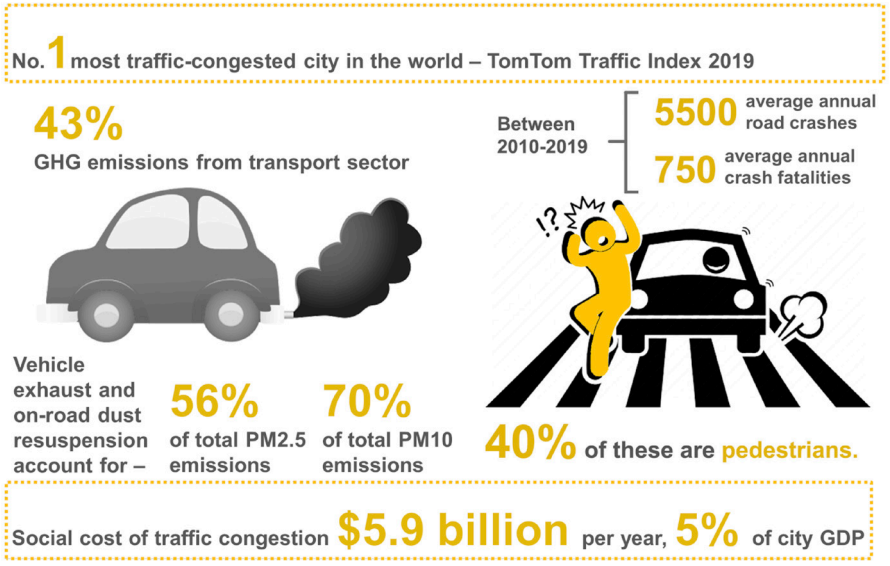
Sprawl and Inefficiency

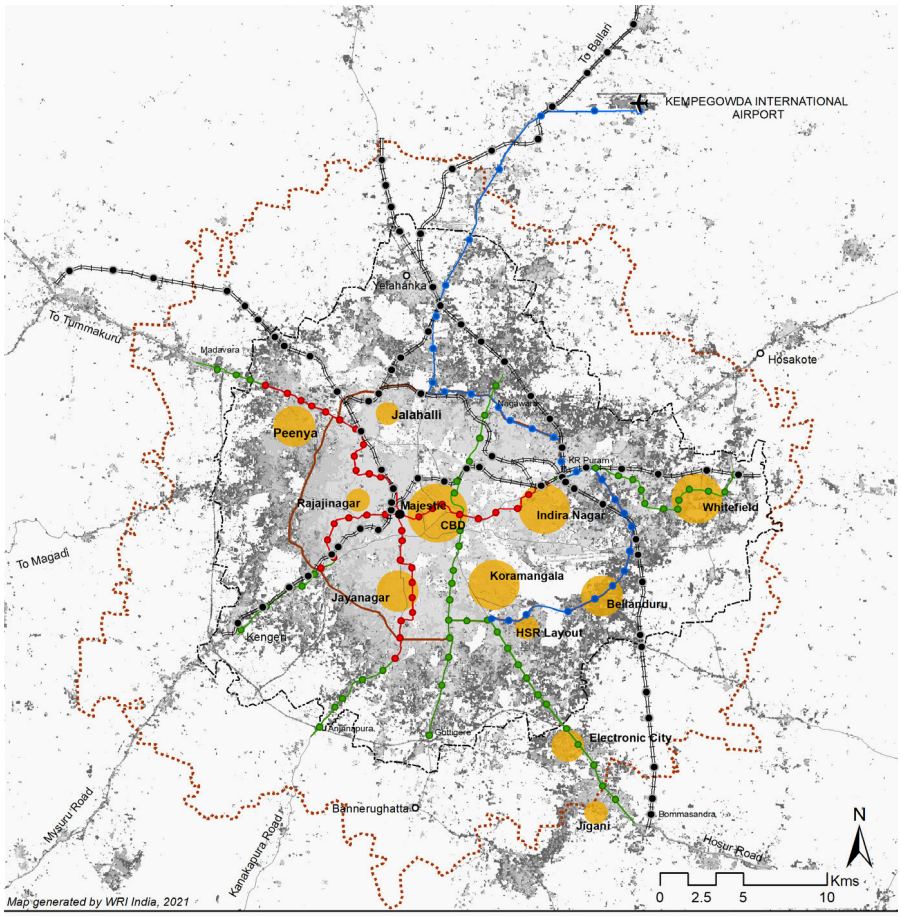
Over the last two decades, Bengaluru has seen de-densification of its central/inner-city areas and much of the city's growth has occurred beyond its Outer Ring Road (ORR), even beyond municipal and metropolitan limits. Several new businesses and industries coming up on the outskirts are not located close to mass transit networks. Unplanned land use changes have resulted in dispersed, disconnected development and haphazard sprawl, causing significant inefficiencies in urban management, infrastructure and service delivery. As a result, areas beyond the ORR lack adequate essential services. This has compelled reliance on more expensive and poorly regulated private service providers or self-provisioning.

Congestion, Mobility and Accessibility

Despite having one of the most extensive public bus transport systems in the country, its mode share has fallen over the years (from 42% in 2007 to about 32% in 2015)[3], because of competing modes being less expensive, faster or more convenient. Buses however remain the workhorse of the city when it comes to public transportation. Ridership on the operational Phase-1 of the metro network (42 kms) is also considerably lower than expected. While metro and suburban rail networks and capacity are set to expand, safe access to stations, last-mile connectivity and multimodal integration remain a challenge.

A 2011 study also noted that the city had a dearth of safe pedestrian crossings, no segregated cycle lanes, and about 40% of surveyed roads had no paved footpaths.





BENGALURU - JOB CLUSTERS AND TRANSIT

Data Source: WRI India, BMRCL

Disclaimer: This map is created for study purposes, jurisdictional boundaries indicated are representational only

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Legend

Primary Roads
ORR
BBMP
BDA
Metro Phase 1 (Operational) Station & Line
Metro Phase 2 (Under Construction) Station & Line
Metro Phase 2A & 2B (Proposed) Station & Line
Suburban Railway (Proposed) Station & Line

Job Clusters (No.of Jobs): 50000, 60000, 100000, 165000, 1000000

Built-up Extent by Year: 1975, 1990, 2000, 2010, 2015

Meanwhile, vehicular numbers have continued to surge, with registrations crossing the 8.5 million mark in 2020.[4] This has far outpaced the development of road and transit infrastructure, contributing to severe traffic congestion and associated negative externalities.

2.3 Key Opportunities

Towards Compact, Connected and Coordinated Development

In recent years, several interventions by government agencies have sought to initiate a multi-pronged strategic response, promoting progressive planning tools such as TOD and MMI [See Annexure 5.1 Timeline of Project and Policy Initiatives]. Several enabling policies and plans have either been approved, or proposed, or are under preparation.[6] The city has taken strides in facilitating tech-enabled, shared mobility solutions, implementation of pedestrian-friendly, road redesign projects, pilot bus priority lane and cycle lanes, and public bicycling sharing (PBS) schemes. However, these efforts need scaling and wider adoption. GoK's 'Bengaluru Mission 2022' has identified four key areas — improved mobility, a cleaner and greener city, celebrating culture and heritage, and digital services — to improve infrastructure, the environment and citizen connect in the near term.

The city is investing billions into augmenting and upgrading its public transport infrastructure and services. To derive the maximum benefits from these investments and drive a more sustainable form of development, land use planning needs to be integrated with transport planning, to create and capture value for public good.

4. Total Vehicles Registered in Bengaluru Urban District as on May 2020; https://transport.karnataka.gov.in/storage/pdf-files/May%20Blr%202020.pdf
5. Source: IISc 2015, Urban Emissions Info 2015, Bangalore Traffic Police, The Footpath Initiative, Boston Consulting Group, TomTom Traffic Index 2019
6. The Comprehensive Mobility Plan and Parking Policy for Bengaluru and Karnataka Open Data Policy has been approved. The Draft Bengaluru TOD Policy and the Bengaluru Metropolitan Land Transport (BMLTA) Bill have been proposed and Revised Master Plan for Bengaluru is under preparation. Provisions for Land Value Capture have been enabled through legal amendments or government orders.

3. HIGH-LEVEL CONVENING

3.1 Day 1: Visioning Session – City Vision, Challenges and Opportunities

Intent and Overview

This session convened key stakeholders from government, civil society and private-sector businesses in Bengaluru. The intent was to engage and initiate a dialogue on the vision for the city, the challenges and opportunities in achieving long-term goals, and perspectives on TOD and MMI. The vision of the ADB TA project and its objectives were also presented. This session also intended to bring inspiring stories of how cities can be revitalized through long-range, visionary ideas for transformation, continued investments and initiatives such as TOD and MMI. A plenary talk, showcasing the case of Bogota, Columbia, and the lessons it held for Bengaluru, was also organized as a part of this session. [See Annexure 5.2 Program Agenda.]

Vision for Bengaluru - Government Perspective

SPEAKERS:

Sri. P. Ravi Kumar, Chief Secretary, GoK
Sri. Anjum Parvez, Managing Director, BMRCL
Smt. V. Manjula, Commissioner, DULT, GoK
Sri. Gaurav Gupta, Chief Commissioner, Bruhat Bengaluru Mahanagara Palike (BBMP)

"Bengaluru's unprecedented growth has left us surprised and faced with multiple challenges. It is however not too late, and we hope the policies for TOD and MMI will help with course correction. Unless these (policies) are in place, the whole thing breaks down."
Mr. Kumar

"Bengaluru has been a 'pioneer city' in India – the first to be electrified, start bus services, establish a specialized planning authority. It continues to lead the way with progressive initiatives."
Ms. Manjula

"Interaction with various stakeholder groups is very important. Bengaluru has gained a lot from its communities and thought leaders."
Mr. Gupta

The speakers of this inaugural session set the stage for the event by outlining the government's vision for Bengaluru (recognizing its strengths and significance in the global arena), and how it can be made livable and sustainable. They highlighted the city's key challenges, initiatives underway, and imperatives to consider in enabling TOD and MMI. A summary of the key takeaways is given below.

City Vision

A healthy, accessible and inclusive city, that remains globally attractive and competitive. Key priorities include provision of world-class infrastructure and amenities to improve mobility (road, non-motorized and public transport facilities) and the environment (public open spaces/greens, waterbodies).

Challenges

- Rapid urbanization, haphazard sprawl
- Resource constraints, strained infrastructure
- Severe traffic congestion hampering mobility
- Inadequate road capacity (narrow carriageways and space constraints) for ever-increasing vehicles, efficient and speedy movement of public buses
- Poor last-mile connectivity to mass transit and multimodal integration
- Shrinking green spaces – now at 3.3 sqm per capita, which is less than optimal and lower than other Indian metros
- Pollution and environmental degradation
- Inequitable access to basic services
- Livability issues
- Lack of alignment in priorities, policies and working of multiple government agencies

"The metro is improving mobility and access between different parts of the city with reduced travel times. It is expected to play a key role, along with suburban rail and city bus services, in reducing vehicular congestion and delivering clean, energy-efficient and low-carbon mobility in Bengaluru."
Mr. Parvez

Opportunities and Imperatives (to consider in enabling TOD and MMI)

- **Develop a comprehensive public transport system integrated with land use:** The government is fast-tracking mass transit projects, however, integrating these systems with other transport and last-mile feeder services is crucial; and efforts towards this are underway. A multimodal public transport system integrated with land use is needed to maximize its potential and benefits - requiring robust policies for TOD and MMI.

- **Prioritize bus transport:** Even with an extensive metro and suburban rail network, buses will continue to be the prime mover of people. It is therefore crucial to focus on improving the city bus system by augmenting the fleet, upgrading services, and earmarking Bus Priority Lanes (BPL) where necessary.

- **Allocate requisite road space for walking, cycling and feeder bus access to transit stations:** Equitable allocation of road space and robust infrastructure is needed for the modes (walk, cycle and buses) that have been prioritized in the Draft Bengaluru TOD policy. Several existing or emerging mixed-use neighborhoods in the city can be developed as active mobility clusters.

- **Develop public open spaces and greens:** Ensuring the development of adequate public open spaces and urban greens, as well as access to these spaces when implementing TOD is essential.

- **Enable well-planned, serviced and equitable development:** Infrastructure and service levels vary across different types of areas. It is important to ensure new growth or densification does not lead to, or exacerbate, inequitable development. Managing densities while providing universal access to basic services, including open spaces, is key.

- **Establish an empowered transport authority:** It is proposed to set up the Bengaluru Metropolitan Land Transport Authority (BMLTA), with a legal mandate to ensure holistic planning (land use-transport integration) and coordination between various transport providers.

Speakers of Vision for Bengaluru - Government Perspective Session

Vision for Bengaluru - Citizen Perspective

SPEAKERS:

Mr. T. V. Mohandas Pai, Chairman, Manipal Global Education Services
Ms. Kathyayini Chamaraj, Executive Trustee, CIVIC
Mr. Srinivas Alavilli, Head, Civic Participation, Janaagraha Center for Citizenship and Democracy
Mr. Naresh Narasimhan, Managing Partner, Venkatraman Associates
Ms. Revathy Ashok, Chief Executive Officer, Bangalore Political Action Committee
Dr. Ashish Verma, Associate Professor, Dept. of Civil Engineering, Indian Institute of Science
Mr. R. K. Mishra, Founder Director, Center for Smart Cities
Mr. Bhaskar Nagendrappa, President, Confederation of Real Estate Developers' Association of India (CREDAI), Bengaluru

This session brought together leading citizen voices and opinion makers to share their vision for Bengaluru, challenges and opportunities in achieving long-term goals, views on TOD and MMI, and how these concepts can be taken forward in the city. A summary of the key takeaways is given below.

"Today, Bengaluru has become extremely prosperous. While wealth and modern comforts have increased, quality of life has deteriorated. We must work hard to restore it."
Mr. T. V. Mohandas Pai

City Vision

A sustainable, equitable and livable city, offering a high quality of life. Green, safe, reliable and affordable mobility - planned with public participation.

Challenges

- **Mobility issues and quality of road infrastructure:** Poor condition of roads and pedestrian infrastructure, along with severe traffic congestion and pollution continue to ail movement and productivity.

"Bengaluru is the world's worst traffic-congested city because of how we allocate road space. An IISc study found that in peak hours, cars (that carry 5% of total trips) occupied 2100 times more road space than BMTC buses (carrying 45% of trips)."
Dr. Ashish Verma

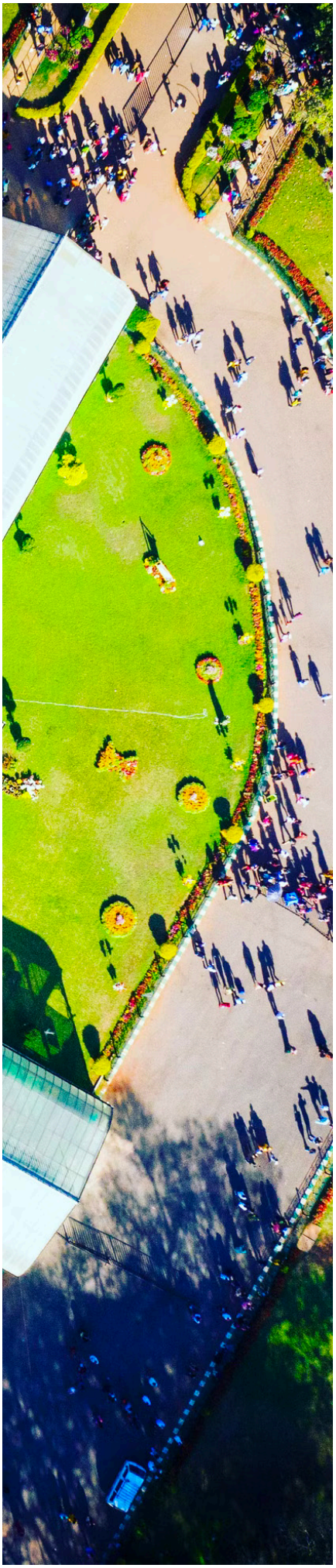
- **Excessive focus on road infrastructure-based solutions to solve traffic and transportation problems and inequitable allocation of road space:** The constant quest to create more road space to accommodate and ease (private) vehicular movement remains the biggest challenge.

- **Lacking public transport provision and integration:** Inadequate public transport provision, poor last-mile connectivity and MMI are major challenges.

- **Falling bus mode shares and inadequate support:** Bus services are becoming slower and more expensive (at times more than using private vehicles) - as their success is measured by profit and loss. There is little rationality or equity as large budgets continue to be allocated to road or metro rail projects, as compared to the bus system.

- **TOD and MMI are complex to plan and implement:** Rail transit systems are being inserted into an existing city context and already developed areas. It is a different challenge compared to greenfield or developing areas. Managing the process of leveraging benefits while mitigating adverse impacts is complex.

- **Faltering progress:** Though issues and solutions are well-known, implementation is too slow, or poor. For e.g., the highly delayed suburban rail project, non/half-baked implementation of the National Urban Transport Policy directives, capital-intensive road upgradations that do not meet ideal requirements, etc.



- **Lack of reliable data to inform decision-making:** Updated and accurate data is difficult to obtain. Typically, government agencies also do not share data and sometimes end up working at cross-purposes.

- **Lack of institutional integration:** Fragmented responsibilities across multiple agencies operating in silos and lack of inter-agency coordination is a big challenge. There may be piecemeal solutions, but there is no integrated plan with synchronous strategies and implementation.

- **Absence of an empowered and accountable city government/authority:** No directly elected Mayor and Council with political, administrative and financial oversight of various development and service provider agencies. There is no single authority responsible for delivering on common city goals, leading to lack of accountability.

Opportunities and Imperatives

- **Plan for compact development based on the '15-minute city' concept:** Create multiple, smaller commercial-business districts and mixed-use neighborhoods across the city, such that education, work, recreation and other basic needs are accessible within a short distance of 2-3 kms or 15-20 mins.

- **A walkable city based on pedestrian-first philosophy:** Provide pedestrians safe and comfortable (barrier-free) movement at-grade – to make walking a pleasure. Improve footpaths, install pelican signals and include cycle lanes where possible to encourage active, green mobility.

- **Provide an integrated multimodal public transport system:** Different modes should supplement and complement each other rather than compete, to improve the quality of the system as a whole. The city should capitalize on locations where transit systems converge and intersect.

- **Public transport services for all categories of people:** Affordability may be paramount for one group, while for others it may be comfort, speed or flexibility. Public transport options should cater to these different needs/priorities, while also reducing personal vehicle usage. Choice of transit systems should be based on rational decision-making, integrating stakeholder views, cost-benefit and impact assessments, equity principles, sustainable development goals, etc.

- **Reorganize and improve city bus services:** A more efficient way of organizing bus services – as a trunk-and-feeder or hub-and-spoke system – had been conceived and piloted. This should be scaled to the entire city and smaller buses deployed on narrower roads, to improve last-mile connectivity and access.

- **Establish performance indicators for public transport services:** Indicators such as accessibility, reliability, emissions and pollution reduced, resources saved (time, fuel, money), etc should be included. These environmental and socio-economic benefits should be used to decide budgetary allocation and support, for instance, to BMTC.

- **Fast-track implementation and scale pilots:** Several efforts to improve pedestrian, cycling and public transport facilities are underway. This is being done through healthy partnerships between government agencies and in collaboration with communities.

"We want to become Singapore, but don't want to adopt such measures – parking and congestion charges, limits on vehicle ownership."
Ms. Kathyayini Chamaraj

- **Disincentivize use of private vehicles by reflecting real costs:** Introduce congestion charges and implement provisions of the approved Parking Policy. Parking fees are a big, unexploited source of revenue. Pricing hierarchy should build in incentives for electric and shared mobility modes.

- **Clean and green transport:** Decentralized biogas plants can be set up at major transport terminals to fuel smaller feeder buses/vehicles. Biogas can also be converted to electricity and combined with solar rooftops for charging electric vehicles.

- **Learn and leapfrog:** The city's current lower road capacity and car ownership levels provide a great opportunity to learn from other world-class cities and leapfrog in terms of infrastructure choices and investments.

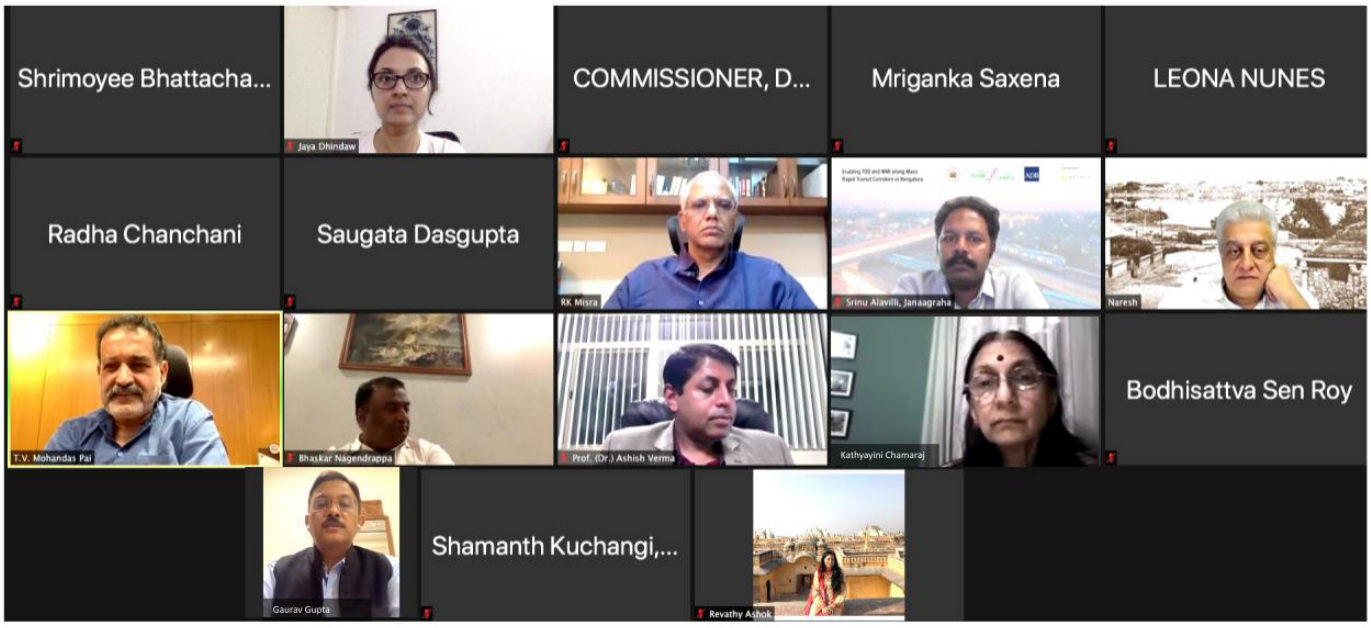
- **Leverage the city's intellectual capital and technical expertise:** Bengaluru is the hub of India's knowledge industry, with a large data, research, technology and innovation ecosystem. This should be leveraged and brought to improve urban processes and practices.

"You cannot plan a city if you cannot measure it." **Mr. Naresh Narasimhan,** quoting Richard Saul Wurman

- **Create an integrated data and planning center:** Evidence-based decision-making cannot happen without high quality data. The government should set up an integrated data and planning center, to visualize the city and plan for its future. A data-led approach also helps create systemic shifts towards greater innovation, collaboration and, ultimately, better governance.

- **Develop an action plan with targets to deliver on city goals:** City should develop a manifesto setting out a clear vision, with long-term goals and targets, putting sustainability and the citizen (people) at the center. This should be supported by an Action Plan, outlining strategies and milestones for tracking and annual reporting to measure progress.

- **Formulate guidelines/templates:** Guidelines for street design and tendering processes, pedestrian infrastructure, road safety audits, etc., should be continually refined and institutionalized for scaling implementation across the city.



Speakers of Vision for Bengaluru - Citizen Perspective Session

- **Establish the empowered authority for coordinated planning and implementation of TOD and MMI:** A unified transport authority is needed for comprehensive mobility planning, integrated with land use, and implementation of a holistic TOD policy. The proposed BMLTA should be established at the earliest.

- **Institutional leadership and champions:** Senior leadership of government agencies have been approachable, willing to consider reasonable proposals, engage and collaborate with thought leaders, business communities and civil society. The presence of dynamic, passionate leaders and a proactive citizenry shows the city has the vigour to reinvent itself.

- **Grow public awareness and participation in city building processes:** Build awareness and create community spirit towards encouraging active and sustainable mobility, development and living choices.

Vision of the ADB TA Project

"ADB is happy to partner with a city as vibrant as Bengaluru in its efforts to bring about a strategic shift towards sustainable and dynamic city growth and low carbon mobility."
Mr. Yokoyama

SPEAKER:

Mr. Kenichi Yokoyama,
Director General, South Asia Regional Department, ADB

Acknowledging the government's visionary direction and initiatives for Bengaluru, Mr. Yokoyama, provided a brief overview of ADB's TA project, highlighting its aim and specific objectives in the context of the city.

Aim of the TA project: help maximize benefits from investment in mass transit infrastructure and support realization of the city's vision and long-term goals
Construction of Phase 2A and 2B metro lines will significantly enhance connectivity to the international airport and ease intra-city movement along the ORR. Along with the creation of mass transit infrastructure it is important to maximize the socio-economic and environmental benefits such investments can bring to the city. Improving livability is also a key priority of ADB's corporate strategy. It is with this aim that ADB is supporting BMRCL and DULT with technical assistance on enabling TOD and MMI along the 2A-2B metro corridors (in particular, while informing city level strategies). ADB is committed to helping these agencies create an ecosystem for integrated planning and management to enhance competitiveness, sustainability, resilience, inclusiveness and quality of life. The intent is also to enable higher revenue mobilization for transport agencies and urban local bodies; facilitating a virtuous cycle of augmenting public and private sector investments in the city.

Overview and objectives of the TA project components:
1. TOD: Create a framework to realign growth and densities in areas along mass transit corridors and maximize their potential and productivity, through strategic renewal and densification. Foster the creation of higher density, mixed-use, mixed-income and resource-efficient neighborhoods, designed to reduce the city's carbon footprint. In addition, recommend appropriate strategies for land value capture along the transit corridors and generate capital revenues to meet long term investment needs of the city.

2. MMI: Create a framework across four key pillars of integration -- physical, information, operational, institutional -- and integrated ticketing. This, in order to provide seamless, efficient mobility and enhanced accessibility for all through a comprehensive public transport system; and enable a shift towards low carbon modes.

3. Capacity Building: While TOD and MMI concepts are fast gaining ground in India due to the substantial merits they bring to urban agglomerations, these concepts are complex to plan and design, and eventually implement and manage. Capacity building of relevant government agencies and other stakeholders will enable them to successfully plan and implement these with technical know-how and efficacy

Transforming Cities: The Case of Bogota, Columbia

"What distinguishes an 'advanced' city from a 'backward' one in terms of infrastructure, is not its subways and highways, but the quality of its footpaths, cycle paths, public spaces and greens."
Mr. Peñalosa

SPEAKER:

Mr. Enrique Peñalosa,
Former Mayor of Bogota (1998-2001, 2016-2019)

Case Summary

The plenary session explored critical dimensions in city building through the story of Bogota, Columbia. Under the administration of Mayor Enrique Peñalosa, the city witnessed a profound transformation - hinged on the development of TransMilenio, its world-class Bus Rapid Transit (BRT) system. The talk highlighted policies and initiatives that have contributed to Bogota becoming an international model for improvements in quality of life, mobility, equity and sustainability.

Mr. Peñalosa pointed out that as India transitions from 35% urban to about 70% urban (like most Latin American countries today), large cities like Bengaluru would grow at least two to three-fold and smaller cities much more; a great opportunity to build better. He emphasized that good mobility, more than a question of engineering, is a matter of urban structure, rational decision-making, democracy and equity. Key takeaways from the talk relevant for Bengaluru are summarized below.

Highlights

"In a dense city, all forms of sustainable and efficient transportation work well. In a low-density one, nothing works well."
Peñalosa

Organizing city growth – in the right place and in the right way – is the most crucial aspect for quality of life, competitiveness and efficient mobility. Bogota is among the densest cities in the world (220 pph). Its BRT system was used to trigger city level renewal and densification, with allied interventions such as amenities and public space enhancement.

With Bengaluru set to double in size over the next decade or so, it is crucial that its growth and urban infrastructure are planned strategically. The government should regulate where and how the city should grow – through good land management and urban design.

Rational evaluation should determine choice of transit systems. Buses continue to play an important role.
In Bogota, robust studies and comparative cost-benefit analyses have been used to assess and choose the most suitable transit mode/system for a mobility corridor.

Bengaluru is expanding its rail networks, though this alone will not be enough to meet the city's mobility needs. Buses will continue to play a central role as part of a multimodal public transport system.

"From a democratic point of view, if all citizens are equal, a bus carrying 50 people has a right to 50 times more road space than a car with one person. To have that bus stuck in traffic, is almost as undemocratic as not letting women vote."
Peñalosa

Road space should be allocated in the most democratic, equitable and efficient way possible, prioritizing sustainable transport modes.
Higher-density development in Bogota has been supported by good road networks, wide sidewalks and protected bikeways (600 kms) to feed mass transit systems, along with parks and connected greenways. Given a BRT lane can move several times more people than a car lane, bold decisions were taken to convert narrow two-lane roads in the city center to 'Bus Only'.

Bengaluru, like Bogota, has a lot of inequality. The provision of safe and high-quality pedestrian and cycling infrastructure not only reinforces the fundamental rights/values of equality and respect for all road users, but also supports the most important mode integration with transit systems (essential for their success).

"Transport is an enabler, a means to an end. The end goal is to have a great city for people - with great streets and parks. Creating such public spaces is an end in itself - and what will make people happier."
Peñalosa

Development strategies must aim to enhance the quality of the public realm and amenities. Government can play the role of developer and/or facilitator.
In Bogota, nearly half the development cost of BRT trunk ways went to acquiring and demolishing buildings alongside to build wider sidewalks and improve the pedestrian area. The city also passed a law where redevelopment at higher densities was allowed only against relinquishment of space to develop wide footpaths and bike lanes. The provision of urban infrastructure, amenities and improvement schemes/projects in Bogota have been financed through the sale of development rights, parking charges, its (high) property taxes and at times, a ring-fenced surcharge over the property tax that is channeled towards improvements in a particular area.

Similarly, Bengaluru should ensure that new growth and renewal create high quality streetscapes, public spaces and amenities - through government-led interventions (acquisition, alternative mechanisms) and enabling development regulations (additional building rights against public realm improvements). In areas where the city is expected to grow, government agencies should proactively create land banks to be used for public purposes in the future, such as large parks or affordable housing.

"Bengaluru has the technical and financial capabilities, however, solving its mobility challenges is not a technology or economic issue, but a political one – with difficult decisions to make."
Peñalosa

Building consensus among stakeholders and persistence over time are crucial for success.
Case building to show why and how a new concept or project can be a win-win for all, or in the larger public interest/good; turning stakeholders into shareholders; demonstrating proof-of-concept and on-ground impact (visible benefits) – all of these can help overcome apprehensions and resistance, reduce opposition and garner support to persist with a chosen approach towards a long-term vision/goals. Sometimes incentives and disincentives are needed to bring different actors on board.

Visioning Session - Key Takeaways for Bengaluru

- Rapid growth has posed several challenges, in the form of haphazard sprawl, severe traffic congestion hampering mobility, strained essential infrastructure and environmental degradation, leading to poor quality of life in Bengaluru.
- The vision for Bengaluru is of a sustainable, livable, accessible and equitable city that is globally competitive. A city providing green, safe, reliable and affordable mobility.
- Key priorities identified for the city include: a walkable city based on pedestrian-first philosophy; an integrated multimodal public transport system serving all categories of people; universal access to basic services; public open spaces/greens and water bodies. Prioritize and support bus transport which will continue to play a central role.
- Emphasis is placed on the need for: rational, evidence-based decision-making and data-led planning and governance; public participation and collaboration in city building processes; an empowered authority for coordinated planning and implementation of TOD and MMI.
- Organizing city growth – in the right place and in the right way – is the most crucial aspect for quality of life, competitiveness and efficient mobility. Effective land use-transport integration, land management and good urban design are key.
- Development strategies should enhance the quality of the public realm and amenities - through government-led interventions and enabling regulations.
- Building consensus among stakeholders and persistence over time are crucial for success. Bold decisions need to be taken for the larger public good.
- While TOD and MMI are crucial for maximizing the benefits from investments in mass transit, they are complex to plan and implement. The ADB TA project aims to build institutional capacities for effective delivery and achievement of desired outcomes, towards realization of the city's vision and long-term goals.

3.2 Day 2: Technical Session - Planning and Implementing TOD and MMI

Intent and Overview

Following the Visioning Session with city stakeholders, the intent of this Technical Session was to learn from global experience and best practices on planning and implementing TOD and MMI and identify priorities for Bengaluru. The session brought together five international experts with extensive domain knowledge and practical experience. Each expert speaker made a short presentation, sharing insights on the approach to planning and implementing TOD and MMI in their respective/different cities, challenges encountered, outcomes achieved, and important considerations for Bengaluru. These included the cases of London, Mexico City and Seoul, along with examples from other cities. The talks were followed by a moderated Q&A session with the expert panel. [See Annexure 5.2 Program Agenda.]

Opening Remarks

SPEAKER:

Mr. O.P. Agarwal,
CEO, WRI India

Mr. Agarwal set the context by highlighting key priorities for Bengaluru, which emerged from the proceedings of the earlier Visioning Session. He observed that there was a clear recognition of the fact that transport (and mobility) is a major challenge, which is constraining the city in many ways. The need for a compact city, an integrated multimodal transport system and an empowered agency for coordination, was also well articulated. He stressed that there is little doubt about what needs to be done and the focus should now move to the 'how', which is what this Technical Session is intended for.

A unique challenge and opportunity, in the national and city context were also highlighted. Two-wheelers are the dominant mode of personal transport in Indian cities, including Bengaluru, given their speed, convenience of parking and affordability (the marginal cost of using a two-wheeler is cheaper than using a bus). For personal vehicle users to shift to public transport, the services must be significantly better and more user-friendly.

> "Karnataka has set up an outstanding organization like DULT and has some of its best officers heading it, as well as its transport agencies. Bengaluru is also a rare case where the head of BMRCL is a state cadre IAS officer, who can drive coordination with other state government agencies. The city should leverage the advantage and opportunities that good leadership provides."
> **Mr. O. P. Agarwal**

Planning for a Compact and Connected City: The Case of London

A key aim of any urban planning initiative should be to develop an economically efficient entity, where productivity can be improved. It is a fundamental reason for cities to exist."
Mr. Verma

SPEAKER:

Mr. Shashi Verma,
Director of Strategy and Chief Technology Officer,
Transport for London

Case Summary

London operates one of the most integrated public transport systems in the world. Crucially, land use planning is also heavily integrated with transport planning. The talk focused on London's approach to planning for a compact and connected city, while highlighting the lessons for Bengaluru.

Highlights

Canary Wharf is a good example of what density supported by public transport can enable. In this case, the transformation of derelict port land into a thriving business district with over 150,000 very high value jobs. The area has about 5,000 parking spaces, which are not fully utilized on most days, as most people working in the area (over 85%) use public transport.

Density fuels productivity – TOD a means to achieve good densities without congestion

Compact and dense urban environments are more productive; and growth in the most productive areas generates the largest increases in national productivity. Inner London, for instance, has a Gross Value Added (GVA) per capita that is 2.5 times higher than the United Kingdom average. Bengaluru and London are similar in terms of population. While Bengaluru has a much higher population density, public transport provision is much sparser compared to London (or Singapore, Beijing, Mexico City, New York, etc.). Inadequate provision of public transport leads to congestion, not density.

Bengaluru should encourage and value density, and Floor Area Ratio (FAR) policies should be devised based on, and supported by, commensurate public transport provision. Currently, in its central and inner-city areas having the highest infrastructure and service levels, development is constrained by relatively low FAR limits, which has contributed to urban sprawl. With Bengaluru expected to double its population in the next decade, a radically different approach to planning the city's form and structure is needed.

Not just 'growth', but 'good growth'
The London Plan identifies key priorities for good city growth - make the best use of land; build strong and inclusive communities, provide equitable access to basic services; create a healthy city; grow a good economy; increase efficiency and resilience; net zero carbon targets, etc.

A shared city vision supported by an integrated plan and strategies

Stakeholders should have a shared vision of what a successful city looks like, the future city they want. Finding mechanisms to engage various stakeholder groups/ communities in the visioning and planning processes is essential. In London, for instance, the proposal for congestion charges and the need for an integrated transport authority came from its business community (and not the government), following which the creation of Transport for London (TfL) became a big part of the Mayor's policy manifesto.

Directly driven by the Mayor, the London Plan, sets out the vision for Good Growth and a spatial development strategy for Greater London; with all other strategies for economic development, transport, environment, health, etc. tied in and drawn up together. Democratic accountability drives the tight integration of strategies to support larger city goals. Ensuring and integrating the delivery mechanisms – implementation and financing strategies, institutional setup – to back up good policies, is crucial.

7. London does not have a FAR system and property occupants are taxed, not owners. LVC mechanisms are adapted for the tax system in UK.

TOD is not a one-size-fits-all - identify opportunity areas based on public transport accessibility levels

The London Plan identifies areas with development potential, based on availability of land as well as transport and other infrastructure. It focuses on areas well-connected by public transport (or could be in future). The measure of connectivity used is the Public Transport Accessibility Levels (PTAL) and available land in high PTAL areas are considered as Opportunity Areas.

Synergizing TOD and LVC to generate revenues

London uses parking reforms and density bonuses, which allow developers to reduce parking (up to 80%) in return for higher densities and provision of affordable housing. Besides cost savings from lower parking requirements and impact fees, this also helps produce more mixed income neighborhoods. Property taxes, development, and community infrastructure levies are the main sources of revenue. In the case of Crossrail, a supplement on commercial property taxes – arrived at through extensive negotiations with the business community – covered 40% of the project's capital cost.[7]

Set desired targets and define the bundle of strategies to achieve them

Core to the Mayor's Transport Strategy for London is a bold aim, for 80% of all trips to be made on foot, by cycle, or using public transport by 2041 (from 64% in 2015). This requires the provision of high-quality transport systems and infrastructure, along with disincentives for private vehicle use, which is key for the success of public transport. In London, there is also a clear recognition that road space is relatively fixed and therefore, prioritization of space-efficient modes has been the focus. These policies and strategies are relevant for Bengaluru as well.

- Connectivity and capacity of public transport systems: A well-planned bus network integrated to complement the rail networks is essential to maximize the potential of the public transport system. Protecting land for new public transport schemes and securing budgets to continually augment/upgrade infrastructure and services is vital.

- Healthy Streets approach: The provision of high-quality walking and cycling infrastructure and connected networks to aid safe access and last-mile connectivity to transit is an integral component of a multimodal system and should not be an after-thought. New development should be permeable for people walking and cycling.

- Parking management: London has put in tight parking controls, through rationing and right pricing of parking spaces. The city has set maximum limits for parking provision and permits. This not only helps move the economics towards (and thus incentivize) public transport, but also helps realize the full housing potential of well-connected locations.

- Congestion and pollution charges: London has a Congestion Charge Zone covering the central city area, an expanded Ultra Low Emission Zone and the Low Emission Zone which covers most of Greater London, with charges for use of road space and for vehicles not meeting specified emission standards. A key objective of the congestion charge was to reduce private vehicular traffic in the central city and allow public bus transport to flow more freely and efficiently.

8. Apart from the provision of various transportation services, TfL is also responsible for the integrated management of road space.

Need for an empowered and truly unified authority

In 2000, London decided to collapse different transport provider agencies into a single unified authority, TfL, whose role was to implement the Mayor's Transport Strategy.[8] India has pushed for establishment of the Unified Metropolitan Transport Authority (UMTA) to align and oversee the activities of multiple agencies. While inter-agency coordination is good, Bengaluru should aspire towards integration, and demonstrate why it is important. No amount of coordination can get the city to the level of integration needed to reach a single master plan for land use and transport, as well as delivery. A unified authority for planning and implementation also reduces inter-agency conflicts with respect to responsibilities, budgets, etc. This is where the creation of TfL has been so productive and instrumental to the transformation one sees in London.

Implementing TOD-led Renewal: The Case of Mexico City

"Creating enabling institutional and financial mechanisms, and good governance is crucial for success."
Ms. Lobo

SPEAKER:

Ms. Adriana Lobo,
CEO, WRI México

Case Summary

Through case examples, the talk presented Mexico City's experience with implementing TOD-led renewal/redevelopment at the neighborhood and corridor levels. The talk highlighted the implementation mechanisms, challenges, evaluation of outcomes and the learning the city has had, through its trial-and-error approach to understanding what works.

Highlights

Identify opportunities for densification and renewal

Mexico City is not a dense city in general, and while its downtown areas have good infrastructure and quality of life, its outlying, low-income areas do not. The city has tried to identify opportunities for densification and renewal to improve service provision and livability.

TOD planning, implementation, challenges and outcomes

SAC Polygons are special areas of development, for which special legal mechanisms were created to execute redevelopment and improvement projects within its perimeter. Developer entities were mandated make monetary contributions to a trust fund, which was to be used for improving infrastructure and services in the same area.

- SAC Granadas: Located in a high value area within the city, this large-scale, high-end development project, ended up being a very speculative enterprise. Redevelopment took place, but without mixed use or mixed income. While some investment did go towards improvement of public spaces and non-motorized transport infrastructure, since the money collected from developer entities was not clearly used for public good, there were questions if the mechanism really worked for the city's benefit.

Overall assessment of TOD outcomes in city neighborhoods (over 10+ years):

- Density has increased
- Mixed use - some neighborhoods have, and some don't
- Mixed income has been challenging to achieve
- Active and shared mobility has improved, several streets better designed to support this
- Station areas with investment into public realm/infrastructure improvements see greater demand and development

- SAC Tacubaya: A strategic inner-city area well-connected by public transport, it is however water-stressed and has deteriorated over time. Accommodating different socio-economic groups and social housing, it also has a large slum. A renewal plan for the area has been conceived, with better transparency and accountability measures built into the financial mechanism. Implementation has however been slow due to the complexity of issues and processes, combined with financing and governance challenges.

Inner city redevelopment has been challenging on account of several factors, such as i) nature of the urban fabric ii) need to minimize disruption to people's lives, displacement/gentrification, and ensuring fair rehabilitation, iii) means of financing and lack of transparency in utilization, iv) changing governments and plans, coordination among multiple agencies to develop and implement integrated plans. Mixed income development (especially within the same building/complex) has also been hard to achieve, as typically people are not comfortable with the idea or arrangement.

Consistent and aligned efforts needed towards the goal, under a larger plan

In Mexico City, the share of public transport in motorized trips is currently 67%. While individual projects cannot alter mode shares at the overall city level, every small intervention counts and adds up. For instance, bike shares have increased, as the network of bike lanes has grown and become more connected.

Revitalizing City Neighborhoods through TOD: The Case of Seoul

"TOD is a tool for a walkable city"
Dr. Kang

SPEAKER:

Dr. Myounggu Kang,
Professor of Urban Planning and Design, and Director of Smart City Research Center, University of Seoul

Case Summary

Seoul has been managing an extensive urban regeneration program since several decades. The talk highlighted the key principles, institutional and implementation mechanisms for TOD-led renewal and redevelopment efforts in the city.

Highlights

Well-planned TOD enables shift to sustainable modes, creates value and brings co-benefits

Studies show that well-planned TOD can demonstrate higher utility (performance) of public transit, such as BRT or trams, as against cars. The competitive edge for public transit comes from holistic station area planning-design (all TOD components), and the provision of transit services alone will not induce the shift to sustainable modes. Good non-motorized transport facilities, and attractive and productive public streets and spaces around transit stations not only help improve safe access, but also contribute positively to neighborhood revitalization and livability by supporting businesses and social life.

In central Seoul, restoration of the Cheonggyecheon stream converted a major traffic artery with an elevated highway into a beautiful blue-green public open space. This helped create 'place value' and revitalize the surrounding downtown areas through socio-economic development, environmental and health benefits.

TOD-led renewal – better city building with citizens. Bringing more space into the public realm helps create 'place value'

The most crucial aspect in the upgradation and revitalization of older, deteriorating neighborhoods is to bring more space from the private to the public realm, to service and support higher densities as well as recreate a more livable, sustainable area. Property owners, residents, businesses and developers would participate, partner and invest in the process when the opportunities and benefits (economic and quality of life) are visible. To achieve renewal/redevelopment in older city areas, Seoul has largely used land pooling and readjustment techniques, where private owners contribute up to 50% of their land for public purposes.

Planning tools for TOD and LVC – FAR incentives to enable private sector participation

Seoul uses incremental higher FAR incentives in exchange for provision of additional civic amenities or social benefits by the developers, beyond mandatory components like open spaces. Additional provisions can include NMT facilities or other feeder services, affordable housing, public realm improvements or amenities like parks, vending zones, libraries, etc. This mechanism has been successfully used to plan, implement and achieve the desired outcomes of TOD through public-private participation.

Institutional setup for TOD-led renewal schemes

Seoul has instituted a collaborative process for planning of renewal and redevelopment schemes/projects that include all stakeholders -

- Government: In charge of project planning, execution, coordination with interest groups/stakeholders.

- Citizen's Committee: Includes representatives from affected communities of the target areas. They collaborate to co-develop the principles, priorities and plans together with the government and expert groups. Also collect public opinion, weaving citizens' interest into the project, and manage public relations.

- Research Centre: Includes research centers/institutions who are responsible for survey/studies and analyses to ascertain feasibility, develop proposals and policy advisory.

Implementing TOD and MMI in Developing and Indian Cities

"TOD and Placemaking are two under-utilized, complementary approaches to shaping cities."
Mr. Ollivier

SPEAKER:

Mr. Gerald Ollivier,
Lead Transport Specialist, India and TOD Community of Practice, World Bank

Case Summary

Drawing on two recent World Bank publications, other studies, projects and case examples, this talk highlighted the strategic approaches to planning for TOD and imperatives for effective MMI. It also showcased the TOD principles, knowledge products and toolkits developed by the Bank.

TOD and MMI are crucial to achieve accessibility objectives. Studies in Chennai found that the accessibility granted by each transport mode, individually, is quite limited. The percentage of jobs accessible in 60 mins was 8% by walk, 17% by rail and 25% by bus, and over 30% with all three modes together.

Highlights

Scales of planning from macro to micro

Plan for TOD and MMI across scales, i.e., regional – city – corridor – neighborhood – street – scheme/project levels, in ways that allow leveraging public transport infrastructure to create denser, accessible, inclusive and livable urban areas.

TOD helps shape accessible and sustainable cities

Hong Kong has managed to bring high population and job densities along its mass transit systems, which also helps to decouple economic growth and resource use. Employment and GVA per capita increase, while fuel consumption and carbon emissions per capita decrease.

Densities should be distributed based on public transport connectivity levels

Across the city, there will be areas where public transport connectivity is higher; for instance, in the city centre where multiple transit lines intersect. Higher densities should be enabled at well-connected nodes that are most accessible to the city-region, as Tokyo has done. These areas would have the highest tendency for concentration and demand for space and therefore the highest land values.

The 3V framework

Developed by the World Bank, this framework uses the three values of node, place, and market potential to understand typologies, for strategizing and planning for TOD across scales (from city-region to station areas). The framework helps to (i) quantify development opportunities for creating economic value (and articulate densities for maximum impact), (ii) identify misalignment or imbalances between the three values/aspects and support inter-agency dialogue, and (iii) align and develop a shared vision among city stakeholders. The application of this framework in Mumbai and Chennai has enabled the development of a coherent vision for the city and different station areas, aligned with city goals.

Mitigate displacement and gentrification, plan for inclusive development and access

Alongside the development of mass transit networks, Bengaluru should also plan for the development of affordable housing in well-connected places, across scales, providing good living conditions for lower-income populations combined with accessibility. Measures to mitigate gentrification in station areas (for e.g., by retaining and creating affordable housing stock, etc.) should be employed. Where relocation is unavoidable or necessary, affordable transport and last-mile connectivity to the transit station should be ensured.

Data and technology needed for effective planning and implementation of MMI

The integration of schedules, service information and fare collection, smart payments, curb management and Mobility-as-a-Service (MaaS), would require building a data and technology-enabled delivery system, along with good administration, new PPP frameworks, etc. Physical, operational, information and fare integration are required to enable seamless mobility, but other broader perspectives also need to be considered. For instance, accessibility to different points of interest in the station neighborhood, at different times, availability of services that are gender informed, safe, affordable, green, etc. This requires a lot of data for effective planning and design.

Towards Sustainable TOD

"TODs are not just about transit; they are places to be, as symbolic and functional hubs of neighborhoods and communities. As such, the emphasis is not just on mobility, but also on placemaking."
Dr. Cervero

SPEAKER:

Dr. Robert Cervero,
Professor Emeritus of City and Regional Planning,
University of California, Berkeley

Case Summary

Dr. Cervero's talk highlighted the core features of TOD and TOD types across several international settings. Implementation tools including value capture, parking reforms and enabling legislation were also discussed, along with the impact of market forces and global disruptors on TOD.

Highlights

Density distribution and urban design are important aspects for enabling mode shift

The organization of density in the city at strategic locations along transit networks and the design of the urban environment in station areas, plays an important role in enabling the shift to sustainable transport modes. Los Angeles, for instance, is relatively dense, but development is automobile-oriented; while Stockholm, where densities are organized along liner transit corridors surrounded by lots of green space, has 5-6 times the public transport ridership per capita.

Node v/s Place design challenge

Transit station hubs are places, as well as mobility and logistical nodes. They have interchanges and see the convergence of different kinds of modes (people and vehicles), apart from through-traffic. The planning and design of these areas should therefore balance its placemaking and logistical/utility functions. In Shenzhen, the design of the station hub was shifted from a 'node' to a 'people-friendly place' by placing the logistical staging area at the periphery of the development.

Market shifts towards TOD-led adaptive reuse and retrofitting

Today the tech world is realizing that their desired workforce (millennials) prefer walkable, vibrant, mixed-use communities, where they are not dependent on cars. As such, the market has shifted, and Silicon Valley is slowly moving towards a TOD model. Several tech campuses are relocating downtown or near public transit stations; retrofitting green building features, green mobility facilities and green spaces; adaptively reusing former parking lots as park lots, etc.; or rebuilding to create mixed-use, mixed-income developments with reduced parking, thus reducing traffic impact fees and supporting higher public transport ridership.

Resource-constrained cities in India like Bengaluru cannot afford to emulate the (sprawled, automobile-dependent) US-style business/tech campuses and suburban model of development. It is imperative to avoid unsustainable lock-ins and leverage market forces favoring TOD to trigger transformative change.

Green urbanism superimposed with TOD can enable reduction in carbon emissions

Hammarby Sjöstad, an inner-city area in Stockholm has been rebuilt on the lines of the 'Green TOD' model with compact, mixed use, pedestrian-friendly development, minimized parking and congestion pricing, green buildings, parks and community

gardens, and self-sufficient and zero-waste communities. This has helped cut carbon emissions per capita by a third compared to conventional developments in the same setting. In hot climates like Dubai, rooftop solar systems have been used to generate electricity for passenger amenities and cooling areas. Trees/planting and shading devices for climate comfort are also essential in Indian conditions.

Planning tools for TOD and LVC – creating and capturing value to enhance quality of the urban environment

New York City has aggressively used Transfer of Development Rights (TDR) and stacking of densities around transit stations to capitalize on accessibility benefits and generate revenues for not only upgrading their subway system but also the transformative redesign of its streets and non-motorized transport infrastructure. Hong Kong has strategically captured rising real estate values from properties around transit stations through MTR's[9] Rail plus Property (R+P) development model.

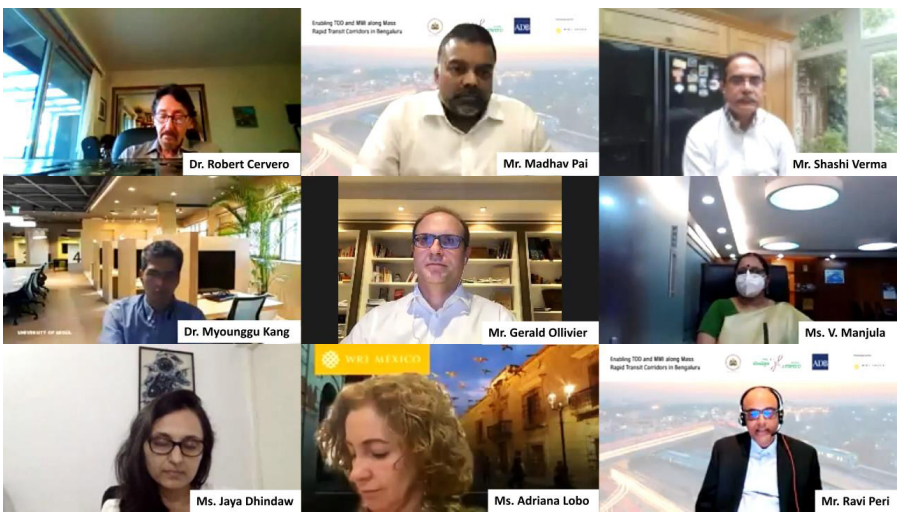
Recognizing the potential of creating value before capturing it, there is a strong emphasis on pedestrian-friendly infrastructure and placemaking in their property and station area development. This has resulted in a 30% increase in their LVC revenues, which are in turn reinvested into the transit system and station area improvements.

> Decentralized growth doesn't have to be in the form of auto-oriented sprawl. It could be the Stockholm Green TOD model like a 'necklace of pearls'; or a poly-centric model with new growth nodes developed on the '15-min city' concept and connected by high-quality transit; or as 'transit villages'.

Market forces, global disruptors and mega trends enabled by data and evolving technology have major implications for urban form and mobility, requiring a proactive and robust planning response

Across the world, rising incomes and shrinking household sizes are seeing an increased per capita demand for space. There is also a massive move towards Shared, Electric and Autonomous (SEA) mobility and on-demand Mobility-as-a-Service, which could aid last-mile connectivity to transit but also adversely affect transit patronage in other ways. Telecommuting and e-commerce have been changing the profiles of space and travel demand patterns in the city, towards greater decentralization and personal vehicle use - a trend that has only been exacerbated by the COVID pandemic and health concerns.

Policy makers and planners in Bengaluru must take cognizance of these factors that are not only extending and exacerbating 'business-as-usual' but will fundamentally change and shape the cities of the future. A proactive approach is needed to manage growth in the city-region, in ways that aggressively advance sustainable models of urbanization (of which TOD is one) and allow public transport to be a significant player/competitor in the regional mobility market space. Building institutional capacities for planning at different scales, particularly at the regional level, is crucial.



Speakers and Moderators of the Technical Session

9. The MTR Corporation, which manages Hong Kong's urban rail system, is a public-private listed entity.

Technical Session - Key Takeaways for Bengaluru

General

- A shared city vision, goals and targets should be supported by an integrated plan with synchronous (sectoral/ cross-sectoral) strategies and effective delivery mechanisms. Engage various stakeholder groups and institute a collaborative process for visioning, planning and city building.
- Given the strong forces towards deconcentration, a proactive approach is needed to plan and manage growth in the city-region, in ways that aggressively advance sustainable models of urbanization.
- Encourage compact, higher density development, supported by public transport, to enable higher efficiencies and productivity. TOD helps achieve good densities without congestion, and decouple economic growth from resource use.
- Green urbanism superimposed with TOD can significantly reduce emissions and support the goal of low-carbon mobility and development.
- Government should leverage market forces favoring TOD, by creating enabling planning-design and regulatory frameworks, as well as good examples (catalytic projects) to emulate.

TOD and MMI - Planning and Design

- TOD is not a one-size-fits-all. While TOD and MMI principles are universally applicable to all geographies, the strategies to deploy them successfully are not. These strategies must respond to different development contexts and local area characteristics. The organization of densities at strategic locations along transit networks and the design of the urban environment in station areas, play an important role in enabling the shift to sustainable transport modes.
- Identify opportunities for renewal and densification; areas with development potential, based on the availability of land, transport and other infrastructure. Distribute densities/FAR provisions based on public transport accessibility levels.
- TOD is a tool to create great walkable and cyclable neighborhoods, served by high-quality public transport. Prioritize road space for space-efficient and sustainable modes.
- Bring more space into the public realm and enhance the pedestrian environment to create 'place value' and support higher densities.
- Mitigate displacement/gentrification in station areas and plan for inclusive development and access.
- Leverage data and technology for effective planning and implementation of MMI.
- Integrate a well-planned bus network to complement the rail networks, for maximizing the potential of the public transport system.
- Ensure universal, safe access by feeder modes and integration at the station hub, and smooth traffic flows - through right location and careful design of infrastructure/facilities. Balance its placemaking and logistical/utility functions.

TOD and MMI - Implementation

- Disincentives for private vehicle use (parking management, congestion and pollution charges) help move the economics towards public transport and are key to its success. They also support realization of TOD objectives.
- Synergize TOD and LVC to achieve desired outcomes and generate revenues. Devise regulatory mechanisms and incentives to enable private sector participation in the delivery of public amenities.
- An empowered unified authority is needed to anchor the whole process of operationalizing TOD and MMI for urban transformation and drive integration and coordinated action.
- Building institutional capacities and resources for data-led, integrated planning and management (across sectors, scales), and good governance, is crucial for success.

4. ROUNDTABLE DISCUSSION

Intent and Overview

A step forward from the High-Level Convening sessions held earlier, the intent of this final session was to provide an opportunity for government agencies in Bengaluru to discuss with each other and a panel of technical experts, the key priorities and challenges with operationalizing TOD and MMI in the city. The Roundtable Discussion convened the department heads of 14 city and state government (parastatal) agencies responsible for planning and service provision in Bengaluru. It also brought together 6 technical experts/technocrats from Delhi, Mumbai and Ahmedabad. The objective was to draw on their extensive practical knowledge and learn from the experience of other metropolitan cities in India that have taken significant strides in operationalizing TOD and MMI. With an intent of building institutional capacities, technical/operational staff from the various (participating) government agencies in Bengaluru were also invited to attend the session.

The context for the session was set through two presentations, highlighting efforts on enabling TOD and MMI in Bengaluru and pan-India, respectively. This was followed by the roundtable discussion on operationalizing TOD and MMI in Bengaluru, structured under four broad thematic areas. The key discussion points and takeaways from the session are presented below. [See Annexure 5.2 Program Agenda.]

4.1 Orientation and Context Setting

Revitalizing Bengaluru through TOD and MM

"From the earlier High-Level Convening sessions, livability and sustainability emerged as strong imperatives for Bengaluru, if it is to remain globally competitive. TOD is not a magic bullet, but an effective tool, an opportunity to leverage the large investments in public transport to reimagine the city's urban form and enhance quality of life."
Ms. Manjula

SPEAKER:

Ms. V. Manjula,
Commissioner DULT

Introduction

DULT has prepared the Draft Bengaluru TOD Policy in consultation with other government agencies (many of those present in the session). Ms. Manjula outlined the Policy's key features, objectives and associated enablers. The three components of the ADB TA project, preparatory TA activities, and the implementation arrangement for the TA were also highlighted [See Annexure 5.4 for details]. She pointed out that achieving the TOD Policy objectives will require coordinated action – across all stages of planning and implementation – by multiple public transport, planning, infrastructure and utility agencies, and anchored by the proposed BMLTA. The establishment of a statutory body for institutional coordination would be an important milestone and a crucial step forward for the city.

Highlights of the Draft Bengaluru TOD Policy

TOD Zone Classification

Accessibility is the key criteria for delineation of TOD Zones around mass transit (metro/suburban rail) stations, BMTC's Traffic and Transit Management Centers (TTMCs) and intermodal transit hubs. The TOD Zone classification is based on the 6-6-6 principle.

- Core TOD Zone: 6 minutes by walk (up to 500 m)
- Standard TOD Zone: 6 mins by cycle (up to 1 km)
- Catchment Area: 6 mins by feeder bus (up to 2 kms)

Objectives and Policy Enablers

Objective 1:
Achieve high mode share of public transport
Policy Enablers:
Transit Service Design; Design for Captive Ridership; Multimodal Integration; Mobility as a Service; Parking Management

Objective 2:
Provide built-environment and associated infrastructure conducive to NMT use
Policy Enablers:
Complete, Connected NMT networks; Cycle Facilities; Walkable Neighborhoods

Objective 3:
Implement mixed land use that leads to shorter commutes and reduce travel demand
Policy Enablers:
Mixed-use, Mixed-income Balance; TOD Zone Plans; Differential Densification; Land Value Capture; Civic Amenities

Objective 4:
Ensure inclusivity for all economic classes, gender, age, and ability in TOD interventions
Policy Enablers:
Inclusive Barrier-free Design; Affordable Housing; Informal Sector Integration

Objective 5:
Enable high quality of life through placemaking and sustainable practices
Policy Enablers:
Vibrant Public Spaces; Form-based Codes; Use of Green Technology; Safety and Security; Conservation of Heritage, Nature and Environment

Objective 6:
Build an enabling framework to deliver TOD projects of high quality
Policy Enablers:
TOD Zone Planning and Implementation; Standards and Approvals; Monitoring, Evaluation and Lifecycle Asset Management; Capacity Building; Financial Mechanism.

Enabling TOD and MMI – The Indian Experience

SPEAKER:

Mr. S. K. Lohia,
MD & CEO, IRSDC

"Santiago Calatrava said, 'a railway station is something which can generate a city' and that is our aim. These projects should not only transform and benefit the Railways, but more so the city. Global experience shows that a Rupee invested in station development brings five times the return in the vicinity."
Mr. Lohia

Introduction

IRSDC[10] is the nodal agency for Railway Station Re/development across India. Mr. Lohia highlighted that the agency has a wide mandate, requiring it to play multiple roles.[11] It is the single-point planning and approval agency for its station plans and projects. It does this in consultation with ULBs and other statutory authorities, so that development in railway land is harmonious with its surroundings. The agency has approved plans in several cities and presently, over 60 station re/development

projects are underway across the country. Mr. Lohia's presentation highlighted the guiding and enabling framework for the successful implementation of the program, along with glimpses of ongoing projects.

Highlights of IRSDC's Station Redevelopment Program

The Railopolis – Vision and Guiding Framework

The 'Railopolis' is envisaged as a mini-Smart City, where one can live, work, play and ride. The aim is to develop sustainable habitats, through TOD and MMI, and enable a shift from private to public transport modes - which is built into the project right from the planning-design stage. Seven focus areas (7Cs) have been identified:

- Creating a city center: 24x7
- Conservation: of the natural and built environment
- Convergence of modes: MMI
- Communication: clear and fast communication systems
- Congestion-free experience: segregating passenger arrivals and departures
- Convenience: lifts and escalators, climatic comfort for passengers
- Cleanliness: on priority at all places

The Enabling Framework for Station Planning and Development

The project planning and design needs to comprehensively address the station (as a transport node) as well as the real estate adjoining or surrounding the station (as a place and a city/neighborhood centre for communities) and integrate both sides of the city across the rail line. The Rail + Property development model has been adopted to monetize government assets and revenues generated from the commercial utilization of surplus railway land would be used for station developments.

Based on TOD principles, IRSDC has developed special Form-Based Codes (FBCs) for station planning and design, which are now being adopted. The codes refer to and harmonize several other guidelines and standards and have been developed through wide consultation with stakeholders, including ULBs and relevant national level organizations. The codes apply to the entire Railway land (treated as a single plot), as an overlay on (and overriding) the local DCRs/Building Byelaws. Underlying principles and priorities include:

- Network(s) integration: harmonize between station and neighborhood
- Pedestrian and NMT-friendly environment: create safer, active streets
- High-quality public spaces and greens: enhance value and livability
- Flexible mixed-use development: provide variety and vibrancy
- Heritage and environmental considerations: heritage preservation, green buildings and environment management plan
- Parking: demand-management through norms and pricing strategy

To standardize, operationalize and expedite the process of station planning and development, IRSDC has developed several guidance documents for consultants and developer entities to follow. It has also created design templates and modules, allowing permutations and combinations for adapting to the local context. Based on the city DCRs, FBCs and design standards, 'Buildable Volume and Property Development Cards' for each project are prepared. Common areas and mandatory works are listed to guide the entire development.

10. A Special Purpose Vehicle set up in 2012, the IRSDC is a joint venture company of the Rail Land Development Authority (RLDA), Ircon International Limited (IRCON) and Rail India Technical and Economic Service Limited (RITES).
11. The main objectives and responsibilities of the company are to: (i) re/develop existing or new stations; (ii) undertake projects for development of real estate on Railway/Government land and its commercial utilization; (iii) undertake project preparation (planning-design) and development through various implementation models; (iv) financing; (v) PPP and facility management; (vi) approval of station/building plans, issue of Occupancy Certificates (OC), etc.
12. Manual for Standards and Specifications for Railway Stations (MOSSR), National TOD Policy, National Building Code (NBC) 2016, Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines, FBC guidebook by the Ministry of Housing and Urban Affairs (MoHUA), etc.

4.2 Panel Discussion

Operationalizing TOD and MMI along Mass Rapid Transit Corridors in Bengaluru

GOVERNMENT AGENCIES

Sri. Rajender Kataria, IAS, Principal Secretary, Transport Dept, GoK
Sri. Dhananjay Reddy, Town Planning Member, Bangalore Development Authority (BDA)
Sri. Girish Hosur, IFS, Commissioner, Bangalore Metropolitan Region Development Authority (BMRDA)
Sri. Shailender Singh, Joint Director / Mr. Murali, Directorate of Town and Country Planning (DTCP)
Sri. Anjum Parvez, IAS, MD, Bangalore Metropolitan Rail Corporation Ltd (BMRCL)
Dr. M. T. Reju, IAS, MD, Bangalore Metropolitan Transport Corporation (BMTC)
Sri. Amit Garg, MD, Rail Infrastructure Development Company (Karnataka) Ltd. (K-RIDE)
Sri. Lakshman Singh, Additional Divisional Railway Manager, South Western Railways (SWR)
Sri. N. Jayaram, IAS, Chairman, Bangalore Water Supply and Sewerage Board (BWSSB)
Sri. Rajendra Cholan, IAS, MD, Bangalore Electricity Supply Company Ltd. (BESCOM)
Sri. Ravikanthe Gowda, IPS, Joint Commissioner of Police, Traffic
Sri. N. Shivakumar, IPS, Commissioner, Transport & Road Safety

TECHNICAL EXPERTS

Mr. S. K. Lohia, MD & CEO, IRSDC
Ms. Deepa Dave, Town Planner, Ahmedabad Urban Development Authority (AUDA)
Ms. Uma Adusumilli, Ex-Chief Planner, Planning Division, Mumbai Metropolitan Region Development Authority (MMRDA)
Mr. Sameer Sharma, Vice President, Delhi Integrated Multi-Modal Transit System (DIMTS)
Mr. Shivanand Swamy, Professor and Director, Center of Excellence in Urban Transport (CoE-UT), CEPT University
Mr. Madhav Pai, Executive Director, WRI India Ross Center

Introduction

When looking at global cities that have had experience with operationalizing TOD and MMI, and the ingredients for success, four broad thematic areas emerge. This discussion was structured as below and the highlights are presented in the Q&A format in which it was conducted. The views shared are of the representatives of respective agencies.

Theme 1
ALIGNING VISION FOR REGIONAL GROWTH

Theme 2
ENABLING TOD AND MMI POLICY AND REGULATIONS

Theme 3
INFRASTRUC-TURE RESPONSE

Theme 4
INSTITUTIONAL SETUP AND FINANCE

Theme 1: Aligning Vision for Regional Growth

A growth strategy based on 'compact city' and 'TOD' concepts (denser neighborhoods linked by public transport systems and good access to local services and jobs) can help move towards a sustainable growth pattern and lower carbon mobility. How can we align institutional (sectoral) priorities towards enabling this common vision?

Mr. Lohia, IRSDC: Continuous dialogue and process standardization - To align priorities and arrive at a common vision for station re/development - learning from global experiences, financial wherewithal and the value proposition (benefits) for different stakeholders, emerge as critical aspects. Continuous dialogue and standardization of procedures are needed to ensure alignment and high-quality outcomes, across levels of planning and implementation.

Ms. Adusumilli, MMRDA, Mumbai: Coordination through a regional planning authority - In the Mumbai Metropolitan Region's multi-jurisdictional context, the MMRDA has been able to bring some alignment and integration with respect to requirements of the region, in two ways. Firstly, through regional planning, which aimed to integrate the priorities of various areas into a strategic framework for land use and infrastructure development, particularly transportation. The MMRDA also provides technical/managerial assistance and financial support to the UMTA as well as other local authorities, for planning and implementing their infrastructure projects. This has allowed MMRDA to contribute to decision-making processes and in turn, improve inter-agency dialogue and resolve conflicts.

Mr. Sharma, DIMTS, Delhi: City growth strategy based on land use and transport integration - To enable a shift towards public and non-motorized transport modes, in Delhi, the aim is to move towards TOD supported by strong MMI. In the regional plan for Delhi NCR, the regional mass rapid transit system has been used as an instrument to structure future growth in a more sustainable manner. The Draft Delhi Master Plan 2041 proposes realigning growth and densities around mass transit stations to promote greater public transport usage. For the first time, the PTAL tool has been used to determine density distribution and parking provisions in the city. The optimum level of densification in TOD Zones is however dependent on other factors as well and should be modulated based on local context.

Ms. Dave, AUDA, Ahmedabad: TOD concepts given statutory backing - The vision for a 'compact city' based on land use-transport integration was established in the Revised Development Plan 2021 for Ahmedabad, which embedded TOD concepts. The planning framework and regulations for TOD were first incorporated into the Development Plan (DP), and subsequently the Gujarat Town Planning and Urban Development Act 1976 was amended in 2014 to enable the preparation of detailed Local Area Plans, such as TOD Zone Plans, with the core objective of promoting public transport use.

Mr. Parvez, BMRCL, Bengaluru: Planning for TOD and MMI alongside metro network to support city growth strategy - A common vision for city growth based on landuse-transport integration would help in planning subsequent phases of Namma Metro. The planning for metro lines and TOD should be a simultaneous, iterative process. The city should pre-determine which areas can be densified and developed as growth nodes, to be supported by public transit. While the metro network in Bengaluru is set to expand, in isolation, it cannot solve the city's mobility problems. Multimodal integration is needed for the metro system to be utilized to its full potential and support the city's growth strategy. To this end, BMRCL is working with BMTC on route and service rationalization for complementarity. To address issues of last-mile connectivity, a Bike Policy for the city is also being explored, and efforts towards integrated ticketing are underway.

Dr. Reju, BMTC, Bengaluru: An integrated, multimodal public transport system to support city goals - A common vision, with a core objective of achieving a higher mode share of public transport, as defined by the Draft TOD Policy and CMP for Bengaluru, is an opportunity for developing an integrated and efficient public transport system for the city. To enable MMI, essential aspects include (i) government support, whether in terms of policies, funding, etc., (ii) greater investment in infrastructure, technology and human resources, (iii) identifying areas of working together with rail transit agencies – mapping demand, planning complementary routes/services, common mobility card, sharing revenues, coordinated station area improvements and so forth.

Mr. Garg, KRIDE, Bengaluru: City's transport strategy to guide development of the suburban rail system - The approved CMP for Bengaluru clearly outlines the transport policy and strategy for the city, future development for each element of a comprehensive transportation system, and the roles of different transport agencies. K-RIDE will initially focus on increasing public transport capacity in the city by developing another metro-like system, and in the next phase, connect to satellite towns around Bengaluru. The agency plans to monetize its assets (as much as possible) and develop the suburban rail stations as thriving commercial hubs.

Mr. Hosur, BMRDA, Bengaluru: Growth in the city-region can be based TOD and MMI principles - The Bengaluru Metropolitan Region (BMR), covering about 8,000 sq. kms., has 11 Local Planning Areas (LPAs), including the BMA. Bengaluru is sprawling, unlike Hong Kong which is constrained by geographical limits and where TOD is focused around its rail stations. Although planning for TOD and MMI is currently not feasible/practical in certain LPAs, these concepts can inform the future regional growth strategy for holistic development in the BMR — premised on the sub-urban rail, serving as the regional transportation system for many commuters between suburban areas/towns and Bengaluru city.

Ms. Manjula, DULT, Bengaluru: Lead agency needed to anchor coordination process - To align the priorities of multiple agencies and build consensus around a

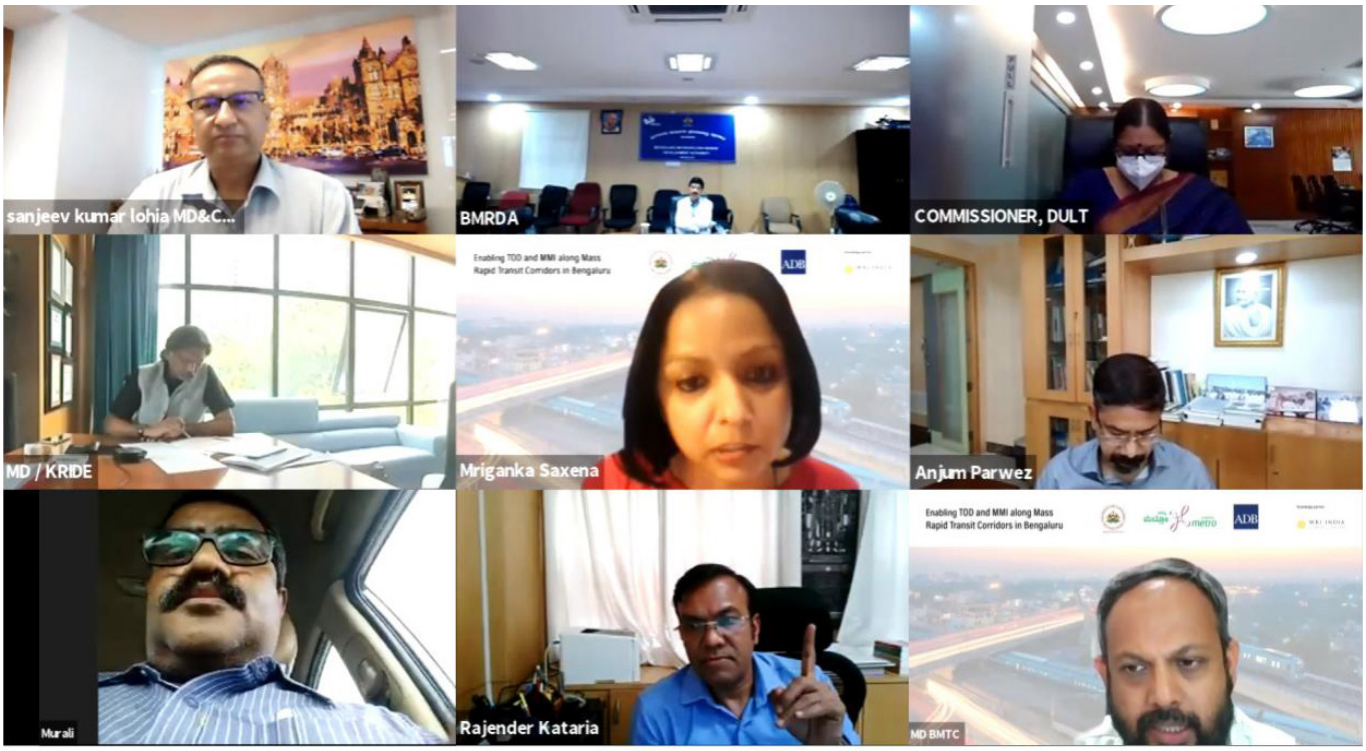
common vision, one agency must take lead and initiate the dialogue. It is a process that requires time and continuous effort and in Bengaluru, it is a work-in-progress. The BMLTA Bill and TOD Policy currently applies only to the BMA and Bangalore International Airport Area Planning Authority (BIAAPA) areas, and not the BMR. Since these are new interventions, they are initially limited to the city, and later can be extended to the metropolitan region. However, given the rapid urbanization and development occurring in the peripheries of the city, beyond the BMA, there is an urgent need for proper regional planning and land management to align the growth trajectories/strategies of smaller towns in the region and address rampant land use changes and speculative development, leading to haphazard sprawl.

Mr. Pai, WRI India: Strategic and integrated land use and transport planning - In the context of regional growth strategies, globally, cities are moving towards a more strategic planning approach. With Bengaluru investing significantly in public transport infrastructure, a key focus should be bringing jobs closer to its mass transit systems. For instance, downtown areas in New York or London have job densities over 150,000/sq. km. whereas in Bengaluru we don't see densities greater than 7,000/sq. km. While planning for mass transit systems, BMRCL and KRIDE can have conversations with large employers in the city and encourage them to locate close to the rail networks.

Key Takeaways

Critical aspects for harmonizing priorities and institutionalizing the same include:

- Continuous dialogue, capacity building, availability of financial resources and value proposition for different stakeholders.
- Integrated, strategic planning at the city/regional level by an empowered authority – providing oversight, technical and financial support – aids in inter-agency coordination.
- Embedding core concepts, such as TOD and MMI, into the statutory planning and regulatory framework (i.e., into sectoral/ cross-sectoral plans at different scales) and standardization of procedures for planning and implementation.



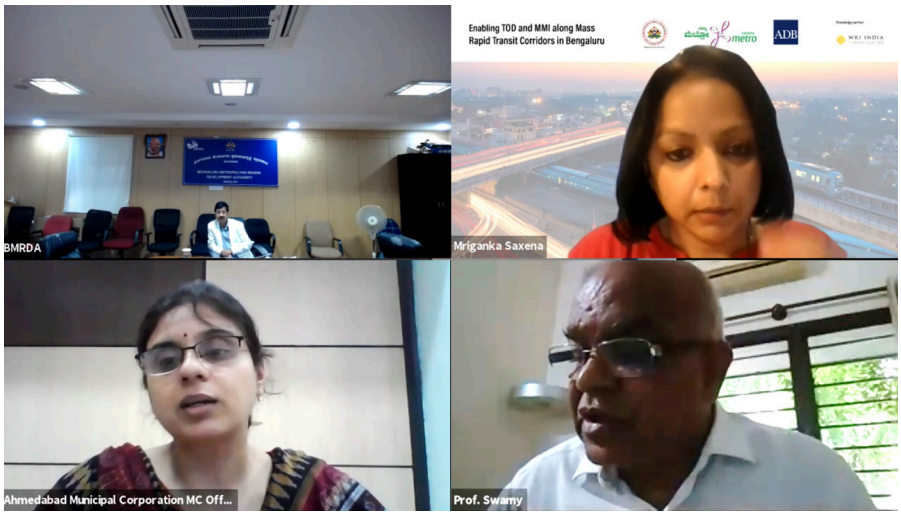
Theme 2: Enabling TOD and MMI through policy and regulations

How can TOD principles and MMI priorities be integrated into statutory and regulatory frameworks?

TOD: *Planning and design for TOD needs to be enabled across scales. The objectives of TOD would require a different approach to Parking and Zoning or Development Control Regulations*

Representative of Town Planning Dept. BDA, Bengaluru - Revision of city's master plan to integrate TOD principles - The city's master and development regulations are being redrawn. They will incorporate the objectives and principles outlined in the proposed Bengaluru TOD Policy.

Mr. Swamy, CEPT, Ahmedabad: Strategize phasing and institute mechanisms to plan for TOD across scales - Priorities to consider in formulating a well-planned phasing strategy for TOD in the city include the assessment of TOD typologies based on the local context, the objectives for adopting TOD (at the larger city and local area level) and the potential for development, value creation and capture. Importantly, an implementation mechanism that is rule-based and not project-based will have to be developed. This would help strategize and structure in terms of how much TOD, where and when. Case studies from other Indian cities show that the 'TOD project' approach alone can be limiting, and moreover, difficult to implement quickly. In Ahmedabad, planning and implementation of TOD is enabled as a process, through statutory and regulatory frameworks. A two-tier planning process has been institutionalized – TPS for new growth/greenfield areas and LAP for existing/brownfield areas – to implement the city's DP. These mechanisms enable the preparation of TOD Zone Plans.



Ms. Adusumilli, MMRDA, Mumbai: Need for comprehensive planning and regulations beyond higher FAR - Mumbai's Development Plan did not include special TOD regulations, as it already had an incentivized FAR regime for many areas in the city, including railway, metro lines and major roads. Over-reliance on the market and market-related instruments is, however, a weakness. Beyond a regulatory regime (DCRs), there is a need to assign a greater role for planning

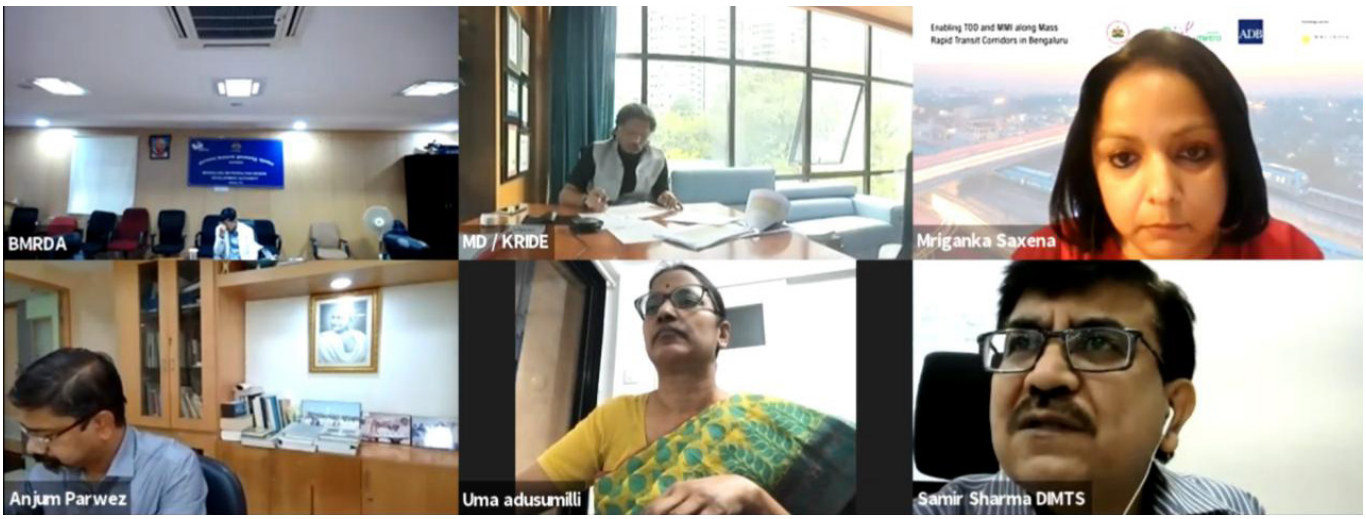
authorities to undertake a comprehensive visioning and planning exercise for transit corridor(s) and delineated station areas, identifying priority areas for government-led or market-led development. MMRDA, as the regional planning authority, also implementing the metro lines, has proposed that metro station influence zones be considered as 'Special Planning Areas' under its purview.

Mr. Murali, DTCP, Bengaluru: Statutory mechanisms to enable TOD Zone Plan preparation and notification - The Karnataka Town & Country Planning Act has provisions for preparation of Town Planning Schemes (TPS), though improvements are required. Amending the Act to also bring in provisions for preparation of Local Area Plans (LAP), is under consideration. These mechanisms (TPS/LAP) would enable the preparation and notification of TOD Zone Plans (for different development contexts).

MMI: *To match total public transport capacity and quality of service to user demand, operational integration would need to be enhanced. Integrated ticketing plays a significant role for effective MMI. Administrative and regulatory provisions are needed to operationalize.*

Mr. Sharma, DIMTS, Delhi: Data openness and suitable technology are needed for integration - In Delhi, some efforts have been made towards operational and information integration and integrated ticketing. Transport service data was strategically opened and a mobile application for trip planning has been developed, where the metro, bus and paratransit services have been integrated. Eventually paratransit services should be included within the realm of integrated ticketing, though it would require technology transformation w.r.t. fare meters, etc.
Learning for Bengaluru to consider: Data openness is the most important step, which can help bring different transport provider agencies onto a single integrated platform. For integrated ticketing, technology specifications or systems that can work for all modes of transport should be outlined and employed.

Mr. Kataria, Transport Dept., GoK: Common platform for policy development and deployment - Parking management measures outlined in the approved Parking Policy for Bengaluru should be implemented to manage travel demand. A common platform is needed to take different transport provider agencies on board for policy development and operationalization. The common mobility card, for instance, has been discussed, but a lead agency may be needed to drive implementation.



Key Takeaways:

TOD: Planning authorities should undertake a comprehensive visioning and planning exercise for transit corridor(s) across the city, apart from preparation of guidelines and regulations which are incorporated into statutory plans. Various assessments and station area typologies should guide the phasing strategy (identification of priority nodes/clusters/ corridors) and preparation of TOD Zone Plans (enabled through statutory provisions).

MMI: Data openness and technology are important enablers for MMI. A common platform for different agencies involved with transport/mobility in the city is needed - for consensus building, policy formulation and coordinated implementation.

Theme 3: Infrastructure Response

TOD Zones (typically high intensity areas) and MMI require infrastructure augmentation/ upgradation based on the development potential and need as outlined in the TOD Zone Plans. How will this be achieved? What are the challenges that different stakeholders anticipate and what support will be needed?

Representative of BWSSB, Bengaluru: Manage demand and mobilize funding for requisite infrastructure requirements - TOD Zones are expected to realign population densities along mass transit corridors in the city. Some of the key challenges to manage water supply and sewerage services because of this redistributed demand, include reallocation of water supply and corresponding upgradation of infrastructure. This will require mobilization of additional funds, beyond what has been raised for augmenting water supply to meet the overall city requirement (based on the Draft RMP 2031 population projections). To reduce/optimize water demand, measures such as rainwater harvesting and wastewater reuse will need to be aggressively promoted.

Mr. Cholan, BESCOM, Bengaluru: Budget allocation to meet requisite infrastructure requirement - The agency is improving its infrastructure and has adequate installed capacity to meet the growing and peak demand in future. It also has a separate budget for implementing TOD-related infrastructure augmentation/ upgradation and will coordinate with the Urban Development Department for implementation of requisite works.

Mr. Parvez, BMRCL, Bengaluru: Improve transit system efficiency, safe access and integrate feeder services - With TOD implementation, ridership on the metro is expected to increase many-fold. Signaling upgrades (in Phases 2, 2A-2B) will help improve frequencies (from the existing 5-min to 2-min intervals) and cater to higher ridership levels. For developing walkable footpaths and cycling facilities in the station areas, implementation of the TenderSURE model for road redesign and upgradation (based on the pedestrian-first principle) must be fast-tracked and scaled. Efforts to improve last mile connectivity through PBS, e-bikes and paratransit are underway. Space for these feeder modes as well as bus bays, close to station entry/exits points, also need to be planned and provided in consultation with ULBs.

Dr. Reju, BMTC, Bengaluru: Financial support for procurement and operation of fleet - The challenges envisaged relate to augmentation of the bus fleet, including the extent of financial support available from the government to procure and operate the buses. With respect to feeder services, BMTC will have to work closely with the Traffic Police and BBMP to streamline the movement of buses on narrower roads. There are several areas in the city where the available carriageway cannot

accommodate even midi-buses and therefore the agency is considering smaller-sized buses (as used in Mumbai).

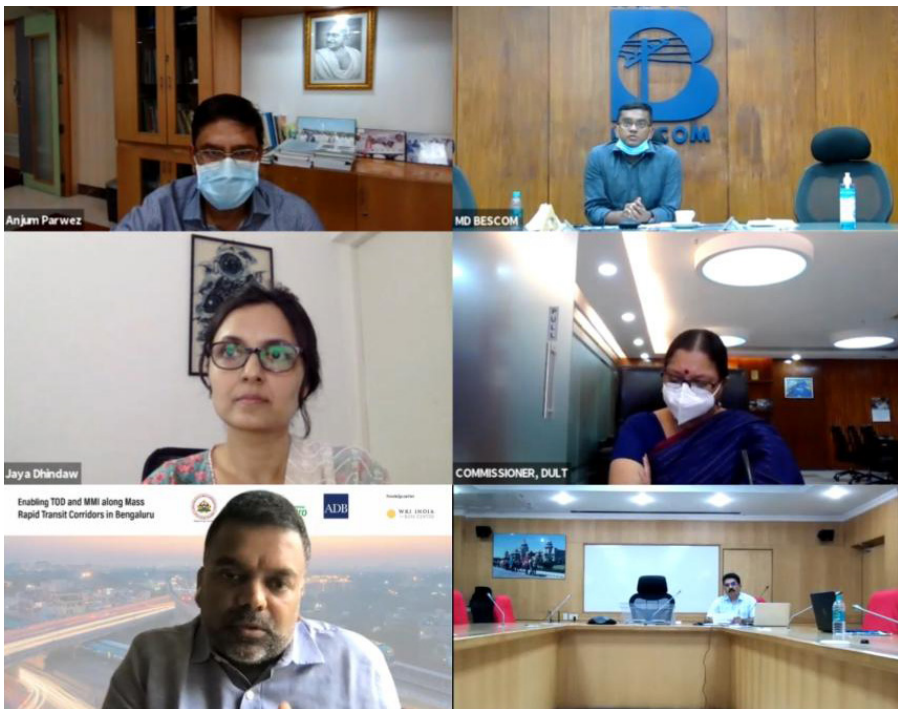
Mr. Swamy, CEPT, Ahmedabad: Infrastructure augmentation through enabling regulations and private sector participation - In Ahmedabad, re/development (triggered by higher FAR provisions in TOD Zones) and infrastructure augmentation is an ongoing market-driven process, where the government is the facilitator — creating an enabling regulatory regime, planning the road network, improving the public realm and infrastructure, with private sector participation. An important point to note is that an increase in FAR does not automatically translate to a proportional increase in population density and demand. The deployment of demand management measures would also reduce resource/infrastructure requirement and improve efficiency.

Mr. Sharma, DIMTS, Delhi: Customize TOD based on infrastructure capacities, and to maximize its utility - TOD parameters (nature and intensity of development) should be tweaked based on the infrastructure carrying capacities of different areas. Public transit capacity and traffic impact assessment are key determinants. TOD Zone planning should also consider how employment and population densities can be arranged to balance transit network flows (i.e., well-utilized in both directions during peak hours and at different times of the day). This is not easy to plan but is another means to achieve the optimal situation.

Key Takeaways:

Infrastructure requirements in TOD Zones may not increase proportional to FAR/density. They should be gauged judiciously based on anticipated growth, deployment of measures to manage demand and maximize the efficiency of built-in capacities. TOD parameters should be adjusted based on the optimum holding capacities of different areas.

Service provider agencies would need to reallocate or mobilize additional resources and work in coordination with other agencies. Private sector participation in infrastructure improvements can be leveraged, though funding support from the government would also be needed.



Theme 4: Institutional Setup and Finance

Successful implementation of TOD and MMI will require a collaborative institutional structure which integrates the transit systems with urban development and livability objectives. Timely, adequate, and sustainable funding flows are also needed. Land Value Capture is a key priority when it comes to TOD. What institutional arrangements and revenue streams need to be put in place?

Ms. Adusumilli, MMRDA, Mumbai: Various LVC and revenue streams directed to a dedicated fund - LVC mechanisms in the state (Maharashtra) include TDR and Premium FSI, which apply to TOD Zones. It is essential that DCRs achieve a balance between the two instruments, to ensure a healthy demand and market for both. The state also has specific scheme/project-linked infrastructure levies, though this is yet to be determined in the case of TOD. Additionally, in Mumbai, the MMRDA has proposed that as the Planning Authority for the 'Special Planning Areas' around metro stations, they be allowed to levy premiums (on development in the area), with revenues to be shared equally with the Municipal Corporation. Other expected sources include revenues from commercial development in the metro station and car sheds, co-branding of stations, advertisements, etc. Furthermore, the state government had issued an order in 2019, wherein any city that had a metro line passing through it could levy up to double the development charges across the whole city and use that revenue to fund metro rail development. A 1% additional cess on Stamp Duty for all property transactions has also been approved. All such revenues would flow into the Urban Transport Fund (UTF) managed by the MMRDA, the use of which will be determined by the UMTA.

Ms. Manjula, DULT, Bengaluru: Anchor agency for coordination, planning and financing for TOD and MMI - The BMLTA Bill currently under consideration by the GoK seeks to address institutional arrangements for cross-sectoral, inter-agency coordination and the operationalization of TOD and MMI. All the concerned government agencies are represented in the BMLTA, under the Chairmanship of the Chief Minister. It is expected that the TOD plans, once prepared and approved by the BMLTA, will be binding on the various transport, infrastructure and utility agencies who will take it forward for implementation. Guidelines and standard operating procedures are needed to align their functions towards achieving the set policy objectives. The CMP for Bengaluru should be given more weight and credence. A Government Order (GO) will soon be issued for Bengaluru and other cities in the state w.r.t. setting up the UTF. In Bengaluru, LVC revenues collected through Premium FAR or MRTS cess will flow into the UTF, and a specific fund sharing mechanism among various city development and service provider agencies will be outlined in the GO. Innovative mechanisms for financing and developing public infrastructure/amenities in TOD Zones should also be explored, for instance, higher FAR allowances against in-kind contribution by developers. There is a lot that Bengaluru can learn from other cities and good practices, but ultimately, the city must find its own way.

Key Takeaways:

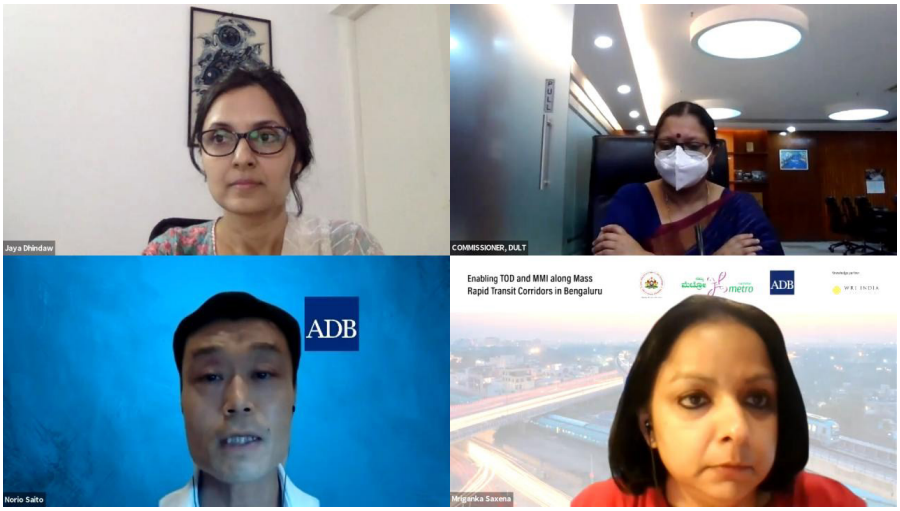
- Appropriate sources of revenue, including from LVC instruments, should be identified, harmonized and channelized into a dedicated Urban Transport/TOD Fund. The establishment of such a fund, with clear mechanisms for revenue-sharing, ring-fencing etc., which can serve as a reserve for investment over time, is crucial for TOD implementation.

- To effectively address Bengaluru's challenges and achieve the envisaged transformation, a paradigm shift in approach is needed. Central to this is a 'One Bengaluru' approach - to work across multiple agencies and offer integrated solutions.

- Setting up an empowered authority with financial powers, for coordinated planning and implementation of TOD and MMI (across all stages), is crucial for success. Standard protocols are needed to align the functioning of different agencies.

Way Forward

It is hoped that the deliberations and learning, will provide useful cues on how to move ahead with enabling TOD and MMI in the city. This information will also be used to contextualize the upcoming ADB TA project. ADB will continue to support the committed leadership in Bengaluru, and DULT and BMRCL in particular, through the TA resources.



5. ANNEXURE

5.1 Timeline of Project and Policy Interventions

Mass Transit Networks and Efforts Towards Enabling TOD and MMI in Bengaluru

2006
- Phase-1 of Bengaluru's metro rail project (42 kms) receives Government of India (GoI) approval.

2009
- The Revised Master Plan for Bengaluru (RMP 2015) is amended to allow areas within 150m radius of completed metro stations a maximum FAR of 4 for all permissible uses

2011
- First section of Phase-1 metro network is operationalized. Bangalore Metropolitan Transport Corporation (BMTC) launches metro feeder bus services.
- A pilot Station Accessibility Plan and Development Control Regulations (SAP-DCRs) for Indiranagar metro station is prepared.

2012
- Urban Development Department (UDD), Government of Karnataka (GoK) issues order for operationalizing instruments such as Transfer of Development Rights (TDR), cess from new developments, Public Private Partnerships (PPP), carbon credits, etc. to part-finance GoK's share for the proposed Phase-2 metro lines.

2013
- Directorate of Urban Land Transport (DULT), GoK launches 'Cycle Day' in collaboration with community partners.

2014
- Phase-2 of Bengaluru's metro rail project (72 kms) receives approval.

2016
- BMTC launches an integrated Intelligent Transport System (ITS) and Passenger Information System (PIS).
- Based on the pilot, SAP-DCRs for 11 other metro stations (of 40) in the Phase-1 network are prepared by DULT.

2017
- Phase-1 metro network is fully operationalized. BMTC progressively deploys feeder bus service around operational metro stations.
- Bangalore Metro Rail Corporation Limited (BMRCL) launches the Station Access and Mobility Program (STAMP Challenge) to identify and scale innovative data/tech-enabled market solutions for improving last-mile connectivity to the metro system.
- Bounce (a Bengaluru-based startup) wins tender to scale its two-wheeler rental services to Phase-1 metro stations and major bus terminals.

2018
- BMTC ties up with Bykerr (a Bengaluru-based startup) to provide last-mile connectivity to passengers on its airport services, in the pilot phase.
- DULT introduces a permit system for fully automated, dock-less PBS in select city clusters; Yulu and Bounce begin operations. The PBS system is officially launched the following year.
- UDD, GoK issues order according approval for legal agreements between BMRCL and corporate entities, for financing the proposed Phase-2A metro line.

2020

- The Bengaluru suburban rail project (148 kms) receives GoI approval.
- BMTC initiate efforts towards complementarity (optimization and integration) of bus services with the metro, along Phase-1/2.
- DULT and BBMP with other stakeholders, pilot a bus priority lane and cycle lane along the proposed Phase-2A metro line on the Outer Ring Road.
- BMTC prepares an Open Data Policy; approves sharing of real-time data for non-commercial purposes.
- The Comprehensive Mobility Plan (CMP) for Bengaluru that includes strategies to promote TOD and MMI receives GoK approval.
- The Draft Revised Master Plan for Bengaluru (RMP 2031) is withdrawn by the GoK; to be revised in alignment with the CMP, TOD and Parking policies.
- BMTC develop a long-term vision plan and strategies for meeting their potential transport demand over a 15-year timeframe. The plan includes measures to decarbonize, improve the declining mode share and financial sustainability of the public bus system.

2021

- The Parking Policy for Bengaluru receives GoK approval. It includes guidelines for differential parking regulations in TOD influence zones.
- The Draft Bengaluru TOD Policy is finalized by DULT and submitted to GoK for approval.
- The Bengaluru Metropolitan Land Transport Authority (BMLTA) bill - for establishing a unified and empowered transport authority - is prepared by DULT and submitted to GoK for approval.
- The Karnataka Town and Country Planning Act (KTCPA) is amended to allow urban local bodies and GoK to charge a premium for purchase of additional FAR (over base), primarily along mass rapid transit systems.
- Two sections of Phase-2 metro network are operationalized. Phase-2A and 2B of Bengaluru's metro rail project (58 kms) receives GoI approval.
- DULT finalizes a city-wide permit scheme to operate PBS and shared micro-mobility systems, with an aim to integrate these services and payment through a common platform.
- DULT partners with government stakeholders and communities to build upon its 'Cycle Day' initiative, which has reached over 50 neighborhoods through 500+ events till date.
- DULT leads several efforts, along with other city agencies and communities, to improve walking and cycling facilities, public spaces and amenities and road safety in city neighborhoods and school zones.
- GoK issues the Karnataka Open Data Policy providing guidelines for departments on classifying and sharing of data.
- BMRCL receives $500 million loan from Asian Development Bank (ADB) for Metro Phase-2 implementation.

* Policy Interventions

5.2 Program Agenda

DAY 1: 26th August 2021 | 4:30 to 7:30 pm (IST) / 11:00 am to 1:30 pm (GMT)

SESSION TIMINGS	SESSION TYPE	SESSION TITLE	SESSION SPEAKERS
4:30 - 5:15 pm	Inaugural Session	Welcome Address	**Sri. Anjum Parvez**, Managing Director, Bengaluru Metro Rail Corporation Limited
		Keynote Address: Making Bengaluru a livable, sustainable city	**Sri. P. Ravi Kumar,** Chief Secretary, Govt. of Karnataka
		Urban development vision for Bengaluru	**Ms. V. Manjula,** Commissioner, Directorate of Urban Land Transport, Govt. of Karnataka
		Vision of the ADB project and objectives of the event	**Mr. Kenichi Yokoyama**, Director General, South Asia Regional Department, Asian Development Bank
5:15 - 6:10 pm	Plenary Session	Transforming Cities: The Case of Bogota	**Mr. Enrique Penalosa**, Former Mayor of Bogota
6:10 - 6:15 pm	Break		
6:15 -7:30 pm	Visioning Session	Vision for Bengaluru – Challenges and Opportunities	**Sri. Gaurav Gupta**, Chief Commissioner, Bruhat Bengaluru Mahanagara Palike **Mr. TV. Mohandas Pai**, Chairman, Manipal Global Education Services **Ms. Kathyayini Chamaraj**, Executive Trustee, CIVIC **Mr. Srinivas Alavilli**, Head, Civic Participation, Janaagraha Center for Citizenship and Democracy **Mr. Naresh Narasimhan**, Managing Partner, Venkatraman Associates **Ms. Revathy Ashok**, Chief Executive Officer, Bangalore Political Action Committee **Dr. Ashish Verma**, Associate Professor, Dept. of Civil Engineering, Indian Institute of Science **Mr. R. K. Mishra**, Founder Director, Center for Smart Cities **Mr. Bhaskar Nagendrappa**, President, Confederation of Real Estate Developers' Association of India (CREDAI), Bengaluru

DAY 2: 27th August 2021 | 5:00 to 8:00 pm (IST) / 11:30 am to 2:30 pm (GMT)

SESSION TIMINGS	SESSION TYPE	SESSION TITLE	SESSION SPEAKERS
5:00 - 6:45 pm	Context Setting	Opening Remarks	**Mr. O. P. Agarwal**, CEO, WRI India
		Planning for a Compact and Connected City: The Case of London	**Mr. Shashi Verma**, Director of Strategy and Chief Technology Officer, Transport for London
		Implementing TOD and MMI: The Case of Mexico City	**Ms. Adriana Lobo**, CEO, WRI Mexico
		Revitalizing City Neighborhoods through TOD and MMI: The Case of Seoul	**Dr. Myounggu Kang**, Professor, Dept. of Urban Planning and Design, University of Seoul
		Implementing TOD and MMI in Developing and Indian Cities	**Mr. Gerald Ollivier**, Lead Transport Specialist and TOD Community of Practice, World Bank
		Towards Sustainable TOD	**Dr. Robert Cervero**, Professor Emeritus of City and Regional Planning, University of California, Berkeley
6:45 - 7:45 pm	Panel Discussion		Speakers of Technical Session: **Mr. Shashi Verma** **Ms. Adriana Lobo** **Dr. Myounggu Kang** **Mr. Gerald Ollivier** **Dr. Robert Cervero** Moderated by: ***Mr. Madhav Pai***, Executive Director, WRI India Ross Center
7:45 pm to 8:00 pm	Closing Remarks		**Mr. Ravi Peri**, Director, South Asia Transport and Communications Division, Asian Development Bank
	Vote of Thanks		**Smt. Kalpana Kataria**, Executive Director, Connectivity and Asset Management, Bangalore Metro Rail Corporation Limited

DAY 3: 31st August 2021 | 2:00 - 5:00 pm (IST)

SESSION TIMINGS	SESSION TYPE	SESSION TITLE	SESSION SPEAKERS	
2:00 - 2:30 pm	Orientation and Context Setting	Revitalizing Bengaluru through TOD and MMI	**Ms. V. Manjula,** Commissioner, DULT, GoK	
		Enabling TOD and MMI - The Indian Experience	**Mr. S. K. Lohia,** Managing Director (MD) & Chief Executive Officer (CEO), Indian Railway Stations Development Corporation Ltd. (IRSDC)	
2:30 -4:45 pm	Roundtable Discussion	Operationalizing TOD and MMI at city and station area levels: - Aligning vision for regional growth - Enabling TOD and MMI through policy and regulations - Infrastructure response - Institutional setup and finance	**Sri. Rajender Kataria**, IAS, Principal Secretary, Transport Dept, GoK **Sri. Dhananjay Reddy**, Town Planning Member, Bangalore Development Authority (BDA) **Sri. Girish Hosur**, IFS, Commissioner, Bangalore Metropolitan Region Development Authority (BMRDA) **Sri. Shailender Singh**, Joint Director / Mr. Murali, Directorate of Town and Country Planning (DTCP) **Sri. Anjum Parvez**, IAS, MD, Bangalore Metropolitan Rail Corporation Ltd (BMRCL) **Dr. M.T. Reju**, IAS, MD, Bangalore Metropolitan Transport Corporation (BMTC) **Sri. Amit Garg**, MD, Rail Infrastructure Development Company (Karnataka) Ltd. (K-RIDE) **Sri. Lakshman Singh**, Additional Divisional Railway Manager, South Western Railways (SWR) **Sri. N. Jayaram**, IAS, Chairman, Bangalore Water Supply and Sewerage Board (BWSSB) **Sri. Rajendra Cholan**, IAS, MD, Bangalore Electricity Supply Company Ltd. (BESCOM) **Sri. Ravikanthe Gowda**, IPS, Joint Commissioner of Police, Traffic **Sri. N. Shivakumar**, IPS, Commissioner, Transport & Road Safety	**Mr. S.K. Lohia**, MD & CEO, IRSDC **Ms. Deepa Dave**, Town Planner, Ahmedabad Urban Development Authority (AUDA) **Ms. Uma Adusumilli**, Ex-Chief Planner, Planning Division, Mumbai Metropolitan Region Development Authority (MMRDA) **Mr. Sameer Sharma**, Vice President, Delhi Integrated Multi-Modal Transit System (DIMTS) **Mr. Shivanand Swamy**, Professor and Director, Center of Excellence in Urban Transport (CoE-UT), CEPT University **Mr. Madhav Pai**, Executive Director, WRI India Ross Center Moderated By: **Ms. Jaya Dhindaw**, Director - Urban Development, WRI India Ross Center **Ms. Mriganka Saxena**, Principal, HTAU and TOD & Mobility Expert, ADB Consultant
4:45 -5:00 pm	Closing Remarks		**Mr. Norio Saito**, Director, Urban Development and Water Division, South Asia Regional Department, ADB	
	Vote of Thanks		**Sri. Shamanth Kuchangi**, Technical Head, DULT, GoK	

5.3 Key Speakers and Domain Experts - Bios and Abstracts

Key Speakers – Visioning Session

Sri. P. Ravi Kumar,
Chief Secretary, Govt. of Karnataka

Ravi Kumar hails from Andhra Pradesh and is a 1984 batch Indian Administrative Service (IAS) officer. He holds a Post-Graduation (PG) degree in Mathematics and a PG diploma in Econometrics. He will head the State administrative machinery till May 2022. He has previously held the positions of ACS in the Power, IT-BT and Science and Technology Departments, GoK and ACS to CM of Karnataka.

Ms. V. Manjula,
Commissioner, Directorate of Urban Land Transport, Govt. of Karnataka

Manjula Vinjamuri holds a PG degree in Organic Chemistry and was selected for the IAS in 1987. She has worked in diverse sectors including rural and urban development, power, information and biotechnology, urban transport and education, among others.

Sri. Gaurav Gupta,
Chief Commissioner, Bruhat Bengaluru Mahanagara Palike

Gaurav Gupta is a 1990 batch IAS officer of the Karnataka cadre. He has held various positions within GoK since 1992. Prior to his role as BBMP Administrator, he was the Principal Secretary of IT, BT and S&T for over two years. Before that, Gupta was the Commissioner of Department of Industries and Commerce and has also held senior positions at the Karnataka government's revenue department, BWSSB, KSRTC and MESCOM among others.

Sri. Anjum Parvez,
Managing Director, Bangalore Metro Rail Corporation Limited

Anjum Parwez is a 1994 batch IAS officer of the Karnataka cadre. He is an engineering graduate and holds a PG degree in Public Policy and Management. He has vast experience in urban administration and has held different roles in the GoK including Principal Secretary to Govt. in the Transport and Urban Development Departments, Secretary to Govt., DPAR, Commissioner of Municipal Administration, BWSSB, BMTC, among others.

Mr. Kenichi Yokoyama,
Director General, South Asia Regional Department, Asian Development Bank

Kenichi Yokoyama joined ADB in 1999 and was the ADB Country Director in India between 2017 and 2020. Mr. Yokoyama was also Principal Water Resources Specialist in ADB's South Asia Department, responsible for developing water resource projects in South Asian countries including Bangladesh, Nepal and India.

Expert Panel

Mr. Enrique Penalosa,
Former Mayor of Bogotá

Enrique Penalosa is an internationally respected leader who has significantly contributed to the progress of Bogotá, Colombia. He is currently a consultant on Urban Vision and Strategy. His advisory work focuses on the identification and elaboration of projects for improving mobility, public space and equity. As Mayor of Bogotá, Penalosa shaped the city into an international model for improvements in quality of life, mobility, equity and sustainability. He gave priority in the use of road space to pedestrians, cyclists and public transport, and created TransMilenio, the world's best BRT system, and further supplemented Bogota's mass transit system. Between 1998 to 2000, Penalosa built more than 250 kilometers of physically protected bikeways, which he expanded to 600+ kms during his second term.

> ***Transforming Cities: The Case of Bogotá***
> Bogotá is a city with 9 million+ inhabitants, with 114 kilometers of TransMilenio trunk ways that move around 2.5 million passengers daily. Before any investments in transport infrastructure are made, we ensure it is used in an efficient and democratic manner. In terms of efficiency, a BRT lane with overpass at stations can move several dozen times as many citizens as an automobile lane. In terms of democracy, a bus with 200 passengers has a right to 200 times more road space than a car with one. Furthermore, bicycles have become very important in Bogotá's transportation system, moving nearly 10% of all citizens.

Mr. Shashi Verma,
Director of Strategy and Chief Technology Officer, Transport for London

Shashi Verma is a member of Transport for London's (TfL) Executive Committee and upon joining TfL in 2002 Verma established its Corporate Finance division. He led the development of Crossrail, a £16 billion project to build the next railway line in London and worked on several projects including the East London Line and White City, which resulted in the building of one of UK's largest malls – the Westfield shopping mall. Since 2006 Verma has been responsible for the operation of TfL's revenue collection system including the Oyster card, the largest smartcard-based ticketing system in the world, and advising the Mayor of London on fares and ticketing policy. Shashi has led the development of contactless payments since 2007 and implemented this successfully on TfL's systems starting 2012.

> ***Planning for a Compact and Connected City: Multi-Modal Integration***
> London operates one of the most integrated transport systems in the world with the Underground, heavy and light rail, buses and other public transport running in an integrated manner. Road traffic is also managed by the same agency, Transport for London. Crucially, land use planning is also heavily integrated with transport planning, giving rise to a truly integrated system of planning and operation for any large city. The talk focused on key elements of running an integrated transport and land use planning system and what it takes to make such a system successful. It also highlighted the transformation that has been enabled with this integration.

Ms. Adriana Lobo,

CEO, WRI México

Born in Brazil, Adriana Lobo studied civil engineering at the Polytechnic School of the University of Sao Paulo. Under Lobo's leadership, WRI Mexico has played a vital role in the development of new norms and public policies, as well as its leadership in charitable projects for the environment. She has more than 20 years of professional experience and worked in the development of sustainable policies, urban mobility projects, urban development and the environment, mainly in Mexico, Brazil, Panama, Colombia, Peru, Venezuela and Chile. In addition, she worked for more than six years as Technical Director of the consulting firms Cal y Mayor y Asociados, SC and Transconsult, SC.

> ***Implementing TOD-led Renewal: The Case of Mexico City***
> Mexico City has about 450 kms of quality public transport network, including the Metrobus (BRTS), trolleybus and light rail systems (STE), metro and suburban rail systems. Through case examples, the talk presented Mexico City's experience with TOD implementation at the corridor and neighborhood levels, with a focus on renewal/ redevelopment in inner city areas. The principles guiding this work are based on the DOTS (TOD) Guide for Urban Communities published by EMBARQ Mexico in 2010. The discussion also highlighted implementation mechanisms, challenge areas and an evaluation of outcomes.

Dr. Myounggu Kang,

Professor, Department of Urban Planning and Design, University of Seoul

Myounggu Kang holds a Master's degree from Seoul National University, and a Master's in City Planning (MCP) and a PhD degree from MIT. He has been appointed Professor of Urban and Regional Planning at the University of Seoul since 2006, where, in addition, he is the Director of the Smart City Research Center and the editor of the International Journal of Urban Sciences (IJUS). He also serves as a lead urban specialist at the World Bank. Former appointments include the position of the Vice-President of International Affairs at the University of Seoul, and the Director-General of International Urban Development Collaboration at Seoul Metropolitan Government, among others.

> ***Revitalizing City Neighborhoods through TOD and MMI: The Case of Seoul***
> Seoul has been managing an extensive urban regeneration program since several decades. The talk focused on the key principles, enabling policies, and institutional and implementation frameworks for TOD-led renewal/redevelopment projects. The presentation highlighted transformational cases at different scales, such as the Cheonggyecheon Stream Restoration and Downtown Revitalization project and area-specific small unit redevelopments, challenges encountered in the process, and outcomes or impact.

Mr. Gerald Ollivier,

Lead Transport Specialist, India and TOD Community of Practice, World Bank

Gerald Ollivier is Lead Transport Specialist for the World Bank in India. He focuses on developing solutions to enhance urban mobility, unlock markets for electric mobility, achieve sustainable economic integration through multimodal transport, and achieve safer transport to better serve the needs of India. Prior to India, he was Cluster Leader in the Singapore World Bank Hub and led the Community of Practice on Transit Oriented Development. From 2010 to June 2018, he supported the development of metro lines and high-speed rail lines in China, as team leader for several World Bank projects. From 1995 to 2010, he focused on World Bank trade and transport projects in Europe and Central Asia. He is a civil engineer and a chartered financial analyst.

> ***Implementing TOD and MMI in Developing and Indian Cities***
> Imagine a city that is more competitive, with higher-quality neighborhoods, lower infrastructure costs, and lower C02 emissions per unit of activity. This city has lower combined transportation and housing costs for its residents than other cities at similar levels of economic activity. Its residents can access most jobs and services easily through a combination of low-cost public transport, walking and cycling. Its core economic and population centers are resilient to natural hazards. It can finance improvements to public space, connectivity, and social housing by capturing value created through integrated land use and transport planning. Such a vision has never been more relevant for rapidly growing cities than it is today. Transit-oriented development (TOD) can play a major role in achieving such a vision. The session drew on two recent publications: Transforming Cities through TOD: the 3V Framework (http://hdl.handle.net/10986/26405) and the TOD Implementation Toolkit (2021) (http://hdl.handle.net/10986/34870) to share emerging solutions.

Dr. Robert Cervero,

Professor Emeritus of City and Regional Planning, University of California, Berkeley

Robert Cervero is Professor Emeritus of City and Regional Planning and former Director of the Institute of Urban and Regional Development at the University of California, Berkeley. His research focuses on the transport/land-use nexus. His most recent book, Beyond Mobility, won the 2019 National Urban Design Best Book Award. Currently, he is a faculty affiliate at Tongji University in Shanghai, teaches a J-term course on green mobility at NYU-Abu Dhabi, and is advising on Dubai's 2040 strategic master plan. He was a contributing author to the IPCC's Fifth Assessment on Climate Change, UN-Habitat's Global Report on Sustainable Mobility, and recently received the Athena Accolade from KTH University and Distinguished Legacy Award from UC Berkeley's Institute of Transportation Studies.

> ***Towards Sustainable TOD***
> This presentation reviewed TOD types across several international settings and focused on tools used to leverage implementation, including value capture, parking reforms, and enabling legislation. Accessibility and compactness are core features of TOD; however, so are mixed land uses, pedestrian-supportive designs, and place-making. Disruptors like electro- and autonomous mobility and growing concerns with public health compel policymakers to adapt new models of transit supportive development, embracing technologies that support first/last mile connectivity and potentially moderate densities, such as advanced by transit village models.

5.4 Highlights of the Draft Bengaluru TOD Policy, 2021

Presented By: Ms. V. Manjula, Commissioner, DULT, GoK

Objective 1: Achieve high mode share of public transport

- **Transit service design:** Augment public transport supply and benchmark service quality with world cities.

- **Design for captive ridership:** Station-specific TOD Zone Plans promoting higher-density, mixed use, transit-supportive development, with direct linkages to nearby destinations.

- **Multimodal integration:** An integrated, multimodal public transport system for seamless mobility and improved accessibility (to out-compete private vehicles w.r.t. convenience, cost-effectiveness, journey time).

- **Mobility as a Service:** An integrated portal connecting all forms of transport/ mobility systems, to enable access to information, trip planning and fare payments through a common interface.

- **Parking management:** The approved Parking Policy for Bengaluru stipulates differential parking norms for TOD Zones (reduced parking supply for all uses, restricted on-street parking around the stations, pricing hierarchy, Park-n-Ride facilities at select/peripheral stations).

Objective 2: Provide built-environment and associated infrastructure conducive to NMT use

- **Complete, connected NMT networks:** A connected street network with well-defined hierarchy and priority for pedestrians, cyclists, paratransit and high-occupancy vehicles/buses providing feeder services. Redevelopment provides an opportunity to negotiate and secure the space to plug connectivity gaps.

- **Cycle facilities:** Adequate (free/nominal cost) parking for cycles and shared micro-mobility modes at station hubs, NMT-only and market streets.

- **Walkable neighborhoods:** A pedestrian-friendly environment, ped-priority/ pedestrian-only streets.

Objective 3: Implement mixed land use that leads to shorter commutes and reduce travel demand

- **Mixed use, mixed income balance:** Mix of transit-supportive uses and mixed income development in TOD Zone, to reduce travel demand and trip lengths; shift longer trips shifted to public transport and increase patronage. Horizontal/vertical mix of use with minimum residential component to ensure TOD Zones are active throughout the day.

- **TOD Zone plans:** To be based on station typologies, local context, infrastructure carrying capacities, impact assessments, etc. Certain elements of TOD to be mandatory (for e.g., accessibility, walkability, placemaking) and certain others can be selective (for e.g., densification based on context).

- **Differential densification:** The Base FAR of non-TOD areas to be lower than TOD Zones, and within it, the Core Zone to have higher permissible FAR/density than the Standard Zone.

- **Land Value Capture:** LVC through appropriate regulations and instruments, with proceeds allocated to public transport and infrastructure agencies for TOD Zone development/improvements. Develop policy framework for land pooling and plot amalgamation to enable TOD and optimum utilization of land.

- **Civic Amenities:** Enable provision through built-up area, in addition to land reservations.

Objective 4: Ensure inclusivity for all economic classes, gender, age, and ability in TOD interventions

- **Inclusive barrier-free design:** Ensure TOD Zones and infrastructure are universally accessible to all; adopt consistent barrier-free design, signage and communication protocols.

- **Affordable housing:** Enabling regulations to enhance the range of affordable housing mix and supply for economically weaker sections, and lower- and middle-income groups in TOD Zones, including rental housing. Facilities for students, paying guests, working professionals, migrant and frontline workers.

- **Informal sector integration:** Facilitate safe and dedicated multi-utility vending zones and/or small-scale entrepreneurship supportive commercial activities.

Objective 5. Enable high quality of life through placemaking and sustainable practices

- **Vibrant public spaces:** Design stations as public spaces that encourage community interactions. Ensure provision of quality public open spaces/greens through regulations.

- **Form-based codes:** Adopt street and landscape design guidelines and codes to ensure good urban design of public streets, spaces, building frontage and form, for creating a pleasant, walkable environment in the station area.

- **Use of green technology:** Plan for resource-efficient infrastructure, encourage green buildings and water and energy conservation.

- **Safety and security:** Adopt measures to ensure safe transit stations and public areas.

- **Conservation of heritage, nature and environment:** TOD Zone planning to include preservation of heritage, environmentally sensitive areas and unique socio-cultural characteristics of the local area. These should act as positive constraints for development and densification.

Objective 6. Build an enabling framework to deliver TOD projects of high quality

- **TOD Zone planning and implementation:** City master plan to outline modalities for preparation, approval and notification of TOD Zone Plans and Schemes. A city-wide TOD Phasing strategy to be prepared.

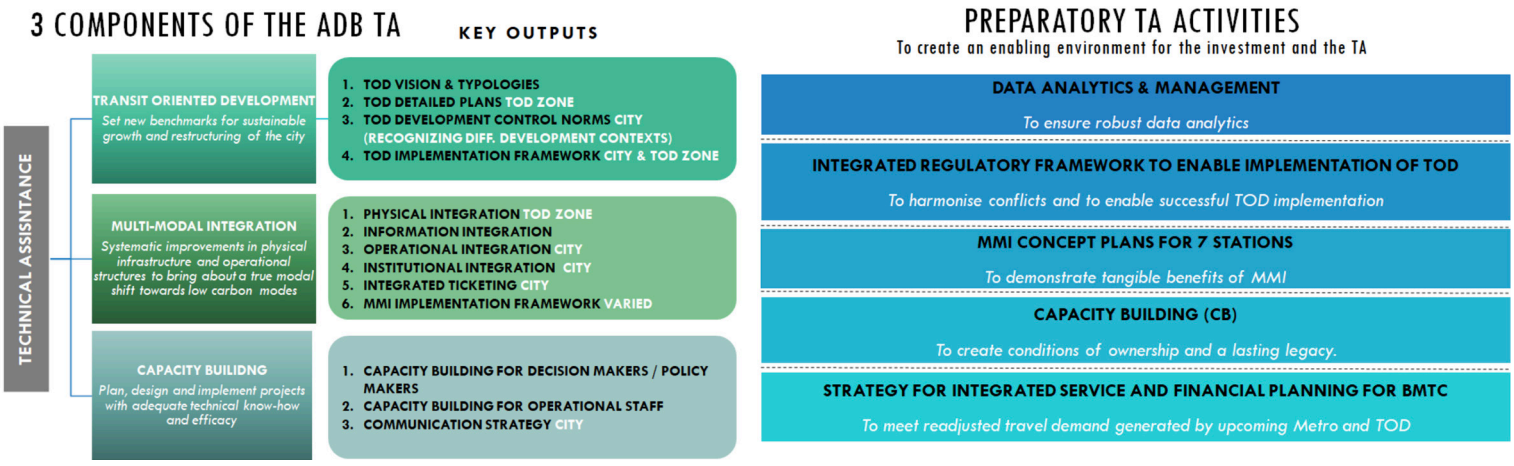
- **Standards and approvals:** Prepare and adopt necessary design guidelines/ standards. Robust, streamlined and expeditious appraisal and approval systems to be instituted for time-bound delivery of high-quality projects.

- **Monitoring, evaluation and lifecycle asset management:** Monitor outcomes and periodically evaluate to inform guidelines, regulations, etc. Set up a public asset management system to facilitate timely interventions.

- **Capacity Building:** Raise community awareness and participation through communications and outreach. Build institutional capacities and skills through customized training programs.

- **Financial Mechanism:** Agencies to earmark budgets for implementation of TOD Zone Plans and management of assets, to supplement proceeds from LVC. Augment non-fare box revenues through government-led catalytic projects that leverage the commercial/monetary potential of public assets.

5.5 ADB Technical Assistance (TA) Project



IMPLEMENTATION ARRANGEMENT FOR TA

- **TA Secretariat**: Established in DULT to administer the TA with members from BMRCL and DULT.

- **TA Working Group**: Chaired by Commissioner, DULT; MD, BMRCL (Convener), and heads of BDA, BBMP, BMTC, Commissioner (Transport Department) and Director (TCP) as members.

- **TA Steering Committee**: Chaired by ACS (Urban), GoK; MD, BMRCL (Convener) and ACS (Finance), heads of DULT, BDA, BMRDA, BBMP, BMTC, Transport Department and Director (TCP) as members.

DIRECTORATE OF URBAN LAND TRANSPORT
UD&D, Government of Karnataka
shaping the way cities move

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ADB