Ease of Moving Index

2018 India Report
I am happy to know that Ola will be launching the Ease of Moving Index 2018-India Report developed by its Social Innovation Think Tank, Ola Mobility Institute, which is a unique framework to evaluate mobility scenarios in our cities.

I very much appreciate the efforts and methodology adopted in coming out with such a vast data report with pan-India coverage. The index comprehensively captures the various parameters that define sustainable mobility along with emphasis on future of mobility which includes cashless transactions, technology based mobility, clean fuels and the need for encouraging non-motorized transportation.

I am sure the report will help all stakeholders, including administrators and city planners alike in tackling some of the challenges faced by our cities like congestion and pollution and chalking out sustainable transport solutions. With the rapid growth in economy and resultant urbanization, planning of cities and public transport system will be better based on real-time data generated through such reports.

I congratulate Ola Mobility Institute for this initiative of benchmarking various cities on ease of moving. I hope that this index is adopted by various stakeholders to understand mobility requirements and plan for the future accordingly.

MESSAGE

This report has taken into account several thousands of data points from primary research conducted, as well as established sources of secondary data. Whilst every effort has been taken to validate and verify correctness and accuracy of all material in this document, neither Ola, Ola Mobility Institute nor any other party associated with this report will be liable for any loss or damage incurred by the use of this report.

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OLA Mobility Institute

OLA Mobility Institute, the research and outreach arm of Ola, focuses on issues of public interest by developing a knowledge repository and a thought leadership framework on mobility and allied services. The Institute will leverage the potential of mobility as a growth and innovation engine for India. Ola also commits itself with a wide range of technology-based issues and developments from privacy and data protection to digital economy and e-commerce that have a far reaching impact on India’s digital and mobility ecosystem.

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RAHUL TIKIWAR

AISHWARYA RAMAN

OLA Mobility Institute

www.ola.institute/
Mobility is an important issue for all citizens. For most of us, time and cost of everyday commutes are important to how we make decisions. The movement of goods and services are essential to economic activity. For cities, improving mobility has a direct impact on improving the lives of communities. Innovation in mobility has the potential to shape our economy and our future.

Public transportation, non-motorized transport, shared mobility, electric vehicles and digitization across have already begun to transform our cities. As a platform that moves millions every day, Ola is particularly sensitive to the challenges of growth: road safety, congestion, pollution, among others. To address this, we believe that a better understanding of mobility in the country could inspire constructive conversation and innovation that has a direct impact on how we live.

To raise our collective understanding of this rapidly evolving sector, the Ola Mobility Institute has developed a unique framework to evaluate mobility scenarios in cities. The Ease of Moving Index looks at 50+ parameters grouped under the three pillars of People, Infrastructure, and Sustainability. For the first edition, 43,000+ citizens spread across 20 Indian cities were interviewed on all aspects of mobility.

These personal interviews from diverse commuters across cities with varying size, geography, culture, economy, and character, offer invaluable insights into the mode preferences, choices, needs, and aspirations of a diverse India. Further, the Index considers secondary data on parameters related to mobility infrastructure and sustainability goals of the country. Lastly, data on usage of intermediate public transport (IPT) such as cabs and auto-rickshaws, travel times and speeds in cities, proportion of cashless transactions in everyday commute, and surface quality of roads indicated via the potholes and bumps per kilometre, have been provided by Ola for this study.

With the Ease of Moving Index, we hope to share our key findings with the public, city administrators, and innovators towards sustainable mobility that meets the needs and aspirations of more than a billion citizens. We are in the midst of a radical transformation in how people and goods move. India has the potential to lead the ‘mobility economy’ and demonstrate a transportation ecosystem that is shared, sustainable, and accessible to all.

We look forward to your feedback and an opportunity to collaborate in the years to come.
This report is the outcome of an evaluation of mobility scenarios in 20 cities in India, using a unique framework titled the Ease of Moving Index India Report 2018. We are grateful to the Ola leadership, particularly Bhavish Aggarwal, Ankit Bhati, Pranay Jivrajka, Pallav Singh, Ankit Jain, Pranav Tiwari and others who have shared their perspectives on the topic. We are thankful for the efforts and contributions of our colleagues at Ola Mobility Institute, Abhishek Bakre, Nitish Anra, and Raksha Sharda, and others at Ola, particularly Mr. Aadihya Hatwar, Data Sciences, and Mr. Aapno Kulkarni, from the Accessibility team.

We would like to extend our sincere gratitude to our reviewers for providing their valuable input and feedback, including Prof. (Dr.) R. Sivanandan, IIT Madras, Dr. Purnima Parida, Former Head - Transportation Planning Division, Central Road Research Institute (CRIRI), New Delhi, Dr. Kishama Puntambekar, Assistant Professor, School of Planning and Architecture, Bhopal, Dr. P. K. Sarkar, School of Planning and Architecture, New Delhi, and Ms. Akshima Ghathe, Principal - Rocky Mountain Institute, India.

A group of multi-stakeholder partners came together to produce this first edition of the Ease of Moving Index India Report 2018. We are grateful to Abhijeet Saboo, Abhinav Rao, Ms. Lakshmi, and all the surveyors involved in primary data collection for their efforts in all stages of evaluation and report building. Finally, the team would like to acknowledge the support of the Ministry of Road Transport and Highways (MoRTH) and the Ministry of Housing and Urban Affairs (MoHUA), Government of India for their encouragement, as well as the contributions from all participating organizations and individuals.
We find ourselves on the cusp of a new technology revolution. For the last generation, the Internet transformed the way we access information. Today, we are in the midst of a radical shift in how people and goods move. The opportunity in mobility in India is now. With some of the lowest private vehicle ownership rates of a major economy, we have significant potential to transform mobility from being a legacy means of moving around to a source of livelihood and innovation for our society. From driving to battery technology and data science, mobility also has the potential to create millions of jobs over the next few years.

It is no doubt that mobility occupies a lot of mindshare today across stakeholder groups - from citizens, owners and drivers of automobiles and mobility services, and businesses of all sizes on the one hand to planners and policymakers on the other. Businesses and people alike, consider mobility as a key factor to determine their city of establishment or residence respectively. At the same time, people’s aspirations, economic realities, and planning needs usually do not go hand in hand. A wide and varying range of preferences by commuters makes it a complex activity for planners and policymakers to assess mobility requirements. Data generated from connected vehicles, GPS systems, digital transactions, on-demand entertainment devices and other electronic devices has the power to revolutionize mobility and empower policy makers. How can this be done systematically is the fundamental question.

Every city dreams, plans, and works to offer multiple, if not the best, choices of mobility to its denizens. The focus has now shifted to making mobility sustainable through the creation of a robust multi-modal public transportation and intermediary public transportation networks enabling first and last-mile connectivity. Shared mobility trumps personal vehicles as the preferred mode of commute, and is widely expected to solve the problem of congestion, making mobility affordable for the common man. Are these offerings enough to make a city the easiest to move within? This is precisely what the Ease of Moving Index helps answer.

Ease of Moving Index is a framework created by the Ola Mobility Institute to help cities evaluate their mobility scenarios on the three pillars of People, Infrastructure and Sustainability. The Index aims to support policymakers, planners and practitioners, and businesses and citizens alike to identify mobility requirements of cities in India, challenges faced by public, and aspirations of the citizens. The Index helps promote sustainable mobility through emerging technologies and business models, and enables cities to benchmark their performance with other comparable cities on various predetermined mobility parameters. The Index provides for an overall score cum ranking of each city, with the Ola Mobility Institute aspiring to release annual Ease of Moving Index rankings for cities to benchmark improvements achieved on each of the parameters and foster a competitive spirit amongst the cities to improve mobility holistically and in a sustainable fashion.

**GLOSSARY**

AMRUT: Atal Mission for Rejuvenation and Urban Transformation
APSA: American Planning Association
BRTS: Bus Rapid Transit System
CDP: City Development Plan
CMM: Comprehensive Mobility Plan
CNG: Compressed Natural Gas
CO2: Carbon dioxide
cse: Center for Science and Environment
CV: Electric Vehicles
GDP: Gross Domestic Product
GHG: Greenhouse Gas
GPS: Global Positioning System
INR: Indian National Rupee
IoT: Internet of Things
IPT: Intermediate Public Transport
ITS: Intelligent Transport System
JKSRTC: Jammu Kashmir State Road Transport Corporation
JnNURM: Jawaharlal Nehru National Urban Renewal Mission
KG: KIlogram
KmPL: Kilometers Per Litre

Maas: Mobility as a Service
MMTS: Multimodal Transport System
MHUA: Ministry of Housing and Urban Affairs
MRTH: Ministry of Road Transport and Highways
MRTS: Mass Rapid Transit System
NCR: National Capital Region
NCT: National Capital Territory
NMT: Non-Motorized Transport
NTPC: National Thermal Power Corporation
NUTP: National Urban Transport Policy
OMI: Ola Mobility Institute
PCTR: Per Capita Trip Rate
PIS: Public Information System
PM: Particulate Matter
PT: Public Transport
PT: Public Transport
PWR: Per Capita Trip Rate
SDG: Sustainable Development Goals
SO2: Sulphur dioxide
SUTP: Sustainable Urban Transport Project
UNESCO: United Nations Educational, Scientific and Cultural Organisation
USD: United States Dollar
WHO: World Health Organization

**EXECUTIVE SUMMARY**
The Ease of Moving Index India Report 2018 covers 20 cities in India which were selected on the basis of population, character of the city, culture, economy and geography, and combines those insights with secondary data. Mobility needs are city-specific and each city needs to have a different mobility strategy. Therefore, the 20 cities have been further grouped into metro cities, booming cities and promising cities based on similarity of size, economy, existing infrastructure, socio-economic and cultural factors that have contributed to mobility unraveling in city-specific fashions. The Ease of Moving Index aims to include more cities in the next phase of ranking along with international benchmarking to comprehensively identify rapidly evolving mobility needs. The ranking is based on a survey of users of public transport, intermediary public transport and private vehicles across the selected cities combined with city-specific secondary data. In the 2018 India edition of the Ease of Moving Index, more than 40,000 commuters were surveyed on 50+ parameters creating 20,00,000+ data sets which were grouped under the three pillars as follows.

People: This includes the indicators of Pattern of Travel, Quality of Life, and Perception. These indicators measure pattern of commuters’ modal choice, and perceptions regarding reliability, accessibility, safety, affordability and comfort in public transport.

Infrastructure: This pillar assesses the efficiency and reliability of mobility systems in cities. The indicators of road condition, riding quality along with availability of parking spaces, infrastructure for cycling and network can help analyze the congestion profile of the cities along with facilities to promote non-motorized transport for sustainable mobility.

Sustainability: This evaluates cities on their efforts to lower transport emissions, building non-motorized transport infrastructure, reducing air pollution, designing of green spaces during city and mobility planning, and on measures taken to increase the adoption of zero-emission mobility.

The cities are ranked on the overall score on People, Infrastructure and Sustainability. Another component i.e Mobility Planning captures the aspirations of the people and together with the other three pillars can enable policy makers to fulfill the city’s mobility needs and improve its rankings.

Mobility Planning: This provides insights into the aspirations of people through a Pan-India analysis of urban mobility on the parameters important for planning of sustainable and inclusive transportation systems.
You will always find a public transit option near you in Patna. Just ink a dot than 4 m of walk.

51% of Mumbai prefers public transport over personal vehicles.

Jaipur has the best footpath condition for its pedestrians.

Delhi offers the best Surface Quality to ride on.

Amongst all, it is easiest to park a vehicle in Jammu.

5,000+ RESPONDENTS

2,150,000

DATA POINTS

50+

PARAMETERS

43,000+

MINUTES INTERACTION

A detailed city-wise analysis has been presented in the report based on the survey and secondary data. Some of the key observations include analysis of important parameters such as shared mobility, safety, first- and last-mile connectivity, digital transactions, affordability, sustainable mobility, etc. More than 60% of the people in the 20 cities feel that the mobility scenario in their respective cities has improved in the last five (5) years. While in a few cities like Chennai, Jabalpur, and Kolkata, policies and infrastructure have enabled non-motorized mobility through walking and cycling, cities such as Kolkata and Delhi, have shown how to embrace shared mobility to increase access, and improve utilization of public transit. More than 60% of the people in the 20 cities report using public transport.

Further, around 60% of the non-users are willing to shift to public transport provided its coverage, first- and last-mile connectivity, frequency, and comfort are improved. Today, almost 70% of the public transport users rely on cabs, autos, and NMVT to access buses, metros, etc. Integrating intermediate public transport (IPT) with micro-mobility through offline and online multimodal terminals and fare integration, can augment public transport usage in India. Metropolitan cities like Delhi are already paving the way for this by making metro rail cards usable on buses as well.

The growth of smart-card based metro rail usage and app-based RTP and public transit services has increased the acceptance of digital currency in mobility. Over a third of cabs and auto-rickshaw rides are paid for using digital wallets. Further, Kolkata, for instance, has taken steps to digitize its transport sector through smart card based commute, and an innovative app-based parking system. This has led to over 70% of the commuters reporting using public transport in the city. Streamline digitization across cities would further enhance the creation of seamless, multiple models, facilitating deeper partnerships between the public and private sectors, and help people move with ease.

Among the many concerns for commuters, ranging from connectivity and coverage on one hand to affordability, travel time, and comfort on the other, safety seems to be on top of everybody’s mind while making the choice to adopt public transport. 10% of the users find public transport safe in general; 36% find it safe except at night; 35% find it somewhat safe; 19% find it unsafe to use public transport. To change this, many have begun making mobility gender-friendly and far more equitable. Kochi, for instance, has all-women metro rail stations, pink taxis for women, and generally encourages women to participate in mobility as service providers.

Reduced travel time by augmenting public transport, improving first- and last-mile connectivity, strengthening shared mobility, and creating interconnected mobility, coupled with an emphasis on clean mobility would pave the way for sustainable mobility in cities. Nearly all commuters prefer their mobility to be environment-friendly. This is a much-required validation of the country’s multiple mobility initiatives geared towards sustainability to promote clean fuels, shared mobility, and non-motorized transportation.
THE NEED FOR AN URBAN MOBILITY INDEX

The world is witnessing the largest wave of urban growth in history. By 2030, over 5 billion people will be residing in urban agglomerations. Urbanization will introduce a new era of prosperity, economic growth, and resource efficiency. What is driving economic growth in cities is mobility. It is rightly said that the rise of the modern city is built on mobility. The evolution from the medieval city in which all movements were on foot to today’s sprawling agglomerations has only been possible with evolutions in mobility. Nonetheless, as cities keep on changing, so excessively should their transportation systems. The manner in which individuals explore a city - what is termed as urban mobility - poses numerous questions. Can a city occupying a fixed space reduce congestion when faced with a growing population? Would it be able to abstain from increasing travel times as more individuals hope to travel? Can the quality of life be kept up, or improved, in a city with or without a great deal of investment in travel infrastructure?

Transport demand in cities has to be met through efficient and integrated use of existing transport infrastructure and urban space, with an objective to reduce traffic congestion by reducing the number and length of travels by walk and cycle, and to reduce the demand for travelling itself. The expected effect of these actions is less noise and air pollution, and reduced greenhouse gas emissions. Increasing impact of transport on environment especially air quality is a matter of concern in urban areas. Therefore, the new urban goal is to create sustainable mobility balancing environmental friendly forms of travelling. Sustainable mobility in cities should fulfil the transport needs of all groups through a proper modal share of different means of transport and determine ways of providing transport services in order to minimize environmental and social impact.

To promote sustainable mobility, evaluation of the current Level of Service is important. The systematic and periodic evaluation of various aspects of sustainable mobility helps observe whether transport behaviour of a city is consistent with the concept of sustainable mobility, as well as what is the pace and efficiency of its transformation.

Translating service quality is a well-established practice among public and private entities that are interested in improving their performance. This exercise allows agencies to measure their performance against the performance of other similar agencies, assuming that similar data sets are available to allow for meaningful comparisons. The practice of evaluation also allows agencies to measure their progress over time. Similarly, cities maintain and generate considerable data, which could provide the foundation for meaningful evaluation of performance of overall city mobility. Evaluation would help cities benchmark themselves against other cities, nationally, and globally. Further, in order to assess the requirements of people from city mobility, it is essential to understand their aspirations of shared and personal mobility services, which may vary with demographics, income, culture and location. For this purpose, an index to evaluate cities on various parameters that represent the ease of moving becomes imperative.

However, there is currently no effort to utilize these data sets nationally in a manner universally regarded as constructive by the mobility ecosystem. Part of the problem is that cities operate transit services in different economic, regulatory, social and geographic environments with different policy goals, which renders broad comparisons and benchmarking of cities difficult. Such comparisons also usually do not capture preferences and behaviours of using intermediate public transport and private vehicles. What is needed is a method for measuring mobility metrics that are comparable and broadly acceptable to the cities. This is what the Ease of Moving Index developed by the Ola Mobility Institute intends to accomplish.

The Ease of Moving Index India Report 2018 uses a holistic framework to evaluate mobility conditions in 20 Indian cities. This first edition captures preferences, behaviours, and aspirations of citizens along with an evaluation of service level data maintained by cities and transit agencies. There is also an attempt to understand the quantum of potential ridership in the 20 cities of India. Under the components of evaluation, the novelty of this study is that it considers maturing and emerging technologies such as electric vehicles (EV), connected public transport systems, smart traffic sensors, and even driverless cars offering a glimpse into what the city of the future might look like: a city through which people can travel in an efficient, easy and sustainable manner.

The purpose of this report is to examine and assess how cities across India are approaching this ultimate goal of sustainable urban mobility and the progress of some key cities across the country towards achieving viable solutions. The results of this evaluation will allow cities to measure their performance against relative peers using a simple index system. The method described in this study will provide a way of measuring overall mobility conditions. Individual transit agencies and cities alike can use the results and methodology to compare their mobility performances. While the evaluation framework is intended to be comprehensive, and is certainly useful in its current form, there is no doubt that future benchmarking efforts will benefit from additional inputs from the mobility ecosystem. Another benefit of this evaluation will be the additional thought and research into cities; mobility performances that is mooted by this effort.
NON-PERSONAL MOBILITY
AN INDICATION OF PROGRESS

Shared mobility has more benefits than personal mobility. A simple illustration is presented below. Buying a car for personal use appeals to individuals across countries and cultures. However, there are clear disadvantages to personal mobility. To start with, each time one drives a personal vehicle, one adds to the number of vehicles out and about on roads at a specific time, thereby adding to increasing traffic. While facing traffic jams, all costs of transport (fuel, support, periodic repairs, and so forth) are to be paid out of the vehicle owner's pockets - thereby increasing the operational cost for a personal car/vehicle owner. Third, driving a personal car adds to the ever-increasing carbon footprint of the world. This implies that personal vehicles users are adding to the relentless decay of nature’s well-being. However, a decent and reliable shared mobility service is considered a good indication of the progress of a nation.

Mass transport and shared mobility through intermediate public transport help a large number of people get from one location to the next in an efficient manner. Such systems permit the transportation of different individuals while utilizing minimal resources (such as fuel and power), and maximizing asset utilization. An efficient urban mobility system aids in limiting rush hour gridlock by decreasing the number of vehicles on the road, reducing carbon footprint and also doing its bit in taking care of Mother Earth. Citizens can also save money because all they need to use urban mobility services through shared modes is pay for the fare, i.e. usage alone. There are also a number of situations wherein mass transport – as in the case of Mumbai’s suburban railway system in India – or shared-cab services such as the one provided by Ola is the fastest and cheapest means to get from one area to the next.

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<th>Car</th>
<th>Bicycle</th>
<th>BRTS</th>
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<td>Capacity per hour per lane</td>
<td>represents 2,000 passengers per hour per lane</td>
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EASE OF MOVING INDEX 2018

1. Identification of evaluation pillars and parameters
2. City Selection
3. Citizen Survey & Data Collection
4. Analysis of primary & secondary data across parameters
5. Index Development

Selection based on geography, scale, economy and character, and cultural diversity
Conducting one to one app-based GIS authenticated survey of citizens
Scores assigned based on cities’ performance on different parameters

Framework Development
City Selection
Citizen Survey & Data Collection
Analysis of primary & secondary data across parameters
Index Development
For cities, ease of mobility can be comprehensively evaluated on three main aspects - People, Infrastructure, and Sustainability. These aspects are highlighted frequently in visions, targets, and goals of declarations, and mobility planning documents for cities across the world, thus synthesizing and making it appropriate to consider them as the evaluation pillars for the Ease of Moving index. The Three Pillars of Evaluation: People, Infrastructure, and Sustainability, help appraise the overall health of a city's mobility. The Ease of Moving Index which constitutes the three pillars of evaluation, would help answer the questions: "How easy is it to move in my city? How should my city move in the future?" Cities should respect nature, consider the urban ecological environment as an asset, integrate environmental issues into urban Planning and administration, and accelerate the transition to Sustainable development. They should promote the use of renewable energy sources and build low-carbon eco-cities. They should strongly advocate for conservation of resources and promote environment-friendly Infrastructure. Cities and their Citizens should join together to create sustainable lifestyles and an ecological civilization in which people and environment co-exist in harmony.

- Shanghai Declaration on Better Cities, Better Life

Let's recognize that People, occupy center-stage in our cities and all Planning would be for their common benefit and wellbeing, and make our cities the most livable in the world and enable them to become the "engines of economic growth" that power India's development in the 21st century. Additionally, to allow our cities to evolve into an urban form that is best suited for the unique geography of their locations and is best placed to support the main social and economic activities that take place in the city.

- National Urban Transport Policy (NUTP) of India

Urbanization is a trend of today and the future, as more than half of the world's population now lives in cities. By 2050, this figure is expected to reach 6.5 billion people—two-thirds of all humankind. Urbanisation presents a host of opportunities and challenges, which will warrant planning with a mission to achieve a model of co-existence and sustainable development. Cities worldwide realize that the global agenda on sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. Cities, in fact, are themselves recognized by their distinct urban transportation systems, established to traverse their unique topographies and urban realities including density, demographics, and design. Urban Mobility has been traditionally thought of as moving people from their trip Origin to Destination, via a Mode. Planning for urban mobility was based upon general assumptions that people move to access housing, jobs, and services such as education, health, recreation etc., and also that they prefer motorised transport to non-motorised transport, because the former is convenient and perceived more efficient...
in terms of time than the latter, especially as cities grow and the society becomes more affluent. These assumptions are not always true, especially in the world we live in today where technology as a driver of mobility has accounted for a paradigm shift in how people move, in other words, how cities move. With the rise of E-Mobility, Mobility as a Service (MaaS), E-Commerce, and On-Demand Mobility, commuters don't have to move to get services anymore. Increasing awareness amongst people about the environmental, health and other costs of motorised mobility, coupled with the surging popularity of Non-Motorised Transport (NMT), including Cycling and Walking, is altering the trend of the future of mobility as we see it.

India is uniquely positioned as a country thriving on shared mobility too. Despite the fact that more and more people in India can afford to own personal vehicles, more than half of daily trips are still carried out on foot or using bicycles, intermediate public transport, and public transit. One could argue that what matters to citizens is the ease of moving within cities. Ease of Moving, therefore, becomes crucial for a country as a whole and for cities in particular, as this is an important consideration for people to live in a city, for businesses to set up their establishments in order to attract talent, and for cities to ensure delivery of services, so that their denizens and citizens benefit the most by living there. Access from one's residence to places of learning, work, recreation and Walking, is altering the trend of the future of mobility in first & last mile, on-demand and On-Demand Mobility, commuters don't have to move to get services anymore. Increasing awareness amongst people about the environmental, health and other costs of motorised mobility, coupled with the surging popularity of Non-Motorised Transport (NMT), including Cycling and Walking, is altering the trend of the future of mobility as we see it.

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Planning of urban services including mobility is people-centric. Federal, state and local administrations, all across the globe, identify people/citizens as the most important stakeholders of urban projects. Over the last few years, citizen participation has become a crucial aspect of any urban planning or development exercise in India. Hence, the pillar People has been selected in the methodology. This evaluation pillar indicates the pattern of travel, perception of transportation and quality of mobility services. These indicators measure social and economic aspects of mobility systems, which include the assessment of cities on road safety, passenger safety, patterns of commuters’ mode choice, and perceptions regarding reliability, accessibility, safety, and comfort in public transport in the city.

The pillar People includes the parameters of travel behaviour, the mode choice that dictates the modal share of cities coupled with the usage of public transportation systems. This further includes the bifurcation of mode share and frequency distribution of public transport users to get various insights on the trip characteristics of citizens. A key concern for urban dwellers is the coverage and accessibility of their city’s public transport network. This has been imparted due share in the evaluation. For citizens, a convenient and easily accessible public transport network, which the commuters can rely upon day and night, allows people to travel freely at their own will. Cities are also rewarded for the digital capabilities of their public transport networks in the People pillar of evaluation, assessing whether or not commuters can access information regarding arrival and departure of trains and buses, which is collectively termed as Intelligent Transportation System (ITS), use smart cards and payment systems for easier city travel, and plan trips on smartphone applications. The details on distance travelled by commuters daily to work have been expressed under this head for the 20 selected cities. New age travel network companies are able to offer insights on average trip lengths, times, and speeds, using different modes of commute, during different time periods of the day as well as represent historical and seasonal variability. Such data from Ola, for instance, has been used to offer unique perspective on mobility patterns in various cities, and the same has been illustrated in the City Walkthrough section of this report.

The aspects on quality of life bring up analyses from statistics related to accidents and fatalities highlighting the concerns on safety, and measures taken by cities to improve safety. The preciousness of time has been evaluated in the People evaluation pillar, through details on time spent in transit each day and the waiting time for public transport services. The perception of commuters regarding reliability, safety, affordability, cleanliness, comfort and convenience provides a comprehensive understanding on the quality of life in cities.
The Evaluation Pillar of Infrastructure assesses the quality and availability of mobility infrastructure. The indicators provide insights on the integration of footpath and cycle tracks with the road network and public transportation, along with the condition of footpaths and cycle tracks, and availability of footpaths and cycle tracks. Availability of footpaths and cycle tracks is critical to promote non-motorized transport, thereby leading to sustainable mobility. This aids in popularizing non-motorized transport and its usage, which encompasses a number of positive follow-on impacts on the environment and ecology of a city. The infrastructure evaluation pillar also includes the number of parking stops for cycles so that more people find it convenient to commute through NMT modes. Additionally, cycles can act as a feeder to the existing public transport, thereby creating a network of NMT and public transport in all corners of the city, and thereby making public transit more accessible. Under infrastructure, an insight has also been drawn on the parking situation in cities. The scoring on ease of parking can help draw a conclusion on whether the provision of parking surplus is wounding cities from the optics of increasing usage of public transport and shared mobility. Moreover, the pricing of parking regulates the use of parking spaces thereby guaranteeing the financial health of bodies looking after the transport systems. Further, in the era of digitalization and smart cities, an interrogation can be deep-set upon the surface quality index of an area would provide comprehension on profiling of roads in cities. While the evaluation, here, has considered citizens’ views on surface quality, Ola offers real-time data on bumps and potholes on roads using an app- and sensor-based detection approach. The same has been presented length in the Epilogue of this report. Road roughness has an impact on vehicle speeds, tyre wear, fuel consumption, and increased maintenance costs of the road surface. Further, it has a direct impact on road safety. Thus, it is necessary to gather the roughness data of road network to notch cities on the evaluation pillar of infrastructure. Assessment of infrastructure for urban mobility cannot be complete without analysing public transport. Hence, the aspect of public transport infrastructure has also been included in the study. A key area considered is the coverage of public transport. Analysis has been conducted on the basis of the proportion of people not being able to use public transport because of its non-availability and coverage issues.
Sustainability, the third pillar, evaluates cities through the lens of efforts to lower transport emissions, increasing non-motorised transport infrastructure, reducing air pollution, and measures taken to increase the adoption of zero-emission mobility like cycles, electric vehicles, etc. These indicators can be broadly considered as green factors of mobility. Under this evaluation pillar, each parameter has been blended with taking notice of the three major areas of Sustainability, i.e. Economy, Society, and Environment. Under the area of economic sustainability of mobility, cities are evaluated on the investments in transportation by the government and private sector, as well as related expenditure carried out by each household for deriving inferences in these terms. Population density of a city has also been considered under this evaluation pillar of sustainability, since ensuring sustainable transportation is dependent upon the population of a city and its size. The study also looks at the percentage share of owners of bicycles not using NMT mode for commuting for diverse reasons. Under this pillar, emphasis has also been given to the area of environmental sustainability of mobility, stressing upon eco-friendly mobility practices of cities and preferences of citizens. Air pollution is a major threat to cities, impacting the quality of life. A major contributor to air pollution are the greenhouse gas emissions from urban transportation. In this regard, cities have been evaluated based on citizens’ awareness of the need for environment-friendly modes of transportation, which would indicate the success or failure of such initiatives in a city. Analyses have also been carried out on the data collected through secondary sources on levels of average PM10 and PM2.5 concentrations, SO2 levels, and GHG emissions to rank cities on air quality sub-index, and corresponding concerns and considerations of city governments and citizens in fighting air pollution.

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<tr>
<td>Population Density</td>
<td>Densely populated cities tend to have shorter trip length</td>
</tr>
<tr>
<td>Average trip length</td>
<td>Average trip length of respective cities</td>
</tr>
<tr>
<td>Per capita trip rate</td>
<td>Per capita trip rate of respective cities</td>
</tr>
<tr>
<td>Share of public transport</td>
<td>Proportion of respondents using public transport</td>
</tr>
<tr>
<td>Ownership of Bicycle</td>
<td>Proportion of respondents using cycling for various purposes</td>
</tr>
<tr>
<td>NMT usage</td>
<td>Perceived prices of parking by the citizens</td>
</tr>
<tr>
<td>Parking pricing</td>
<td>Reported average monthly expenditure on transport</td>
</tr>
<tr>
<td>Expenditure on transport</td>
<td>Total number of accidents reported in a year</td>
</tr>
<tr>
<td>Number of accidents</td>
<td>Total number of fatalities reported in a year</td>
</tr>
<tr>
<td>Number of fatalities</td>
<td>PM2.5 &amp; 10, SO2 and GHG emissions under transportation sector</td>
</tr>
<tr>
<td>Air Quality</td>
<td>People’s perception towards environment-friendly modes of transport</td>
</tr>
<tr>
<td>Importance of eco-friendly vehicles</td>
<td></td>
</tr>
</tbody>
</table>
The three pillars of the Ease of Moving Index provide policymakers with comparative analysis along with absolute scores of the cities on each of the parameters identified for evaluating mobility scenarios. The evaluation provides the governments, practitioners, and citizens themselves priority areas that need corrective measures to improve the rating on each of the parameters. Therefore, Mobility Planning of a city based on the three pillars provides an opportunity to determine the quantum of reforms and the willingness of the citizens to embrace the reforms of the governments. These initiatives include, inter alia, measures to improve road safety and passenger safety, emphasis on sustainable forms of transport including zero-emissions mobility forms such as electric mobility, as well as strengthening public transportation to increase accessibility and ridership. It is rightly said - A developed country is not a place where the poor have cars, it’s where the rich ride public transportation.

In order to have a yardstick for Mobility Planning, components of willingness to shift to public transport have been recorded and a response has been solicited on improvement in mobility scenario over the last 5 years. This presents us with an opportunity to estimate the number of people who might shift to public transportation if last- and first-mile connectivity is improved, which will further offer insights on demand to city administration, policymakers, and planners. Based on these insights, they can design strategies that would bring maximum benefit in augmenting the patronage of public transport in cities. Further, on this aspect, a detailed analysis of the existing public transport system is also drawn. In addition to public transport, Mobility Planning also gauges the willingness of citizens to put up personal cars for ridesharing purposes. This is important in light of shared mobility gaining momentum across the world and especially in India. Reversing the trend in transportation, which has been based entirely on fossil fuel-driven means of transport coupled with the exponential growth of personal vehicles, requires better urban planning and policy interventions that minimise the need for private vehicles by providing multiple options for public transport, other forms of shared mobility, cycling, and walking. However, urban transport planning and management is complex. It involves the consideration of a variety of factors such as affordability, local culture, environmental issues, financing, energy use, etc. along with the impact on the young and old, women and specially-abled persons. Mobility needs and aspirations can be addressed through the three pillars of evaluation – People, Infrastructure and Sustainability – and consequently, a holistic mobility plan for a city can be designed and adopted.
The cities identified for the Ease of Moving Index India Report 2018 evaluation show mixed representation across diversity. This assessment is a first-of-its-kind for India in terms of scale and coverage. The Index covers 20 cities inhabited by approximately 92 million people. Another highlight of the city selection ties back to its strong link to Sustainable Development Goals (SDGs). To factor for all of the above, the cities have been carefully chosen on the grounds of geographical location, diversity, cultural distinctiveness and classification of their population sizes. 

**CITY SELECTION**

**10 Million + cities**
- Nanded
- Kochi
- Patna
- Surat
- Jabalpur
- Nanded
- Vijayawada
- Mysuru
- Patna
- Jabalpur

**5 Million + cities**
- Bhubaneswar
- Chennai
- Kolkata
- Mumbai
- Bengaluru
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi

**3 Million + cities**
- Ahmedabad
- Patna
- Surat
- Jabalpur
- Indore
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi

**1 Million + cities**
- Ahmedabad
- Patna
- Surat
- Jabalpur
- Indore
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi

**Less than 1 Million cities**
- Ahmedabad
- Patna
- Surat
- Jabalpur
- Indore
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi

**POPULATION**
- < Million
- 5 M cities
- 5 M cities
- 10 M cities

**METRO CITIES**
- Ahmedabad
- Patna
- Surat
- Jabalpur
- Indore
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi

**BOOMING CITIES**
- Ahmedabad
- Patna
- Surat
- Jabalpur
- Indore
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi

**PROMISING CITIES**
- Ahmedabad
- Patna
- Surat
- Jabalpur
- Indore
- Jaipur
- Ahmedabad
- Bhopal
- Indore
- Kochi
The evaluation has been conducted on both secondary data sources as well as a primary survey carried out in the 20 cities chosen on the basis of distribution of characteristics in a population within defined confidence limits. Generalisation of the results of the study is therefore dependent on the representativeness of the sample chosen for the survey. The study, hence, has included a sample size of more than 43,000 respondents spread across the 20 cities identified.

The profiles of the respondents vary across a) Age, so as to capture the perception of the children, youth, middle aged as well as senior citizens, b) Gender, allowing us to note the opinion and aspirations of men, women, and transgenders, c) Occupation, so that the desires of those employed, unemployed, staying at home, and students are all accounted for, and d) Income, comprising holistically the views of those in the low-income, middle-income, and high-income groups are all documented.
The illustration represents the overall scores obtained by respective cities in Ease of Moving Index, 2018.

**2018 RESULTS**
The users of public transport have diverse requirements. For instance, the most important aspect of public transport for economically weaker sections of society may be affordability; whereas for the elderly it may be access to public transport. Similarly, women may give priority to safety. The service providers must design their services to cater to diverse users based on their needs and aspirations. Patna has outperformed other cities in satisfying user needs. It is worth mentioning that Patna has buses operating as the primary mode of public transport, along with a high number of shared intermediate public transport (IPT) options such as auto-rickshaws, providing last mile connectivity. These IPTs also serve as the main mode of transport for the economically weaker sections and for short distance travellers. This indicates that to create an effective public transportation system, multimodal integration is required. This would need integrating the first and last mile connectivity like IPTs, shared cabs etc. with the main modes of mass transport like Metro, BRTS, buses and more. Additionally, ensuring affordability of public transport is critical for increasing adoption, so that a user is not disincentivized by virtue of higher fares. Incentives could be offered for using sustainable modes of transport like shared mobility, electric vehicles, non-motorised transport etc.

Travel time of work trips is the least in Patna, which may be attributed to the compact and dense nature of the city. Since the city is compact and well served by IPTs, the distance to access transport and waiting time is also perceived to be less by the residents in Patna. Kolkata is perceived to offer the most affordable transport services, whereas Delhi provides the most comfortable transport to its citizens. On the cleanliness front, Ahmedabad leads the way in offering cleanest public transport services. Ahmedabad, closely followed by Jaipur, provide the safest travel options to their denizens.

The illustration represents the overall scores obtained by the cities based on the parameters under the pillar of ‘People’.
Evaluating cities on the parameters under the pillar of 'Infrastructure'.

Amongst the 20 cities, Mysuru ranks 11th in the pillar of Infrastructure. The city performs well on nearly all parameters considered for this pillar—Bhubaneswar emerged to be the leader under the pillar of Infrastructure. The city performs scores the highest among all cities when it comes to the Public Information System, and has the top score on street lighting as well.

Interestingly, the cities with leading scores in infrastructure have performed poorly in building positive perceptions of the people on mobility. For instance, Bhubaneswar doesn’t perform well on people’s perception, ranking 16th under the pillar of People. However, the city is ranked second overall in the Ease of Moving Index. This could be a guiding point for cities to actively engage with the denizens on civic issues including aspects of city mobility.

Amongst the 20 cities, Mumbai ranks 11th in the pillar of Infrastructure. Mumbai scores fairly on most of the parameters under infrastructure due to its wide roads, relatively congestion-free daily mobility, fewer potholes on a majority of the city roads compared to other cities, well-lit streets, along with good patronage of public transport and adequate investment in public transport infrastructure. However, the segment of the population accessing public transport via walk or NMT, which are considered to be sustainable modes of transport, is substantially less when compared to the other cities.

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Additionally, a majority of the respondents reported that they are not aware of or have little information regarding the Public Information System, and has the top score on street lighting as well.

Evaluating cities on the parameters under the pillar of Infrastructure yields interesting insights for all. Many cities scored low in offering cycle tracks, pedestrian facilities, parking, footpaths and cycle tracks, road condition and quality of public transport infrastructure. However, a majority of the respondents reported that they are not aware of or have little information regarding the Public Information System, and has the top score on street lighting as well.

In conclusion, the Ease of Moving Index India Report 2018 has highlighted the importance of infrastructure in enhancing the ease of moving and improving perceptions of the people on mobility. Cities need to prioritize investment in public transport, pedestrian facilities, cycling infrastructure, and information systems to improve the overall experience of citizens. Furthermore, cities should actively engage with the citizens and stakeholders to build awareness and foster a culture of sustainable mobility.
The third pillar of sustainability focuses on adopting green modes such as non-motorised transport (NMT) and pedestrianisation. For enhancing the adoption of non-motorised transport, enabling infrastructure like encroachment-free footpaths, cycling tracks connecting to public transportation are required to be developed. Ensuring safety for NMT users through dedicated tracks and traffic signals ought to be a priority for cities. Two cities that have outperformed others in this pillar of sustainability under the Ease of Moving Index 2018, and have similar scores are Surat and Bhubaneswar. The three major aspects which were considered under this pillar are: a) financial sustainability comprising the amount spent on transport and parking pricing; b) environmental sustainability comprising eco-friendly vehicles, air quality, ownership and usage of bicycles, and lastly, c) social sustainability comprising road safety measured in terms of road accidents and fatalities, and population density.

Surat has scored exceptionally well on financial sustainability specifically parking pricing, and also social sustainability by way of being the city with the least number of road accidents. While comparing cities on environmental sustainability, parameters such as air quality and green preference for and usage of modes of transport have been considered, among others. Cities like Myuru and Bhopal have secured the best positions on the parameters which measure PM 2.5 levels, PM 10 levels along with CO2 and SO2 emissions from the transport sector, commonly referred to as transport emissions.
MOBILITY PLANNING
MOBILITY PLANNING

Mobility Planning offers insights into the future of mobility through a pan India analysis of urban mobility on the parameters important for planning of sustainable and inclusive transportation systems. Planning captures the aspirations of the people, and together with the three pillars of mobility evaluation, would enable the policy makers to fulfill the mobility needs and improve city rankings.

Despite rising congestion and travel times, the
Ease of Moving Index India Report 2018
survey finds that more than 80% of the 43,000+ respondents in the 20 cities, report an improvement in the mobility scenario, in their respective cities, over the last five (5) years. However, the quantum of increase needs to be established based on detailed city-wise studies. This general feeling of improvement in mobility, despite mobility challenges induced by increasing people and vehicular densities, could be attributed to various initiatives such as Smart City, AMRUT, and Metro rail projects along with many initiatives led by State governments. Additionally, demand-responsive app-based services have made intermediate public transport modes readily available to commuters. Such services providing real-time information on availability of a commuting option, waiting times, accessibility etc. have democratised mobility in urban agglomerations and improved the convenience of users.

The
Ease of Moving Index India Report 2018
has helped identify, from citizen feedback and secondary data analysis, a four-pronged approach to holistic mobility in India, and leverage mobility to pave the way for development.

SCENARIO IMPROVEMENT

More than 80% of the citizens feel that the mobility scenario has improved over the last five years in their respective cities. This establishes that various initiatives of Central and State Governments like Smart City, AMRUT, Metro rails, projects to augment public transport and road infrastructure, etc. have succeeded in creating a positive impact on the urban mobility scenario in Indian cities. These missions with a clear policy and legal framework, and a well-defined roadmap, can substantially augment commuter experience in the country.

AUGMENTING PUBLIC TRANSPORT USAGE

A majority of the Indians (80% of the survey respondents) are willing to shift to public transport, provided it has better coverage, and becomes more affordable and comfortable than it is today. It has also been observed that only 15% of the public transport users in India are captive customers, and more than 80% of commuters use public transport on account of it being affordable, time saving and convenient. Given the high willingness to use public transport, policy makers need to devise strategies to cater to specific needs of different users by improving service levels, real time information, providing clean public transport, improving frequency, better route planning etc.

CASHLESS MOBILITY

Urban mobility in India is going cashless. 55% of the commuters using public transport own smart cards. Metro rail is to be credited with making cashless mobility popular. Similarly, an analysis of Ola’s rides data reveals over a third of its users pay ride fares digitally. To increase the penetration and usage of smart cards and other cashless ticketing solutions, smart ticketing system and e-wallets need to be enabled in buses and other modes of Intermediary Public Transport (IPT) with interoperability across modes. Smart cards are now increasingly being replaced with smartphone-based ticketing solutions. Given the high penetration of smartphones in India, interoperability across such a ticketing system could give the necessary fillip to digital transactions and make it convenient for interoperability across modes. Smartphone based ticketing solutions will reduce the waiting time for ticketing/ purchase of cards at metro stations and buses besides reducing the capital expenditure for the operators on smart cards and smart card readers.
SHARED AND ELECTRIC MOBILITY

Shared mobility through public transit and intermediate public transport is gaining momentum across cities. Almost 30% car owners are willing to put up their own car for hire. An additional 50% car owners expressed willingness to explore this option, were there a policy on usage of cars for sharing purposes. Such a policy can boost the first- and last-mile connectivity for urban public transport services, thereby also making it affordable in addition to reducing stress on the existing road infrastructure.

Further, almost 75% Indians believe electric vehicles have the potential to replace conventional vehicles by 2030. For Indian consumers, a subsidy to buy their own electric vehicles is not required for shifting to electric vehicles. 85% of the people feel that providing electric buses as public transport or other forms of shared mobility, investing in research and development, and creating infrastructure for electric vehicles, will boost electric mobility in India.

The Government of India and various State Governments have already prepared or are in the process of drafting policies to promote the adoption of electric vehicles. It is estimated that by 2040, 95% of new car sales and 33% of the global fleet will be electric. The governments at the centre, state and local levels need to proactively create an enabling environment if India is to reap the benefits of the global revolution in mobility being driven by electric vehicles.

Some of the measures could be to provide lower taxation levels for EVs, allow carbon credits to be utilized for EVs, fast-track approvals for setting up of charging and swapping stations, rationalisation of electricity tariffs for charging, dedicated parking for EVs in public spaces and commercial buildings, creation of low emission zones, and so on.

IMPROVING FIRST AND LAST-MILE CONNECTIVITY

Walking and cycling are two of the predominant modes of accessing public transport in India. 80% of the people believe that improvement in first- and last-mile connectivity will translate into better adoption of public transport in the country. 72% and 76% commuters feel the necessity for dedicated cycle tracks and pedestrian footpaths, respectively.

Further, around 60% of the non-users are willing to shift to public transport provided its coverage, first and last mile connectivity, frequency, and comfort are improved. Today, almost 70% of the public transport users rely on cabs, autos, and NMT to access public transport. Integrating intermediate public transport (IPT) with modes of public transit along with the creation of cycle tracks and pedestrian footpaths can augment public transport usage in India.
Bengaluru
Silicon Valley of India | Garden City

Bengaluru is the 3rd most populous city in India and 18th in the world. The city has to brace over 2 million migrants, all believing in Bengaluru’s ability to offer multiple opportunities. At 61.91%, Bengaluru is experiencing the 2nd highest decadal population growth rate in India, only after Hyderabad.

In their bid to fight congestion, Bengalureans are giving up on public transport and roadsharing, which has reduced congestion and travel times. This shift is also reflected in the sentiments of the survey, with 4 out of 5 respondents preferring sustainable modes such as public transport, intermediate public transport (taxi/cab, auto-rickshaws) and non-motorized modes of commute over personal vehicles. Only 15% Bengalureans prefer using public transport. A variety of reasons deter their adoption despite efforts from the government. 65% cite a lack of parking facilities near public transit stops/stations, preventing them from using public transport. 60% of the respondents in the Ease of Moving Survey wait a considerable time for buses to arrive. Further, 60% of the respondents in the Ease of Moving Survey believe that the last mile connectivity needs to be improved to help them shift to public transport.

Among the private vehicles, two-wheelers (over 41.86 lakh in number) continue to dominate the city’s roads, followed by cars (11.8 lakh). The city prefers zipping through its congested roads powered by unclean fuels, responsible for the 37% of total PM 2.5, PM 10, SO2 and CO2 emissions in the city. Traffic in Bengaluru has grown exponentially over the last decade and a half, and has now become a real challenge. Travel during peak hour traffic takes an average of 162% more time than the same distance travelled during off-peak hours. This disclosing traffic has reduced the average vehicular speed on roads, according to data from Ola. With an average speed of 15.5 km per hour, Bengaluru has the 3rd least average speed after Kolkata and Patna. In this situation, even affordable and cheap public transport is not attractive.

Footpaths
The city maintains good physical condition and contiguity of footpaths throughout.

75% of the residents believe that the mobility situation in Bengaluru has improved over the last five years.

Bengaluru leads the way with the highest percentage of digital transactions in mobility. Forbes considers Bengaluru one of “The Next Decade’s Fastest Growing Cities.”

Sustainability
Safety & Comfort
People find it safe and comfortable to use public transport.

Bengaluru is bestowed with a variety of transport services such as city buses, metro rail, auto-rickshaws, and taxis/cabs.

SAFETY 84%
AFFORDABILITY 77%
COMFORT 73%
PUBLIC TRANSPORT SENTIMENT

Traffic is a problem in Bengaluru and has grown exponentially over the last decade and a half, and has now become a real challenge. Travel during peak hour traffic takes an average of 162% more time than the same distance travelled during off-peak hours. This disequilibrium traffic has reduced the average vehicular speed on roads, according to data from Ola. With an average speed of 15.5 km per hour, Bengaluru has the 3rd least average speed after Kolkata and Patna. In this situation, even affordable and cheap public transport is not attractive.

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PUBLIC TRANSPORT USERS

Chennai has emerged as a pro-sustainable-mobility city as the majority of people here prefer public transport for their commute.

75
%

Chennai carries 1,330 passengers per bus per day, which at an average of 351 is the highest in the country.

PUBLIC TRANSPORT USERS

67%

of the people perceive public transport as affordable.

58%

Buses, as the data indicates, are the main form of public transport users preferring buses as their mode of transport. Interestingly, despite carrying huge volumes of passengers, public and private buses are comfortable and affordable. These factors of comfort, affordability, and high capacity, justify why public transport thrives in a crowded atmosphere like in Chennai.

While a majority of Chennai prefers buses for its daily commute, 100% elderly residents in Chennai are concerned about accessibility to public transit. They would feel at a loss of first and last mile connectivity solutions to public transit deters them from using buses.

Another incentive for the city to strengthen its public transport is that almost 50% of the non-public transit users feel that they will shift to public transport if it becomes more frequent (less waiting time) and gets better coverage (easy access to public transport).

Among those not using public transport, a significant portion is in the affluent class. More than 40% of people in higher income groups do not use buses for the daily commute. Detailed profiling of public transport users in Chennai could help determine how big this demand is, allowing the city administration to design appropriate solutions.

1. Review of the performance of state road transport undertakings by MoRTH, GoI.
2. Chennai Metro minds the last-mile gap; The Hindu, August, 2018.
There are many ways of getting around in Hyderabad. The city has a bus service with wide coverage, over 1,05,027 autorickshaws and taxi-cab's offering accessibility to public transport, and a new metro system. However, the 2005-launched Hyderabad Multi-Modal Transport System (MMTS), the city's suburban rail system, has not witnessed growing patronage over the years. After the success of the Metro, efforts are being intensified now to get the Monorail on track in the city. According to this Ease of Moving study, 64% of the denizens prefer urban transport. In the city, the public bus network is so extensive that 87% of the residents of Hyderabad can access public transit within 15 minutes of walking. However, only 41% of public transit users are women. Nearly 60% of the women not using public transport prefer to shift from their conventional motorised mode should the coverage of public transport be improved. Hyderabadians are also exploring the variety of options of shared mobility with 33% of them opting for shared oafs. The city has truly embraced technology with 40% of ridesharing transactions taking place over apps and digital wallets. To respond to the demands of the rising population of the city, the Government of Telangana and Greater Hyderabad Municipal Corporation have taken up ‘Strategic Road Development Program’ for the development of roads in Hyderabad. As a part of this program, the government is planning to construct numerous flyovers and underpasses across the city. According to traffic police data, there were 2,26,456 vehicles added to the city roads every year since 2010. The once laid-back city is now witnessing an alarming upsurge of vehicles in 2017 as 16.72 lakh (1.16 crore) vehicles were added to the city roads every year. The Intermediate Ring Road (IMMR) has been identified as connecting roads between various radial roads in the city, acting as a bypass, when travelling from one end of the city to the other, thereby, helping reduce travel time. Despite the mobility challenges the city has been facing, nearly 95% of the denizens opine that there has been an improvement in the aspect of transportation in the last five years. Almost 46% of non-public transport users across all genders in Hyderabad are willing to shift to public transport if it has better coverage. More than 95% of the denizens would like their mobility to be more environmentally friendly. The city needs to capitalise on such preferences of its denizens to stop Hyderabad from choking. This creates an opportunity to increase the share of public transport and ridesharing while retaining the existing infrastructure and customers and adding the ones willing to shift by offering a strengthened system with better coverage and convenience.

The government of Telangana is one of the few state governments in the country that has embraced technology and are digitising everything including state governments in the country that has embraced technology and are digitising everything including traffic-related work and data. Take, for instance, the permeation of the smart card, with 46% of holders utilising it for their public transport trips. Can Hyderabad make headlines once again in the future, this time for being a city that uses technology for transforming mobility? The chances are that it will.

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Kolkata is the city of joy with a rich culture and home to over 14 million citizens with a 2% decadal growth rate, covering an area of more than 200 km² and a population density of over 24,000 persons per km².

Kolkata has seen a huge spurt in the past resulting in the average time spent in transit to reach more than one hour and stand at 71 minutes of daily commute. However, the survey indicates that expenditure on transport is substantially less in the city when compared to other metropolitan cities, with more than 50% households spending less than Rs. 3,000 per month on transportation.

Public transport is quite accessible as almost 27% people get access to public transport in less than 5 minutes of walk and 34% people within 15 mins of walk. The Kolkata Metro has seen a huge spurt in the past resulting in the average time spent in transit to reach more than one hour and stand at 71 minutes of daily commute. However, the survey indicates that expenditure on transport is substantially less in the city when compared to other metropolitan cities, with more than 50% households spending less than Rs. 3,000 per month on transportation.

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Mumbai City of Dreams

The financial and commercial capital of the country, Mumbai has been ranked 6th among top ten global cities on the billionaires count. It home to over 18 million citizens with a decadal growth rate of 4.73%, covering an area of 488 sq km and a population density of more than 27,000 persons per km².

Accessibility

Public Transport

75%

Public Transport

75%

More than 30% of the respondents choose public transport for ease of travel or comfort, would prove beneficial for the city.

Another form of shared mobility, auto-rickshaws, have been a favourite mode of last mile connectivity for Mumbaikars. Auto-rickshaws are found to be faster than buses, more comfortable, readily available, and provide access where buses don’t. The “Kaali-Peeli” Taxi’s have a rich glory of more than a hundred years, planting themselves close to the heart of people living in Mumbai. As per the Regional Transport Authority of Mumbai, currently, there are more than 50,000 such taxis registered and operational in the city with a portability of them available at the last mile.

Despite the fact that a majority of Mumbai residents travel through public transport, only 12% prefer public transport over alternatives. On analysing the responses as to why they are travelling through public transport when they don’t exactly prefer it, the study found that almost 75% of the public transport users find the same to be time-saving and/or cost-effective. Understanding the demand and pattern changed too. In addition to choosing shared mobility such as public transit, people in Mumbai prefer logistics of their lunch box to be shared. This city hosts the world’s most efficient shared tiffin box distribution system, popularly known as “Dabbawalla”. This system also relies primarily on public transport network of Mumbai. Mumbai suburban railway is the lifeline of the city; in spite of being overcrowded, it transports more than 20 lakh commuters daily. It has been surprising to find that ownership of cycle in Mumbai, a city this vibrant, is very low. People who own it either don’t use it for the daily commute or use it for leisure only, accounting for around 30% of the respondents. Mumbaikars are not using cycles as almost 60% people feel the city lacks cycling infrastructure or it is not safe to cycle in Mumbai. Therefore, there exists a huge opportunity for Mumbai to augment its cycling and sidewalk infrastructure as almost 65% people believe Mumbai needs segregated infrastructure or it is not safe to cycle in Mumbai. It has been surprising to find that ownership of cycle in Mumbai, a city this vibrant, is very low. People who own it either don’t use it for the daily commute or use it for leisure only, accounting for around 30% of the respondents. Mumbaikars are not using cycles as almost 60% people feel the city lacks cycling infrastructure or it is not safe to cycle in Mumbai. Therefore, there exists a huge opportunity for Mumbai to augment its cycling and sidewalk infrastructure as almost 65% people believe Mumbai needs segregated infrastructure or it is not safe to cycle in Mumbai.

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More than half of the Mumbaikars use public transport which includes buses, metro and local trains. But if we talk about mode preference, only 12% prefer to use public transport. The Ease of Moving survey also reveals that overall people can easily access public transport within ten mins of walk. Despite being safe, 70% of the respondents reported that the public transport is unreliable and 44% of the people have to wait up to 15 mins for buses to arrive which dents the overall image of public transport in Mumbai.

There is an interesting divide among the higher income group as regards their preference for public transit - while 29% find public transport inconvenient, nearly double their peers (58%) find public transport convenient and actively use the same.

A little more than half of the public transport users are female, out of which 72% usually feel safe using it but showed concern about safety during night hours. This can be an opportunity to start alternative shared mobility services for women during non-operational hours of public transport in Mumbai.

To reduce the number of private vehicles in urban areas and boost public transport, the state government has developed a draft urban transport policy that suggests levying additional charges to the cost of private vehicles, and high parking charges based on location. The government has also initiated the Mumbai Metro Project, where line 1 is already operational, to reduce traffic congestion in the city, and supplement the overcrowded Mumbai suburban railway network. Once complete, this system will have a network of 235 kilometres with more than 200 stations, spread across Mumbai.

A major concern area for Mumbai is its road condition with 68% of the respondents of the Ease of Moving (italicised) survey calling this out as a road safety hazard. As per the data from Ola, Mumbai has a significantly higher number of potholes and bumps amongst its peer metro-cities. There exists the huge potential for Mumbai to make the commute for its citizens easier. This may be achieved by augmenting last mile connectivity, creating mass transport infrastructure and improving road quality.
New Delhi is the 2nd most populous urban agglomeration in India, inhabited by more than 17.65 million people over 1485 sq km of land. The population density has increased to 11,390 persons per km² due to 21% decadal growth rate and 23% decadal migration.

The silver lining for the NIC is that the level of ownership of vehicles is still low compared when developed countries – for instance, Delhi has 157 cars per 1000 persons whereas, in the Sydney, it is 760 cars per 1000 persons. However, there might be different outlook when road density is compared for the two. While on the one hand there is a growing threat of the increasing number of private vehicles in Delhi in the coming years, degrading trend of sale of cars (18% decreased) and increasing adoption of shared ride schemes that is a full-blown private-vehicle causing congestion and pollution could be averted by facilitating and embracing of shared mobility. (In 2017, Delhi with the highest proportion of Ola Share rides, saw 4 times more fuel from the previous year*, telling of the high consumer adoption rate).

The priority given to the construction of new road and flyover infrastructure as witnessed by the 80 flyovers built in the last six years has spurred the growth of private vehicles. Compounding this is the middle-class aspiration of owning a car, evidenced from our very survey, with nearly 50% of the respondents owning at least one personal car.

A significant number of commuters travel by the Delhi Metro daily. According to our estimates this forms approximately 11% of the overall mode share of the motorized trip in the city. In January 2016, on the same days when the Odd-Even scheme (a 15-day pilot of keeping cars off the road based on their last digit on odd and even number plate) was in effect, the ridership crossed the 3 million mark, demonstrating that people prefer metro as their mode of traveling when they face inaccessibility to private vehicle. As per Ola’s data, it is also noted that the ever-increasing rush and a rapidly expanding network made commuters’ Delhi Metro train to manage to record an average operational punctuality of over 99 per cent.

The Ease of Moving survey found that more than 65% people use public transport, out of which almost 50% of the commuters use public transport daily but 80% don’t find public transport to be comfortable, which is a clear-out example of captive users. As the affordability of this group grows, they will show a tendency to shift to personal transport thereby creating more pressure on the road infrastructure.

Incentive to Private Transport

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Safety being a colossal concern, it has been computed through the results of the Ease of Moving survey that 43% of Delhiites feel that the city needs a public transport system that is still unsafe whereas 4 out of 5 women feel the same. A shift towards public transport is still unusual whereas 4 out of 5 women feel safe in these modes despite the danger. The shining beacon of hope is that there has been a remarkable effort for improving safety in Delhi’s bus infrastructure with the introduction of “公交车” Paris buses will act as a line of defence and deterrence to ensure the safety of women in Delhi’s buses. The alarms have been put in five cluster buses plying on route 522 as a pilot project.

A positive outcome of the measures taken by the government is that the conversion of buses from diesel to CNG has helped to reduce PM10, CO, and SO2 concentrations in the city and has not, contrary to conventional wisdom, led to the recent increase in NO2 for the city. Another idea as per National Green Tribunal (NGT) reports, is to adopt CNG as the only fuel for the newer segment of commercial vehicles plying in the city. Given the massive expansion as expected in the urban population over the next 20 years, and the need to attract investment to create quality jobs, it is imperative that the issue of pollution be immediately and sustainably addressed.

Further, a novel common mobility card is being introduced offering seamless travel in NCT which would enable travellers to use their Metro smart cards to pay for a bus ride in the city. The key to a scalable solution is to leverage smartphone technologies. This could be the start of an integrated mobility service in the national capital, wherein travellers to use their Metro smart cards to pay for a bus ride in the city. The key to a scalable solution is to leverage smartphone Technologies. This could be the start of an integrated mobility service in the national capital, wherein. The Delhi government has set in motion the process of creating a vision document that could pave the way for the first comprehensive policy on zero-emission vehicles in the capital. The focus will be on electric mobility across almost all types of vehicles, including buses, private cars, taxis, three-wheelers and two-wheelers. With pollution as an alarming existential concern many serious discussions around electric mobility being the future of Delhi is reportedly gaining momentum in government circles. This also opens a door for the mobility services operating in the city to put hands with the government to create more sustainable and beneficial service for Delhi.
Ahmedabad, the former capital of Gujarat, was founded in 1411 AD as a walled city on the eastern bank of the river Sabarmati. Ahmedabad has gradually emerged in the form of circular rings generating 5 rings and 19 radials. Transport in Ahmedabad mainly comprises of bus service being operated by the Ahmedabad Municipal Corporation, which has extensive coverage across the city as well as a Bus Rapid Transit System (BRTS) locally called ‘Janmarg’. The BRTS Corridor is also characterised with dedicated footpaths and cycle lanes in the city. Ahmedabad has initiated for the cities of Ahmedabad and Gandhinagar. The BRTS in Ahmedabad is equipped with Intelligent Transport System (ITS) and Public Information System (PIS) technologies, but the city buses might be lacking these facilities as 70% denizens opine that PIS is not available in Ahmedabad. Parking at the Transit Stops and elsewhere is troublesome in Ahmedabad as the majority of the citizens responded that they have to wait for a very long time and it's very difficult to get a parking spot. This can be very well linked to the response that a majority of public transport commuters access the stops by walk and it is perceived to be the safest service amongst bus services across all cities, even for women, as 94% of the commuters find public transport in Ahmedabad to be safe.

The city with its widely available and universally accessible Public Transport and Intermediate Transport has succeeded in achieving the right choice as regards to people’s mobility. Only 3% commuters prefer personal vehicles over other modes, which is the least amongst all cities reviewed under the Ease of Moving Survey. Interestingly, autos and shared taxis account for the preference of 50% commuters in the week of the survey and the city appears to be the least electrical mobility-friendly cities. Electric mobility is expected to play an important role in reducing energy consumption in transport. Ahmedabad was among one of the poorly performing metropolitan cities with high overall emissions and energy consumption in transport.

Ahmedabad can be a great test bed for electric mobility initiatives from the government as well as public-private partnerships. While the city needs sustainable modes of mobility, it’s very character can have great learnings for expansion and replication in metropolitan cities with high overall emissions and energy consumption in transport.
The city is blessed to have an efficiently running Bus Rapid Transit System (BRTS) spanning 186 kilometres including 24 kilometres of a dedicated corridor serving a daily ridership about 1,68,000 passengers.

Another option for public transport in the city is the Inter-City Rapid Transit System (ICRIT), which is also expected to start serving the city by 2020. (Innovative integration of Intermediate Public Transit (IPT) modes with these options of public transport systems is efficient in Bhopal with around 460 IPT vehicles plying on over 20 routes of the city. The city ranks the best in terms of average trip length, which is around 4.75 KM, as per capita usage data from OLA.

As per the recent report by the Centre of Science and Environment (CSE), titled The Urban Commute, Bhopal is the best in terms of overall emissions & energy consumption under transportation both of which are low for the city. Bhopal can take pride in its relatively cleaner air thanks to low emissions from vehicles. Doubling on its efforts to minimise the negative effect of commuting on the environment, Bhopal is now focusing on public bicycle sharing. For its sheltered city, Bhopal is also emphasising explicitly on safety, design, and modal integration to encourage ridership of bicycles. The been ranked long and 5-meter-wide cycle track has put more people on bicycles. The new 12-kilometre-long and 5-meter-wide cycle track has put more people on cycles.

With such emphasis of the city administration on sustainable choices of mobility, Bhopal has rightly been declared as the 10th cleanest city of India, as per the Ease of Living Index, 2018 issued by the Government of India. Bhopal has been ranked as the second cleanest city of India. Bhopal needs to invest in a public information system and provide proper signage to back up the efforts to encourage walking.

As per the study, a good 53% of the youth population in Bhopal owns a bicycle. Out of this 5% are utilising them for either commute or leisure or both. Almost half of Bhopal prefers to use public transport for the daily commute. This is at the top among all the cities, where 77% utilise the government-run BRTS and system of buses of Bhopal City Link Limited (BCLL), and the privately owned and operated minibuses in the city.

Commutes in Bhopal on an average spend 62 minutes of their time in transit daily. This is the highest side compared to other cities similar to Bhopal where the time is 47 minutes. Almost two-thirds (67%) of the people feel that the public transport of the city is clean. It may be noted that Bhopal has received the second highest score in preference of this mode, only after Jaipur, and top score for average trip length (4.75 km). Further, 85% of the population is willing to put their car up for hire. 91% commuters in Bhopal are sensitive towards the environment and desire for environment-friendly vehicles. Similarly, more than 70% people know for footpaths and cycle tracks. This Becomes one of the most livable cities among 111 cities, as per the Ease of Living Index, 2018 issued by the Government of India.

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Indore is the most populous and the largest city in the Indian state of Madhya Pradesh (MP). Interestingly, Indore also served as a capital of the province of India named Madhya Bharat from 1950 until 1956. It is also termed as the commercial capital of Madhya Pradesh (MP), as it has highest GDP in MP. It is also known as "Mini Bombay" on account of the same and is a home to the Madhya Pradesh Stock Exchange, India's oldest stock exchange. Twice (2017-18), the city has been the winner of the "Swachh Survekshan" of the Government of India, and bagged the title of the "Cleanest City of India".

Indore is a premier centre for education, medicinal institutions and is a major industrial hub of Central India. As a historical as well as a modern city, it is a attracting a number of industries and is undergoing an economic surge. It is also an important tourist destination in central India. The rapid industrial and commercial development coupled with the rise in population in the recent past has contributed to a large-scale increase in road traffic in the city. This increasing intensity of traffic has resulted in the manifestation of a number of challenges and opportunities. Traffic congestion is already serious on major roads and sections, and parking problems are aggravating. The city is experiencing a rise in the use of personalised modes and to contain this, the city administration, the proposal for Indore Metro would be launched soon. As per CMP, modal share of personal vehicles - especially the two-wheelers - in Indore is high at 45%, followed by public transport at 28%. 14% of the commuters also plan to start Mass Rapid Transit System (BRTS) services in India. Indore has already initiated one of the best Bus Rapid Transit System (BRTS) in the form of Metro, to be launched soon. As per CMP, more than half of the population reach their workplaces in 30 mins. A considerable proportion of Indore citizens are commuting more than 20 kilometres on a day-to-day basis within the city.

On the downside, the accident rates are quite high in Indore and is a city with one of the highest number of accidents and fatalities. Parking issues abound too as almost 40% of the commuters find it difficult in parking their vehicle at transit stops and elsewhere. However, 72% commuters find parking for cycles near public transport stops easy. A huge proportion of the population in Indore owns bicycle - more than 80% of them utilise cycle either for commute or leisure. But the availability of cycling infrastructure is a matter of concern where only 40% of residents feel that seamless cycle tracks are available in the city.

Public transport in Indore bears patronage of more than 6% commuters use public transport. Also, public transport in the city is perceived to be expensive by the denizens, with 45% of the commuters feeling that fares are reduced, giving the potential for increasing the ridership. Can Indore achieve the optimum balance between affordability and service quality, remains to be seen!
Jaipur offers a bouquet of mobility options for its denizens. 72% city buses cover 180,000 passengers/day. Auto and cycle-rickshaws offer the much needed first and last mile mobility in Jaipur. In an attempt towards sustainable mobility, a key initiative of the government is that, Jaipur metro has also taken the initiative for women’s mobility situation has improved in Jaipur over the last 5 years. Metro proves as a boon to Jaipurites running as the fastest mode in the city, helping a commuter cover a distance of 96 km in just 28 minutes, on average¹. Another feature regarding this option of Public transit is that, Jaipur metro has also taken the initiative for empowerment of women by creating the country’s first metro station fully operatively women only. The buses operating under the BRTS are another example of comfort and affordability in the city. The buses have a dedicated lane to know the accessibility of the elderly and the specially-abled. The e-rickshaws, auto rickshaws and cycle rickshaws in the city facilitate feeder to the mass transport services for both tourists and local denizens.

Jaipur metro has also taken the initiative for women’s mobility situation has improved in Jaipur over the last 5 years. Metro proves as a boon to Jaipurites running as the fastest mode in the city, helping a commuter cover a distance of 96 km in just 28 minutes, on average¹. Another feature regarding this option of Public transit is that, Jaipur metro has also taken the initiative for empowerment of women by creating the country’s first metro station fully operatively women only. The buses operating under the BRTS are another example of comfort and affordability in the city. The buses have a dedicated lane to know the accessibility of the elderly and the specially-abled. The e-rickshaws, auto rickshaws and cycle rickshaws in the city facilitate feeder to the mass transport services for both tourists and local denizens.

Almost half of the denizens of Jaipur prefer travelling sustainably through public transport, while only 8% prefer their personal vehicles. The overall usage of public transport is 66% and includes ridership of metro rail and bus systems available in the city. Interestingly, as the peri, 85% of people find public transit affordable and clean to travel. Further, 80% of people have stated that they find public transport system comfortable in Jaipur.

¹. Data from Pink City: Booming City Million +, Times of India, November 2017. )2. Metro losses mount as daily ridership falls below 18,000, Times of India, November 2017. 3. “Indian cities among global outsourcing cities”. The Economic Times. 4. Bus Rapid Transit. 5. “Multimodal Connectivity for Sustainable Cities: The Jaipur Case Study”, by Shalaka Deshmukh Tehra. 6. “Multimodal Connectivity for Sustainable Cities: The Jaipur Case Study”, by Shalaka Deshmukh Tehra. 7. http://transport.rajasthan.gov.in/jmrc. 8. At 60% cycle ownership, Jaipur ranks above most other Indian cities. This ownership ratio is also maintained among youngsters. Despite such high ownership of bicycles, only 55% of the city uses it to commute. A lack of designated and safe infrastructure deters denizens from using bicycles for the daily commute. The study further finds that preference of mode changes according to the trip time. For instance, 75% of people prefer public transport for short trips of less than 30 minutes. As the travel time goes over 30- 60 minutes duration, only 15% people prefer public transport. This proportion decreases further to 1% when the trip time is more than 60 minutes. In such a case, 47% prefer on-demand taxi-cabs and 42% people prefer autos. The remaining 10% comprises of personal vehicles (7%) and NMT (3%) users. Jaipur with its influx of tourists can make an impactful mark by improving its state of public transportation and last mile connectivity.

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Kochi (Cochin) with its wealth of historical associations and its unique setting reflects the eclecticism of Kerala. The city has a population of 672,381 persons (Census of India, 2011) spread across an area of 94.88 km², with a population density of 7,193 persons per km².

The Wyte Fort

360 DEGREE MOBILITY
Kochi has augmented its mobility service offerings through the introduction of Kochi metro rail, and formulating NMT and Pedestrian policies for the city.

![Image: By Kounosu [GFDL (http://www.gnu.org/copyleft/fdl.html) or CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0)], from Wikimedia Commons](image)

**CHALLENGES**

- **Access to public transport**: Although the availability of public transport is not an issue, the affordability and reliability of the service are concerns for the majority.
- **Traffic congestion**: Kochi has been facing a declining usage of public transportation system attributed to the lack of last-mile network and affordability. Bus service in Kochi is limited, with the network being operated by private owners. More recently, the state-owned bus network company, KRTC, too has started intra-city services which have been praised for its efficient and comfortable service. But safety and affordability remain concerns for the majority. The ultra-city services operate at two levels: A basic no-frills service known as Thru-Kochi which is funded under the JNURM scheme, and a service known as Kochi Metro which is being operated by the Government. The affordability issue can be attributed to a lack of modal integration, as last mile connectivity for modes such as ferries, and buses, are not integrated in terms of intermodal transfers involved in making the overall fare of public transport making it unaffordable.

- **Public transport**: Despite the many efforts taken by the city administration to offer holistic mobility solutions to its citizens, Kochi has been facing a declining usage of public transportation system attributed to the lack of last-mile network and affordability. Bus service in Kochi is limited, with the network being operated by private owners. More recently, the state-owned bus network company, KRTC, too has started intra-city services which have been praised for its efficient and comfortable service. But safety and affordability remain concerns for the majority. The ultra-city services operate at two levels: A basic no-frills service known as Thru-Kochi which is funded under the JNURM scheme, and a service known as Kochi Metro which is being operated by the Government. The affordability issue can be attributed to a lack of modal integration, as last mile connectivity for modes such as ferries, and buses, are not integrated in terms of intermodal transfers involved in making the overall fare of public transport making it unaffordable.

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**OPPORTUNITIES**

- **Better coverage, frequency, and affordability**: 4 out of 5 of the non-public transport users in Kochi are willing to switch to public transport if the quality of the service improves. The shift to public transport is a significant opportunity for augmenting public transport patronage. Additionally, integrating the fares and introduction of “Integrated Common Mobility Card” may prove a boon for Public Transport in Kochi. Furthermore, 90% of the population of Kochi owns a bicycle, out of which remarkably 85% use it. Out of those using the NMT, 26% use it for commuting, 26% for leisure, and 25% ride for both. 57% of the Kochiites feel that walking & cycling is safe in the city but more than 65% separate cycle tracks and footpaths necessary for the city. Given such, safe, women-friendly Kochi has all the right buzzwords going for it.

**Ridesharing**

- **Growing trend in public transport**: Given better coverage, frequency, and affordability, 4 out of 5 of the non-public transport users in Kochi are willing to switch to public transport if the quality of the service improves. The shift to public transport is a significant opportunity for augmenting public transport patronage. Additionally, integrating the fares and introduction of “Integrated Common Mobility Card” may prove a boon for Public Transport in Kochi. Furthermore, 90% of the population of Kochi owns a bicycle, out of which remarkably 85% use it. Out of those using the NMT, 26% use it for commuting, 26% for leisure, and 25% ride for both. 57% of the Kochiites feel that walking & cycling is safe in the city but more than 65% separate cycle tracks and footpaths necessary for the city. Given such, safe, women-friendly Kochi has all the right buzzwords going for it.
Patna, capital of the Indian state Bihar, is located on the south bank of River Ganga. In ancient times, it was called Pataliputra. Today, Patna is the 5th fastest growing city in India and has a rank of the 11th best city according to an annual survey of India's city systems conducted by Janagraha Center for Citizenship and Democracy. Patna is a virtual business centre of Eastern India.

The modal splits show the travel pattern of the city to be environmentally friendly with the maximum contribution of cycling (33%) followed by walking (29%). The existing urban transport scenario of Patna shows that on an average each person in Patna makes more than one trip in a day including walk trips (PCTR being 1.14). The modal split rate of Patna is reported to be 67% for public transport and 76% for average trip length of 5.49 km and average travel time of 15 mins.

Patna will soon have 30 electric buses under the Smart City Mission. This will not only help in reducing pollution but will also lead to solving the city's traffic woes. Patna has been offering free rides for women in buses on Raksha Bandhan and Bhai Dooj, making public transport a preferred mode choice for travel during festivities.

The city’s mobility is sustainable with almost 75% of the commuters preferring Shared Mobility as their mode of commute. When a preference of personal vehicles is less even with increasing purchasing power, in stark contrast to the general trend observed in other cities. In Patna, nearly 50% of the respondents who are categorised under general trend observed in other cities. In Patna, nearly 50% of the respondents who are categorised under 5.49 km and average travel time of 15 mins. Patna will soon have 30 electric buses under the Smart City Mission. This will not only help in reducing pollution but will also lead to solving the city’s traffic woes. Patna has been offering free rides for women in buses on Raksha Bandhan and Bhai Dooj, making public transport a preferred mode choice for travel during festivities.

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In conclusion, the overall mobility of Patna in an urban context is by and large on a higher scale when compared with booming cities.
Surat, the economic capital of Gujarat, is home to over 4.4 million citizens, with 55% of the population being women. Surat has improved its mobility scenario over the last five years as almost 85% of the citizens have a positive opinion about this. Surat is also the home of environmentally sensitive people as 98% of Surat’s denizens would like for their vehicles, including public transport, to be environment-friendly.

Apart from walking and cycling being the prominent modes to access public transport, shared mobility modes like auto rickshaws, and larger IPTs constitute a quarter of the mode share while accessing public transport. Like most other cities, pedestrian and cycling infrastructure in Surat needs a major overhaul as more than 80% Surat denizens feel the city needs dedicated cycle tracks and pedestrian pathways. There is also increasing importance because more than 50% residents of Surat own bicycles, out of which more than 60% use it for the daily commute, leisure or both.

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There is a substantive captive audience for public transport in Surat that can be converted by augmenting public transportation. People of Surat are on an average 15 mins of walking. 40% of women state that they would shift to public transport if the issues of safety, comfort and coverage are addressed. If Surat can improve its public transport ridership, with improved coverage and safety levels, the diamond district can go a long way!
Several cities in India have seen continuous human inhabitation of more than a millennium. One such city is Bhubaneswar in Odisha, which boasts a long and rich history. Its major attractions and glorious past are its monumental Kalinga architecture temples that have earned it the name, "Temple City of India". Bhubaneswar has been the only Indian city among the world's top global smart cities as listed under the Global Smart City Performance Index (2017) by Juniper Research.

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Jabalpur, the cultural capital of Madhya Pradesh

Third largest urban agglomeration in Madhya Pradesh and country’s 30th-largest urban agglomeration, home to more than a million citizens with 16.6% decade growth rate, covering an area of 153 km² and population density of more than 8,200 persons per km². Jabalpur has an extensive road network of about 1,267 km in length which is 19% of the land use of the city. As per the CDP actual modal composition in the city varies considerably with 27% of personal vehicles followed by 7% of public transport, 5% of IPT and 22% of non-motorised transport and a high percentage of pedestrians at 56% of the total share. A key initiative of the Government to improve the mobility scenario in the city is that the public sector undertaking, NTPC, has signed a tripartite Memorandum of Understanding with Jabalpur Smart City Limited and Jabalpur City Transport Services Limited for setting up charging infrastructure for all segments of electric vehicles across the city enabling Jabalpur to become a model city for electric mobility.

Jabalpur is comfortable except on a few occasions. Yet, 49% of the people say that Public Transport in Jabalpur is one of the safest in this category amongst cities. At the same time, however, 71% of the respondents question the reliability of the public transport system. For instance, 85% of the women feel it one of the safest in this category amongst cities. As noted by 70% of the denizens, parking in transit stops is expensive. Addressing the parking issue at public transit stops would help improve the ridership of public transport. Furthermore, 81% of the citizens have mentioned that there are no cycle tracks in the city. Over 70% of the commuters support non-motorized transport as a mode of daily commute in Jabalpur. The city aspires for proper cycling infrastructure that can support non-motorized transport as a mode of daily commute. Jabalpur is a leader in the aspect of facilitating gender-wise usage planning for shared mobility services. Jabalpur is a promising city for electric mobility.

Any mode of transportation that is shared by users on an as-needed basis, from bikes to 4-wheelers to mass transit can constitute shared mobility. Consideration of all user-types should be taken into account while planning for shared mobility services. Jabalpur is a leader in the aspect of facilitating gender-wise usage planning for shared mobility services. Jabalpur is a promising city for electric mobility.

As per the study, 70% of the population spends within INR 3000 per month on transport which indicates that the expenditure on mobility is nominal. However, the study also reported that, 70% of the population have asserted that the ease of parking is affected in Jabalpur with long waiting time and unavailability of parking spaces at transit stops for both 2-wheelers and 4-wheelers. About 70% of people opined that the riding quality of the streets of Jabalpur is not perfect due to potholes on majority of the roads within the city limits. 45% of the city’s population commutes within 20 kilometers on a daily basis. The total time spent in transit each day for 59% of the residents is around 60 seconds. 45% of the city’s population commutes within 20 kilometers on a daily basis. The total time spent in transit each day for 59% of the residents is around 60 seconds. 45% of the city’s population commutes within 20 kilometers on a daily basis. The total time spent in transit each day for 59% of the residents is around 60 seconds. 45% of the city’s population commutes within 20 kilometers on a daily basis. The total time spent in transit each day for 59% of the residents is around 60 seconds.

Per capita trip rate 1

Frequency of using Public Transport

Reported to have high frequency of usage by its public transport by its users.

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Jammu is winning the hearts of its citizens with a reasonably-priced, reliable, and high-frequency public transport system. 81% of the people find public transport affordable. 62% find the system reliable and state that the schedules are generally complied with. 96% do not wait for more than 15 minutes for buses to arrive at the stops in the city, pointing to high-frequency of the public transport system. Notably, this average waiting time is one of the lowest among the 20 cities of Ease of Moving study. All these positives of the public transport system make it a popular choice and has led to high utilization of the state-run buses.

The existing road network of Jammu is of radial pattern. As observed through the Ease of Moving survey, 44% of the mode preference comprises of public transport, 50% personal vehicles, Rest 6% consists of MGT (Pedestrians) and Intermediate Public Transport options such as taxi/cab. The city bus service operated by JRCST dominates the Public transport scenario serving approximately daily ridership of 16,000 passengers plying on 50 routes with a fleet size of 750 buses. Jammu is targeting a fully electric fleet for the public transport including buses, taxis and auto-rickshaws under the second phase of FAME India scheme.

The downside to Jammu’s mobility is the cost burden spent between INR 3,000 and INR 10,000 per month on mobility due to high usage of personal vehicles. Further, majority of the people do not find any sort of public information system available in Jammu. As far as safety is concerned, 42% of the women cite safety as the reason for not using public transport in the city. Despite these challenges, 71% women use public transport, and 44% women prefer public transport over other modes, in Jammu. This indicates the need for such a system for an upgrade of the public transport infrastructure which the city-developers are so dependent upon.

A noticeable insight from the Ease of Moving survey is that almost 100% of people (highest among the cities chosen for the study) consider that it is essential for their vehicles to be environment friendly. This can be taken as a ground of opportunity for implementing the government’s policy of electric mobility in Jammu. Additionally, Jammu also houses a large share of people willing to shift to public transport should the same be made comfortable. This too indicates an urgent need for the government to augment public transport services in the city.

There is a need for improvement in road infrastructure with 56% of the denizens finding a majority of the roads to be dark and unsafe post-sunset. Street-lighting should become a priority for the city planners. Overall, the people of Jammu have a positive perception regarding the mobility scenario prevailing in the city. A noticeable insight from the Ease of Moving survey is that almost 100% of people (highest among the cities chosen for the study) consider that it is essential for their vehicles to be environment friendly. This can be taken as a ground of opportunity for implementing the government’s policy of electric mobility in Jammu. Additionally, Jammu also houses a large share of people willing to shift to public transport should the same be made comfortable. This too indicates an urgent need for the government to augment public transport services in the city.

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Kohima, originally known as Kewhira, is the capital of the state of Nagaland. The city’s population of 99,039 is estimated to be 28.50% as compared to other cities. As per the Ministry of Road Transport and Highways, the rate of accidents is reported by the Accident Report (PCTR) is 1.1.

The land of the Angami Naga tribe, Kohima was founded in 1878 and is home to more than 6,600 persons per km². Originally known as Kewhira, Kohima was registered as either auto-rickshaws and/or taxis and buses which have a small network length of 8.4 km (Greater Kohima Planning Area). Kohima offers options for public transportation in the form of city buses which have a small network length of 8.4 km across 3 routes serving 27 passengers per day. Along with this, there are about 300-400 vehicles registered as auto-rickshaws and/or e-autorickshaws and/taxis providing accessibility to various parts of the city. The total road network length is about 115 km. Land use under transportation is about 2.1% with per capita road network share of about 1.16. Per capita trip rate (PCTR) is 1.1.

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A large number of people prefer the usage of IPTs. Planning for a network of IPT with cleaner fuels like renewable-energy-powered electricity (e-rickshaws, e-autorickshaws) can help Kohima achieve sustainable commuting. Apart from this, walking is also encouraged through adequate coverage of footpaths and other transport infrastructure could be made easily accessible for people with different disabilities making Kohima’s mobility truly inclusive. The city is also a front runner in safety as lesser rate of accidents is reported by the Accident Report of the Ministry of Road Transport and Highways, Government of India, as compared to other cities.

Kohima’s accessibility to mobility is exemplary - 95% of the people owning bicycles in Kohima use it for leisure as well as daily commute making Kohima one of the top cities in Non-Motorized Transportation (NMT) utilization. On the other hand, walking is also a preferred mode in Kohima illustrated by the Ease of Access study findings that only 5% access the public transit system on foot. Since Kohima is on a hill ridge, travelers and citizens both can almost always travel up or down through the city. But, there is a need to improve the walking infrastructure to facilitate more pedestrians.

One of the primary missions of Accessible India Campaign (Sugamya Bharat Abhiyan) is to make India a more accessible country for people with disabilities. Launched by the Ministry of Social Justice and Empowerment, Government of India, the campaign is a key initiative for the capital of the state of Nagaland from the perspective of making modern accessibility for the society to be able to reach. The campaign looked at how bus stops, pedestrian crossings and other transport infrastructure could be made easily accessible for people with different disabilities making Kohimas mobility truly inclusive. The city is also a front runner in safety as lesser rate of accidents is reported by the Accident Report of the Ministry of Road Transport and Highways, Government of India, as compared to other cities.
Mysuru is well known across the world for its magnificent architectural marvels and rich history. Mysuru has thereby established a sustainable public transport by successfully using intelligent transport system (ITS) to provide information on the frequency and timing through application-based information. Distinctly, the implementation of which could also be measured by the current study where 67% of the inhabitants have reported to enjoy a short amount of waiting time for accessing public transport system which is within the range of 15 minutes.

In a pioneering effort, the Government of Karnataka has initiated projects under the Sustainable Urban Transport Programme (SUTP) of the Ministry of Urban Development, Government of India. The programme has not only sought to improve the efficiency of mobility and passenger safety, but offered commuters to make informed choices of travel modes which also happens to be the ICT initiative supported by the World Bank in the city of Mysuru.

74% people use public transport in Mysuru. Due to this majority of the population using public transport, it is quite evident that the city roads would be catering to less traffic. In other words, personalized motor vehicles would be the lesser in the city. This is also evident whilst connecting another dot from the survey results which shows that 73% of the residents feel that mobility situation has improved during the last 5 years.

85% of the residents feel that mobility situation has improved during the last 5 years.

85% still think that improvement in last mile connectivity is required.

85% people perceive public information system within reach.

80% of women patronize System Public Transport.

85% people across public transport in Mysuru within 15 minutes of walking - this is contributing to good air quality in the city. When considering gender-wise bifurcation of usage of mass transit facilities, a staggering 86% of female public transport users in Mysuru perceive it as safe. Further, 80% of all users consider public transport to be clean.

A public bicycle sharing system in Mysuru, 'Trin-Trin', funded partially by the United Nations is a popular mode of transport. Pertaining to this, the analysis presents that 72% of the respondents said that the condition of cycle tracks in the city is fair and that they are available along major roads of the city. The NMT ridership is also supported by the good quality of road facilities in Mysuru - 85% of the city finds the roads to be free of potholes.

The key objective of ‘Trin Trin’, is to encourage local commuters, as well as visitors, to prefer bicycles over motorized modes of travel and thereby help scale down the environmental and road-traffic hazards, enhance convenience, and make local daily commutes economical for the common citizen. As reported by 63% people, the cycle transit stops at various points across the city supplementing NMT usage thereby greening the transport emissions of Mysuru.

Interestingly, it can be seen in Mysuru that income has not seemingly influenced the usage of transport across classes: 29% of the affluent class & 30% of the lower to middle class use taxi-cabs. Penetration across classes: 29% of the affluent class & 30% of the lower to middle class use taxi-cabs. This is contributing to good air quality in the city. When considering gender-wise bifurcation of usage of mass transit facilities, a staggering 86% of female public transport users in Mysuru perceive it as safe. Further, 80% of all users consider public transport to be clean. A public bicycle sharing system in Mysuru, ‘Trin-Trin’, funded partially by the United Nations is a popular mode of transport. Pertaining to this, the analysis presents that 72% of the respondents said that the condition of cycle tracks in the city is fair and that they are available along major roads of the city. The NMT ridership is also supported by the good quality of road facilities in Mysuru - 85% of the city finds the roads to be free of potholes.

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Second largest city in the Marathwada region of Maharashtra State, home to nearly 5.5 lakh citizens with 16.7% decadal growth rate, covering an area of 46 km² and population density of more than 11,956 persons per km².

More than 40 thousand new vehicles get registered every year in Nanded (2014-15) and more than 88% of these are two wheelers, which is distinctly higher than the previous years. The bus transport system operated by the Maharashtra State Road Transport Corporation (MSRTC) forms the major provider of the public transport system. MSRTC currently has a fleet strength of 48 buses, which includes 4 Standard Buses. 10 Semi Low Floor Non-AC Buses and 34 Mini Buses. These state-run buses operate within the city of Nanded, charge affordable fares and are quite punctual.

The city administration has initiated a project for developing complete streets in Nanded. The road network reflects the diversity in user profile and street activity seen in the town. The project promotes safer environment for the road users in general and cycling in particular. The city has provision for separate lanes for Non-motorized Transport (NMT) users. The project has been entrusted to the Association of Indian cycling Promotion for implementation.

The city of Sanskrit poets and Gurdwaras of Nanded generally stays in and around roads, and also for organized public transport services. This trend clearly highlights the role of IPTs in Nanded. Notably, almost 80% commuters in Nanded feel transport facilities to be unclean. There lies a tremendous opportunity for the city to develop/better transport facilities if it becomes safe, comfortable, affordable and accessible. This is also supplemented by the fact that almost 80% commuters in Nanded feel that first and last mile connectivity should be improved by creation of pedestrian and cycling infrastructure for better public transport experience.
Vijayawada, meaning ‘place of victory’, previously known as Bezavada, is located on the banks of river Krishna and is enveloped by Indrakiladri Hills to its west. Vijayawada is recognized as a “Global City of the Future,” one of the most important commercial cities of Andhra Pradesh. Strategically located, the city has experienced a fast growth rate of population. A quite modern city still preserving its antiquated remains, the city has a promising connectivity through rail, road and flights.

Studies find Vijayawada’s transport system to be emitting the least harmful gases among other comparable cities. The Government of India through its ‘Ease of Living’ Index has dubbed Vijayawada as the ninth most livable city in India. In the context of public transport, the system functioning in the city is essentially road based provided by businesses operated by the Andhra Pradesh State Road Transport Corporation (APSRTC) and supplemented by paratransit modes, “the chakkra’s” (common name for the 10-seater intercity paratransit modes), and auto-rickshaws. Vijayawada City Division of the APSRTC operates close to 450 buses for an average of 300,000 daily commuting passengers and is supplemented by paratransit services. There is also a plan for a light metro train expected to cover 40 Km in length and can carry 13.31 lakhs passenger per day as projected by paratransit modes, “the chakkra’s” (common name for the 10-seater intercity paratransit modes), and auto-rickshaws. Vijayawada City Division of the APSRTC operates close to 450 buses for an average of 300,000 daily commuting passengers and is supplemented by paratransit services. There is also a plan for a light metro train expected to cover 40 Km in length and can carry 13.31 lakhs passenger per day as projected for 2051.

Further, through the Ease of Moving study, it is inferred that 56% of the youth population in the city would want to shift from their motorized forms of transport to healthy modes of walking and cycling on the streets of the city for their shorter trips. The denizens would want to shift from their motorized forms of transport to healthy modes of walking and cycling on the streets of the city for their shorter trips. The seamless commuting in the city is supported by the presence of 16 bridges across the three canals of Bandar, Eluru and Krishna. M.G Road and Eluru Road are the major arterial roads of the city, with as many as 160,000 vehicles plying daily on M.G. Road (Bandar canal alone). Public transport service can be augmented on these lines so that the benefits of shared mobility is ensured in the coming years. 60% of the city’s roads is covered by footpaths and cycle lanes. This validates the fact that the denizens would want to shift from their motorized forms of transport to healthy modes of walking and cycling on the streets of the city for their shorter trips. Vijayawada has also shown a good digital approach to carry passengers, with almost one-third of the transactions in the transport sector happening digitally.

Vijayawada has a high rate of fatal accidents. Road safety is a cause for concern in Vijayawada. There is a high rate of fatal accidents. This can be due to deficiencies in infrastructure as evident from the survey results illustrating the fact that 65% of the citizens report that the city roads are full of potholes. There is another challenge - regarding the skewed gender-share of usage of public transport with only a quarter share of females using the shared mobility service - concerns of safety and comfort abound. However, women in Vijayawada prefer using public transport as they are more accessible and have an auto service which has been inferred from tertiary sources explaining that once autos are open-booked, they are perceived to be safer in general.

The Place of Victory | Global City of the Future
This is one of the many ways in which data from mobility and mobility services can help improve cities. Information not only helps new economy models thrive, but can also help cities and communities plan better for transportation, housing, resource allocation, and improving ease of living for citizens. Mobility Data Analytics improves life in rural and urban areas by minimising road congestion, reducing travel duration, widening public transport options, improving bike and pedestrian infrastructure, improving overall city planning and impacting the environment positively.

Ola can share the bump and pothole data with city authorities responsible for road maintenance. The data can be in the form of a map which shows a live view of bumps and potholes with severity. The data collection is extremely dynamic to the extent that if a pothole is fixed, it will be removed from the map in a few hours. To further help the authorities in prioritising which pothole to fix, Ola can provide average vehicle speed at these points at various time periods. Ola can also provide instances of hard braking in and around the pothole as faced by Play cars. This is one of the many ways in which data from mobility and mobility services can help improve cities.

As millions of Ola cabs ply around the city several times a day, these cabs collect a lot of data about the road condition. Ola Play (a unique category with infotainment units) cars, which operate in seven cities, have a custom-built head-unit for infotainment. This special head-unit has sensors (accelerometer & gyroscope) which measures changes in acceleration and direction across three axes. Using data from these sensors and the GPS data, Ola is able to map the bumps and potholes in the city. Whenever a Play car enters a pothole, it records acceleration along the vertical axis. As the car comes out of the pothole, it again records acceleration along the vertical axis but in the opposite direction. This acceleration pattern indicates the presence of a pothole. When multiple cars going around the city ratifies this, it is confirmed as a pothole and its position is stored in Ola’s database. Bump, and pothole data is dynamic in the sense that if a pothole is fixed, then Play cars report the same, and it is automatically removed from Ola’s database. Based on the magnitude of acceleration, Ola is also able to differentiate between minor and large potholes.

Potholes claimed six lives a day in India in 20161. Apart from causing serious accidents and deaths, potholes also lead to slow-moving traffic and traffic jams. Traffic congestion costs four major Indian cities INR 15,000 crore a year2. Assuming potholes cause 10% of traffic congestion, it means a yearly loss of INR 1,500,000. Ola can share the bump and pothole data with city authorities responsible for road maintenance. The data can be in the form of a map of the city, which shows a live view of bumps and potholes with severity. The data collection is extremely dynamic to the extent that if a pothole is fixed, it will be removed from the map in a few hours. To further help the authorities in prioritising which pothole to fix, Ola can provide average vehicle speed at these points at various time periods. Ola can also provide instances of hard braking in and around the pothole as faced by Play cars.

An interesting application developed by one of the world’s leading ridesharing platforms, Ola, is an app-based approach to detecting potholes and bumps on roads. A rough road is an important cause of road accidents. Such data, crucial to improve the surface condition of roads, and thereby improve road safety, could help cities adopt a more proactive and money-saving approach to road maintenance.

1. Times of India.
2. The India Express.

Traffic congestion costs four major Indian cities INR 15,000 crore a year3. Assuming potholes cause 10% of traffic congestion, it means a yearly loss of INR 1,500,000. Ola can share the bump and pothole data with city authorities responsible for road maintenance. The data can be in the form of a map of the city, which shows a live view of bumps and potholes with severity. The data collection is extremely dynamic to the extent that if a pothole is fixed, it will be removed from the map in a few hours. To further help the authorities in prioritising which pothole to fix, Ola can provide average vehicle speed at these points at various time periods. Ola can also provide instances of hard braking in and around the pothole as faced by Play cars.

In addition to using open data to reduce travel times. Additional value can be gained by using open data to improve the efficiency of public transportation and freight operations, through adjusting train and bus schedules to match demand better and optimising operations based on industry-wide benchmarks.

The vast amount of data generated in mobility, from public transit use and operations, mobile phone usage, app-based aggregators, navigation systems, connected devices, autonomous vehicles, etc., reflects the unprecedented potential to significantly improve global opportunities potentially worth USD 1 trillion annually by 2025 for improved, smart transport systems that unlock latent capacity. India, with its increasing urbanisation and commuting challenges, presents opportunities for innovative solutions in mobility via global and local expertise in transport modelling, design, planning and testing, and most importantly, big data analytics.

The India Express. 2018. November 16. Which data can answer the question “What should be done to reduce traffic jams in Bengaluru?”

1. Extracted from a press release by Ola in India, 2018. 15th July.
