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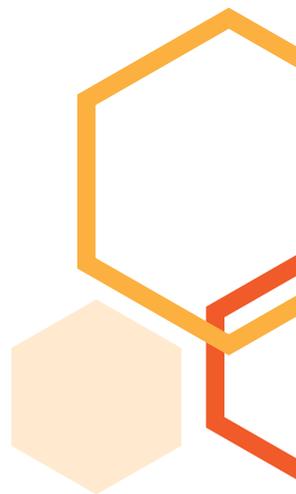
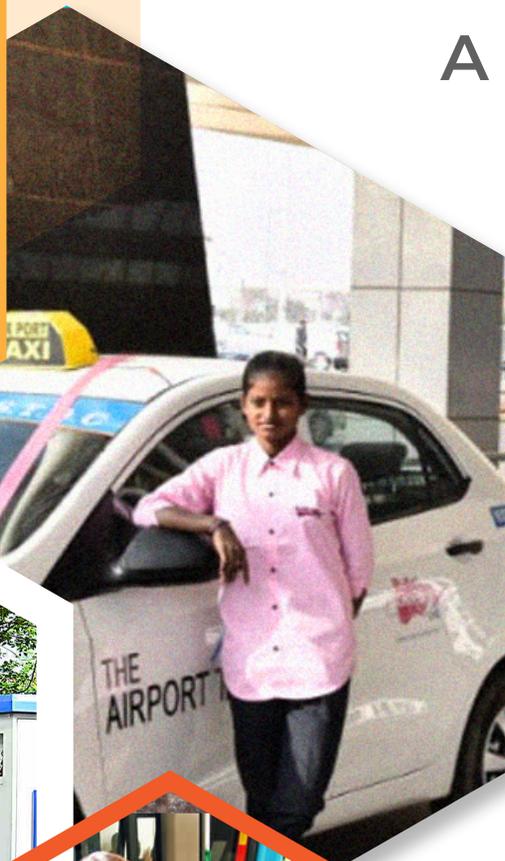


National Institute of Urban Affairs

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# LOCALISING SDG 11 IN INDIA:

## A Special Series



### SPECIAL FOCUS ON SDG 11.2

To provide access to safe, affordable, accessible & sustainable transport systems for all, improving road safety, by expanding public transport, with a focus on the needs of those in vulnerable situations, women, children, persons with disabilities & older persons by 2030.



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# India's Approach to SDG 11.2

Transport is one of the most important factors that define not only commuting but logistics, accessibility, ease of business, and much more for a country, state or city. The need for reliable and sustainable transportation has been on the international agenda for 50 years. It was first recognised in the 1972 Stockholm Plan of Action that drew light on the need for alternatives to meet the growing transportation demands. In the 1922 Earth Summit, the need for effective design and management of traffic and transportation system was felt and it was labelled so under Agenda 21. Further, 'The Future We Want', the 2012 outcome document from Rio+20, brought to light potential benefits of sustainable transport and expressed governments' support for the development of sustainable transport systems, including public mass transportation, and clean fuels and vehicles. In the 2030 Agenda, five targets under the sustainable development goals (SDGs) have been enlisted that are related to transport, SDG 11.2 being the major one among them. Also, in the New Urban Agenda governments have committed to augmenting sustainable transport to encourage transit between urban and rural communities.

India, home to the world's second-largest population, faces numerous challenges when it comes to transportation. However, recurring steps have been taken by the government to bring in improvement. Recently, in a bid to enhance EV adoption in India, the Centre had extended the Faster Adoption and Manufacturing of Hybrid and Electric vehicle (FAME) scheme by two years. Also, now at least 18 states have their own EV policies. Another major step is the Smart Cities Mission wherein technology is being leveraged to build an inclusive, safe, accessible, and affordable transportation system for all. Also, India is working towards utilising renewable sources such as solar power to generate electricity to run metros. Delhi metro is one of the lighthouse examples. Besides metros, it is seen that many states are including a fleet of electric buses in their public transport system.

However, to achieve SDG 11.2 more needs to be done. Emphasis should also be given to women safety in public transport, making transport systems accessible for all including for differently-abled people, and finally inducing a behaviour change among people to opt for public transport as a preferred mode to commute.

Former Mayor of Bogota, Colombia, Enrique Peñalosa, once said, "A developed country is not a place where the poor have cars. It is where the rich commute in public transport." Such a perspective is needed to make transportation accessible, reliable, safe and sustainable. However, the lessons learnt from the COVID pandemic cannot be overlooked and hygiene has to be included as an important aspect too.

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रवि गुप्ता

**DR RAVI GUPTA**

Editor-in-Chief, eGov magazine, and

Founder Publisher & CEO,

Elets Technomedia Pvt Ltd

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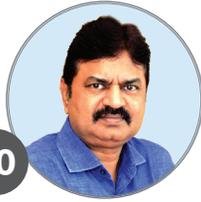
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# Indian Cities and SDG 11.2

HITESH VAIDYA

Director  
National Institute of Urban Affairs

India is transforming into an ever more urbanised country. Most estimates indicate that India's urbanisation is poised to accelerate in the coming decades. The scale of the projected urban population offers both an opportunity, as well as a challenge of mobilizing resources and capacity to manage this transition.

Recent global policy discourses orchestrated under the aegis of the United Nations, such as the Agenda for Sustainable Development (2030), the Paris Agreement, the Kyoto Protocol and the New Urban Agenda - all stress upon the need for concerted focus at the city and the community scale and contribute direct tangible benefits to the quality of lives of the people. India affirms its commitment to the larger goals of urban equity and eradication of poverty, productivity, competitiveness, innovation, and urban resilience, all while respecting the carrying capacity of the planet.

A much-needed urban transformation is the core focus of Sustainable Development Goal (SDG) 11. SDG 11 consisting of 10 sub-goals and 15 indicators, is most relevant for shaping and function of future cities. It seeks to make cities and human settlements inclusive, safe, resilient and sustainable through eliminating slum-like conditions, providing fossil-fuel-free transportation, renewable energy and improved urban planning, reducing urban sprawl, increasing participation of people in urban governance, enhancing cultural and heritage preservation, addressing urban resilience and climate change challenges, better management of urban environments (pollution and waste management), providing access to safe and secure public spaces for all, and improving urban management through better policies and regulations. India through its flagship missions is already striving towards inclusive, safe, sustainable and adequate housing for individuals and families while promoting livelihoods, innovation, urban renewal and the preservation of India's built heritage

The National Institute of Urban Affairs and eGov magazine have collaborated to raise awareness, inform, recognize, celebrate, and share successes through bringing out a special series focusing on SDG 11. The second issue of the series focuses on SDG 11.2—provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons by 2030.

Transportation networks are the arteries of any country's economy. Currently, the transport sector contributes around 6.81 % to India's economy. Transportation networks and services contribute to the physical, social, and economic well-being of the people by providing access to jobs, health, education, and other key services. Well-integrated, sustainable, and inclusive transportation also fosters development, promotes equity, and reduces poverty in an urban area.

This issue is a collection of 13 articles and four interviews related to the urban transportation situation in India. They highlight the need for a holistic understanding and assessment of the urban transport sector across social, environmental, and economical aspects. The broad themes covered in the articles include accessibility-mixed land use and smart growth, transit-oriented development, transportation cost and affordability, public transport, transport facilities and accessibility by women, children, PwDs and older people, urban transport schemes and policies in India, transport finance models, use of technology, information and data in transportation planning.

NIUA is committed to helping Indian cities perform better. To achieve this objective, along with our own resources, we partner with media, industry, academia, and other government and non-government organisations for effective research, capacity-building, and advocacy outcomes. This collaboration is a demonstration of the same. Teams at NIUA and eGov magazine have enthusiastically worked to collate a diverse range of knowledge-base on the cross-cutting issues in the transport sector in India for this special issue. My sincere thanks to all the authors who have contributed to this special issue and shared their knowledge to make this issue possible.

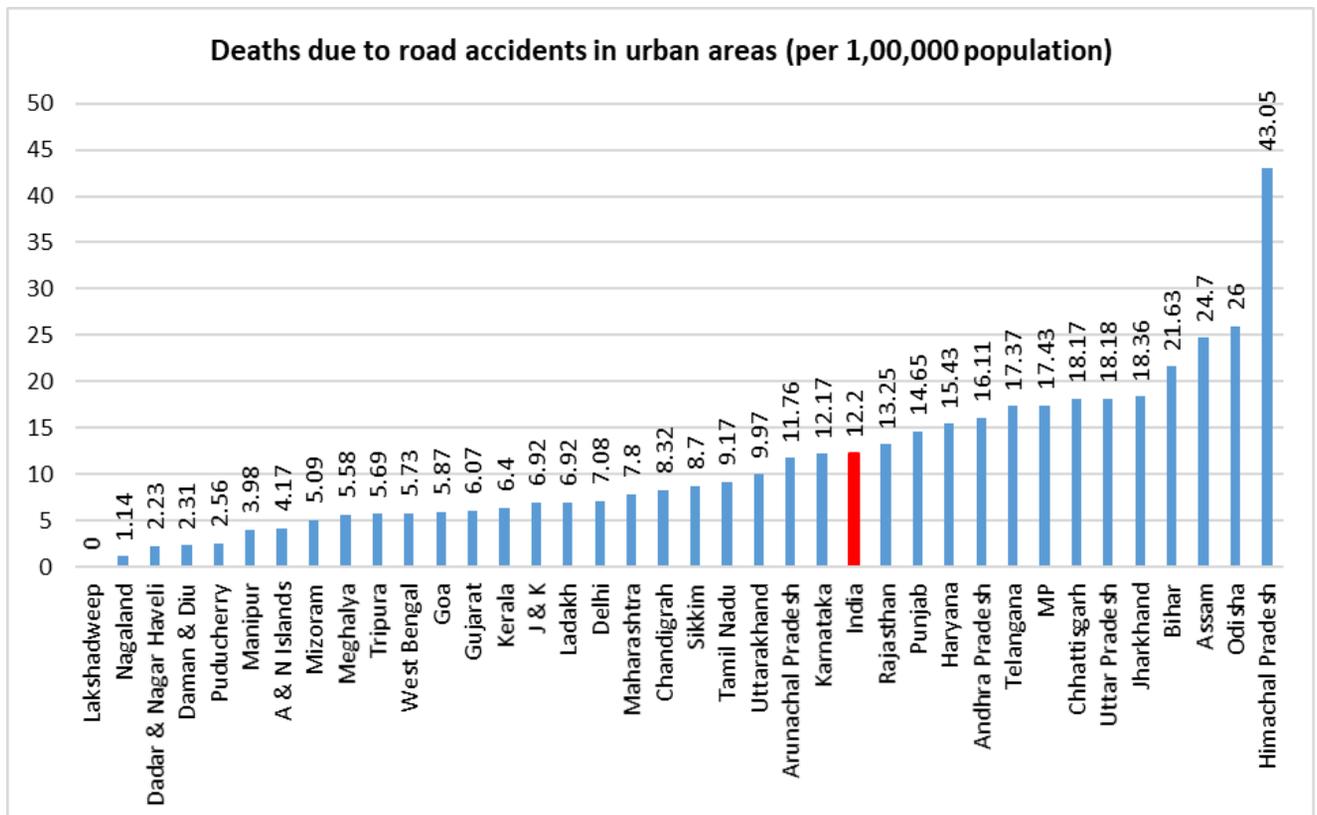


## SUSTAINABLE CITIES AND COMMUNITIES

Make cities and human settlements inclusive, safe, resilient and sustainable

**SDG 11.2—By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs to those in vulnerable situations, women, children, persons with disabilities and older persons.**

Indicator to measure India's performance towards SDG 11.2—Deaths due to Road Accidents in Urban Areas (per 1,00,000 population)



Source: NITI Aayog.(2021). SDG India Index and Dashboard (2020-21): Partnerships in the Decade of Action. NITI Aayog, Government of India. New Delhi.

# What Experts Say



SDG 11 makes a significant departure from past thinking at an international level because it emphasizes the need for balanced and regionally-integrated urbanisation. It talks about core-periphery relationship in a sustainable manner. It talks about interaction, and overall regional development so that the questions of environmental degradation can be answered in a regional context”.

– **Prof. Amitabh Kundu**



SDG 11.2 in Indian context is very challenging. We have to move a large number of people. There are systems in place, but we need more investments in mass transport. At the same time, cities also need investment and infrastructure for non-motorised transport. If we want to move forward in sustainable transport, we need a balance between non-motorised personal transport and mass transport.

– **Prof. Dinesh Mehta**



Because of COVID-19 and contagion precautions, there is a fear of mass transit causing people to move to private vehicles. It is important to look at how much we have done in India particularly with SDG 11.2 national level indicators”.

– **Prof. Om Prakash Mathur**



The most important part in achieving SDG 11.2 is improving the public transport, mainly the buses. The more we improve buses, the closer we will be to achieving better public transport for the citizens. We should also focus on improving the last-mile connectivity”.

– **Prof. Chetan Vaidya**



Implementation of urban transport in India requires a holistic approach. It is not about building more metros or adding more buses, but rather it needs a better analysis of how people travel, how people want to travel, and how we can make sure that the demand is properly met by the systems we put in place”.

– **Dr. O.P Agarwal**



SDG 11.2— Provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs to those in vulnerable situations, women, children, persons with disabilities and older persons, by 2030.

## Sustainable, Inclusive, and Integrated Transport Planning and Solutions



### Avoiding the Need for Travel

Integrate land use transport transit-oriented planning.

### Improving Efficiency and Safety of All Modes

- Push use of green fuels (electricity and other non-fossil fuels).
- Enforce safe driving practices.

### Improving Resilience of Transportation Systems

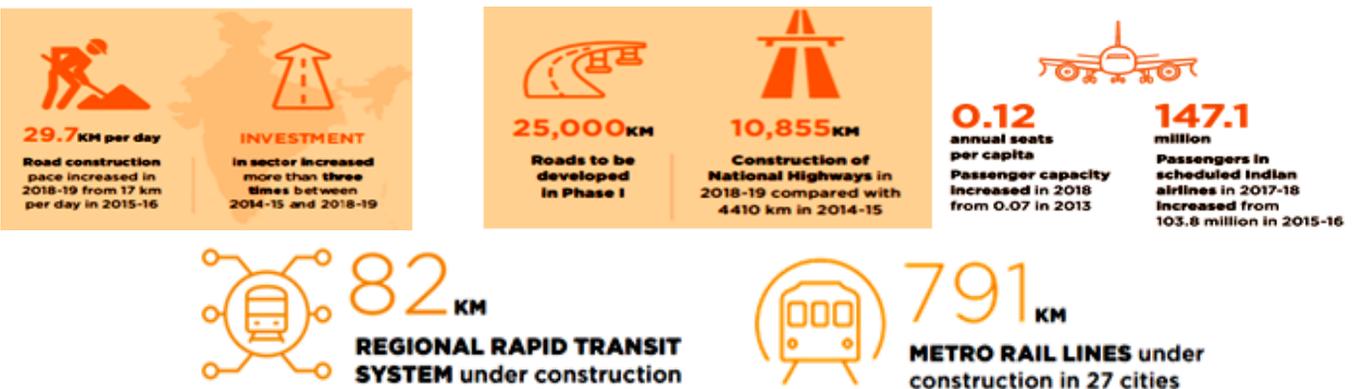
Use of big data and artificial intelligence to improve coordination, efficiency, and resilience amongst transport systems.



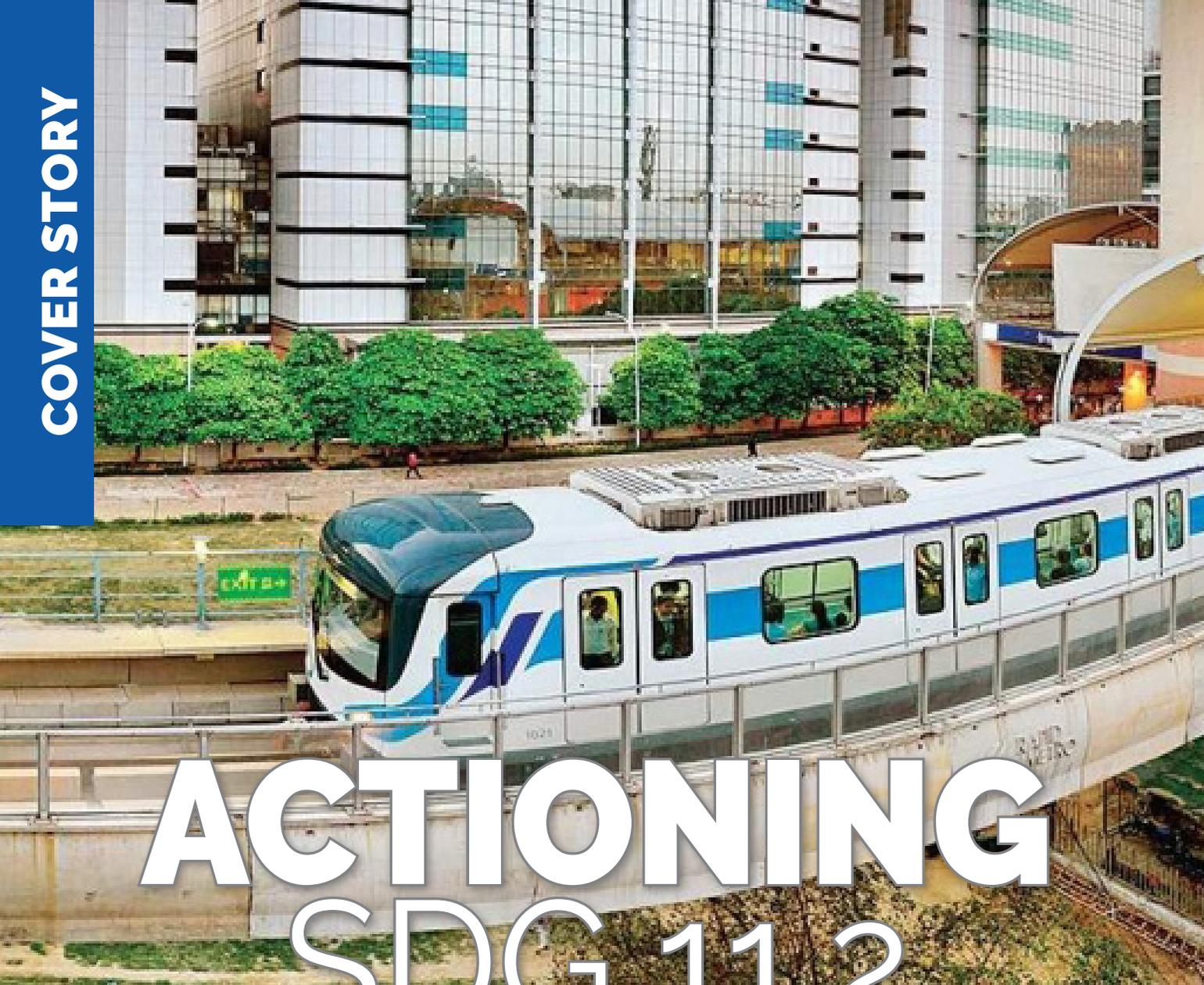
### Shifting Towards More Sustainable Transport Modes

- Increase network coverage, service and quality of PT.
- Increase modal choices.
- Integrate multiple modes of transport.
- Improve first- and last-mile connectivity.
- Encourage the use of shared mobility modes: 'own-a-ride' instead of 'own-a-car'.
- Development infrastructure to promote the use of non-motorised transport modes, walking and cycling.
- Universal accessibility for transport modes and infrastructure.
- Increase freight transport by rail and waterways.

## India's Progress and Infrastructure Development Towards Achieving SDG 11.2



Source: NITI Aayog (2020). India Voluntary National Review 2020:Decade of Actions Taking SDGs from Global to Local. NITI Aayog, Government of India, New Delhi.



# ACTIONING SDG 11.2

Integrated, inclusive, and sustainable mobility systems are prerequisites to achieving the development objectives of the United Nation's Sustainable Development Goals (SDGs). The significance of transport has been explicitly emphasised by Target 11.2 of SDG 11 that states, "By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons". In this article, **The National Institute of Urban Affairs** chart out the road map for achieving SDG Target 11.2 through accessible, safe, and equitable public transport services in urban India.



The transport sector plays a key role in poverty reduction, overcoming income inequality, and promoting inclusive and sustainable growth of an urban area. A well-integrated transport system also fosters the human index of a city by facilitating the movement of people as well as their access to opportunities such as jobs, health, education, and other amenities. Mode of transport affects physical and mental health, via the physical activity of travelling and commuting time, facilitates social interactions, and promotes social inclusion.

Providing access to safe, affordable, accessible, and sustainable transport systems for all, by improving road safety and expanding public transport (PT), with special attention to vulnerable demographics constituting women, children, persons with disabilities (PwD) and older persons;

is Target 11.2 of the SDG 11. This target is tracked by Indicator 11.2.1: “Proportion of population that has convenient access to PT, by sex, age and persons with disabilities”, with ‘accessibility’ being the operative principle. Accessibility of PT systems and their efficiency can be improved by overhauling their existing institutional arrangements, and their spatial and operational integration.

Presently, the multiplicity of laws and agencies involved in the sphere of urban transport in India have led to gaps and overlaps in urban transport functioning and a lack of integrated planning and coordinated management of urban transport. Integration of various transport agencies, as recommended by the National Urban Transport Policy (NUTP) 2006, would enable integrated planning and functioning of the various PT modes of the city, help them operate in a complementary manner, provide seamless travel experience to the commuter by multi-modal integration and improve the travel time efficiencies. With the integrated planning efforts of a unified transport agency, equitable access to PT from all parts of the city can be ensured by assessing the PT accessibility levels in terms of network coverage, frequency, quality, etc. Quality of PT services is also important as it would help in achieving the modal shift from personal vehicles to PT resulting in definite environmental benefits, lesser congestion on roads, better quality of urban life, etc.

Spatial interventions such as integrating land use with transit by means of transit-oriented planning improved first and last-mile connectivity, etc., can also improve the access to PT. Research shows that households in Transit-Oriented Developments (TOD) travel 45 per cent less than residents of automobile-dependent neighbourhoods<sup>1</sup>, making TODs energy-efficient developments. By the year 2019, only half of the world’s urban population had convenient access to PT, defined as living within 500 meters’ walking distance from a low-capacity transport system (such as a bus stop) and within 1 km of a high-capacity transport system (such as a railway). In India, various states have set ambitious targets of increasing access to PT by adopting the TOD principles. For example, the Jharkhand TOD Policy (2016-2026) provides a strategic framework to create compact, liveable cities where 80 per cent or more of a city /metropolitan area’s population can access housing, employment and amenities within walking distance of high-quality PT. Although achieving such targets would be a tall order for most cities with the need for extensive network

1. Linda Bailey (2007), Public Transportation and Petroleum Savings in the U.S.: Reducing Dependence on Oil, ICF International for the American Public Transportation Association ([www.apta.com](http://www.apta.com)); at <https://bit.ly/1tY558x>.



expansion of PT, reassignment of densities, propagating mixed-use developments, developing walking and cycling infrastructure, etc. around transit nodes; developing policy frameworks to promote TOD is a step in the right direction.

Along with spatial interventions, accessibility of PT can be improved by providing a safe environment for the commuters while approaching the PT as well as while travelling on it. There is also a nuanced overlay of criminal activities that prevents certain sections of society from using PT. The findings of perception surveys reveal that women, elderly populations and PwD find traveling in PT to be unsafe and inconvenient. Safety of commuters can be achieved through built-to-edge developments with active frontage to enable 'eyes on the street', well-illuminated public pathways/roads, installation of surveillance systems, etc. Application of universal design guidelines in the design of transport fleet/rolling stock as well as infrastructure will also improve the accessibility of PT.

The use of technology-based interventions such as Integrated Traffic Management System (ITS), Smart Information System, Unified Ticketing System, etc., would serve to operationally integrate the multiple PT modes, convenience the commuters and increase the ridership of PT. Unified ticketing data would also help transit agencies to collate information regarding the travel preferences of commuters, identify areas that are attracting most trips and undertake the planning of demand-responsive transport interventions. Similarly, big data and artificial intelligence should be used to improve resilience, efficiency and coordination amongst transport systems. To increase the usage of PT by students, senior citizens, women and bulk

***This target is tracked by Indicator 11.2.1: "Proportion of population that has convenient access to PT, by sex, age and persons with disabilities", with 'accessibility' being the operative principle.***

employers (corporate groups, government offices, etc.), transit agencies could adopt fare rationalisation strategies.

In addition to increasing the accessibility of PT systems, road safety is another major issue that needs to be addressed in India to achieve its SDGs. It is estimated that in 2019 alone, India reported over 151,000 fatalities due to road accidents<sup>2</sup>, 21 per cent of these road fatalities were due to truck accidents. To counter this undesirable trend, equitable allocation of road space for all modes (including non-motorised transport modes as well as pedestrians) is required. Additionally, enforcement of traffic rules and regulations, proper design of road geometries and street sections, installation of traffic calming measures like speed breakers, etc. should be undertaken.

2. <https://www.statista.com/aboutus/our-research-commitment> (March, 2021)



Disabled-friendly public transport



Dedicated cycle track

A favourable trend that needs to be promoted is the increase in app-based cab aggregators in the country. A growing population of commuters now prefer 'owning-a-ride' rather than 'own-a-car'. This concept of shared mobility should be encouraged as much as possible.

Transport currently accounts for 23 per cent of global CO<sub>2</sub> emissions. In India, outdoor air pollution accounts for 29 per cent, which causes premature deaths of 109,000 adults each year. The health cost of air pollution due to vehicular activities was about three per cent of GDP in 2013. Traffic congestion during peak hours in four major cities - Delhi, Mumbai, Bengaluru and Kolkata, costs the economy Rs 1.47 lakh crore annually<sup>3</sup>. The negative environmental, economic and social impacts of the transport sector can be successfully mitigated through integrated planning, increasing usage of PT and shared modes, facilitating active mobility (walking and cycling), encouraging use of green fuel-dependent

***The path to achieving the transport-related SDGs in India would involve adopting sustainable, inclusive, and integrated transport planning measures and solutions.***

vehicles (electricity and other non-fossil fuels), etc. COVID-19 has given a unique opportunity for India to support green mobility programs/initiatives/challenges that promote active travel like FAME (Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles), Streets for People, Cycles4Change, etc. Such programs/initiatives should be leveraged and upscaled further.

The path to achieving the transport-related SDGs in India would involve adopting sustainable, inclusive, and integrated transport planning measures and solutions. Changes and innovations in mobility are dynamic and therefore, policies/plans/data that provide transport intelligence and guidance also need to be revised and updated regularly. Data-driven integrated planning supported by interventions and solutions that promote low-carbon mobility and consider the needs of all user groups, would be the way to move forward for the country. [e.gov](https://timesofindia.indiatimes.com/india/traffic-congestion-costs-four-major-indian-cities-rs-1-5-lakh-crore-a-year/articleshow/63918040.cms#:~:text=NEW%20DELHI%3A%20Traffic%20congestion%20during,conducted%20by%20global%20consultancy%20firm)



Open public space at Connaught Place, Delhi

3. <https://timesofindia.indiatimes.com/india/traffic-congestion-costs-four-major-indian-cities-rs-1-5-lakh-crore-a-year/articleshow/63918040.cms#:~:text=NEW%20DELHI%3A%20Traffic%20congestion%20during,conducted%20by%20global%20consultancy%20firm>



# Achieving Sustainable Urban Transportation System for India



**DR O P AGARWAL**

Chief Executive Officer  
World Resources Institute

Since the adoption of the 2030 Agenda for Sustainable Development by United Nations Member States, each of them is making efforts to fulfill the 17 Sustainable Development Goals (SDGs). India has also been implementing various measures to achieve SDGs. The SDG 11.2, which overall focuses on sustainable, affordable, safe and accessible transport for all, needs some major policy shifts and adoption of innovations to be fulfilled in India. Here's how **Dr O P Agarwal**, Chief Executive Officer, World Resources Institute, describes the status of SDG 11.2 in India.

**In your opinion, is India on the right path to meet the broad objective envisaged under SDG 11.2? What key actions, and at which levels, should be taken to achieve the envisaged objectives?**

The adoption of the National Urban Transport Policy in 2006 was a turning point in India's approach to urban mobility. This policy prioritised investments in public transport over those in road widening and flyovers. Public transport investments have gone up significantly, thereby putting India on the right track to meet the objectives of SDG 11.2. However, an impression seems to have since emerged that large and stand-alone high-cost projects will be sufficient to provide the needed access to jobs, education, healthcare and other basic needs. Unfortunately, this is not correct and an aggressive effort is needed to ensure a more holistic approach to urban mobility planning.

**In order to provide a solid framework of transport-related indicators and apt data to monitor progress, what structures need to be set up to derive final transport statistics estimates at the national level?**

It is true that transport-related data is extremely weak in India. There is no systematic effort at collecting and managing such data. This has constrained scientific planning and led to the unreliable estimation of demand for several investment projects. This is evident from the consistent shortfalls we have seen in the ridership estimates of several metro rail projects. The problem has been further compounded by the belief that real-time data collected through IT-based systems will meet all our needs. Such real-time data is



Shared pathways enable safe non-motorised transport in cities

*Achieving the overarching goal of Atmanirbhar India requires every nook and corner of the country to be connected to every other corner to move goods and people safely, speedily and affordably.*

good for minute-to-minute operations planning but is not enough for future investment planning. Investment planning needs time series data and a clear analysis of trends over a longer period of time. Unfortunately, a clear data collection and management architecture is yet to be developed.

It is important to initiate an exercise for identifying specific use cases, based on which the required data items to be collected have to be determined. Protocols for collecting such data, including collection methodologies, frequency of collection and a harmonised definition of each data item needs to be developed. Institutional architecture for collecting, managing and disseminating this data also needs to be put in place. This will be a fairly involved exercise and shortcut methods of collecting large amounts of data using modern-day IT tools will not be good enough. The data items to be collected need to be identified from concrete use cases, identified by those who understand transport planning, especially transport investment planning. Without good data, we will be making decisions, often involving large investments, on the basis of individual perceptions. We run the risk of high-cost investment decisions being influenced by unreliable analysis



Mobility as a Service (MaaS) improves the efficiency of urban transport

undertaken solely to justify projects, that are otherwise not justifiable.

**To what extent is low-carbon development a priority in relevant sectoral plans? Are there any institutional/decision-making/policy processes in place to integrate this priority? We have been discussing the Unified Metropolitan Transport Authority (UMTA) for a long time. Do you think it is the way to establish institutional mechanisms and strengthen capacities for better planning and management of transport systems?**

It is true that realising the ambition of becoming a five trillion dollar economy depends, to a very large extent, on how well cities are able to accommodate, and even enable, the required growth. Mobility systems will be fundamental in this. As they say, "if cities are the engines of economic growth, mobility systems

are the wheels of that engine'. If the wheels don't move, the engine does not move.

I think urban mobility systems in India are being primarily driven by the co-benefits than by the need for low carbon growth. Investments in public transport are being driven by the need to reduce congestion and air pollution. Electric mobility is being driven by the need to reduce air pollution and dependence on imported fossil fuels. In either case, they also lead to low carbon development, even if the prime motivator is something else. Hence, whether the co-benefits or climate change drive the planning for urban mobility systems should not matter as long as the outcome is low carbon transport.

On Unified Metropolitan Transport Authority (UMTA), I feel that having a lead agency to look at urban mobility systems in a holistic and coordinated manner is very important. Currently,

the governance systems are highly fragmented. Metro rail systems are managed by one entity, bus systems by another entity, roads by a third entity, suburban rail systems by yet another entity, and so on. These entities barely talk to each other and there is no platform that brings them together. Many of these entities also report to different higher-level administrative departments, resulting in an unfortunate lack of coordination. This is not an effective way of ensuring a well-coordinated plan for urban mobility. Therefore, a lead agency for urban mobility is needed in each city. In India, we refer to them as the UMTA for the city. These bodies are easy to set up but very difficult to operationalise. Many cities across the world have notified such bodies but very few have been able to ground them and get them to function meaningfully. Even in India, many cities have set up such bodies, most through executive orders and some through legislation, but none

have been able to build them up to become powerful voices in the design, planning and management of the systems. There is a need for careful and sensitive handling as, otherwise, existing entities dealing with smaller pieces of the urban transport pie, are likely to become hurdles in the evolution of a lead agency like the UMTA.

**Please elaborate on how the transport and logistics sector can improve the last mile connectivity and achieve the overarching goal of 'Atmanirbhar' India?**

Achieving the overarching goal of Atmanirbhar India requires every nook and corner of the country to be connected to every other corner to move goods and people safely, speedily and affordably. Essentially, the country should be well connected. It is well known that large quantities of farm produce are lost in transit before they reach our plates. Fruits, vegetables, milk, sugar cane and a variety of such farm produces have a limited shelf life and need to move to their processing and consumption centres quickly. People should also be able to move around to any place in the country quickly. All of this requires a logistics system that is well organised and well integrated across all modes. Roads are the only mode that can reach every nook and corner, but they cause pollution and are not the most efficient for high volumes. Rail and marine systems are cleaner and more economical for higher volumes, but are unable to reach every nook and corner, or provide last-mile connectivity. Airline systems are good when goods and people have to move long distances quickly, but they are expensive. Therefore, each mode has its own cost, capacity and speed characteristic which need to be appropriately leveraged to give us an efficient transport network. This

will help realise our ambition of an Atmanirbhar India.

**With the rise of smart technology, there is an increasing buzz around the term Mobility as a Service (MaaS). Do you think India should actively pursue this idea? If yes, how close are we in terms of materialising this concept? What kind of mindset, technological and governance shifts do you think we need to make this happen?**

MaaS is the future of mobility, especially in urban areas, and India must not just pursue it but strive for

*Mobility as a Service (MaaS) is the future of mobility, especially in urban areas, and India must not just pursue it but strive for global leadership, given the IT and software skills it has.*

global leadership, given the IT and software skills it has. Basic features of MaaS are already in place with Ola, Uber and a host of other aggregators demonstrating what these technologies can do. Matching supply and demand on a real-time basis is what these aggregators have done. It has made transport so convenient that the younger generation does not find the need for a personal motor vehicle as compelling as their parents did. Many are either getting rid of their cars or at least their second cars, as they find an Ola or Uber to be good enough. Building on this, several bus operators have also come up with

aggregator models. These are even better as they will be more efficient in the use of road space and energy consumption than shared taxis.

Unfortunately, the current Motor Vehicles Act is a barrier as these bus services do not fit into the classification of being either stage carriages or contract carriages, as required under the Act. It is important that such regulations be reviewed and better aligned with the changing times. They should embrace new technologies instead of becoming barriers by remaining rooted in old principles.

What MaaS does is take this kind of real-time matching of supply and demand to the next level. It brings together all modes of transport and virtually plans, and provides, the entire trip seamlessly, meeting all the requirements of the person desiring to make the trip. Of course, this will need a much higher level of integration across modes. It will be very important for all modes to move towards open data systems. Sadly, we are a far cry for that today and must move towards looking at transport as one system rather than a collection of several independent, and often competing, modes.

India is perhaps the only country in the world where even at the national level, the responsibility for transport is split across five ministries – Road Transport and Highways, Shipping, Civil Aviation, Railways and Housing and Urban Affairs. This needs to change. Having a unified policy advocating MaaS will be a futile effort in such a fragmented system. As mentioned earlier, even within a city, mobility systems are awfully fragmented with no city being able to institutionalise an effective UMTA. MaaS has the potential to make personal motor vehicle ownership obsolete, but a unified system is a must for that. 



# Bhopal Smart City Achieving SDG 11.2 amid COVID



**ADITYA SINGH**

CEO, Bhopal Smart City

Bhopal Smart City has always been a name among the top-performing smart cities. However, the COVID-19 pandemic has been hard on Bhopal just as it was for the rest of the country. **Aditya Singh**, CEO, Bhopal Smart City, informed about how Bhopal managed to tackle the COVID crisis and what steps are being taken towards achieving the ambitious target 11.2 of the sustainable development goals (SDGs), in an exclusive interview with **Elets News Network (ENN)**.

**Bhopal Smart City has shown noteworthy progress. How has been the journey since the inception of the smart city project? Which are the five most significant projects recently completed?**

The Smart Cities Mission of the Government of India seeks to address the issue of urbanisation through the transformation of selected cities. Bhopal has been amongst the 20 lighthouse cities with a dramatically different approach which is driven by 'Redevelopment' rather than 'Retrofitting'. Bhopal's quest for a better urban living got a boost as it was listed among 98 cities selected by the Ministry of Housing and Urban Affairs (MoHUA), Government of India. Bhopal Smart city has undertaken multiple diversified Information and Communication Technology (ICT) Projects in Pan City and has been successful in the land monetisation of the ABD parcels which is first in nature, amongst other smart cities.

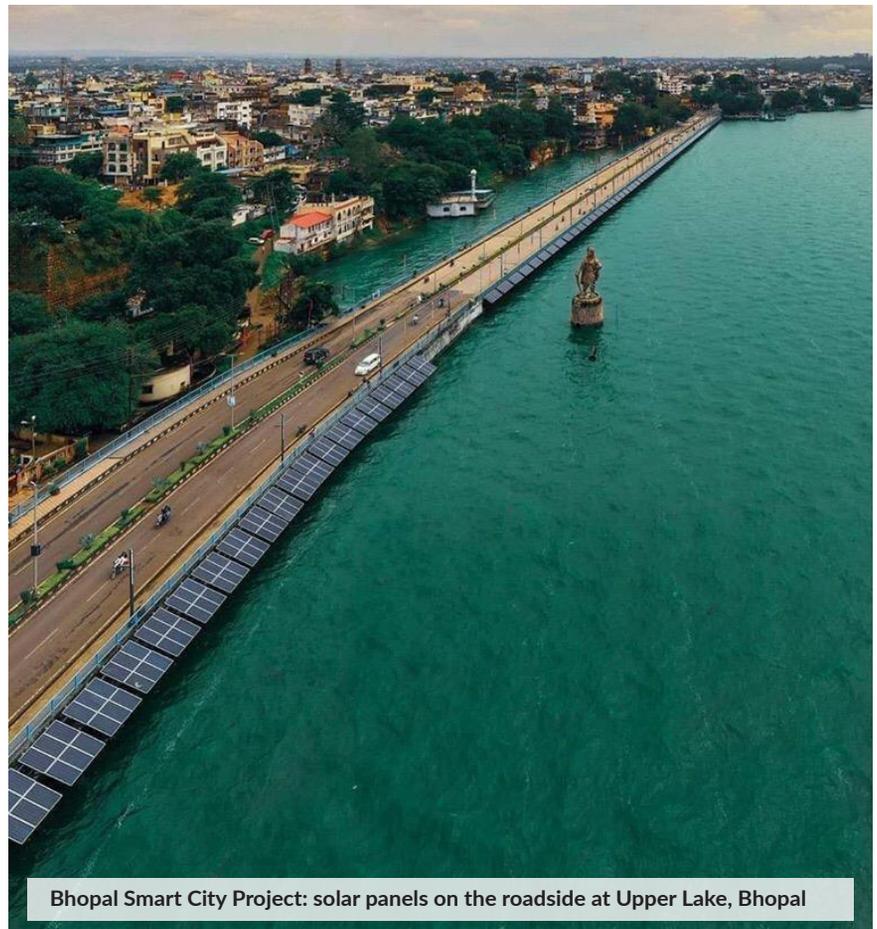
Bhopal Smart City has been ranked continuously as no. 1 in the MoHUA ranking. The objective of Smart City Bhopal is to transform Bhopal into a smart, connected, sustainable, and liveable city.

The five most significant projects recently completed by Bhopal Smart City include:

**Boulevard Street** - 45 M Boulevard Street with underground utilities, state of the art civil infrastructure, beautiful plantation and other amenities.

**Arch Bridge** - Steel Arch Bridge to connect Ginnori Ghat and Visarjan Ghat on the lower lake. The superstructure is of 200 m. The bridge length including junction improvements is 534 m.

**Solid Waste Transfer Station** - BSCDCL has implemented solid



Bhopal Smart City Project: solar panels on the roadside at Upper Lake, Bhopal

waste transfer stations for the municipal solid waste from the households. The infrastructure includes a Compactor machine & hook loader with capsules, Weighing Bridge Boom Barrier with RFID Tags and other civil components.

**Smart Road** - 2.21 km from Bharat Mata Square to Polytechnic Crossing, 8.5 m wide driving lane on both sides, 30 m ROW.

**Smart School** - Modernising 10 municipal/government schools of Bhopal with state of art ICT and civil infrastructure along with digitized contents and online application platform.

**As the second wave of the COVID pandemic has claimed lakhs of lives in India, what measures is Bhopal Smart City Ltd implementing to**

**control the pandemic?**

The Crisis Management Plan for the second wave of COVID-19 assesses hospitals, governance, structures, plans and protocols to help Bhopal rapidly determine their current capacities and gaps in services necessary to respond to the COVID-19 pandemic. This will be helpful in identifying major areas that require investment and action and to develop plans to improve hospital readiness. The main focus of this plan is to primarily assist hospitals in preparing to effectively respond to the pandemic by assessing existing capacities and identifying those areas that need further strengthening.

Bhopal Smart City has established a State COVID Control Center. The Centre is responsible for the data



Integrated Command and Control Centre (ICCC) of Bhopal Smart City

management of the COVID cases and suggestive actions based on data analysis.

The COVID crisis management activities in Bhopal can be broadly categorised into four categories - Hospital-Level Interventions, Oxygen Level Interventions, IT Interventions (Existing and Proposed), Capacity Building Initiatives and IEC Campaign.

**COVID is not the only pandemic and definitely is not the last one. So, how is Bhopal Smart City Ltd. building its capacity and resilience to avoid such catastrophic scenarios in future?**

The shortage of oxygen supply is one of the most important learnings from the second wave of the COVID pandemic. This has been a major reason for many deaths at several places. The second wave of the pandemic in India has exposed the poor management of oxygen supplies and called for a need to have a detailed Oxygen Supply Management Plan in order to cater to the oxygen requirements as and when required.

*Bhopal Smart City has been ranked continuously as no. 1 in the MoHUA ranking. The objective of Smart City Bhopal is to transform Bhopal into a smart, connected, sustainable, and liveable city.*

The oxygen supply management plan will play an instrumental role in estimating the oxygen demands. The dynamics of the oxygen demands in Bhopal from the pre-second COVID wave to today can be deduced in pointers as follows:

- Before the COVID pandemic, Bhopal had a demand of about

30 MT of oxygen per day.

- The capacity of the existing five oxygen generation plants was close to 60 MT per day which was enough to suffice the requirements before the second wave of the COVID pandemic.
- The demand for oxygen in Bhopal during the second wave increased to 100 MT per day.
- This called for the need to increase the capacity at least up to 150 MT per day to meet the present demands and speculated future demands.
- Also, considering the problem of the logistics of transporting medical oxygen - involving the number of tanks/containers and the distribution system. There is a need to create backup storage capacity for the city which should not be less than 25-50 per cent of the existing capacity.

Bhopal Smart City has a clear assessment of the oxygen demand and supply gaps and requirements for which the city has readiness on the various infrastructure upgradation planning for the Hospital



Bus Rapid Transit System (BRTS) in Bhopal

– Beds, Oxygen, Manpower, Medicines.

**Online platforms, digitisation are a part of the new normal that has set in owing to the pandemic and lockdowns. What technologies are you leveraging to manage the COVID situation?**

If it is for the technology, Bhopal Smart City is implementing several technology interventions to enhance city operations, management, civic services, providing benefits to citizens, and more. Following technologies are used and managed by Bhopal Smart city under Covid19 situations:

**Niramay App:** Niramay Bhopal is an initiative by Bhopal Smart City Development Corporation to monitor/track home isolated and quarantined patients. Also, the app enables the authorities to provide the best medical facilities and free resources to citizens of Bhopal.

**COVID relief food distribution using Bhoj-Pal:** -By using this service, the patient who is in home isolation and

*Bhopal Smart City has established a State COVID Control Center. The Centre is responsible for the data management of the COVID cases and suggestive actions based on data analysis.*

those admitted in hospital can order the food at their doorstep. Hospitals can also order food on behalf of their patients if needed.

**Let's Book Bed:** This is an Initiative by Bhopal Smart City Development Corporation Limited. With this, citizens can find hospitals and book bed online. Also, hospitals can use the admin portal to manage and update their availability of beds status.

**Public Portal:** Citizens can find the hospitals ward-wise and area-wise to book bed online. Following the booking confirmation, a token will be generated for reference purpose.

**Oxygen Tracking:** Authority can track the oxygen-carrying tankers from the oxygen supply plants to the storing stations in different districts of Madhya Pradesh and have seamless and end to end support in tracking and reporting.

**What steps have been taken to achieve the ambitious target 11.2 of the SDGs? Throw some light on the way forward for Bhopal Smart City Ltd. in terms of sustainable development?**

Considering SDG 11.2, Bhopal Smart City Ltd. has made several efforts to make the city's transport system affordable, safe and accessible for all.

On the safety front, we've installed smart poles at 100 locations with CCTV cameras for surveillance across the city. The camera feeds are monitored from our Integrated Command and Control Centre (ICCC). Through our Bhopal Plus mobile application we have introduced an Emergency SOS Button option keeping in mind the security of women. Besides, as a part of women-centric initiatives, Bhopal Smart City has also introduced She Lounge. It is basically a convenience facility for women. Apart from safety service, the application also offers a MaaS (mobility as a service) option of bus route planner. On the technology front, the Smart City has also implemented the integrated traffic management system (ITMS) that includes a network of smart traffic surveillance cameras placed at 22 locations across the city. [bhopalsmartcity.gov.in](https://www.bhopalsmartcity.gov.in)



# Strategising Delhi's Transition Towards Low Carbon Mobility



**NILESH RAJADHYAKSHA**

Project Coordinator  
Master Plan Delhi-2041

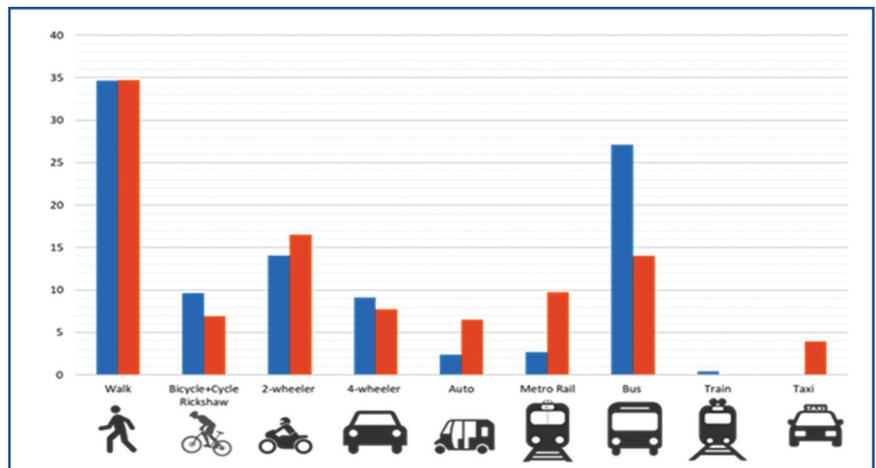
Target 11.2 of the Sustainable Development Goals (SDG) lays specific emphasis on three aspects - sustainability, safety and accessibility of mobility solutions. While the broad contours of what ails the sector and needs to be corrected are well understood, implementing mobility reforms remains a challenge. Particularly for countries like India, prevalent policy environments are heavily inclined towards private car ownership, creation of more and more roads, focus on facilities for private car parking, and lack of a regulatory environment to reduce private vehicular use, writes **Nilesh Rajadhyaksha**, Project Coordinator, Master Plan Delhi-2041.

In this context, Delhi demonstrates a marked duality. On one hand, it has one of the densest metro networks in India (fifth largest in the world) and well-networked bus service, while on the other it also has one of the highest private vehicle ownership in the country. The number of vehicles has more than doubled since 2005-06. Share of bus trips and bicycle trips have fallen and while walking remains a predominant mode, this has not been a focus area. A large proportion of metro rail usage remains regional in nature and it is yet to fully serve as a default choice for travel within the city largely due to high tariffs associated with longer trips, issues of last-mile access and lack of integration between land use and transport.

The Delhi Development Authority (DDA) recently released a draft of the fourth master plan for Delhi, setting out agendas and strategies up to 2041. The plan has been prepared with technical support from the National Institute of Urban Affairs (NIUA), to rethink and reinvent the prevalent planning provisions. The draft plan targets 'low carbon mobility' as a fundamental objective and sets out numerous hard and soft strategies for achieving this. These can be clubbed under four major buckets as detailed in subsequent paragraphs.

### Aligning spatial strategies with mobility

The plan advocates transit-oriented development in a big way - promoting compact mix-use development, reduced parking minimums, active and un-gated built typology, and dense public street networks in all development/regeneration projects close to transit stations. Select strategic stations with high development potential will be permitted higher FAR and mixing of uses to foster city-level social and economic hubs. Under-utilised land



Share of different modes of transport<sup>1</sup>

*The draft plan targets 'low carbon mobility' as a fundamental objective and sets out numerous hard and soft strategies for achieving this.*

assets such as depots, repair yards, etc. will also be permitted a mix of activities after meeting operational requirements. Such transit orientation will help to bring homes, jobs, cultural spaces and facilities close to mass transit. It will also reduce dependence on private vehicles for daily commutes, minimise vehicular emissions, and adequately leverage the high investments that go into transit infrastructure through value capture.

Complementary improvements in last-mile access, multi-modal interchange and availability of public amenities catering to a wide variety of user groups will be ensured through local planning within 500 m influence area of transit stations. An important feature is the focus on small-format

housing in such projects that will result in higher densities close to transit. Further, transit stations that act as regional entry points will be encouraged to provide functions like tertiary healthcare, higher education, hospitality, and logistics to cater to regional needs and restrict throughfare traffic passing through the city.

Convergence between spatial strategies and mobility will also be ensured in greenfield areas being developed through land pooling. Primary corridors for future alignment of mass transit routes have been identified upfront and these will be developed as TDR-receiving zones and areas where higher FAR and mix of uses will be permitted.

### Encouraging 'shared', discouraging 'private'

While shifting modal choice from private to public transport remains a major concern, the plan recognises the need to support a wide range of non-self owned, motorised and non-motorised options, covering the entire spectrum from metro rails and buses to non-motorised IPT, on-demand or app-based services, feeder systems, gramin sewas, or even future

1. RITES 2007, DIMTS 2018; Analysis: NIUA



Public Bike Sharing (PBS) is an important element of green mobility

forms such as hyperloops, travel pods, etc. The critical point of differentiation is between ‘shared’ versus ‘private’ modes as a means to achieve sustainability, and the new plan demonstrates a decisive shift in favour of shared mobility.

The entire spatial strategy has been shifted to a ‘public transport accessibility levels (PTAL)’ framework, adopted in many global cities - putting public transport at the centre of planning decisions such as allocation of higher development rights, flexibility of mix of uses, mandatory parking requirements, etc.

The focus has shifted to improving systems and facilities for shared modes, so as to improve user convenience and also ensure that more people adopt shared mobility as a preferred mode. The plan provides strategies for improving the network, coverage and services of mass transit networks. It also recommends fare rationalisation, preferential pricing etc. to ensure accessibility to all citizens. It also makes provisions for pick-up/drop and idling facilities, preferential public parking for shared vehicles, adequate accommodation within street design,

provision of supporting facilities like public toilets, changing rooms, drinking water facilities, etc. to support other shared modes.

Importantly, the plan takes a hard line on private motorised transport and sets out several disincentives and regulatory measures in this regard. Identification of congestion pricing zones, reduction of free-of-FAR private parking allocations, volumetric and area-based dynamic parking norms, etc. are some of the key provisions aimed at discouraging the use of private vehicles.

**Moving towards green mobility**

Delhi has been one of the first cities to make a move towards cleaner fuels like CNG for public transport. Delhi Metro also meets a proportion of its energy needs from renewables like solar. There is a need to conclusively move towards greening of other shared modes as well as encouraging people to make greener choices like walking, cycling, personal electric vehicles, etc. both for purpose-oriented and leisure trips.

Provisions of the plan include mandatory Walk Plans and Cycle Plans

for project sanction, identification of areas/corridors for priority improvement of pedestrian and cycling infrastructure, enhancing user experience and ensuring safety through the use of technology - walk apps, air quality sensors, surveillance for ensuring safety and compliance with pedestrian safety rules, etc. This will help to mainstream walking and cycling as preferred modes for short distances and last-mile.

Special walk/cycle plans are also proposed along eco-cultural assets like buffers of natural drains to create citywide ‘greenways’ that will not only act as nature trails or cultural trails but also provide shortcuts and connections for sustainably moving across large parts of the city. The plan also proposes to improve long-distance cycling infrastructure (still a predominant mode used by the urban poor) along identified routes and major RoWs. Such interventions will facilitate the creation of seamless and continuous networks of walking and cycling rather than ad-hoc area level interventions.

Electric mobility is being promoted in a big way both for shared and private modes. Provisions for charging points

in public parking lots, earmarking parking spaces for EVs and providing charging stations within basements, space for battery swapping facilities are some of the provisions included in the plan.

The focus on green mobility is further reinforced through the adoption of complementary planning principles like mix-use, active frontage, walkable street density, restricted block lengths, connected and active public realm, etc. that form the backbone of all spatial, environmental and economic policies of the plan.

### Rethinking mobility as an end-to-end service

Citizens experience mobility as a combination of multiple modes, for example, a person may walk to the metro station, take a train to the station nearest to her workplace, and then take a bus for the last mile to reach office. One of the key targets of the plan is to facilitate seamless transfers from one mode to another and efficient movement from start to end of a desired journey. Mobility is thus viewed as an 'integrated service' with focus on improving user experience across all modes and their interlinkages or transfer points.

To enable this, the plan recommends development of multi-modal interchange facilities at all mass transit hubs. It also promotes use of digital technology, for ensuring better coordination between different modes and provide citizens with accurate, real-time information and updates (both for motorised as well as non-motorised options) for making their journey shorter, cleaner, and more convenient. Local plans such as influence zone plans will also go a long way in integrating first and last mile connectivity with the major mass transit modes.

### In summary

Strategies of the next master plan for Delhi are substantially geared towards achieving the targets set out in SDG 11.2. Application of universal design guidelines is a mandatory pre-requisite for all projects and this will go a long way in ensuring accessibility of public infrastructure. Importantly, mobility assets are also seen as green assets, for example, greenways along natural drains, green roads with plantation, bioswales, etc. This will help build a green-blue continuum over time.

*The focus in Delhi has shifted to improving systems and facilities for shared modes, so as to improve user convenience and ensure that more people adopt shared mobility as a preferred mode.*

The success of this ambitious plan will depend heavily upon the ability of public agencies to converge their efforts and avoid overlaps/ redundancies. This will require comprehensive planning and institutional integration. The plan recommends constituting a Unified Metropolitan Transport Authority (UMTA) and preparing a comprehensive mobility plan for the city. It is imperative that the city agencies pursue a 'whole-of-system approach' and an 'incremental outlook' towards mobility management, focusing multi-agency priorities and investments over three time horizons:

- **Short (7-10 yrs):** Focus new asset creation to the development of priority corridors to provide access to upcoming greenfield areas. The major focus should be on improving walkability, last mile connectivity, public amenities, multi-modal transfer facilities, etc. Adopting city-level smart solutions and developing big data architecture should also be a short term priority.
- **Medium (15-20 yrs):** Focus could be on large scale infrastructure in greenfield areas, development of identified strategic transport corridors, development of TODs, Logistics Parks, etc.
- **Long (25-30 yrs):** Complete upheaval of legacy systems, replaced by technology-enabled and sustainable transport systems.

Further, the role of citizens and other local stakeholders in enhancing mobility cannot be understated. The plan recommends local community action in the form of tactical urbanism initiatives (street reclamation, play streets, etc.), place-making, vigilance against encroachers and violators of traffic norms, participation in walkability or safety audits conducted by public agencies, and so on.

Delhi's citizens and planners often complain of congested roads and traffic logjams; a symptom that has been considered an impediment to the high growth and densification of the city. However, to use a medical analogy this blocking of the city's arteries is the result of poor and unhealthy lifestyle choices and the solution does not lie in creating more road space or more private parking facilities. The condition is reversible if the recommendations of the plan are implemented and Delhi can potentially set the blueprint for megacities to move towards more efficient low carbon mobility solutions. [elets.gov](https://elets.gov)

# Accessibility to Public Transport for the Urban Poor



**DHIRAJ AJAY SURI**

Head, Inclusive Centre for Cities (ICC), National Institute of Urban Affairs (NIUA)

Rapid urbanisation in India is presenting the country with immense opportunities for achieving a sustained high national growth rate. The full benefits of urbanisation can be reaped only if cities are able to provide equitable access to urban services, social facilities, public spaces and economic opportunities for all. Presently, a high proportion of the city population lives in informal settlements (estimated at 17.4 per cent, Census 2011) and estimates show that nearly three-fourth of the urban labour force is engaged in informal economic pursuits – indicators of inequitable access to urban services and economic opportunities in cities, writes **Dhiraj Ajay Suri**, Head, Inclusive Centre for Cities (ICC), National Institute of Urban Affairs (NIUA).



Bus Rapid Transit System (BRTS) in Ahmedabad

The available housing stock in cities and the related urban services fall way short of the demand particularly in the low-income market segment in Indian cities. Lack of formal housing solutions pushes the urban poor to seek informal accommodation. Also with the falling availability of vacant lands and the rising land prices, the low-income layouts – formal, informal and unauthorised, are increasingly located in the city periphery devoid of access to affordable public transport. This, thus, inhibits the access of the inhabitants to economic opportunities and human development facilities located in other distant parts of the cities. It is the dual challenge which needs to be addressed – first, the intersection of public transport routes and areas with high

concentration of poor; and, second, availability of affordable intermediate public transport services for the last mile connectivity. India is one of the

*The public transport routes need to be specifically designed to cater to the demand of the low-income population segment.*

fastest urbanising countries in the world. Its cities, as growth engines, are experiencing a huge influx of population, resulting in a surge in private vehicle ownership. City planners, local governments, and policymakers are now faced with the challenge of declining quality of life in

cities, owing to increasing traffic congestion and the consequences of resultant emissions.

The informal sector workers, most of whom live in informal settlements, are generally categorised as home-based workers, domestic workers, street vendors and waste collectors. Each of these groups have specific public transport needs but the generic needs are carrying goods and equipments, and travel at odd hours – both have implications for public and intermediate transport facilities.

The public transport routes need to be specifically designed to cater to the demand of the low-income population segment. This ensures not only meeting the affordable transport needs of this population segment but also ensures ridership for the transport company. Delhi Metro routes have been specifically



Alongside cost savings, bicycles are also emerging as the preferred mode for last-mile connectivity

designed to intersect the dense settlements generating high ridership while Mumbai and Gurgaon monorail as well as Ahmedabad BRTS struggle on this account.

The last mile connectivity is generally provided by Intermediate Public Transport (IPTs) besides the dedicated feeder bus facilities in some cities. The critique of the latter is the low frequency of service which implies high dependence on the former for the urban poor. Cycle rickshaws and e-rickshaws are increasingly the preferred choices due to factors such as affordability, availability and flexibility to carry goods. There is a need to regulate the services of e-rickshaws which are growing exponentially due to high demand. The high demand is leading to a

*Bicycles are also emerging as the preferred transport mode for commuting within the neighbourhood. This is largely due to the ease and cost savings for the urban poor.*

conflict of interest of the operators and users impinging the safety parameters. Social enterprises may be incubated to rationalise the

e-rickshaw services from the perspective of availability on-call, cost and safety. The social enterprises will be positioned well to promote employment for youth as service providers.

Bicycles are also emerging as the preferred transport mode for commuting within the neighbourhood. This is largely due to the ease and cost savings for the urban poor. Domestic workers and informal workers in the services sector prefer this mode. Bicycle commute may be promoted by positioning bicycle within the neighbourhood mobility plan.

Public transport is amongst public goods and services which impact local economic development. It is hypothesized that equitable access to public goods and services promotes equitable economic growth in cities. This is largely due to health-related productivity gains which results in income gains for the urban poor.

Easy access to affordable public transport has direct productivity and income consequences as it improves the access to social facilities such as education and health besides income-earning opportunities. Long travel time for the urban poor impacts the time available for income-earning opportunities. The low-income population thus prefer to find affordable accommodation close to their workplace and the choice is limited to cheap uninhabitable options. An efficient, fast and affordable public transport system will open up other housing options for the urban poor at locations that are far from the workplace but better serviced. A well designed public transport system thus has the prospect of influencing population densities across the city and improved liveability – tangible benefits for the city population at large rather than just the urban poor. [e.gov](http://e.gov)

# E- Governance Events Calendar 2021



**13<sup>TH</sup>**

**National PSU Summit**

**KEY Participants** - Central and State PSUs Decision makers



**26-27<sup>TH</sup>**

**Future Cities Conclave**

**KEY Participants** - Municipal Corporations, Smart Cities and AMRUT Cities across India



**24<sup>TH</sup>**

**National Power Summit**

**KEY Participants** - Power Departments, New and Renewable Energy Dept, Power DISCOMs

# Rethinking public transport through the lens of universal accessibility

An integral element in the evolution of cities has been the development of a robust and far-reaching public transportation system. Over the past 200 years or more, urban public transport systems have evolved and advanced tremendously. Irrespective of its form or size, a public transport system is meant to move people in masses and at speed. A public transport system acts as a basic mobility service that is meant to be affordable, accessible, and easily available for all. It is for this reason, they are often referred to as the lifelines of modern cities, write **Utsav Choudhury**, Team Leader, Building Accessible, Safe, and Inclusive Indian Cities (BASIIIC), NIUA **Prabha Roy**, Research Associate, BASIIIC, NIUA and **Kanika Bansal** Project Associate, BASIIIC, NIUA from the National Institute of Urban Affairs (NIUA).



**UTSAV CHOUDHURY**

Team Leader, BASIIIC, NIUA



**PRABHA ROY**

Research Associate, BASIIIC, NIUA



**KANIKA BANSAL**

Project Associate, BASIIIC, NIUA

“A developed country isn’t a place where the poor have cars. It’s where the rich use public transportation,” said Gustavo Petro. As cities grow, so does their dependency on their public transport system. The role of any public transport system in essence is not just to enable mobility, but to also augment economic opportunities, and improve access to education, employment, health, and overall quality of life and standard of living. Hence, it is imperative to design and build an efficient public transport system that is accessible and inclusive for all.

Sustainable Development Goal 11 is focused on making cities and communities safe, resilient, and sustainable. A stepping stone towards achieving such an outcome is to provide access to safe, affordable, accessible, and sustainable transport systems for all, especially for the vulnerable and marginalised sections of the society; persons with disabilities, women, children, elderly persons, urban poor, etc. Further, indicator 11.2.1 of SGD 11 prioritises measuring and monitoring the proportion of the population that has convenient access to public transport. Improving the walkability and connectivity of streets with home, school, work, market, public places, etc. would play a critical role to achieve the indicated goals and targets. Well-designed street networks are the backbone of the public transport system and have interlinked benefits including improved access to basic urban services and infrastructure, foster economic development, improve safety, access to public spaces and creating scope for walking/cycling opportunities. The growing awareness around the importance of accessible streets instead of a car-centric street approach would act as a gamechanger to build an efficient public transport



Disabled-friendly public transport

*Accessibility of public transportation plays a vital role in the empowerment and independent living of persons with disabilities, the elderly, and women, says Prabha Roy*

system that is accessible, safe and appropriate for the needs of all users (irrespective of age, ability and gender).

Opting for compact, connected and accessible street networks at a neighbourhood or ward level would create scope to integrate innovative street design elements like barrier-free elements, tactile paving, street furniture, urban greenery, signage/wayfinding mechanism, footpaths, walkways, cycle lanes, crosswalks, median crossing islands, accessible pedestrian signals, accessible utilities, etc. and thus enabling space for safer pedestrian movement. Linking of urban spaces with accessible street networks would act beneficial for the city

dwellers to indulge in outdoor activities and further improve the physical and mental well being of the end-users.

Accessibility of public transportation plays a vital role in the empowerment and independent living of persons with disabilities, the elderly, and women. The accessible street design has an influence on the perception and travel behaviour of individuals with disabilities. It helps in improving the quality of living through facilitating perceived better service, accessibility, safety, activity pattern, and availability of mode of choices. Non-existent or poorly maintained, crowded, unsafe and encroached pavements in the vicinity of stations and bus stops, haphazard local traffic behaviour have made the streets inaccessible even for an able-bodied person. The absence of universal design features like tactile tiles, kerb ramps, adequate width and accessible crossings, further make the streets unsafe and inaccessible for persons with visual impairment, wheelchair users or people using other assistive devices. The lack of adequate street furniture and shaded walkways, nuisance created by litter, and annoyance due to stray animals adds to the discomfort and lack of safety for the vulnerable group of population.



Zebra crossing improves walkability and safety on roads

The “Street design Guidelines” prepared by Unified Traffic & Transportation Infrastructure (Planning & Engineering) Centre (UTTIPEC), Delhi Development Authority (DDA) has propagated essential features like clear walking zone, kerb height and ramps, continuous pavement, raised “Table-top” crossings, tactile tiles, plantation system to develop the streets as shared public spaces. While these guidelines make it mandatory for all arterial and sub-arterial roads to include the features of barrier-free design, the major aspects of maintaining the street infrastructure remain unanswered.

There is a persistent need to eliminate the use of single-step and replacing it with ramps, provision of grab rails along kerb ramps, maintain minimum clear walking width, employ proper signages and wayfinding system, include adequate resting place (with shade) along the street, and deploy suitable TGSIs (Tactile Ground Surface Indicators) to create compact and connect street networks. Proper illumination of the streets and adding a component of “right eyes on streets”, along with the provision of manual patrolling and CCTV surveillance will strengthen the perception of safety

*Improving the walkability and connectivity of streets with home, school, work, market, public places, etc. would play a critical role to achieve the indicated goals and targets under SDG 11.2, says Kanika Bansal*

among the users. Cautious design decisions like the selection of the appropriate type of plantation, shaded areas, placement of garbage bins to avoid stray animals and nuisance, considerate design of street furniture, auditory signal and sensors at crossings etc. will definitely enhance the walking experience on the Indian streets and will enable and ensure a sense of ownership and responsibility amongst the users to keep the streets clean, safe and usable for all. Furthermore, it is imperative to involve persons with disabilities, elderly persons, women and

children in the planning and design process; evolve strategies for stringent monitoring and enforcement of accessibility standards; and promote awareness and sensitisation programmes to improve policies and decision making process to improve the street infrastructure in the Indian context.

No conversation is complete without contextualising it in the backdrop of the current pandemic. From the point of view of transit and mobility, the pandemic has taught us a lot and the cities across the globe have been receptive to it. The emphasis has been to make the cities more accessible, pedestrian and cyclist-friendly. In the Indian context, in light of the pandemic, the Ministry of Housing and Urban Affairs recommended holistic planning for pedestrian-friendly streets in various cities and municipal areas in the country. The advisory issued by the Ministry to all states/cities/municipal corporations also suggested the million-plus cities to select at least three market places for pedestrianisation and non-million plus cities to select at least one area for piloting the pedestrianisation of market places. Following which a domino effect was seen among numerous cities and a renewed emphasis on pedestrian-friendly and non-motorised forms of transportation. The vigour and enthusiasm for initiatives like the Cycles4Change challenge launched under the Smart Cities Mission have been noteworthy. Cities like Chennai, Bhubaneswar and Pune have taken the initiative to make the cities more accessible through various planning and design measures, but more importantly by being inclusive in their approach and thinking. Moving forward it will be important for all cities to encapsulate such approaches and focus on implementing the tenets of accessibility, safety, and inclusion to make cities and communities more inclusive, resilient and sustainable. 

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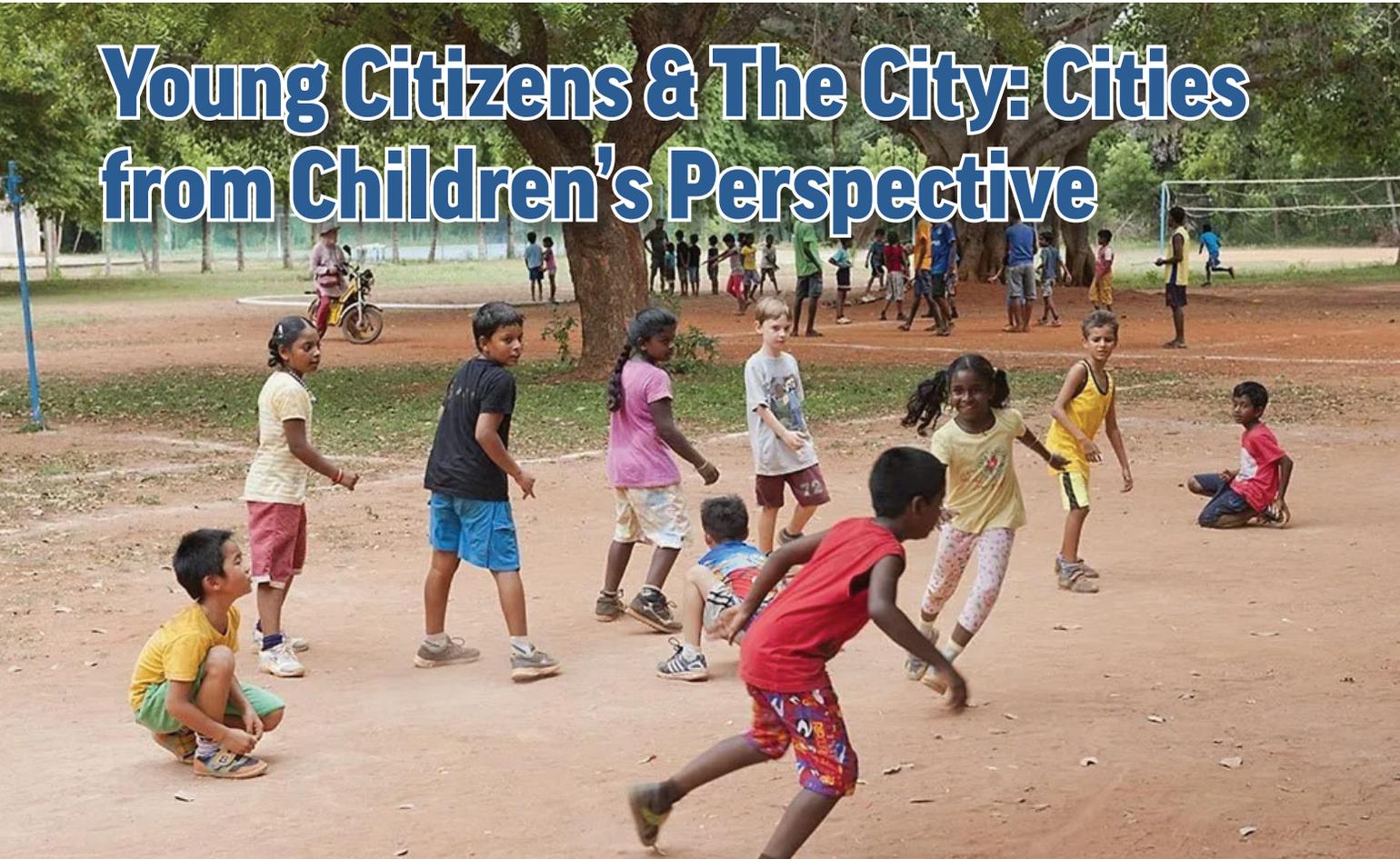
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# Young Citizens & The City: Cities from Children's Perspective



**DIVYA JINDAL**

Project Associate, Building Accessible, Safe & Inclusive Indian Cities (BASIIIC) programme, National Institute of Urban Affairs (NIUA)

Children are a universal indicator of the level of well-being in a society. Cities not only have a direct impact on children's health but also act as critical facilitators of fundamental thinking on how children perceive and become an active part of their urban environment, reinforcing the importance of balanced development of all groups of children within their urban context through skilful planning of cities. **Divya Jindal**, Project Associate, Building Accessible, Safe & Inclusive Indian Cities (BASIIIC) programme, National Institute of Urban Affairs (NIUA), writes about the role of cities in ensuring their needs are addressed through accessible, inclusive and equitable planning principles and mechanisms.

“A Good City is one in which children can grow and develop to the extent of their powers; where they can build their confidence and become actively engaged in the world; yet be autonomous and capable of managing their own affairs.” Kevin Lynch, *Growing Up in Cities*, 1977.

“Childhood is a branch of cartography” as once reflected by novelist Michael Chabon<sup>1</sup>. Layering the city with micro landmarks and seemingly utilitarian objects that provide physical cues that help shape their understanding of the built environment from their vantage point, giving them a sense of place. Children’s exposure to environmental, social and physical changes in the places where they live, play and grow affects their health and overall development during every stage of their life, particularly in their early years.

Although, children form an important part and a large category of people who live in cities - yet they are a demographic group that is often ignored in planning our cities.

India, is home to 472 million children (0-18 years) comprising of 39 per cent of the country’s total population<sup>2</sup>. 128.5 million Of these children reside in urban areas, constituting around 34 per cent of the total urban population. India being home to the world’s largest population of children<sup>3</sup>, the overall health and safety of children in the country is a matter of great concern. Of the 27 million children born each year



Young children enjoying the interventions undertaken in Bhubaneswar city parks<sup>10</sup>

*A neighbourhood should be able to cater to all the basic facilities ensuring a mix of housing typologies, ample play areas, day care facilities, and schools within safe, walkable & accessible distances.*

in India, nearly two million of them do not live to the age of five<sup>4</sup>. 63 million adolescent girls in India live in homes without proper toilet facilities - this means they are forced to defecate on the open risking their lives<sup>5</sup>. One in

every eight children in urban India stays in slums where infrastructure is insufficient and living conditions are poor.

Although the statistics are daunting, progress has been made in improving children’s health in various areas and addressing their rights. The Constitution of India guarantees Fundamental Rights to all children in the country and empowers the State to make special provisions for children. The National policy of children, 2013,<sup>6</sup> emphasises the importance of a sustainable, integrated and inclusive approach for development and protection of children, recognising the rights of children to have an appropriate life. Proactive efforts have led to aligning children’s needs in urban areas as a part of the national urban development missions such as the Smart Cities Mission<sup>7</sup> and AMRUT Mission<sup>8</sup>.

Bhubaneswar<sup>9</sup> was one of the first cities under the Smart cities mission to take on the commitment to become India’s first child friendly smart city with support from Bernard van Leer Foundation and handholding technical from NIUA under its Child Friendly Smart Cities (CFSC)<sup>11</sup> Project. The interventions included transforming

1. <http://planplaceblog.com/2015/01/20/child-friendly-cities/>

2. Handbook on Census 2011 Results, India: Vol. 1

3. The National Policy for Children, 1974. Every fifth child in the world is Indian

4. <http://www.friendsofsbt.org/statistics>. 1,600 children die every day before reaching their fifth birthday.

5. [www.Dasra.org](http://www.Dasra.org)

6. The Policy for Children, 2013.

7. Smart Cities Mission Guidelines, 2015

8. Amrut Mission Guidelines, 2015

9. <https://www.childinthecity.org/2018/05/31/bhubaneswar-joins-urban95-child-friendly-city-movement/?gdp=accept>

10. Bhubaneswar Development Authority

11. <https://www.niua.org/cfsc/>



Children and families enjoy the car-free street in Ahmedabad<sup>13</sup>

green public spaces into child-friendly areas, making healthcare more accessible, supporting parents and using locally-collected data to target resources better.

Following the success and response from citizens in Bhubaneswar, many cities across India have been actively promoting and motivated to implement such interventions. With interventions such as the all-inclusive park in Vishakhapatnam<sup>12</sup> have proven to be successful interventions by including basic needs of all its citizens within their interventions and plans. Works of organisations like aProCh<sup>13</sup> in Ahmedabad and Rahagiri across India, have supplemented the ways to share public spaces in a more active and engaging way with its citizens. These local community driven practices and interventions have helped understand in detail how children move and navigating the fact that children spend a majority of their time within the home, school and recreational spaces - their needs have to be locally

provided and easily accessible. Further establishing that for a city to be inclusive and child-friendly, it must provide a physical environment that ensures children's health, develops their faculties, and fosters their love for community, and for nature.<sup>14</sup>

To encourage more such localised and young children focused interventions, Nurturing Neighbourhood Challenge<sup>15</sup> - an initiative aimed at supporting and developing cities that are responsive to the needs of very young children and their families are some of the forward looking interventions that the national government has promoted.

To realise this, innovative methods such as the Popsicle test<sup>16</sup>, the toddler walk-shed<sup>17</sup>, urban95<sup>18</sup>, are some simple yet innovative methods that cities across the globe are utilising to understand their urban ecosystem from the perspective of their young citizens. These tests are designed to understand the way children traverse within their neighbourhoods and communities and

tries to look at the urban realm from their vantage point. As cities in India, find their own customized methods and indicators to better learn and design spaces for children, these tools and methods offer a good head-start for cities more people-centric.

"It is important for children to carry out activities on the streets – such as cycling, walking, running, playing and other common group activities. It is also important for their healthy development that children, from an early age, undertake such activities. For this reason, it is important for the street to be safe so that these activities can be undertaken without the child's safety being put at risk." WHO and UNICEF, 2008 World Report on Child Injury Prevention.

With the understanding that this inter-relationship between urban space and its people is key to ensuring children's everyday freedom, the neighbourhood offers the appropriate scale for a child to be self-sufficient and move about freely, to use daily basic requirements of play, school, and housing. A neighbourhood should be able to cater to all these basic facilities of ensuring a mix of housing typologies, ample play areas, day care facilities and schools within safe, walkable and accessible distances. However, in most Indian cities this has not always been possible, even though planning norms and standards exist. To critically evaluate how neighborhoods and cities can better accommodate the needs of children, it is vital to look at the different scales on which a city functions and how children navigate the spaces between these areas.

As these pro-active urban experiments will help open a discourse, that promotes children's everyday freedoms and choices and links it directly to their local geography, mobility, and safety, cultivating a unique identity for the city and fostering a sense of belonging for its children and youth. [e.gov](https://www.e-gov.in)

12. <https://www.yovizag.com/vizag-all-abilities-park/>

13. <http://aproch.org/>

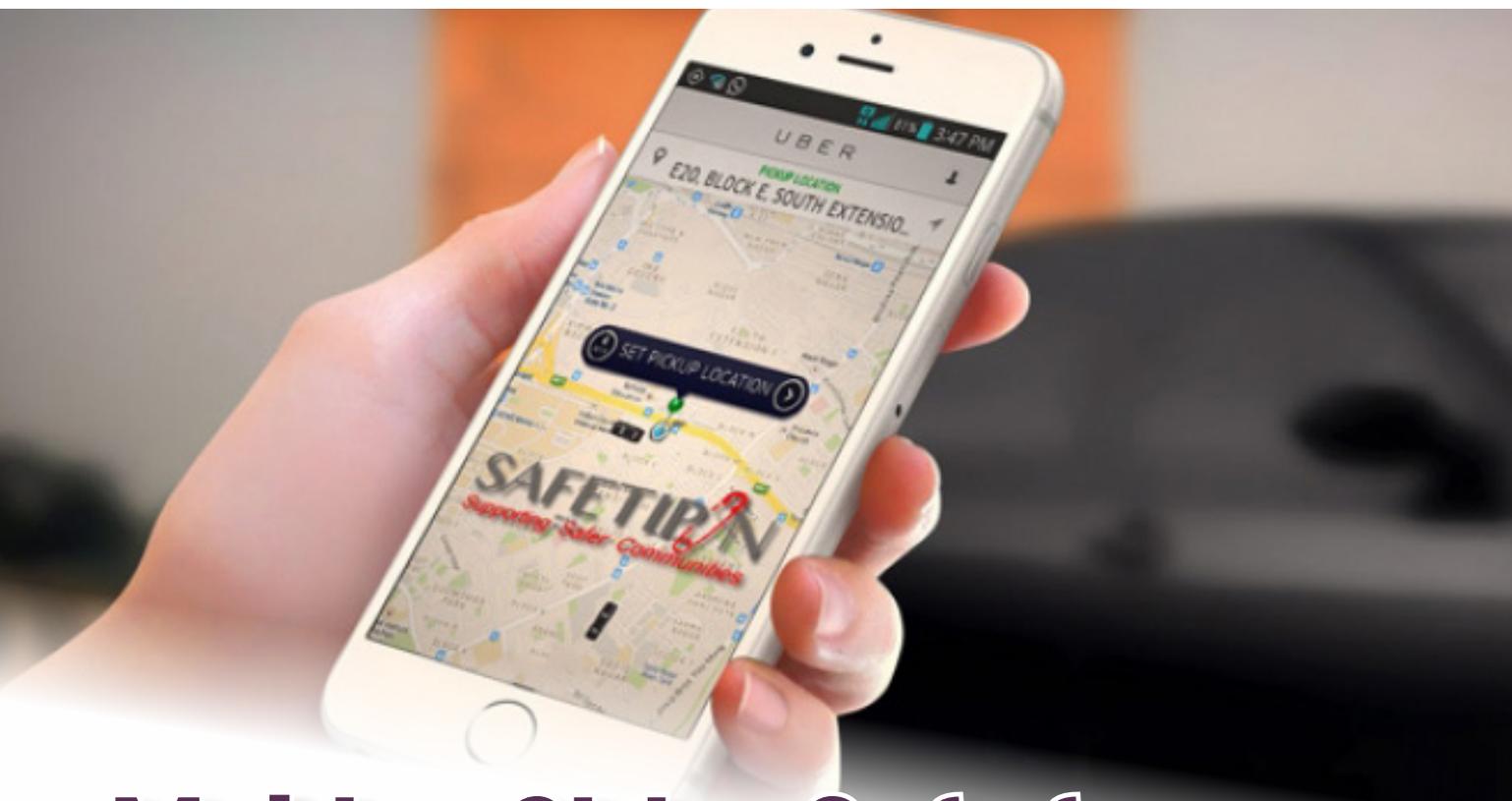
14. <http://www.livablecities.org/articles/child-friendly-communities>

15. [https://smartcities.gov.in/Nurturing\\_Neighbourhoods\\_Challenge](https://smartcities.gov.in/Nurturing_Neighbourhoods_Challenge)

16. The Guardian article: The popsicle test Link: <https://www.theguardian.com/cities/2015/aug/21/city-good-children-popsicle-test-crime-property-play>

17. <http://planplaceblog.com/2015/01/20/child-friendly-cities/>

18. <https://bernardvanleer.org/solutions/urban95/>



# Making Cities Safe for Women Through SDG 11.2



**KALPANA VISHWANATH**

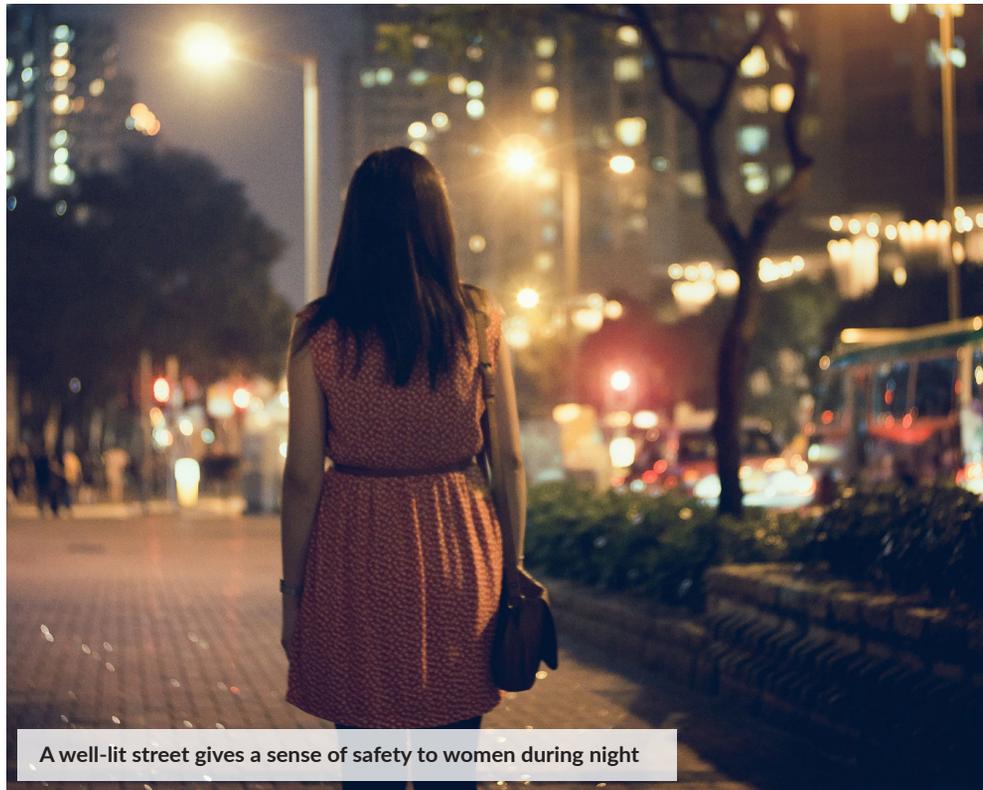
Director, Safetipin

The SDG 11.2 focuses on building “safe, affordable, accessible and sustainable transport systems for all”. However, for women (and some other excluded groups) the fear of violence in public spaces restricts their movement and access to education, employment, and leisure. It is critical to creating the conditions by which women can move about safely without fear. Research has shown that gender-friendly urban design and transport are key in determining women’s access to the city and achieving the SDG target 11.2, writes **Kalpana Vishwanath**, Director, Safetipin.

Patriarchal ideologies play a significant role in hindering women's right to the city by devaluing their labour, restricting and controlling their movements. In relation to mobility in India, women are less likely to own a vehicle, have access to a vehicle or even access to resources to use public transport. Secondly, women's trips are often planned differently from men as they tend to carry the burden of managing work of care within households. They may drop a child at school on the way to work or visit the market on their way home. Thirdly in India, women's workforce participation which is already low (31 per cent as per the last census), has dropped even further in the last couple of years. We must recognise that this not only has an impact on women but on the economy as well. The McKinsey Global Institute estimates that India's economic output in 2025 can be higher by as much as 60 per cent if women's participation in the economy were on par with that of men.

Public transport is a public good and needs to be planned and delivered with that spirit. In India, the last census data shows that only five per cent of the urban population have a personal vehicle. Most people in the country use public transport, bicycle or walk to work but there are gender differences. The census 2011 data reports that 84 per cent of women's trips are made by the public, intermediate public and non-motorised modes of transport. Only four per cent of cyclists in urban India are women.

In addition to public transport, waiting areas such as metro and train stations, bus stops, and IPT stands need to be well lit with well organised last-mile transit. The need for safe and efficient first and last-mile connectivity is critical. Women and girls may reach



A well-lit street gives a sense of safety to women during night

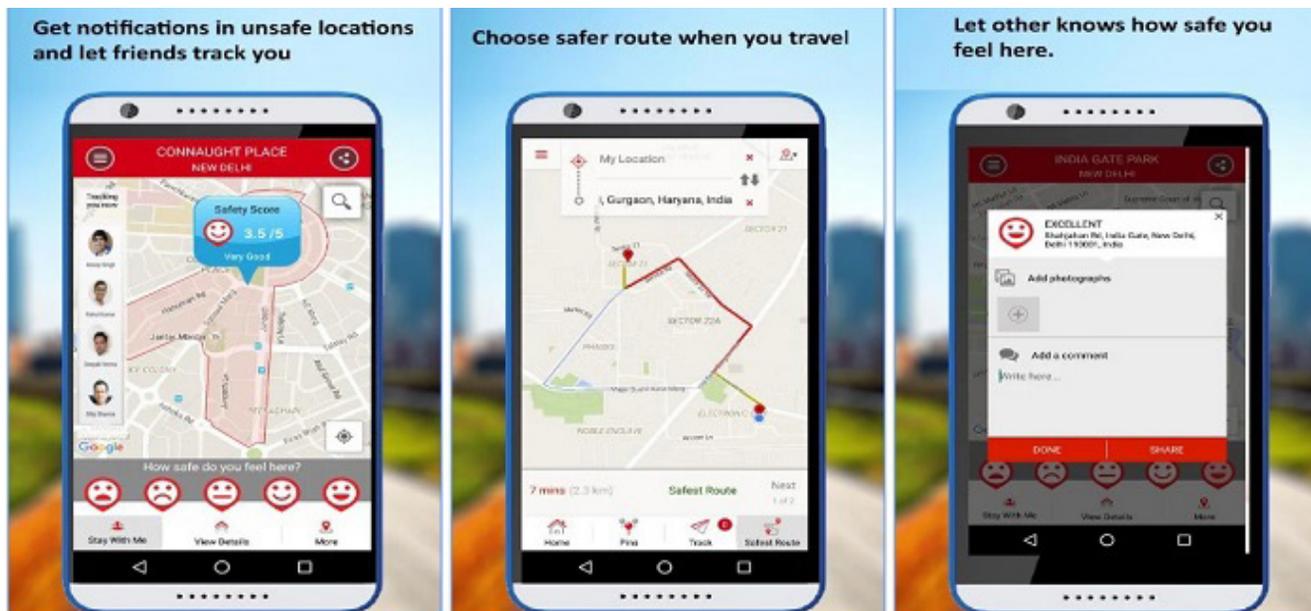
*Safetipin uses technology platform and apps to collect geospatial data and citizen perceptions on safe and inclusive public spaces to address mobility issues of women and other vulnerable groups.*

metro stations and bus stops safely, but unless they can reach their destination safely as well, there will still be restrictions on their mobility.

Other studies also support these findings. A 2018 study with 9,000

women across 11 cities revealed that 59 per cent of women used public transport like buses, trains and on-demand taxis, despite over 80 per cent claiming that they felt somewhat safe using it during the day, but not at night. As per Ola Mobility Institute 2019, the key factor driving public transport use among women was affordability, with around 40 per cent claiming this to be the main reason. Other reasons were coverage, frequency, safety, and comfort.

Several studies by UN Women and Jagori have shown that an extremely high percentage of women face sexual harassment in public spaces and transport. A study across six Indian states conducted by the United Nations Development Fund (UNDF) with the Breakthrough Trust in 2017 highlighted that over 90 per cent of women and girls experience sexual harassment in public spaces, including bus stops and inside buses.



Key features of Safetipin mobile app

In the monitoring of SDGs at the country level, it is disappointing to see the sole indicator for target 11.2 that is counted is the number of deaths due to road accidents and not the proportion of persons who have access to public transport. A renewed focus on women's access to public transport as well as their presence in the public sphere is crucial to address the gaps. There is a need for bold and innovative thinking to reduce the gender gap in all aspects of social, economic and political life. One innovation that has been used in the past few years is technology as a tool to generate data as well amplify the voices of citizens in policymaking, especially those that have been traditionally underrepresented.

Safetipin is one such tool that has used a technology platform and apps to collect geospatial data and citizen perceptions on safe and inclusive public spaces to address barriers to the mobility of women and other vulnerable groups. My Safetipin is an app where women's perceptions of safety and danger are crowdsourced and shared with urban stakeholders. The data has been used by city and

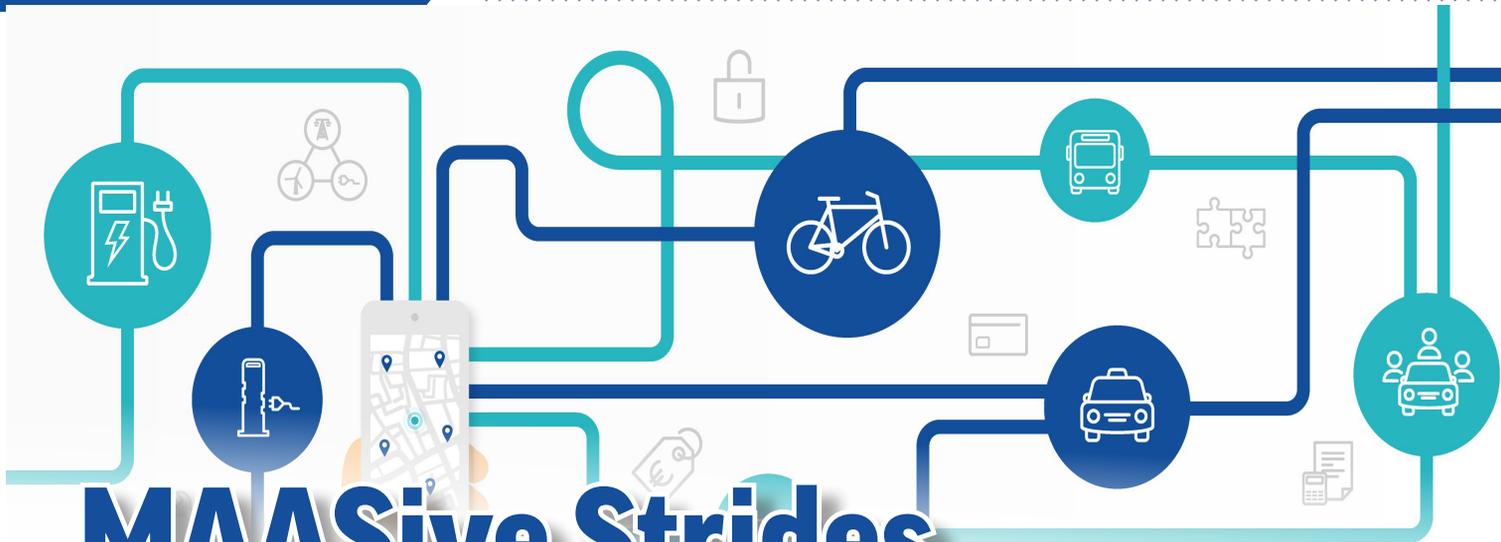
*The need of the hour is to make sure that women's rights and access to the city are not further hampered as we slowly recover from the pandemic.*

municipal governments to address make physical and social infrastructure more inclusive.

In Delhi, the data helped in identifying over 7000 dark spots which led to a large percentage getting repaired and improved by local authorities. The safety audit data at bus stops and metro stations were used to identify barriers such as poor last-mile options, deserted areas and poor lighting which impacted women's access. The data also helps in prioritising resources. For example, in Gurgaon, lighting data was overlaid with data on areas of high usage especially by women to prioritise which areas to focus on.

Walkability and access to public transport and IPT are another set of parameters that Safetipin measures and advocates for. In several cities including Delhi, Hanoi, Bogota, and Durban, the app has been used by citizens and governments to address last-mile connectivity and safety at bus stops, stations and bicycle tracks. In Durban, the technology platform has supported the Safe Taxi campaign initiated by women's groups through detailed safety audits at waiting spaces.

Much more needs to be done by a range of stakeholders. The pandemic has highlighted the vulnerability faced by women. The need of the hour is to make sure that women's rights and access to the city are not further hampered as we slowly recover from the pandemic. A city is not just the brick and mortar, but the interactions and connections as well as the spaces that people carve out for themselves. Women cannot be left behind in this. [eGov](#)



# MAASive Strides Towards Sustainability

MAAS or 'Mobility as a Service' is the integration of different forms of transport services into a single mobility service that can be made accessible as per demand. A MAAS operator facilitates various transportation options, including taxi or bike-sharing, car rental, etc. or a combination of options to fulfill the customers' demands. Such a system holds the potential to revolutionise mobility in India, write **Amit Bhatt**, Executive Director, World Resources Institute (WRI) India and **Jagrati Arora**, Project Associate, WRI India.



**AMIT BHATT**

Executive Director  
World Resources Institute (WRI) India



**JAGRITI ARORA**

Project Associate  
WRI India.

It's 2021. "Tech is the future" is a hackneyed expression now. Humankind's love for technological innovation sometimes transcends use-cases too. Innovation must be encouraged! We carry the world in our pockets. The mobile phone has replaced books, televisions, banks, and most recently, schools too. Mobile phones have replaced tickets, bus charts, and even the ride-hailing spaces when it comes to transportation. The rise of Uber and Ola in India is a testament to the success of mobile phones as space rather than just a product.

Mobility-as-a-service (MAAS) has been picking up steam in the transportation discourse worldwide. MAAS brings every kind of transport together into a single intuitive mobile app and integrate services, including travel planning and

payments, from different providers. It holds the potential to revolutionise mobility in India, nudging mobility choices in a sustainable direction and enabling a mode shift from private vehicles to public transport. To help improve its polluted cities and congested roads, India needs MAAS. However, it is essential to implement MAAS equitably.

Sustainable Development Target 11.2 states that by 2030, vulnerable groups like women, children, persons with disabilities, and the elderly, should have access to safe, affordable, accessible, and sustainable transport systems. Products that offer simple, intuitive solutions should be made available to every part of society. Such solutions fuel economic activity across user groups, protecting their rights as citizens and offering them more choice. Little needs to be said about their contribution to a greener future. So far, MAAS has been perceived as a private player's arena, but the government has a vital role to play in making MAAS viable in Indian cities. From the government's viewpoint, MAAS is characterised by multimodality, digital access to transport services, user-focused trip planning, data sharing, convenience, demand and supply management, integration of transport networks and payment interfaces, better information (to the users), and competitive markets (ensuring efficiency).

It is pertinent to ask what role the government can play in making MAAS successful in Indian cities. A typical MAAS ecosystem consists of three actors, transport service providers (including public transport operators, informal public transport operators, car rental agencies, micro-mobility platforms, etc.), MAAS integrator, and, finally, MAAS provider (consumer-facing). In a market-led MAAS ecosystem, private players will be both integrators and MAAS providers; in a public MAAS ecosystem, the



Online taxi service is an important element of MAAS

*MAAS holds the potential to revolutionise mobility in India, nudging mobility choices in a sustainable direction and enabling a mode shift from private vehicles to public transport.*

government will play the roles of integrators and MAAS providers; in a public-private MAAS ecosystem, the government will play the role of an integrator, while private players will play the role of MAAS providers. The scenario should be chosen keeping public value in mind. The government is best placed to ensure that the beneficial and sustainable modes of transport are incentivised. The government needs to play at least one role in MAAS ecosystem to keep it equitable.

Once the government identifies its roles, it can work towards ensuring social equity. How is social equity different from social equality, one might wonder. Social equality considers the idea that every individual within a

governed society receives the same opportunities, support and resources with no discrimination or reserve. Social equity denotes separately that each person should have access to the number of options they specifically need. This entails tailored solution across socio-economic backgrounds of the society. The mobile phone penetration in India has been increasing but has it grown equally? According to Pew Research, only 24 per cent of people in India have smartphones. Additionally, India trails other emerging economies like South Africa, Brazil, Philippines, Mexico, Indonesia, Tunisia, Kenya, and Nigeria, in smartphone adoption rate.

Thinking of MAAS as just a mobile app might restrict its use for non-smartphone-users; thus, building smart card booths, with interfaces available in regional languages, around bus stops might help bring these solutions to everyone. It is also essential to keep MAAS cheap. Thus, alternative revenue mechanisms should be deliberated. For example, charging more for on-street parking might help pay for certain loss-making services, like public transport. MAAS can become profitable only after it reaches a particular scale. The government should thus play the role of a promoter to ensure that it scales its way to profitability. When making decisions about MAAS, public value should be the key currency. The government can take both MAAS and

# Leveraging Mobile Applications to Audit Mobility Access for ITCs



**UDIT SARKAR**

Geospatial Analyst, Data Analytics and Management Unit, NIUA.

As neighbourhoods play an instrumental role in shaping one's mental and physical development, it becomes imperative for any society to secure its future by empowering children to realise their fullest potential through access to a healthy, fair, and nurturing environment. Considering this, incorporating the requirements of children in place-making, planning, and design at the neighbourhood level can make better cities for all, writes **Udit Sarkar**, Geospatial Analyst, Data Analytics and Management Unit, NIUA.

The National Institute of Urban Affairs (NIUA) believes that data is a powerful tool that can bring to light hidden inequalities and give voice to the unheard. Children do not have a seat at the policymaking table and their perspectives are seldom considered. In order to overcome the challenges of limited access to data on young children or in many cases, simply a lack of data collected on them, there is a need for systematic collection, analysis and

monitoring of data on the needs of children and their caregivers in terms of health, education, living conditions, environment, mobility, and play. It is imperative that such an exercise also identify the gaps in our knowledge that have inhibited evidence-based policymaking thus far. To address such data gaps in the area of urban mobility infrastructure, there is a strong case for a mobility audit, with the overarching objective being to identify how much a city is universally accessible and safe for

its infants, toddlers, caregivers (ITCs). A mobile application can subsequently be designed that can help crowdsource audits of accessibility - mobility infrastructure from the perspectives of infants, toddlers, and their caregivers.

To lead these efforts, NIUA is developing frameworks and methodologies that measure the different facets of early childhood development. One of the methods for doing that involves collecting data directly from citizens and

incorporating their ideas in planning and developing infrastructure in Smart Cities. Through initiatives such as Google's Project Sidewalk that works toward reviewing the city's sidewalks, the world is now using crowdsourcing as a tool in the development of holistic solutions to complex problems. Crowdsourcing effectively empowers the ordinary citizen to become the eyes of the municipality, and crowdsourced data could allow new parents and invested member of the community to contribute towards creating a more accessible environment for infants and toddlers.

The mobile-based application can be used by caregivers to assess accessibility during their daily commute. Since the application spatializes the information, it will help stakeholders map which streets, footpaths, crossings or bus stops are assessed and how these have

*A mobile application can subsequently be designed that can help crowdsource audits of accessibility - mobility infrastructure from the perspectives of infants, toddlers, and their caregivers.*

been scored by users. The crowdsourced data-backed analyses thus developed can be leveraged by the city administration, planning

department, academia and research organisations to influence planning guidelines for Local Area Planning (LAP), ward planning, zonal development as well as design corrective interventions to achieve a healthy, safe and accessible living environment for toddlers. Platforms such as this have been proven to be effective in the past, expediting solutions in issues ranging from the repair of potholes to the identification of accident-prone intersections. The methodology to assess accessibility in a given area would follow the parameters outlined below.

**Step 1: Identifying parameters for accessibility**

A child's pattern of trips is quite different from that of an adult. It involves mostly going to school, parks or accessing nearby transit. For the purposes of this article, a complete treatment of the origin-destination trip

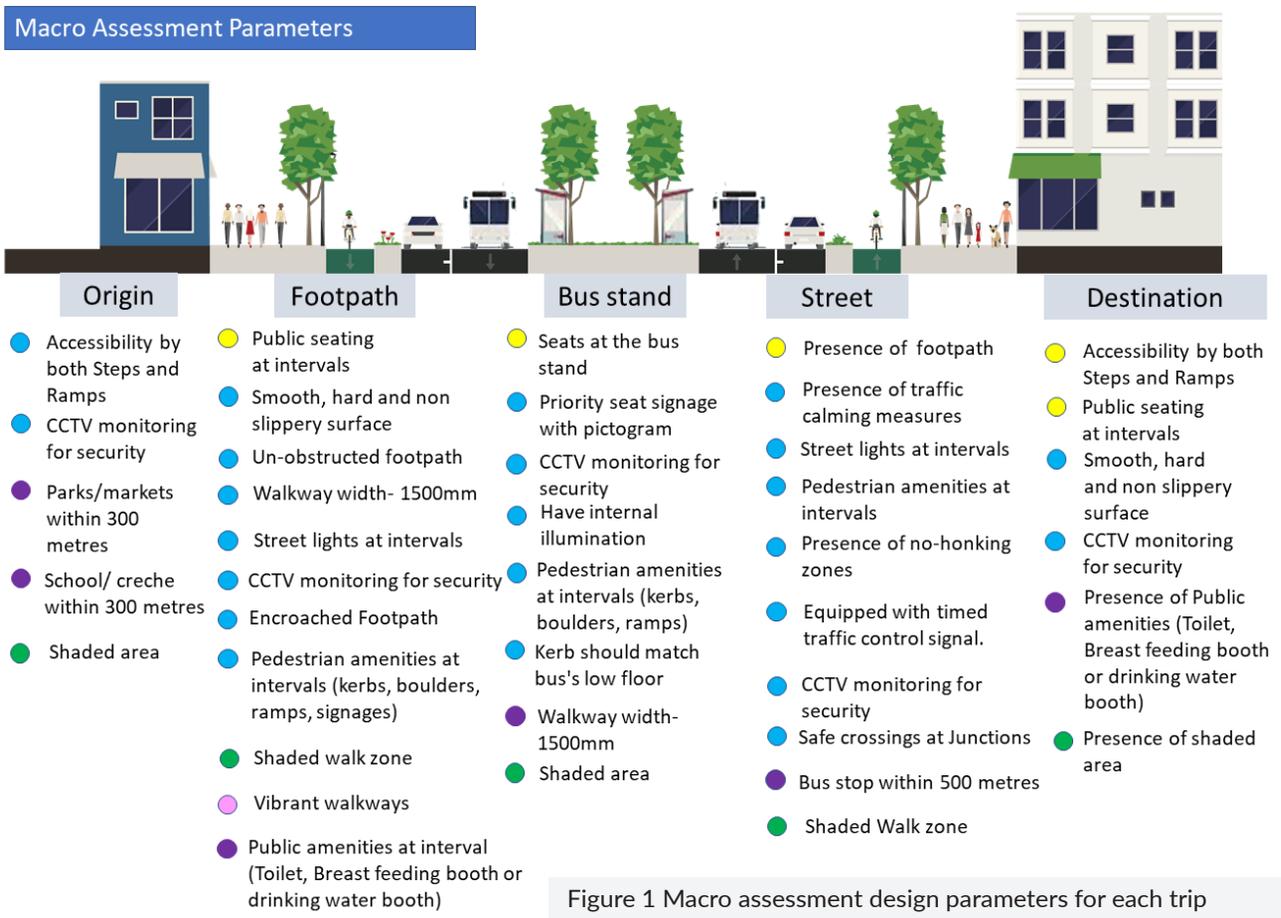
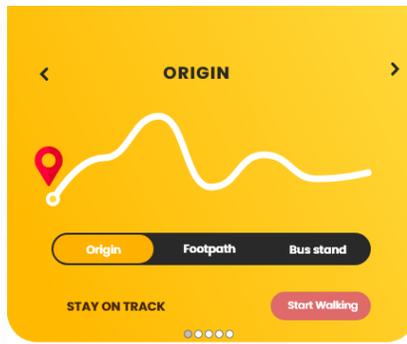


Figure 1 Macro assessment design parameters for each trip

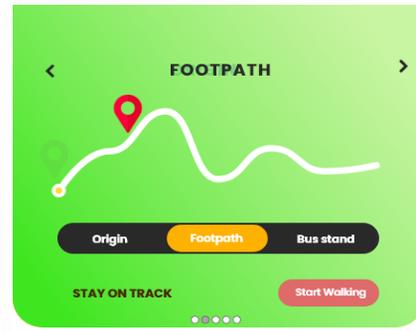


1. Enable geolocating routes by clicking 'Start Walking Button'

**ORIGIN**

- Accessible by both Steps and ramps  
सीढ़ियों और टैप दोनों द्वारा पहुँचा जा सकता है
- CCTV monitoring for security  
सुरक्षा के लिए CCTV निगरानी
- Bus stand within 500m  
500m . के भीतर बस स्टैंड
- Pre-primary school within 500m  
500m . के भीतर प्राथमिक विद्यालय

2. Notify issues on trip by clicking on the button

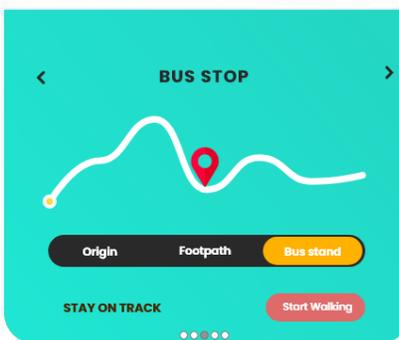


**FOOTPATH**

- Public seating at intervals  
पब्लिक सीट अंतरालों पर
- Street lights at intervals  
बत्ती अंतरालों पर
- Walkway width- 1500m  
वॉकवे की चौड़ाई- 1500m
- Pedestrian amenities at intervals  
Pedestrian amenities अंतरालों पर

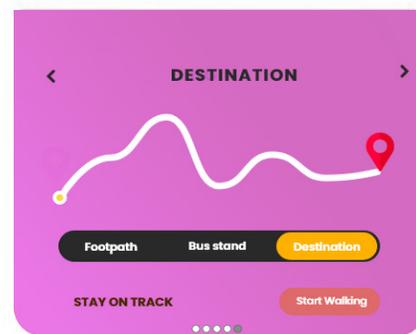
3. Icons to enhance user interface

4. Integration of regional language to enhance greater accessibility



**BUS STOPS**

- Seats at the bus stand  
बस स्टैंड पर सीटें
- Ramps at edge  
किनारे पर टैप
- Priority seating signage with pictogram  
चित्रलेख के साथ बैठने की प्राथमिकता के संकेत
- Have internal illumination  
बस स्टैंड में रोशनी है



- Seats at the bus stand  
बस स्टैंड पर सीटें
- Presence of Public amenities  
सार्वजनिक सुविधाओं की उपस्थिति
- Upload Image  
तस्वीरें डालिये

5. Upload photo- Photographs will validate the crowdsourced data



Figure 2 Sketches of the mobile application

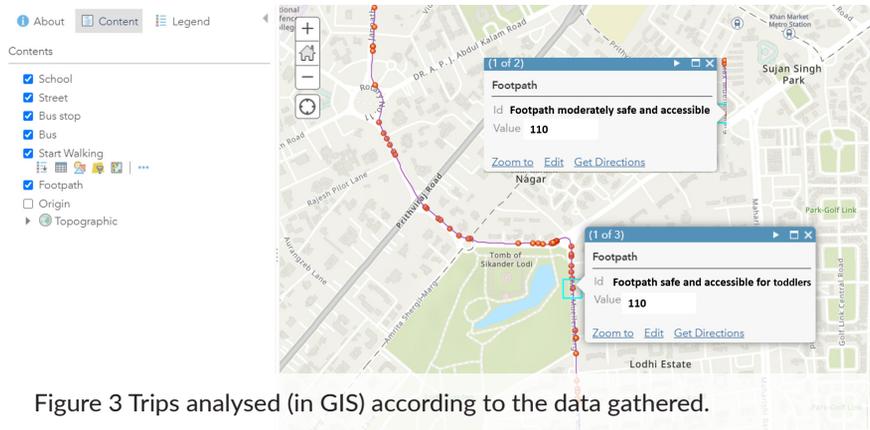


Figure 3 Trips analysed (in GIS) according to the data gathered.

chain was identified for toddlers, so that the toddler with the caregiver can make their journey without any barriers/interferences. Along with the trip chain, the parameters were structured with reference to the handbooks on ITCN design Guidelines prepared by BvLF, Ministry of Social Justice and Empowerment's Sugamya Bharat Abhiyan's guidelines and Proximity of Care's urban design for toddlers and disabled guideline. The assessment parameters identified for each trip shown in **figure 1** are based on the recommendations provided in infant, toddler and caregiver-friendly guidelines mentioned above.

### Step 2: Prioritizing parameters

What makes a trip safe and accessible to toddlers? A questionnaire listed 40 parameters encountered on each trip and asked experts to rank them in order of priority.

### Step 3: Developing a web-based Accessibility Audit Toolkit

In order to develop a tool to assess accessibility, a web-based geotagged application is a pre-requisite for capturing data from the field. The tool must be carefully designed to empower the user to envision accessibility issues from a toddler's point of view. The front-end has a feature to geo-locate the route taken for the trip and mark the issues identified on the trip in real-time. Regional languages were

integrated to enhance accessibility. In order to validate crowdsourced data, the user has to upload a photograph as evidence. The data accumulated from the back-end can be analysed on a GIS platform and visualised according to the classifications mentioned in figure 2.

### Figure 3 Sketches of the mobile application

#### Analysing the data

The data captured by the tool can be used to visualise and analyse the physical barriers a child faces at regular trip intervals. In the dashboard shown in **figure 4**, we have tried to visualise trip accessibility for toddlers in a Delhi neighbourhood. The barriers or issues

found on the trips are spatially joined with the trip's polyline from the route generated while walking. Trips are marked as red for unsafe/less accessible streets and green for safe/accessible trips.

### Potential Inferences/ Conclusion

The classifications of routes on the basis of spatial data and parameters' values generated from trips can be used to identify the routes that are unsafe for toddlers and therefore need an immediate intervention of the relevant stakeholder in the city. The issues submitted by the users can also form the basis of further investigation to determine co-relations between different elements of the surrounding built environment that may have contributed to such a classification.

**Figure 5** is a model sketch of the neighbourhood, which clearly illustrates that the sections of the neighbourhood away from the primary roads are safe and accessible for toddlers, whereas the areas near markets or roads linking the primary roads are not safe or accessible for toddlers. [eGov](#)

(Acknowledgement: DataSmart Urban95 project at NIUA is funded by the Bernard van Leer Foundation)

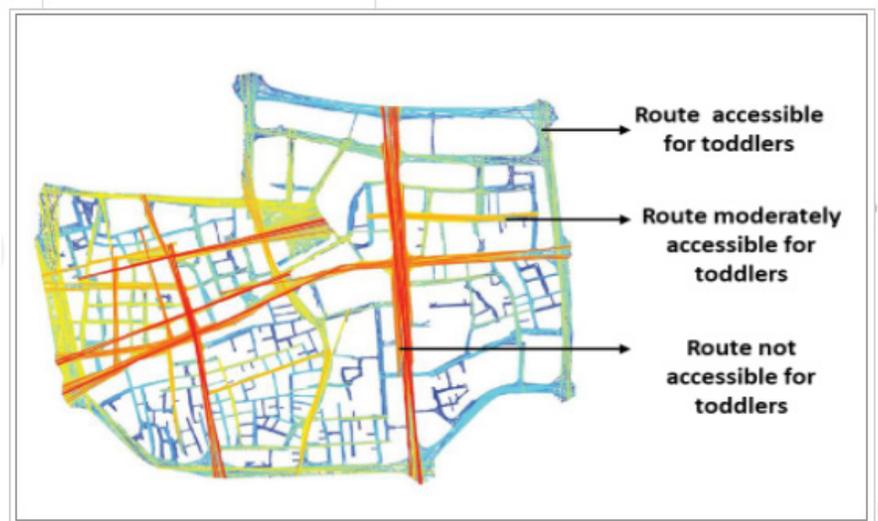


Figure 4 : Model sketch of potential output from the assessment tool



Limited vehicle capacity due to social distancing norms in the city buses drastically reduced the revenue causing operational instability in India. (Source - PTI Photo)

## Overcoming COVID-19 challenges in achieving SDG 11.2



**LAGHU PARASHAR**

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SMART-SUT, GIZ-India.

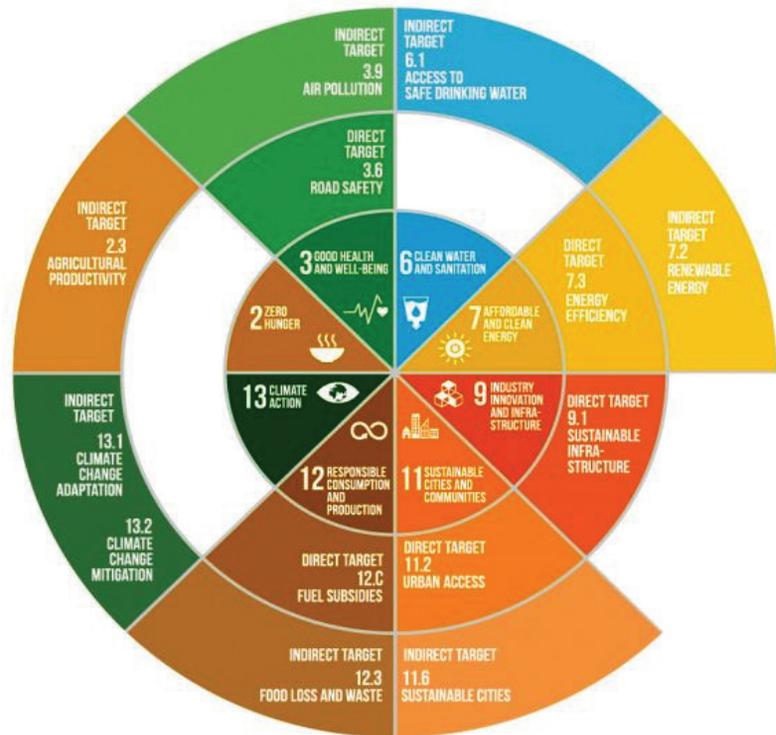
The global urban population is on the rise and is expected to constitute 68 per cent of the world's population by 2050 (United Nations, 2018). India, alone, will add 404 million urbanites, the highest in the world (United Nations, 2014), putting tremendous pressure on the urban transport infrastructure in its cities. As per SDG 11 of the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States, the goal is to 'Make cities and human settlements inclusive, safe, resilient, and sustainable', writes **Laghu Parashar**, Deputy Project Director, SMART-SUT, GIZ-India.

One of the important aspects to prepare actions on meeting SDG 11 is to look comprehensively the way our urban mobility systems work in cities. With rapid urbanisation in India, the registered motor vehicles in India grew at a compound annual rate of over 10 per cent from 2007 to 2019. Reflecting upon the same, we can paint a picture of the predominant effects of rapid urbanisation on the country's transportation system.

The number of registered vehicles in the country in 2019 alone was 295 million (Statista Research Department, 2021). As a result, various negative externalities like road congestion, air pollution, road fatalities, and social issues of equity have become commonplace and put target 2 of SDG 11 a priority area to focus on. The SDG Target 11.2 states that 'By 2030, to provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons'.

SDG11 and precisely Target 11.2 are relevant and crucial for directly and indirectly achieving the other major SDGs. However, the COVID-19 pandemic altered life-as-usual and affected people's commuting patterns because of disrupted mass transit services. The exposure to the contagion in crowded public transportation modes raised fears, adversely affected the ridership, and led to a surge in private vehicles and bicycle usage because of their ability to abide by social distancing norms.

One of the critical focuses of Target 11.2 is to provide accessible, affordable, and sustainable public transport. Investing in technological advancements, energy-efficient e-buses, multi-modal integration, and



### Targets that are directly and indirectly affected by the SDG 11.2<sup>1</sup>

public transport network expansion are necessary steps to meet this target. However, in the wake of the COVID-19 pandemic, the nationwide lockdown and subsequent social distancing policies perturbed the already financially stressed transportation agencies. The two predominant public transport systems in India, i.e., the city buses and the metro-rail, experienced a drastic decline in ridership due to the COVID-19 pandemic.

The Bengaluru Metropolitan Transport Corporation (BMTc) in Bengaluru had a pre-COVID ridership of 3.5 million per day. During the post-pandemic stage, the transport authority recovered only 2.5 million riders by March 2021 (P.K, 2021). BEST ridership numbers in Mumbai showed a similar trend of losing approximately 1 million riders compared to 2019 numbers (Sen, 2020). The limited bus fleet and operational instability will probably yield further financial losses for the already loss-bearing state-owned bus companies.

Hitherto they have suffered a combined loss of Rs 16.68 billion in 2017-18 (CIRT, 2018). Impact on the metro was no different as the Delhi metro ridership decreased from 5.7 million (including airport line and rapid metro) in 2019 to only 1 million in 2021 (Economic Survey of Delhi, 2021). Similarly, Namma Metro in Bengaluru could bring back only 0.2 million passengers by 2021 out of the 0.45 million riders in the pre-covid times (Kulkarni, 2021).

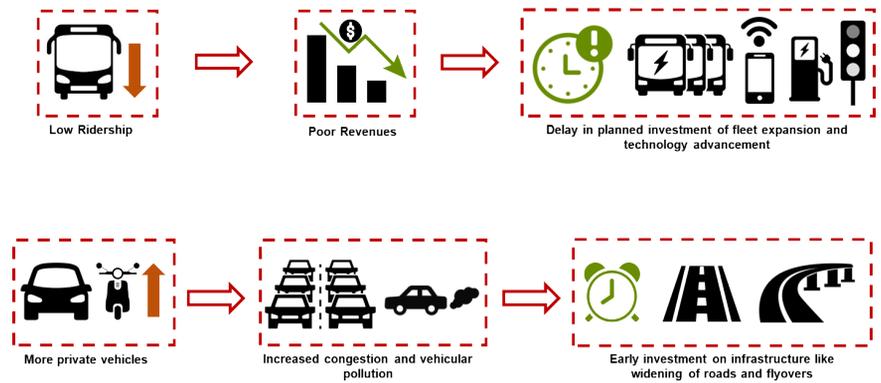
An alarming trend of a shift to private vehicles accompanied the decline in public transport ridership. A survey conducted by TERI in 2020 reported that about 36 per cent of pre covid metro users and 41 per cent of pre covid bus users would switch to other options. The respondents preferred private cars and two-wheelers. Thus, even in the Business-as-Usual (BAU) scenario, the poor patronage of the public transportation system and financial

1. [https://c4dlab.ac.ke/slocat\\_sdgs/](https://c4dlab.ac.ke/slocat_sdgs/)

losses will delay the planned investment of fleet expansion and technology advancement towards electric mobility, ITS, etc. The simultaneous growth in the private vehicles on the roads will precipitously increase the need for early and increased investment in infrastructure. The resultant widening of roads and flyovers will only fuel the vicious circle of more private vehicle growth and make it challenging to meet SDG Target 11.2.

Looking on the bright side, during the COVID-19 phase, the increased popularity of cycling as a mode of commute has proven to be a comfort. Retaining the same can undoubtedly aid the achievement of SDG 11. According to AICMA, the Indian bicycle industry grew by 15- 20 per cent in 2020 compared to 5 -7 per cent in 2019. Cycling has emerged as a promising alternative to private vehicles in India. It can help redirect public transport trips to active mobility instead of motorised personal vehicles since a staggering 70 per cent of the population travels less than 10 km for work and educational purposes (CEEW, 2019). Cities like Guwahati, Bengaluru, Chennai, Kochi, Mumbai, and Chandigarh invested in cycling infrastructure such as pop-up lanes, PBS systems, etc., during the COVID-19 pandemic.

The initial steps from the Government of India to encourage this sustainable mode of travel is visible under the Smart City Mission's 'Cycles 4 Change Challenge'. It is a welcome step to promote cycling in Indian cities. However, to improve the



modal share of active modes like walking and cycling, developing a comprehensive network of NMT infrastructure is vital. Road safety at present is dreadful, as, in the year 2019, 25,585 pedestrians and 4196 cyclists' deaths were recorded (MoRTH, 2020). The issue will only exacerbate under the BAU scenario in the absence of significant city-wide investment for NMT in the Indian cities.

SDG 11.2 objectives desired a 'New-Normal' having equitable urban space and higher coverage of the sustainable, affordable, and energy-efficient modes of transport.

To achieve this envisioned 'New-Normal', Indian cities need a paradigm shift in their investment priorities in the urban transport sector. Projects' pipelines need reviewing and re-prioritisation. We must re-route the investment allocated to the road and related towards public transport and NMT infrastructure. As per a National Transport Development Policy

Committee report, by 2031, urban India would require approximately 1,96,000 buses with an investment of Rs 1,181 billion against the currently operating 46,000 buses. As we advance, India can convert this into an opportunity by leapfrogging the deficit with new energy-efficient buses (e.g., e-buses) that supplement climate goals. Further, additional funds should be raised by imposing the green taxes on ownership and usage of private vehicles and direct this fund towards public transport and NMT infrastructure.

Several countries around the world have earmarked capital funding to promote public transport and NMT. For example, Paris allocated €300 million for a network of cycle lanes, many of which will follow existing metro lines, to offer an alternative to public transport (Taylor & Laville, 2020). Likewise, the U.S. CARES Act included \$25 billion in emergency relief for transit agencies to help them from going bankrupt due to the effects of the pandemic (Welle & Avelleda, 2021). Cities worldwide are also investing in technology advancement and energy-efficient transport systems that have various tangible and intangible benefits.

The envisioned post-COVID new normal demands Indian cities to design a well-integrated transportation system that supports walking, cycling, and public transit, creating safer, cleaner, and sustainable cities.



Business as Usual Scenario



Desired New Normal Scenario

# Innovation as an Impetus to Achieve Increased Public Transport Ridership



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**ANUSHA MISHRA**

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Globally, COVID-19 has adversely impacted public transport ridership. In India, where personal vehicles were already the preferred mode of transport, the propensity to choose private transport is greater now owing to the pandemic. As a course correction, we need to adopt newer methods to solve the problems that our cities face while keeping sustainability at the core of those solutions, write **Nabamalika Joardar**, Programme Manager, National Institute of Urban Affairs (NIUA); **Ankit Rai**, Senior Associate, NIUA, and **Anusha Mishra**, Research Associate, NIUA.

India is currently one of the fastest urbanising countries in the world. Its cities, as growth engines, are experiencing a huge influx of population, resulting in a surge in private vehicle ownership. City planners, local governments, and policymakers are now faced with declining quality of life in cities, owing to increasing traffic congestion and the consequences of resultant emissions.

SDG 11.2 envisions that by 2030, participating countries will provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities, and older persons. The primary challenge toward the achievement of this goal is India's struggle with its largely inefficient public transport system, which is one of the contributing factors towards an increase in private vehicle ownership in the country.

Most public transport services in India are currently plagued with overcrowding, unreliability, unpredictable travel time, and poor access to transit stations. Public transport infrastructure in tier 2 and tier 3 cities is inadequate and largely overlooked by state governments, despite 'transport' being a state subject. Metropolises, such as the National Capital Region, face the additional challenge of planning boundaries and administrative boundaries not overlapping. This leads to peripheral urban areas suffering from poor public transport connectivity – while functional city boundaries expand quite rapidly, municipal boundaries take much longer to change.

Further, public transport systems



Post-pandemic social distancing in a bus

*The primary challenge to achieve SDG 11.2 is India's largely inefficient public transport system, which is one of the contributing factors towards an increase in private vehicle ownership in the country.*

are not friendly to the marginalised and vulnerable populations. Whether it is connectivity to marginalised neighbourhoods and urban slums, safety concerns for women and children, or reduced physical access to persons with disabilities and older citizens, our public transport infrastructure has consistently remained outdated.

Public transport's patronage is governed by multiple factors including access to a transit stop (motorised and non-motorised), frequency or time headway of the service, fare, travel time between origins and destinations, transfers required, and multi-modal integration facility (physical and institutional), among others. It is when all these elements of a public transport system are accounted for in the design that it provides an adequate level of service, thereby becoming a preferred mode of choice for commuters. For instance, in 2017, the central government earmarked USD 1.5 billion in an attempt to strengthen mass rapid transit in India. Despite such large investments, metro-rail is meeting ridership expectations in very few cities.

India currently relies significantly on intermediate public transport (IPT) for its first/last mile connectivity and there is a growing need to integrate



Post-pandemic social distancing in metro train

IPT within the urban mobility sector of India. A push for faster establishment and operationalisation of Unified Metropolitan Transport Authority (UMTA)-like bodies at regional levels will facilitate faster integration of different public transit modes, including IPTs. The presence of UMTA could also make decision-making at the operator and policy level fast and effective, helping improve the overall system performance. However, policymakers have maintained that despite the presence of such a nodal unit, the absence of clear guidelines on how to translate these goals at a city level makes the achievement of Sustainable Development Goals (SDG) in India a lofty task. Going forward, statutory planning documents need to include separate sections to address transport concerns in cities, ideally integrating cities' Sustainable Urban Mobility Plans. Interventions should focus on universal transport accessibility and affordability, improvement of first/last-mile connectivity, and promotion of IPTs.

Prioritising smart mobility seems like a logical progression for decision-makers, focusing on the reduction of congestion and pollution, cost-effectiveness for consumers, and

*India currently relies significantly on intermediate public transport (IPT) for its first/last mile connectivity and there is a growing need to integrate IPT within the urban mobility sector of India.*

eventually becoming a source for more varied choice availability to commuters. In 2015, in its efforts towards striving for a cleaner future, the Government of India adopted the Faster Adoption and Manufacturing of Hybrid and EV (FAME) scheme with an outlay of Rs 8.95 billion (USD 130 million), which provided subsidies for EVs. In the year 2019, FAME-II received further sanctioned subsidies for a total of 5,595 e-Buses to 64 cities for intra-city and inter-city operations.

In a post-pandemic world, however, oft-repeated policy recommendations

cannot be the sole path to the achievement of the SDGs and when faced with never-before scenarios, innovation can pave the path to improved transport mechanisms in cities. India has an existing scheme in place to promote startups and entrepreneurs in India in the form of Startup India. Surprisingly, out of almost 39,000 startups recognised by the Department for Promotion of Industry and Internal Trade on the Startup India portal, only 356 pertain to 'transportation', 'passenger transportation services' and 'transport infrastructure' cumulatively. Further, Startup India presently does not host any challenges in the transport sector and has only 46 incubators and 29 accelerators listed on its portal.

This vacuum can be addressed by challenges hosted by Ministries of the government and its affiliated organisations, such as Transport for All, initiated by the Ministry of Housing and Urban Affairs (MoHUA), and SMART move: Innovative Urban Mobility Challenge, initiated by GIZ India and the National Institute of Urban Affairs (NIUA). Innovation challenges offer mentorship, capacity building and engagement facilitation to participants, proving to be the necessary incubation space between city officials and innovators. These challenges provide young academicians and professionals with an opportunity to help the nation in building efficient and resilient urban transport systems and address some of the pressing problems that commuters face on a daily basis. In the face of the ongoing pandemic, when cities face the responsibility of providing sustainable, safe, and seamless mobility systems for their citizens, it is imperative to also consider pandemic-sensitive challenges and climate change as critical foci while developing innovative approaches to existing problems. [eGov](#)

# Sustainable Urban Transportation: A Key Enabler for Achieving SDGs

Over 4.4 billion people live in cities today, putting extreme pressure on energy and resource consumption. By 2050, 6.5 billion people<sup>1</sup> will be urban. Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. Although cities occupy just 3 per cent of the available land, they account for 60-80 per cent of energy consumption and 75 per cent of carbon emissions. The transport sector alone causes over 23 per cent of the global greenhouse gas emissions<sup>2</sup>. Every year 3.5 million people die prematurely due to pollution, one-fifth of which are reported from India<sup>3</sup>, write **Naim Keruwala**, Program Coordinator and Team Lead, City Investments To Innovate, Integrate and Sustain (CITIIS), the National Institute of Urban Affairs (NIUA) and **Swapnil Saxena**, Knowledge Officer, CITIIS, NIUA.



**NAIM KERUWALA**

Program Coordinator and Team Lead,  
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**SWAPNIL SAXENA**

Knowledge Officer  
CITIIS, NIUA

There is a growing international consensus towards action on sustainable transport that can lessen the strain on social, economic and environmental well-being of cities, while also promoting development. While there is no universal definition of sustainable transport, the High-Level Advisory Group on Sustainable Transport<sup>4</sup>, appointed by the UN Secretary-General in 2014 defines it as *‘the provision of services and infrastructure for the mobility of people and goods - advancing economic and social development to benefit today’s and*

- <https://www1.undp.org/content/oslo-governance-centre/en/home/sustainable-development-goals/goal-11-sustainable-cities-and-communities.html>
- <https://sustainabledevelopment.un.org/content/documents/2375Mobilizing%20Sustainable%20Transport.pdf>
- <https://www.cseindia.org/air-pollution-is-now-the-fifth-largest-killer-in-india-says-newly-released-findings-of-global-burden-of-disease-report-4831>
- <https://unfccc.int/news/new-un-high-level-advisory-group-on-sustainable-transport>

future generations—in a manner that is safe, affordable, accessible, efficient, and resilient, while minimising carbon and other emissions and environmental impacts.<sup>1</sup>

### Transportation's Crucial Role in Achieving the SDGs

Managing the transport sector can make a direct and indirect contribution towards the achievements of the Sustainable Development Goals (SDGs) if the three pillars of sustainable development - economic, social, and environmental - are integrated into transport policies, planning and operation. Mobility stands out as a key focus area for SDG 11 (Sustainable Cities and Communities) which promotes 'cities and human settlements that are inclusive, resilient, safe and sustainable.'

SDG target 11.2 explicitly calls on the international community to work toward sustainable transport for all people by 'providing access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.' Four out of 169 SDGs are directly transport-related, while 15 are indirectly related to the transport sector. This shows that though transport does not have a dedicated SDG, it plays a critical role in enabling other SDGs and achieving growth and development. As an example, sustainable transport systems are necessary to provide access to education (SDG 4), food security (SDG 2), employment and empowerment for women (SDG 5), healthcare (SDG 3), and to curtail the global greenhouse gas emissions (SDG 13).

Accomplishing the SDGs will thus rely on advances in sustainable transport. As a member state, India is committed to the 2030 Agenda for Sustainable Development. With only ten years



**Four out of 169 SDGs are directly transport-related, while 15 are indirectly related to the transport sector. This shows that though transport does not have a dedicated SDG, it plays a critical role in achieving growth and development under other SDGs.**

remaining to meet the set targets, now is the time for action to tackle the multiple challenges posed by the urban transport sector, such as congestion, air pollution, and traffic fatalities.

#### The Focus Areas for Sustainable Transport in India *Depleting Air Quality and Congestion*

According to the 2019 World Air Quality Report,<sup>5</sup> 17 Indian cities rank among the world's 25 most polluted cities, a significant percentage of which is caused by vehicles, especially in the

big cities. In addition, congestion on roads is a critical issue in India, not only has led to increased traffic incidents but also huge economic losses emerging from time and workforce losses. Bengaluru leads worldwide in traffic congestion, while Mumbai, Pune, and New Delhi are at the fourth, fifth, and eighth positions, respectively. Pollution and congestion, albeit critical, are manifestations of larger systemic issues in India's transportation policy.

#### *Deteriorating Road Safety*

There is a huge proportion of India's population, especially in Tier II cities that still depend on walking, cycling, or using informal modes of non-motorised transit for commuting. In most Indian cities, non-motorised modes share the same right of way as cars and two-wheelers leading to unsafe conditions for all. The number of fatalities is also increasing in relation to the increasing motorisation and higher slow-moving vehicles in the traffic stream and is estimated to be at 2,30,000 deaths per year - half of which are reported to be vulnerable road users - motorcyclists, pedestrians and cyclists.

#### *Policy and Institutional Barriers*

Growth in polycentric metropolitan regions, commonly called the 'sprawl' continues to present a huge challenge for transportation planning in India. The most common solution to manage this

5. <https://www.google.com/url?q=https://www.iqair.com/world-most-polluted-cities/world-air-quality-report-2019-en.pdf&sa=D&source=editors&ust=1625057990436000&usq=AOvVaw0tuPok3Inmr6UgLFv43yHS>



India's urban transport is shifting to sustainable modes of transport like electric vehicles

challenge is through informal solutions that increase congestion and pollution and disproportionately affect the poor. This 'last mile' challenge is apparent globally but is acute in the case of India and can be attributed to a fragmented institutional structure and a federal decision-making system.

Urban transport systems require several functions to be performed in a well-coordinated manner for a seamless and comfortable travel experience for commuters. Unfortunately, these are performed by multiple agencies under the central, state and city governments with different mandates. Various government agencies plan infrastructure as per their geographical mandate but fail to come together to provide end-to-end solutions to complete the transport loop. In addition, fragmentation or overlap of legislations poses challenges that constrain the ability to effectively manage the problems of urban transport. Firstly, it leads to incoherence in the policy framework and secondly, it reflects in the timing, coordination and treatment of how states and cities approach a particular problem.

### ***Fragmented Markets and Structural Barriers***

Three key players in transportation planning include technological

innovators, decisionmakers, and end-users. The interaction between the three owing to their conflicting visions acts as a major barrier for formulating policies and actions. While city planners try to reduce congestion, the manufacturers do the opposite by maximizing sales. Therefore, to achieve the common societal goal of promoting sustainable development necessary to balance the commercial interest of the manufacturing industry, the central government's focus on infrastructure development, and the city governments' need to enable to deal with local issues such as pollution and congestion.

### ***Deficient comprehensive design standards***

The lack of common standards for design, operation, and maintenance of transport infrastructure has caused unorganised and unregulated traffic across many Indian cities and is a major cause of the high occurrence of traffic accidents and fatalities. The Indian Road Congress (IRC) has been the nodal agency that sets design guidelines and technical standards for the construction of roads and bridges, primarily for intercity roads but also for urban roads. These standards are voluntarily followed by all road

6. <https://pib.gov.in/PressReleasePage.aspx?PRID=1577880>

construction agencies, including the Public Works Departments of cities. Since they are voluntary for municipalities or public works departments, their enforcement of the contractors is sacrificed.

### ***Resource Barriers – human, institutional, and financial***

Planning integrated transportation projects is a multi-stakeholder process. Unfortunately, the capability for undertaking a coordinated approach along with a holistic understanding of transport issues and their causes involved is generally lacking at the state government and city level. In addition, there is an imbalance and bias between funding and investments for auto-centric road expansion projects and non-motorised and high-capacity public transport infrastructure. It is important that urban transport is treated as an integrated whole through systems financing and pricing.

### ***Noteworthy Achievements***

Despite several structural challenges, one cannot negate the incremental progress made in several aspects of transportation planning across levels of governance in India to push for specific solutions. Policies such as the Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles in India (FAME)<sup>6</sup> which provide subsidies for EV production and charging infrastructure have made India a frontrunner in taking proactive steps to ensure healthier lifestyles and decrease greenhouse gas (GHG) emissions. India expects a 30 per cent share of Electric Vehicles (EVs) on the road by 2030.

The Ministry of Housing and Urban Affairs (MoHUA) through the Smart Cities Mission has put impetus to solutions like public transport and NMT, increasing the adoption of technological solutions for transport integration, using BRTS, and construction of walking and cycling

tracks. The 'Streets for People' initiative aims to create flagship walking initiatives in cities, which focus on placemaking and liveability. By reimagining streets as public spaces through the lens of economic regeneration, safety, and child-friendly interventions initiatives, cities are working to ensure a green recovery from COVID-19. A similar initiative called 'Cycles4Change' is enabling cities to implement low-cost interventions like pop-up lanes, traffic-calmed streets, community cycle rental schemes, and cycle-training programs, thus fostering a long-term social and behavioural change in the perception of mobility.

Also, a noteworthy urban project that deserves mention is the Rejuvenation of Auto Rickshaws in Amritsar through Holistic Interventions (project RAAHI)<sup>7</sup> by replacing 7,000 diesel-run autorickshaws with e-autos, the largest formalisation activity of such nature in India. Financed under the CITIIS<sup>8</sup> program, and currently under implementation, the project adopts an integrated approach and aims to achieve mobility-related, socio-economic, environmental, and institutional reforms.

### Way Forward

Achieving sustainable transport will need a broad coalition of stakeholders—from industry, policy, and research institutes, local and national governments, and sector organisations—to engage and address challenges in a holistic manner, at a scale commensurate with the size of the challenges.

Integrated policymaking is critical to decision-making on transport systems and infrastructure. It is essential that financial resources be channeled into training and capacity building of the concerned personnel in order to empower them to take on the complex challenges of the urban



E-rickshaws provide eco-friendly means of last-mile connectivity

*Importance should be given to reinforcing efforts towards preventing road traffic fatalities, which include ensuring minimum safety standards for vehicles at the national level, and through commuter awareness at the local level.*

transportation sector.

Importance should be given to reinforcing efforts towards preventing road traffic fatalities, which include ensuring minimum safety standards for vehicles at the national level, and through commuter awareness at the local level. The SDG target of

reducing global road traffic deaths and injuries by 50 per cent by 2020 can be used as a guide for this. Higher quality vehicle design, infrastructure, driver training, information, and many other factors contribute to a more equitable system, and, in this way, accessibility is a key element in ensuring the social sustainability of the transport sector.

Technology advancing clean fuels and clean energy is a high priority, and when considering the scale of the health and climate challenges, it is imperative.

Implementation of all the above suggestions calls for strong supporting institutional and governance structures, political will, sound leadership, transparency, and adequate resources. The focus on long-term sustainability can be strengthened by creating an effective network of cities for cross-learning and knowledge sharing. It is equally important that any solutions generated are analysed for scalability and transferability potential. Wherever feasible, they should be implemented in other cities. 

7. <https://www.niua.org/citiis/project/development-sustainable-and-green-public-transportation-amritsar-city>  
8. <https://www.niua.org/citiis/>

# Sustainable Transport for Better Tomorrow: Visakhapatnam in Focus

Sustainable Development Goal (SDG) 11 is to make cities and human settlements inclusive, safe, resilient and sustainable. SDG target 11.2 is to provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons, by 2030. There is a need to develop an intelligent transportation system(s) that can meet the target SDG 11.2 as well as manage all the necessary transportation management components effectively, write **Dr. Srinivasa Rajamani**, Programme Director, Sustainability and Resilience Unit (SRU) (UNDP-Gol Project), Greater Visakhapatnam Municipal Corporation (GVMC).



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Visakhapatnam Municipal Corporation  
(GVMC)

A sustainable transport system is a system that allows the basic access and development needs of society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations (EU Transport Council in 2001). Sustainable mobility is a key enabler of economic growth and shared prosperity in cities. Comprehensive integration of urban transport with various sectors and systems is needed to harness the synergies. The city administration's efforts in association with the transportation departments and police are essential to balance social, economic and environmental objectives in order to improve sustainable transportation for the citizens.

As per Todd Litman (2021), an independent researcher at Victoria Transport Policy Institute, sustainable transportation indicators can include:

- **Planning process**– the quality of analysis used in planning decisions.
- **Options and incentives**– whether consumers have adequate travel options and incentives to use the most efficient option for each trip.
- **Travel behaviour**– vehicle ownership, vehicle travel, mode share, etc.
- **Physical impacts**– pollution emission and crash rates, land consumption, etc.
- **Human and environmental impacts**– illnesses and deaths, environmental degradation, etc.
- **Economic effects**– monetised estimates of economic costs, reduced productivity, etc.

- **Performance targets-** a degree to which stated targets are achieved.

India's Smart Cities Mission is an innovative initiation that provides an exciting, new, comprehensive method of improving the lives of people, through citizen-centric approaches. Integration of the latest technological advances in a systematic, cost-effective manner is a must for cities desiring to be regionally and globally competitive. The Smart Cities Mission has a component on Sustainable Transport System (STS) which deals with urban transportation to allow a path for sustainable growth to support the desired economic growth, protect the environment and improve the quality of life. While planning urban transportation, integration of technology and citizen participation, with environmental and socio-economic aspects may deliver better outcomes to meet the SGD target 11.2.

### Visakhapatnam (Vizag) city

Visakhapatnam is an industrial city on the southeast coast of the Bay of Bengal and the second largest urban agglomeration in Andhra Pradesh, with a population of approximately two million. The city is well connected with neighbouring districts and states through railway and roads. Visakhapatnam is also home to a Seaport and an International Airport. The city has taken some initiatives like LED street lightings, solar lights, electric vehicles, sidewalks, cycling tracks, smart bus shelters, smart signalling, traffic surveillance, Bus Rapid Transit System (BRTS) roads, Integrated Bus Transit System (IBTS) etc., as well as regular road widening and transportation planning to make the city sustainable.

As Visakhapatnam is the largest city in the state of Andhra Pradesh, this city has become a centre for employment, education, business, health, tourism, etc. The needs of the diversified and



*Smart Cities Mission has a component on Sustainable Transport System (STS) to support the desired economic growth, protect the environment, and improve the quality of life.*

growing population along with local topographical factors and anthropogenic activities creating transportation challenges in the city.

The main challenges in Visakhapatnam city with respect to urban mobility are:

1. Urban sprawl is necessitating the expansion and up-gradation of the roads and transportation facilities.
2. Road accidents and traffic congestions became common due to overcrowding.
3. The widening of roads is a tough task in old towns and hilly areas.
4. Frequent accidents in industries and cyclones cause havoc.
5. Water stagnation in low lying areas due to blockage in the drainage system, hence, heavy rains causes

6. Potholes and road diggings are being a reason for accidents and traffic congestions.
7. Encroachments and unauthorised occupancy of roadsides lead to parking issues at commercial and recreational areas.
8. Sub-urban and satellite townships have poor public transportation facilities.
9. Increased vehicular pollution in the city.
10. Overcrowding in public and private transportation

Visakhapatnam city has a clear demarcation of industries, residential areas, commercial centres, educational and recreation facilities. This city has a scope to expand and modernise its transportation infrastructure and facilities to meet the needs of its citizens.

Suggestions for Sustainable and Smart Transport System for Visakhapatnam city:

#### 1. Urban Planning

- Transportation planning should be integrated with land use so that facilities can be developed at sub-urban and satellite towns to meet future needs.
- The focus should be on people needs, rather than only improving



Beach Road, Vizag



HSBC near Siripuram Junction, Vizag

modern transportation facilities.

- Transportation planners should consider the specific needs of vulnerable people, women, children, elderly persons, people with disabilities, etc.
- Reduce personal vehicles by encouraging public transport and pooling of vehicles.
- Consideration of social indicators in transportation planning according to the commuter's requirements, improved connectivity to sub-urban, satellite towns, bus/train stations.
- Low carbon comprehensive mobility plan development and its implementation are required.
- An intelligent transport system as a part of the smart city project can be developed.
- Identification of specific roads for evacuation and escape purpose during disaster times.
- Alternate work schedules can be suggested for schools, colleges, offices etc., to minimise traffic.

## 2. Urban Greening

- Reduce air pollution by utilising clean energy, energy-efficient fuels, diversion of traffic, road widening, etc.
- Protect and improve urban green spaces, which may act as lung spaces as these absorb air pollution

and release fresh air.

- Increase share of walking and cycling in the city by constructing sidewalks and cycling tracks, with green materials and avenue plantation.

## 3. Institutional Strengthening

- Institutional coordination should be improved between line departments - city administration, police, roads and buildings, transportation authorities, etc.
- Proper rules should be framed to collect user charges.
- Promotion of e-vehicles for personal use by encouraging subsidies. Government and private organisations can replace most of their vehicles with e-vehicles.
- Shift to updated road designs for new roads, traffic management, and road safety measures required based on standard guidelines.
- The city administration can undertake a safety audit for hazardous locations to reduce accidents, fatalities and injuries in association with line departments and stakeholders.
- Increase public safety through the provision of safety alarms, surveillance systems, public announcement systems, traffic awareness programs through Road

Transport Authority (RTA), mandating safety rules, etc.

## 4. Funding

- Viability of Public-Private Partnerships (PPP) for improving transportation amenities.
- Making separate budgetary allocation for different components in the budget especially pedestrian and cycling tracks.
- Fuel and vehicle technology improvements should be supported by tax concessions.

Through the proper planning and implementation of action plans based on targets fixed according to SDGs, the city administration – Greater Visakhapatnam Municipal Corporation (GVMC) may easily reach the targets of SDG 11.2 by providing access to safe, affordable, accessible and sustainable transport systems to its citizens in terms of improving road safety, expanding public transport with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons, by 2030. The adoption of SDGs may develop Visakhapatnam city as inclusive, safe, resilient and sustainable, and fulfil its famous saying that Visakhapatnam is the 'City of Destiny'. 

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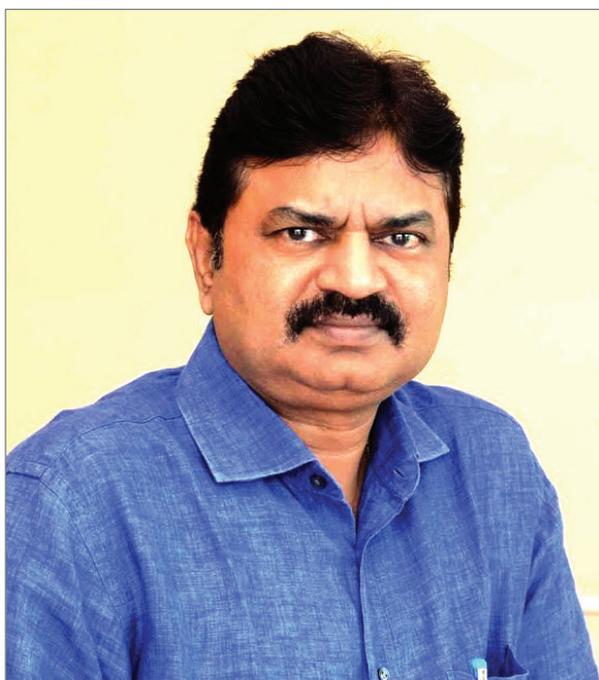


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# IT Interventions Fueling Odisha's Growth Engine



**C J VENUGOPAL, IAS**

Member, Board of Revenue, Odisha

Owing to the COVID-19 pandemic, the governments, industries and even the common people have taken the digital route to continue their activities. The pandemic has opened eyes to realise the value of digitisation and technology. Sharing his perspective on how digitisation in Odisha augmented revenue and land services, citizen services, and other government sectors, **C J Venugopal**, IAS, Member, Board of Revenue, Odisha, interacted with **Kartik Sharma** of **Elets News Network (ENN)** in an exclusive interview.



### Please give us a brief idea of IT innovations done in the Land and Revenue sector in Odisha?

We have taken a number of IT interventions in the land and revenue sector for the benefit of the citizens. Revenue and Disaster Management Department of Odisha had brought a great change in the revenue administration of the state by the introduction of 'Bhulekh' web service. Bhulekh is a part of the Land Records Modernisation Initiative implemented by the government and under this programme, the government aimed to achieve complete digitisation of all the land records. Odisha successfully made all the land records digital and accessible to the general public through Bhulekh Odisha website.

Similarly, the introduction of the CCMS (Court Case Monitoring System) project was a revolutionary step that brought the general public and the Revenue Administration closer. The general public can now get to know about the status of land through Bhulekh and about the

status of Revisional Cases through CCMS project. Through 'Bhunaksha' software, the general public can view and search tehsil and village wise maps of the state. The other IT innovations introduced in the revenue sector are online issuance of miscellaneous certificates, online mutations of Tehsil wise RoRs and payment of revenue dues online.

### Please tell us about the IT interventions in ease of registration of land in Odisha?

To make the registration of a property hassle-free, we have reengineered the whole registration process in Odisha and now it can be done with ease, through the Inspector General of Registration Revenue and Disaster Management Department (IGR) website. The department is primarily responsible for computerisation of revenue offices, updating of land records, digitisation of cadastral maps, inter-connectivity among revenue offices, undertaking survey operations using modern technologies, etc.

To offer ease of registration, the department makes available a host of services on its website. These include:

- Online land records, showing the ownership of the land
- Model sale deed format for property registration in Odia and English languages
- Issuance of e-Stamp certificates
- Online payment of registration fees
- Stamp duty and registration fees calculator
- Benchmark valuation of all land

Several online facilities have been provided to the citizens for registration. Various certificates required for different purposes are now made available online easing the requirements of the citizens.

### Please tell us about the opportunities and challenges of Virtual Court hearings in the lockdown period and what have been the innovations to overcome the challenges?

Last year during the lockdown period pertaining to the COVID-19 pandemic, there had been certain restrictions on the movement of people imposed by the Government, we felt that was the opportune time for the introduction of Virtual Courts by the Revisional Courts under the Board of Revenue, Odisha.

By holding Revisional Courts through the Virtual Courts system integrated with CCMS project the concept of social distancing was being adhered to in letter and spirit as the people need not visit the Revisional Courts physically to contest their cases. This is now being used as an alternative to in-person interactions between petitioner, defendants, and all parties related to trials and judgment. The general public/their advocates could participate in the Court proceedings by sitting at the comforts of their home or workplace through online linking to the concerned Courts via links provided to them in the Daily/ Weekly Cause lists of the Courts.

The virtual court concept is not just for ease of use. The fact of the matter is that most court systems are already dealing with the burden of heavy backlogs of cases and other matters. Anything that can be used to speed things up is a boon for this sector of the government. However, there are certain challenges that also come along with this opportunity. The challenges faced in holding of Virtual Courts during the lockdown period are providing an online platform to all the litigants to participate in the hearing of their revisional cases, since many litigants are either not techno-savvy or that they have not provided their email IDs/mobile numbers it was difficult to facilitate the process.

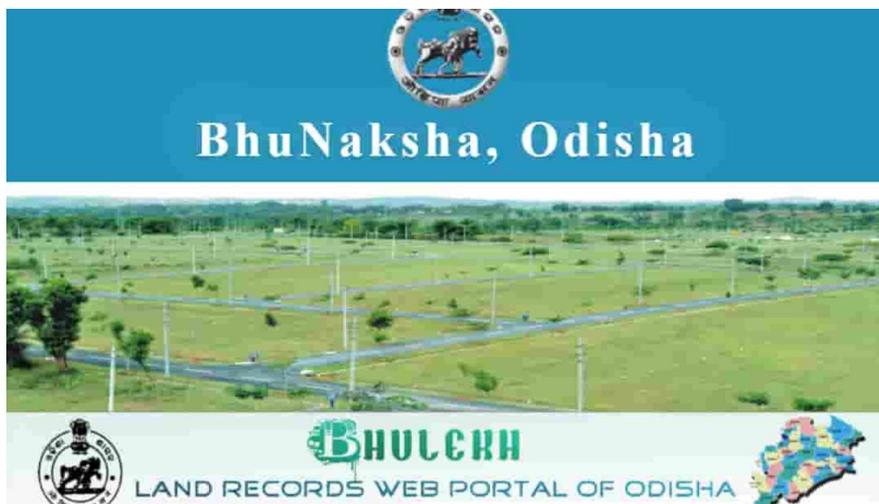
Besides, the sustainability of the data in the virtual cloud space for a long and trouble-free environment for usage by more number of participants during a single sitting of the virtual court also poses a challenge.

To overcome such challenges steps were being taken in consultation with the National Informatics Centre (NIC) to broaden the virtual data cloud space, the speed of data and other technical issues. The information gap of email IDs/mobile numbers has been addressed by the collection of proper data from the users for holding the virtual courts. Also, regular training is being imparted to the departmental personnel in the revisional courts for smooth facilitation. The Virtual Court platform for government work is device agnostic i.e., it can be operated on a Desktop, Laptop, Ipad, Smartphone, etc. The result is a virtual court system that deals with more hearings per day in a quicker and more efficient manner. Aggrieved citizens can get on with their lives faster and pursue the next course of action or other solutions for their future in a time-bound manner.

I sincerely hope that virtual courts have the capacity to break through the barriers of months-long waiting periods and speed up the court work at the same adhering to public safety of social distancing.

**Please share insights on the innovative Court Case Management System which you have developed in Odisha?**

The introduction and development of the innovative CCMS application in the State of Odisha has transformed the old practice of physical verification of Court case status by the general public. It not only saves time but is also a cost-saving option for people.



*Bhulekh is a part of the Land Records Modernisation Initiative implemented by the government and under this programme, the government aimed to achieve complete digitisation of all the land records.*

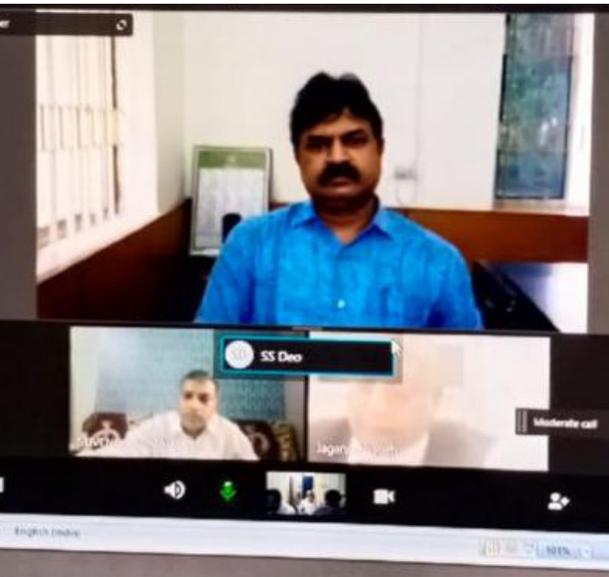
Revenue Court Case Monitoring System is a generic e-governance system yet unique of its kind. It can be rolled out across the country with minimal customisation or modification. SMS integration and online Stamp and Payment Gateway modules are planned for implementation shortly. The mutation cases along with Appeal cases are handled in Revenue Court Case Monitoring System. The database contains all the Revenue case details. The processing stages and the final disposal status are

made available online to the concerned people.

**Please tell us more about the document management system?**

As the revenue documents are of vital importance for Revenue Administration, they need to be preserved for future use. The physical records after they have been finalised are generally preserved in the Record Rooms of various offices. However, with the advancements in technologies, the documents of various offices can now be stored in digital formats. Our Document Management System (DMS) is a digitally storage and retrieval system introduced for online storage and retrieval of the records, indexing of data and images, etc. The land record details, case records, maps and other documents are scanned/digitised, indexed and stored in computer systems which can be used at any given point in time.

The objectives of the DMS are to preserve the data of tehsil case records in scanned copy format, metadata storage of records for intelligent search facilities, easy retrieval of soft and hard copies of the Tehsil records and maintenance



of the flow of case records for court cases. As a result, the flow of the document to courts and their movement is being recorded in the system and we can easily provide a certified copy to the citizens.

**Please tell us about the successful integration of databases to ensure better services to the citizens?**

Presently, the databases of various online programmes are at their introductory stage in the state which are continuously being developed to cater for the needs of the people and revenue administration. For better administration, we need to keep pace with the technological advancements, which can be done through the successful integration of the databases with various developmental programmes. By giving importance to the end user's needs and priorities for rendering better services to the citizens at large we can take up need-based integration for optimal results. This will also enable faster decision making and to make available information/certificates/land records to the concerned citizens.

*Revenue Court Case Monitoring System is a generic e-governance system yet unique of its kind. It can be rolled out across the country with minimal customisation or modification.*

**You have taken e-governance initiatives in every department you work in. What has been the inspiration?**

We are in the most exciting phase of e-governance in the history of our country. Information Technology (IT) is bringing a great transformation in the governance spectrum. Though we still have a long way to go, compared to some developed countries. Our lack of physical infrastructure, awareness and digital literacy are some of the hurdles that we are yet to overcome. But as time progresses,

I think we will be able to find ways and means to overcome these challenges. Over the years, I have used my project management techniques and expertise to conceptualise innovative e-governance solutions which had helped departments to identify and clear bottlenecks, promoted transparency, reduced service delivery costs, and delivered public services efficiently.

As of now, the priority of the R&DM Department is to be on a digital platform for each and every component. This approach eventually will lead to leveraging the power of IT for streamlining administrative functions, reduce duplication of work and increase transparency. In addition, the processes of data collection and analysis will be simplified, and become less tedious. E-governance holds advantages to citizens in every walk of their life. But perhaps the single-largest benefit of e-governance is its potential to make the state and nation an information and knowledge society and contrary to popular perception, its impact will be far-reaching, down to the villages and could bridge traditional and digital divides across the country. 

# Urban Water, The Weakest Link In The Water-Food-Energy-Climate Nexus



**AJITABH SHARMA, IAS**

Chairman and Managing Director, Jaipur Metro Rail Corporation Ltd.

This year too, like last year, the “World Environment Day” was shorn of the usual razzmatazz it entails among the activists, agencies, and people due to the Covid induced lockdowns. But the concerns, thoughts for innovative strategies, and policy tweaks for a better planet cannot be banished, writes **Ajitabh Sharma**, Chairman and Managing Director, Jaipur Metro Rail Corporation Ltd.

In the age of the Anthropocene, the inextricably connected environmental degradation and climate change are endangering the survival of the earth and humanity as well. At the root of protecting and preserving the planet lies our incessant endeavours towards the goal of sustainable development and nurturing the water-food-energy-climate nexus is the key principle behind it. Water being an integral part of the whole development process and urban water component being fraught with critical challenges has sadly become the weakest link in the chain putting the whole nexus under threat.

According to a United Nations (UN) report (2014), the share of the urban population in the world will rise to 66 per cent by 2050, reaching 9.3 billion, while countries like China, India, and Nigeria will witness the highest growth, collectively accounting for 37 per cent of this global surge.

With growing urbanisation, affordable access to quality water will become the most critical issue for humanity. This would make the task of achieving United Nations Development Programme's (UNDP) sustainable development goals (SDGs) - of providing, clean water and sanitation, making cities inclusive, resilient and sustainable - more daunting for the policymakers. To ward off a dire predicament, stakeholders and policymakers need to expressly set out the priorities for holistic water management.

In many Indian cities, the urban water crisis is hurtling from bad to worse because of the fragmented approach of management. Sprawling urban areas with the burgeoning population, insatiable groundwater extraction, shortage of sewerage systems, inefficient solid waste management, unplanned urban-land development, poor stormwater management,



Poor stormwater management is a major concern in most Indian cities

*Under circular management, water is handled in a cycle by ploughing the used water back for varied uses and consequently closing the loop.*

stretched and ageing infrastructure, the impact of climate change and inadequate investment stand out as potential hurdles. Besides, the unpredictability of existing urban freshwater resources and the absence of robust regulatory and institutional framework is further miring the way forward.

Most water utilities in India are trapped in a traditional linear approach that focuses more on supply, distribution, usage, onward treatment, and subsequent discharge of water into the ecosystem, while the merits of circular management still remain unheeded. Under circular management, water is handled in a cycle by ploughing the used water back for varied uses and

consequently closing the loop.

The above characterisation explicitly describes that urban water management is a process full of complexities and the business as usual approach with less attention on cross-linkages of urban planning and development process, with the water management plan, will render the situation grimmer.

In this context, the role of Integrated Urban Water Management (IUWM) cannot be over-emphasised. While the IUWM model excels in supply-side management, wastewater treatment, sanitation services, solid waste disposal and environmental protection; its ascent on aquifer recharging, watershed management, storm-water conservation, urban landscaping, urban flood plain zoning, and constructed watersheds gives sustainability a chance to survive. This is where the prime minister's 'catch the rain' slogan can turn into a reality.

It is vital for water utilities in metropolitan areas to have a mindset shift because heavy infrastructure investments in supply systems is not a silver bullet. There is a need to explore mixed approaches that draw its



Circular management of water can play an instrumental role in improving water conservation

efficiency from decentralised systems: such as on-site sanitation solutions, nature-based systems, treatment up to fit-for-purpose standards, and direct use of treated water for non-potable and ecosystem services. The overarching framework of management has to be utilising water in a closed-loop and make it an essential component of the circular economy.

Urban land zoning is another key to strengthen sustainable planning. Capturing rain and stormwater, keeping drainage basins uninterrupted to mitigate flood situations, and reducing pollution load to the water reservoirs are central to it. The city planners need to integrate their development plans with the urban watershed and catchment management plans for the protection of natural water resources and the linking reservoirs.

In its interconnected nature, IUWM draws its strength from several institutions working in the water policy space. It seeks to create harmony between resource management and urban planning resulting in synergistic

*Capturing rain and stormwater, keeping drainage basins uninterrupted to mitigate flood situations, and reducing pollution load to the water reservoirs are central to sustainable planning.*

outcomes. The governments in the states must look forward to creating a coordinated environment of the formal and informal institutions, including the local communities. IUWM is a no panacea but is inevitable to make our cities sustainable and water resilient, as it facilitates the paradigmatic transition of 'water supply' cities to 'water wise' cities. The 'Blue Water Green Cities' initiative of the World Bank, utilizing

IUWM tools, in the cities of Brazil, Colombia, Kenya, Uganda and Azerbaijan has shown encouraging results in creating water resiliency. Similar has been the experience under the European Union SWITCH program.

There is a strong possibility of many Indian cities either slipping into a Day Zero situation similar to Cape Town, face urban floods like Mumbai, Gurugram, Chennai and Hyderabad or encounter Bengaluru's toxic lake froth situations in future. There are multiple stakeholders in water management - individuals, groups, institutions, governments, the environment and the biophysical ecosystem itself. We can avoid the dreadful consequences but the clarion call has to come now, and Integrated Urban Water Management is the most impactful road ahead for balancing the environmental, social and economic needs for a sustainable future. 

*Author: Ajitabh Sharma, IAS  
Principal Secretary to Govt. of Rajasthan, B. Tech Civil Engineering, IIT Delhi, Recipient: Water Steward Award  
(Views are Personal)*



# Securing Cyberspace with Kaspersky



**ROHIT SOOD**

Government Leader  
Kaspersky, discusses cybersecurity  
solutions offered

With the surge in the adoption of digital interventions, especially after the COVID-19 pandemic, the threat to cybersecurity has risen like never before. In such times, companies like Kaspersky with their cybersecurity solutions pose a resort for not only the private firms but the government firms and even for the individuals. In an exclusive interaction with Elets, **Rohit Sood**, Government Leader, Kaspersky, discusses cybersecurity solutions offered by Kaspersky.

The COVID-19 pandemic has been a hard teacher opening eyes to our lack of resilience. In your opinion how can digitisation help improve India's response to such a crisis in future?

There is a huge potential for digitisation and innovation to add value to society and to contribute to public health, the environment and biodiversity. A successful digital transformation will involve empowering people to work in new ways, including reskilling and upskilling. Cross-sector collaboration will play a pivotal role in allowing us to 'build back better' from the current crisis.

The pandemic is a wake-up call for companies to have a plan to deal with disruptions to ensure business continuity. It is also a watershed moment that will signal the fast-track acceleration process for digitisation throughout society. There is enormous potential for tech to help connect people during lockdown periods, and the shift to remote working and e-learning will likely extend beyond the COVID-19 pandemic. Collaboration with governments, financial institutions, and regulatory bodies will be necessary to build the right digital infrastructure to serve society.

It is due to digitisation that in Smart Cities the ICCC (Integrated Command and Control Centre) have played a vital role during the pandemic time. Most smart cities have leveraged their citizen engagement tools at the ICCC comprising city portals, citizen apps, variable display boards, and public address systems, push notifications on mobiles from citizen databases to disseminate information and create awareness amongst the citizens. Some cities have introduced apps through which citizens can be alerted whether they are at risk. If any respondent is assessed to be at risk, connections are made for digitally consulting a doctor



*AI and cybersecurity have been touted as revolutionary and much closer than we might think. However, this is only a partial truth that must be approached with reserved expectations.*

over phone or meeting platforms and if required, guiding the person to testing centers in their locality.

**Can Smart Cities leverage Kaspersky's cybersecurity solutions to safeguard the city's communication and networking systems and more importantly citizens' data?**

Some of the challenges with smart

cities' information systems in relation to cybersecurity include:

- A large number of technologies and practical solutions that have to interoperate and communicate with each other.
- The possible uneven quality of different embedded technologies.
- The remote and onsite exploitability of smart city information systems.
- Huge amounts of data to analyse and store.

It is easy to see that the familiar cybersecurity issues are intertwined with each of them. Our position here is that cybersecurity should be considered early on, at every possible level. Kaspersky has become a trusted partner for major CERTS, government bodies and law enforcement agencies in India and around the world, sharing our up-to-the-minute knowledge on cyberthreats and helping to find and implement effective defensive mechanisms.

**Considering work from home as the new normal, what specific line-up of products Kaspersky offers as a**

### complete package for companies?

Kaspersky has many innovative and state of the art solutions which will help the children, parents, and individuals working from home in the new norm.

### Kaspersky Endpoint Detection and Response

Many attacks on companies happen at the endpoint level, especially with the current remote working environment in view of the current pandemic, where employees are connected to home wifi while accessing to company's network. Kaspersky EDR enables the ongoing monitoring of endpoints and visualisation of every investigative stage, fast access to data, premium threat discovery and efficient analysis.

### Kaspersky Hybrid Cloud Security

As companies are gradually migrating to the cloud environment to scale their businesses and allow access to their employees remotely, Kaspersky's Hybrid Cloud Security provides next-generation protection and transparent management across the organisation's cloud-enabled infrastructure

### Kaspersky Threat Management and Defense Solution

For larger corporates, Kaspersky Threat Management and Defense solution delivers a unique combination of leading technologies and services to support the implementation of an Adaptive Security Strategy - helping your security team to prevent attacks, rapidly detect unique new threats, respond swiftly and accurately to live incidents, and predict future threats.

**Can emerging technologies like AI, Cloud, IoT, play a revolutionising role in taking cybersecurity a notch above? If yes, how is Kaspersky leveraging such technologies?**

Internet of Things (IoT) has become



one of the cutting-edge technologies and an attracting area of interest for the research world, and economically attractive for the business world. It involves interconnection of multiple devices and connections of devices to humans. IoT requires cloud computing environment to handle its data exchange and processing; and at the same time, it requires artificial intelligence (AI) to analyse the data stored at cloud infrastructure and make very fast and reliable intelligent decisions. These interconnected IoT devices use their unique identifiers and the embedded sensor with each device to communicate to each other and exchange information among them using the internet and cloud-based network infrastructure. We are living in the era of big data where the necessity of applying AI/ML has been very critical to the process and analyse the collected cloud-based big data fast and accurately.

AI and cybersecurity have been touted as revolutionary and much closer than we might think. However, this is only a partial truth that must be approached with reserved expectations. The reality is that we may be faced with relatively gradual improvements for the future to come. In perspective, what may seem gradual when compared to a fully autonomous future is actually still leaps beyond what we've been capable of in the past. As we explore the possible implications of security in

machine learning and AI, it's important to frame the current pain points in cybersecurity. There are many processes and aspects we've long accepted as normal that can be treated under the umbrella of AI technologies.

Human error is a significant part of cybersecurity weaknesses. For example, the proper system configuration can be incredibly difficult to manage, even with large IT teams engaging in setup. In the course of constant innovation, computer security has become more layered than ever. Responsive tools could help teams find and mitigate issues that appear as network systems are replaced, modified, and updated.

To ensure IoT systems are used effectively and safely, we recommend organisations to:

- Consider protection at the very beginning of IoT implementation by using dedicated security solutions. For example, the Kaspersky IoT Infrastructure Security solution is designed to safeguard industrial and business networks for IoT devices – including smart meters, controllers and others. Its key element is Kaspersky IoT Secure Gateway, based on KasperskyOS1.
- Conduct regular security audits and provide the security team responsible for protecting IoT

systems with up-to-date threat intelligence.

- Establish procedures for obtaining information on relevant vulnerabilities in software and applications, and available updates to ensure proper and timely responses to any incidents. ICS Threat Intelligence Reporting service provides insights into current threats and attack vectors, as well as the most vulnerable elements in OT and industrial control systems and how to mitigate them.
- Implement cybersecurity solutions designed to analyze network traffic and detect anomalies and prevent IoT network attacks, then integrate the analysis into the enterprise network security system. Kaspersky Machine Learning for Anomaly Detection analyses telemetry and identifies any suspicious actions in the network before it causes any damage.

### **Kaspersky Solutions for AI/ Machine Learning and IoT Sector**

**Security by Design** - Providing all the tools to secure every software and hardware component of your interconnected systems, enabling a fully validated Chain of Trust to be established, without overloading individual systems or devices, or limiting overall flexibility

- **Built-in Security at OS level** - The Kaspersky OS (operating system) is designed to protect diverse and complex embedded systems from the consequences of malicious code, viruses and hacker attacks, through strong separation and policy enforcement.
- **Embedded Protection** - Harden and protect your Microsoft Windows-based embedded devices and computers with a solution created to optimise security for low-end systems with limited memory capacity that doesn't require ongoing maintenance or internet connectivity.

- **Automotive security** - Built-in 'Security for Safety' based on Kaspersky OS technology, a single secure gateway into ECUs, and a spectrum of security assessment services addressing the needs of current and future connected vehicles.

**What new products or software Kaspersky is about to launch in the near future? As digitization is being actively adopted across the nation, what innovative solutions Kaspersky is coming up with to ensure the security of identity, data, and networks, especially for the government sector?**

*Kaspersky IoT Secure Gateway is a solution designed to build secure IoT systems. At the core of its software lies Kaspersky OS, Kaspersky's proprietary technology.*

Some of our recent innovative solutions for the Indian market include:

- **Anti-Drone Solutions** - The stand-alone Kaspersky Antidrone solution uses a neural network to detect and classify drones in automatic mode. Sensors, selected specifically for each site, in combination with AI-based technology, signal that a drone is approaching the controlled zone.

- **Threat Intelligence services** - Kaspersky's threat intelligence service provides evidence-based knowledge, context, and actionable recommendations, regarding cyber threats, delivering organizations in-depth visibility to ensure supreme protection for highly critical infrastructures, including the government sector. With the intel provided, organisations would be able to predict and minimise the risk of a successful attack.
- **IoT Solutions** - Kaspersky IoT Secure Gateway is a solution designed to build secure IoT systems. At the core of its software lies Kaspersky OS, Kaspersky's proprietary technology. This is a microkernel operating system with extra security tools that render most types of cyberattacks on the device fundamentally impossible. IoT systems allow administrators to monitor hardware in real time. However, it is difficult to achieve complete transparency as the components of complex, multi-level IoT systems are often based on different platforms – which means they use different architectures and software – and they are extremely inconvenient to administer from a single control centre. This can interfere with timely delivery of updates to devices and fast incident response, reducing the reliability and efficiency of the infrastructure.
- **Kaspersky Machine Learning for Anomaly Detection predicts breakdown of production processes** - Kaspersky Machine Learning for Anomaly Detection, designed to reveal deviations in production processes at the earliest stage, is now generally available as a commercial product. 



# Stay informed & mitigate your risk

With the expanding attack surface and the growing sophistication of threats, just reacting to an incident is not enough. The only way to keep up with these changes is to build an effective Threat Intelligence program.



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# THE VIRTUAL PLATFORM

## WELCOME TO THE WORLD OF ONLINE EVENTS

Show your conferences, meetings, product launches, a door to the Elets Virtual Event Platform and make your audience/attendees have an experience of a lifetime. Experience the real world-like event in a 3D virtual realm.

### Why Host Your Event on Elets Virtual Event Platform?



- 1.** Hold Virtual Panel Discussions, Presentations, Award Ceremonies
- 2.** Conduct Roundtable Conferences & Conversations
- 3.** Visit the Networking Centre to connect virtually with Industry Leader
- 4.** Exhibit your products to delegates from across the world at the Exhibition Hall
- 5.** Hold Polls or Chat during the live video conferencing
- 6.** Experience the real world-like events in the virtual realm

**BOOK DEMO**

**FOR MORE INFORMATION PLEASE CONTACT**  
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