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APPLIED RESEARCH

FINAL REPORT: Post-COVID-19 Mobility: Key levers to reform urban transport systems

COVID-19 Research & Response Transport Recovery Fund

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from the British people

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Abstract

The COVID-19 pandemic has challenged public transport operations in an unprecedented way in developing cities. The street space, public transport (and as their extension paratransit) operations will need to cope up with the changing times by providing a safe and hygienic environment. It is crucial that the potential boom in the purchase and use of private automobiles in the post-COVID world remains short-lived and non-motorised transport, public or shared transport options are prioritised in the urban policies in developing cities. It is also crucial that public transport and paratransit retain and expand the patronage of these vulnerable groups while building infrastructure and supporting walking and cycling facilities.

This research will identify the 'key levers' that have driven reforms and innovative transport solutions in cities in LICs. These 'key levers' could be in the form of organisational capacities, institutional resilience, specific reforms, financing mechanisms or planning methods and tools. The purpose of this project is to create a guidance document with case study briefs for LICs that will help them to learn from the 'key levers' of the best practices and create a sustainable transport strategy for the new normal phase. Based on this research project, the governing authorities at various levels would be able to implement ideas about reforming the existing walking, cycling, paratransit, or public transport system. Moreover, the study will help the governments issue advisories to the cities, transit authorities and implementing agencies to make them resilient to absorb and respond to the post-pandemic scenarios.

Keywords	COVID-19, post-COVID, urban transport reform, bus based public transport, walking, cycling, informal public transport, non-motorised transport
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ACRONYMS

AACRA	Addis Ababa City Roads Authority
AARTB	Addis Ababa Road & Transport Bureau
AATMA	Addis Ababa Traffic Management Authority
ADB	Asian Development Bank
AUV	Asian Utility Vehicles
BBMP	Bruhat Bengaluru Mahanagara Palike
BBPT	Bus based public transport
BDA	Bengaluru Development Authority
BESCOM	Bengaluru Electricity Supply Company
BMRCL	Benglauru Metro Rail Corporation Limited
BMTC	Bengaluru Metropolitan Transport Corporation
BRCC	Bus Reform Civic Centre
BRP	Bus Reform Program
BRT	Bus Rapid Transit
BRTS	Bus Rapid Transport System
BTP	Bengaluru Traffic Police
BWSSB	Bengaluru Water Supply and Sewerage Board
CBD	Central Business District
CER	Certified Emission Credits
CPPR	Center for Public Policy Research
DARCOBOA	Dar es Salaam Commuter Bus Owners Association
DFT	Department for Transport, Government of UK
DOTr	Department of Transport
DULT	Directorate of Urban Land Transport
E-auto	Electric Auto
ECF	European Cyclists' Federation
EJADCS	Ernakulam Jilla Auto-rickshaw Drivers' Co-operative Society

ERF	Ethiopian Road Fund
FAME India	Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India
FTA	Federal Transport Authority of Ethiopia
GDP	Gross Domestic Product
GHG	Green House Gas
GLA	Greater London Authority
GoT	Government of Tanzania
HIC	High Income Country
IDRD	Instituto Distrital De Recreación Y Deporte
IDU	Instituto de Desarrollo Urbano
IISc	Indian Institute of Science
INDC	Intended National Determined Contribution
IPT	Informal Public Transport
IRC	Indian Roads Congress
IST	IISc Sustainable Transportation Lab
ITDP	Institute for Transportation and Development Policy
JICA	Japan International Cooperation Agency
JUSP	Jana Urban Space Foundation
KCCA	Kampala Capital City Authority
KMC	Kochi Municipal Corporation
KMRL	Kochi Metro Rail Limited
KMTA	Kochi Metropolitan Transport Authority
KPT	Kochi Public Transport
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
KSRTC	Kerala State Road Transport Corporation
LAMATA	Lagos Metropolitan Transport Authority
LASTMA	Lagos State Traffic Management Authority
LCN	London Cycle Network

LIC	Low Income Country
LMIC	Lower Middle-Income Country
LMTS	Lagos Mass Transit Study
LOHAC	London Highways Alliance Contract
LPG	Liquefied Petroleum Gas
LPTRP	Local Public Transport Route Plan
LSG	Lagos State Government
LTF	Local Transport Fund
LTFRB	Land Transportation Franchising and Regulatory Board
LUTPS	Lagos Urban Transport Project
MACE	Manila Aerosol Characterization Experiment
MATA	Metropolitan Area Transport Authority
MoLIT	Ministry of Land, Infrastructure and Transport
MoRTH	Ministry of Road Transport and Highways
NACTO	National Association of City Transportation Officials
NESTS	National Environmentally Sustainable Transport Strategy
NIP	National Implementation Plan
NUMO	New Urban Mobility Alliance
NURTW	National Union of Road Transport Workers
ORR	Outer Ring Road
PDP	Philippine Development Plan
PUV	Passenger Utility Vehicle
PUVMP	Passenger Utility Vehicle Modernisation Program
QPBS	Quasi-Public Bus System
Sataco	South African Taxi Council
SDG	Sustainable Development Goals
SDM	Secretaría Distrital de Movilidad
SMG	Seoul Metropolitan Government

SMP	Sustainable Mobility Plan
SRTU	State Road Transport Undertaking
STARS	Sustainable Travel: Active, Responsible Safe
SUMA	Sustainable Urban Mobility Accords
SWR	South Western Railways
TenderSURE	Tender Specifications for Urban Utilities and Road Execution
TFL	Transport for London
TOPIS	Transport operation and information system
TPMO	Transport Programs Management Office
UDA	Shirika La Usafiri Dar Es Salaam
UDA-RT	UDA Rapid Transit
ULB	Urban Local Body
UMIC	Upper Middle-Income Country
UMTA	Unified Metropolitan Transport Authority
UMTC	Urban Mass Transit Company
UTF	Urban Transport Fund
W&C	Walking and Cycling
WRI	World Resources Institute

EXECUTIVE SUMMARY

A transport system is the city's lifeline as it makes the city accessible for all. The Covid-19 pandemic has impacted the urban transport system in an unprecedented way. Public transport and intermediate public transport are struggling to find commuters or, in some cases, continue to run with the safety protocols. There is a renewed interest in cycling as reflected in its use and purchase. However, this initial excitement still needs to be converted into permanent infrastructure and institutional arrangements. Future cities will need to build robust systems to deliver efficient public transport, integrated intermediate transport, and streets that prioritise walking and cycling.

This pandemic has been a life-altering event for many, and it compels us to go back and re-think urban priorities. Some cities have managed their urban transport crisis with more resilience, and there is a lot to learn from them. Some cities have converted the challenges to building their systems better. Some cities have been making the right choices for the last two decades, and with resilient systems, they have been able to bounce back quickly. Based on the case studies of many such cities, this strategic guidance document provides ways of moving ahead with the urban mobility reforms to build more resilient systems in the future. The document is organised around three modes – walking and cycling, bus-based public transport, and intermediate public transport. For the modes, the document details how to 'get it right' – developing and investing in a system, resolving institutional issues, and building the right kind of infrastructure.

Walking and cycling – Walking and cycling are the most fundamental, sustainable modes that need to find dignified space and permanent infrastructure in our cities. This would require someone in the ULB to champion the cause – a cycling commissioner supported by a dedicated team and an adequate budget per year. This team is further supported by a city-level NMT committee coordinating with other agencies and providing organisational support to all the activities. A critical job of this team is to understand and expand the demand for walking and cycling. Demand/interest generation events and some bold pilot projects can showcase the city's commitment to these sustainable modes. Finally, capacity-building programs for the municipal, traffic police, and other government staff would go a long way in building a resilient system that delivers quality walking and cycling infrastructure.

Bus-based Public Transport – Bus-based public transport in any city is an essential component of the urban transport system. Buses are genuinely a 'mass transit' given how easily they can cover the entire city, with greater flexibility of operations/routing based on the demand. During and after the pandemic, more buses are required to maintain the physical distance between the commuters and continue to provide a safe mode of transport with greater frequency. Indian cities require systematic investment plans in bus-based public transport to modernise the existing fleet and maintain and upgrade them with a long-term vision. For the effective and continued investment in the bus-based public transport, a robust institution of public transport authority is required which can plan, coordinate, implement and invest in this system. Finally, a robust bus-based public transport authority makes all its policy around the motto of 'commuters come first'. It is observed in this research that the cities which have systematically invested in buses, learned from their past failures, created strong institutions for efficient bus operations are the ones that have better resilience.

Informal public transport – Informal public transport is a shared mode of transport, and thus, it is imperative to treat them as a sustainable mode rather than seeing them as a nuisance. IPT is also a crucial mode to provide last-mile connectivity for the high-capacity mass transit systems. Indian cities need institutional and regulatory reforms to integrate IPT with their existing public transport system. As strategic guidance, a mobility department within the urban local body is envisioned coordinating all urban transport service providers in the city. They can regulate the IPT services, understand the demand and make strategic interventions for better coordination. Here, modernisation of the IPT fleet or electrification scheme can nudge the institutional reforms in the right direction. If IPT is treated as legitimate transport service providers integrated with a larger urban system, it will lead to the IPT services being safe, hygienic, and beneficial to the city.

Finally, a city's transport needs to be viewed and designed as "one" integrated system – a system that is planned for future travel demand, with supply coming from various modes like public transport, IPT, walking, and cycling. This would mean designing a system to enable people to reach where they need to go; the result

is an accessible city. A city that invests in a robust transport system is not only accessible for all, but it is also a prosperous city, a liveable city.

1. Introduction

1.1 Project aims and objectives

The COVID-19 pandemic has challenged transport systems in an unprecedented way in developing cities. The street space, public transport (and as their extension paratransit) operations or other shared modes will need to cope up with the changing times by providing a safe and hygienic environment. It is crucial that the potential boom in the purchase and use of private automobiles in the post-COVID-19 world remains short-lived and non-motorized transport, public or shared transport options are prioritised in the urban policies in developing cities. It is also crucial that public transport and paratransit retain and expand the patronage of these vulnerable groups, while building infrastructure and supporting walking and cycling facilities. **This research will identify the 'key levers' that have driven reforms and innovative transport solutions in cities** in LICs.

Key levers can be defined as the integral steps or levers that were employed which resulted in the success of an implementation practice/action. These 'key levers' could be in the form of organisational capacities, institutional resilience, specific reforms, financing mechanisms or planning methods and tools.

The purpose of this project is to create **a guidance document with case study briefs for LICs** that will help them to learn from the 'key levers' of the best practices and create a sustainable transport strategy for a scenario where COVID-19 is part of the way of life. Based on this research project, the governing authorities of LICs at various levels would be able to implement ideas about reforming the existing walking, cycling, para-transit or public transport system. Moreover, the study will help the governments of LICs issue advisories to the cities, transit authorities and implementing agencies to make them resilient to absorb and respond to the post-pandemic scenarios.

1.2 Transport challenge being addressed during/ post-COVID-19

Unlike previous experiences with corona virus strain (with MERS SARs etc.), the COVID-19 pandemic has lasted for more than a year and is still actively transmitting in various countries. Therefore, while there may have been differential impacts based on the income levels and resilience of infrastructure, it is now also dependent on the policy approaches and actions adopted by each country, state, and city. For instance, in the United States of America, while there is a national stimulus to reactivate public transport, the same is not necessarily followed by individual states. In India, while there is a budgetary commitment to expand bus fleets in various cities, there is still lack of a comprehensive and integrated plan to reactivate urban transport. Hence, while the pandemic has highlighted the existing vulnerabilities and their differential impacts on cities and citizens, it has also highlighted varied responses and priorities.

Nonetheless, across, all contexts low-income countries (LICs), lower-middle-income countries (LMIC), upper-middle income countries (UMIC) and high-income countries (HICs) the fear of infections and the subsequent lockdowns have greatly impacted the degree of mobility, while some modes have seen visible improvements (walking, cycling, private vehicles) and some other modes seeing drastic decline (public transport and Intermediate public transport). Within these, the shift towards privately owned vehicles would prove quite detrimental to the challenge's climate change and transport equity and hence necessary steps must be adopted. Prima facie the challenges to be addressed, is to build public confidence in PT and IPT systems whilst supporting the newfound focus on NMT. Which would involve an array of strategies, including improving operational efficiency through increased fleet sizes, better bio security measures, integrating existing management systems with ITS base etc. And understand the institutional and financial frameworks that have allowed for the quick response and finally understand the role of government and politics.

1.3 Alignment with the HVT research themes, priorities, and programme objectives

The research project identifies how different urban transport in different cities have responded to a crisis and why they were able to do so. Therefore, this research project directly plugs into two HVT research themes. Namely climate change & adaptation and policy and regulation. Furthermore, as the project is also direct response to the COVID-19 pandemic, it can situate itself in some of the most relevant and critical discourses that are shaping and will continue to shape urban transportation.

The findings, learnings and recommendations are being disseminated in two formats the research report and guidance document, the focus of both documents is LICs in Asian and African continents. Lastly, the guidance document has also been designed as a pedagogical tool and hence can be utilised in capacity building programs.

1.4 Alignment with FCDO priorities

The research projects and its results are geared towards making urban transport systems in LICs in Asian and African continents more resilient in the face of crisis. As urban transport networks are integral for the functioning of a citizen to access livelihood and other opportunities, a disruption or the lack of a good reliable service drastically affects the lives of many. Hence the research project aligns with FCDO's priority of strengthening resilience and response to crisis and tackling extreme poverty.

2. Methodology

2.1 Summary of approach

As the pandemic is progressing further, there is growing literature on policy response from high-income countries on how the public transport systems are coping up. On the other side, there is far less information available about low-income countries, including India. Secondly, there is a need to 'translate' the available information from HICs and frame it in a contextually relevant way to make it available to the decision-makers, advocates, and researchers in the LICs. This project attempts to address this gap. While addressing this gap, this project employs the idea of 'key levers.

The idea of 'key levers' suggests going beyond the 'best practice catalogue' from the HICs and dive deep into the public systems approach of working through constant adjustments, outcome-oriented planning and actions by multiple actors. This conceptual approach of this project uses the filters of pragmatism and contextual relevance to bring forward policy responses from elsewhere while building up on the intuitive responses from cities in LICs, particularly India.

2.2 Methodology

Three-prong approach: A three-prong approach of studying bus, informal public transport and walking and cycling (rather than looking for perfect examples where all three were addressed well) are adopted. An existing situation analysis is conducted for each mode of transport to understand their current scenario, overarching policies, acts and regulations, initiatives undertaken by national governments, large and medium-sized cities in South America, Sub-Saharan Africa, South Korea, Europe, and India. The selection was also to reflect upon varied responses across different contexts (social, cultural, political, and economic), which has enhanced our understanding of the practices/ actions that were employed to adapt/tackle COVID-19 and the contexts and systems that allowed them to implement the same.

Stakeholder's mapping: Good practice case studies are identified to create a stakeholder map with the implementing agency and a network of supporting actors - governments, experts, civil society organisations and academics. The stakeholders mapping has helped to identify the key interviewees who have first-hand knowledge of transformations and innovations in a particular city.

Key informant interviews: This project has employed the method of in-depth, qualitative interviews of the key informants. Key informant interviews are very useful to understand the perspectives or motivations based on qualitative and descriptive information. We have conducted in-depth and semi-structured interviews with some of the key officials and experts to identify the 'levers' in the deployment of NMT solutions, buses, innovations in IPT and physical distancing measures.

Data analysis and findings: The interviews are recorded and analysed to understand the process, benefits, policies, regulations for public transport, informal public transport, and non-motorised modes. At this stage, the identification of **'key levers'** based on the contextual analysis is carried out, with a focus on **how various operational/organisational structures responded in absorbing shocks of COVID-19.** These learnings play an important role in proposing operational systems for various sustainable modes that are resilient and future-ready to absorb shocks of similar disasters.

Data Validation: After analysing the data and identifying key levers in expanding non-motorised transport, public transport operations and formalising IPT, three online round tables were organised with the above experts, policy makers and research institutes. They have validated the findings, their relevance for different scales of low-income cities.

2.3 Innovation

The core aspect of this research is the identification of key levers. As mentioned earlier, the project aims to go beyond the more descriptive analysis of good practices and identify those integral steps undertaken to conceptualise and execute these good/best practices. To do the same, each of these practices is placed within their own social, cultural, economic, and political contexts, and in doing so, the research provides a more nuanced understanding of how these practices worked. The nuanced learnings have eventually enabled us to

develop a strategic guidance document for each of the three modes (public transport, informal public transport, and non-motorised transport).

2.4 Research activities undertaken

The research team has conducted thorough research of the existing situation (Modal split change, ridership trends, existing and proposed urban transport policies or programmes), analysed urban transport systems and related COVID-19 responses across various countries, as well as learning/strategies as proposed by experts through literature (reports, news articles, reports etc.) And key informants' interviews. Based on the above, the team has identified the relevant cities for study to carry forward the research.

After the completion of all key person interviews, possible key levers were identified. Which was then verified and validated through three mode-specific data validation workshops. During the workshop, we ascertained the relevance of the key levers that had been identified and the relevance with respect to LICs.

The consequent learnings were then condensed into a strategic guidance document specifically meant for policy makers and officials in urban local bodies in India. To ensure the dissemination of the strategic guidance document, there are active efforts to jointly publish the document as part of NIUA and Smart Cities Mission[1].

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[1] Smart Cities Mission (SCM) has shown interest in integrating the strategic guidance document as part of existing capacity building program undertaken by SCM

3. Implementation

3.1 Low-income country beneficiaries

The learnings and findings from the research report can be utilised for LICs in Africa and Asian continents. The strategic guidance document "Moving ahead: Urban Mobility Reforms for Post-COVID Resilience in India" was particularly made for the Indian context. If the recommendations can be contextualised, the recommendations could possibly also work for other countries with similar conditions.

3.2 Limitations of the innovation/ approach/ design/ system

The key levers that have been identified looks to the past and present to assess and understand what practices and actions have worked as a response to COVID-19. And as stated earlier, there is much to learn from the approach, especially for cities that have less resilient urban transport systems. On the flipside, while the key levers are important and can provide guidance, it is not able to create a road map for those cities that are already doing well for themselves.

4. Integrated Urban Transport Systems

4.1 What is an Integrated Urban Transport System?

An Integrated Urban Transport system ensures that a resident can travel between any two parts of her city in a safe, accessible, affordable, comfortable, convenient, and sustainable manner.

- A safe system reduces the probability of road accidents and subsequent morbidities and fatalities through clear physical separation of slower road users from faster ones and by prioritising the movement of slower and shared road users.

- A safe system also ensures the physical security of vulnerable groups such as women, children, and the elderly.

- An accessible system ensures that all residents – especially vulnerable groups such as persons with disabilities, the elderly, children, and their caregivers – can move quickly and freely between different modes of transport without encountering physical or systemic barriers. It ensures that whether the user's destination is within the same neighbourhood or at the other end of the city, it can be reached with minimal change of modes.

- An affordable system ensures that every resident can access their travel requirements (work, education, healthcare, etc. etc.) without spending more than 5% of the city's average monthly household income.

- A comfortable system ensures that users have a pleasant trip; it provides resilience against adverse weather (through shading, lighting, and seating on footpaths or bus stops) and ensures optimal functioning to reduce overcrowding.

- A convenient system ensures that users can quickly plan how to reach their destination and to access various modes quickly; it focuses on the compatibility – physical, operational, and financial, informational, and institutional – between various modes of travel.

- A sustainable system ensures that the environmental cost (in terms of carbon emissions and air pollution) made by one trip in the system is lesser than the same trip made by a private motorised car. A sustainable system also ensures that road space is allocated equitably and is not geared towards private motor vehicles.

Figure 1: Mobility pyramid
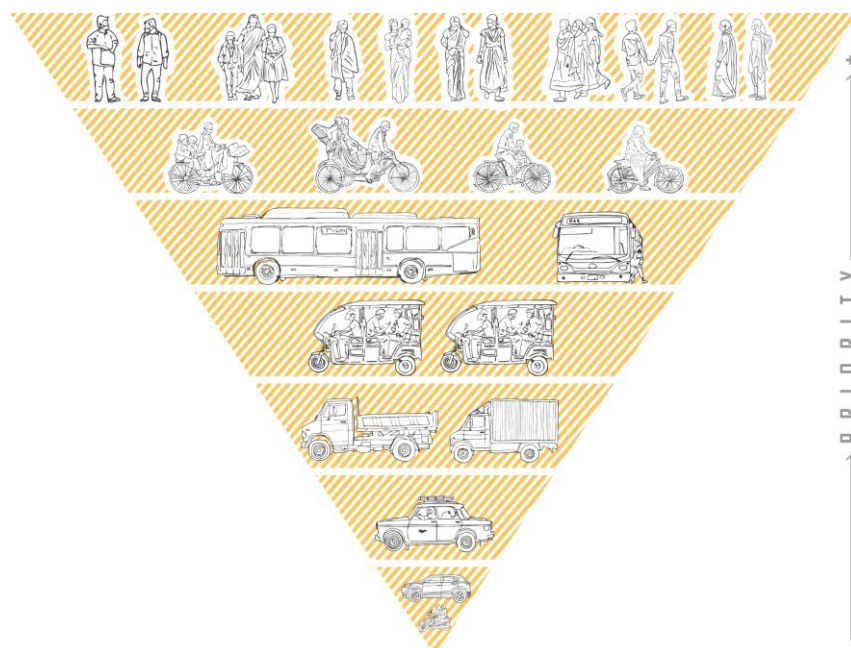
Source - The Urban Catalysts, Victoria Institute of Transport Policy, Bicycle Networks

4.2 Pre-COVID-19 situation in Indian cities

4.2.1 Walking and cycling

The Census of 2011 reports on the modes of travel and the distance travelled by other workers (i.e., those not employed in cultivation, agricultural labourers or on household industries) – in urban India(1), walking and cycling accounts for 30% and 17% of all commute trips. For women, walking constitutes 45% of all trips (while for men, walking trips are 27%), but cycling constitutes only 4% of all trips (for men, nearly 20% of commute trips are by cycle)(1).

However, this is only a part of the total number of walking and cycling trips made in our cities. The Census (and alongside it, city Comprehensive Mobility Plans, Master Plans, and other similar approaches) do not count trips made for education, healthcare, caregiving, and recreational purposes. Independent studies have shown that these trips are largely by walk (along with informal public transport modes such as shared autos) (2).

However, even with this great existing demand, the infrastructure for walking and cycling is systematically poor across the country. Only about 10% of the country's urban roads are reported to have footpaths[2]; most of them are of poor quality and unfit for use; similarly, the total length of cycle tracks across the country would only be a few hundred kilometres at the most. Without the necessary infrastructure, pedestrians and cyclists are forced to share the carriageway with motor vehicles and increasing their exposure to road crashes and accidents. Official data from MoRTH reports that pedestrians account for about 15% of the 150,000 annual road fatalities (3); however, independent researchers estimate that this share might actually be closer to a third (4).

One of the major reasons for the poor attention paid to walking and cycling is the existing institutional structure and frameworks present in Indian cities. Urban local bodies do not have dedicated departments or staffing or funding for addressing concerns related to non-motorised transport.

4.2.2 Bus Based Public Transport

As mentioned above, formal bus-based public transport is limited to a few cities in the country; however, even with this limited set, Census 2011 reports that buses account for about 15% of all commuting trips in urban India. Like in the case of walking and IPT, women rely more on buses than men – 22% of women's work trips are made by bus.

In most small and medium cities, urban bus operations are run by state road transport undertakings (SRTUs); most metropolitan cities have separate entities running their bus operations. In cities such as Mumbai, Pune and Ahmedabad, the operating entity is located within the urban local body. In others – Bengaluru, Chennai, Delhi, Kolkata etc. – it is the SRTU or Transport Department that runs the operating entity. Most bus agencies have been created as corporations; this leads to pressure on them to turn profits and a reluctance from state governments to provide funding.

The largest challenge facing urban bus systems in Indian cities is availability. It is estimated that there might be at most 25,000 to 30,000 urban buses in the city (and concentrated within the metropolitan cities) when the actual requirement is about 189,000 (based on the conservative estimate of 50 buses per lakh population). SRTUs find it difficult to replace their fleet and upgrade their supporting systems due to financial constraints. The recent FAME-II scheme provides an opportunity for cities to create or upgrade their vehicles and supporting systems; however, this initiative needs to be scaled up drastically to ensure that the requirements of cities are met.

4.2.3 Informal Public Transport

In smaller Indian cities, informal public transport modes are the predominant source of mobility. Only 66 of the 450 Indian cities with more than 100,000 inhabitants have access to a formal city bus service (5); hence the unserved demand in these cities is met by IPT. Even in metropolitan and other large cities, IPT provides last mile as well as point-to-point connectivity additionally. Overall, it is estimated that close to 10% of trips in cities below 10 million are made by IPT; it is also clear that women rely more on IPT than men (TUC,2020).

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[2] https://blogs.worldbank.org/transport/COVID-19-creates-new-momentum-cycling-and-walking-we-cant-let-it-go-waste

However, the IPT sector faces a major perception challenge from the State as well as citizens even despite being an affordable and flexible mode of transport.

The informal nature of IPT operations puts the sector at odds with transport and traffic police departments and city governments. In many Indian cities, the issuance of 'Stage carriage' (which allows operating as a shared vehicle on pre-defined routes with multiple stoppages to pick-up and drop passengers) is restricted to formal public transport agencies, which results in illegal operations of IPT vehicles under 'Contract carriage' but plying on given routes with multiple stoppages.

Due to its unregulated nature, the IPT sector has not been provided with formal infrastructures such as auto stands or the usage of public bus stops. The unregulated nature also puts IPT operators (who are largely owner-operators) financially at risk. Over the past decade, electric rickshaws have emerged as a significant addition to the IPT fleet in the country, combining technological upgradation with further informality in vehicle manufacturing.

4.3 COVID-19 challenges and post-COVID-19 opportunities

The COVID-19 pandemic has had a strong effect on urban transport systems; while the lockdown and fears over infection have led to a significant fall in trips made by public buses and IPT, there have been anecdotal and newspaper reportage of recreational cycling gaining increased popularity amongst a section of citizens. Data also shows that motorisation has been increasing as the initial lockdown was lifted, both in terms of trips made by personal motor vehicles as well as in the purchase of new vehicles (6).

This disruption caused by the pandemic can still be seen as an opportunity by cities to create an integrated urban transport system. In the light of the pandemic and the oncoming climate challenge, the focus for cities should be on building resilience.

For (formal and informal) public transport systems and non-motorised transport, resilience would entail the creation of an enabling institutional and financial structure; for the public transport systems, this restructuring should be attempted through the urgent step of technological upgradation. Governments also simultaneously need to focus on enabling behavioural change amongst urban dwellers.

5. Walking and cycling – Post-COVID-19 dynamics and possible key levers

5.1 Introduction

One of the very few silver linings of the pandemic necessitated lockdown has been a global resurgence of walking and cycling in urban areas(7). Several cities around the globe have recognised the opportunity that the reduced traffic from private vehicles have provided and have acted accordingly(8). Cities have largely focused on such interventions as opportunities to promote health outcomes for citizens and/or to improve environmental outcomes, such as air quality and greenhouse gas emissions. These initiatives have been seen in cities across the world, with varying socio-economic and demographic features. For non-motorised or active transport –walking and cycling – these initiatives can largely be grouped into four typologies. These include:

- Pedestrianisation – To ensure physical distancing norms, cities have moved to increase the space available for pedestrians by restricting motor vehicles in markets, major avenues, and other large public spaces. These initiatives have ranged from a permanent ban on vehicles in such locations to car-free day events, where motor vehicles are restricted over scheduled time periods.

- Addition of walking infrastructure – Apart from restricting vehicular usage, cities have also sought to increase the total space available to pedestrians through the reclamation of carriageway space to footpaths and walkways. However, this intervention has been largely seen in High-Income Countries in Europe with extant pedestrian facilities.

- Increasing capacity of cycling infrastructure – By far the most popular intervention during the lockdown, cities across the world have added (temporary) cycling lanes to encourage more cyclists out on the roads. This approach has been very popular in cities in Latin America and Europe, with the European Cyclists' Federation (ECF) reporting that more than 1,100 kilometres of bicycling infrastructure have been implemented (out of 2300 kilometres announced) in Europe alone (9).

- Improving access to bicycles –The lockdown has seen a boom in the sale of cycles(10), increasing the overall number of cycles on urban streets. Countries such as the UK and France have also sought to facilitate cycling through funding schemes to repair bicycles. Cities have also tried to improve residents' access to bicycles through hiring schemes and increased health workers' mobility through existing PBS systems.

There have been several attempts made to document and quantify all such interventions that were done around the world, such as the Shifting Streets Database[3] and the COVID Mobility Works[4]

This section documents such initiatives that were undertaken across the world, with a focus on cities from Latin America, Asia, Africa, and Eastern Europe. A table of some of these interventions is listed in Appendix a table 10. The above-mentioned regions were chosen as interventions in HICs, particularly in Western Europe, have been well documented. While several cities have undertaken initiatives during the pandemic, this study will aim to understand four cases in detail. As the larger focus of the study is on understanding the key levers that lead to innovative and effective actions, it is hoped that the complex governance challenges in developing world cities will lead to a clearer demonstration of such levers and the limits to their effectiveness. The only exception to the rule is that of London and the UK (a HIC), which has been taken as a deep-dive case study due to the extent of their initiatives undertaken during the pandemic.

In their guidance note for the transport sector, the ADB puts forward an indicative framework and strategy for exiting the lockdown(10). The framework is divided into three phases – a short-term response phase (up to three months), a medium-term recovery phase (between three months to a year), and a long-term rejuvenation phase (after one year). They are integrating public health guidelines with existing SDGs and climate change goals, the strategy advocates for strengthening non-motorised transport capacity using temporary measures in the recovery phase. During the rejuvenation phase, these measures should be institutionalised and made permanent.

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[3] https://www.pedbikeinfo.org/resources/resources_details.cfm?id=5235
[4] https://www.COVIDmobilityworks.org/

The selection of the in-depth case studies has been made based on their fit into the framework described above. These cases have a history of innovation in prioritising non-motorised transport measures before the pandemic, but they have also used the pandemic as an opportunity to further their goals. The detailed case study examination helps to identify the nuances present in the 'key levers,' which a simple overview would not be able to do. A detailed examination is also necessary as several of the initiatives taken across the world are still in their preliminary stages. It thus becomes necessary to examine in detail 'successful' case studies, which can help other cities to identify potential routes to success.

Table 1: Overview of the case studies

Variable	Addis Ababa	Bengaluru	Bogota	Greater London
Country	Ethiopia (LIC)	India (LMIC)	Colombia (LMIC)	United Kingdom (HIC)
Population (in millions)	4.79	12.32	10.98	9.3
Metropolitan Area (sq. km)	527	709	1,775	1,500
Road length (km)	5,900	10,200	NA	14,800
Modal share for NMT	54%	34%	33%	27%
Key authorities for walking and cycling	Addis Ababa Road & Transport Bureau (AARTB) AA City Roads Authority (AACRA) Transport Programs Management Office (TPMO)	Bruhat Bengaluru Mahanagara Palike (BBMP) Directorate of Urban Land Transport (DULT) Bengaluru Traffic Police	Secretaría Distrital de Movilidad (SDM) Instituto Distrital De Recreación Y Deporte (IDRD) Instituto de Desarrollo Urbano (IDU)	Transport for London (TFL) 32 boroughs and City of London Highways England
Major initiatives in 2020	National NMT Strategy 2020-2029 National Transport Policy Three pilot cycling corridors implemented	34 km of pop-up cycle lanes – Scale-up announced. Pedestrianisation initiative on crucial CBD street – Scale up to more CBD streets announced	One of the pioneers of pop-up cycle lanes Added 86 km of pop-up lanes. Brought cycling mode shares to 13%	Gear Change - national strategy for W&C Expanded W&C infrastructure Two billion pounds of national investment

5.2 Case 1 - London, United Kingdom

5.2.1 Background

The United Kingdom, with an average annual per capita income of US$ 48,000, is a high-income country[5]. According to the latest National Transport Survey[6], as of 2018, 27% of all trips in the UK were by walking, while cycling only accounted for two percent of trips. The government, however, recognised that there existed a significant potential for improvement in the mode shares of these two modes as 58 percent of car trips were under 5 miles (8 km). Urban areas had two out of every five car trips with a trip length of under 2 miles (3.2 km).

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[5] https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=GB
[6] https://www.gov.uk/government/collections/national-travel-survey-statistics

Greater London

Greater London is divided into 33 entities (32 boroughs and the City of London) and extends over an area of 1500 square kilometres. Its population is estimated to be 9.2 million as of 2020(11). Greater London consists of Inner London (13 boroughs and the City of London), having 20% of the area and 40% of the population, and Outer London consisting of 19 boroughs. Each borough has an average population of around 250,000. Most are governed by an elected council headed by a leader and a cabinet. Through their ability to collect Council tax, they retain a significant amount of autonomy.

Under the Greater London Authority Act of 2000, the post of Mayor was created as the executive head and who is accountable to an elected London Assembly. The powers of the GLA and the Mayor are restricted to a few strategic sectors such as transport and economic development, thereby ensuring that the boroughs remain autonomous.

Governance of transport in London

Since 2000, Transport for London (TFL) has been the integrated authority managing and operating public transport systems in London. TFL also owns, operates, and maintains several key roads (under the TFL Road Network), drawing its authority from the Greater London Authority Act.

As the key coordinating authority, it oversees long-term planning for mobility in the metropolitan area; it is also in charge of monitoring and evaluation and setting standards and frameworks in place. Long-term planning is set by the Mayor's Transport Strategy (published in 2018), which details sectoral visions through Action Plans (for Walking, Cycling and Road Safety).

Non-motorised transport for TFL is headed by the Walking and Cycling Commissioner[7], who reports to the Mayor. The vision for NMT is set by the Walking Action Plan, and the Cycling Action Plan, components of the Mayor's Transport Strategy, and which is based on empirical evidence provided by Strategic Walking and Cycling Analysis reports.

Roads and street management

Road ownership in London is distributed between TFL, Highways England, and the boroughs of London. TFL manages around 580 km of key roads – called the TFL Road Network or the red routes, while Highways England owns and operates 60 kilometres of Motorways. The remainder of the 14000 kilometres of roads and streets in Greater London is owned and operated by the boroughs.

TFL has also provided guidance on the design, construction, and maintenance of streets through the London Highways Alliance Contract (LOHAC), a joint initiative between TFL and London's boroughs.

Table 2: Typology and length of roads in Greater London

Road Type	Length (km)	Characteristics
Major: Trunk roads (A) and motorways	61.9	Motorways are operated by Highways England and have a speed limit of 100 Kmph and three or more lanes in each direction. This includes 60 kilometres of motorways owned and operated by Highways England
Major: Principal roads (A)	1747.5	These are roads owned and operated by local authorities, designated as main roads, and have heavy traffic flows, but lesser than Motorways. This includes 580 kilometres of red routes owned and operated by TFL
Minor roads (B and C)	13005.4	They mostly function as a collector and local roads and are owned and maintained by local borough councils.
Total road length	14814.8	

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[7] The post was created in 2017 by merging the positions of the Walking Commissioner and the Cycling Commissioner.

Figure 2: Map of major road network in Greater London
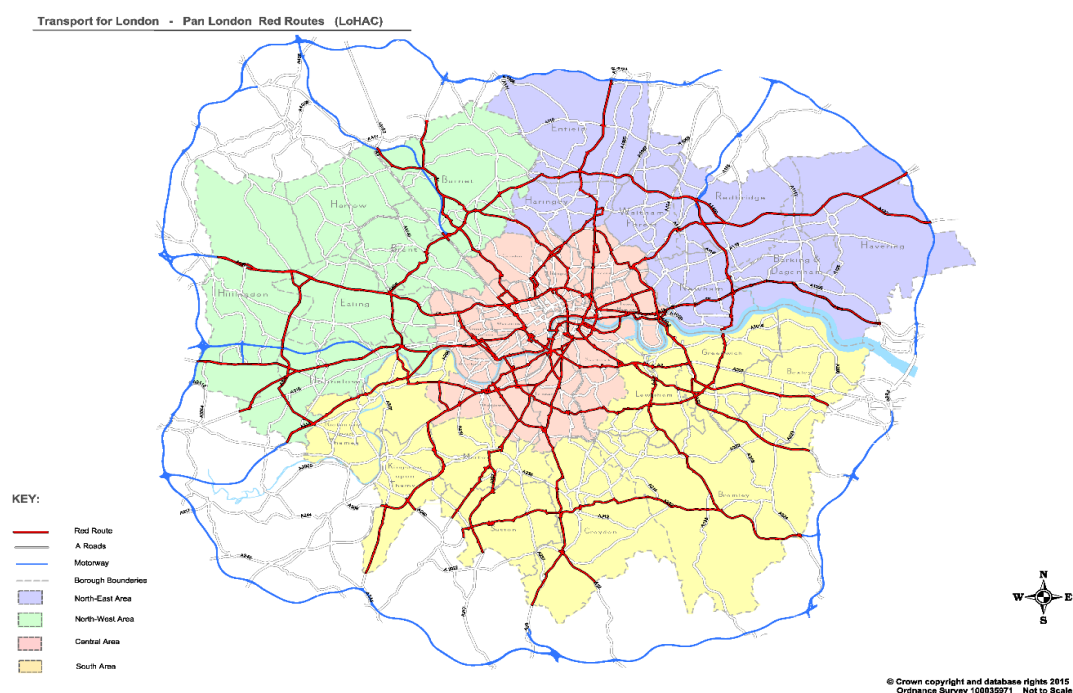
Mode share in London

TFL reports that as of 2018, while 35.5 percent and 37 percent of trips in London were made by public transport and private transport modes, respectively, walking and cycling accounted for 25% and 2.5% of trips respectively(12). The same report also shows that the share of walking trips has remained rather constant over the past two decades while cycling trips had doubled from 1.2% in 2000.

Table 3: Timeline of interventions related to walking and cycling in London

Year	Initiative
2000	TfL created under the Greater London Authority Act (Preceded by London Regional transport)
2003	Congestion charging zones are created for the first time
2004	London Cycle Action Plan is launched (Aimed to create a London Cycle Network Plus system of 900 km)
2005	TfL publishes first Cycling Design Standards (Revised in 2014)
2010	PBS scheme introduced in London First cycling superhighways opened to the public (however, they are not segregated)
2014	Mini-Holland schemes announced TfL adopts the Healthy Streets Approach
2015	The existing London Cycle Network (LCN) is rebranded as Quiet ways
2016	First, segregated cycling superhighways are opened to the public
2018	Mayor's Transport Strategy published with separate Walking, Cycling and Vision Zero Action Plans

Year	Initiative
2019	London becomes one of the first cities to have an Ultra-Low Emission Zone Existing (and planned) cycling infrastructure – Quiet ways and cycling superhighways – integrated as Cycleways

Mayor's Transport Strategy 2018

In 2017, with a new Mayor in charge, a Healthy Streets approach - which would push for active mobility as the cornerstone of future mobility planning in London - was adopted. The approach pushed for further investment and interventions in walking and cycling and ensuring that public transport would also integrate walking and cycling(13). Based on this approach, the Mayor's Transport Strategy was published in 2018 for the next two decades. The three key components of the Strategy were the Walking, Cycling, and Vision Zero Action Plans.

Walking Action Plan

The Walking Action Plan had four main components. Firstly, through an allocation of 2.2 billion pounds under the Healthy Streets programme in the five-year business plan, it would build and manage streets that prioritised walking and cycling. TFL's Streets toolkit[8] would be used for planning and designing streets, while further integrations with public transport networks would also be built. Finally, through active travel campaigns (such as the STARS programme[9] for schoolchildren) and improvement of placemaking (through schemes such as Legible London), it would also try to affect a culture change[10].

Cycling Action Plan

Like its walking counterpart, the Cycling Action Plan also put forward the creation of physical infrastructure, enabling regulations and conditions as well as affecting a culture change as its constituent components. It promised the creation of 450 km of cycleway routes and the borough-led Liveable Neighbourhood and mini-Holland schemes.[11]

5.2.2 Pre-COVID-19 scenario

Evolution of cycling in London

London cycle network

Although the first bikeways were introduced in London in the 1930s[12] and followed by the first 'network' in the form of the London Cycle Network[13] in the 1980s, most interventions to promote cycling happened after the creation of the TFL in 2000. In 2001, the London Cycle Network Plus Project was announced by TFL to create a network of cycle routes of 900 kilometres. Although the project received a significant budget outlay (150 million pounds) and was backed by the creation of a London Cycle Action Plan (2004) and London Cycle Design Standards (2005), the project did not take off as expected and was wound up in 2010.

Cycling superhighways

In 2008, a new project – cycling superhighways – was announced. With 12 radial routes, these superhighways were intended to connect residential suburbs with central London, and thus, bring the cycle to the forefront as a mode of commute(14). With over 400 million pounds of budgetary support, the project had significant financial and political support due to the upcoming Olympic Games in 2012. The first phase of the project saw the completion of two superhighways in 2010 and another two in the following year.

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[8] https://TFL.gov.uk/corporate/publications-and-reports/streets-toolkit
[9] STARS (Sustainable Travel: Active, Responsible Safe) is an accreditation-based programme run by TFL in conjunction with schools to encourage students to walk, cycle or take public transport. Schools register and work with TFL to identify relevant solutions and ideas in line with the Healthy Streets approach
[10] https://TFL.gov.uk/corporate/about-TFL/how-we-work/planning-for-the-future/encouraging-cycling-and-walking
[11] https://TFL.gov.uk/corporate/about-TFL/how-we-work/planning-for-the-future/encouraging-cycling-and-walking
[12] http://www.landscapearchitecture.org.uk/history-cycle-network-infrastructure-planning-london/
[13] A series of suggested routes off the main roads and on back streets attempting to connect various London boroughs, but with no investment in physical infrastructure upgradation

Phase two of the superhighways project saw a definite change in the manner of planning and implementation. Criticism of the first phase centred around the lack of physical separation between the cycle lanes and the rest of the carriageway. Phase two, therefore, included a redesign of existing streets to create cycle tracks separated from the carriageway. It was also supported by the 'Better Junctions' programme, which aimed to improve junction design for better circulation of pedestrians and cyclists(15).

Mini-Holland scheme

The Mini-Holland scheme was launched in 2014, aiming to improve the conditions for cycling and to initiate a mode shift away from the car in the outer boroughs of London. 18 of the 19 outer boroughs in Greater London applied to TFL to be considered under the scheme, and three – Waltham Forest, Enfield, and Kingston – were selected for a period of six years up to March 2021. A total of 100 million pounds was allocated for the project. Each of the boroughs would receive 30 million pounds under the scheme, while five other boroughs (the "runners-up") would receive two million pounds each.

The mini-Holland scheme initially faced a lot of resistance from motorists, who feared that it would increase congestion in their localities.

However, a longitudinal study showed that the scheme had not increased congestion nor travelling times for motorists. More encouragingly, the study also reported that both walking and cycling trips had seen an increase in the mini-Holland areas as compared to the control sample. The study showed that there was also a marked positive increase in the public perception towards walking and cycling in the mini-Holland boroughs, showing the necessity of such wide-ranging schemes in precipitating a modal shift(16). The project's success could also be gauged from the council's additional investment of 15 million pounds of its own revenues to the original TFL grant of 30 million pounds.

Waltham Forest

Under the Mini-Holland scheme, the East-London borough was reported to have created more than 26 kilometres of segregated cycle tracks covering major locations within. Alongside the creation of cycling tracks, the borough has also sought to improve safety through the creation of pedestrian and cyclist-controlled crossing, key junction upgrades, and redesigns and with the use of bollards and modal filters for restricting motorised vehicles. Through the creation of pocket parks and blended crossings, it has also sought to improve the pedestrian and cycling experience.

To ease cycle parking, the borough has installed nearly 400 Bike hangars (permanent cycle storage units at residential locations) and 500 on-street parking spaces at transit and commercial points of interest. The borough also provided free cycling training through a private partner – over 15,000 people availed of this scheme in four years. Apart from training for novices, they also provided refresher courses as well as courses in bicycle maintenance. The borough also held maintenance and repair sessions where residents could get their faulty cycles repaired or diagnosed.

The borough council has also set up a community walking and cycling fund for community groups whose work includes outreach on walking and cycling. Over the past two years, the borough has provided about 45,000 pounds in funding.

The borough has also regularly helped to organise playstreets, events that close off roads to vehicular traffic and encourages the usage of streets as public arenas and play areas. While these are neighbourhood level efforts, in 2019, the borough conducted a much greater effort on the occasion of World Car Free Day, closing about 5.5 kilometres of roads to vehicles; this event drew about 10,000 residents(17).

Cycleways

In 2015, the LCN was rebranded into the Quiet ways programme. In 2019, both the cycling superhighways and the quiet ways were merged and rebranded into the cycleways programme.

Public bicycle sharing scheme

In 2010, London also saw the launch of its public bike hire scheme, first announced in 2008 along with the cycle superhighways. With over 400 bike stations and 6600 bicycles, the scheme was supported by a sponsorship from Barclays along with user fees. It has since a gradual expansion over time, both in terms of its

spatial coverage as well as its infrastructure. This network has expanded to over 800 stations and 11,000 bicycles as of the latest available figures(18). TFL has also claimed that the scheme has led to an increase of 35% in the number of cycle trips undertaken in London.

5.2.3 COVID-19 strategies

Street space for London

One of the key initiatives that TFL has taken up during the COVID-19 pandemic-induced lockdown is Street space for London(19). As public transport vehicles faced limitations in their capacity due to physical distancing guidelines and with limited private motor vehicles on the streets, TFL took the opportunity to reallocate carriageway space for pedestrians (22,500 sq. m) and for temporary cycle lanes for cyclists (89.1 km)[14]. To supplement the same, traffic signal timings were changed in favour of more time for pedestrians. In 20 crossings, the Green Man Authority protocol was introduced, which provided for a continuous pedestrian signal.

Through TFL funding and guidance, boroughs also undertook the creation of low-traffic neighbourhoods and school streets, both of which restrict vehicular access in favour of pedestrians and cyclists. TFL has reported that 88 Low Traffic Neighbourhoods and 317 School streets have been created so far.

Gear Change

At the national level, too, the Department for Transport (DFT) of the Government of the UK has also put in place several measures and interventions in the wake of the COVID-19 pandemic lockdown. In May 2020, the government announced 2 billion pounds of funding for the promotion of walking and cycling. Under the title 'Gear Change,' DFT expanded on the vision for active transport and the specific components for which the funding would be used(20).

Over 220 million pounds have already been allocated in two phases towards the emergency active travel funds[15], which will be used to help cities to implement both short-term temporary and permanent long-term interventions in the expansion of non-motorised transport infrastructure.

Along with infrastructural interventions, DFT also recognised the need to encourage citizens to take up or return to cycling. To facilitate the same, it introduced a voucher scheme (up to 50 pounds) to pay for bike repairs(21) as well as providing free cycling training for those in need(22).

Regulatory amendments

The national government conducted a public consultation for proposals to amend the existing Highway Code to improve road safety and to place vulnerable road user groups such as pedestrians and cyclists at the forefront of road hierarchy. It has also eased the regulations[16] for local authorities to enact permanent or temporary interactions such as bicycle tracks or lanes. It has also created a dedicated note for local authorities – LTN Cycle infrastructure design[17] - which provides detailed technical guidance on the planning, construction, and maintenance of cycling infrastructure.

5.2.4 Key levers

Continuity in focus on walking and cycling

Since the reorganisation of governance in Greater London and the consequent creation of the GLA and TFL at the turn of the millennium, there has been a continuous focus on improving walking and cycling. All three of the mayors who have been in power since then – Ken Livingstone (2000-2008), Boris Johnson (2008-2016), and Sadiq Khan (2016 -) have supported walking and cycling.

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[14] As announced by the Walking and Cycling Commissioner (Source: https://twitter.com/willnorman/status/1334555075004477441/photo/1)
[15] https://www.gov.uk/government/publications/emergency-active-travel-fund-local-transport-authority-allocations/emergency-active-travel-fund-total-indicative-allocations
[16] https://www.gov.uk/government/publications/reallocating-road-space-in-response-to-COVID-19-statutory-guidance-for-local-authorities/traffic-management-act-2004-network-management-in-response-to-COVID-19
[17] https://www.gov.uk/government/publications/cycle-infrastructure-design-ltn-120

Ken Livingston's mayoralty saw attempts to improve the London Cycling Network – through the LCN Plus programme and the creation of the first design standards for cycling infrastructure. Crucial planning decisions such as the creation of cycle superhighways, the PBS system as well as strengthening neighbourhood and borough level cycling networks were made during the Livingston administration.

The mayoralty of Johnson largely continued with these strategies. During the tenure of the Johnson administration, the superhighways, as well as the PBS system, are open to the public – indeed, the PBS system is still often referred to as Boris bikes by Londoners. Johnson's administration also saw the introduction of the mini-Holland schemes as well as the Healthy Streets approach.

Sadiq Khan's administration has reinforced the emphasis on the Healthy Streets approach and has made it the cornerstone of his Mayor's Transport Strategy. Recognising the importance of behavioural change and learning from the experiences of other parts of the UK such as Manchester ad Scotland, he also created the post of a Walking and Cycling Commissioner and aimed to reconcile differences that seemed to exist between pedestrians and cyclists and push forth the idea that the approach for walking and cycling had to be co-ordinated.

Healthy Streets Approach as a part of Mayor's Transport Strategy & Gear Change

As mentioned above, since 2014, the Healthy Streets Approach has been slowly integrated into mobility planning in London. Through such an approach, the aim was to improve the individual health of citizens to promote walking and cycling, simultaneously leading to a reduction in the usage of personal motor vehicles.

This approach was made the cornerstone of the planning process for the most recent Mayor's Transport Strategy in 2018 and its constituent Walking, Cycling, and Road Safety Action Plans. This approach was continued during the lockdown - the only concession available to citizens looking to step out of their house was exercise. Additionally, the focus on individual health also would help to reduce the physical and financial stresses on the NHS system during the pandemic.

Apart from the Street space for London initiative, the Healthy Streets Approach has also scaled up to the national level through initiatives such as Gear Change. This is also indicative of the aspect of continuity mentioned above, as Boris Johnson's cycling commissioner Andy Gilligan has led the Gear Change initiative as an adviser to the PM.

Dedicated capacity for walking and cycling

The clear institutional and regulatory framework in London has provided a strong foundation to build a sustainable transport system. Within TFL, although the focus had earlier been on bus and rail services, there has been a marked increase in the importance given to walking and cycling. Within the Surface Transport Division of TFL, the portfolio of London Streets manages work relating to the red routes network (TFL Road Network) and other work relating to walking and cycling. Our primary research indicates that there is a dedicated team for walking and cycling present in the City Planning directorate, which coordinates and works with boroughs. At the same time, there is also a Network Management directorate within the Surface Transport Division which takes care of design and implementation work – including aspects such as the cycling superhighways – on the TFL Road Network. We are awaiting clarifications on the detailed organisational structure – including roles, responsibilities, and team capacities – of TFL; this section will be updated once the same is received.

Civil society

Although London has a strong institutional and regulatory structure, civil society has played an instrumental role not just in the advocacy of walking and cycling but also in the provision of technical support for projects relating to the same. Civil society organisations also provide consulting services, largely with boroughs and local councils, in the implementation of walking and cycling projects. Civil society organisations have been instrumental even during the lockdown, pushing for and reviewing the Gear Change strategy. Another major example of the central role played by civil society organisations is the Healthy Streets approach, created by academic and practitioner Lucy Saunders, which has now been adopted at the city and the national levels.

Civil society organisations have also come together to form broad alliances; one such example is the Walking and Cycling Alliance formed four years ago to present a collective voice for the improvement of walking and

cycling conditions in the country. As a coalition, they have managed to get major changes across, including the introduction of design standards for walking and cycling infrastructure and the prioritisation of pedestrians and cyclists in the country's Highway Code.

One of the unique aspects of the functioning of civil society organisations in London (and the UK) is their role as custodians of infrastructure. The National Cycle Network – a UK-wide network of cycling and walking routes – created by the civil society organisation SusTrans in the 1970s is a prime example(23). This network is mostly located on private land; SusTrans sets design principles and standards that ensure the creation of a uniform network(24). It helps landowners and local communities with maintaining the network and, through constant monitoring and evaluation, sharing the evidence of the impact generated by such networks. Through its partnerships with local authorities and communities, it also strives to continuously expand the network.

5.2.5 Opportunities and threats

The key levers in the city also show that there are further opportunities to be exploited to improve walking and cycling. At the same time, they also help to show that there are also threats and bottlenecks present in the background.

Opportunities

- Interventions such as the mini-Holland scheme have been declared successful by various stakeholders and citizens. New research coming out from the mini-Holland scheme has comprehensively looked at the pre- and post- results of the scheme on behavioural change in modal shifts and road safety, among other aspects (16). Such studies not only help to quantify the benefits of walking and cycling interventions but also help provide evidence for furthering such schemes and expanding them to other geographies. TFL has also actively used such research outputs in its messaging and communications strategy.

- Although TFL and the boroughs are largely autonomous in terms of their functioning, the Mayor and TFL can exert a positive influence on the boroughs through the Healthy Streets approach. As funding for TFL projects (such as the Mini Holland scheme and Low Traffic Neighbourhoods scheme) is tied to adherence to the Healthy Streets principles, this can incentivise the uptake of such principles as well as standardisation of guidelines across boroughs.

- One of the major reasons for the increased importance given to walking and cycling during the pandemic has been its role in improving the health of citizens while ensuring physical distancing norms. London has been a pioneer in this regard, using the Healthy Streets approach to educate and inform citizens about the benefits of walking and cycling. The pandemic has provided a further opportunity for cities, including London, to increase the focus on individual and public health to reduce vehicular usage.

- Advocacy groups have played a major role in ensuring that walking and cycling have gained an increased profile over the past decade. Apart from their work with the government, they have also worked closely with citizens (through local walking and cycling groups) to increase public demand for improving walking and cycling. They also ensure that key pieces of infrastructure such as the National Cycle Network is continuously expanded and maintained under strict quality guidelines in their role as custodians. This approach shows an opportunity for the future of the London Cycle Network/Cycleways.

Threats

- The Conservative government's focus on austerity over the past decade has had a negative influence on the finances of TFL. Grants from the DFT have been to the tune of two billion pounds at the start of the decade; over the last two years, this has been stopped and converted into a conditional loan. Such a move shows two dangers - firstly, when different political parties are in power at the city and national level, the national government might try to reduce the autonomy and functioning of the city government. Secondly, the first casualty of a budget crunch would be sectors such as walking and cycling, which do not generate revenue for TFL.

- Political and/or cultural differences can also manifest at the local level. Within London itself, such differences have led to certain boroughs being deemed as more progressive in terms of promotion of walking and cycling, while others are deemed to be car friendly. Such differences can lead to a situation where pan-London infrastructure such as Cycleways can be of varying quality in terms of design and

maintenance levels across boroughs (25). It has also led to interventions being challenged politically or legally within boroughs – the recent Low Traffic Neighbourhoods scheme is a prime example.

- The financial and central business districts surrounding the City of London are one of the major employment generation locations in the city and are serviced by the rail network bringing in commuters from the periphery. While London has found it easy to implement sustainable mobility interventions in this central part of the metropolis, the urban form within outer London boroughs and suburbs is much less dense. This makes it more oriented towards car travel and hence, more resistant to the uptake of sustainable modes, although exceptions such as Waltham Forest exist. To add to the same, other outer London boroughs have a larger proportion of families with children and the elderly.

5.3 Case 2 - Bogota, Colombia

5.3.1 Background

Bogota, the capital and largest city of Colombia, has earned a global reputation over the past few decades due to its numerous interventions towards creating an ecosystem of sustainable mobility. Bogota has an estimated population of more than 7 million(26), contributing to nearly 14% of Colombia's population.

5.3.2 Pre-COVID-19 scenario

One of the first sustainable mobility interventions to take place in Bogota was in 1974 when a group of cycling enthusiasts led by Jamie Ortiz under the Pro-Cicla Foundation, along with the support of Bogota's traffic and transportation department, took out a rally along two key streets as a demonstration against the proliferation of cars in the city and to showcase the potential of cycling as a daily mode of transport(27). Named the Great Pedal Demonstration and inspired by events in the Netherlands and other European cities, it attracted a crowd of 5,000 citizens from various backgrounds(28).

Although the next event was held a year later (in 1975), by 1976, the city administration hired Jamie Ortiz as an adviser to institutionalise the same(28) as Ciclovía under the department of transportation. However, Montero (2016) argues that this led to a change in focus of Ciclovía from the mobility potential towards the recreational aspect. Although it was institutionalised by the city, till the mayoralty of Augusto Ocampo (1983-1985), Ciclovía was largely neglected, seen by the transport department as yet another responsibility to be executed. Ocampo also saw the Ciclovía as primarily a recreational tool, but he also focused on extending the program to poorer parts of the city. Ciclovía routes were extended to 54 kilometres during his tenure, and the event itself was seen as a way to ensure that an equitable mode of recreation was available to all citizens (28).

However, the 1980s and the early 1990s saw the further decline of Ciclovía to just 20 kilometres, as concerns over safety and security led to a drastic reduction in the general usage of public space in Bogota(28). Decentralisation and democratisation reforms – both at the federal and local levels - in the early 1990s saw an improvement in local government functioning(29), particularly in the devolution of financial resources. In particular, Mayor Jamie Castro's passing of the Organic Statute in 1993 was significant in demarcating the roles and responsibilities of the mayor and the city council(30). These early reforms were instrumental in reducing clientelistic practices(29) and set the stage for significant changes in the mobility sector in Bogota during the mayoralties of Antonas Mockus (1995-1997, 2001-2003) and Enrique Peñalosa (1998-2000).

The revival of Ciclovía began with Antonas Mockus's mayoralty in 1995. He appointed Guillermo Peñalosa as the commissioner of parks and recreation, and the responsibility of Ciclovía was moved to the autonomous Recreation and Sports Institute (IDRD). Peñalosa managed to bring in support of non-profit organisations and corporate entities and raised additional funding from the private sector to conduct Ciclovía. He also expanded the ambit of Ciclovía through the introduction of Recreovia, which added additional activities such as PA classes and dance workshops. Finally, through the introduction of a volunteer base, he was able to significantly expand the scale of Ciclovía, both in terms of user participation and the extent of the network. By the late 1990s, it was reported that Ciclovía had more than a million users and a coverage of 120 kilometres(28).

In 1998, Enrique Peñalosa took over as the Mayor of Bogota following the tenure of Mockus. While Mockus focused more on building a culture of citizenship, Peñalosa engaged with building public spaces and infrastructure(28). Apart from the flagship Transmilenio BRT system, his tenure also saw the large-scale

creation of dedicated bikeways – ciclorutas and over 1000 public parks(28). In fact, Peñalosa's first tenure saw the creation of 232 kilometres of ciclorutas (31), which accounts for 40% of the entire existing network.

After the end of Peñalosa's term, Antonas Mockus returned for a second term and continued with the construction of bikeways. His second tenure saw the creation of 55 kilometres of bikeways(31) and an overall consolidation of the gains from the previous decade. The approach of consolidation was carried on by his successors – only 76 kilometres of new bikeways were created in the three mayoralties following Mockus's second term(31).

Between 1995 and 2014, the mode share of cycling increased from 0.5% in 1995 to 6% (31). In 2016, Enrique Peñalosa returned as Mayor for a second term. He introduced the Plan Bici, an ambitious plan to increase the mode share of cycling to 10% of all trips by 2020 and to create 120 kilometres of new bikeways in the city. Plan Bici also put forward the idea of a 25-kilometre-long dedicated cycling avenue through the heart of Bogota (32).

5.3.3 COVID-19 strategies

As it became evident that the COVID-19 pandemic needed swift and decisive responses, Bogota became one of the first cities in the world to provide more space for cycling and walking. Such an effort would also ensure that public transport systems could operate within physical distancing guidelines. In March, even before a lockdown was put into place, Bogota opened up 22 kilometres of temporary bike lanes taking space from existing car lanes (33). By the end of the month, this intervention was scaled up to a total of 76 kilometres.

Mayor Claudia Lopez, who had only assumed office in January, had announced in February that the city would add 280 kilometres to the 550 kilometres of cycling infrastructure already existing in the city (34). By September, Mayor Lopez reported that Bogota had seen the share of cycling trips double from 6.6% to 13% of all trips (35).

To encourage uptake in cycling, citywide speed limits were reduced to 50 kmph. As lockdown led to emptier streets, there was an overall increase in speeding amongst motor vehicles leading to reduced safety for cyclists. Furthermore, the city increased parking for cycles in both public and private parking spaces. A cycle registration database was also created to curb bike thefts – a chronic problem in the city – such a step would help to curb the resale of stolen bikes within the city (34).

Based on a winning idea from a hackathon, Bogota also deployed a pilot project where health workers were provided with e-bikes. The micro-mobility operator MUVO – in conjunction with civil society organisations Despacio and NUMO - agreed to provide their entire fleet of 400 electric cycles to health workers in the city for a month so as to improve their personal mobility and also their ability to access the workplace (36).

5.3.4 Key levers

Mayoral leadership

The Mayoralty of Jaime Castro was instrumental in the reshaping of Bogota. With the constitutional reforms of 1991 as an enabler (by devolving urban governance powers and responsibilities to the city level), Castro's Organic Statute enabled the mayor to have a clearer role in the development of the city. The Mayor would be responsible for envisioning, planning, and implementation of interventions in the city; the role of the city council would be limited to overseeing and monitoring the work of the Mayor(30). The role of the Mayor now included ensuring coordination between the various agencies present at the city level.

Castro undertook the reforms necessary – better assessment and collection of property taxes – to improve Bogota's crumbling fiscal situation through IDU; this move simultaneously helped to build the capacities of IDU as an efficient organisation. He also was the first mayor to bring a team of technocrats with sectoral expertise into the municipal administration, which further reduced the rampant clientelism in the city administration(30).

The role of the Mockus and Peñalosa mayoralties in improving public space and mobility has been well documented(28,29). They were able to draw on the reforms undertaken by Castro and build on the same. At the same time, both had their own visions of improving the city. Mockus focused on building a civic culture and used Ciclovía to achieve this result. Ciclovía also helped in creating a culture of usage of public spaces. This also had the effect of nurturing a strong civil society that actively demanded better infrastructure(29).

Building on the efforts of Mockus in creating a civic culture, Peñalosa focused on building and supplementing infrastructure. At the same time, through the introduction of the Cycle Route Master Plan and the adoption of standardised street design guidelines, his administration was able to set a clear vision and path forward that continues to influence the city to date. Both Mockus and Peñalosa gave importance to building a strong institutional structure to enable their visions – Mockus through the reorganisation of IDRD and Peñalosa through the creation of SDM (29).

Mayor Lopez faced a different set of challenges in the form of the pandemic at the start of her Mayoralty. She was able to quickly galvanise the various agencies at hand and use the lockdown as an opportunity to augment the city's cycling infrastructure. Faced with concerns over safety and security, the administration took steps not just to allay these fears but also to simultaneously improve the mode share of cycling, especially amongst women.

Institutional structure and framework

One of the key issues plaguing the transportation sector in Bogota – which could also be seen in the neglect of Ciclovía over time – was a lack of institutional capacity(37). The administration of Mayor Mockus (1995-1998) recognised the necessity of reforming existing institutional structures and initiated a proposal for creating a single entity in charge of all matters around transportation and with dedicated channels of funding(37). This approach faced political resistance initially from the city council; as a result, the Mockus administration moved its attention towards strengthening the responsibilities and capabilities of the Urban Development Institute (IDU), particularly in charge of construction and maintenance of street infrastructure as well as monitoring of external projects. In his first term as Mayor, Enrique Peñalosa continued with his predecessor's efforts of supporting IDU, but simultaneously undertook the revival and reorganisation of the SDM(37) and entrusted it with the operations of the public transport system, especially the newly created Transmilenio (Bogota's Bus Rapid Transit System).

Within SDM, larger policy and planning questions related to walking and cycling are handled by an office of walking and cycling, comprising seven members. At the same time, the city also has a manager of cycling, who works on the co-ordination of cycling activities between all agencies (such as SDM and IDU). Peñalosa instituted the office in his second term for the implementation of Plan Bici. IDU – as the agency in charge of implementation and maintenance of street infrastructure, also has a separate team for walking and cycling activities. The presence of capacity within key organisations and a managerial leader helps to set long-term priorities for the city while also ensuring that quicker, agile interventions such as those undertaken during the pandemic lockdown can be executed.

Ciclovía

The rejuvenation of Ciclovía has also been a key lever for the expansion of walking and cycling in the city. The role of IDRD in this process also helps to highlight institutional redesign. Under Gil Peñalosa's leadership, IDRD was able to function in a less bureaucratic manner as compared to the transportation department(28). IDRD is one of two departments in Bogota that can engage in commercial relations with advertisers. This enabled them to raise funds for Ciclovía from private sources – it is reported that 25% of Ciclovia's requirements are funded by the private sector(38)- and also to widen the scope of Ciclovía by incorporating other physical activity programmes such as Zumba under the brand of Recreovia. The institutional flexibility of IDRD is also what enabled them to hire more guards for Ciclovía and to bring in school children as volunteers – the increased number of guards and volunteers was directly responsible for an increase in the spatial coverage – from only well-off neighbourhoods to all neighbourhoods and economic classes – of Ciclovía.

IDRD has also been successful in institutionalising the procedure of conducting Ciclovía, thereby ensuring that it becomes a key part of the life of a citizen and removing any dependence on the support of a mayor. Ciclovía has also led to citizens demanding strongly for everyday cycling infrastructure and has been instrumental in expanding the coverage of the cycle track network across the city(38). It has also helped to increase the presence of cycles with citizens, thereby ensuring that cycling becomes ingrained into daily life.

5.3.5 Opportunities and threats

Opportunities

- One of the silver linings for Bogota during the pandemic-induced lockdown has been the (temporary) reduction in vehicular congestion, which has been a major contributor to poor air quality and reduced productivity. The absence of vehicular movement during the lockdown became a blessing in disguise as the city was able to quickly create the pop-up cycle lanes over a period of just two days and faced lesser resistance in completing the work.

- Although the city already has an extensive network of cycle tracks of 550 kilometres, it also had a plan to expand it by an additional 280 kilometres further. For the new Mayor, the pandemic lockdown offered an opportunity to do so and quickly. Although only 86 of the planned 280 kilometres were created as pop-up cycle lanes, these managed to cover some of the gaps within the existing network. This increase of coverage still needs to be extended to all parts of the metropolis, including key commercial avenues as well as lower-income neighbourhoods, to ensure continued patronage for cycling.

- Apart from the institutional structure, the long history of working on cycle tracks has helped the city to build a network of contractors who were familiar with the processes of implementation. There was also a steady availability of materials such as traffic cones, paint (for demarcating cycle tracks), and bollards to quickly begin work on the pop-up cycle lanes. This presents an opportunity for the city to quickly expand its network and not be bogged down by procedural delays.

Threats

- Although the city was able to quickly implement the pop-up cycle lanes at the start of the pandemic due to lesser traffic and congestion, opposition to the intervention has been increasing over recent months. As the lockdown has eased, traffic and congestion levels have been returning to pre-pandemic levels; this has led to aggrieved motorists demanding the removal of the temporary cycle lanes to ensure a faster flow for motorised traffic.

- Despite the presence of strong cycling culture, including city-wide events such as Ciclovia, motorisation has slowly been increasing over time in Bogota. This has largely been driven by the presence of cheap motorcycles imported from other parts of the world (particularly India); these vehicles not only provide the convenience of door-to-door transport but can do the same at similar costs to public transport. The perceived lack of safety and security from violent crime, especially in the public transport system and on the cycling network, has also helped to reduce their popularity and increased motorisation.

- Another incipient bottleneck faced by the city is the dependence on the mayor. Although Bogota has been lucky with strong mayors such as Castro, Mockus, Peñalosa, and now Lopez in promoting walking and cycling, it had also struggled in furthering its agenda when other mayors were in power. The successors of Mockus and Peñalosa lacked vision and decisiveness on furthering the agenda set, and some even tried to roll back the work done by Castro, Mockus, and Peñalosa. At the same time, although the institutional structure is well defined in terms of the roles and responsibilities of agencies such as SDM, IDU, and IDRD, it also poses a threat in terms of siloed functioning. Therefore, ensuring that coordination occurs between these agencies is largely down to the ability and the political power of the Mayor.

5.4 Case 3 - Bengaluru, India

5.4.1 Background

Bengaluru, the capital of the state of Karnataka in south-western India, is the fifth-largest urban agglomeration in the country, with a population of 8.5 million[18] as of 2011. Urban governance in the city is under the Municipal Corporation - Bruhat Bengaluru Mahanagara Palike (BBMP), with an indirectly elected Mayor as the legislative head and a Municipal Commissioner as the executive head. In reality, urban governance in the city is fragmented, with multiple other parastatal entities exerting control over various functions(39). Entities such as the Bengaluru Development Authority (BDA), Bengaluru Metropolitan Transport Corporation (BMTC), Bengaluru Metro Rail Corporation Ltd. (BMRCL), Directorate of Urban Land

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[18] The estimated population for 2020 according to the World Urbanisation Prospects 2018 is 12.3 million

Transport (DULT), South Western Railways (SWR), Bengaluru Traffic Police (BTP) are some of the major agencies involved in various aspects of mobility planning and implementation in the city.

5.4.2 Pre-COVID-19 scenario

While recent or overall modal split is not available, data from the Census of 2011 indicates that 29% of those who commute for work in Bengaluru walk to work while an additional 5% cycle. 29% of commuters depend on public transport (1% on suburban trains, the remaining on buses), while 33% of commuters had their own personal motor vehicles (1).

Governance of transport in Bengaluru

Physical infrastructure – in terms of roads and streets – in Bengaluru is largely owned and maintained by the BBMP and BDA. In addition, agencies such as the BMRCL, SWR, and Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC) also own and maintain street networks in parts of the city(40). BBMP's network of roads is largely in the core central areas of the city, while BDA, as the city's development authority, has ownership of land (including road networks) in the expanding peripheries of the city. In both the agencies, an Engineering Department is in charge of roadworks, including planning, street design, implementation, and maintenance.

DULT is another key organisation related to mobility in Bengaluru. Created in 2007, it has a wide-ranging responsibility of coordination of planning and implementation of urban transport projects for all urban areas in the State. In Bengaluru, it has worked on several projects related to promoting non-motorised transport with the help of civil society organisations.

Walking initiatives in Bengaluru – the TENDERSURE project

In 2011, the India Urban Space Foundation (later rechristened as Jana Urban Space Foundation [JUSP]), a civil society organisation, came out with TENDERSURE[19], street design guidelines that gave priority to pedestrians and integrated utility networks (such as water and sewer pipelines, electricity, and telecom cables, etc.) into the process of street design. Street design was not a priority concern for city officials, and existing national guidelines such as those published by the Indian Roads Congress (IRC) were inadequate and mostly ignored.

In this context, when JUSP approached the Chief Secretary of Karnataka for pushing the adoption of TENDERSURE guidelines, they were asked to consider addressing the challenges faced in the implementation of such guidelines. Taking this advice, JUSP created a second volume for the TENDERSURE manual, which dealt with procurement, tendering, and construction according to the design guidelines. The project received a significant boost when the state government (informally) approved the guidelines and called for the implementation of a demonstration phase of 27 roads (for a total length of 42 kilometres). In the budget of 2011-12, the state government allocated Rs 200 crores for the project(41), with half of the amount coming from the state government and the remaining to be invested by BBMP.

The project faced significant difficulties in taking off, with two rounds of tendering failing to find bidders. This was apparently due to contractors fearing that the new guidelines would not only be hard to implement but also be more stringent on maintenance and accountability clauses. Due to these difficulties, the project was split into two parts. The third round of tendering saw a successful bid (from a Hyderabad- based firm) and with JUSP taking up the street design consultancy aspects of the project. This involved seven roads in the core part of the city (length of 10 kilometres) out of the total 12 roads (16 kilometres) taken under the first phase.

JUSP reported significant difficulties with street design. A significant portion of the work included shifting of utilities; however, the agencies responsible (such as the Bengaluru Water Supply and Sewerage Board (BWSSB) and the Bengaluru Electricity Supply Company (BESCOM)) often did not have maps of their own utility networks.

Following the completion of the street design, construction work started in 2013. These roads were in the centre of the city and were important in terms of economic and commercial activity and connectivity to different parts of the city. The prolonged construction work, due to the difficulties in identifying and shifting functional utility networks, led to complaints and negative feedback from citizens. Janagraaha, JUSP's sister concern, conducted outreach exercises amongst the project-affected residents and traders, focusing on the

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[19] SURE, is an acronym for Specifications of Urban Roads Execution

long-term benefits of the project and the rationale for the difficulties in execution. The construction of the first road under the TENDERSURE guidelines was completed in 2015.

At the inauguration of the first road, the then Chief Minister of Karnataka announced that TENDERSURE would be expanded to 50 more roads in the city(42). The state government followed up by allocating Rs 250 crores in the budget for the following year. Currently, as part of the national Smart Cities Mission (SCM)[20], Bengaluru is implementing the TENDERSURE guidelines in 36 roads (32 kilometres in length) in the CBD of the city. TENDERSURE has been acknowledged as good practice by the national Ministry for Housing and Urban Affairs and has also been included as a case study in NACTO's Global Street Design Guide(43). JUSP, as a consultant, is also taking the TENDERSURE guidelines to other cities in the country, namely Chennai, Nagpur, and Hubli-Dharwad.

Cycling initiatives in Bengaluru

One of the earliest interventions for cycling infrastructure in Bengaluru was the creation of cycling lanes in the Jayanagar neighbourhood in 2012 by BBMP and a group of cycling enthusiasts(44). Although this 'cycling network' extended over 40 kilometres of streets, they were not physically segregated from the rest of the carriageway and merely ended up as parking spaces for cars.

In 2013, DULT organised the first Cycle Day event in the city along with a coalition of civil society organisations(45). Since then, it has been reported that the city has conducted over 500 Cycle Day events spread out across nearly 50 neighbourhoods in the city(45). Mirroring Recreovia in Bogota, these Cycle day events have seen large turnouts from residents as alternate physical and recreational activities have also been included. The key success of Cycle Day remains its ability to scale up. In the initial events, DULT had a pivotal role in bringing together diverse stakeholders, especially in procuring regulatory allowances from BBMP and the traffic police. However, over time, it was able to withdraw from this central role. It managed to do so by successfully building the capacity of its partnering neighbourhood associations in conducting the events themselves.

5.4.3 COVID-19 strategies

At the start of the pandemic lockdown, DULT saw the opportunity to improve the infrastructure for cyclists following an increase in cycling activity and sales(46) as well as strong demand from the cycling community for infrastructural support. Accordingly, DULT, alongside other stakeholders such as BBMP, BMTC, city traffic police, and civil society organisations such as WRI and BYCS, conducted field surveys to identify potential interventions. Following the example of cities such as Bogota, pop-up bicycle lanes were seen as a quick and effective solution. The pilot stretch identified was for 17 kilometres on both sides of the service lanes of the Outer Ring Road, one of the major 'IT corridors' of Bengaluru(47). Alongside the creation of dedicated cycle lanes using bollards and markings, the project also aims to reconfigure junctions for safe pedestrian and cyclist crossings.

This project is currently being incorporated into the city's formal plan for the recently announced Cycles4Change challenge of the Smart Cities Mission and is envisioned to be the backbone for a 'cycling district' connecting surrounding neighbourhoods(47). DULT has also begun to engage with BBMP to connect this cycling district with the upcoming cycle lanes being built in the CBD under the Smart Cities Mission(48).

In order to ensure the integration of cycling with their services, BMTC has also begun to install bicycle holders on its fleet operating on the ORR(49).

In November 2020, a key pedestrianisation initiative was launched in Church Street[21], one of the key high streets of Bengaluru. Under the 'Clean Air Street' project, initiated by DULT and the Indian Institute of Science (IISC), the street would be pedestrianised during weekends(50). The project initially faced resistance from traders, who worried that the move would reduce footfalls to their establishments. IISC, as the research partner, is monitoring the economic, mobility, and environmental aspects of the study. Based on the

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[20] The SCM is the flagship intervention of Government of India's Ministry of Housing and Urban Affairs. 100 cities across the country have been selected. under the mission and will be provided with monetary and capacity-building support for implementing projects to augment infrastructure across multiple sectors (and with a strong focus on transport and traffic). The Mission has a cap of 2 trillion rupees (roughly equivalent to £20bn) and has been running since 2015

[21] It was one of the streets that had been redesigned significantly following TENDERSURE principles.

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enthusiastic initial responses from citizens, DULT and BBMP have recently announced that they were expanding the Clean Air Street initiative to seven more key commercial streets in the city(51).

5.4.4 Key levers

Role of civil society

Over the past decade, civil society has played a central role in improving the conditions for walking and cycling in the city. It has demanded and advocated for better infrastructure, it has provided guidelines and technical support to civic agencies in planning and implementation, and it has also helped in outreach and the creation of a strong message to the larger citizenry. The TENDERSURE project is an excellent example showcasing most of these aspects; however, the same can be seen across almost all walking and cycling interventions that have taken place in the city over the past decade.

The TENDERSURE project has been pushed by civil society organisations from start to finish; interestingly, it also showcased the influence of civil society organisations such as JUSP, who were able to reach out directly to the Chief Secretary and the Chief Minister to push for better walking infrastructure, bypassing the bureaucratic machinery at the city level. This was perhaps instrumental in the project getting approved, as funding decisions for larger projects must have the (tacit) support of the Chief Minister. Even the expansion of the TENDERSURE project has similarities – the then Chief Minister announced his support for the second phase and funding from the state budget at the inauguration of the first stretch, gauging the success of the initiative and its potential for public support.

The two major initiatives during the lockdown –pop-up cycle lanes on ORR and Clean Air Street – were both initiated by civil society. The Bicycle mayor of the city was a key part of the former. He took the initial steps, the creation of a group of cycling ambassadors within the tech community in the city, and simultaneously started to collect data on the cycling patterns of this community. Armed with evidence, it became easier for civil society advocates to make the demand for the provision of infrastructure.

The Clean Air Street initiative began with the IISC Sustainable Transportation Lab who was working with Energy Systems Catapult on a project titled Innovating for Clean Air in India, which would involve piloting projects. As IST did not have the capacity or mandate to take on such a task, it got in touch with the state-level agency, DULT.

Piloting as strategy

On examination of the various walking and cycling initiatives that have taken place in the city over the past decade, piloting of projects has been used as a consistent strategy. Piloting helps stakeholders to analyse the effects of an intervention and learn about aspects that could be replicated and mistakes that should be avoided in the future. Unlike several other cities in the country, however, there is a key difference in Bengaluru – once the success of the pilot project has been clear to the stakeholders, the project is provided support for scaling up. The scaling up of TENDERSURE to a second phase has been discussed above; TENDERSURE has now become an established part of the city's urban development strategy, with the project being scaled up independently by BBMP, but also under the Smart Cities Mission. Although the then Chief Minister had initially been critical of the need for such an intervention during the construction phase, he was able to change his opinion on seeing the completed work. Thus, piloting has been a key tool to change the perceptions of political stakeholders.

Although still under implementation, both the pop-up cycle lanes and the Clean Air Street initiatives have also seen announcements for scaling up. The pop-up cycle lanes on the ORR have been identified as a crucial component of a proposed neighbourhood cycling district under the city's plan under the Cycles4change challenge of the Smart Cities Mission. In this case, it was identified by the stakeholders that the creation of a larger network would also help to create momentum that could then help the initiative across the entire metropolitan area.

The popular response elicited by the pedestrianisation of Church Street under the Clean Air Street initiative has also led to announcements of scaling up the initiative to other crucial commercial streets in the central business district of the city. It is also to be noted here that the Clean Air Street initiative was supposed to be a testbed, where the impact of measures such as pedestrianisation on air quality or business recovery would be

studied in detail. The success of initiatives such as TENDERSURE earlier has also made scaling up and openness to new initiatives much easier.

The coordinating role played by DULT

Ever since its inception, DULT has played a key role in promoting walking and cycling in Bengaluru. The Commissioner of DULT has had an important part in this; as a senior bureaucrat (at the Principal Secretary level), she has had the power to bring together various stakeholders. The Clean Air Street intervention is a clear example of the above. Her reputation as a champion of sustainable mobility interventions and bridge between civil society and the State led IST Lab to approach her to push for the project. She was able to convince political leaders at the city and state level of the necessity of such an intervention. She was also able to ensure coordination between various departments and agencies involved, such as the Traffic Police, BBMP, and the state pollution control board. It was reported by a stakeholder in the project in a key informant interview that such levels of coordination between agencies were probably unseen before in the city.

Her senior role in the state administration also ensures that DULT remains free to pursue its stated mandate and even go beyond the same. Despite constraints overbuilding capacity in the organisation, she has also ensured that DULT was able to build a team with technical capacity and the ability to coordinate with civil society organisations.

Decentralised approach

A major weakness for the city has been the rigidity of its institutional framework coupled with a lack of adequate capacity. Therefore, although the BBMP is in effect responsible for walking and cycling initiatives as the key road owning agency, it is often unable to plan for the requirements of its residents or to implement them in a quick or effective manner.

Other organisations, such as DULT and civil society organisations, similarly suffer from a lack of sufficient personnel to ensure that their initiatives can be quickly scaled up to the city level. To remedy this situation, organisations have taken up a decentralised approach. This is most clearly visible in the organisation of Cycle Day events.

As stated earlier, Cycle Day was started in 2013 with DULT and a few cycling enthusiasts in central Cubbon Park. However, realising that such an approach would not help in reaching out to the majority of the city's residents, a decentralised approach was taken where neighbourhoods would initiate Cycle Day events themselves, with initial support from DULT. Thanks to such an approach, more than 50 neighbourhoods were able to build their internal capacity to organise these events and be part of the initiative.

When the pandemic lockdown came into place, Cycle Day events had to stop. However, not wanting to lose out on momentum, the Sustainable Urban Mobility Accords (SUMA) was envisaged by DULT as its successor. Through this initiative, communities would be able to envision their own plans for walking and cycling in their neighbourhoods and work on the same. They would be supported – both technically and financially – by DULT and other technical experts to plan, implement and monitor interventions.

5.4.5 Opportunities and threats

Opportunities

- One of the major opportunities that the Clean Air Street Initiative offered was in showcasing the role of pedestrianisation in helping businesses to recover during the pandemic. While numerous cities have provided evidence over time of how pedestrian plazas and similar interventions are more profitable, such an argument is rejected by businesses due to its counterintuitive nature. Due to the enforced lockdown and subsequent reduction in footfalls, businesses have struggled to stay afloat. Consequently, when the Clean Air Street initiative was launched, businesses were more open to trying out such an approach.

- In the early days of the lockdown, one of the clearest impacts for most was the improvement of air quality thanks to the reduction in traffic. As the lockdown has eased in Bengaluru and other cities and traffic has returned to pre-COVID-19 levels, air quality has also seen a decrease. The Clean Air Street initiative also attempts to gather clear evidence of its impact on the overall quality of life, particularly air quality.

- While Bengaluru has largely adopted a decentralised approach towards events such as Cycle Days, the same approach also shows the possibility of such events coalescing to form a city-wide event. With the presence of agencies such as DULT and with support from organisations such as the Traffic Police, the opportunity exists to mirror the success achieved by Bogota in the organisation of Ciclovía.

- As guidelines such as TENDERSURE become a part of day-to-day work within the municipal corporation, it also presents an opportunity for formalisation. Through a formal adoption of the guidelines or of any other street design guidelines, BBMP can ensure that a standard is set in place. Alongside design standards, such a formal adoption can also ensure that funding channels for future works can be made clearer.

Threats

- The lack of a formal set of street design guidelines can, however, also be a bottleneck. Even currently, the city has interventions running under two different sets of street design guidelines. Apart from TENDERSURE guidelines, redesigning of cycle tracks in two principal streets has been based on guidelines provided by WRI. Conflicting guidelines can hamper the integration of infrastructure at the city level and create confusion in the minds of the bureaucracy.

- Although the city has adopted piloting as a successful strategy, it is not necessary that successful pilots are always scaled to the city level. Pilot initiatives could also be replicated in other contexts without required adaptation, resulting in negative outcomes.

- The lack of sufficient capacity within the system is a clear threat to the future of sustainable mobility in the city. Although organisations such as DULT, WRI, and JUSP have the technical capacity, it is not sufficient for the requirements of the city; the BBMP has an even starker capacity gap to bridge. Unfortunately, no clear pathways have been identified to improve the capacity of these various organisations at scale.

- Finally, the lack of clear funding channels for walking and cycling infrastructure remains its biggest bottleneck. As mentioned above, funding has largely been made from decisions made by the state leadership and not due to consistent programmatic allocations. In any case, the political economy of transport in the city (and in all parts of India) has been captured by contractors with interest in big-ticket infrastructure projects promoting motorisation. Unless a break is made from such a situation, funding for walking and cycling interventions will remain piecemeal.

5.5 Case 4 - Addis Ababa, Ethiopia

5.5.1 Background

Addis Ababa is the capital and largest urban centre of Ethiopia, with an estimated population of 4.5 million as of 2019[22] - one in every five urban residents of Ethiopia is estimated to live in the urban area of Addis Ababa[23]. Ethiopia itself is largely rural, with only about 21% of its estimated 112 million population living in urban areas[24]. With a per-capita (PPP adjusted) GDP for Ethiopia of 2300 USD, Ethiopia falls into the Low-Income Country classification of the World Bank.

5.5.2 Pre-COVID-19 assessment

Like most cities in the developing world, Addis Ababa is plagued by a host of issues related to mobility. Even though 54% of its residents depend on walking and cycling to get around the city and an additional 31% depending on its public transport system, traditionally, mobility planning in Addis Ababa has revolved around the remaining 15% who use personal motor vehicles. Therefore, the focus of most transportation interventions was on building flyovers and widening roads to increase the supply of road space to motor vehicles, based on old planning documents such as the urban structure plan of 2004. However, as expected, mobility issues continued to plague the city, with increasing vehicular congestion and worsening air quality and road safety. To add to these issues, the institutional framework in Addis Ababa was severely fragmented, with multiple agencies unable to coordinate with each other in planning and implementation.

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[22] https://data.worldbank.org/indicator/EN.URB.LCTY?locations=ET
[23] https://data.worldbank.org/indicator/EN.URB.LCTY.UR.ZS?locations=ET
[24] https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=ET

Mobility governance system of Addis Ababa

In Addis Ababa, at least 13 agencies or departments are involved with various aspects of non-motorised transport. However, the most important agency of them all is the Addis Ababa Roads and Transport Bureau (AARTB), headed by the Deputy Mayor. The AARTB was created from the merger of a few other institutions and, therefore, has a wider role and responsibilities than other agencies. Apart from the AARTB, the Transport Programs Management Office (TPMO), AA City Roads Authority (AACRA), AA Traffic Management Authority (AATMA), Road Safety Council are some of the more important agencies. A list of all major agencies in Addis Ababa is listed in Appendix A, Table 11.

As mentioned earlier, the focus of these agencies has largely been on facilitating motor vehicle travel till recent years. This has been reflected in the institutional set-up as well, with no formal section for NMT within the AARTB. However, over the past few years, as more and more NMT initiatives have begun in the city, engineers and bureaucrats who pioneered the above work have begun to work together as an informal NMT cell. Their focus was on developing a broad strategy for non-motorised transport and to co-ordinate their activities with that of other departments and agencies.

Federal mobility governance system in Ethiopia

At the national level, mobility in Ethiopia is governed by the Ministry of Transport, with the Federal Transport Authority (FTA) as its primary agent of change. As there is a fair degree of devolution of decision-making to local authorities, the main role of the federal government is providing technical and monetary support to the capacity and cash-strapped local administrations. The Ethiopian Road Fund is one of the major instruments through which the federal government provides support to local bodies. A key source of revenue for the ERF is direct budgetary allocations from the national government. Taxes and levies on fuel sales and vehicle operations form the majority of the ERF's corpus, the monies which are then used for road improvements.

Table 4: Timeline of key NMT initiatives in Addis Ababa and Ethiopia

Year	Initiative
2011	Transport Policy for Addis Ababa introduced
2015	The first set of footpath and intersection improvements in Addis Ababa are initiated under the Bloomberg Initiative for Road Safety
2017	Ethiopia publishes its Climate Resilient Transport Sector Strategy; mobility is identified as a particular area of interest
2018	Addis Ababa City Administration publishes its NMT strategy
2018	First Car-free day event held in Addis Ababa
2020	Ministry of Transport publishes Ethiopia NMT Strategy 2020-2029

5.5.3 COVID-19 strategies

National NMT Strategy

In May of 2020, during the COVID-19 pandemic, the Federal government of Ethiopia put forward a National Non-Motorised Transport Strategy for the decade of 2020-2029. This document, largely following the structure of the 2018 Addis Ababa Non-Motorised Transport Strategy, put walking, and cycling as a key part of Ethiopia's climate-resilient strategy. It has four key goals - improves road safety, air quality, and usage of sustainable mobility modes, especially by increasing women's patronage of cycling whilst simultaneously reducing vehicular usage and, consequently, congestion. Through a set of implementation targets, it simultaneously aims at building a network of NMT infrastructure for all major cities in the country.

Institutional structure

The strategy proposes the creation of a national NMT committee, chaired by the Transport Minister and consisting of representatives from all major national and local transport organisations. The primary role of the committee would be that of inter-agency coordination and periodic reviewing of the progress made by cities.

The NMT strategy is planned out to be rolled out primarily via local governments. Cities would also have to collect data on their current situation, identify issues and gaps in infrastructure through the creation of Sustainable Mobility Plans (SMPS). These SMPS will also provide an overview of their vision and goals as well as major projects that would be undertaken. City-level SMPS would then be, vetted at the national level by the NMT committee.

Capacity building

The Federal Transport Agency (FTA) has been put in charge of creating a framework for improving capacity. It will build on its existing programme of engaging with universities, both to impart training to current officials as well as to incorporate good practices into university curriculums for urban planning. The federal NMT strategy has also called for the adoption of a detailed urban street design manual.

Funding

A large portion of the funding to cities for operationalising the NMT strategy is to be made through the Ethiopian Road Fund. The Strategy details that cities will be allocated funds based on the respective project proposals in their SMPS, which will then be disbursed through dedicated Local Transport Funds (LTF), which would be set up for this purpose. At the federal level, however, further details of the quantum of budgetary allocations have not yet been made.

Communication and outreach

The NMT strategy has explicitly claimed to undertake an inclusive planning process and, therefore, has asked for citizens' support in the matter. It has also detailed several other ways to engage with citizens, including the expansion of car-free days and open streets events (already present in Addis Ababa since 2018), training for cycling, regular marketing campaigns, and participatory neighbourhood planning activities.

5.5.4 Key levers

Political leadership

The political leadership at the federal level has been instrumental in the national (and global) attention towards walking and cycling in Addis Ababa and Ethiopia. The Federal Minister of Transport, due to her previous experience as the Deputy Mayor of Addis Ababa, was aware of the principles and practices of sustainable mobility and was eager to replicate the successes of the city at the national level. The adoption of a federal NMT strategy and the transport policy based on similar guiding frameworks present in Addis reflects this concern.

Apart from her support towards the publication of the Federal NMT strategy and the transport policy, she has also taken an active role in outreach. During the pandemic-induced lockdown, along with the Federal Minister for Health, she has participated in public Car Free Day events to showcase the importance of walking and cycling to the larger public and thereby bring about behavioural change. She has also been supported in her mission by the Prime Minister, whose interest in combating climate change has seen the country adopt a 'Climate resilient transport sector strategy.'

Role of civil society

Civil society organisations have played a major role in Addis Ababa over the past few years. Through the Bloomberg initiative, organisations such as NACTO and WRI started working in Addis Ababa, primarily from the point of view of road safety. These organisations have brought in principles of sustainable mobility planning as well as examples of good practices from around the world. They have also strongly participated in capacity-building efforts, which have since enabled government officials to identify and implement initiatives that were suited to the local context. The Non-motorised strategies for both Addis Ababa as well as Ethiopia were largely developed with the help of the ITDP Africa Programme and UN-Habitat. The Addis Ababa NMT Strategy also had support from NACTO's Global Designing Cities Initiative, Bloomberg Initiative for Global Road Safety, and WRI. Through their interventions, civil society organisations have tried to institutionalise regulatory, organisational, and financial frameworks for the city.

Apart from providing technical support, these organisations have also helped in the implementation of pilot projects such as junction improvements, footpath improvements, and cycle tracks. Through the latest pilot

initiatives of the cycling corridor, they are also helping city agencies to create a monitoring and evaluation framework for interventions.

Civil society organisations have also helped in demand generation for walking and cycling infrastructure through events such as Car Free Days. Since the first event in 2018, more than a dozen such events have taken place, showing the latent demand present in the city. These organisations have also been instrumental in pushing for outreach and communication as key components of the NMT strategy.

Strategies and plans

While Addis Ababa had a detailed transport policy which was published by the Federal Ministry of Transport in 2011, it did not provide sufficient operational guidance for identifying and implementing projects for city officials. Learning from these difficulties, the Addis Ababa NMT strategy chose to adopt a simpler and clearer tone. It set out a clear vision, which was backed by a set of measurable goals and outcomes. It set out clear design principles for walking and cycling initiatives and provided street design guidelines as well. It finally also provided the city with an institutional framework for executing the strategy and sources of funding. Thus, it aimed to provide a comprehensive overview of the walking and cycling sector and a step-by-step approach to implementation. The Federal NMT strategy proceeds in a similar manner and spells out the infrastructure requirements for various cities in the country.

In the absence of a strong legislative and regulatory framework, the NMT strategies have stepped in to plug this gap. Through the Strategies, the emphasis is on institutionalising existing processes to make them independent and resilient of political regimes. As mentioned above, the strategies also double up as guidelines, thereby helping to improve the technical capacity of government officials as well.

5.5.5 Opportunities and threats

Opportunities

- The Federal NMT strategy of Ethiopia has gained a lot of attention globally due to the presence of the Minister at several high-level events on mobility. She has also emphasised the importance of promoting walking and cycling at the national level. This spotlight provides an opportunity for government agencies to build their capacity and begin work on successfully implementing the NMT strategy.

- Nearly three out of every five trips in Addis Ababa are made by walk. Although a large proportion of these could be captive users, improvement of walking and cycling infrastructure still provides an opportunity in ensuring that the mode share for walking and cycling does not get reduced. Initiatives such as the forthcoming PBS system can ensure that walking and cycling continue to constitute the lion's share of trips in the city.

- The NMT and PT technical team within AARTB has been playing a major role since its inception. They have been deeply involved in capacity building for fellow government officials from other agencies and have also been involved in reviewing the work done by other agencies. With sufficient legal backing, the team can set the agenda and become the de facto leader for sustainable mobility amongst the various transportation-related agencies in the city.

Threats

- As has been seen in the case of many other developing countries, detailed plans and strategies could remain on paper and not be implemented. There could be multiple reasons for such a situation to occur, including a change in staff or government, lack of financing, lack of capacity amongst implementation agencies, and the appearance of new or competing strategies or plans. In Ethiopia, an additional concern has been the emergence of internal conflicts in the Tigray region, drawing national and global attention.

- Although Addis Ababa has piloted three new cycling corridors at the start of and during the pandemic, there are fears that these initiatives could be unsuccessful like previous attempts (where lack of a network-based approach, encroachment by motor vehicles, and inadequate enforcement by traffic police led to the initiatives being suspended). Failed pilot attempts have made both city agencies and citizens wary of the efficacy of cycle tracks and their suitability to the Ethiopian context.

- The NMT and PT technical team within AARTB has done a stellar job on capacity building and reviewing the work of other city agencies. However, the small size of the team – it consists of only four members, including the team leader – and the lack of formal powers mean that they could very well be overlooked in the future, especially if individual agencies are concerned about losing their powers.

- The lack of capacity – both technical and financial – is a major threat facing the city. While sustained efforts are being made to bridge the technical capacity gap, including a focus on building strong city planning curricula at the university level, capacity building is an area of concern for which resolution takes a long-term approach. Financial capacity remains an issue in the short-, medium- and long-term scenarios with the city and country dependent on financing from multilateral agencies such as the World Bank for their needs.

5.6 Conclusion

The above four case studies have tried to provide an overview of the initiatives that have been taken up over the past few years for walking and cycling. This was done through a review of the literature along with information gathered from in-depth interviews conducted with key informants. The key informant interviews were also helpful in identifying the key levers that were instrumental in driving change across each of the case studies. Alongside key levers, the study also looked at the opportunities for improvement as well as possible threats or bottlenecks that awaited each of these cities in the future. This was done with the recognition that certain key levers are subject to quick change than others and can hence improve or reduce a city's fortunes drastically.

This approach has also validated some of our earlier assumptions – while we had listed eight candidates as potential key levers, we also were sure that the levers of (technical and implementation) capacity, well-defined and structured institutional framework, and clear channels of funding were important for sustained growth of walking and cycling. This was reiterated by key informants, especially in the mature cases of London and Bogota. As such, it also clearly shows the way forward for the emerging cities of Bengaluru and Addis Ababa.

Table 5: Summary - key levers identified for the case studies

London	Bogota	Bengaluru	Addis Ababa
Continuity in focus on walking and cycling	Mayoral leadership	Role of civil society	Political leadership
Healthy Streets Approach	Clarity of institutional structure	Piloting as strategy	Role of civil society
Dedicated capacity for walking and cycling	Ciclovía	The coordinating role played by DULT	Strategies and Plans
Civil society		Decentralised approach	

Civil society

The table below lists the key levers from all four case studies. It can be seen very clearly that certain key levers remain common to all four cities – in all four cities, the presence of civil society organisations has been important in furthering walking and cycling. In all our cases, civil society organisations have been instrumental in creating demand and advocating for walking and cycling infrastructure but have also contributed on the supply side by providing technical support in policymaking, planning, and implementation, helping to build capacities and even as custodians of infrastructure.

In the emerging cases of Bengaluru and Addis Ababa, it has been a civil society that has pioneered efforts towards improving the conditions for walking and cycling. Even in the mature cases of London and Bogota, civil society continues to play an active role in lobbying with governments and introducing innovative interventions.

Leadership

Another common thread linking the four case studies is the role played by political and bureaucratic leadership. Even though political leadership usually plays a supporting role in all four cities, we find that political buy-in has been crucial towards ensuring continued funding. In London, Bogota, and Bengaluru, we

also see that the political leadership has been able to recognise the success and impact of walking and cycling interventions and has, therefore, continued to support the larger vision even as individual leaders change. However, Bogota also shows us that a strong leader is required to set a long-term vision, without which earlier gains might be squandered.

Along with political leadership, the role played by bureaucratic leadership is also of interest. This is most pronounced in the case of Bengaluru, where the Commissioner of DULT has been central in the promotion of the walking and cycling agenda in the city. She has actively played a bridging role between civil society and the State; she has also enabled coordination within and between various government agencies. In London and Bogota, a similar role is played by the Walking and Cycling Commissioner and the Walking and Cycling advisor – in both cases, the appointees are political and are hence able to support the respective city's Mayor in setting the agenda.

Communications and outreach

Another aspect highlighted is that of the importance of messaging, communications, and outreach in effecting behavioural change, visible most clearly in the approaches undertaken by the mature cases of London and Bogota. In Bogota, Ciclovía played a central role by linking civic culture to the usage of public space and, later, to the internalisation of cycling within the larger mobility infrastructure of the city. London took a direct route through the Healthy Streets Approach – the idea incidentally came from civil society – as the way to educate citizens. By focussing on personal health – and the positive externalities it can generate for both the individual as well as the public healthcare system, the city created a clear message that was aimed at moving people away from their cars. By linking the approach to their formal strategy, the city was also able to ensure that their actions and words were in sync. Furthermore, the current Walking and Cycling Commissioner for London was selected due to his experience in effecting behavioural change.

Institutional structure, capacity, and financing

The experiences of London and Bogota show that clarity in institutional structures and processes is required to sustain sustainable modes of mobility. In both cities, there is a clear recognition of roles and responsibilities between various agencies involved in improving walking and cycling. At the same time, the various agencies themselves have sufficient internal capacity to envision and plan and implement existing projects. The avenues of funding are also clear in these cities (notwithstanding the current troubles faced by TFL) and include a mixture of local revenues and resources and national grants. This structure is backed by legal and regulatory frameworks.

In the emerging cases of Bengaluru and Addis Ababa, these aspects account for a much less significant share in the city's success. In both cases, the lack of sufficient technical capacity is a major bottleneck for future success. Addis Ababa has tried to resolve the same by using civil society organisations and a focus on quickly building capacity through formal educational channels. Bengaluru has evolved to create more capacity through a decentralised approach, focusing on educating community groups to become self-reliant. While the channels of financing are clearer for London and Bogota, both the mature and emerging sets of cities find the funding of walking and cycling difficult. In the wake of funding crunches, Bengaluru, and of late London, has relied on funding from national schemes.

6. Bus based public transport – post-COVID-19 dynamics and key levers

6.1 Introduction

Bus-based public transport is the mainstay for most cities in Low-Income Category[25] countries. Cities in India boast nearly 75% public transport usage across inter and intracity trips (53). Cities across African nations largely depend on walking and public transport (formal and informal) for their day-to-day activities. Simultaneously, these systems face institutional inadequacies (lack of integration), good quality infrastructure, lack of funding, small fleet size, etc., inadvertently resulting in loss of public ridership over the years.

With the onset of the COVID-19 pandemic, globally, there has been a drastic decline in public transport ridership, fearing the risk of infection. Further, the present scenario, i.e., post-lockdown phase, owing to capacity restrictions and the mandates to follow stringent necessary bio-security measures (sanitisation and providing relevant support to staff), has increased the overall operational cost. This situation has further exacerbated the financial difficulties of both public and private-owned public transport systems. A World Bank report estimates the financial loss to the sector to the tune of 20 billion dollars (53). Like with many other infrastructural systems, the COVID-19 pandemic has laid open existing fault lines within the functionality of public transport systems. Globally, many bus-based public transport systems (public and private) face blowbacks in their operations, resulting in demands for better support from Governments in terms of financial compensation and relief during COVID-19 (54–56). While there are a few promising initiatives, it is early to be studied due to the pandemic's volatile nature and the dynamic responses of nations and cities.

Therefore, the report aims to move forward with identifying case studies that have faced similar circumstances in the past and has a history of strong public transport reforms. By doing so, this report will draw from experiences and responses cities and countries have taken under similar circumstances or with the anticipation of the same. Here the circumstance is an event that has/will/might drastically disrupt a city's day-to-day functioning. These events can vary from economic disasters, climate change, pandemics, epidemics, and other planned or unplanned events. The following questions would be the specific focus areas of the report.

- What steps have cities adopted to build back better public transport?
- What are the varying degrees of transformative steps taken to make public transport resilient?

6.2 Public transport, disruptions, and resilience

6.2.1 Disruptions in travel behaviour studies

Recent surveys conducted during the pandemic lockdown of 2020 to capture the long-term impacts of COVID-19 on transport choices in India suggest a significant shift from public transport systems to other alternative modes(57,58). On the contrary, earlier studies focusing on the impacts of disruptive events on travel behaviour report the opposite of returning to normalcy. The reversion of travel behaviour is identified across various disruptions in the past (here, a disruption could stand for either planned or unplanned). A study conducted on public transportation linkages and fear of the SARS virus in Taipei, Taiwan, indicated that on average public transport ridership would revert within 28 days of the last reported incident (59). Similarly, the same phenomenon is noticed when studying the impacts of natural disasters (60), economic crises (61). From all the studies, it can be ascertained that the quantum of change will vary based on the type of disruption and duration (62,63) but will nonetheless revert (61).

The conflict of findings between the COVID-19 surveys and the studies on travel disruption is due to the former's survey method and context. The technique used was predominantly an online form and was conducted during the lockdown. While it indicates possible shifts, the participants mainly have better access to infrastructure and possibly wealth. The same has been confirmed by transport experts Geetam Tiwari and Graham Currie in a Webinar organised by TERI, ``Impact of COVID-19 on Urban Mobility''. During the webinar, the experts suggested that there will be immediate impacts on transport choices owing to insecurity, fear, etc. (64), resulting in a preference for private modes. The same is unlikely to continue. The high percentage of

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[25] Income categorisation based on World Bank Atlas Method(52)

captive users opposed to the choice users depending on public transport indicates a travel behaviour that will most likely revert, with minor changes—attributed to the retention of teleworking practices within wealthier commuters (60) or choice commuters. In the context of COVID-19, the distinction between captive and choice users' travel choices or opportunities is imperative to develop strategies to induce a shift and retain public transport patronage. As choices related to travel behaviour go beyond a legal framework or access to infrastructure, social, cultural, and economic influences (65). Hence, in LIC's where the majority share of public transport users is captive users, the chances of a shift seem minimal. Therefore, LICs require a resilient public transport system to lessen disruptions.

6.2.2 The resilience of public transport systems

Resilience was first introduced to explain the strength and stability of ecological systems; resilience was defined as determining the persistence of relationships within a system, a measure of these systems to absorb and adapt to changes. The key focus of such systems is to ensure persistence by maintaining flexibility and adaptability (66). Since then, the concept has been utilised across main domains; within the urban realm, some of the definitions for resilience are "the degree to which the system minimises the level of service failure frequency over its design life when subject to standard loading or when subject to exceptional loading" (67). Further urban resilience frame how actors and infrastructure contribute to the capacity to survive, respond, recover, adapt, and evolve to respond to events of stress or disruption (68). In particular, transport resilience has been defined as the "capability to recover from a disruption to an operational level similar to before the disruption promptly (69) and as the ability to avoid and recover from sources of adversity, disturbance, damage or catastrophe that affect system performance (70).

Across all definitions, critical is the ability to transform the status quo to persist and be resilient. In the context of COVID-19, while it is a global crisis, it has also highlighted the differential impact it has across LICs and its citizens. Due to the hyperconnected nature of cities and the rising occurrences of events that can impose significant pressure (71), it is imperative to future proof. Hence, while resilient transport systems are adaptive, dynamic, and have self-organisation, they need not be stable as stability within the resilience discourse is defined as returning to the status quo. Hence, the focus for LICs is to understand and implement the strategy or a range of strategy targeted towards a continuous transformation that will eventually future proof and help navigate the differential impacts of disruptions, such as COVID-19.

The report aims to explore and expand on the transformative practices adopted to futureproofing across various case studies through this lens.

6.2.3 Selection of case studies

With this theoretical framing, the case studies selected are those cities that have had or are presently going through urban transport reform/transformation. By focusing on such case studies and assessing the impacts and responses of COVID-19, LICs can understand, learn, and adapt strategies that have worked in these varied contexts. Hence, the case studies selected are Seoul, Lagos, and Kochi, each at different urban transformation stages and across various income.

Table 6: Case cities and stages of public transport reform

City/ Urban Region	Country	Country Classification	Stages of Public Transport Reform
Seoul	South Korea	HIC	Established
Lagos	Nigeria	LIC	On going
Kochi	India	LMIC	Emerging

Table 7: Case cities

	Seoul – Bus	Lagos – BRT Lite	Kochi – KSRTC, Private
Country	South Korea	Nigeria	India
Total population (in millions)	25 Million	22 Million	2.1 Million
Total metropolitan area (Km2)	11818	1171	632
Share of BBPT in daily commuter trips	27% (60% is PT)	4% (60% is Danfos)	49% (PT)
Total network length	361 Routes (120 Km)	35 Km	775 Routes
Fleet size	7485	500	2000
Governance	Quasi-Public System	LAMATA- Metropolitan transport authority	KMTA – Metropolitan transport authority

6.3 Case 1 - Seoul, South Korea

6.3.1 Background

Seoul is the capital of South Korea and is a megacity with a population of 9.63 Million (72) and 25 million in the wider metropolitan area. The city covers a geographical area of 605 Km^2 with a population density of 16158 Inhabitants per Km^2. The city has a very high share of public transport, increasing from 52% in 2000 to 65% in 2018 (73). 40% of all rideshare in public transport is attributed to the metro and 25% to the bus. The total number of trips attributed to public transport amounts to 20 million trips per day. The city has 22 metro lines, and 746 stations connect the whole metropolitan area of Seoul and Gyeonggi province, and the Seoul bus system possesses nearly 7400 buses (74).

6.3.2 Pre-COVID-19 assessment

The very high percentage of public transport users can be largely attributed to the centrality public transport has played in the lives of the citizens since the early 1950s. Nonetheless, like many other cities worldwide, Seoul too followed motorisation. And since then, it has undergone a transition from a traditional bus-centred transport-dependent city towards motorisation and now back to public transport, emphasising integration and cleaner and better technology. The resurgence towards public transport was rooted in the necessity to rein in the congestion issue that plagued the city between the 1970s to the late 2000s due to the increasing private motorisation rate. And the same was achieved through a consistent effort to build the Seoul Metro, but can primarily be attributed to the significant public transport reforms of 2003 initiated by Mayor Myung Bak Lee.

Figure 3: Seoul - History of mobility (75)
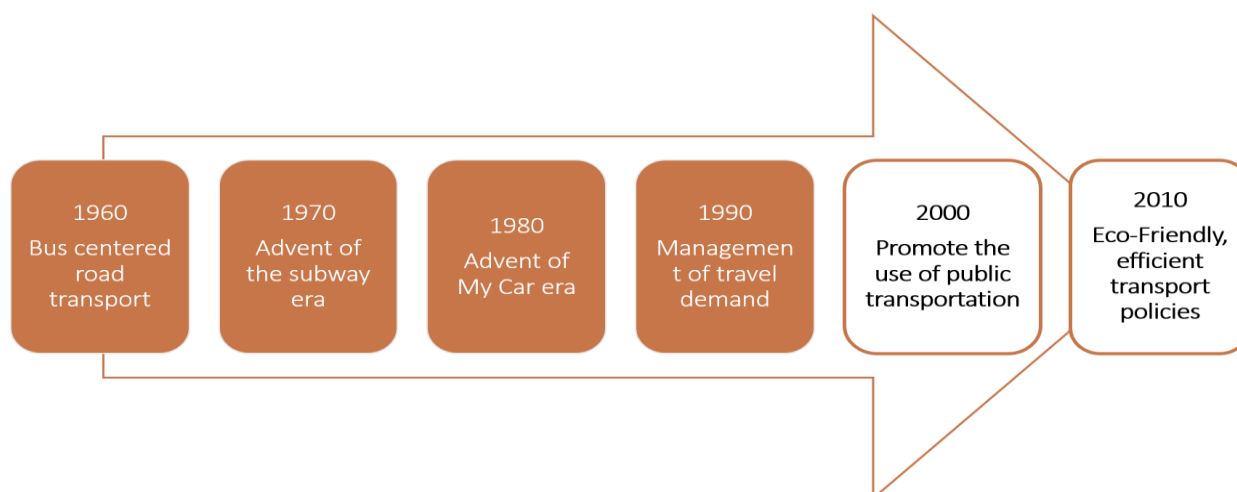
Mobility challenges prior to public transport reform

While historically a public transport-dependent city, Seoul faced two critical problems before the 2003 public transport reform. Rising levels of congestion on the one hand and the need for an affordable public transport solution on the other.

Between 1970 and 2002, the city witnessed a 40-fold increase in its per capita income levels from 311 $ (1970) to 12531 $ (2002). Seoul saw a rise in the ownership of private vehicles (2 cars per 1000 in 1970 to 215 cars per 1000 in 2003)(76). Resulting in an increased level of congestion and reduced travel speeds, an increase in the levels of air pollution, and the construction of roadways and other parking facilities. The unlimited supply of infrastructure approach was symptomatic of the "My Car era." The need for an alternate and effective public transport was necessary, and in 1974 the city built its first metro line. Since then and until 2004, the city had built over 487 km, 13 lines, and 389 stations. While the construction of the Seoul metro was imperative for a growing city, the resulting financial burden (capital exp and operational exp) was immense. Hence, there was a need for an alternate but affordable transit option and fuelled the public transport reforms of 2004 with a specific focus on BBPT.

Figure 4: Seoul - Public transport vicious circle (77)
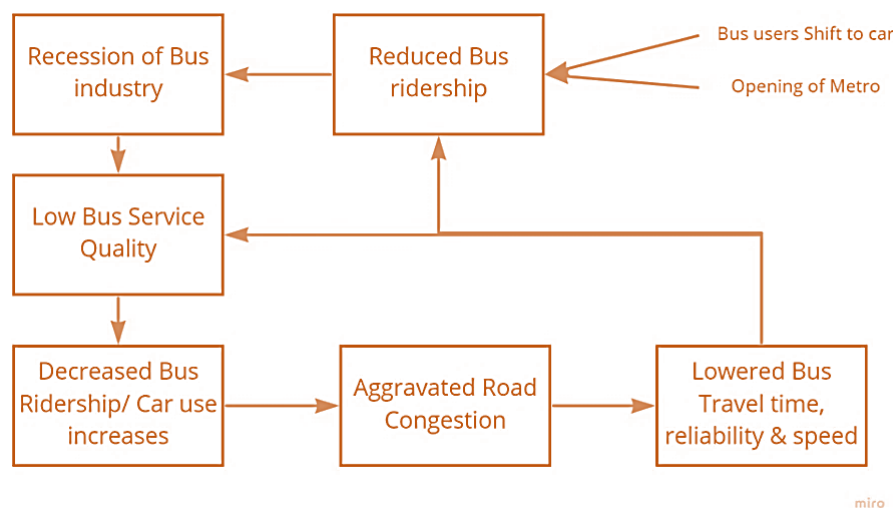
Since its inception in 1953, the bus service was the primary mode of travel well into the early 1990s. The system at the time was highly unregulated, with bus operators deciding on routes to service, cost control, operations, and management of employees. At the same time, the Seoul Metropolitan government oversaw licensing and evaluation. The fare system was based on the number of passengers occupying the bus. Hence, this situation resulted in a highly competitive scenario wherein some routes (The Golden Routes) were better serviced than others and increased levels of crowding in buses. Clubbed with a lack of improvement in the system's overall quality resulted in decreased system reliability. This unregulated and fragmented system, further exacerbated by the rise in private motorisation and rise in metro ridership, resulted in a steady decline in BBPT patronage and overall market share. It was resulting in a vicious circle (77), as depicted in the diagram above.

Over time, the situation proved unsustainable. The burden on the city and the national government was consistently rising due to Metro construction's financial responsibility (78,79) and the increasing subsidy levels required to plug the operational deficit faced by buses(76). In this climate, the then-mayor and later president Myung-Bak-Lee, with the aid of the Seoul Development Institute, brought about the massive reforms in bus-based public transport. The reforms were a complete overhaul of the existing system and focused on overall modernisation.

The public transport reform of 2004

The public transport reforms introduced the quasi-public bus system, wherein the government-controlled fare structuring, routes, schedules, and system's overall design. They retained the bus service companies to operate the routes (76,80). The reforms introduced improved and staggered bus systems, which are colour-

coded, improving the accessibility of the bus system systems. A complete network redesign removed the earlier overlaps and unnecessary competition between operators and enhanced coverage. The reform also introduced a joint revenue management system based on passenger trips to vehicular km of service, stopping the unhealthy overcrowding. Introduced a bus management service integrated with an intelligent transport system and GPS trackers for buses; this enabled users to plan their trips and avoid overcrowding if at all (76,77,80). The reform also introduced a smart card facility that allows for easy payment and monitoring of operational levels of the buses.

The city government faced protests and other hurdles, From the reform announcement in 2002 until its execution in 2004. Over time, the reform resulted in increased patronage in BBPT, and consequently, the overall share of public transport increased. Further still, there was an increase in travel speeds, reduced levels, and quantifiable improvement in air pollution. Additionally, the system saw an increase in citizen satisfaction levels (14% pre-reform to 37% post-reform)

There are three key reasons why Seoul is selected as a site for study. Firstly, owing to the strong public transport culture that exists due to the public transport reforms of 2003 and current plans of green growth. Secondly, due to its experience of dealing with two SARS epidemics in 2003, the MERS epidemic in 2015. Thirdly, owing to its prior experience and knowledge, the city has continued to keep its public transport system mainly functioning through the COVID-19 pandemic. Hence Seoul is a case study of public transport resilience.

6.3.3 COVID-19 assessment

Seoul was one of the few cities that continued to keep its public transport running through the pandemic. It was the first city to impose mask restrictions in public transport since May 2020 (81). Owing to the city's earlier encounter with SARS, the city quickly responded with its COVID-19 distancing guidelines "distancing in daily life." Under this, public transport operation guidelines were drafted, which detailed out protocols to be followed based on congestion levels in the PT system. To further ensure the citizens are empowered to respond and make changes based on congestion levels, Seoul Metro set up a pre-notification system that commuters can access through the website or app. On the bus, commuters can access live updates through the bus information terminal and app (74). Apart from this, various other biosecurity measures were also put in place by the appropriate authorities, which involved sanitation protocols. Furthermore, Seoul Metro and other authorities utilised communication campaigns to make passengers feel safe while using PT during the pandemic (81). Seoul Metro has also operationalised a staff evacuation plan (82), ensuring business continuity.

Seoul Metro has also introduced contactless ticketing systems that utilise facial recognition technology. The city government has also released the "My-T" app in Jan 2021, which tracks the users' routes through GPS and traffic card use(83). The app can automatically send alerts if the planned route has overlapped between an individual and a COVID-19 patient. More recently, due to the rise in cases, the Seoul government has reduced operation levels (30%) post 9 pm (84). The city has also installed intelligent bus stops which filters those who can enter it based on the body temperature levels.

The aforesaid ascertains Seoul's efforts are expansive and detailed in terms of planning, financial commitment and range of actions and infrastructures deployed. Due to the experience with an earlier pandemic, both the citizens and the government officials were able to respond in record time. Yet, despite all the above efforts, the pandemic has resulted in a significant decline in public transport ridership, with a plunge in ridership by 27% in Seoul's subway and 24% in Seoul's Bus system, and a nearly 85 % drop in ridership in airport buses (85). And the prolonged nature of the pandemic is acting quite heavily on public transport systems and, more so, on the private bus operators as financial burdens continue to rise on account of the reduced ridership.

6.3.4 Key levers

The entire section results from the detailed documentation and research that has already been executed by various individuals and organisations. Hence, the resulting analysis cannot be attributed to a single document as only by reading them together a clear picture is discernible. The documents referred to are (76,77,86–88)

Putting a system in place – A road map to public transport reliability

As mentioned earlier, Seoul is a case that focused on building towards public transport reliability. The Seoul Metropolitan Government (SMG) achieved this by ensuring a continuously growing bus system supported by vital digital infrastructure. Although initiated in 2004, The Seoul Metropolitan Government implemented the public transport reform in phases.

Figure 5: Seoul - Chronology of public transport reform
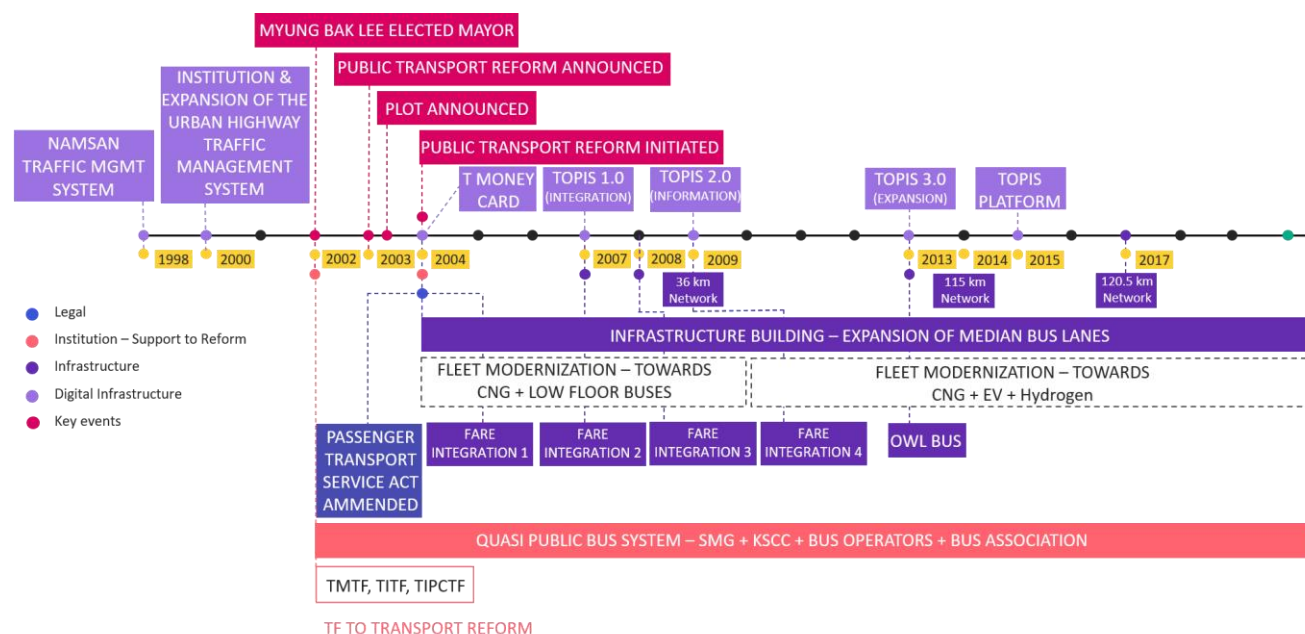
Phase 1 - Legal, regulatory, and institutional

The first step was setting up the necessary legal and institutional capacities. Seoul Metropolitan Government (SMG) was achieved by introducing specific groups/task forces at the beginning of 2002 to support the efforts to detail and fleshing out the reform itself. Between 2002 and 2004, the Seoul Metropolitan Government (SMG), BRCC, and MOLIT made the necessary legal amendments (Passenger Transport Service Act) to legalise the new quasi-public institutional arrangement and joint revenue management system. The amendment also empowered the new institutions (Korea Smart Card company, Joint management council) and articulated the applicable mandates of existing Institutions (Seoul Metropolitan Government, Bus operators).

Phase 2 – Building (physical, digital, and operational) infrastructure

The city government undertook a consistent and incremental approach to building better and reliable physical and digital infrastructure to support the quasi-public bus system arrangement and expand operations. This is evident from the evolution of the Transport operation and information system (TOPIS) from 1.0 (2007), focused on the integration of traffic data (speed, volume etc.) TOPIS 3.0 (2013) focused on the expansion of its functions into the domains of urban safety and disaster management and later TOPIS platform (2015), which enabled the citizens to access the data. The Seoul Metropolitan Government (SMG) undertook a similar approach to introduce fare integration, beginning in 2004 with Seoul and expanded to Gyeonggi-do-province in 2007 and Incheon city in 2009. Similarly, in improving technology from CNG and moving towards EV and Hydrogen fuel-based buses.

From the above, a supporting legal and institutional climate is to be introduced before putting in place (physical/digital/bio security[26]) infrastructure. A sustained and incremental approach needs to be undertaken to build and create a resilient and reliable public transport system. This can be supported by the rising level of public transport patronage (Pre-COVID-19) and ongoing usage of public transport during the COVID-19 pandemic.

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[26] Infrastructure that is introduced specifically to minimise the risk of infectious diseases

Learning from failure, conflict management, political will and leadership

A key ingredient to the success of any reform project is learning from failures. This can be achieved only through conflict management and political will and leadership. In Seoul, these tools played a critical role between June 2002 (election of Mayor Myung Bak Lee) and July 2004 (Commencement of the reformed bus service).

Bus Reform Civic Committee (BRCC) – learning from failure

After the mayoral elections in 2002, the mayor instituted a public transport promotion task force (administrative team) and public transport reform support team (research team) In Seoul Development Institute. With the aim to conduct the necessary background study and research to flesh out the details of the Public transport Reform. Following this, the reform was announced in Mar 2003, and a pilot was to be initiated in the Dobong-Mia area in north-eastern Seoul. These efforts were met with massive protests from the Seoul Bus Association (composed of bus owners) and bus drivers. The bus owners feared that their functions would be limited to operations under the new institutional arrangement. And the bus drivers feared there might be a decrease in the number of jobs due to increased speeds and frequencies. Eventually, the consistent pushback resulted in the postponement of the pilot project. Post this event. It became evident that consultation and agreement of all stakeholders were necessary. And as a result, and spearheaded by the NGOs (Coalition for economic justice, The YMCA civil Society, The Green Transport Movement, and the Green Consumers Network), the Seoul Metropolitan Government constituted the BRCC on 26th August 2003 (87). BRCC consisted of four civic organisations, three Bus companies, eight Academia, five city council members, and other related entities and was imagined as a stakeholder feedback group as it brought all relevant stakeholders into one platform. The BRCC and Ministry of land, infrastructure, and transport (MOLIT) were Instrumental in amending the passenger Transit Business act in 2002, which gave legal backing to the quasi-public institutional system and the joint revenue management mechanism. The committee was instrumental whenever multiple stakeholders were necessary to make decisions. For instance, identifying bus routes that could meet the requirements of citizens and the financial stability of bus companies (77). The BRCC plays a critical role in the overall institutional arrangement of public transport in the city.

Conflict management

Between August 2003 and June 2004, the Seoul Metropolitan Government (SMG) held multiple stakeholder meetings. It organised 27 special briefings for bus drivers, which the mayor and vice mayor attended to address their fears associated with public transport reform. The Seoul Metropolitan Government (SMG) also organised a two-day workshop in mid-October 2003 between the Seoul Metropolitan Government (SMG) 's public transportation reform team and bus company representatives to discuss the finer details of the quasi-public system, fares, and route tendering. Resulting in a critical decision in 2004 where Seoul Metropolitan Government (SMG) promised the bus companies to total compensation (based on a pre-approved standard operating cost) if they were to incur financial losses on account of the new system (77). Further, the Seoul Metropolitan Government (SMG) also undertook multiple negotiations with the national police agency with regards to the safety of bus median lanes, MOLIT with regards to the legality of the quasi-public system, the Korea railroad (integrated fare system and T money card implementation), Incheon transport corporation company and Gyeonggi-do province with regards to fare integration across provinces/regions.

Political will

Mayor Myung Bak Lee was integral in creating the Institutions that supported the drafting, consultation, and implementation of the public transport reform. Apart from this, the mayor and his team of civil servants were also instrumental in running and organising a public relations campaign a month before the actual reform was initiated. They oversaw the implementation and firefighting, which followed two months into the reform until finally all snags were resolved (Seoul a public Transport reform).

Unique institutional arrangement

Figure 6: Quasi Public Bus System (88)
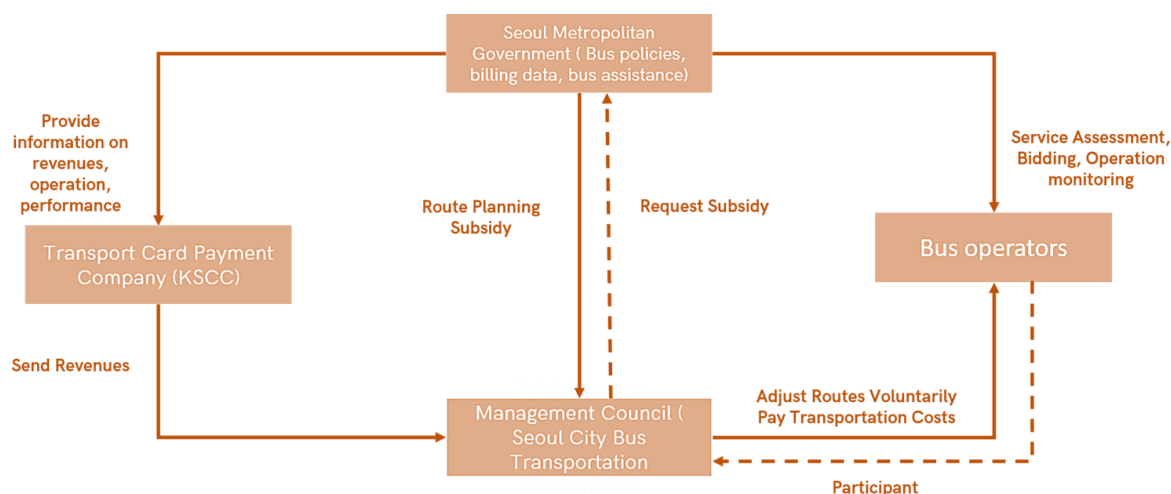
The Quasi-public system drastically changed the way BBPT was managed in the city. In the pre-reform situation, there was a concentration of power with private operators, which created a highly unbalanced system driven by the notion of profitability—resulting in certain "golden routes" being more serviced than others. And resulted in a few bus owners monopolising the system. The new arrangement breaks this by separating the regulatory (Seoul Metropolitan Government) and the service provider/operator (bus operator).

To strengthen this relationship, the Transport card company (Korea Smart Card Company) was introduced, which will enable the collection of revenue, revenue pooling, profit clearance. On the advice of the Seoul Metropolitan Government (SMG) and Joint Revenue Management Council, the company will ensure fair distribution of revenues and profits amongst the operators. The transport card company also provides the Seoul Metropolitan Government (SMG) with information on payments, operations, and overall performance, enabling the Seoul Metropolitan Government (SMG) to measure the service levels of the bus operator.

Further, the Joint revenue management council, i.e., the Seoul City Bus Transportation Cooperative, manages the fare collected by the bus operators and requests subsidies on behalf of the operators. The subsidy was part of negotiations made in February 2004 before initiating the reform where Seoul Metropolitan Government (SMG) would reimburse the Operators for any losses they incur from the new arrangement. The overall billing is calculated based on the "standard operating cost" as defined in the passenger transit service act. If a bus owner/ operator makes a loss, they are reimbursed. It is also important to highlight that the subsidy is not linked to a performance-based criterion, resulting in an over-reliance on fare revenue and no incentives to improve the services.

Systematic investment in BBPT

From Figure 8, it is evident that there has been a systematic and sustained investment in BBPT. Be it in terms of setting up the median bus lane system, which grew from nice km in 2004 to 120 in 2017. Or the establishment of the TOPIS system and gradual up-gradation of technology. While a complementary and feeder mode of travel to Seoul Metro, the bus system has received sufficient support financially (operation subsidy and capital expense in setting up infrastructure), which further strengthened the overall public transport system by pushing for an integrated urban transport system. Additionally, the amendment of the passenger transit business act in Feb 2004 was followed by the revision of an ordinance that regulates the establishment and management of the promotional fund for SMEs. This revision identified bus companies as SME and made them legally eligible to acquire funding (77,87).

Figure 7: L: Seoul - Subsidy provided to bus operators | R: Length of bus median lane
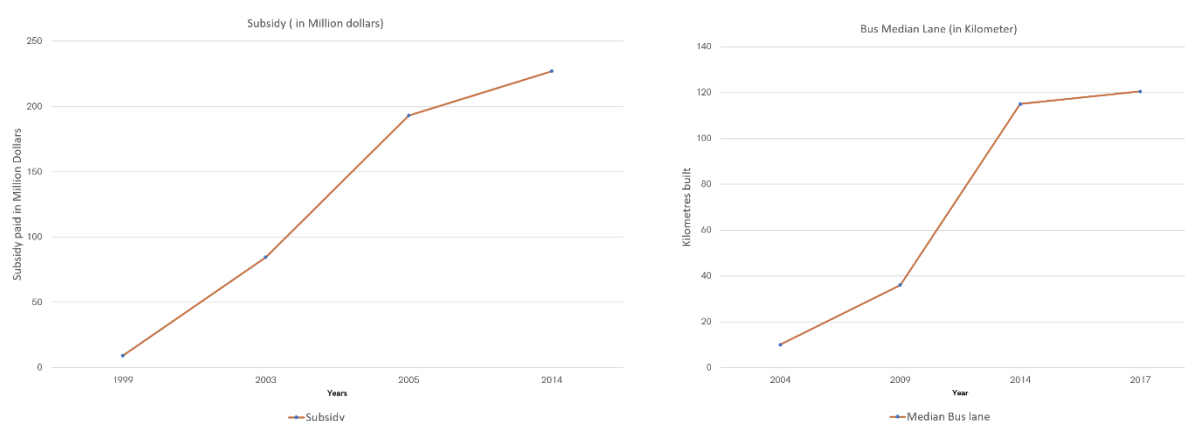
6.3.5 Opportunities and threats

This section elaborates on the opportunities and threats faced by the city based on the identified key levers.

Opportunities

- Expansion and Innovation - Owing to the advanced stages of public transport infrastructure, Seoul can further leverage the benefits by investing and expanding on its public transport services beyond its present limits. Simultaneously, there is room for technological innovation in terms of augmenting the TOPIS system and expanding to cleaner, greener buses.

- Public transport Business- Presently, the system works on subsidising the operators and the users. Given the high levels of public transport patronage and strong data points in terms of operations, the PT system in Seoul can attempt to move towards a business to ease financial burdens on Seoul Metropolitan Government.

Threats

- Rising financial burden – The quasi-public bus system, while it has reformed the bus service favouring the commuter, has also placed a compensation mechanism for the bus operators that eliminate competition as subsidies are based on a standard operating cost. Because there is no incentive mechanism, the subsidy system has effectively removed competition and the need to find alternate modes of cost recovery. Hence, bus operators now have over-reliance on the subsidies received and farebox revenues. When coupled with the flat fare values, this situation further aggravates the already rising financial burdens.

- Information Scare – While the motive to provide complete information to public transport users is integral and necessary. It could also be seen and understood as a double-edged sword, wherein the information such as knowing and understanding where COVID-19 patients have been on the public transport system could further extend the scare response. And hence also have a reverse effect on public transport ridership. Therefore, it is also critical to identify cultural relevance and the applicability of strategies.

6.4 Case 2 - Lagos, Nigeria

6.4.1 Background

Lagos city is one of the densest cities in Nigeria, with a population of 15 million as of 2015 and a density of 2400 people per Km^2 (89). It is the regional commercial and transport hub for the state of Lagos and the erstwhile capital of the country. In 2008, nearly 82% of all trips depended on privately owned buses (Danfos and Molues) for their mobility needs, translating to about 16 million trips/day (Of which 69% relied on the Danfos). The remaining travel demand was met by taxis and cars (13%) and Okadas (5%). And as of 2016, Public transport accounts for nearly 46% (59982000 trips) of all trips made in a day, of which 45% is semi-formal Danfos, and the regulated BRT system accounts for only 1% (90). Walking accounts for 40% of all trips, making it the -highest mode of travel, followed by private vehicles at 11%. The remaining was attributed to taxis and Okada's (motorcycles)(90). While the situation has changed between 2008 and 2016, the average

Lagosian is highly dependent on public transport and active modes of mobility. While this a positive note, it has posed and continues to do so a unique urban transport challenge for the city.

6.4.2 Pre-COVID-19 assessment

With the advent of cars in the 1980s and until the early 2000s, Lagosians were faced with significant challenges regarding urban mobility due to an overburdening of existing systems. While the informal public transport systems were meeting a much-needed demand for a strong public transport network, the unregulated nature of the system was the cause of multiple challenges. The city was faced with four major challenges in the urban transport sector; the first was that the dominant public transport at the time, i.e., the Danfos, was characterised by a lack of good quality infrastructure and was highly unregulated. Fare prices would frequently fluctuate during a day resulting in variations nearly twice or thrice the average cost (91). And route development was motivated by where the greatest profits can be derived, which also resulted in aggressive competitions between the various private bus operators (92).

Further, these systems clubbed with rising motor vehicles and Okada levels also resulted in creating high levels of congestion in the city. In 2008, commuters from the residential areas in the north and west would spend over 2 hours, one way (approx. 20km), every day to access jobs in the city centre. This situation was further exacerbated as the average family would spend nearly 40% of their income on travel. Since the more impoverished families lived in the peripheries, this would have disproportionate impacts on their daily lives(91). The lack of safety, overcrowding, violating traffic laws, poor maintenance etc. (91,93) contributed to increased travel time and increased travel expenditure. Despite the challenges, it is also important to note that these informal modes of transit arose due to the lack of a strong public transport system and an integral part of how the citizens of Lagos travel. Also, the public transport sector is a mainstay of livelihoods. It contributes to the direct employment of 500,000 people, and further still nearly 15% of the population rely on the PT sector directly or indirectly (94).

Public transport transformation projects

The transformation journey of urban transport begins with the Lagos mass transit study (LMTS) completed in 1996, highlighting the need for overarching solutions to tackle the lack of physical infrastructure and the need to organise the splintered and complex institutional framework. The institutional reforms began with Lagos State Traffic Management Authority (LASTMA) in 2000. The body was tasked with overseeing the enforcement of traffic laws, setting new standards, and encouraging compliance among road users.

Figure 8: Lagos urban transport reform projects

Lagos urban transport project 1 (2002)	Lagos urban transport project 2 (2011)	Bus reform program (2017)
• LAMATA, • BRT lite • Building infrastructure	• Building and expanding infrastructure • institutional support	• Modernization of fleet • digitization • expanding infrastructure, • institutional support

Continuing this climate of transformation, the city has seen three major urban transport projects, Lagos Urban Transport Project (LUTP) One (2002), Lagos Urban Transport Project Two (2010), and the more recent Bus Reform program (2017). LUTP 1 furthered the institutional reform agenda by laying the groundwork for the Lagos Metropolitan Area Transport Authority (LAMATA) in 2002. This agency has proved instrumental in all other major transport ventures undertaken in the city. The LUTP 1 also introduced the first BRT Lite system (22 Km); the line was further expanded under LUTP 2 to 35km. While the focus of LUTP 1 and LUTP 2 was to introduce and create the basis for a public transport system by putting in place robust institutions and physical infrastructure, the BRP focused on fleet modernisation, digitisation, and expansion of existing modes. The introduction of LAMATA and the BRT Lite system resulted in positive impacts. It had reduced the average travel time by nearly 40% and average waiting times by 35% (91). Fare affordability was drastically improved along the BRT corridor as fares decreased by 30%. Further, the system also had reduced road accidents from 139 to 96 per 100000 and generated direct employment of 2000 (91).

The reason for selecting Lagos city as a case study is due to its rapid and cost-effective public transport reforms. Further, the city has also had the experience of dealing with Ebola in 2014 and now the pandemic, and lastly, owing to its context of LIC, the city is more relatable in terms of urban conditions of crowding, inequity, and resource scarcity. All the above makes Lagos an apt case study of building back better in the context of LIC's.

6.4.3 COVID-19 assessment

Like in many other countries, Lagos faced an extended lockdown which drastically reduced its public transport ridership (60%) (95) and is now witnessing a complete resurgence of its ridership. During the last one-year Lagos has made considerable efforts to support and reinitiate PT services in the city.

During the lockdown, the operators of the Bus services allocated staff to reside (with all necessary food and living arrangements) in bus depot to ensure the continued maintenance of the Bus system (96). Post lockdown, the Lagos State Government, following the directives of NCDC, put in place transport guidelines after the easing of lockdown (May 4th). These guidelines involved strict procedures of following biosecurity measures of periodic sanitisation, time-based operation restrictions. And specific carrying capacity requirements for the Danfos, Tricycle and Bus system(97). The BRT and the Lagos Bus Service Limited have been directed not to take more than 21 passengers(98). Further requirements also banned the usage of air conditioning. LAMATA and Lagos State Government have also ensured constant advocacy to ensure citizens are aware of the social distancing guidelines. Compliance with the state guidelines by operators was also being monitored(96).

In July, owing to the earlier reduced capacity restrictions, Governor Babajide Sanwo-Olu raised the fares of LBSL and BRT by 46% and 50%, respectively and simultaneously increased the cap of seating restrictions from 21 to 42 (99). Between July 2020 until Feb 2021, the city has also expanded its E-ticketing system to promote contactless transactions (August 2020). LAMATA also Introduced the Cowry card system(100), which aims to be an equivalent to Transport for London card and acquire 2000 unit microbuses to improve the first and last mile and improve the gridlock in the state(101). And more recently, in February 2021, there are now talks of fleet modernisation by replacing the Danfos and Molues with High-capacity buses (102) in line with the Bus Reform program. Simultaneous to this process, the Strategic Transport Master plan has also been updated by LAMATA, focusing on integrating public transport.

From the above assessment, it is clear there has been an immediate response to the COVID-19 pandemic via guidelines from the national and state government. What was also clear is the commitment of Lagos State Government and LAMATA to build back better and strengthen public transport by following through with their earlier promises of public transport reform. While COVID-19 was a significant setback, the city quickly adapted and moved ahead.

6.4.4 Key Levers

Putting a system in place

As mentioned earlier, Lagos has had three Major Urban transport projects, which have ushered in the public transport reform agenda.

Figure 9: Lagos - chronology of urban transport reform
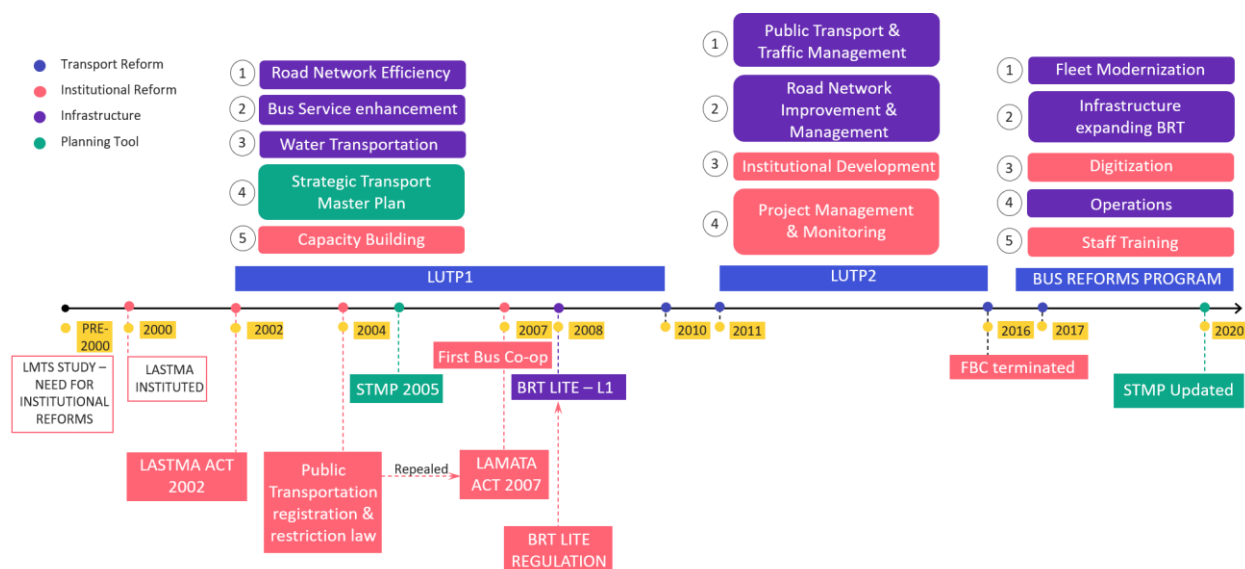
Phase 1 – Legal and institutional framework

LUTP 1, spearheaded by the Tinubu government in 2000 and supported by World Bank, initiated, and constituted the long-pending legal and institutional reforms comprising the LAMATA in the city through the LAMATA Act of 2002. Between 2002 and 2007, the period saw the scrapping of the public transportation registration and restriction law, which only allowed Lagos Bus Service to run and operate buses in the city (was in a clash with bus franchise model stipulated in LAMATA act 2002). Lagos State Government rectified this conflict through the LAMATA act 2007, which also strengthened LAMATA as a planning and regulatory authority (93,103,104). Following this, LAMATA and Lagos State Government collaborated with the National Union of Road Transport Workers (NURTW) and established the First Bus Cooperative (FBC) in 2007. The NURTW is a crucial player in the Urban transport scenario of Lagos, as many of the operators of Danfos and Molue were part of the union. The FBC runs the BRT lite system established in 2008 until its termination in 2016 due to poor service as per their service agreement (40). The primero transport company is presently providing the service. The BRT lite regulation also was introduced in line with the BRT Lite system in 2008; this regulation banned all other vehicles from plying on the BRT lane(103). During LUTP 1, LAMATA, with the support of WB, also drafted the first strategic transport master plan, focusing on integrating modes.

Phase 2 – Building infrastructure in an incremental manner

Once the Lagos State Government and LAMATA placed the necessary legal and institutional frameworks, the BRT Lite system was built and made operational in 15 months. Since then, the line was extended once during LUTP 2 to extend the network up to 35 km. Apart from this, LUTP 1 also focused on expanding and improving the road network and capacity development. Under LUTP 2, Lagos State Government and LAMATA made efforts to strengthen institutions and build and maintain infrastructure. There were also efforts made into investing in ITS systems. With the BRP program in 2017, there were evident efforts to modernise the fleet by replacing the Danfos (which is ongoing now), and digitisation becomes critical, with the introduction of the E-ticketing system in 2017.

The above once ascertain a clear trajectory/ road map to achieve urban transport reforms. First, identify the type of reform, and then establish the necessary statutory and institutional climate that can then help lead the change towards better infrastructure.

Sustained efforts to build BBPT – Political will, vision, and leadership + catalytic agents/ institutions funding

Urban transformation is not an immediate process; hence, while it is essential to chart a road map, sustained support is also needed. In Lagos, this was made possible due to strong and unwavering political leadership, will, and vision combined with Catalytic agents/Institutions that provided timely technical support and financial backing.

Figure 10: Lagos - Political affiliation, urban transport reform and catalytic agents
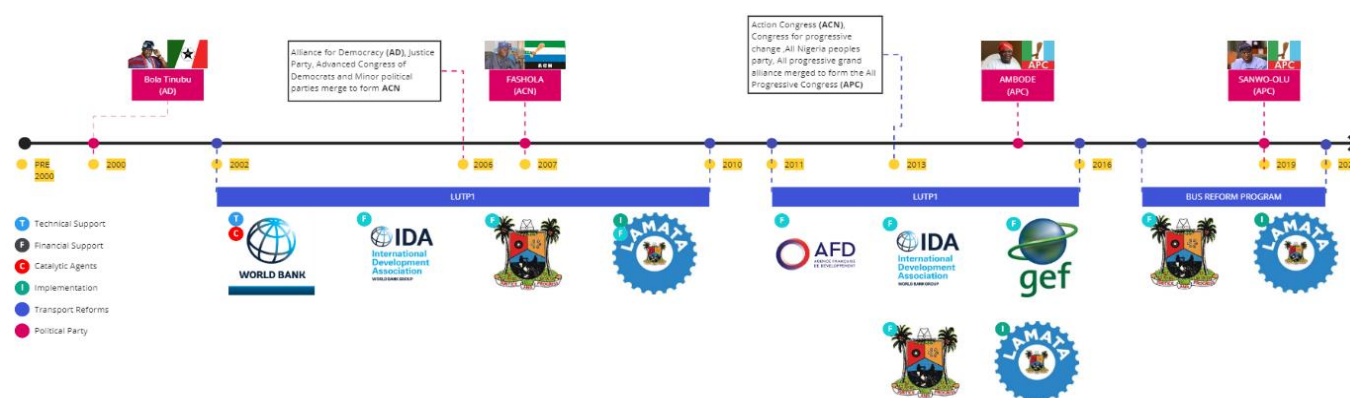
Political leadership and legacy

Between 2000 and 2020, political leadership has not changed hands. Asiwaju Bola Tinubu was elected as state governor in 1999 on the Alliance's ticket for democracy. Which later is merged with the justice party, advanced congress of democrats and other minor political parties to form Action Congress in 2006. The next governor, Babatunde Fashola, who was also chief of staff to Bola Tinubu, becomes the next governor to represent the Action congress. To further solidify political power against the rising popularity of the People's Democratic Party, Action Congress of Nigeria (Action Congress renamed itself in 2010), Congress for progressive change, All Nigeria people's party and All Progressive grand alliance merge under the leadership of Bola Tinubu to form the All-Progressive Congress (APC) in 2013(105). The subsequent two governors, Ambode and Sanwo-Olu, have since been elected on the ticket of the APC. What is evident here is a continued political legacy. Apart from Ambode, all other governors have so far enjoyed two terms; this can also be attributed to a possible fall out between Ambode and Bola Tinubu(106).

The above indicates a continued political legacy through the last 20 years. The role of a strong political leader, Asiwaju Bola Tinubu, was crucial in ascertaining the necessary support needed to spearhead urban development and the urban transport reforms. The same can also be confirmed by financial and budgetary commitments that were made during the various governors. The Lagos State Government has invested nearly 100 million dollars in LUTP 1[27] and LUTP 2[28]. The Lagos State Government is presently continuing to invest in expanding bus fleets and associated infrastructure. The Lagos State Government is also a contributor to the Transport Fund of LAMATA.

Catalytic agents/ institutions

From the above graphic, we can also ascertain that both the Development partners have played a critical role in initiating and providing sustained funding. It is also important to note that the creation of LAMATA was a prerequisite placed by WB to access funding and technical support. WB was also instrumental in providing technical support to initiate and draft the Strategic Transport Master Plan. The Development partners like IDA, GEF and AFD have funded nearly 400 Million dollars (LUTP 1 – 150 Million dollars (107,108) and LUTP 2 – 294.5 Million dollars (107,108)) to support LUTP 1 and LUTP 2. While this support was critical, the transport fund (sanctioned under LAMATA act 2002 and 2007) has also been instrumental in ensuring LAMATA achieves operational independence and generates funds to support capacity development. Simultaneously, the continued financial support from Lagos State Government has been instrumental in constructing the first BRT lite segment and taking forward all the urban transport reform projects.

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[27] Refer to (107,108)
[28] Refer to (107,108)

Unique institutional design

Figure 11: LAMATA - Institutional design
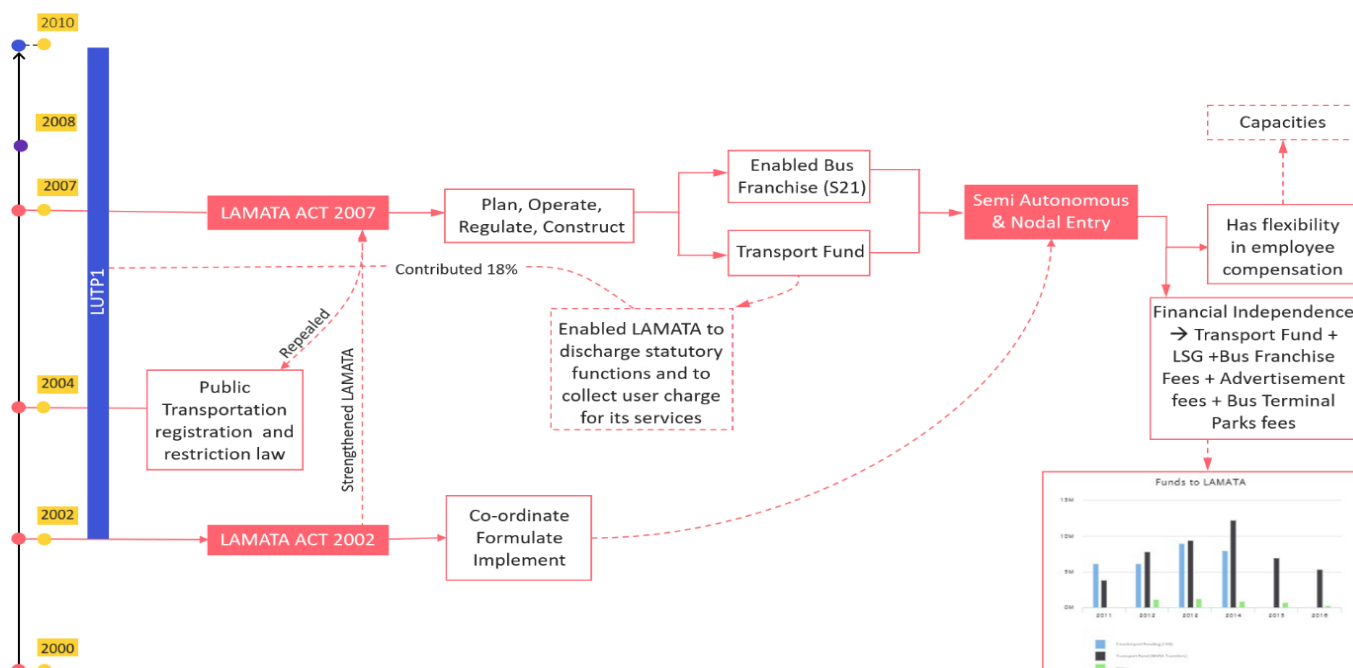
As mentioned earlier, institutional reform began with the creation of the LASTMA in 2000. Before this, many agencies, organisations, and individuals were involved in providing and managing urban transport in Lagos. And most entities functioned in siloes; the need for organising and creating nodal institutions was highlighted in the Lagos Mass Transit Study (LMTS) (1996). Like the LASTMA, LAMATA too finds its beginnings here. It was only until the start of the LUTP 1, under a prerequisite condition laid down by World Bank, that LAMATA act 2002 was instituted (While this step was crucial, it would have been impossible if not for the political support) and leading to the establishment of LAMATA. Under this act, LAMATA was established as an authority responsible for the formulation, coordination, and implementation of urban transport policies and programs in the Lagos Metropolitan region. LAMATA was also envisioned to stand apart from the Ministry of Transport and directly report to the governor(103).

The LAMATA act was further strengthened in 2007, giving the authority the power to plan and regulate various transport modes. Under this act, the Bus Franchise model also was enabled. All the above further strengthened LAMATA as a Semi-Autonomous entity. LAMATA act 2002 and 2007 also gave the provision to create a Transport fund (TF), which was subsequently established in August 2005(109). The TF derived its revenue from Lagos State Government Budget provision, license fees, concession fees, franchise fees, and other road user charges. The LAMATA law also gave LAMATA the power to explore other avenues of cost recovery. In doing so, LAMATA has also achieved operational independence, and hence its funding component was subsequently removed from LUTP 2 (109). Through the transport fund, LAMATA was also able to fund nearly 18% of LUTP 1 and financed STMP 2005. To further strengthen its Institutional capacities, LAMATA also enjoyed flexibility in employee compensation, and hence the agency could attract active and robust personnel. This unique Institutional design created a strong agency that can spearhead the public transport reform efforts towards a common goal.

Investing in "buy in"

Another critical aspect of the public transport projects is investing in the idea of "buy-in". In the case of Lagos, this was achieved in three ways.

Figure 12: Approaches to buy-In
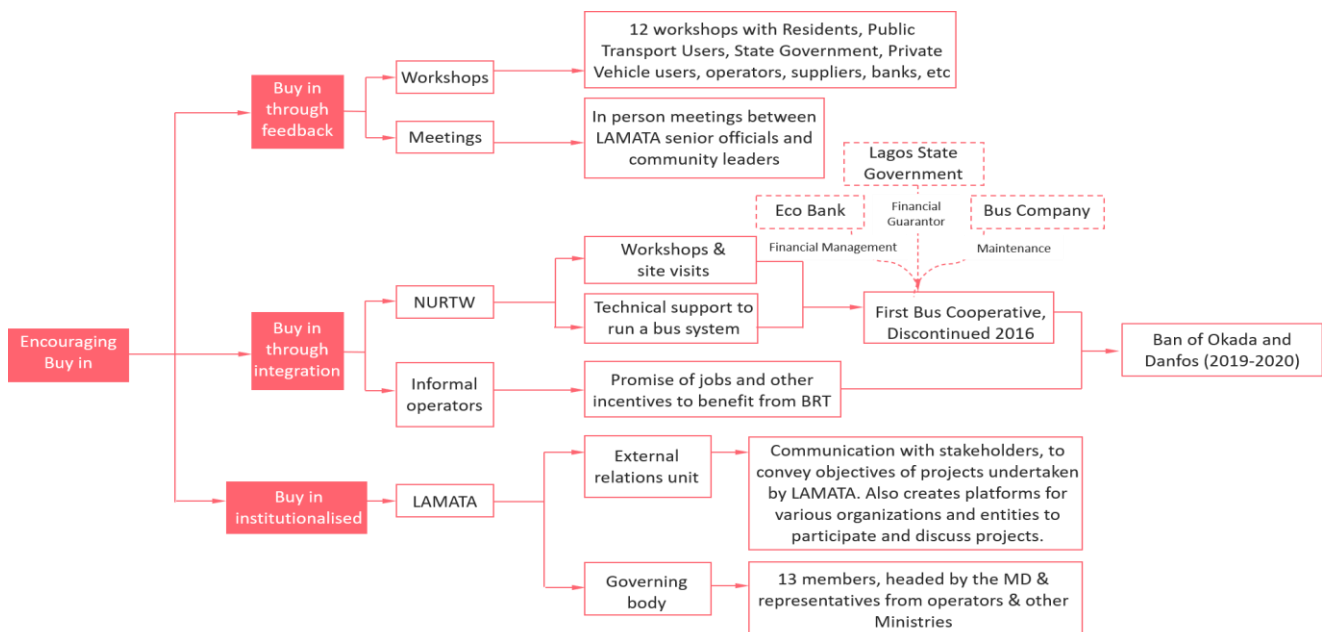
Buy in through feedback

Introducing the BRT lite system into a city with little or no knowledge was quite challenging. There was a need to get local communities, leaders, and other stakeholders on board and build a sense of community ownership. The same was achieved by organising 12 workshops through the period to take in feedback and act upon it. Apart from these, meetings were also organised with communities, endorsed by the leaders, between LAMATA's senior officials to ensure the organisation had a face(103). All of these were executed helped create a sense of trust and "buy-in" into the system.

Buy in through integration

In Lagos, NURTW dominates the urban and small bus sectors in Nigeria and plays a critical role in the urban transport sector. And hence their involvement was critical to the success of the BRT. To do this, LAMATA organised study tours to cities with successful BRTS to explain the benefits of the regulated system(91,103). LAMATA also organised several high-level meetings between union leaders and officials. Eventually leading to the formulation of the first bus Cooperative and BRT steering committee (BRT report). The steering committee had representatives from the lending agency and LAMATA.

Further, LAMATA also provided technical support for improving operations. Eventually, the First Bus Cooperative was initiated in 2007 but was later discontinued in 2016, citing insufficient service levels.

Further, Babatunde Fashola made attempts and assurances to integrate the drivers of the informal transit system(91). But, since 2019, there have been repeated efforts to ban Okada's and, more recently, Danfos in the name of fleet modernisation(102). While there are efforts from Lagos State Government to give guarantees, no concrete plans are in place. This Indicates a situation where there seems to be a lack of effort to build towards integration.

Buy in institutionalised

To ensure there is a constant feedback loop, as part of the organisational structure of LAMATA, the external relations unit (ERU) was established, which was primarily focused on raising awareness around projects undertaken by LAMATA. The ERU creates a platform for various organisations and citizens to ensure their concerns are heard.

Another feature of this is the Governing body of LAMATA. As mentioned earlier, LAMATA functions as a semi-autonomous unit outside the purview of the ministry of transport. To full fill its role as a coordination agency, the council was set up. The council has 13 members, which involves representation from the bus operators and other ministries and is presided by the Managing Director of LAMATA.

6.4.5 Opportunities and threats

Opportunities

- Building Back better – Lagos State Government and LAMATA have made consistent efforts to strengthen and build better urban transport systems. Beginning with the pre-lockdown, urban transport projects, and efforts made during and post-lockdown. While the pandemic was devastating, the city has recognised the challenges and is adapting to the situation. Most promisingly, it is not retracting from further investing in its public transport system.

- Reliability- The reliability factor is critical and should be integral to the meaning of infrastructure and the values attached to it, especially during times of crisis. The Building back better attitude and other critical steps taken by operators and LAMATA to strengthen and reinvest in public transport will strongly contribute to the reliability of public transportation.

Threats

- Political Support - In Lagos, the continued Political support, while its most significant strength, is also its greatest weakness. While there have been attempts to institute permanence in the urban transport transformation process through LAMATA and Strategic Transport Master plan, their effectiveness is subjected to Political patronage. Hence a change in political power change the direction or slow down the process.

- Sustained funding - As was seen earlier, apart from political will, the sustained funding provided by development banks was imperative for the program's success. Hence, Lagos must embark on further investing and expanding its infrastructural systems to support the ever-growing population. Access to funding is critical in the years to come. Despite the strong technical capacities present in LAMATA

6.5 Case 3 - Kochi, India

6.5.1 Background

Kochi is on the western coast of India and has enjoyed an integral role in the development of the region historically. Greater Kochi constitutes the Kochi municipal corporation, nine Municipalities and 29 Panchayats, and amounts to 636 Km^2. The area also houses a population of around two million as per Census 2011 (110). The region has seen a decadal growth rate of 8.9% since 2001. The Kochi Municipal area accounts for 94.86 Km^2 and a 0.64 million residential population. Several modes of mobility are active in the city, metro, ferry, buses, autos, etc. As of 2016, Public transport (bus) accounts for 42% of all trips, followed by private vehicles at 36% (110). PT accounts for 49% of all motorised trips in the city and composes only 4% of all traffic on the road, while Private vehicles form 79%. This indicates a skew in how much road space is allocated, which is also typical of many other cities in India and globally. The cities bus system is predominantly run by KSRTC, running close to 600 buses (Kerala State Road Transport Corporation), KURTC running 400 buses (Kerala Urban Road Transport Corporation), a subsidiary under KSRTC, and Private bus operators running 1000 buses.

6.5.2 Pre-COVID-19 assessment

Kochi is relatively young to reform urban transport when compared to Seoul and Lagos. Yet, it too faces similar issues. While the roads in Kochi are sufficiently wide, the ones in the central part of the city have a smaller right of way. This, when clubbed with the rising level of motorisation (11% per annum since 2000) and increased traffic volumes, results in congestion. Simultaneously, the share of newly registered buses has reduced from 3.3% in 2006 to 1.59 % in 2013 (111).

Figure 13: Kochi - Mode Share (66)
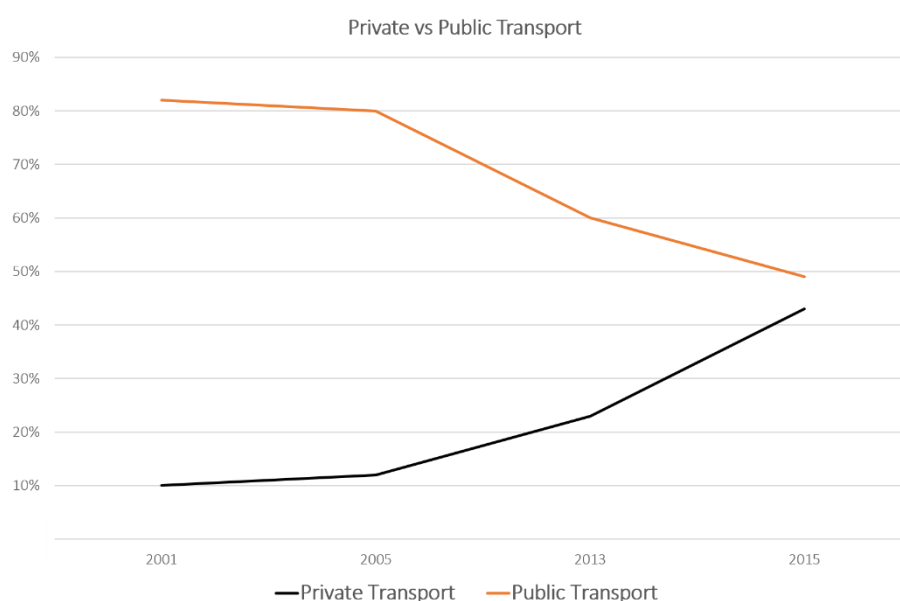
Another key factor is that despite the private bus operators contributing to nearly 50% of the public transport demand in the city, there were no efforts taken to organise them before 2017. Bus operators propose bus routes, schedules, and regional transport offices (KSRTC) to follow them (112). Resulting in inefficient routing, aggressive competition on routes share by more than one operator, lack of safety etc. (112). All the above results in the low patronage of PT on some routes and resulting in an overall decrease in PT ridership. The situation was further exacerbated by the complete lack of integration across modes.

To improve public transport in the city, the Government of Kerala initiated the construction of Kochi Metro phase One in 2012, and to construct, implement and operate Kochi Metro Rail Limited (KMRL) was set up. Following this, in 2014, when GOI put the metro policy, KMRL entered into a tripartite agreement, requiring the entity to integrate and strengthen public transport as an integrated system actively. The same KMRL initiated the Urban transport wing, spearheading all projects and negotiations to achieve the same. At this point, KMRL was functioning as a precursor to Unified Metropolitan Transport Authority. Under this mandate, KMRL collaborated with Urban Mass Transit Company (UMTC) to draft the city mobility plan (CMP). The CMP focused on integrating all transit modes in GCDA and GIDA region.

KMRL, which is also the acting Metropolitan Transport Authority, devised the "Seamless Transportation for Kochi approach," which focused on operational, Institutional and policy, Technological and physical integration. Under this effort, by 2017, KMRL managed to organise 1000 buses and 800 individual operators into five limited liability partnership (LLP) and two companies[29] and Auto rickshaw drivers into a single union(113). This act essentially gave the operators more bargaining power and accessed diesel rewards points in collaboration with a few oil companies (114,115).

Following this, KMRL collaborated with Axis bank to integrate these bus companies and autos with Kochi, a digital payment platform comprising a smart card and an app. A feeder system was also established around phase one of the metro with a coverage of 1.5-2km using Minibuses and auto rickshaws. KMRL was also instrumental in drafting the KMTA bill in 2018 and subsequently the rule for KMTA act in 2019, until finally in November 2020, Kochi Metropolitan Transport Authority was established. In 2019 the smart bus pilot project was initiated with 150 buses being fitted with a GPS tracking system and then integrated with a journey planner app "Chalo". The events indicate a tentative road map KMRL followed to initiate the urban transport reform in Kochi.

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[29] Kochi Wheels United LLP, Muziris Bus LLP, My Metro Bus Services LLP, Pratheeksha Transport Operators Organisation Pvt. Ltd, Great Kochi Bus Transport Association LLP, Perfect Bus Metro Services LLP, Kochi Metropolitan Transport Co-operative Society Ltd

6.5.3 COVID-19 assessment

COVID-19 pandemic has drastically impacted the overall ridership of public transport, witnessing a reduction to as much as 40% on the initial day of partial lockdown in March 2020. Some operators indicate a dip in passengers per day, from 950 in January 2020 to 650 in March 2020 and to 285 passengers per day post-lockdown(116). The result has drastically impacted the revenue streams of operators, from 8000rs per bus per day to 300 – 500 Rs per bus per day (61), which was further exacerbated by the capacity restrictions in place. All the above has drastically impacted operators and private operators that do not have state backing.

To support the operators, the state government increased the fare by 25% by reducing the minimum chargeable distance(117). It also allowed for deferred payments of tax first until December, but now it has been extended until March 2021(115). The current resource strained situation of private operators is worsened with the new notification released by the state government on September 14th, 2020. The notification effectively limits the trip distance of private operators to 140 km, initially planned across 31 partially nationalised routes and on 241 ordinary limited-stop service private buses, which would drastically curtail financial capabilities(118). The notification also further limits the expansion of service only to the KSRTC. COVID-19 response of the state government seems to be at odds with the earlier expressed vision of seamless transportation, and it seems to be moving towards a more nationalised and controlled BBPT environment.

6.5.4 Key levers

Putting a system in place (road map to KMTA)

Please refer to Figure 17. The state government first initiated the metro project in 2012 to start this process of urban transport transformation. Still, it was not until 2014, with a government mandate (Metro Rail Policy), that it was anchored in the form of a tripartite agreement. The agreement mandated KMRL to initiate integration, which resulted in a series of incremental and simultaneous efforts to improve the institutional and operational framework. By assimilating the 800 private bus operators into seven larger entities, an institutional setup that will enable effective coordination, communication, and implementation amongst the various private stakeholders was created. Further, through the incremental efforts to integrate all modes of transport via last & first mile systems and the Kochi one digital platform, the foundation to create a robust transit network supported by an ITS service is created. In many ways, these efforts can be interpreted as an example of a roadmap to establishing the KMTA, where an existing agency (KMRL) was empowered to function as transport authority to initiate and lead the urban transport transformation until the necessary legal requirements (KMTA Bill to KMTA Act) was met. In Seoul and Lagos, a robust institutional and legal framework was first put in place to lead the transformation. In Kochi, an independent KMTA/ transport authority was not conditional on initiating urban transport transformation.

Catalytic institutions and legal prerogatives

The story of Kochi's transformation is, if not entirely but is strongly connected to the functioning of KMRL as a catalytic agent. Although a government mandate drove the response, there was considerable effort put in by KMRL to organise the private operators through numerous meetings/consultations. Further still, KMRL, in collaboration with UMTC, has initiated and drafted the City Mobility Plan, which will provide a way forward to the KMTA. And KMRL, in partnership with Axis bank, has started a process of integrating buses and autos onto the digital platform and a journey planner app.

Political will and leadership

While the role of KMRL is critical, the same would have been difficult if not for the support from the State government and Kochi Municipal Corporation (KMC). The State Government proved instrumental in passing the KMTA Act and establishing the associations and companies. The KMC, along with the Centre for heritage, environment, and development (Research wing of KMC), also played a critical role in bringing other NGOs and organisations to support the urban development projects undertaken in the city. And finally, RTI act 2005, is also a key factor as it allows for the State Government and Local Government to be held accountable(114).

6.5.5 Opportunities and threats

Opportunities

- Strong foundation – Due to KMRL, state government, municipal corporation, and specialised agencies, strong operational and institutional foundations have been laid. This will prove as an excellent opportunity for Kochi metropolitan transport authority.

Threats

- Over Regulation – Despite all the efforts undertaken regarding assimilating and integrating transit modes. The recent notifications of limiting private transport services seem to be counterintuitive and moving to overregulate the sector.

6.6 Conclusion

Across all three case studies while there are certain commonalities in the general trajectory towards public transport reforms. It is interesting to note as each of the cities are different culturally and economically.

- There is a strong push towards establishing a legal and institutional framework either prior to establishing public transport system and infrastructure or during its building process. Nonetheless, the focus is the need for a strong support framework to manage, run, operate the resulting public transport infrastructure, either through a new agency or an existing agency that is empowered.
- Infrastructure building has been seen as a systematic process that requires sustained funding and willpower. Here there has been a difference in how funding has been achieved, either it is government funding or part of development aid.
- And finally, generating and sustaining buy-in with all stakeholders is critical; methods employed to achieve the same in all three cities are different.

The table below provides a more detailed assessment of the same.

Table 8: Bus based public transport - key levers and learnings

Key Levers	Seoul, South Korea	Kochi, India	Lagos, Nigeria	Key learnings
Putting a System in Place	Legal & Regulatory → Institutional arrangement → Infrastructural Reforms/Trans formation	Institutional arrangements → Improvements in infrastructure→ Legal & Regulatory framework.	Legal & Regulatory → Institutional design → Infrastructural Reform/Transforma tion	There is a clear trajectory of necessary legal and regulatory reform in Lagos and Seoul that put in place an institutional arrangement/design to spearhead the reform agenda. Whereas in Kochi, a temporary institutional arrangement was put in place (KMRL as acting Transport Authority) to lead the multiple efforts to organise the splintered institutional framework. These steps functioned as the steppingstones for the KMTA.
Policy & regulatory framework	Passenger transport service act 2002	Metro policy 2014, NUTP 2006, KMTA 2019	LAMATA act 2002, LAMATA act 2007	The necessary policy and regulatory frameworks were in place across all case studies.
Plans, strategies & technical resources	Seoul Mobility plan	Seamless transportation for Kochi framework, City Mobility Plan, Integrated Public	Strategic Transport Master Plan	In Lagos and Kochi, the plans are critical to driving the shift towards urban transport reform. While in Seoul, it seems to be a post-reform action.

Key Levers	Seoul, South Korea	Kochi, India	Lagos, Nigeria	Key learnings
		Transport plan and NMT Plan		
Sources of funding & financing	National and City Government	Kochi Metro Rail Limited (KMRL), State government, Central government	Development Agencies, LAMATA, Lagos State Government	Funding is key. While Seoul is a successful case, funding through subsidies has led to an over-reliance on operators. Lagos and KMRL are better examples of different modes of financing, through transport funds, grants, development banks, etc.
Leadership & political will	Mayor and Civil Servants - Critical	KMRL, State Government and Municipal corporation - Critical	Governors of state - Critical	Across all 3 cases, Political will and leadership are essential to initiate the process. Yet, at the same time, it should not be the only driving force once initiated.
Capacity (for planning & implementation)	High	High	High	Across all 3 cases, Capacities within organisations and the technical support available is integral. And hence efforts must be made to increase capacities in institutions incrementally.
Institutional structures & framework	Quasi-Public Bus System	KMRL, Private Bus Co-operative, and LLPs, KMTA,	LAMATA Semi-Autonomous Entity, Private Bus operators, State-run bus operators	Across all 3 cases, the differentiation between planning, regulating, and operating is essential. Essentially creating a system of checks and balances.
Role of the private sector and civil society	High – Constituted the BRCC	High – Axis bank, Technovia info solutions	Moderate – First Bus Cooperative – Collaboration between Eco Bank (Finances and revenue) + Bus suppliers (Maintenance)	The role of CSO, Banks, Technology providers, Suppliers is critical to make any reform survive. As it promotes a collaborative work environment wherein, each entity is dependent on the other and hence would be more effective during times of crisis
Communications, Messaging & outreach	High – Considerable efforts were made pre-reform and are being made during COVID-19	Moderate – Awards, Public transportation day	High – LAMATA – External Relations unit	In all three cities, communication and reach has been instrumental in all phases of reform.

7. Informal Public Transport – Post-COVID-19 dynamics and key levers

7.1 Introduction

The cities in the global south are highly dependent on informal public transport. There are several definitions of informal public transport by various researchers. (119) describes that paratransit includes informal and formal public transport services, but within a system that is not highly regulated. He mentions that the paratransit is an informal or even illegal transport that operates on the fringe of the institutional transport system. According to Cervero (120), paratransit systems function in a "laissez-faire" context in which the authorities allow for a very flexible regulatory environment or even total deregulation. (5) defines that paratransit or Intermediate Public Transport (IPT) systems as informally owned and operated shared services that provide shuttle services between various key origin and destination points in a city, without a fixed operational plan. Paratransit modes are mostly individually owned and operated and are much more demand-responsive than the formal bus systems. (5). Tun et al. (121) highlight that the semiformal and informal transportation services can be described as demand-responsive, unscheduled, and flexible public transportation services offered by self-organised individual operators, generally without effective regulatory frameworks.

Most authors agree that paratransit represents a privately developed service profiting from relaxed or non-existing regulatory frameworks (122). Some authors also attribute aspects such as flexibility of the operations, small and old vehicles, lack of fixed schedules, and fragmented ownership to these services as further defining elements (119). This document will use the term' informal public transport' to describe the public transport services that are poorly organised, operate under flexible regulations or in an unregulated manner, and without any proper scheduling or discipline. To this report, the term 'Informal Public Transport (IPT) indicates the passenger services operating in urban or peri-urban areas to fill the gap of undersupplied public transport in either unregulated or under flexible regulatory environment, without any specific operations plan or a predefined timetable. The report considers vehicles that operate on a shared basis and not point-to-point trips contracted by any individual. The term operator indicates the drivers operating shared vehicles unless specified.

Ferro 2015 admits that the IPT has a role to play in urban contexts of the Global South. Flexibility and demand-responsiveness, and the relatively low cost are characteristics often overlooked and lost during radical formalisation initiatives. Tadamun (123) refers to the argument by Behrens et al. 2016 that mentions that from an economic perspective, informal transportation services create employment opportunities directly for the drivers and multiple indirect job opportunities.

However, various research highlight that informal public transport services are often partly responsible for road accidents, traffic congestion, and air pollution(119). Gadepalli (5) describes that in Indian cities, IPT faces a perception problem. They operate irresponsibly. The research by Gadepalli points out that as indicated by Gwilliam and Scurfield (124) – the system functions in the form of 'prisoner's dilemma,' where it is to the advantage of any individual to behave "irresponsibly" if others behave responsibly. Similarly, even the responsible paratransit operators change to irresponsible behaviour once a significant number of others behave that way. Cervero (120) and Wilkinson (125) underline that the IPT sector brings several severe challenges. The cutthroat competition for customers leads to road safety challenges, lack of traffic discipline, and operational inefficiency. The vehicles are often unmaintained.

Figure 14: Proportion of bus, taxi and paratransit numbers (vehicles) in Indian cities (2015) (2)
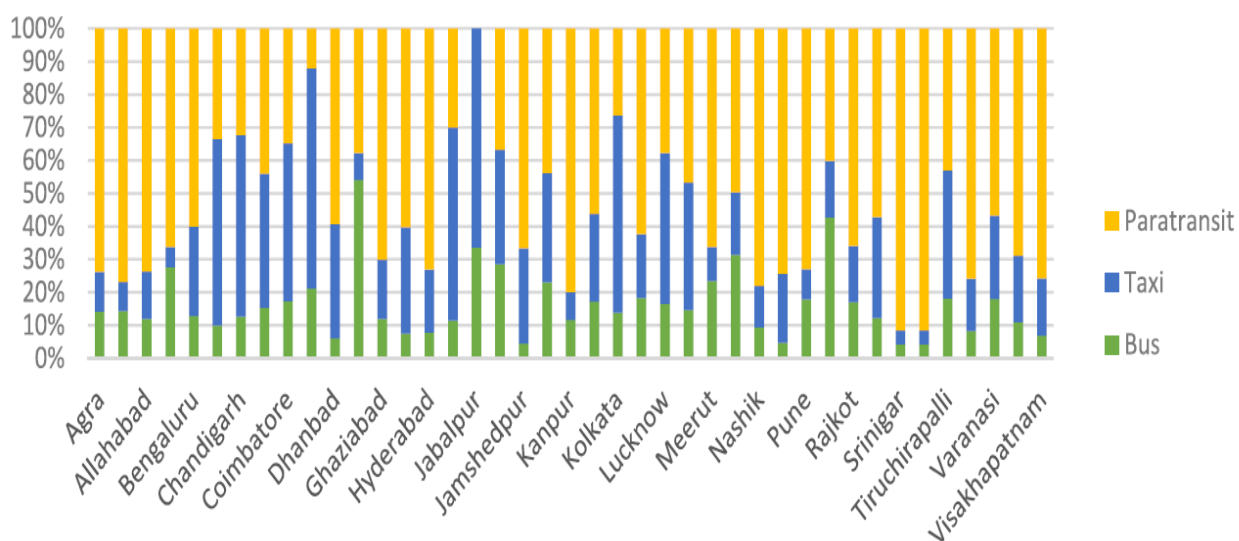
Source: MoRTH year book, 2017

Figure 15: Paratransit services - estimated daily modal shares in selected cities

Figure 16: Motorised public transport fleet for selected Latin American Cities (3)

Note: The characterization of "combi/vans" includes all the vehicles of below 20-passenger capacity from Figure 3; "microbus" includes between 20 and 35 passenger capacity, and "standard bus" includes those above 35 passengers.

Source: CAF 2019.

7.1.1 Role of IPT in cities worldwide

IPT sector dominates the mobility in the cities of Global South. For instance, only 66 of the 450 Indian cities with more than 100,000 inhabitants have access to a formal city bus service. (5). Figure 14 highlights that most Indian cities lack formal public transport, and hence the unserved demand is met by the informal public transport. In Latin America, more than half of public transportation trips are served by semiformal and informal services (121). The decline of scheduled large bus services in most Sub-Saharan African cities in the latter half of the previous century led to extensive paratransit operations. (126) The studies have shown that 99% of households in the poorest African countries do not own a car and have to rely on public transportation to access schools, hospitals, and employment opportunities (120). Figure 15 and 16 highlights the dominance of informal public transport in the global south.

7.2 A brief overview of case studies

The case studies have been selected from the global south and demonstrating different key learnings. The level of maturity of the IPT transformation projects also varies. For instance, the Philippines Passenger Utility Vehicle Modernisation Program (PUVMP) targets air quality improvement by IPT reforms. Dar es Salaam BRT demonstrates bus rapid transit as an opportunity to upgrade the IPT sector. Kochi's case study is emerging and indicates a unique model of leading IPT transformation activities by Metro rail corporation. The following figure provides a brief overview of case studies and types of IPT vehicles.

Figure 17: IPT - Case studies and IPT mode share

Metro Manila, Philippines

19%

Kochi, India

7%

Dar es Salaam, Tanzania

68%*

Auto rickshaw in Kochi

Jeepney in Manila

Dala dala in Dar es Salaam

1 million habitants

Mode share of IPT to total trips

*68% also includes BRT mode share

Sources: GIZ-DOTr,2016, Kochi CMP, Laal et el, 2017
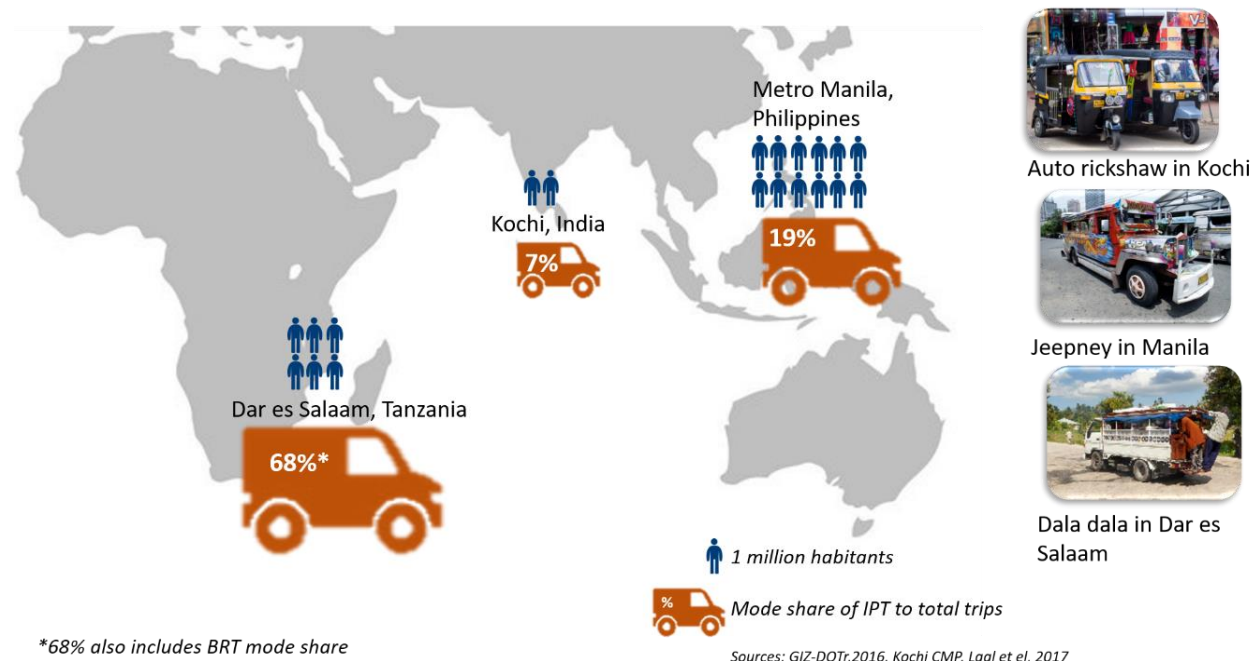
7.3 Case 1 - Jeepney, Manila, Philippines

The Philippines is one of the fastest urbanising countries in East Asia and the Pacific region. In the past five decades, the urban population grew by over 50 million people, and by 2050, approximately 102 million people (more than 65% of the country's total population) will reside in cities (127). Public transport in the country is highly dependent on informal transport by jeepneys, where they are responsible for 40% of motorised trips in the Philippines (128). The informal transport sector is also a significant contributor to employment creation, with 83% of total informal workers in 2002 (129). Similarly, jeepneys are also a significant mode of commute in Metro Manila, a population of around 12 million, and an important political and economic centre of the country (128). As per the JICA study, 2015, the share of all types of Public Utility Vehicles (PUV) — particularly tricycles and jeepneys was around 35% of motorised trips (130), where jeepneys carry 19% of total trips as indicated in Figure 16.

Figure 18: Modal split of daily trips around Metro Manila (128)

Tricycle, 16%

Bus, 7%

Jeepney, 19%

Train, 4%

Other Modes, 3%

Public

Motorcycle, 8%

Private

Walking

Car, 8%

Taxi, 1%
Other Modes, 3%

Walking, 31%
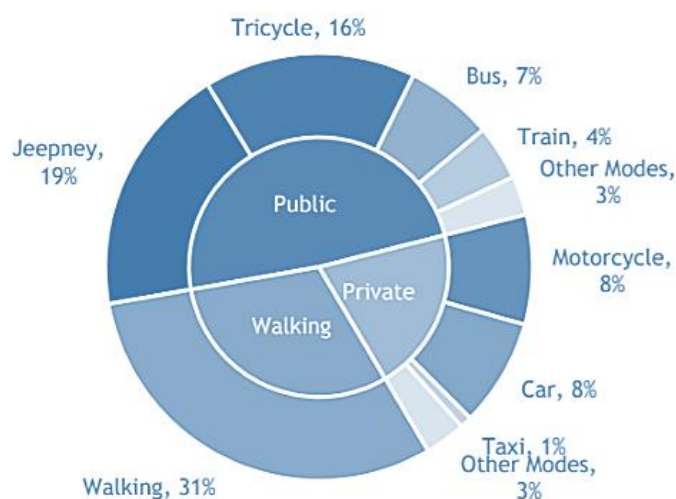
Figure 19: Number of PUV Franchise and Units per Region 2017 (130)
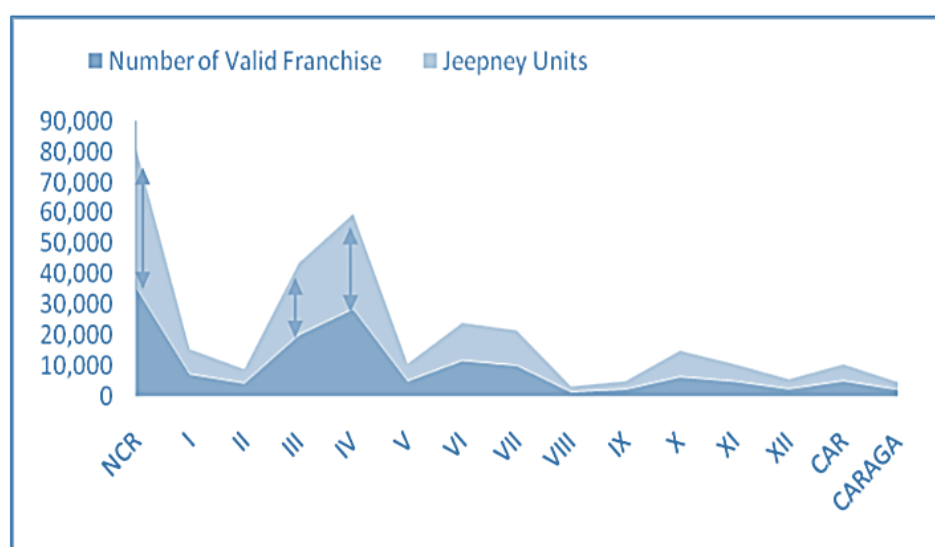
Sources of basic data: LTFRB as cited by Napalang and Pontawe (2018)

7.3.1 Challenges with existing jeepney sector

Jeepneys are public utility vehicles and are a significant transportation mode in the Philippines' urban areas. The first jeepneys were made from surplus jeeps that American forces left behind after the second world war by adding benches and a roof while creating an affordable public transport option hosted by small businessmen (131). Hence, they also carry cultural importance. While they take the majority of the trips, according to the study by Manila Observatory, cited in Blacksmith Institute and Clean Air Asia 2016 (132), jeepneys are one of the significant contributors to air pollution and contribute 15% of the particulate matter emissions in Metro Manila. The emissions inventory conducted in Iloilo City by GIZ in 2015 estimated that jeepneys contributed 80% of the ultra-fine particulates, 18% of CO, 58% of NO_x, 54% of SO_x from mobile sources. The sector also contributes significantly to GHG emissions from the road sector, with 7% of all transport-related GHG emissions in 2015 (133). The study by (132) highlights that the frequent starts and stops, low cruising speeds, long idle times while waiting for passengers, excessive lane changing, and high acceleration rates of jeepneys significantly contribute to defining their fuel consumption and emissions. Road safety is another challenge due to improper and lousy driving behaviours from improperly trained drivers that have caused road crashes (134). The jeepney sector in the Philippines is fragmented. It mainly demonstrates the individual vehicle ownership model. Almost 80% of operators in Manila own just a single vehicle, with less than 1% of operators owning ten or more vehicles, leading to an average operator-to-vehicle ratio of operators just 1.3 (135). Out of these jeepney units, many jeepneys do not possess valid franchises (see Figure 19). Apart from this, unfair competition, unsafe driving and grapple between jeepney drivers to accommodate maximum passengers lead to dangerous situation on roads (128). The key informant highlighted that Asian Utility Vehicles (AUVs) have well defined terminals and are typically well-organised within their start or end points but there is a lot of competition among jeepneys and buses on the same routes many different owners or interests along the same route.

7.3.2 Pre-COVID-19 assessment

The Department of Transport (DoTR) began introducing jeepney co-operatives under the Philippine Cooperative Code, 2008. However, several invalid franchises were operating on streets, as shown in Figure 19 (133). The co-operatives of these jeepneys were loosely organised and do not function as fleet managers, and do not have the personnel and financial resources. The small operators, which operate independently, did not have access to loans, and they rely only on fare revenues with a narrow profit margin. As per the research by Biona, the progress of formalisation was slow. By 2015, less than 10% of jeepney operators in Metro Manila got themselves organised into co-operatives. (128).

 Figure 20 highlights the efforts of the Government to formalise and integrate the jeepney industry from 2000 to 2014. In 2015, the Land Transportation Franchising and Regulatory Board (LTFRB) introduced the Jeepney modernisation program – Public Utility Vehicle Modernisation Program (PUVMP). It targets regulatory

reform, scrapping old vehicles, new vehicle standards, 'one route one franchise' model for public transport (128), service planning by local authorities (136). The program targets to minimise outdated jeepneys on the streets, improve passenger safety, and prevent pollution by imposing an age limit for transport vehicles (137). Under this program, the objective was to replace over 15-year-old polluting shared vehicles with modern public utility vehicles. The key informant highlighted that the program includes vehicle scrapping and enforcing new motor vehicle inspection services that DoTR is currently undertaking. The program offered a new franchising system, improving PUVs to international standards and training for drivers. For the drivers, the benefit would be better job opportunities. The program is designed to enhance safety, comfort, health, environment and offer a better payment system to commuters. The Government provides a 5% subsidy to every e-jeepney unit under the program, payable within seven years at a 6% interest rate (138). The Government offered access to credit facilities, organised operators and drivers, enhanced service quality of public transport, and reduced competition, among others. The program adopts 'one-stop-shop principle for the easy roll-out of program.

Figure 20: Jeepney industry transformation programs before 2015 (132)

2000
- Introduction of jeepney cooperatives was initiated under the Philippine Cooperative Code of 200815.

2006
- The government provided incentives for e-vehilces under the issuance of Executive Order 488. But the uptake of electric jeepneys was not transformationas as expected.

2007
- An initiative was launched to replace the old engines used in jeepneys by new engines against the Certified Emission Credits (CERs). But the insufficiency of CERs required additional public and/or private funding due to which the initiative didn't receive expected results.

2008
- Electric jeepneys were promoted as environmentally friendly alternatives to old diesel engine jeepneys. But the initiative resulted in poor outcome due to the limitations in battery capacity limited E-jeepneys to serve shorter routes.

2009
- Government proposed Retrofitting of jeepneys using an Australian technology that would reduce as much as 80% of soot emissions but the project didn't take off.

2011
- Initiative was launched for promoting Liquefied Petroleum Gas (LPG) for jeepneys to reduce emissions. But the high cost of engine and transmission components and the limited LPG stations resulted in poor outcome.

2014
- Senate passed the bill (SB 2151), known as the Electric, hybrid and other alternative fuel vehicles Promotion Act of 2014 to strengthen the incentives for E-vehicles.

Blacksmith Institute and Clean Air Asia 2016 indicates that, before PUVMP, the Government launched several initiatives to modernise vehicles to reduce air pollution (as highlighted in Figure 19). Still, the Government had taken a 'piecemeal' approach, and hence the efforts did not improve the quality of service. The experience of prior programs also indicates that introducing new technologies alone is not sufficient to improve the industry and the service. Mettke (135) highlights that the formalisation of the sector was a precondition for electrifying the public transport fleet (135). Still, prior initiatives by Government did not prove to be holistic.

The response of the jeepney sector to the PUVMP

Initially, the program received opposition from the small operators with the fear of incapability to avail new loans and doubts about the protection of drivers. Instead, they demanded retrofitting as an alternative to scrapping old vehicles, increasing subsidy, reducing interest rates, and more extended repayment periods.

Beyond vehicle modernisation, the 'PUV Modernization Program' has broader reform objectives such as planning and rationalising public transport routes, transforming route franchise issuing procedures, and promoting industry consolidation and professionalisation to enhance service levels, as shown in Figure 19. The DoTR 2017 omnibus policy guidelines published under the program highlight the Government's mobility approach and key performance indicators for public transport modes. The goal is to reduce reliance on low-capacity private modes and move towards environmentally sustainable solutions that carry high volumes, low emissions. The policy also highlights that public transport should be reliable, safe, accessible, comfortable, and environmentally sound. The Government's move from 'Competition in the Market to Competition for the Market' aims to overcome unfair on-street competition between the jeepneys. The eligibility criteria for franchise requires the applicant to either be a co-operative or a corporation. The financial benefit is linked to moving from fragmentation to consolidation. (135).

Data from 2016 quoted in (128) describe that in Metro Manila alone, over 43,000 jeepney franchises and over 830 bus franchises have been issued on more than 900 routes, making it practically difficult for the Government to manage them. Multiple jeepneys operated by different operators ply on the same route resulting in unfair competition and poor discipline in operations. The PUVMP makes it mandatory to follow 'Omnibus Franchising Guidelines on the Planning and Identification of Public Road Transportation Services and Franchise Issue.' The guidelines set out new vehicle specifications, franchise issue procedures, and operating practices for all 'Public Utility Vehicles,' including the Public Utility Jeepney. The route franchise links compliance to mandatory vehicle standards, safety, and emission norms. The route-based franchise will help eliminate unfair competition of multiple jeepneys on the same route and bring discipline in operations and passenger occupancy. (135). A study by Deutsche Gesellschaft für Internationale Zusammenarbeit, i.e., GIZ in 2019(135) on early evaluation of the program, highlights that the new service planning has improved ridership by 53%. In a nutshell, the program tries to provide components that can overcome existing challenges.

Figure 21: Summary of the PUVMP programme

Challenges with Jeepney sector	PUVMP program key highlights	Reasons behind initial resistance by the drivers and slow uptake
Unregulated sector	Regulatory reform	Small operators' fear of incapability to avail new loans
Traffic congestion	Local public transport route planning	Demand of retrofitting as an alternative to scrapping old vehicles
Air pollution	Route rationalization	Doubts about the protection of drivers
Poor vehicle utilisation	Industry consolidation	Demand to increase the subsidy
Fragmented sector	Fleet modernization	Reduce interest rates
Unfair competition	Financing	Lengthen repayment periods
Passenger discomfort	Vehicle useful life program	Resistance to consolidation
Road safety	Pilot implementation	Pushback against the phasing out of the cultural icon
	Stakeholder support mechanism	Steep costs of the units
	Communication	

Taguig Cooperative is one of the first co-operatives that has undergone the Public Utility Vehicle Modernization Program. CPBRD 2020 data reveals that the new formal structure helped the co-operative earn more with around a 37% increase in operating income from 2017 to 2018. However, they also reported that they feel pressured to form a co-operative. Otherwise, the Government will choose another group in the first phase. Since the inception, the program's pace has been slow, with only 3% of 1,80,000 jeepneys shifting to modern vehicles in 3 years (140). The reasons for slow uptake are the resistance to consolidation, pushback against the phasing out of the cultural icon, and the steep costs of the units (130). By September 2018, the program resulted in the formation of 486 co-operatives. The co-operative facilitates easy access to financial institutions and ensures efficient public transportation.

Early evaluation of the program

The study conducted by GIZ in 2019 reveals that the program has resulted in better utilisation of vehicles, better efficiency, and better income. The move to salaried drivers and conductors has facilitated a two-shift operation with increased employment and better vehicle utilisation. Apart from salary, the drivers receive social security benefits (135). However, low uptake indicates the Government needs inclusive planning and the program and needs state support for a better outcome (141).

As of January 2020, the program authorised 27,606 units corresponding to 1,022 routes nationwide. The submission of the transport route plan is a prerequisite for the program. In the absence of motivation to prioritise transport plans over other development plans, resulting in an inadequate response from the local government units until early 2020, only 20% of the local governments finished their plans. (PUVMP PMO 2020 cited in (133). The key informant highlighted that the response by the local government units is also linked with the lack of capacity because transport planning was never their key area of work. The disbursement rate of subsidies is low, where the banks released only 7.34% of the allotted funds. By January 2020, two government financial institutions are working on the program approved P4.46 billion (which is 0.7 GBP)(133).

The report by GIZ (135) also highlights that due to the limitations of the banks to disburse credits, the program might end up in a risk that fewer professional operators enter the scheme, with the risk of bad loans.

7.3.3 Impacts of COVID-19, lockdown, and post-lockdown

Figure 22: COVID-19 physical distancing measures inside jeepneys (142)

The national Government decided to impose a ban on all forms of public transport vehicles on March 17 2020, in response to the COVID-19 outbreak. (143). The Government set 50% occupancy norms as the lockdown was eased. One of the co-operatives- Taguig co-operative, claimed that - following strict COVID-19 guidelines such as face masks, sanitisation norms, physical distancing, crowd management limited passenger capacity and discipline resulted in zero infected passengers or drivers from March till June 2020 (144). However, the critical informant highlighted that the claim might not be correct as the contact tracing system might not exist or unreliable.

7.3.4 A decline in ridership

As indicated in Figure 22, the ridership of IPT has reduced substantially due to the COVID-19 outbreak. The pandemic hit the livelihood of the jeepney drivers. In November 2020, the Government gave allowance to 33,979 traditional jeepneys to serve 387 routes and 865 modern jeepneys on 48 routes. (143).

Figure 23: L: COVID-19 Mobility trends in Manila (145) | R: Post-COVID-19 mobility comparison with the baseline (146)
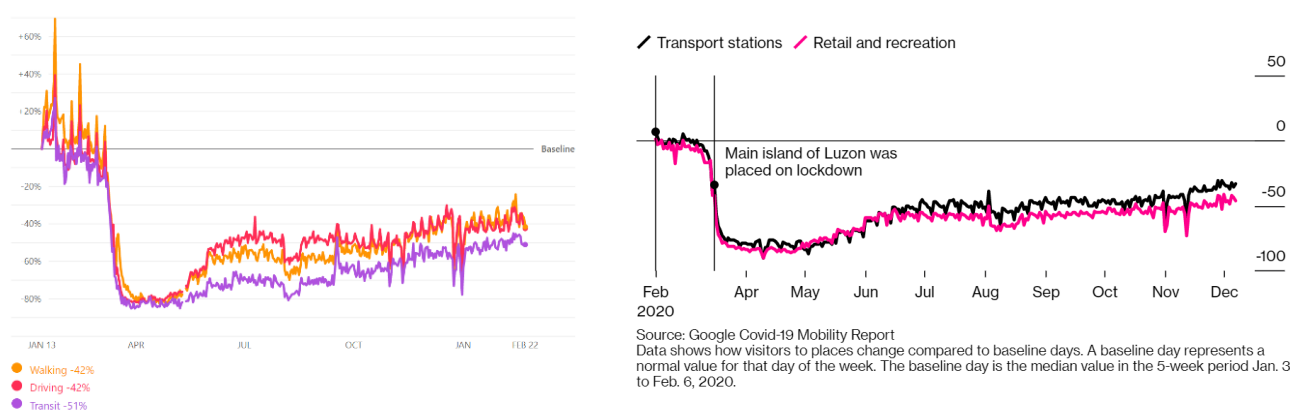
- **An impact on the livelihood of drivers -** In November 2020, around 70% of jeepneys in Manila were operational but in a limited capacity. Operators took several hygiene measures. The International Labour Organisation estimates that 7.2 million Philippine workers, including jeepney operators, might be affected by the job disruption due to COVID-19 and digitisation. (146). In response to the impact of COVID-19 on jeepney drivers' livelihood, the Land Transportation Franchising and Regulatory Board (LTFRB) distributed more than P802 million worth of direct cash subsidies. By the start of December 2020, the subsidies covered 123,517 Passenger Utility Vehicle units. Under the direct subsidy program, each operator is eligible to receive P6,500 (around 135 USD, Ref: oanda.com) per unit under their franchise (147)

- **Relief to the drivers under PUVMP** - In the pandemic, the formalisation provided relief to the drivers associated with the program. During the grace period of any amortisation payments, the banks extended the loan without any interest. The banks waived off payments till January 2021. The drivers also received insurance benefits (144). However, the drivers who were not part of the program felt pressured to meet the deadline of December 31, 2020 (148). Several experts recommend increasing the subsidy or purchasing the units by Government and operationalising through service contracting on a fee per day or per km basis in the pandemic situation. The experts highlighted that the Government should increase the subsidy to expedite the program (149).

- **Recent initiatives under the program -** In October 2020, the Government announced a contracting service agreement for jeepney drivers. The agreement allows two drivers to operate a single jeepney unit for 18 hours, aiming to earn a performance-based subsidy. The objective is to raise service, reliability, and system efficiency. The Land Transportation Franchising and Regulatory Board (LTFRB) reported that 1,520 drivers applied for the program on November 25, the first day of general registration. (150)

- **Post-COVID-19 potential implications on the program** - The bill related to the programme is pending approval to be passed into law, significantly impacting the schedule. If the law is passed, the modified program will allow retrofitting of vehicles instead of replacing entire units. Under the new law, the Government will cap the equity subsidies, but the loan amortisation will not exceed. It will result in diminishing annual interest. (141). The key informant interviews revealed that the bill's impact on the program might not be severe as many jeepneys are very old and unable to undergo retrofitting.

7.3.5 Key levers

The political will and champion for the program

The plan to transform jeepney sectors was on the Government's drawing board for a long time. As per (134) and verified by the local key expert, the real transformation started in 2016 when the new Government was elected. The key informant highlighted that while political will played a significant role, the supporting studies created in 2014 helped the program. Interestingly, (151) reports that in 2016, the President announced that the Government would not honour the Paris climate agreement. The Duterte government's top priorities include promoting rapid infrastructure development(152). However, the air pollution coupled with traffic congestion was on the political party's agenda, and hence the President was keen to implement the program. Key informant interviews revealed that the transport secretary appointed by the President used his personal experience of losing his 11-year-old son due to Asthma to get support for the program. Politically, a desire to

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address traffic congestion also played a significant role as the traffic significantly worsened around 2015-2017 and people were keen for change.

Role of catalysts

The program includes various components that have been designed with support from GIZ. GIZ supported the Philippines government with the technical work required to roll out the program. The GIZ is a federal enterprise that supports the German Government in achieving its objectives in international cooperation for sustainable development (153). The GIZ launched the transfer project funded by the International Climate Initiative (IKI) of the German Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU). The project acts as a mitigation action preparation facility and supports explicitly implementing the Nationally Determined Contributions (NDC) of the Paris Agreement. The Philippines is one of the beneficiary countries under this program (135).

Along with the GIZ, local civil societies were keen to transform air quality and mobility in the congested cities of the Philippines, which acted as constant support. Though these organisations are asking to improve the program details, they support the program. "Move As One" is civil society – a coalition of more than 140 organisations and 77,000 individuals advocating for a safer, more humane, and inclusive transportation system in the Philippines, is one such organisation. The organisation is working in support of better public transport and just transition for workers and asking for improving the program's pace, subsidy amount, introducing automated fare collection, etc.

The commitment of the government to reduce air pollution

The research highlights that, apart from mobility gains, the other main reason behind upgrading jeepneys is improving air quality. Agaton et al. (138) mentions that according to the Manila Aerosol Characterization Experiment (MACE) in 2015, old technology diesel PUV, particularly jeepneys being only 20% of the total vehicular fleet, contribute up to 75% and 94% of total roadside emitted refractory particle number and soot mass in Metro Manila, respectively (154). The Intended National Determined Contribution (INDC) in the context of the Paris Agreement of 2015 under the United Nations Framework Convention on Climate Change (UNFCCC) includes Jeepney modernisation. (128) The Government signed the Clean Air Act, which aims to maintain clean air to meet the National Air Quality guideline values and reduce GHG emissions. The PUV Modernization Program (PUVMP) aspires to make the public transportation system more efficient and environmentally friendly. The study reveals that in terms of air pollutants, the adoption of e-PUV can decrease the PM, NOx, Sox, and CO emissions by an average of 96%, 82%, 59%, and 93% respectively.

Aim to reduce traffic congestion

JICA (155) highlights that the cost of congestion in Metro Manila alone translates to an estimated loss of 20 billion USD annually. It is around 7.4% of the country's GDP or 51 million USD per day (Php 2.4 billion) due to lost working hours, additional fuel consumption, health costs due to pollution, and investment opportunities. Various plans by the Government aims to modernise public transport to fight traffic congestion. Different plans such as the National Environmentally Sustainable Transport Strategy (NESTS) and the National Implementation Plan (NIP) on Environment Improvement in the Transport Sector of the DoTR, the National Strategic Framework on Climate Change (NFSCC), the National Climate Change Action Plan (NCCAP) 2011-2028, and the Philippine Development Plan (PDP) 2011-2016 include similar vision. The modernisation of the jeepney industry might not solve all transport issues but aims to reduce the dependency on private vehicles and reduce the motorisation rate. (128). Early evaluation of the program highlights that the fuel consumption litre/km has declined by 12%, and fuel economy per passenger per km has improved by 41% (135). Multiple plans created by the Government highlighted the importance of improving transportation conditions in the cities, especially Metro Manila.

Ownership by the local government to improve mobility in the urban areas

In most Philippine cities, no agency is responsible for transport planning. Transport development plans were largely non-existent. The absence of any comprehensive national planning framework results in apathy towards a sustainable transport plan at the local level (128). The PUVMP program mandates creating the Local Public Transport Route Plan (LPTRP) by the local government units. The local Government is more versed with local conditions, passenger demands, terrain within their respective territorial jurisdiction. This

kind of allocation of responsibility will improve the local Government's ownership of the new jeepney service plan. (136)

7.3.6 Opportunities and threats

Opportunities

- **Use of pandemic experience strategically in stakeholder consultations -** COVID-19 pandemic has revealed the importance of sustainable modes of transport. While there is hardly any data on the ridership of IPT, it might have declined due to physical distancing. Norms, lack of trust in shared vehicles reduced occupancy, making it further non-profitable for the operator to operate the jeepney. The key informant mentioned that long queues for jeepneys could evidence the decline. The experts mention that this decline is temporary. IPT ridership may have declined more because of the lack of supply (evidenced by long queues for buses and jeepneys). The impact of a pandemic on the drivers who were not part of the PUVMP program was severe than the drivers under the PUVMP program. Also, the drivers who are part of the program will benefit from long-term gains in terms of the valid franchise, modern and comfortable vehicles, and hence chances of earning more. The Government can use this in the communication strategy while conducting stakeholder consultations to attract more stakeholders to join the program.

- **Introduce electric vehicles -** The pandemic has revealed the importance of good air quality and the urgency to reduce vehicular pollution. The key informant interviews revealed that the E-vehicle Original Equipment Manufacturers (OEMs) are willing to work with the Government and develop a green mobility corridor. The PUVMP program can work with the industry and the drivers to expand the roll-out of Jeepneys as an option. The share of e jeepneys is limited; for instance, the esakay jeeps going from Makati to Mandaluyong.

Threats

- **Shift in occupation due to pandemic -** The key informant interviews revealed a temporary or permanent shift in the employment to other industries due to the pandemic. It will be challenging for the Government to review stakeholder consultations in such cases and might need extra efforts and modified communication strategy.

  Slow implementation of the program can impact patronage.

  The data and interviews highlight that the program's pace is not commendable. The pandemic has further affected the speed of the program. The Government needs to expedite the program implementation and improve the uptake rate to avoid any impact on patronage.

- **Low subsidy amount -** Since the beginning of the program, the IPT industry and civil societies are not satisfied with the subsidy amount. The low subsidy coupled with the financial challenges due to the pandemic might negatively impact the social livelihood status of the drivers. The key informant interviews revealed demand to increase subsidy amount. It was doubled from P80,000 to P160,000 in 2020, but demand increased further(156). Hence the subsidy amount might need modifications and the modified social impact assessment.

- **Capacity issues -** The key informant interviews revealed that the slow uptake of the program is also a result of the low capacity to deliver the program on time. (157) highlights that the capacity building at all levels – transport industry workers, regulators, local governments, transport planners, and the public - shall be an integral part of the program to improve the results. The policymakers and implementers will need to be oriented and trained regarding new goals, administrative systems, procedures, and values.

- **More attention to the rail-based transit -** The growing attention to constructing rail-based transit (158) might shift the Government's focus from the PUVMP program to the new mobility infrastructure. (157) highlights that while rail projects are important and urgently needed, most Filipinos— of all public transport users, over 95% are road-based public transport users. It also highlights that the Government prioritised rail-based transit has over road-based public transport in the 2021 budget. Such change in the focus might severely affect the program's roll-out of the program.

- **Fare integration and technology challenges -** While the COVID-19 pandemic highlights urgency to move to cashless transactions, the key informant highlighted that the system faced integration issues such as

integration with other modes of transport and across different card operating systems. In the past, while they were trying to operationalise a cashless payment mechanism. Also, as mentioned in the research (159), the accuracy of fare collection in buses and jeepneys is not standardised because of which some commuters prefer to board on a train. The cost of the card was also a significant roadblock in the implementation because it was not affordable to poor sections of society, which are highly dependent on public transport.

7.4 Case 2 - Kochi, India

7.4.1 Background

As mentioned in the above section, several commute modes exist in the Kochi region, such as state transport and private buses, private vehicles like cars and two-wheelers, and ferry services. Still, auto-rickshaws within the city carry a substantial number of passenger trips. The auto-rickshaws are popular in the city centre because the streets are narrow, and auto-rickshaws are the only available public transport. Mode, Auto-rickshaws are also a convenient and safe mode of public transport for women and, in general, for all to provide first- last-mile connectivity (160). As per the OMI 2018, auto-rickshaws carry 32% of total trips in Kochi city. Auto rickshaws in Kochi operate as point-to-point services or as shared vehicles on specific routes. As per the comprehensive mobility plan of Kochi, the data of 2013-14 shows that the Greater Kochi Metropolitan region has 87,906 registered auto-rickshaws(111). The issue of illegal autos plying in the city is severe. For instance, in 2013, the Motor Vehicle Department (MVD) in Kochi identified 5600 illegal auto-rickshaws plying in the city & then Subsequently decided to raise the numbers of auto-rickshaws in Cochin to 7000 (160).

7.4.2 Pre-COVID-19 assessment

To improve public transport, the Government sanctioned Kochi metro rail plans in 2012. In 2017, the Kochi Metro Rail Limited operationalised the first corridor. The average ridership in 2018-19 was around 34,000 passengers per day (162). Understanding the need to improve ridership, the Kochi Metro Rail Limited (KMRL) involved the Centre for Public Policy Research (CPPR), an NGO based out of Kochi. The recommendations included providing first and last-mile connectivity to the Metro rail under implementation.

In February 2019, auto-rickshaw drivers formed Ernakulam Jilla Auto Rickshaw Drivers Co-operative Society - a co-operative society consisting of six auto-driver unions. The purpose behind the formation of a cooperative society was the welfare of auto drivers to get them better income and the social welfare of their families (163). KMRL drove the initiative to promote auto-rickshaws for achieving last-mile connectivity. The efforts have aggregated 15,000 auto-rickshaws under one Auto Society, 'Ernakulam Jilla Auto Rickshaw Drivers Co-Operative Society.' This society currently operates the shared electric auto-rickshaw service at three metro stations on a pilot basis. (164)

Figure 24: Timeline showing mobility initiatives in Kochi

2012	• Metro rail phase I was sanctioned by the government
2013	• Unified Metropolitan Transport Authority discussions were commenced.
2017	• Kochi Metro rail phase-I was inaugurated partially
nd	• KMRL plans multimodal integration for ridership improvement
2019	• Ernakulam Jilla Auto-rickshaw Drivers' Co-operative Society Limited no. 1405 (EJADCS) was registered
2020	• Kochi Unified Metropolitan Transport Authority was inaugurated
2020	• Launch of 200+ E-auto rickshaws

In 2020, the Kochi formulated Kochi Metropolitan Transport Authority (KMTA) to integrate, plan and regulate different commuting modes. Before forming the KMTA, the Government was ready with the preparatory work, including bringing autorickshaws under a cooperative society. (165). In February 2020, Ernakulam district autorickshaw drivers took the initiative to launch 250 e-autos in the city. The KMRL plays a role in upgrading the industry with plans to provide recharged batteries to e-autos. (166). For this purpose, KMRL has contracted M/s. Kinetic Green facilitates E-Autos as a feeder to Kochi Metro and M/s Vinsca Electric Vehicles Pvt. Ltd for developing 6-7 seater electric feeder vans through retro fitment kits. (164) The KMRL initiated a pilot at Maharajas college metro station (see Figure 24).

Figure 25: Multimodal integration of Kochi metro with shared autos (115)

E-autos integrated with Metro rail within 3km from Maharajas college metro station

Overall, the KMRL is taking the lead to attract more people to use metro rail with various initiatives in the city. For instance, it allows commuters to carry bicycles inside metro coaches and promote the bicycle as a sustainable mode of first and last-mile connectivity (167).

7.4.3 Impacts of COVID-19, lockdown and post-lockdown

The pandemic affected drivers' earnings to Rs 300 from Rs 1000, which they used to earn pre-COVID-19. Due to the formalised structure of the co-operatives, the drivers associated with it received aid in the form of essential kits, physical separators for hygiene measures, food packets. (168). In the Kochi Metro Rail Limited (KMRL) initiatives, the rickshaws are working as a feeder to metro rail and earn more money. The KMRL has also invested initial amounts in the ride-booking app and cashless transactions. In the initial phase, the app will be relied on by 1,500 autos complementing the Metro corridor (169). The co-operative society didn't; let the pandemic affect the capacity building initiatives and shifted to virtual training modes (170). Society bore the expenses of the initiative, and drivers will bear a nominal expense of associating with the app-based system. The KMRL and co-operative society are developing a revenue model to generate non-fare revenue as well. (171) Followed by this, in October 2020, the plans are also to implement the project in association with the Kochi Municipal Corporation (KMC) under a Joint Declaration of Intent (JDI) between the Ernakulam Zilla Autorickshaw Drivers Cooperative Society & KMC (172). Society plans to launch a ride-booking app. The plans also expand the E auto services under the Smart SUT program funded by the German Federal Ministry of Economic Cooperation and Development (BMZ). The key informant highlighted that the KMC would also support the society on a pilot project of 100 e-auto with GIZ seed funding. (5) describes that the co-operative society offers several incentives to society members, such as training selected drivers on routes of operation and road safety. The drivers can work for 8 hours a day, and they will receive a few days of paid leave per month. They will be eligible to get discounted fuel to members from Society and KMRL's banking partners to provide loans to drivers' wives for catering, tailoring, tuition centres etc.

The ridership of all modes of public transport experienced a steep decline due to physical distancing norms, lack of confidence among passengers to use public transport. For instance, just before the lockdown, KMRL

observed the highest ridership of around 2 million in December 2019. But due to COVID-19 on the first day of unlocking, the ridership went down to 4408 passengers on the First day. On January 9 2021, it observed 25162 passengers. (167) The decline in ridership of metro rail will harm share rickshaws that are acting as feeders at stations. At the beginning of the pandemic, the state government of Kerala declared relaxation in fitness fees for one month. Though small, it announced a special package of Rs 2000/- (~19.64 GBP) to auto-rickshaw drivers (173). The Government reduced the occupancy of auto rickshaws (3 wheelers) to a maximum of two passengers, which further affected the income of drivers. (174)

7.4.4 Key levers

Metro rail policy of India and KMRL's zest to improve metro ridership

Metro rail policy of India encourages a system approach where it emphasises multimodal integration between various modes such as suburban rail, metro rail, buses, auto-rickshaws, etc. (175). The key informant interviews revealed that the policy helped to endorse the need to integrate metro rail with existing modes of transport. On top of it, KMRL is interested in improving the metro rail ridership, for which multimodal integration is a key solution.

Multiple technical resources

KMRL is closely working with technical partners like GIZ, CPPR. The E -the auto project is part of the civic administration's Integrated Sustainable Urban Transport Systems for Smart Cities (SMART-SUT) scheme. In association with GIZ and UN-Habitat, the local, state and Union governments will provide subsidies for purchasing E autos. The remaining amount will be funded through a loan taken by the society. GIZ will also fund the charging infrastructure, and the auto stands that the corporation will set up. (176). KMRL has associated with the Centre for Public Policy and Research (CPPR)-Kochi and observed a special Kochi Public Transport (KPT) Day on the first Friday of every month. (164). For other infrastructure improvements in Non-Motorised Transport, KMRL receives finance from the French Development Agency(162).

KMRL taking the lead in multi-stakeholder coordination as the nodal agency of KMTA

The metro rail policy of India highlights the need to set up UMTA and mandates the State government to formulate it (175). One of the primary roles of this UMTA is to establish effective coordination among various urban transport agencies and manage the Urban Transport Fund (UTF) etc. Following the policy, the state government of Kerala established UMTA, known as KMTA. A prerequisite to set up UMTA is to make a particular agency responsible for managing the establishment process of UMTA. The Government of Kerala has approved the implementation of UMTA under Kochi Metro Rail Limited (KMRL). Hence, KMRL acts as the Nodal Agency to set up UMTA for Kochi Urban Mobility Area. (177). KMRL is the sole authority to implement Metro and act as a nodal agency of KMTA to better coordinate with agencies or owners of other transport modes such as rickshaws.

KMRL is a channel to the financial resources and drives institutional reforms in IPT

As mentioned above, KMRL is an agency taking the lead in various initiatives that can help the IPT sector improve. Though the state government of Kerala has a strong history and success stories of co-operatives, KMRL is taking the lead in institutional reforms in the IPT sector by the formation of auto-rickshaw co-operatives. It is also a key agency to channelise the various financial resources necessary in improving IPT in the city.

7.4.5 Opportunities and threats

Opportunities

- **COVID-19 as an opportunity -** The KMRL used COVID-19 lockdown as an opportunity to introduce a QR code for cashless payments. The KMRL implemented a pilot on feeder E-autos for metro rail. The results of the performance and acceptance of the same have not been documented yet. But here can expand it further on other auto-rickshaws under the co-operative society and move towards a completely cashless payment system. The KMRL also continued training sessions for the drivers using online platforms during the pandemic to avoid any delays in the integration process.

Threats

- **Impact of COVID-19 on ridership -** The ridership of Metro rail and auto-rickshaws have been affected severely due to physical distancing norms and lack of trust. Hence, integrating more auto-rickshaws into the feeder system is expected to get impacted.

- **Challenges of large-scale cooperatives in urban transport -** The cooperative society of auto-rickshaw drivers formed in Kochi is unique. The size of a society with more than 15,000 members is enormous, and hence it is not easy to envisage the challenges associated with it.

7.5 Case 3 - Dar Es Salaam

7.5.1 Background

Dar es Salaam, Tanzania's capital city, houses approximately six million people and is expected to become a megacity with more than ten million people by 2030 (178). Mkalawa et al. (179) highlight that public transport and walking are two significant modes of transport in Dar Es Salaam. The study by Worrall et al. (180) indicates that most public transport trips are dependent on Daladalas. Daladala is a small minibus and medium-sized privately owned city bus operated as a passenger vehicle. However, lack of first and last-mile connectivity, shortage of buses, overcrowding, waiting for time, and more than one transfer and cost associated with it results in inconvenience to use Daladalas (181).

Figure 26: Mode Share in Dar Es Salaam (179)

- Walk — 17%
- Public Transport — 68%
- Private Transport — 15%
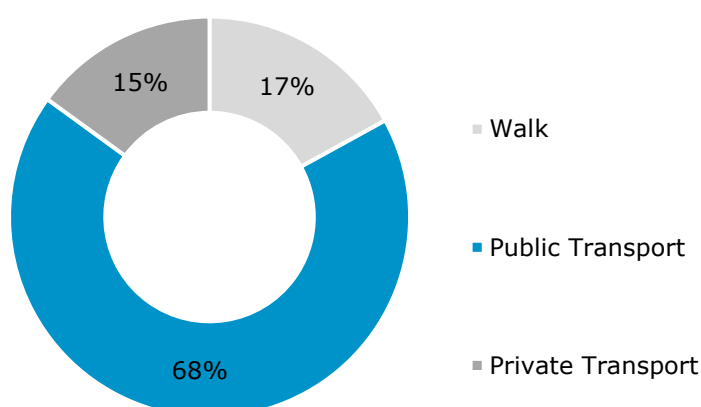
7.5.2 Challenges with Daladala industry

As shown in figure 30 the Daladala industry flourished around 1983 when licensed to fill the gap between the demand for public transport and the Government's ability to provide formal buses (182). Though they provide an affordable public transport option to the citizens, research highlights that several issues result in poor operations such as safety, overcrowding, poor maintenance, and untrained drivers. The Daladalas are unsafe, with most traffic accidents involving Daladala buses. This is in part due to reckless driving, as the drivers try to complete the trip in less time by over speeding and violating traffic rules (183). As a result, children denied using Daladala buses due to overcrowding irrespective of the fare discount. (Weingarten et al., 2008). The ownership model of Daladalas is flexible, where a company or individual can own the vehicles. (185). Typically, these vehicles are poorly maintained. Research by (186). This shows that the UDA undertakes routine maintenance regularly, while the system undertakes major repairs quarterly. The Daladala operators and the Shirika La Usafiri Dar Es Salaam (UDA) are stark. UDA is an entity in which the Government of the United Republic of Tanzania is the majority share Holder[30]. The system does not have any formal driver training program. Typically, most of the drivers employed in the Daladala business are very young without any formal training, and there are no laid down procedures for driver recruitment. (186). (184) mentions that the monitoring framework in the city is inadequate, with 6,000 Daladalas are licensed, but another 1,500 vehicles

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[30] https://udart.co.tz/about/

are operating without licenses. On top of it, there is a great deal of mistrust between the police and the informal public transportation industry.

Figure 27: History of the initiatives of formalisation of Daladalas (182)

1947
• The British Private Company was the sole public transport operator in Dar Es Salaam

1974
• UDA (Shirika la Usafiri Dar es Salaam Limited) took over the operations

1983
• In 1983, informal operators Daladalas were licensed to fill this gap between the demand for public transport and inability of the government to provide formal option. Interestingly, they were licensed under the UDA which sole had license to operate buses.

1998
• The negligence towards public transport and rapid urbanization resulted into deterioration of public transport system from 257 buses to 12 buses (Mkalawa, 2014) an on 10% trips by buses and rest by Daladalas.

2011
• Several changes took place in the management of Daladalas. However, they remained under the government agency with controlled fare
• There were 6,600 Daladala buses operating along 482 routes in Dar es Salaam

2014
• The Usafiri Dar es Salaam Rapid Transit (UDART) was formed under the company's act in 2014 to operate the buses under DART

7.5.3 Pre-COVID-19 assessment

Figure 25 indicates the important milestones till the emergence of Daladalas to the initialisation of Dar Es Salaam BRT. With the emergence of the Bus Rapid System in the city, the local Government utilised this opportunity to better formalise the existing public transport[31]. (107) mentions that in 2008, there were approximately 7,000 registered & privately owned Daladala in service. They were operating along 192 bus routes, out of which 45 bus routes were affected by the Phase 1 project. The BRT Phase 1 system was expected to displace 1,800 Daladala (existing minibuses).

Based on the stakeholder consultations, the approach adopted by the Government to integrate Daladalas with the proposed BRT was (a) Daladala to be paid disturbance allowances and be rerouted (b) Daladala to buy shares in the Usafiri Dar es Salaam (UDA) company (a privatised former Government-owned operator) where the central Government owned some shares, and (c) Daladala to get compensation for their vehicles when scrapped. Finally, the Government signed an agreement with the Daladala owners affected by Phase 1, and 400 out of 1,800 were paid disturbance allowances not to compete on the main routes. Simultaneously,

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[31] DART has been established for BRT operations by order under the Executive Agencies Act on May 25, 2007 (World Bank 2017)

the Government continued consultations for rerouting the remaining 1,400 before the feeder services of Phase 1 started operating.

The system encouraged existing Daladala operators to become a part of the new system by buying shares (30% within three years). It received a good response, with nearly half of the drivers working as BRT drivers are former Daladala drivers. (182) concludes that the operational arrangement with UDA-RT has enabled some degree of participation of former Daladala drivers in DART, offering more stable employment, incomes, benefits, and job training. However, his research also highlights that there are complaints about the social livelihood displacement of Daladala operators due to the ban on operating Daladalas along the main arterials. They have chosen to shift to adjoining neighbourhoods which has added chaos on the neighbourhood streets.

7.5.4 Impacts of COVID-19, lockdown and post-lockdown

Based on the government directives, the UDART took sanitisation, installing physical measures between the drivers and passengers & minimum distance of 1.5 meters between passengers queuing at stations or bus stops, crowd management measures such as 'no standing passenger rule' during COVID-19 (187). However, according to the daily news, the operators and passengers ignored the directive (188).

Figure 28: Phases of DART BRT (189)
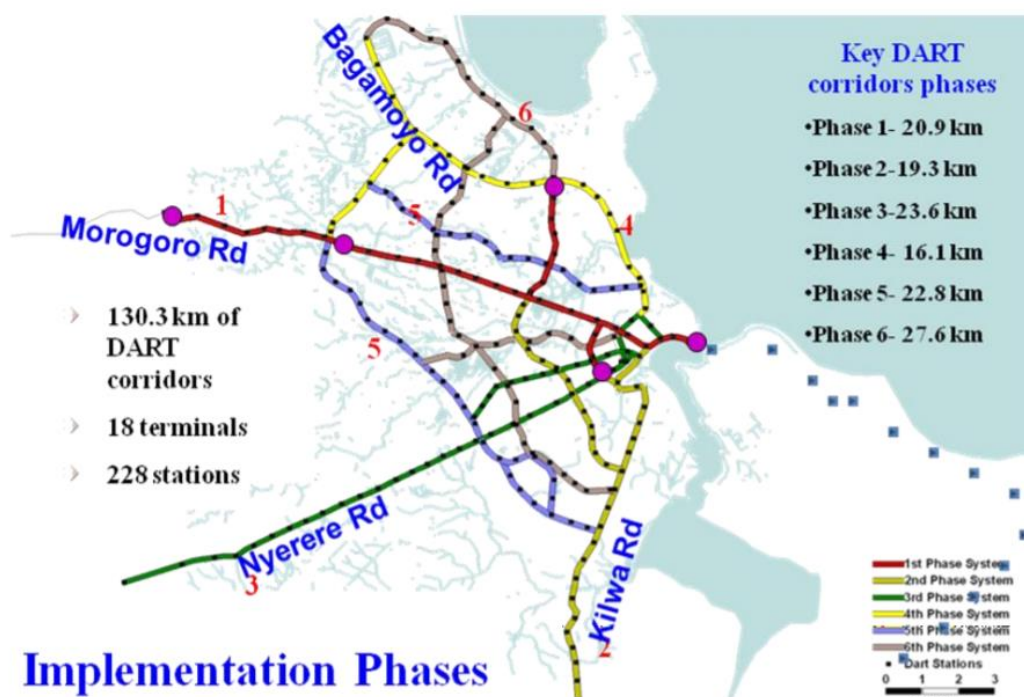
As shown in figure 27 , the city plans to implement 19.3km of BRT in the second phase (190). In June 2020, Tanzania declared that the country is free of COVID-19, and the Government stopped publishing the data on COVID-19 cases (191). Due to the unavailability of the data on COVID-19 and the absence of COVID-19 measures, it is difficult to identify the impact of COVID-19.

7.5.5 Key levers

BRT as an opportunity for integration

Reforms in Latin America often, but not always, occur because of, and in tandem with, new infrastructure-based BRT projects(121). Likewise, the Dar Es Salaam government utilised an opportunity for BRT to formalise the IPT sector. The new system provided relief to the Daladala operators who shifted to the BRT system. They got relief from the 'target system,' which was exploiting them to get more passengers and earn revenue – often by giving a toss about road and passenger safety - to meet the target set up by the owner of the Daladala.

Role of funding and financing

Dar es Salaam BRT received financing from multiple development banks and organisations, as shown in Figure 33. The local Government's commitment to implement BRT with the help from development agencies helped take care of necessary components such as planning and stakeholder consultations. For instance, USAID supported the project by carrying out stakeholder consultations, GEF provided support in planning and designing the system.

Figure 29: Dar es Salaam BRT project funding summary (189)
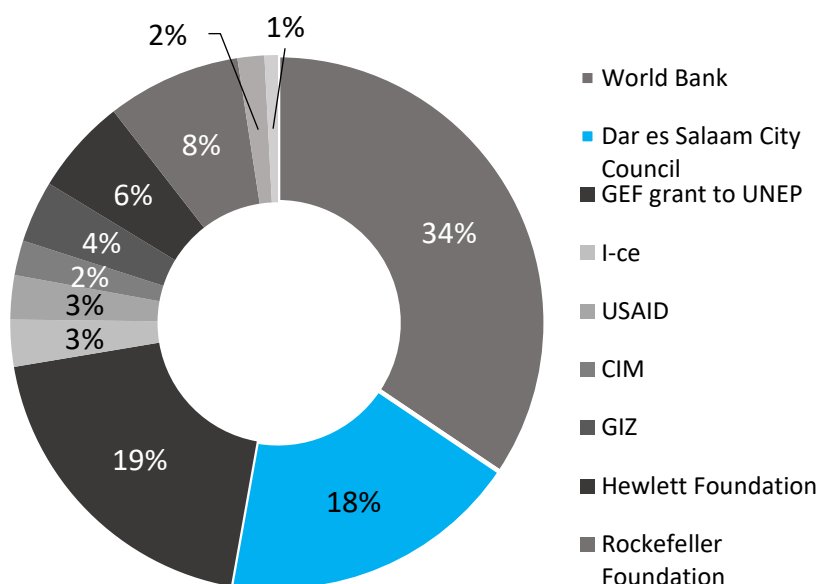
Plans, strategies, and technical resources

The implementation authority carefully carried out planning activities considering the impact of the BRT on existing Daladala operators. As mentioned above, the plan indicates that BRT would impact around 1,800 Daladalas. The local authorities conducted multiple stakeholder consultations to identify the compensation, integration with the BRT, and other details. The technical resources in development agencies and organisations helped the Government in the process.

Communication and outreach

The detailed plan provided the exact stakeholders with whom the Government should conduct the consultations. The communication and outreach activities primarily involved stakeholder consultations, study tours for the operators.

7.5.6 Opportunities and threats

Opportunities

- **Opportunities for Daladala and BRT to co-exist -** As per the policy brief by The World Bank 2019, the BRT has resulted in a mode shift from Daladala to BRT, with more than 10% of people living near Phase 1 are using BRT instead of Daladala. However, two national experts (193) research shows that Daladalas is still a preferred mode of transport as a feeder to the BRT corridor. 43% of the respondents in their surveys reported that they use Daladala to reach the BRT terminals/ stations.

  Today, DART has been designed to not rely on subsidies from the got to cover its operating expenses, other than an exploration of a targeted pilot subsidy for the urban poor. It resulted in high fares that represent an increase of more than 60% over the cost of a Daladala. (World Bank, 2017). The World Bank n.d. It also highlights that the Public transport operations are currently not subsidised, directly or indirectly,

irrespective of the local Regulation 3-17 states to enable regular transport to be subsidised, but it is not implemented.

(107) highlights that the next phases of BRT might impose a threat to the Daladala operators concerning their livelihood opportunities. Hence for the next BRT phases, the approach needs to be modified further with the appointment of the transaction advisers. The proposal is to support the consolidation of the Daladala owners and help the formation of companies, co-operatives, and franchises for a more structured approach. The formal associations will only be eligible for getting the service contract for operating BRT buses. The formalisation and integration of Daladala into the BRT have further scope for improvement. For instance, the BRT ridership target for 2016 was 360,000. However, due to parallel Daladala operations, BRT ridership touched hardly 162,000 in 2016. Rest 200,000 passengers per day were dependent on Daladalas (107)

- **Improving operations contracts -** During the consultations, the Government offered two options to the operators: raise capital to form new companies to bid to become an operator on the new BRT system or buy shares in other local or foreign companies set to bid for BRT. It led to the creation of UDA-RT - a special purpose company formed by the Usafiri Dar es Salaam (UDA) bus company, DARCOBOA, and UWADAR for the provision of interim services. As per the key informant, the preference was given to the local affected stakeholders to form a company and bid for the operations contract. The key informant also highlighted that the adopted operational model was the 'net cost' operations model, resulting in many issues related to service levels. By 2018 there were "ongoing complaints" about the state of the UDA-RT system. These included overcrowding, vandalism, and poor reliability (193). Another concern was the frequent cancellation of services whenever the city experienced heavy rain. (194). A poor image of operations might affect the Daladala operators on other corridors to join the BRT system when the authorities expand the BRT to other areas. It might lead to more efforts in terms of communications and improving service contract. The Institute of Transportation and Development Policy is now working with the authorities to change the operations model to the gross cost model with service level benchmarks.

- **Moving towards cashless fare collection -** It is interesting to note that, unlike many developing countries, the DART is trying to set up its fare collection mechanism using the experience of collecting parking fees. The Government is extending the backend system for automated fare collection with in-house capacities, and the private entities will take only the hardware part care. Such arrangement is expected to provide more transparency, ease in system integration.

Threats

- **Social livelihood displacement of Daladala operators -** The key informant interviews revealed that compared to many other BRT systems, the system tried hard on stakeholder consultations the social impact assessment. Still, it did not consider all aspects of the livelihood displacement of Daladala operators. For instance, the number of owners and drivers who registered was a small proportion of the affected workforce. There is no evidence of any engagement with the trade unions or associations representing the workforce. (194)

- **Shifting Daladalas on neighbourhood streets increasing chaos on those streets -** The social impact assessment did not include the impact of shifting of the Daladala operators on neighbouring streets. It has resulted in chaos in neighbouring areas and the deterioration of the operations.

- **Most operators are unable to see long-term benefits -** The benefits of shifting to the new system are often long-term. For instance, the existing Daladala vehicles are old and poorly maintained. Though shifting to the BRT system as bus operator will provide them with a new vehicle with more life and better passenger comfort, the operators often think about the direct earnings from the Daladala Vs. Investment to shift to the new system. The key informant highlighted that due to the lack of understanding of the long-term benefits of the formalised system, joining the BRT in the subsequent phases might be slow.

7.6 Case 4 - Johannesburg

7.6.1 Background

The case study on Johannesburg focuses only on understanding the role of industry transition when a highly dependent city on informal public transport introduces a new mass transit mode. The key levers are not validated by external experts.

Johannesburg – political capital of Gauteng Province- houses about 5.7 million people[32]. The city's transportation is based on informal public transport even though formal public buses operate. 2003 statistics estimate that there are 130,000 minibus taxis throughout South Africa, with 60% commuters using the informal public transport services (Venter 2013 cited in (123). Similarly, everyday public transport is a significant mode of transport for the masses in Johannesburg. As per the UN-Habitat Nairobi, 2011 report, the minibus-taxi usage comprised 72% of all public transport trips in Johannesburg. This informal public transport sector began as early as the 1940s in response to the spatial planning policies that compel black population neighbourhoods to live away from the Central Business Districts. It gave rise to the emergence of informal public transport that provided access to jobs for the black population at an affordable price. Later in 1988, the Transport Deregulation Act resulted in explosive growth. The five-year period between 1985 and 1990 saw a 2,500% increase in the number of permits issued for minibus-taxis in Johannesburg (McCaul and Ntuli 2011 cited in (123). It oversupplies, adding to the indiscipline, poor safety standards, and service quality. It prompted the operators to form minibus taxi associations that were based on the fees against the right to operate the system. However, it resulted in a mafia mentality among the sector and gave rise to violence.

7.6.2 Informal transit challenges

Though informal public transport is an important mode of transport in the city, it has several issues. The routes are unplanned, resulting in multiple transfers for many passengers. The waiting time is high as the vehicles do not depart till the vehicle is full.

The absence of multimodal integration results in long trip lengths and poor access to public transport. For instance, research by (195) highlights that the motorisation and growing urban expansion in Johannesburg affect travel times and recommends that informal public transport be integrated with other modes into one well-interconnected system. The research reveals that almost four-fifth of residents in Johannesburg can only access up to 60% of jobs within an hour. Only 9% of the residents can be classified as "well located," with low transport costs and good access to jobs. Almost 74% of people in the city face a higher-than-average cost burden to reach their destinations. A significant proportion of residents, almost 17%, are "stranded" without adequate access to opportunities and lacking the ability to spend more on transport. (195)

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[32] Year 2019, https://www.macrotrends.net/cities/22486/johannesburg/population

Figure 30: Level of access vs mobility expenditures in Johannesburg (195)
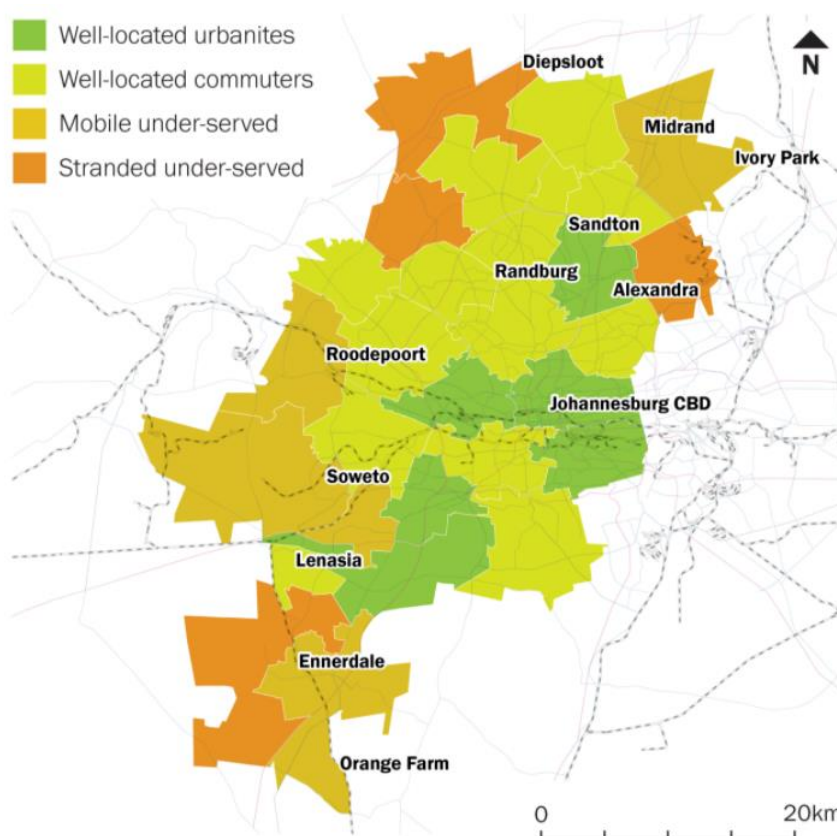
7.6.3 Pre-COVID-19: Efforts by the government to improve IPT

In 2003, understanding the importance of the IPT sector, the Government made the National Land Transport Transition Act to rationalise the existing operators into a national transport plan. The planned reform included the legalisation of the industry. The objective was to prohibit new licenses and curb the oversupply. Financial formalisation through the registration of taxis was essential for joining the Government's Taxi Recapitalisation Program. The national taxi council (Santaco) was formed as a single representative body for whom the city could negotiate and consult.

The program was partially successful, and the Government upgraded around 44,000 old vehicles. However, (123) explains that it resulted in increased fare and loss of jobs and gave rise to illegal informal services that offered comparatively lower fare. The Santaco could not become a genuinely representative body (Venter 2003 cited in (123). Eventually, the efforts did not result in visible public transport improvements. Research by Venter, Christoffel, 2012 argues that the initiative results were not great due to the Government's inability to execute the program, poor stakeholder participation, and active resistance from the industry. (196). From 2006 to 2018, in 12 years, only 72,690 were scrapped against a readjusted target of 135,894 (197).

7.6.4 Towards a formalisation of IPT sector

Schalekamp (198) describes that the country utilised the opportunity to host FIFA World Cup 2010 and leveraged funding for the fast track planned investments such as Bus Rapid Transit (BRT)(123). The integrated planning approach helped to IPT sector for the success of the BRT. Based on the learnings of IPT reforms in the past, the city tried to follow a participatory approach to involve the taxi operators in Rea Vaya BRT discussions. The goal was to avoid competition between the existing minibus taxi operators and the BRT buses. Initially, 585 taxis had to be withdrawn along the BRT corridor. Displaced drivers were offered re-employment and training in the new scheme, and 80 ex-taxi drivers obtained secure jobs in the BRT operations in the first phase. The Government provided compensation after categorising the taxi drivers into four groups (199). Before the formal negotiations, the city initiated months of engagement with bus and minibus taxi operators potentially affected by the introduction of Rea Vaya. The stakeholder participation

initiatives were intense with international study tours, discussions, and negotiations. The continued efforts to involve the stakeholders and negotiations resulted in getting buy-in from multiple taxi operators. In April 2009, due to taxi-related issues on the verge of a general election, African National Congress President Jacob Zuma called for a temporary halt until the new administration could be briefed (200). But around May 2009, 4 months-long negotiations concluded with offering share to the taxi operators in the newly formed company and compensation to the drivers against the loss of income under the five framework agreements, such as participation framework agreement. Phase 1A was launched in August 2009 and connected Soweto and Johannesburg city centre. It comprises 25.5 km of trunk routes with 143 buses that serve 70,000 passengers daily (201). Initially, 313 drivers agreed to scarp-off their vehicles and joined the company as a shareholder. (123). The system also adopted a mechanism of compensations to restrain trade and remove the taxi off the road favouring Rea Vaya buses. In 2016, the Government paid large compensations of about R830,000 per taxi to around 317 drivers. Besides, they were eligible to receive a sum of R2.6-billion, or R221-million annually, to operate the bus system for the next 12 years. (202).

7.6.5 Impacts of COVID-19, lockdown and post-lockdown

The minibus taxi industry in the country faced enormous challenges during COVID-19 due to restrictions on carrying only 70% of the capacity. Maeko (203) highlights that the COVID-19 lockdown impacted their total earnings due to capacity restrictions, fewer operations, and high operational costs. Due to the unregulated nature of the industry, the workers could not get qualified for the Unemployment Insurance Fund (UIF) coronavirus-relief payments (204).

The Government offered a relief package of 1.3 billion Rands[33] for the industry, but the operators were not happy with the relief package provided by the Government (205). Eventually, in June 2020, the South African National Taxi Council (Santaco) went on strike protesting the low relief package of (206) [34]. To offset grievous financial losses, taxi associations called for massive fare hikes of up to 10-25% and mentioned that they might be forced to increase their fares by 172% in the coming weeks (207).

On the other hand, the Rea Vaya system also increased the fares by 6% from 1st July 2020 to 30th June 2021 (208). Rea-Vaya scaled down the bus operations with a principle of one person per two-seater and two people per three-seater bench. Along with adopting sanitisation protocols, the Government suspended cash fare payments in response to COVID-19 measures (209).

Qwabe T's mentions that in 2018, Santaco had over 123 000 individual taxi operators (210). In 2019, the Government revised the Taxi Recapitalization Program, and the scrapping allowance increased. The current process focuses on collecting the vehicle and route details, but more effort on formalisation can help the city.

7.6.6 Key levers

BRT as an opportunity for integration

Reforms in Latin America often, but not always, occur because of, and in tandem with, new infrastructure-based BRT projects(121). Likewise, the Johannesburg government utilised an opportunity for BRT to formalise the sector by offering a stake in the BRT to the operators.

7.6.7 Opportunities and threats

Threats

- **IPT remained a primary mode even after the implementation of the BRT -** The Rea Vaya BRT led the integration of the minibus taxi. It remained restricted to some corridors and could not expand to the city level or beyond Johannesburg. A decade after Johannesburg's bus transport system began, the BRT accounts for only 0.6% of transport users. The IPT is still a significant mode of transport, with minibus taxis carrying 45.7% of trips and cars carry 36% of trips (211). Household surveys by (212) reveal that 39% of the surveyed population still uses taxis for the commute.

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[33] about $76 million
[34] the Government provided one-time R1.135 billion packages however the South African National Taxi Council demanded for R4bn per month

(212) argues that though BRT passenger numbers are increasing, the mode shift from cars to BRT is yet to be achieved. He also claims that the mobility benefits of Rea Vaya are real and significant but skewed towards middle-income rather than poor travellers.

According to data compiled by SA Taxi, a lender to the industry, the informal trade accounts for 15 million commuter trips daily which are almost ten times bus and train journeys (142). Irrespective of this, as per the reports drafted by the Competition Commission, the minibus taxi industry benefits by only 1% of the investments that Government makes in public transport, and the rest goes to the train system or buses (213).

7.7 Case 5 - Kampala, Uganda

7.7.1 Background

The case study on Kampala is limited to understanding the COVID-19 response by the city authority for informal public transport sector reforms.

Intermediate Public Transport in minibus taxis plays a crucial role in Uganda. It provides direct employment to more than 100,000 people in Kampala and many indirect jobs through the motor vehicle repair and servicing industry (214,215). In 2015, Kampala had 1.5 million residents and 16,000 minibus taxis that transported 82.6% of the commuters across its five divisions (216,217). This unregistered minibus taxi industry is estimated to grow at 5.4% annually (214,217).

7.7.2 COVID-19 response: an opportunity to introduce IPT reforms

After the COVID-19 outbreak in Kampala, the Government shut down public transport in March 2020. As the lockdown began to ease in June, minibus taxis were allowed back on the streets, and boda-bodas were permitted to carry only cargo services and food deliveries(218) .

During the unlock, the Government decided to use the opportunity to start registration of various IPT modes. Following the resumption of Public transport on June 4 2020, as per the guidance from the President, Kampala Capital City Authority and Kampala Metropolitan Police, and the Leadership of Taxi Industry initiated the registration process (219).

Before this, around 2010, an attempt to regulate Kampala's informal public transport system through statutory laws and regulations enacted by the Uganda Parliament and loosely enforced by the Kampala Capital City Authority (KCCA) failed due to resistance by the operators backed by influential politically connected owners. The regulations and the means of enforcing them were not clear and left considerable room for discretion. For instance, self-regulation clauses resulted in unfair competition, poor quality of service, high fares. (220) As per (221), the KCCA has been taking initiatives to regulate the taxi industry better.

7.7.3 COVID-19 as an opportunity to transform

In June 2020, the Kampala capital city authority utilised the opportunity of COVID-19 to initiate registration of un-registered passenger service vehicles (222). The 2014 report proposes that, in the short term, the Ministry of Works and Transport establishes a Bus Rapid Transit Agency, responsible for the procurement and management of the BRT system and the management of taxi transformation. In the longer term, it is proposed to establish a Metropolitan Area Transport Authority (MATA), which will require new legislation. The registration of IPT vehicles is also important to initiate the bus rapid transit and light rail projects targeted in the master plan, 2018.

The objective of the initiative was to ensure that all vehicles on the roads have all the requirements in accordance with the existing laws and regulations, as well as ensure that the drivers have valid driving permits for that class of vehicles. By June 16, 2020, KCCA had registered and allocated Route Numbers 13, 301 PSVS while the Ministry of Works and Transport had issued 10,472 Route Charts. The city authority claims that the initiative was successful, and almost all the estimated taxis in Kampala received a registration number. (219). The initiative also includes a brand identity exercise with displaying route stickers, numbers, area of operation, and a new look (223). The newly registered vehicles also need to follow standard operating procedures like occupancy norms, e.g., minibus taxis can have only seven passengers, including the driver and

conductor. Though the registration process received a huge response from the operators in a short time, passengers claimed that the transport costs have gone high as drivers are recovering the amount they spent in the registration process (222).

7.8 Conclusion

The following table summarises the case studies and tries to understand the key learnings. Though the purpose of the table is not to conduct a comparative assessment, it provides critical learnings from the case studies. The key informant interviews helped to identify key levers in various case studies. For instance, all case studies highlight the need to consider the IPT sector as a sustainable mode of transport. It cannot sustain without formal financial as well as regulatory support. Currently, the IPT in many cities, is working under inadequate regulations, and therefore the financial support can help the sector to regularise the vehicle or become a part of the regularised system. In this process of IPT reforms, the implementing agencies have taken technical support from various agencies. While the authorities can hire external experts and consultants, it will be helpful to increase in-house the capacity of implementation agencies. The readiness in staffing and financial resources can drive such initiatives well.

Table 9: IPT - Key levers and learnings

Key Levers	Philippines	Kochi, India	Dar es Salaam, Tanzania	Key learnings
Policy & regulatory framework	Omnibus guidelines are part of the PUVMP program and being used to ensure IPT vehicles with better technology,	Metro policy of India and the existence of Unified Metropolitan Transport Authority played a crucial role in Kochi Metro Rail Limited taking the lead to integrated with existing informal public transport vehicles.	National Transport Policy (NTP), 2003 established the need for having bus rapid transit (BRT).	The national or state-level policies or acts are essential while implanting sustainable mobility initiatives.
Plans, strategies & technical resources	The Government formulated the passenger Utility Vehicles Modernisation Program (PUVMP) for IPT reforms.	Multimodal integration plan of Kochi Metro Rail Limited (KMRL)	BRT phase-wise plan details the impacted informal Public Transport Operators on the proposed BRT corridors and compensation or transition plan.	A systematic plan that identifies stakeholders' social impact is an essential step in transforming the IPT sector. Technical resources are key to prepare plans, and hence the Government needs to hire consultants or build in-house capacity to develop appropriate strategies.
Sources of funding & financing	National Government is funding the program – especially the subsidy component to replace old vehicles.	Kochi Metro Rail Limited (KMRL) and external funding are the two primary funding sources.	Local Government and external funding agencies like development banks played a key role.	While the local government units or national Government can invest funds in the projects, bringing in financial institutes or funding can help scale up.
Leadership & political will	Champion within the Government – The President and the Transport Secretary are playing a	KMRL is taking the lead in multimodal integration to increase ridership.	The multiple agencies are playing the role of champion.	Whether it is a political champion or administrative champion, the champion within the

Key Levers	Philippines	Kochi, India	Dar es Salaam, Tanzania	Key learnings
	significant role in improving acceptance for the program.			Government can be of great help to deliver IPT reforms.
Capacity (for planning & implementation)	The Government formulated the PUVMP program with external support. However, the key informants highlighted that the Government does not possess high capacities for implementation in human resources and technical capacity.	The KMRL has a high level of capacity to implement the program with access to funds and willingness.	The capacity of implementation agencies is moderate.	The poor capacity of the Government in terms of understanding or human resources can become a big challenge. The Government needs to build in-house capabilities to implement the initiatives and more ownership better rather than rely on external support.
Institutional structures & framework	The program adopts the franchise model of IPT operations for bringing operators under a single umbrella.	The KMRL adopts the formation of a co-operatives model for IPT reforms.	The Government formed a BRT company for facilitating industry transition from IPT operators to BRT operators.	It is essential to formalise the IPT sector before upgrading the system in terms of vehicle or transit type (e.g., BRT) or improving air quality by replacing old IPT vehicles.
Role of the private sector and civil society	High. The external technical advisers supported the program formulation. Civil societies act as a bridge between the IPT operators and the Government to further improve the program.	High. The external agencies are working with KMRL in designing the program. The local academic research institutes are also supporting KMRL.	Moderate.	The support of civil societies is essential to ensure the program's long-term sustainability. Such civil societies can drive the agenda irrespective of the type of Government or any other bureaucratic changes.
Communications, Messaging & outreach	Moderate. There is further scope to improve the program outreach and	High. The KMRL is using various platforms, including social media platforms.	High. The Government held multiple stakeholder consultations to understand the social impact and industry transition.	A good program can fail in the absence of incomplete communication and outreach efforts.

8. Research uptake and next steps

8.1 Research uptake/ dissemination activities

Meetings with government partner – The project team has had two meetings with a possible government partner. One included meeting the Joint Secretary of the Smart Cities Mission India. In the meeting, there are talks of integration of the strategic guidance document "Moving Ahead: Urban Mobility Reforms for Post-COVID-19 Resilience in India" with existing capacity building programs in the country.

8.2 Planned next steps

- Follow up with government partner to explore the possibility of publishing and integrating the strategic guidance document as part of existing capacity building programs.
- Opinion pieces based on the findings of the research project and strategic guidance document.
- We plan to write and publish an academic research paper based on the recommendations and findings of the report and strategic guidance document.
- We are releasing short video snippets based on the recommendations and findings of the report and strategic guidance document.

8.3 Low-income countries planned for upscale

The primary focus areas for upscale would-be countries in the African continent and India. The strategic guidance document "Moving Ahead: Urban Mobility Reforms for Post-COVID Resilience in India" is made specifically to disseminate the learnings and recommendations in India.

8.4 Project outputs

The key outputs are:

- The technical research report "Post-COVID-19 Mobility: Key levers to reform urban transport systems;
- Strategic guidance document "Moving Ahead: Urban Mobility reform for posting COVID resilience in India."

9. Conclusion

The key levers identified across different cities and modes have allowed for a far deeper and nuanced understanding of the best practices studied. While the research identified separate key levers for the three modes studied, they are to be considered under the larger ambit of Integrated urban transport systems. As each mode is complementary to the other, and they function as a larger network of mobility.

To further condense the learning and ensure it is developed in an accessible manner, a strategic guidance document "Moving Ahead: Urban Mobility reforms for post-COVID resilience in India". The document has identified actionable steps/points that can be undertaken by various state and city governments in India and a comprehensive capacity building program.

9.1 Key levers – action points

Based on the learnings from the research, Key levers have been identified. The tables below convert the key lever into action points that can be undertaken by the government/ authorities at various levels. While the action points are organised linearly, it does not indicate a sequence. The decision to act must be decided at the respective level of government based on the context and its needs.

Non-motorised transport - Walking and cycling

Table 10: NMT - Key levers and action points

No	Actions	Time period			
		0-6 months	6 months-1 year	1-3 years	> 3 years
Create an enabling institutional structure at the city level					
1	Appoint a Walking and Cycling Commissioner	🟩			
2	Create a walking and cycling team	🟩			
3	Establish a Non-Motorised Transport Committee	🟩			
Understand and increase demand for walking and cycling in the city					
4	Organise demand generation events on a regular basis	🟩	🟦	🟦	🟦
5	Publish annual walking and cycling surveys	🟩	🟩	🟩	🟩
6	Increase access to bicycles	🟩	🟩	🟦	🟦
Implement pilot projects for visibility and support with data					
7	Implement bold pilot projects to maximise visibility and demonstrate outcomes	🟩	🟩		
Create a walking and cycling strategy, financing channels, and capacity building programmes					
8	Create a national walking and cycling strategy	🟧	🟦	🟦	🟦
9	Provide funding channels for walking and cycling	🟧	🟧	🟦	🟦
10	Conduct short-term training programmes	🟧	🟦	🟦	🟦
11	Introduce courses in academic institutes	🟧	🟧	🟦	🟦

Bus based public transport

Table 11: BBPT - Key levers and action points

SNo	Actions	Time period			
		0-6 months	6 months-1 year	1-3 years	> 3 years
What kind of bus service do you need?					
1	Understand commuter demand (City)	[orange]	[blue]		
Institutional design and arrangement					
1	Financing Institutional arrangement (National)	[orange]	[orange]	[blue]	[blue]
2	Setting up a Strong, Smart and Responsive Public Transport Authority (State/City)	[orange]	[orange]	[blue]	
3	Setting up the team for PTA (State/City)	[orange]	[orange]	[blue]	[blue]
4	Service and Business (PTA - State/City)	[orange]	[green]		
Long term and systematic investments					
1	Making a business plan (PTA - State/City)	[green]			
2	Institutionalise business plan (PTA - State/City)	[orange]	[orange]	[blue]	[blue]
How do you get started and sustain a good bus service					
1	Communication and outreach plan (part of the business plan) (PTA - State/City)	[green]			
2	Integration unions and private operators (PTA - State/City)	[orange]	[orange]	[blue]	[blue]
3	Institutionalising buys in (PTA - State/City)	[orange]	[orange]	[blue]	[blue]
4	Building back better – Learning from failures (PTA - State/City)	[orange]	[orange]	[blue]	[blue]
Procuring and embracing technology					
1	Make a bus modernisation plan (PTA - State/City)	[orange]	[green]		
2	Gaining cultural acceptance (National/State/City)	[orange]	[orange]	[blue]	[blue]

Informal public transport

Table 12: IPT - Key levers and action points

SNo	Actions	Time period			
		0-6 months	6 months-1 year	1-3 years	> 3 years
Set up a 'Mobility Department' at the city level					
1	State directs cities to work on IPT reforms	�орange (Preparation)			
2	ULB sets up a 'Transport Committee.'	orange (Preparation)			
3	The transport committee sets up a 'Mobility department.'	orange (Preparation)			
Acknowledge the role of IPT					
1	Bring statutory reforms - Mobility department facilitates the formation of IPT cooperative society.		green (Preparation and implementation)		
2	Identify other aligned objectives - The mobility department identifies long term objectives		green (Preparation and implementation)		
Generate Political Will for investing in IPT					
1	The mobility department makes a case to support IPT reforms		green (Preparation and implementation)		
Conduct Social Impact assessment					
1	Prepare an equity and social inclusion action plan		green (Preparation and implementation)		
2	Prepare a Communications and Outreach plan		green (Preparation and implementation)		
Prepare IPT modernisation plan					
1	Create a Detailed Project Report (DPR) on the Transition		green (Preparation and implementation)	green (Preparation and implementation)	
Implementation of the DPR					
1	DPR implementation			blue (Implementation)	blue (Implementation)

Preparation — orange

Preparation and implementation — green

Implementation — blue

9.2 Capacity building for Integrated urban transport systems

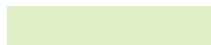**Table 13: Learnings modules for Integrated Urban Transport Systems**

Target audience / Themes	Introduction to sustainable urban mobility and integrated urban transport system	Understanding the perspective of different user groups	Walking and Cycling — Policies, strategies financing for walking and cycling	Street planning, design, and elements	Street management for walking and cycling	Utility planning & maintenance	Designing streets as public spaces	Bus Based Public Transport — Public transport - policy, regulations, financing, and taxation	Bus operations planning and transport management	Bus Modernisation plan/electrification of fleet and services planning	Infrastructure design/planning for public transport	Information technology services and social marketing	Informal Public Transport — Policies, strategies financing	Operations (service planning)	Passenger information system (static and dynamic - ITMS)	Vehicle technology, maintenance	Legal aspects act, etc	Infrastructure for IPT	Traffic management (for sustainable transport)
Leadership in urban local bodies, UMTA, road owning agencies	M	M	M	R	M		R	M	M	M	M	M	M				M		
Leadership in traffic police	M	M	M	R	M							M							M
Chief Engineers, Executive Engineers, Assistant Engineers & other grades	M	M		M	M	M	R		M	M	M	M			M			M	M
Operators	M	M						M	M	M	M	M	M	M	M	M	M	M	
Superintendent of Police (Traffic), Inspectors & other grades	M	M		R	R												M		M
Urban design & urban planning consultants	M	M	M	M	M	M	M	M	M	M	R	M			R			M	M
Traffic engineering & transport planning consultants	M	M	M	M	M	R	R	M	M	M	M	M	M	M	M	M	M	R	M

Legend | Mandatory (dark green) | Recommended (light green)

APPENDIX A: ADDITIONAL DATA

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Cities with interventions promoting walking and cycling during the COVID-19 pandemic

City	Country	Pedestrian facilities	Cycling infrastructure	Access to bicycles	Details
Vilnius	Lithuania (LMIC)	▧			Vilnius is opening 18 of the city's public spaces for restaurants to use for outdoor table seating, including the capital's central Cathedral Square. This will allow restaurants and cafes to operate while maintaining physical distancing. More than 160 restaurants and cafes have applied to the program so far.
Mexico City	Mexico (MIC)		▓		The Cycling Mayor's Office of Mexico City proposed a network of temporary bicycle lanes during the COVID-19 crisis to allow people to travel safely by bike. This will help to reduce travel on public transport. It will also encourage a reduction in the use of private cars.
Lima, Callao	Peru (LMIC)		▓		As part of "pedalling against the pandemic", 301 km of bicycle lanes will be added in Lima and Calla and integrated into the current network of bike lanes. Bike lanes are being added as a compliment to public transport systems. Bike lanes will be expanded in phases with focused efforts on integrated existing bike infrastructure and locations without bike lanes. The temporary pop-up bike lanes will be replaced with permanent infrastructure over time.
Montevideo	Uruguay (LMIC)	▧			The Municipality of Montevideo decided to create a pedestrian area on the boulevard of Montevideo by restricting cars so that pedestrians have more room for safe physical distancing. The measure will be in effect every Sunday from 10:00 a.m. to 6:00 p.m. between Ciudadela and Luis Alberto Herrera.
Jinja	Uganda (LIC)	▧			Mobilising Jinja aims to demonstrate the value of non-motorised transport by improving the flow of people and goods in and around Jinja's Central Market. By creating an eco-friendly, safe and inclusive loading zone around Jinja's market with moveable bollards, parking management and other measures, the project will enhance sustainable access as well as health and road safety.
Kisumu	Kenya (LIC)		▓		Pop-up bicycle lanes in Kisumu; However, city has also adopted a SMP in July 2020
Kalaw	Myanmar (LIC)				Officials there have come up with a simple and innovative idea; behind an open-air market a road has been divided up into sections with painted lines to keep each seller 6 feet (1.8 meters) apart while allowing shoppers to keep a proper distance to browse produce.
Budapest	Hungary (LMIC)		▓		The Municipality of Budapest has decided to establish temporary bicycle lanes for several key routes around the city. The capital's aim with this decision is to provide its residents with an alternative and safer way to travel during the coronavirus pandemic.

City	Country	Pedestrian facilities	Cycling infrastructure	Access to bicycles	Details
Buenos Aires	Argentina (MIC)				Approximately 100 streets are now pedestrianised to try to avoid crowds and encourage commercial interactions within the same neighbourhood, and the use of local public transport. Pavements with substantial pedestrian traffic have physical distancing markers; the public bikes-share and electric scooter scheme has also been reactivated with new protocols.
Jakarta	Indonesia (MIC)				The city of Jakarta has opened a major road, Jl. Sudirman and Jl. Thamrin, to a pop-up bicycle lane. However, the police removed the segregations. Eventually, a compromise was reached to have a separate lane during peak hours
Kohima	India (LMIC)				Under the streets for all challenge, Kohima has already conducted 3 pop-up open street events and is looking for ways to make these spaces permanently pedestrian. Under cycles4change challenge, It is planning to create a 4 km bicycle track; it has also established an app to promote cycling, conducted cycling training camps, made a pump track and started a cycle rental programme.
Guadalajara	Mexico (MIC)				Guadalajara has created 14 kms of temporary bike lanes. It has also usurped Mexico City as the top ranked city in ITDP Mexico's annual cycling survey.
Ho Chi Minh City	Viet Nam (LMIC)				HCM city plans to open more pedestrian streets in central District 1 to meet locals and tourists' entertainment and recreational demands. The city Department of Transport is collecting feedback on possible opening of new pedestrian streets downtown The project, funded by the HCM City Road Traffic Infrastructure Management Centre, aims to make central streets friendly for pedestrians after 2025.

List of agencies and their suggested roles as detailed in the Addis Ababa NMT strategy

Agency	Role
Addis Ababa Road and Transport Bureau (AARTB)	Provide political leadership and general oversight toward implementation of the NMT Strategy
Transport Programs Management Office (TPMO)	Prepare and review plans and designs for transport projects
	Develop and disseminate transport policies and standards
	Host the NMT Cell
	Monitor progress over time and update the NMT Strategy Implementation Plan periodically
Addis Ababa City Roads Authority (AACRA)	Design and implement high-quality walking and cycling facilities
Beautification Agency	Develop and maintain street landscaping
	Maintain storm water facilities
Addis Ababa Traffic Management Agency (TMA)	Regulate traffic operations
	Oversee operations of the on-street parking management system
	Implement traffic calming facilities, including safe intersections, speed bumps, and pedestrian crossings
Transport Authority	Station installation, user fee determination, and service level monitoring for the bicycle sharing system
Rivers and Riversides Development Project Office	Develop greenway corridors with continuous walking and cycling facilities
Traffic Police	Control and manage traffic operations
Construction Bureau	Develop pedestrian friendly building control rules
Plan Commission	Develop pedestrian friendly planning regulations
Code Enforcement Office	Manage street vending
	Prevent encroachments on NMT facilities
Construction and Housing Development Bureau	Develop pedestrian friendly layouts for social housing projects
Road Safety Council	Coordinate with stakeholders on road safety initiatives related to the walking and cycling environment

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