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India's Urban Transport Investment Markets: An Overview

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Abstract:

Urban transport is an important segment of any economy from the point of view of development. Economic development is directly related with investment in urban transport sector. As city grows the transport network also develop. In order to maintain a balance, investment in this sector should also grow parallel. However, in a populous country like India, the development in this sector is not optimistic. Neither the urban transport system nor the investment market is encouraging. But, the demand for urban transport is gathering momentum along with urbanization. This paper is a theoretical overview of the present status, future potential of urban transport system, urban transport investment market and role of different agencies in India.

Key words: Urban transport market, transport demand, city transport plan

JEL Classification: O29

1.0 Introduction

India is experiencing massive and rapid urbanization. Within urban areas travel demand is increasing in geometric

proportions. Urban transport system development is not keeping pace with the demand and the negative impact of such an unbalanced development is very much felt today. The problem of congestion and its consequences are posing a severe threat to sustainability of urban areas.

Population: The population of India stood at 1,210.19 million in 2011 (Census of India, 2011). India's population will reach 1326.09 million in 2020 and 1460.74 million in 2030 as per the projections (Biswas, S.).

Urbanization: In 2011 India's urban population was 31.16% of its total population estimating 377.10 million. Experience across the world reveals that as economies grow, rapid urbanization takes this proportion to 55% before it begins to stabilize. Urban population in India is 410.20 million in 2014. In 2026, the urban population will become 534 million (38.14%), (Census of India, 2011) As such, it is projected that India's urban population will grow to about 473 million in 2021 and 814.39 million by 2050 (United Nations, 2014).

Metropolization: The Metropolization has increased with the urbanization in India. Numbers of million plus cities have increased to 53 in 2011(from 35 in 2001). About 43% of the total urban population lives in these million plus cities. It is expected that the number of million plus cities will be 69 by 2025 (Mc Kinsey Report) and nearly 100 by 2051. The number of class I cities / towns with more than 100,000 population are estimated to reach 1000 in 2051 (468 in 2011), (Riberio 2006).

*Urban Transport***:** Urbanization has led to a high increase in demand for the transportation. But the growth in urban transport infrastructure has not kept pace with the increased demand and the share of public transportation vehicles has declined. In 2005-2006, there were 60 million vehicles in India.

It is expected to reach to 250 million in 2025. The growth rate of vehicles production in India now is 15%.

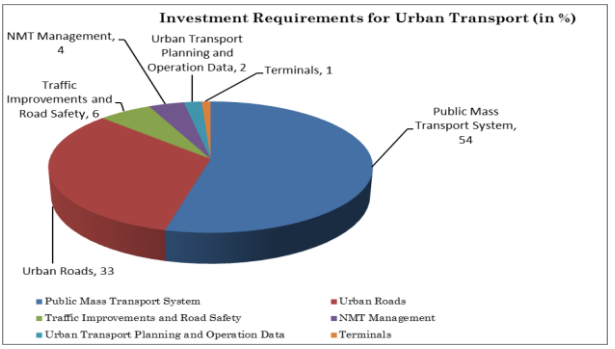
2.0 Objective

The objective of this paper is to theoretically analyze the investment markets for urban transport in India.

3.0 India's Urban Transport

India's Urban Transport – Retrospect: In India Urban Transport till recently, was not a recognized sector. The responsibility was distributed amongst all levels of government - central, state and local – and investment was made under other sectoral heads like Railways, and Roads. The plans and investment under railways were mainly based on intra-city movement needs. Indian Railways had always considered that intra-urban railways as not their responsibility. Whatever sub-urban services were run and maintained were due to history and politics. It is only recently that urban railways are receiving attention for investment both by public and private sectors. Urban road planning, development and maintenance were mainly the responsibility of the local bodies, which were incredibly short of financial and technical resources. Urban road development was a consequence of area development plan-housing, industrial estates, etc. National highways and state roads (SHs and MDRs) running through the urban areas were the responsibility of the central and state governments. Only in a few cities was there organized Bus Public Transport System but were part of the State Road Transport Corporations. There are some rare instances of private sector investment and operation in city bus services. Intermediate Public Transport System (IPT) has been the prerogative of private enterprises. However they have been more overregulated than facilitated. The history of urban transportation –Planning, Development,

Operations and Managements (PDOM) has been one of complete neglect and indifference by all concerned. Under these circumstances there is no reliable statistics to depict the level of investment in urban transport in the last decades. It is only in recent times that there is explicit concern in PDOM of urban Transport. The investment requirement of various urban transports is shown in the pie- graph below.



Source: Wilbur Smith Associate (WSA), Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, 2008.

3.1 Urban – Transport Demand

The urban transport demand is continually increasing at an exponential rate. There are three factors for increase in urban transport demand such as number of people in an urban area moving about for various needs and causing demand for systems and services. The second factor is the increasing mobility rate and the third is increase in trip length. The Government of India's RITES study on the travel demand of 21 cities of different sizes estimated the urban travel demand in class I cities (100,000 and above) by 2016. Ranganathan extended these estimates to 2021. It is given in the table below.

Table 1: Urban Travel Demand in Class I Cities

Item	*1994*	*2016*	*2021*
Total Population (million)	-	1424	1625
Total Urban Population (in million)	-	501	568
No. of Class I Cities	301	633	712

Item	*1994*	*2016*	*2021*
Population of Class I Cities (million)	141.10	288.40	341
Intra-city Passenger Vehicle Trips / day (million)	125.88	327.22	441.75
Intra-city Passenger Vehicle Km / day (million)	698.96	1840.35	2495.89
Intra-city Modal Split range (Public Transport) (%)	36.15	48.26 – 59.64	55-65
Intra-city Public Transport Trips/ day range (in million)	45.11	157.92 – 195.14	242.96 – 287.14
Intra-city General Passenger Trip / day (in million	56.50	106.68	117.35
Through Passenger Trips / day (in million)	20.84	40.29	44.32
Intra-city Daily Freight Transport Demand (in thousand tonnes)	415	714	852.5
Inter-city Daily road based freights traffic per day (in thousand tonnes)	7055.90	13347.10	17050.00

Source: 1. RITES, *Traffic and Transportation Policies & Strategies in Urban Areas in India,* New Delhi 1996.

2. Ranganathan, N.*, Indian Urban* Transport - *Prospects &Strategies,* Commemorative Volume of AMDA, 2008.

A study to appreciation of urban traffic characterization estimate, future transport demand and system plans and programme for urban transport development was initiated by Ministry of Urban Development in 2008. The study was carried out by WSA for 87 cities of India.[1]

The total transport demand in terms of passenger-km for 87 urban centres developed by WSA is given in the Table 2. The daily trips are expected to increase from 1,763 million in 2007 to 5,450 million by 2031.

[1] *The detail information of category of city is given in Annexure I,*

Table 2: Projected Passenger km / day for 87 cities

City Category	*Passenger km for 87 cities*			
	2007	*2011*	*2021*	*2031*
Category – I a	1.84	2.35	3.85	6.01
Category – I b	1.99	2.54	4.22	6.66
Category – 2	93.26	118.31	198.24	319.89
Category – 3	212.97	268.59	445.15	701.17
Category – 4	110.27	136.23	242.50	411.38
Category – 5	302.09	373.77	626.72	934.59
Category – 6	1040.69	1254.62	2003.85	3069.75
Total passengers km	1763.11	2156.39	3524.53	5449.45

Source: WSA, Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, 2008.

3.2 National Urban Transport Planning (NUTP):

The National Urban Transport Policy has been formulated by Government of India to ensure safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to job, education recreation and such other needs so as to enable the cities to become 'engines' of economic growth' and to promote optimal urban growth The main objectives of NUTP are: integrated land use and transport planning, equitable allocation of space, development of integrated multi-modal public mass transport systems, establishment of effective regulatory and enforcement mechanisms, institutional reforms for enhanced coordination and management, use of modern technologies like Intelligent Transport System for traffic management, promotion of road safety, reduction of pollution levels and enhancement of environmental quality, capacity, building, resource mobilization including promoting private sector participation and demonstration of best practices in sustainable urban transport through pilot projects. The NUTP intends to promote development of urban transport systems in the country.

3.3 Jawaharlal Nehru National Urban Renewal Mission (JnNURM)

The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was launched by Government of India to extend financial support to upgrade urban infrastructure in 63 cities of the country. The mission aims to encourage the policy reform and planned development of identified cities with focus on efficiency in urban infrastructure / services delivery mechanism, community participation and accountability of Urban Local Bodies (ULBs) towards citizen. The objective of the mission includes amongst others integrated development of infrastructure services and ensuring adequate funds to meet the deficiencies in urban infrastructure services. The JnNURM has proposed substantial assistance to 63 identified cities over seven year period. The total allocation of fund for JnNURM is INR 550 billion for seven years period from 2005 – 2012. Urban Transport including roads, highways, expressways, MRTS and metro projects and parking lots to be developed on Public-Private-Partnership (PPP) basis, are amongst the sectors that are eligible for funding under the Mission.

Table 3: Source of Funding of JNNURM

Sl. No.	***Source***	***Funding in Billion (INR)***
1	* JNNURM (GOI) including UIDSSMT	155
2	* Non JNNURM (Budgetary support)	44
3	VGF	60
4	Resource from State / ULBs	195
5	Loan from Financial Institutions	611.9
6	Participation by Private Promoters	260
	Total	**1,325.90**

Source: Ministry of Urban Development, Government of India.

*The central allocation provided for JnNURM is 500 billion INR during 2005-2012 out of which the amount available for urban transport is expected to be in the range of 10 billion INR. As regards non-JnNURM, budgetary support is 30.55 billion INR. The shortfall of 19.45 billion INR will need to be met by other sources of finance.

3.3.1 Urban Transport Investments under JNNURM

The urban transport projects sanctioned and approved under JNNURM is given below:

Table 4: Urban Transport Road Based -BRTS Sanctioned Projects under JNNURM

City	*Length (Km.)*	*Cost(INR in billion)*
Pune	101.70	8.07
Indore	11.45	0.98
Bhopal	21.71	2.38
Ahmedabad	58.00	4.93
Jaipur	26.10	2.20
Vijaywada	15.50	1.53
Vizag	42.80	4.53
Rajkot	29.00	1.10
Pimpri Chindwad	23.00	3.12

Source: Lohia, S. K., *Urban Transport in India,* Ministry of Urban Development, Government of India.

Table 5: Urban Transport Rail Based Metro Projects under JNNURM

City	*Length (Km.)*	*Cost (INR in billion)*
Delhi	1221.26	192.51
Mumbai	62.89	186.34
Bangalore	33.00	63.95
Kolkata	13.77	50.68
Chennai	50.00	93.47
Hyderabad	66.39	87.60

Source: Lohia, S. K., *Urban Transport in India,* Ministry of Urban Development, Government of India.

Table 6: Projects under Appraisals in different Categories under JNNURM

Category	*No. of Projects*	*Cost(INR in billion)*
Roads	12	11.61
Flyovers	14	2.84
ROBs/RUBs	18	3.74
Pedestrian path	2	0.94
Traffic Improvement	-	0.23
Total		***19.35***

Source: Lohia, S. K., *Urban Transport in India,* Ministry of Urban Development, Government of India.

3.4 City Transport Plan

The city transport planning in India is steadily gaining pace. The vehicular traffic has increased at the rate of 15.06 percent in 2005-06. The demand for transportation has increased substantially. There arises need for enriching the city transportation plan as efficient and reliable transport system are crucial for India to sustain high growth rate and alleviate poverty. The significance of urban transport in India stems from the role it plays in the reduction of poverty both through its indirect effect as stimulator of poverty reducing growth and through its direct effect on the quality of life of people.

The WSA study for Ministry of Urban Development, Government of India estimated the total investment requirements for identified 87 cities in the Eleventh five –Year Plan as given in the Table 7.

Table 7: Total Urban Transport Requirements for the Identified cities

Category	***Billion INR***
Cities in population range of < 0.5 million	98
Cities in population range of 0.5-1 million	707
Cities in population range of 1.0-4.0 millions	2,172
Cities in population range of > 4.0 millions	1,376.80
Total	***4,353.80***

Source: WSA, Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, 2008.

The phasing out of investment of the Urban Transport Sector has been divided into four phases of equal periods of five years as given in Table 8.

Table 8: Phasing of Urban Transport Investment

Category	***Billion INR***	***%***
2008-2012	1,570.20	36%
2013-2017	1,348.80	31%
2018-2022	800.50	18%
2023-2027	644.30	15%
Total	***4,353.80***	***100%***

Source: WSA, Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, 2008.

The main components of Urban Transport Plan include preparation of integrated urban land use, identification of appropriate technologies for operations in public transport system; up gradation of selected road network in each city into expressways and super arterials providing high level of services; systematic development of public transport system including support to IPT systems; a sustained and scientific transport system management programme to optimize the operational efficiency of existing urban transport infrastructure, particularly in the central areas of cities; sustained R&D effort; support to training and education and development of National Urban Transport information system.

A few metropolitan and large cities have prepared transport plan where the long range system development plan has been envisaged and the cost estimates made. Some the estimates are as under:

3.5 Cost Estimate of City Transportation Plan

3.5.1 Cost Estimates of Traffic and Transportation plan of Mumbai Metropolitan Region: The transport system wise cost estimates of Mumbai Metropolitan region was made by LEA International Limited., Canada in joint venture with LEA Associates South Asia Pvt. Ltd. India is given in the Table 9.

Table 9: Summary of Broad Cost Estimates of Traffic and Transportation plan of Mumbai Metropolitan Region the Year (2008-2021)

Sl. No.	***Transport System***	***Length (Km.)***	***Estimated Total Cost (Billion INR) @2005-06 prices***	***Estimated Total Cost in % of Total***
I	Metro System	318	837	50.95%
II	Sub-Urban Railway System	237	291.13	17.7%
III	Highway System	1,117	448.36	27.3%
IV	Highway Corridors with EBL	112	20.21	1.2%

V	Bus System	-	21.50	1.3%
VI	Passenger Water Transport	-	4.8	0.3%
VII	Truck Terminals, Inter-Bus and Rail Terminals	-	20.38	1.2%
Total		***1,784***	***1,643.38***	***100.0%***

Source: LEA International Limited., Canada (in joint venture with LEA Associates South Asia Pvt. Ltd. India), 'Comprehensive Transportation Study for Mumbai Metropolitan Region'; Draft Final Report, Volume II, 2008.

3.5.2 Cost Estimates of Traffic and Transportation of Bengaluru Municipal Authority (BMA): The Cost estimates of the traffic and transport plan of Bengaluru Municipal Authority (BMA) to cater to the travel demand up to 2025 is given below.

Table 10: Summary of the Cost Estimates of the Entire Traffic & Transportation Plan of Bangalore Municipal Area (billion INR) (@ 2007 prices)

Item	***Length (km. /Nos.)***	***Total Cost (billion INR)***	***Phase I (2007-12)***	***Phase II (2013-18)***	***Phase III (2019-24)***
Mass transport Corridors					
Metro System	1.37	199.21	110.86	88.35	0
Mono Rail/ LRT System	0.6	51	38.25	12.75	0
Commuter Rail System	2.04	30.6	6.9	16.2	7.5
BRT System	2.92	34.98	18.66	16.32	0
Improvement in City Bus System					
Improvement in City Bus System		57.21	44.01	6.60	6.60
Road Infrastructure					
New Road	2.09	51.92	51.92	0	0
Outer Ring Road Realignment	0.17	3.11	3.11	0	0
Road Improvements (inside ORR)	1.42	1.42	1.42	0	0
Road Improvements (Outside ORR)	5.03	4.33	4.33	0	0
Grade Separators					
Grade Separators-Road (Nos.)	0.28	7.13	7.13	0	0
Rail Over Bridges/	0.18	4.32	4.32	0	0

Item	*Length (km. /Nos.)*	*Total Cost (billion INR)*	*Phase I (2007-12)*	*Phase II (2013-18)*	*Phase III (2019-24)*
RUB Rai					
Elevated Roads (km.)	0.165	9.90	9.90	0	0
Pedestrian Facilities Separators		2.81	2.81	0	0
Parking Facilities (No. of car Spaces)	100	3.80	38	0	0
Integrated Freight Complexes (IFC)	0.06	2.7	1.35	1.35	0
B –TRAC		5	5	0	0
Grand Total		***469.44***	***313.77***	***141.57***	***14.10***

Source: RITES, *Comprehensive Traffic and Transportation Plan for Bengaluru.*

3.5.3 Cost Estimates of Traffic and Transportation - Kolkata Metropolitan Area (KMA): The cost estimates for Traffic and Transportation Kolkata Metropolitan Area up to 2025 is given in the Table 11 below:

Table 11: Summary of the Cost Estimates of Traffic & Transportation Project in Kolkata Metropolitan Area (Other than Rail Project)

Item	*Estimated Cost (2007-12) (in billion INR)*	*Beyond Five Years up to 2025*	*Total (in billion INR)*
New Metropolitan highways	1.86	21.62	23.48
New Arterial Road	1.87	17.98	19.85
Widening, strengthening, and extension of existing highways and arterial roads	4.66	6.81	11.47
Widening, strengthening of secondary roads	1.00	4.00	5.00
Flyover/underpasses	17.35	55.73	73.09
Bridges over canals	0.60	1.08	1.68
Pedestrian Underpasses/ F.O.B.	0.98	0.67	1.65
Bus Terminals	0.81	0.50	1.31
Area wide Traffic engineering & operation & improvement schemes	3.21	2.36	5.57
Truck terminal and truck parking area	0.70	0.80	1.50
Off street car parking facility	0.75	-	0.75
Mass rapid transit facility	76.00	-	76.00
Water transport facility	0.96	2.58	3.54
Survey and studies	1.15	2.65	0.38
Grand Total	***110.87***	***114.40***	***225.27***

Source: Master Plan for Traffic and Transportation: 2001-2025, Kolkata Metropolitan Area.

3.5.4 Cost Estimates of Traffic and Transportation plan of Vijayawada City: The total investment proposals estimated to be INR 54,450 Million for development and improvement of Vijayawada City. The item wise quantities and cost estimation for each component are presented in the table 12 below.

Table 12: Summary of Cost Estimates of proposed traffic and transportation plan of Vijayawada city
(INR in Million)

Sl. No.	**Item**	**Cost Estimates**			
		Phase I	***Phase II***	***Phase III***	***Total***
1	Short Term Improvement plan	570	-	-	570
2	Improvement of existing roads (as recommended in VZDP)	222.5	-	-	222.5
3	Road network system development				
i.	Bypass/ ring road system & regional roads	3,904.48	2,085	622.5	6,611.98
ii.	Improvement of city road corridors	1,093.5	1,004.56	-	2,098.05
4	Intersections improvements	437.5	218.75	218.75	875
5	Interchanges	1,170	1,170	585	2,925
6	Flyovers	1,023.75	1,023.75	-	2,047.5
7	Bridge across Krishna river (new and improvement)	6,000	5,000	5,000	16,000
8	Bridge across canals (new and improvement)	2,043.3	971.55	-	3,014.85
9	Off street parking complex	250	250	250	750
10	Pedestrian Facilities				
i.	Subways	8.5	8.5	-	17
ii.	Pedestrian Bridges	42.1	42.1	42.1	126.3
11	Terminals				
i.	Freight Terminals	3,000	3,000	3,000	9,000
ii.	Passenger terminals	1,500	1,500	0	3,000
12	Traffic Management	100	100	100	300
13	Logistics support to traffic police	100	100	100	300
14	BRTS Road infrastructure	2,600	960	-	3,560
15	Bus System				
i.	General Buses	645	322.5	322.5	1,290

Sl. No.	Item	Cost Estimates			
		Phase I	***Phase II***	***Phase III***	***Total***
ii.	Depots	-	150	100	250
iii.	Workshop	200	-	-	200
iv.	BRT Buses	200	100	87.5	387.5
v.	BRT Depots	50	50	-	100
16	Survey & studies (@1.5%)	377.41	270.85	156.43	804.69
Total		***25,538.03***	***18,327.56***	***10,584.78***	***54,450.37***

Source: Consulting Engineering Services (India) Private Limited, New Delhi's Project, *Comprehensive Traffic and Transportation study for Vijayawada City.*

3.5.5 Cost Estimates of Traffic and Transportation Plan of Thiruvananthapuram City: The total improvement proposals estimated to be INR 6,960 million for short, medium, long term improvement of Thiruvananthapuram City. The item wise quantities and cost estimation for each component are presented in the table 13 below.

Table 13: Cost Estimates of Total Transport System Plan of Thiruvananthapuram city

(INR in Million)

Phase	***Year***	***TRIDA***		***Outside TRIDA***
		Short term Measure	Medium & Long Term Measure	Regional Transport System
Phase I	2002-03	38.64	0	0
Phase II	2003-04	103.28	15.2	10.6
Phase III	2004-07	46.94	1775.6	62.88
Phase IV	2007-12	0	1564	776.57
Phase V	2012-17	0	1877.9	97.14
Phase VI	2017-21	0	500	0
		188.86	5732.7	947.19
Grand Total for Total Transport System Plan				***6,868.75***

Source: Consulting Engineering Services (India) Private Limited New Delhi's Project: Comprehensive Traffic and Transportation Study Thiruvananthapuram and Urban Area Medium & Long Term Improvement Measure.

3.5.6 Cost Estimates of Traffic and Transportation plan of Bhubaneswar City: The road, traffic and transportation investment under Bhubaneswar city development plan estimated at INR 10.08 billion for 2007-2011. The cost details are given below.

Table 14: Cost Estimates of Traffic and Transportation Plan of Bhubaneswar City

Item	*Cost (in billion INR)*	*% of Total Project Cost*
Road, traffic and transportation	10.08	33.17

Source: Community Consulting India Private Limited, *Preparation of City Development Plan, Bhubaneswar.*

3.5.7 Cost Estimate of Traffic and Transportation Plan of Delhi: The road, traffic and transportation investment under Delhi city development plan was estimated at INR 13.49 billion for 2007-2011. The cost details are given below.

Table 15: Cost Estimates of Traffic and Transportation Plan of Delhi City

Item	*Cost (in billion INR)*	*% of Total Project Cost*
Road, traffic and transportation	13487	33.17

Source: IL&FS Ecosmart Limited, New Delhi, *City Development Plan, Delhi.*

3.5.8 Cost of Estimates of traffic and transportation plan of Nasik City: The phase wise cost estimated for Master Plan of Nasik City at price level of 2006-07 is presented in Table 16 under two phases (Phase I – 2006-2016 and Phase II – 2016-2026). The total cost works out to 11.05 billion INR.

Table 16: Cost Estimates of Traffic and Transportation Plan of Nasik City

Sl. No	*Item*	*2016*	*2026*
Road			
A	Widening of Existing Roads		
B	Missing Links	**A+B+C**	**A+B+C**

C	Junction Improvement		
Total		***9.07***	***191.88***
STRUCTURES			
D	Fly overs		
E	Widening of Existing Bridges	**D+E+F**	**D+E+F**
F	Pedestrian Subways		
Total		**1.45**	**0.63**
Grand Total		***10.52***	***2.55***

Source: Consulting Engineering Services (India) Private Limited, New Delhi's Project: *Comprehensive Traffic Study for Nashik City.*

3.5.9 Cost Estimates of Traffic and Transportation plan of Chandigarh City: The estimated cost for road, elevated highways and transportation for Chandigarh City estimated for 2007-2012 is given below.

Table 17: Cost Estimates of Road, Elevated Highways and Transportation of Chandigarh

Item	***INR in billion***
Roads	0.16
Elevated Highways	1.73
Transportation	0.08
Total	***1.87***

Source: Chandigarh Administration, *City Development Plan, Chandigarh.*

3.5.10 Cost Estimates of traffic and transportation plan of Mysore City: The estimated cost for road and transport infrastructure during (2007-2031) is given below.

Table: 18 Cost Estimates of Traffic and Transportation Plan of Mysore City

(Investment in billion INR)

Items	***Time Horizon***				
	2007-12	***2013-17***	***2018-22***	***2023-27***	***2028-31***
Roads	3.29	5.05	3.96	5.39	5.50
Transport Infrastructure	4.82	12.90	7.56	13.03	13.37
Total	***8.11***	***17.95***	***11.52***	***18.42***	***18.87***

Source: iDeCK , *City Development Plan for Mysore.*

iDeCK is a joint venture of Government of Karnataka, Infrastructure Development Finance Company (IDFC), and Housing Development Finance Corporation (HDFC).

3.5.11 Cost Estimates of traffic and transportation plan of Ahmadabad City: The estimated cost for road and transport infrastructure during (2007-2031) is given below.

Table: 19 Cost Estimates of Traffic and Transportation Plan of Ahmedabad City

Items	***In billion INR***
Urban Transport including Roads, highways etc.	36.85
City Project	13.25
Road improvement in the periphery	23.35
Total	***73.45***

Source: Ahmedabad Municipal Corporation and Ahmedabad Urban Development Authority with Technical Support from CEPT University, Ahmedabad, *City Development Plan for Ahmedabad.*

3.5.12 Cost Estimate of traffic and transportation Plan of Chennai City: The Cost estimates of the traffic and transport plan of Chennai estimated for 2005-2012 is given in the table 20 below.

Table 20: Cost Estimates of Traffic and Transportation of Chennai City *(In billion INR)*

Item	***Year 1***	***Year 2***	***Year 3***	***Year 4***	***Year 5***	***Year 6***	***Year 7***	***Total***
Traffic and Transportation	29.52	29.53	28.46	27.39	27.22	26.47	26.47	195.04

Source: JNNURM, Government of India*, City Development Plan Chennai.*

3.5.13 Cost Estimates of Traffic and Transportation of Hyderabad City: The Cost estimates of the traffic and transport plan of Chennai estimated from 2005-2012 is presented in Table 21. The total investment requirement for increasing bus fleet, MRTS, MMTS, and Outer Ring Road (ORR) estimated to be 109.50 billion INR.

Table 21: Cost Estimates of Traffic and Transportation of Hyderabad City *(In billion INR)*

Activity	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Total**
Traffic and	2.21	10.71	10.67	9.35	7.62	7.31	7.29	55.18

Transportation								

Source: JNNURM, Government of India, *City Development Plan, Hyderabad.*

4.0 Role of Different Agencies in Urban Transport Development:

The possible areas of urban transport project components for implementations by various agencies are given in table below.

Table 22: Possible Areas of Urban Transport Project Components for Implementations by Various Agencies

Urban Transport Components	***Potential Role players / Agencies***						
	ULB	***State***	***Central Govt.***	***Multilateral Funding Agency***	***Private Sector Sponsorship***	***Private Sector (Annuity)***	***Private sector (BOT)***
I. Urban Roads							
1. Intra-city roads (Bypasses, Development of major arterials in the outer-city area)							
2. Inter-city roads (Bypasses, Development of major arterials in the outer-city area)							
3. Corridor development for major arterials within city							
4. Flyover, ROB/RUB, underpasses, pedestrian subways, etc.							
II. Traffic Improvements							
1. Junction Improvements							
2. Parking (On-street)							
3. Parking (Off-street)							
4. Road Information system							
5. Bus Stops							
III. Road Safety							
1. Signage							
2. Training & education							
3. Accident Information system							
4. Trauma Care Facilities							
5. Management of accident prone areas							
6. Street lighting							
IV. Mass Transport System							

Urban Transport Components	*Potential Role players / Agencies*						
	ULB	*State*	*Central Govt.*	*Multilateral Funding Agency*	*Private Sector Sponsorship*	*Private Sector (Annuity)*	*Private sector (BOT)*
1 MRTS/LRTS							
2. BRTS							
3. Bus Transport System (Intra-city_							
3. Bus Transport System (Inter-city_							
5. Inland Water Transport							
6. Intermodal transfer facilities							
V. IPT							
1. Regulations (licensing, parking, routings, etc.)							
2. Terminals							
VI. Non-Motorized Vehicles							
1. Regulations (licensing, parking, routings, etc.)							
2. Terminals							
VII. Pedestrian Facilities							
1. Footpaths							
2. Pedestrian zones							
3. Pedestrian Crossing Facilities							
VIII. Urban Transport Planning & Operation Data							
1. Urban Road Information system							
2. Data Collection							
3. Collation &Management							
4. Planning & Research Activities							
IX. Roadside Environment							
1. Drains							
2. Regulations of Advertisement/Bill Boards/Posters							
3. Management of Open Space							
X. Terminals							
1. Rail							
2. Bus (Inter-city/Tourist, etc.)							
3. IPT							
4. Circulation Pattern							

Source: WSA, Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, 2008.

5.0 Conclusion:

5.1 Private Investment in Urban Transport Sector

Historically private sector has been shy in investing on major, capital intensive, long gestation period transportation projects in urban areas. However, in recent time there is some initiative by private sector in this market. Examples are, Mumbai Metro (LRTS), Hyderabad Metro, Mumbai Trans-Urban Link, Delhi-Noida Flyover, etc. The main factor attracting private investment is the inclusion of real estate development as part of the project. Much needs to be done to attract private investment for a larger number of projects in urban areas of all sizes.

5.2 PPP in Urban Transport Sector

The India infrastructure Report (1996) has assessed Private and Public Participation (PPP) in Urban Development which includes Urban Transport. The assessment of urban transport components is given in Table 23.

Table 23: Assessment of Potential for Public Private Partnership

Service and Hierarchy	Access to Finance									
	Normative Base	Institutional Capacity	Budgetary Allocation		Institutional Finance		Private Sector Corporate		Rating for PPP	Appropriate Mode
			Existing	Potential	Existing	Potential	Existing	Potential		
Roads										
New Roads	Low	Low	Low	Low	Low	Moderate	Nil	High	Good	Leasing
Routine	Moderate	Low	Low	Low	Low	Moderate	Nil	High	Partial	Contracting BOOT
Maintenance										
Street lighting	Moderate	Low	Low	Low	High	Moderate	Nil	Medium	Moderate	Franchise
Parks & Playgrou-nds	Low	Low	Low	Low	High	Moderate	Nil	Medium	Moderate	Contracting
Parking Lots	Moderate	Low	Low	Low	Low	Moderate	Nil	Medium	Good	Franchise/ Contracting
Intra-city Transport	Low	Low	Low	Low	Low	Moderate	Nil	High	Good	Dereg/Franchise/Contracting
Bus terminals	Moderate	Low	Low	Low	Moderate	Moderate	Nil	High	Good	BOOT/BOO

Source: The India Infrastructure Report, *Policy Imperatives for Growth And Welfare,* 1996

5.3 Urban Transport Private Investment Potential:

The SWOT (Strength, Weakness, Opportunities and Threats) for private investment potential in urban transportation are discussed below.

Strengths:

- ✓ Accelerating Urbanization and Metropolization;
- ✓ Increasing ownership and use of private vehicles;
- ✓ Galloping travel demand, both by size and trip length;
- ✓ High contribution of urban areas to GDP;
- ✓ Realization of urban areas as Generators of Economic Momentum (GEMs) ;
- ✓ Appreciation of the critical role of urban transport in economic efficiency, environmental quality and social inclusiveness, in short sustainable development of urban areas;
- ✓ Need to compete with world cities to attract foreign investment;
- ✓ Extension of fiscal, monetary & legal incentives and facilitation of private sector investment in upgrading and developing urban infrastructure;
- ✓ Formulation of National Urban Transportation Policy (NUTP) ;
- ✓ Initiation of Jawaharlal Nehru Urban Renewal Mission (JNNURM) to act as catalyst of investment in urban infrastructure.

Weakness:

- ✓ Multiplicity of authorities: Delays in decision making, approval, etc. ;
- ✓ Inadequate preparation of city transportation plans and projects;
- ✓ Shyness of financial institutions to invest in urban infrastructure;

- ✓ High cost of urban land and difficulties in land acquisition;
- ✓ High investment risks;

Opportunities

- ✓ NUTP and JNNURM act as catalyst for high investment in urban infrastructure including urban transport;
- ✓ Policy thrust in planning Public Mass of Transport System including Metro-Rail, LRTS , Mono Rail, BRTS etc;
- ✓ Concept of linking urban land (property) development, with urban transport development to enable integrated development and higher returns in investment (example Mumbai Metro, Hyderabad Metro etc.) ;
- ✓ Increasing motorization leading to need for large Parking areas.
- ✓ Modernization of urban rail and bus transport to be of world class (example: development of New Delhi Railway Station at a cost of INR 60,000 million and potential 20 Metro-rail station to be undertaken) ;
- ✓ Development of new towns with high quality of infrastructure (capital city of Chhattisgarh).

Threats

- ✓ Economic slowdown, decline in institutional investment and credit, high investment rates;
- ✓ Political opposition and disruptions (example shifting of Tata Nano Project out of Singur, Kolkata) ;
- ✓ Spreading Urban insurgency;
- ✓ Weak governance;
- ✓ Change in policies due to political change of party in government (due to periodical elections at national, state, local body levels).

5.4 Trigger for Investment in Indian Transport market (Including Urban Transport)

The following are the main triggers for investments in Indian Urban Transport Market

- Population Growth;
- Accessibility and massive urbanization;
- High Economic Growth (Minimum 7.0% to 7.5% in spite of meltdown) ;
- Deregulation;
- Facilitating economic, fiscal and monetary policies;
- Increasing employment;
- Increasing income levels of per capita income (estimated to be US $ 4000 by 2025 as stated by Ministry of Finance, Government of India) ;
- Globalization and increasing internationalization;
- Increasing FDI;
- Increasing Domestic Savings;
- Agriculture modernization, and increasing production;
- Industrial Development, promotion of integrated development of industrial corridors (DMIC to start with);
- Growth of tertiary Sectors;
- Tourism (domestic and international) ;
- SEZs;
- Public Private Participation (PPPs) ;

5.5 Potential Thrust Areas for Private Sector Investment in Urban Transport

The following are the thrust areas for private sector investment in Urban Transport

- Urban Expressways
- Urban Bypasses
- Urban Railways

- Metro, LRTS & Mono

- Passenger Terminals

  - Rail Terminals (i.e. inter-city rail stations and intra-city metro stations)
  - Bus Terminals (i.e. inter-city bus stations)
- Goods Terminals
  - Rail Goods Terminals
  - Road Transport Terminals
  - Integrated Freight Complexes
- Parking Complexes
  - (With modern technology and as multi-use complexes)
- Intermediate Public Transport Services
  - Taxis
  - Auto-Rickshaws
  - Radio cabs
- Traffic Management
  - Intelligent Transport Systems
- National Urban Transport Infrastructures Systems
  - (Design, Development, Maintain ace, Dissemination)

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Annexure - 1

Category Name	Sl. No.	City Name	States/UTs
1a	1	Kavaratti	Lakshadweep
	2	Silvasa	Dadra Nagar
	3	Itanagar	Arunachal Pradesh
	4	Daman	Daman & Diu
	5	Panaji	Goa
	6	Port Blair	Andaman & Nicobor
	7	Agartala	Tripura
	8	Gandhinagar	Gujarat
	9	Imphal	Manipur
1b	10	Kohima	Nagaland
	11	Gangtok	Sikkim
	12	Shimla	Himachal Pradesh
	13	Aizawl	Mizoram
	14	Shillong	Meghalaya
	15	Guntur	Andhra Pradesh
	16	Belgaum	Karnataka
	17	Pondicherry	Pondicherry
	18	Bhavnagar	Gujarat
	19	Dehra Dun	Uttaranchal
	20	Mangalore	Karnataka
	21	Tiruppur	Tamil Nadu
	22	Amravati	Maharashtra
	23	Jamnagar	Gujarat
	24	Warangal	Andhra Pradesh
	25	Cuttack	Orissa
	26	Jammu	Jammu & Kashmir
	27	Bhiwandi	Maharashtra
	28	Gorakhpur	Uttar Pradesh
	29	Bikaner	Rajasthan
	30	Moradabad	Uttar Pradesh
2	31	Aligarh	Uttar Pradesh
	32	Kota	Rajasthan
	33	Jalandhar	Punjab
	34	Raipur	Chhattisgarh
	35	Bareilly	Uttar Pradesh
	36	Salem	Tamil Nadu
	37	Mysore	Karnataka
	38	Dispur	Assam
	39	Bhubaneswar	Orissa
	40	Tiruchirappalli	Tamil Nadu
	41	Jodhpur	Rajasthan
	42	Ranchi	Jharkhand
	43	Gwalior	Madhya Pradesh
	44	Sholapur	Maharashtra
	45	Calicut	Kerala
	46	Bhilai	Chhattisgarh
	47	Chandigarh	Haryana
	48	Hubli-Dharwar	Karnataka
	49	Ghaziabad	Uttar Pradesh

Category Name	Sl. No.	City Name	States/UTs
	50	Rajkot	Gujarat
	51	Vijayawada	Andhra Pradesh
	52	Faridabad	Haryana
	53	Allahabad	Uttar Pradesh
	54	Dhanbad	Jharkhand
	55	Guwahati	Assam
	56	Amritsar	Punjab
	57	Asansol	West Bengal
	58	Jamshedpur	Jharkhand
	59	Srinagar	Jammu & Kashmir
	60	Jabalpur	Madhya Pradesh
3	61	Trivandrum	Kerala
	62	Nashik	Maharashtra
	63	Meerut	Uttar Pradesh
	64	Madurai	Tamil Nadu
	65	Visakhapatnam	Andhra Pradesh
	66	Agra	Uttar Pradesh
	67	Ludhiana	Punjab
	68	Bhopal	Madhya Pradesh
	69	Vadodara	Gujarat
	70	Indore	Madhya Pradesh
	71	Coimbatore	Tamil Nadu
	72	Kochi	Kerala
	73	Patna	Bihar
	74	Varanasi	Uttar Pradesh
4	75	Nagpur	Maharashtra
	76	Lucknow	Uttar Pradesh
	77	Jaipur	Rajasthan
	78	Kanpur	Uttar Pradesh
	79	Surat	Gujarat
5	80	Pune	Maharashtra
	81	Ahmadabad	Gujarat
	82	Hyderabad	Andhra Pradesh
	83	Chennai	Tamil Nadu
6	84	Bangalore	Karnataka
	85	Delhi	Delhi
	86	Kolkata	West Bengal
	87	Greater Mumbai	Maharashtra

Source: Wilbur Smith Associate, Study on Traffic and Transportation Policies and Strategies in Urban Areas in India, 2008.