Research Paper

Transforming Urban Mobility in Madhya Pradesh
The Policy Interventions

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Abstract

Urban transport has become indispensable as cities have outgrown their scale, emphasizing the need for comprehensive transport policies. The Government of India drafted the National Urban Transport Policy in 2006 which till date remains the only guiding document for the states in the country regarding urban mobility and its concerns. The changing mobility choices and the concerns of urban transport provisioning calls for attention by the policymakers. This study puts forth recommendations for drafting a robust and holistic urban transport policy for the state of Madhya Pradesh in India. The study methodology includes meticulous review of secondary data literature, Indian and International case studies, policies and legislative frameworks. The study recommendations take base from extensive deliberations and focus group discussions, a primary field survey and an online citizen feedback. The concepts of mobility as a service, eyes on the street, disability-based planning, allocation of funds for non-motorized transport infrastructure, congestion pricing, capacity building for transport literacy and a dedicated urban transport body are some of the key recommendations. It envisages to create an enabling environment for public transportation systems, thereby facilitating the end users as well as the stakeholders of the urban transportation and mobility sector.

Keywords

Policy, Public Transport, Inclusion, Equity, Mobility, Sustainability

1. Introduction

1.1. The Problem

The state of Madhya Pradesh, India, has a population of 72.6 million (Census of India, 2011) with an area of 308,252 square kilometres. Madhya Pradesh, like other states in India, is increasingly urbanising (Census of India, 2011). In 2011, Madhya Pradesh had a rate of urbanisation of 27.63 percent, with 476 towns. Four cities namely Indore, Bhopal, Jabalpur, and Gwalior have populations of one million and more. The existence of major transportation corridors in the state has influenced rapid growth within its cities. The growth of urbanization in the state was 25.69%, while the national growth rate of urbanization was only 18% during the period 2001-2011 (Census of India, 2011). The growth of the decennial population of Madhya Pradesh has been represented below. The growing urban population is leading to growing travel distances and travel times. The vehicle ownership in Madhya Pradesh is 80 per 1000 persons as compared to the national average of 68 per 1000 persons, which indicates the lack of a robust public transport system falling short of the enormous travel demands (ESCAP, 2019).

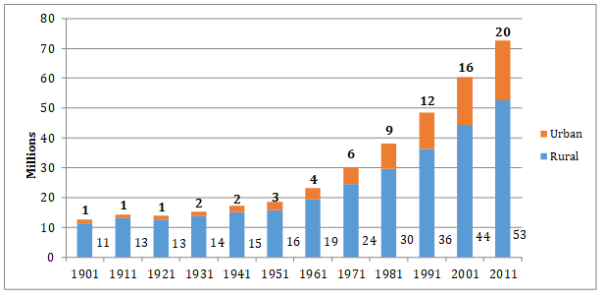

Figure 1: Decennial Population of MP (1901-2011). Source: Census of India, 2011

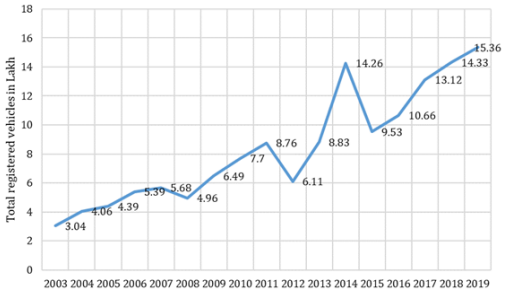

Figure 2. Growth of vehicles in MP (2003-2019). Source: UNESCAP, 2019

1.2. Need for policy transformation

Urban transport is a complex amalgamation of engineering, finance, sociology, economics and environmental sustainability (UNESCAP, 2019). There is a need to ensure people centric mobility with universal accessibility for all. Revisions in legistative framweworks is desired to remove multiplicity of rules and policies. There is a need for organisational amalgamation due to multiple stakeholders and organisations with limited accountability. With technology ruling the roost in future, transport service provisioning through technological innovations is imperative. SDG 11.2 envisages 'safe, affordable, accessible and sustainable transport systems, improved road safety, expansion of PT, with special attention to vulnerable sections, women, children, persons with disabilities and older persons by 2030. Travel demand reduction, alternate fuels, promotion of non-motorised transport (NMT) are necessary for sustainable and resilient transport planning. Hence, an overarching document addressing all facets of Urban Mobility with a framework for implementation & review is desired.

1.3. Methodology

The methodology followed for the study has been represented below -

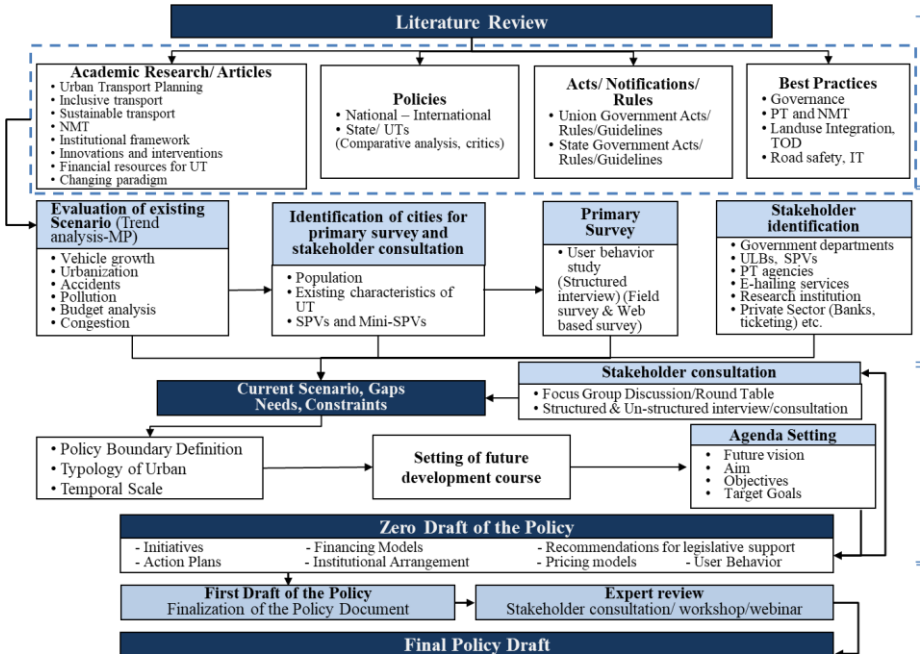

Figure 3. Study methodology. Source: CUG, AIGGPA, 2021

2. Policy Research Study

The study aimed to develop strategies for a wholistic urban transport policy which enables sustainable, equitable, safe, dependable, convenient, affordable, inclusive transportation services to all citizens, while ensuring that these services operate in a manner that is least disruptive to the environment and uses financial, social, and economic resources sustainably, and implements I.T. enabled interventions for optimum monitoring and assured ease of access and usage to the people. The objectives and focus areas of the study are described in the figure 4.

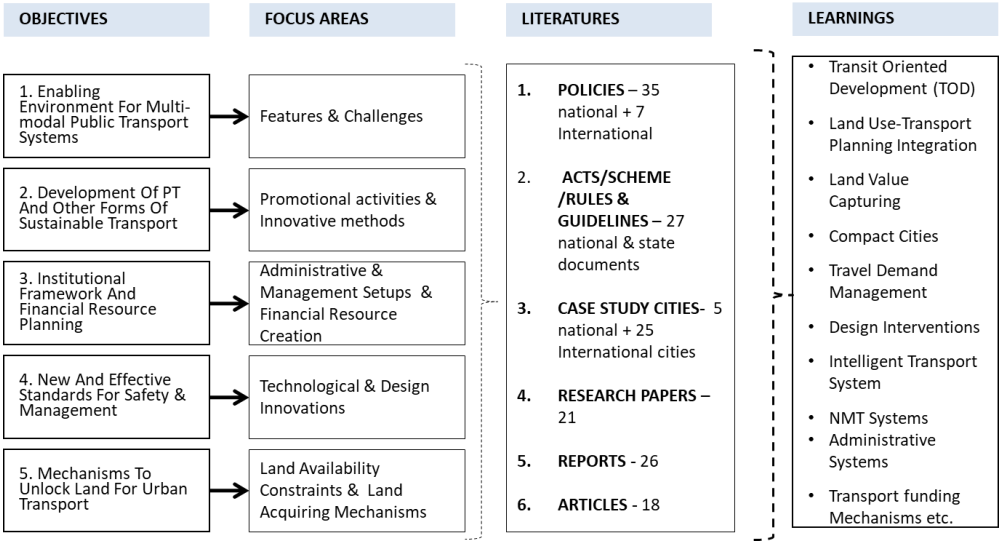

Figure 4 Objective of the study and focus areas. Source: CUG, AIGGPA, 2021

2.2. Literature Review

The development of urban transport sector in the country has been streamlined through various policies, guidelines, acts and other directions given from time to time by the Ministry of Housing and Urban Affairs (MoHUA), GoI. The National Urban Transport Policy (NUTP), 2006, is the only notified document by the GoI in this regard. It lays down the fundamental guidelines, attributes and aspects of the urban transport system and gives direction towards achieving the goal of sustainable urban transportation systems. In the light of the NUTP, a few states in India have come up with policies, guidelines and rules to manage the needs of the urban transport sector in their state. Most of the policy documents include provisions for transit oriented development (TOD), land use planning, compact cities etc (Ministry of Urban Development, 2014). However, context specific policy interventions are desired.

2.3. Stakeholder mapping and consultation

In cognisance of the above, the study recommendations take base from extensive deliberations and focus group discussion to identify the demand and supply gaps in public transport in Madhya Pradesh, during, pre and post covid-19 pandemic. The discussions also focused on understanding the grass root level issues and challenges faced by various stakeholders in urban transport. Existing governance framework and the role of government bodies and stakeholders, financial challenges and their impact on urban transport along with upcoming technologies and implementable solutions were discussed. The deliberations were done with representatives from civil society organizations, women, senior citizens and transgender persons, officials from State Transport Department, Urban Local Bodies, Department of Social Justice and Disabled Welfare, transport service providers and experts from academic institutions and think tanks.

2.4. Representative cities and their travel characteristics

For the study, 20 cities of Madhya Pradesh were selected since these cities were included in the AMRUT Mission and have a Secial Purpose Vehicle (SPV) with a dedicated urban transport fund. Primary surveys were conducted in a few of these representative cities.

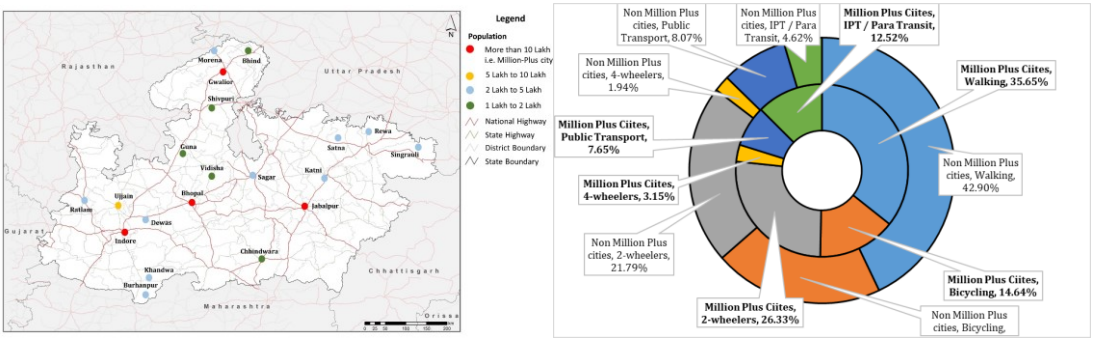

Figure 5. Representative cities and their modal share. Source: CUG, AIGGPA, 2021

Study reveals that 50% of all households in the representative cities own a bicycle. Walking has the largest modal share with 4 wheelers having the lowest modal share. The data of vehicle ownership signifies lower dependency of the cities on public transport and the resultant higher usage of private vehicles. Following sections discusses the findings in detail.

3. Study findings

3.1. Non-Motorized Transport

In million-plus cities of Madhya Pradesh, nearly half of the trips are made through walking and bicycling. In the non-million plus cities, almost 64% of all trips are made by walking and bicycling (DMRC, 2012). The data of existing footpaths and bicycling tracks reveals that footpaths are not available along the entirety of the road network due to which pedestrians have to walk on the carriage way. Despite the higher share of bicycling in the modal split of the city's traffic, dedicated bicycling lanes are insufficient.

City	Footpaths (km)	Bicycle Tracks (km)
Indore	116.4	NA
Bhopal	32	12
Gwalior	31.28	11
Jabalpur	35 (+20 km under construction	15
Ujjain	NA	2
Dewas	8	2
Katni	12	0
Chhindwara	117	NA
Burhanpur	10.5	NA
Guna	9.0	NA

Table 1. Existing footpaths and bicycle tracks in representative cities, Source: RITES, 2011, DMRC, 2012, Jabalpur, 2012, Corporation, 2012

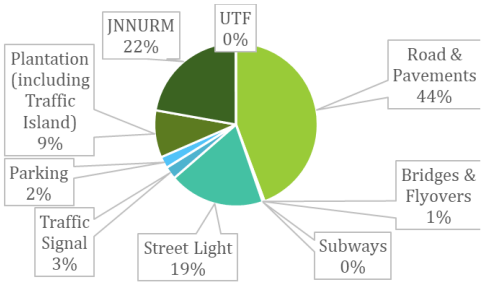

Figure 6. Editing the Headline. Source: CUG, AIGGPA, 2022

The lack of the above infrastructure is also reflected in the pattern of budget allocation of the ULBs. Almost 50% of the transport sector budget is spent on road construction & maintenance (UADD, 2021). The average budget allocation to the transport sector is only 1.38% of the total budget of the ULBs.

3.2. Public Transport and Para Transit Services

In 2005, the state government shut down the Madhya Pradesh State Road Transport Corporation (MPSRTC) due to heavy financial losses. In absence of an overarching agency to regulate public transport and insufficient formal public transport system in cities, intermediate public transport (IPT) services have a significant footfall. Bhopal and Indore have Bus Rapid Transit System (BRTS) as a part of their bus route network. IPT compete with the BRTS on same routes and hence does not let the BRTS reach its full carrying capacity resulting in lower ridership revenues.

Under Atal Mission for Rejuvenation and UrbanTransformation (AMRUT) of GoI, Madhya Pradesh came up with "Cluster-based Hub & Spoke Model for City Bus Transport Services" in 2016 (UADD, 2021) under which intra plus intercity bus transport services were proposed in 20 AMRUT cities of the state. However, bus permit issuance hindered operations in small cities. The demand was less in intra-city routes (less than 10 km) and more in peri-urban areas (20-25 km). Due to financial viability peri-urban routes were preferred for operation, however this resulted in permit conflict with inter-city private operators and SPV operators and hence operations were hampered.

Metro projects in two cities i.e. Indore and Bhopal are currently under construction. From the standards laid out by MoHUA, peak ridership by 2031 should be greater than 20,000 Peak Hour Peak Direction Traffic (PHPDT) to allow for the provision of a metro system (DMRC, 2012) , However, from the ridership forecast for Indore is maximum passenger volume of 13060 by 2031, Bhopal is forecasted to have maximum passenger volume of only 7902 by 2031 (DMRC, 2012). Optimum planning is thus required.

3.3. Social Inclusivity, Equity and road safety

As per the National Crime Records Bureau data MP ranks 3rd in the country in terms of the number of incidences of sexual harassment with women in public transport with 10% of such cases reported from Madhya Pradesh (MP Police Telecommunication Headquarter, 2021). The million-plus cities of Madhya Pradesh have been ranked among the top 10 in terms of road accidents. In 2018, 59.1% of people with disabilities in India travelled in public transport while 65.1% of them reported to have faced difficulties in using the public transport modes, of which 41% reported facing trouble due to steps/stairs and non-availability of ramps (CPWD, 2016). In this regard, The Central Public Works Department (CPWD) issued guidelines for space standards to ensure universal accessibility in 2016 which needs to be incorprated in all public infrastructure designs. Inclusion of socially marginalised groups such as transgender persons needs to be incorporated in decision making. The million-plus cities of Madhya Pradesh are among the top 10 in India in terms of road accidents (MoRTH, 2011-2019).

3.4. Freight Planning and Management

Between 2007 and 2016, the number of registered trucks in Madhya Pradesh almost doubled, while that of light goods vehicles increased by more than 4 times (ESCAP, 2019). This rapid increase is primarily due to the improvements in the road infrastructure. Indore, being the commercial capital has the largest number of such vehicles in the state. Facilities for trucks only exist on papers. Even basic amenities like truck parking spaces, container terminals, toilets are in bad shape. Services like proper resting areas, medicine etc. needs to be given to truck drivers by the government.

3.5. Parking

Commercial parking in the cities of MP is in a dismal condition with increase in vehicle ownership and administration resorting to using on-street parking. Parking accumulation is high due to the absence

of formal parking facilities, which results in on-street parking. The share of parking revenues in the total revenue generated by the Urban Local Bodies is negligible. Building control regulations should mandate parking ownership certificate for residences. Public transport and proximity to MRTS routes need to be considered to fix caps on parking supply in public spaces.

3.6. IT in Transport Services (MaaS)

IT enabled services in public transport for commuters are present in MP in the form e-hailing services i.e., mobile phone applications. Most of them are owned by private organisations. ULBs of million-plus cities also have their own applications that provide transport services apart from other ones. The basic services offered by these applications are journey planning, booking & payment.

Cities under the Smart Cities Mission in MP have established various IT enabled services to better manage traffic and transport services. These have been summarized below.

T Enabled Service	City						
	Bhopal@	Indore#	Jabalpur$	Gwalior%	Ujjain^	Sagar&	Satna*
Automated Fare Collection & Surveillance Solution	●	●					
Smart Parking	●	●	●	●			
Intelligent Transport Management System (ITMS)	●	●	●		●	●	●
Smart Pole	●					●	
Integrated Command & Control Centre (ICCC)	●	●	●	●	●	●	●
Messaging System		●		●		●	
Digital Payment System	●	●	●				
PAN City App	●		●	●	●	●	

Table 2. IT enabled traffic & transportation services. Source: Bhopal Smart City, 2021, Smart City Indore, 2021, Jabalpur Smart City, 2021, Gwalior Smart City, 2021, Ujjain Smart City, 2021, Sagar Smart City, 2021, Satna Smart City, 2021

3.7. Air Pollution and Climate Change

The Air Quality Index of nearly half the state comes in the 'moderate' category. This shows that the state is on the verge of having poor air quality (MPPCB, 2019-20). The Greenhouse gas emissions due to transport in the state were 68.5 lakh tons of CO2 equivalent in 2008. It is expected to become 34.8 million tons of CO2 equivalent by 2030 thus contributing 11.32% to the total emission (Kumar, et al., 2016).

AQI	CATEGORY	NUMBER OF DISTRICTS		
		2017-18	2018-19	2019-20
401-500	Severe	0	0	0
301-400	Very Poor	0	0	0
201-300	Poor	0	0	0
101-200	Moderate	23	14	16
51-100	Satisfactory	18	37	36
0-50	Good	0	0	0

Table 3. Number of districts in each AQI categories. Source: MPPCB, 2019-20

The majority of the districts are in the "Satisfactory" category. This is due to the initiatives and efforts of the MPPCB in regulating & monitoring the emissions, especially of automobiles and factories.

3.8. Urban Governance Structure

In Madhya Pradesh, under Department of Housing & Urban Development (UDHD), Directorate of Urban Administration and Development (UADD) is the executive body, which is headed by a Commissioner who is an Indian Administrative Service (IAS) officer. Out of the 407 ULBs in MP, only 20 ULBs have a Special Purpose Vehicle (SPV) for the purpose of transportation services and infrastructure development. The state Transport Department is responsible for issuing permits & registrations for the vehicles and levy taxes, fee on vehicles in the state and ensuring fitness of vehicles. The heirarchy structure of the Transport Department and SPVs is elaborated from the Figure 7. Urban Governance Structure in Madhya Pradesh and Bhopal regarding transport services. Source: UADD, 2021 below.

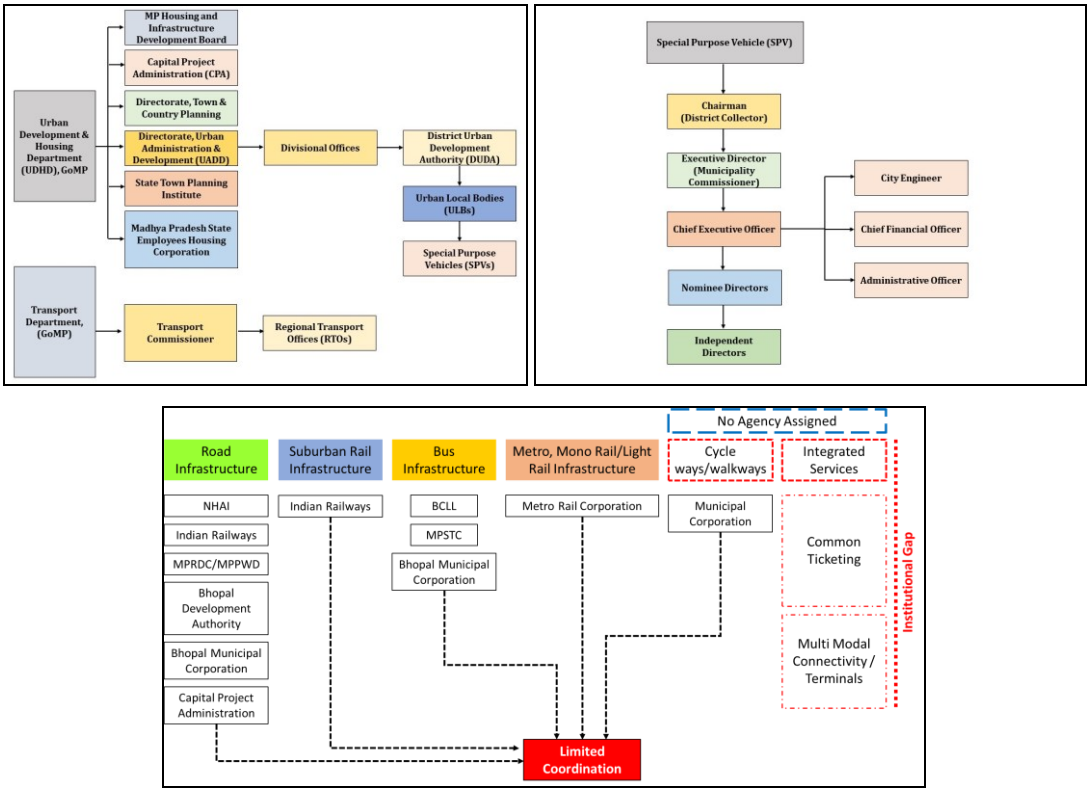

Figure 7. Urban Governance Structure in Madhya Pradesh and Bhopal regarding transport services. Source: UADD, 2021

The above administrative structure reveals the multiple levels of governance involving several agencies and officers who are not transportation experts. This complex structure leads to delays in decision making, planning & execution. The jurisdictions of RTOs, being at the district level, does not give special attention to the public transport needs at the city level.

4. Policy Recommendations

Based on the data analyzed, recommendations have been proposed for improvement in transport in the state.

4.1. Urban Transport and Travel Behaviour Management

There should be funding for the preparation of Comprehensive Mobility Plans (CMP) for all cities with population of 1 Lakh which are updated every 5 years. A Comprehensive Transport & Traffic Study (CTTS) should be done prior to preparation of city master plans. Telecommuting for non-essential jobs

should be promoted with incentives in terms of tax relaxations and staggered working hours. ULBs should develop a congestion pricing mechanism to regulate, collect and levy congestion charges in pre-determined congested areas of the city by means of IT based systems.

4.2. Promoting NMT

Physical growth of the city should be channelised into high density development and services at shorter distances. NMT infrastructure should be free from encroachments, design faults and continuous. Dedicated bicycle lanes should not be developed as stand-alone entities. Pedestrian & bicycle network infrastructure for cities with population of 5 lakhs and more should be made. ULBs should undertake transit placemaking projects at ward level to develop market streets and public spaces. Arterial and sub-arterial streets should be designed as complete streets. Public Bike Sharing should also accommodate local informal vendors.

4.3. Public Transport Planning, Travel Demand, Behavior Management and Parking

'Moving People rather than Moving Vehicles' shall be the aim while enhancing public transportation networks. PT modal share should be 40-50% for cities (5-10 lakh) and 50-60% for cities (<10 lakh). Provisions for the differently abled, elderly, women, transgender persons and children. ULBs should be given the authority to give no objection certificate for permits of operation of IPT within cities shall be done through DUTB. Private Vehicle Usage Regulation & Management through congestion pricing with parking as a TDM. Creation of a Parking Management Authority. Mandating of parking availability certificates. Transition from traditional minimum parking supply method towards maximum-based parking. Principal of price harmonization on the parking typology and time of parking. Travel Behavior Management through telecommuting, travel ambassadors, nudging, Non-Single Occupancy Vehicles (SOV) Days and travel time reduction through bus prioritization should be done.

4.4. Social inclusivity

Disability based planning provisions should not be limited to AV aid, tactile flooring, raised kerbs, etc. Pelican crossings should be mandated. Post reservation women and transgender persons as drivers, conductors, field personnel, toll collector, and other roles in SPVs and private service providers. National level schemes for providing vehicles to differently abled persons by NHFDC should be promoted. Priority permits to women, differently-abled, transgender, and other vulnerable sections of the society to operate E-vehicles. City Urban Transport Authority/ULBs should conduct annual access audits and user perception surveys in consultation with Department of Social Justice and Disabled Welfare.

4.5. Safety & Security

Concept of "Eyes-on-the-Street" through multi-utility zones should be promoted. The concept of 4E's i.e., Enforcement, Engineering, Education and Emergency Care should be implemented. Maintenance of streetlights with regular audits, panic buttons and GPS in all PT should be mandated. Road Safety Audit IS SP-88 and adoption of penalties under MV Act 2019 desired. Women helpline numbers must be well advertised in all public places.

4.6. Transportation and land use planning

To bring about such high-density development, cities should promote mixed land use development are allowed to develop in close proximity. Cities should also incorporate measures such as TOD, TDR,

LAPs, and Land banks for ensuring the availability of sufficient land for public transport. Also, cities should explore the possibility of land pooling mechanism to develop land for public transport.

4.7. Multi-modal integration and smart mobility

Integration of PT service information shall be done on a common mobility platform. Use of IT based intervention and GPS monitoring for traffic violations and assistance to disable shall be mandated. Mobility as a service (MaaS) needs to be focused with creating of a strong digital infrastructure. The ICCCs in the cities should have a back-end integration with police, fire, hospital and other emergency services.

FAME was launched in 2015 by the Ministry of Heavy Industry & Public enterprise to promote the usage of electric & hybrid vehicles in India (UADD, 2021). The GoMP launched the Electric Vehicle Policy in 2019 while also reducing the tax to 1% to promote electric vehicles in the state. However, the number of vehicles which will receive this is not decided. Also, there is no fund for operation and subsidies on electric buses. The Government of India has reduced this to 0 %. Both financial and infrastructural support is required to support the electric vehicle industry in Madhya Pradesh.

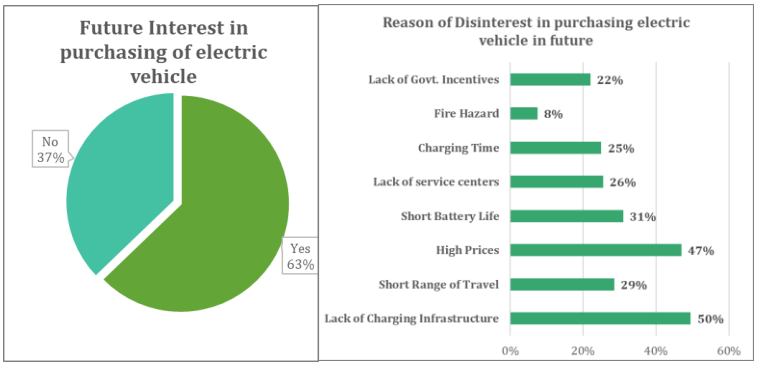

Figure 8. Perception of E.V. Source: CUG, AIGGPA, 2022

4.8. Funding Urban Transport

The. The funds for transport development are allocated to ULBs which are responsible for other developmental activities with no dedicated urban transport fund (DUTF). Thus, DUTF should be put under a Dedicated Urban Transport Body with sole responsibility of working in the urban transport development in the cities. Measures such as fuel surcharge, TOD Impact Fee, Betterment levy, Green Tax on vehicles, Commercialisation of unused property, advertisement on PT vehicles and ULB properties etc. are ways of generating additional revenues. Minimum of 33% of the total DUTF should be for NMT infrastructure and services.

4.9. Reviewing existing policies

“Right to Transport” should be added in the legislation as transport is an essential service. Amendment in Motor Vehicle Act of 1989, to ensure city wide permits for public bus transportation vehicles is required. Permits are currently issued under Clause 70 of the Motor Vehicle Act 1989 for individual routes rather than city-wide operations. Peri-urban routes covering 25-30km distance from city periphery should be given city permits too. Necessary amendments to Madhya Pradesh Municipal Corporation Act 1956, Madhya Pradesh Municipalities Act 1961, Madhya Pradesh Town & Country Planning Act, 1973 and any other related acts to ensure that plans / policies / reports, guidelines, toolkits on any similar document related to urban transport gets the approval of concerned government authority in a time-bound manner. Learning lessons from the Covid-19 pandemic, operational guidelines, health protocols and standard operating procedures should be formulated to

ensure pandemic appropriate public transport services for the future. GoMP should extend tax exemptions/subsidies/VGF for transport operators during emergencies. Driving License for deaf & dumb and transgender persons should be encouraged.

4.10. Improving Governance

The current involvement of several organisations with varying expertise slows down the entire process of transport development. A Dedicated Urban Transport Body (DUTB) should be formulated for the cities with specialised transport wing, having technical expertise in the field of urban transport. The responsibility of right to issuing public transport bus permits, scheduling and route selection, tendering process for components of PT & IPT services should be entrusted with DUTB in order to allow micro level integration. The state government should ensure that the DUTB has the necessary financial support with experts having the decision-making powers.

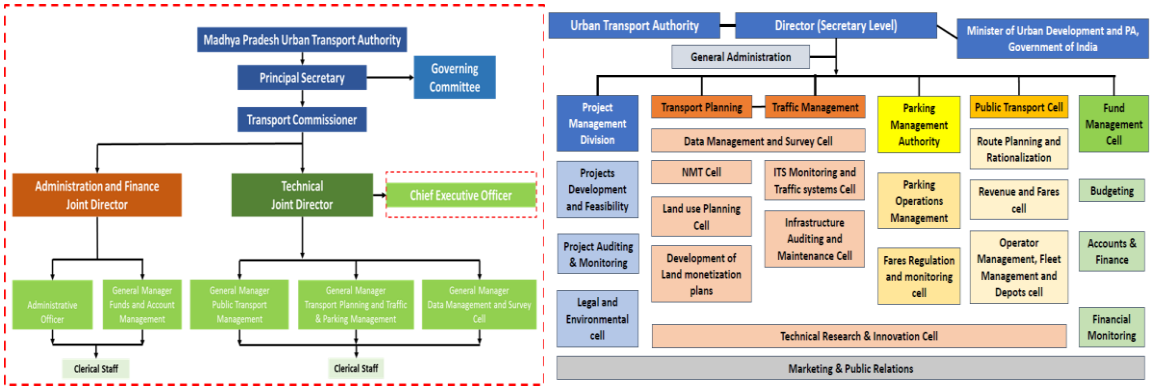

Figure 9. Proposed Organizational Structure for State Urban Transport Authority Source: CUG, AIGGPA, 2021

4.12. Capacity Building

Regular capacity-building exercises involving all agencies and organisations working in urban transportation should be done. Think tanks in the state should be funded for developing certification courses for the capacity building of technical staff from UADD and urban local bodies. Promotion of Transport Literacy with Institutions and HR Capacity Building should be done. Head of SPV should hold a permanent position. There should be Continuous Stakeholder Consultations, Training campaigns/drives by Transport department, PTRI and Public Health department (AYUSH & NHM) to address safety concerns on roads, safe vehicles, speed governance, post-crash response, capacity building of trauma centres and provision of post-crash first aid etc. State level training facility for IPT and PT should be conducted.

4.11. Resilient Transport Strategies

ULBs with DUTB should conduct a vulnerability and risk assessment study for the city's transportation network. SOPs for unhindered PT functioning along with tax exemptions/subsidies/VGF for transport operators during emergencies should be identified. Measures such as pollution under control (PUC) for vehicles need better implementation with private mobile labs under strict vigilance. The use of alternative fuels such as CNG, Biogas, Bio-Diesel, Electricity etc. to power the public transport system and solar energy-based charging stations needs to be explored. Necessary subsidies and concession agreements in this regard should be developed.

5. Conclusion

Cities need to start preparing themselves for the future where urbanisation is channelled to ensure livaility. One of the basic infrastructures to achieving this is an efficient transport network. Transport policies need to be based on emperical evidences ensuring seamless planning, designing, execution, monitoring, and regulating urban transportation. The reccomendations in this study would direct government officials to improve public transportation systems in Madhya Pradesh. It also gives direction to other stakholders to adopt the method of formulating an emperically sound policy docket.

6. Acknowledgement

This study was conducted by Centre for Urban Governance under the aegis of Atal Bihari Vajpayee Institute of Good Governance and Policy Analysis, Bhopal. The study recommendations were drafted to formulate the Urban Transport Policy 2021/22 (Draft) for the Department of Urban Development and Housing, Government of Madhya Pradesh. The authors duly acknowledge valuable inputs from Dr. O.P. Agarwal, CEO, WRI, India, Mr. Amit Bhatt, Director, Integrated Transport, WRI India, Dr. Suprava Patnaik, Principal Advisor, Centre for Urban Governance, AIGGPA, senior officials of Government of Madhya Pradesh, experts from the School of Planning and Architecture, Bhopal and World Resources Institute, New Delhi.

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