

Urban Governance in Multimodal Integrated Urban Transportation

Amit Bhattacharya¹ and Gaurab Das Mahapatra²

¹Associate Professor in Department of Architecture, Piloo Mody College of Architecture, Ajay Binay Institute of Technology, Cuttack, Odisha, India
²Post Graduate Student in Urban and Regional Planning, Department of Planning, School of Planning and Architecture, Bhopal, Madhya Pradesh, India

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Abstract

In the last century, Urban Transportation has undergone the most elaborate changes amongst the other development parameters. From motor age to MRTS, the face of urban transportation has been constantly upgrading. The factors involved in the up gradation include globalization, population explosion, liberalization of global economy and technological advancements. The various modes of urban transport also supported this global need which ultimately had the urgency of integrating. The integration was essential primarily for smooth functioning of urban life. In the recent past, transportation has been the guiding factor in determining the spatial pattern of a development region. One key body which has always been involved in the whole process is governance. Urban Governance has always been challenging owing to the adaptation of multiple socio-economic segments of the society and the involvement of multimodal transportation makes it even more challenging. The role of governance has undergone a paradigm shift from mere policy making to revenue generation and beyond. This paper will discuss on the role of this governance. This will help us have a better insight into the merits and demerits in the role of urban governance in multimodal urban transportation, with a focus of determining the driving forces to foster urban and regional planning.

Keywords: Governance, Urban Transport, Modal Splits, and Revenue

1. Introduction

1.1 Contextual Terms and Terminologies

1.1.1 Urban Governance

Urban governance is always evolving due to the complex field of enquiry which constantly poses challenges to it in terms of growth as well as development. The varied nature of governance across different cities, regions and states adds further complexities in field of both research and practice [Refer Table 4]. Differences in governance arrangements, including distribution of responsibilities and funding pattern, have a substantial impact on the fruitfulness of transport strategy [11]. In countries such as France and Germany, the national transport policy is based on the parameters of cohesion, security, employment and public service. However, in countries like UK and Netherlands, it is based on a principle that transport is a mere service that supports industry. These fundamental differences in urban governance gives a hint that more than any other aspects of governance, societal values and socio-political priorities are the guiding factors towards a successful urban governance, if at all the multilevel and multifaceted outlook is required for multimodal integrated urban transportation [5].

1.1.2 Integration – need or response?

The integration is supposed to bring together different aspects of transportation system and simultaneously bring together transport with other aspects of governance. The major problems in today's urban transportation includes split or duplicated responsibility, inconsistencies in process, political and public acceptability, information and skills shortages, financial constraints and legislative and regulatory framework. The role of governance gets widened to understanding the impact of engineering and microeconomics perspectives too. In this context, integration primarily refers to the physical integration of public transport services [4]. This also includes the integration of:

- Public transport information.
- Public transport fares and ticketing.
- Infrastructure provision, management and pricing for public and private transport.
- Passenger and freight transport.
- Transport authorities.
- Between transport measures and land Use policies.
- Between general transport policies and the transport policies of the social infrastructure sector.
- Between transport policies and policies for environment and policies for socio-economic development.

But still the question lies about the degree of interventions, in our country's context, that is expected from the governance. The process can involve a step wise mechanism from micro to macro level in the following format: to inform and educate people, enable and encourage people to change their behaviours, make healthier choices as a default option for people, use financial and other incentives to guide people to pursue certain activities, use financial or other disincentives to influence people to pursue certain activities, regulate to restrict the options available to people and regulate to eliminate choice entirely [21].

1.1.3 Multimodal Integrated Urban Transportation

India has a large and diversified urban transportation. Traditionally, there are palanquins, bullock carts, horse carriages, bicycles, hand pulled rickshaws and cycles rickshaws. In public road transport, there are buses including BRTS system, taxis and auto rickshaws including E-Rickshaws. The long distance transport is fostered by Indian Railways which is further subdivided into passenger and cargo services. The road transport is fragmented into Expressways, NHs, SHs, ODRs and VRs. Urban rail transport is another elaborate network having suburban railways, Mass Rapid Transit Systems (Metro Rails), Monorails, Light rails and Tram services. 2-wheeler, automobile and utility vehicles are further added to this list. Aviation comprises of passenger and cargo services. Water transport is another matter of great discussion including ferry service, boats (both hand and machine driven), passenger cruises and ships, cargo and freight transport and. Apart from all these, a few more things should be considered like pipeline for crude oil, petroleum and natural gas. Almost all of these sub sectors have a governing body and sub-authorities related to it [30]. For a major city like Kolkata or Mumbai, where a majority of the modes discussed are present, it becomes difficult to manage the governance [Refer Table 5-9]. The decision of one affects the other but remains unmanageable due to segregation of authorities [20]. Further there are problems of multimodal congregation or segregational spaces at urban level. In the light of transit oriented development, there is a relationship between urban land uses, transport planning and multi modal integration with its public services being of special focus on sustainability [19]. With identification of every new core for urban growth, public transport becomes the key sector for intervention in order to cater to the sprawling demands of people. The moment people comes in, the role of government gets started. So ideally governance in transportation sector has to have a subtle balance between the context, content and user of the multiple modes [24].

1.2 Need of Multimodal Integrated Urban Transportation

1.1.1 Current Trends

The never ending technological advancements is responsible proving a varied sector Globalization and liberalization of world economy has led to an uncontrollable and magnanimous flow of finance, goods,

labour, materials and information [15]. This in turn, has unwillingly led to an acute urban scenario in transportation sector where newfangled forms of economic competition has come up, to which, traditional political and administrative role has no effective solutions. Urban areas are always under increasing global influences, posing new and complex scenarios. The major focus that the urban transportation sector requires is the strategy which could mitigate societal and spatial fragmentation and stabilize the multi modal aspects. There is a notion from the global players that should also be agreed upon unanimously by national, state and local level government that present approach to urban policies and programmes are not even suitable to cater to the present urban transportation scenario – leave alone the future transportation of our cities. The new form of governance should involve civil society, business, people and NGOs. Besides, the tiers that need to tie up will revolve around coordinating specialized departments of municipal authorities, various levels of government and political control. The outcome can be a new decision making structure bringing in radical institutional changes. The citizens' living conditions can improve if holistic political strategies involving transportation are oriented more towards complex sources like multimodal integrated transportation. Thus, there is a strong thrust from the transportation sector to address an immediate shift from "Government" to "Governance" in urban world [1].

1.1.2 Inferences from Indian policies

1.1.2.1 National Urban Transport policy

The focus of this policy is to bring about a paradigm shift in terms of three aspects – to avoid increase in demand in travel both by reducing the number and length of trips, to promote a shift from personal vehicles to other MRT and non-motorized transportation (NMT) modes to reduce energy demand and hence pollution in cities and finally, improve strategy including use of clean fuels and clean vehicle technology [6].



Figure 1 National Urban Transport policy

1.1.2.2 National Transport Development Policy Committee

The aim of this policy introduced in 2013 was to - create a consolidated Transport Ministry to focus on systematic performance, set up an Office of Transport Strategy (OTS) to coordinate transport policies at the national level,

clearly decentralize policy and planning authority (including urban transport) to the constitutionally recognized urban and metropolitan governments, to build a comprehensive regulatory environment to govern transport flows, and, to build an interdisciplinary cadre of transport experts [18].

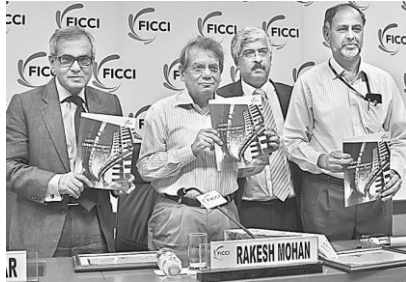


Figure 2 National Transport Development Policy Committee

1.1.2.3 Jawaharlal Urban Renewal Mission (JNNURM) and Unified Metropolitan Transport Authority (UMTA)

An extensive framework in itself, JNNURM had a few reserved priorities for transportation and its governance including– Bus funding scheme, Intelligent Transportation Systems (ITS) through city specific SPVs, setting up city level Urban metropolitan Transport Authority (UMTA), etc. A few modifications in bye laws and master plan to integrate land use and transport by densification along MRT corridors and station vicinity were also discussed. But the major point focused was the proposal for nominating a single department to deal with all Urban Transport issues in place of different departments at present. Mobilization of National Urban Transport funds (NUTF) in state and city level, Special Purpose Vehicle (SPVs) were also aimed at. At state level, the UMTA would be duly backed by legislation to facilitate coordinated planning and implementation of projects relating to urban transport and their integrated management. It will be a body formed by a board comprising of heads of various departments in the city, local elected leaders and eminent citizens and supported by a professional team headed by a chief executive. Hyderabad UMTA, Chennai UMTA, AICTSL - Indore SPV, PMPML - Pune SPV, AJL - Ahmedabad SPV, and JCTSL – Jaipur SPV are the outcome of this noble vision. On comparison amongst these, it is observed that although there is huge difference in the official structures of SPVs, they are quite successful in providing society an alternative urban scheme [12].



Figure 3 Jawaharlal Nehru National Urban Renewal Mission



Figure 4 Unified Metropolitan Transport Authority

1.1.3 Role of Mass rapid Transit System in 21st Century

During a large span of our history, the rich and powerful class of society has been using chariots and horses, whereas the poor were stuck to walking or mule ride. Then came the motor age where rich used cars and poor were stuck to public transport despite the lack of civic standard and smooth availability (in many cases) [22]. The incorporation of Metro Rail and BRTS has opened the acceptability and affordability to the common man. From Land Use to FAR (Floor Area Ratio), every aspect of urban planning got linked to it and laid the foundation stone for Transit oriented development in India. This advancement in Urban Transportation is truly revolutionary and had set the stage for integrating the other modes with the MRTS. Transportation or Mobility plays an important role in the overall development of a nation's economy. A metropolitan or city area's economic and social health depends to a large extent on the performance of its transportation system [26]. Not only does 'the transportation system provide opportunities for the mobility of people and goods, but also over the long term it influences patterns of growth and the level of economic activity through the accessibility it provides to land'. Urban transportation system planning and analysis are an important activity for promoting the efficient movement of people and goods in an area and for community development as well. According to ITDP 2010 Report, transport also carries an important social and environmental load, which cannot be neglected. The salient features of this are discussed next. Pedestrian, bicycle and NMT (Non-Motorized Transport) environments for making people walk should be created [29]. Great, cost-effective public transport also has to be introduced because some trips are too long to make walking or cycling a viable option. Access for clean passenger vehicles at safe speeds and in significantly reduced numbers has to be immediately introduced owing to the fact that in the last century many cities were retrofitted and designed to accommodate automobile travel. Servicing the city in the cleanest and safest manner is to be fostered as city life is fed by the movement of goods. People and activities, buildings and spaces Integrating residential, work, retail, and entertainment activities should be mixed into one area to make better cities and better places. To build dense, people and transit oriented urban districts that are desirable by 2030 is the

most important need of the hour, as cities worldwide are projected to absorb two billion more people. There is also an ardent need to preserve and enhance the local natural, cultural, social, and historical assets. High quality materials need to come into picture to ensure resilience despite rigorous use because, keeping the place up is an expression of ownership that begets higher values [17].



Figure 5 Security Check at Metro Railways, Delhi

1.3 Role of Governance

1.3.1 Major elements of Governance

1.3.1.1 Financing

Economy is the backbone any governance. If efficient urban governance in multimodal integrated urban transportation is the vision, then specific role and guidelines in fiscal terms needs to be defined. The nature of spending are based on few major questions like – from where the funds are generated, what is the allocation pattern, how the funding is to be prioritized and what is the role of private sector. Sustainable urban transportation are expensive and demand additional taxes, the political power seldom wants to allow [23]. But the awareness amongst citizen should spread that for better services, minor increase in cess/taxes should be accepted. In transportation sector, funding primarily flows from three sources – taxpayers, transport system users (public riders, toll payers, etc.) and other beneficiaries (employers, property owners, etc.). Credit rating systems and earmarking financing methods can be effective in long run [8].

1.3.1.2 Affordability

An affordable attempt is the one which saves both time and money, in the context of transportation. It should also aim towards giving real and affordable choices devoid of the users’ gender or physical status. There should be no restrictions in opportunities to get reductions in revenues and services. It is always up to the governance sector that whether cases like women’s urban travel needs and behavior will be considered in their planning of gender sensitive urban transport policies or not. The question of whether the people will benefit is always in a state of crisis in urban India due to factors like rapid urbanization, economic constraints and financial crisis. This lack of

regulatory authority in charge of organizing and coordinating modes of transport has already helped the small and unstructured private operators to make satisfactory business in Indian cities. The affordability parameter which was to be dealt sensitively had already been distorted die to the entry of multiple unwanted stakeholders. When government deals with an issue in transport, it can be handled easily owing to political will and vision strategies [10].

1.3.2 Principles of Good Governance

A good urban governance in 21st century has to be coordinative in order to ensure equitable distribution of cost as well as benefits, efficient in terms of prioritizing cost-effective strategy setting, accountable to maintain trust in public besides encouraging participation amongst all stakeholders, responsive to local needs and sustainable in terms of fiscal framework [27] [Refer Table 10].

2. Case Studies

2.1 International cases

The governance structure in the following cases will give an overview of how the successful multimodal integrated urban transportation functions.

Table 1 Governance Structure of Developed countries

Location	Authority	Governance structure
Klang Valley, Malaysia	KVUTA (Klang Valley Urban Transport Authority)	<ul style="list-style-type: none"> The Ministry of Federal Territories National Physical Planning Council Department of Transport City Council along with Mayor Kuala Lumpur City Hall Local Authorities (Large number of public and private agencies were involved in the transport provision)
Atlanta, Georgia, U.S.	MARTA (Metropolitan Atlanta Rapid Transit Authority)	<ul style="list-style-type: none"> U.S. Department of Transportation Federal Transit Administration Georgia Regional Transportation Authority - GRTA (15 members including Chairman, Vice-Chairman, Executive Director) Atlanta City Council MARTA, BART (Bay Area Rapid Transit), C-Tran (Clayton County Public Transit), CCT (Cobb County Transit, Gwinnett County Transit MARTA consists of 3 Executive members and 12 Board of Directors
Washington, D.C., U.S.	WMATA (Washington Metropolitan Area Transit Authority)	<ul style="list-style-type: none"> U.S. Department of Transportation Federal Transit Administration WMATA (8 voting and 8 non-voting members: 2 each from the district of Columbia, Virginia, Maryland and the federal government) MWCOG (Metropolitan Washington Council of Governments) TPB (Transportation Planning Board)

2.2 Domestic cases

The two cases discussed here gives a ray of hope that the idea which the paper is not utopian. Convinced by the demerits of conventional Town Planning [TP] Schemes, the authorities imbibed the following:

Table 2 Innovative policy reform: Indian transportation

Name and Location	Bodies Involved	Innovation
<i>Prahlad Nagar Town Planning Scheme:</i> Ahmedabad, Gujarat	Government of Gujarat, Ahmedabad Urban Development Authority and residents having land under TP scheme.	Amendment of Gujarat Urban Development and TP Act, 1976.
<i>Pimpri Chinchwad Transit oriented development around BRTS corridor:</i> Pimpri Chinchwad, Maharashtra	Pimpri Chinchwad Municipality	Introduction of Influence zone based FAR revision model

3. Merits

3.1 Policy Responses

There are a number of benefits which an urban transportation system can reap if the governance comes into play. The consequences of change in one transportation mode can be easily readjusted into the other if the governing body is one. The few examples can elaborate this idea [14].

Table 3 Successfully implemented transportation policies

Name and Location	Bodies Involved	Need of the integration and salient features
<i>Urban transport services for medium and small size cities :</i> Karnataka, in the jurisdictional area comprising of Gulbarga, Bidar, Yadgir, Raichur, Koppal, Hospet, Bellary and Bijapur	Bangalore Metropolitan Transport Corporation (BMTC) North Eastern Karnataka Road Transport Corporation (NEKRTC), North Western Karnataka Road Transport Corporation (NWKRTC), Karnataka State Road Transport Corporation (KSRTC)	Presence of overcrowded autos and sharing IPTs. To popularize the use of public transport and discourage private transportation,
<i>Any time auto, G Auto :</i> Delhi, Ahmedabad, Gandhinagar, Baroda, Surat and Rajkot	State government of respective states	No solution to RATS (refusal, accessibility, transparency and safety). To organize auto drivers, offer safe and reliable transportation, initiate mobile technology to call auto, ensure government approved meter rates.
<i>Alwar Vahini , Euro IV</i>	Regional Transport Office, Punjab	Old, outdated, unsafe and uncomfortable

<i>compliant vehicles :</i> Alwar, Rajasthan	National Bank, Urban Improvement Trust of Alwar and Bhiwandi, District Deputy Registrar and District Administration.	existing 3-wheeler services. To cater to the demand supply gap in public transport interconnectivity, Inability to introduce MRTS/BRTS due to medium town size, generate youth employment and encourage indirect spending pattern of Government funds.
<i>AAPKI SADAQ, alternative mobility solutions and pedestrianisation of existing neighbourhoods:</i> Delhi	Residents' Welfare Associations, Local Ward Councillor, MLA of the constituency, The Unified Traffic and Transportation Infrastructure [Planning and Engineering] Centre (UTTIPEC), PWD, Delhi Development Authority (DDA), MCD and South Delhi Municipal Corporation	Existence of poor street conditions, encroachment by residents, shopkeepers and vendors, lack of footpath, lack of proper drainage and grading of access roads and non-inclusive transportation system. To create pedestrian facilities and NMT facilities.
<i>Raahgiri Day, temporary closure of street network :</i> Gurgaon, Haryana [slowly spreading across the country in many urban centres]	Municipal Corporation, PWD, Haryana Urban Development Authority [HUDA] and Traffic police	Lack of awareness amongst people, degrading environment of Haryana and shifting focus of people towards affordable private transports. To promote: cycling and use of public transport, healthy living, active lifestyle, inclusive community, social integration and environmental concerns.



Figure 6 Message or Mural Paintings on Wall AAPKI SADAQ

If the discussed cases can be contextually dealt with the intervention of different sectors of government, then, it can be well understood how effectively these similar scenarios can be handled with the introduction of integrated multimodal urban transportation [25].

3.2 Paradigm Shift in urban governance in multimodal integrated urban transportation

A century back, transportation was a much simpler sector. Today, the parameters like integrated land-use, transport demand management, spatial strategies, travel behaviour analysis and policy effectiveness assessment has

altogether made a paradigm shift in urban transportation, and governance is a part of it [2]. More and more cities are facing inevitable degradation of citizens' quality of life. The current policies are leading us to progressive decline and the only solution is to incorporate a collaborative approach [3]. The table will give a better idea about the lacking in present policies:

3.3 ICT enabling and Sustainability

The role of urban governance will also involve the incorporation of ICT for an efficient multimodal integration in urban transportation. These methodologies have already been accepted by many countries abroad. But due to the socio-economic setting of our country, it's still a major topic of debate [7]. The major threat to urban transportation is the fact that, the population remaining constant, if one mode of transport reduced functionally—there will be a manifold increase in the other type of transport. So, the ICT can bring about technological advancement, but presently this support should be imparted to all modes of transport and not only MRTS or BRTS, making the need for integrated urban transportation more prominent. There are a few benchmarks which defines the role of successful ICT assuming that it is incorporated, like - stimulation of more travel as new opportunities become available, substitution for travel as activities can now be carried out remotely rather than by travel, modification of travel as the two elements combine to change the ways in which activities are carried out [13]. With every advancement in technological innovation, the demand has increased; whereas, for a “greener” earth, the reduction was necessary. It is prevalent that ICT cannot change the direction of current trends [as discussed towards the beginning of this paper] towards a sustainable urban transportation system. It's high time that the travel need to be calculated and designed in terms of specific demand and not population pressure. Thus, the positives of ICT will be a transparent integrated travel planning system, real-time traveller information, route guidance and optimization systems, dynamic road traffic signaling, adequate road pricing and fostering alternative fuel incorporation. Since ICT will have an impact on land-use, infrastructure, lifestyle and behaviour, regulation and pricing, it has to be integrated in terms of modes, robust in terms of operational attributes, attractive in terms of public acceptability and competitive in terms of global research status [16].



Figure 7 Autosensing in Road transport



Figure 8 Speed gun tracking systems



Figure 9 Smart transportation system

4. Demerits

In the form of Challenges and Threats

There are no demerits in the thought of having unified governance, however, the time, place and context for which it is meant remains a matter of grave research. As of now, the major threats towards attaining success on this topic are:

4.1 Prevailing Urban Transport problems including road congestion, parking problems, air pollution and deteriorating road safety.

4.2 Gaps in laws and regulations, fragmented institutional frameworks, distorted land markets affecting transport infrastructure development, lack of comprehensive design standards for transport infrastructure, human resources challenge, absence of reliable transport data, major inefficiencies in bus based PT services and energy security [9].

4.3 Non-uniform policy responses of respective states to Planning commission, NUTP and JNNURM [28].

Conclusions

It has been an extensive discussion about the Urban Governance in multimodal integrated urban transportation. To conclude about on a specific note is difficult. The future of transportation will be based on the correct decisions taken by the government. The decisions can be fragmented into three broader aspects.

- Re-aligning of legal and regulatory instruments and institutional restructuring at central, state and city government level.
- Resource mobilization which includes - Public financing by tapping private source of capital through PPP, setting up the NUTPF [as proposed in the 9th 5 year plan] and tax exemptions.
- Capacity building within government agencies and systems to attract best talents, knowledge management and research and development

Planning reforms are also essential by introducing - Local Transport Plan (LTP) at ward level, Comprehensive Mobility Plan (CMP) prepared by UMTA and Master Plan involving CMP. Transfer of best practice guidelines is also fruitful by exchanging the successful implementation of one regional transport issue to another.

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References

- [1]. (EA,UE), H.-U. S. (2011). Integrated Urban Governance. Barcelona: Metropolis, World Association of the Major Metropolises.
- [2]. (2014). Action points for the public transport sector. Brussels: UITP.
- [3]. Bank, A. D. (2009). Changing Course: A new paradigm in Sustainable Urban Transport. Philippines: Asian Development Bank.
- [4]. Chotani, S. M., & Rana, M. (2014). Sustainable Urban Transport for Sustainable Cities. 7th Conference and Expo, Urban Mobility India. New Delhi: Institute of Urban Transport (India).
- [5]. Consulting, A. (2013). Trancelink Governance Review. Vancouver: Mayors' Council on Regional Transportation.
- [6]. Development, M. o. (2014). National Urban Transport Policy. New Delhi: Government of India.
- [7]. Dhingra, C. (n.d.). Urban Transport Institutions. EMBARQ.
- [8]. Floater, G., & Rode, P. (n.d.). Steering urban growth: governance, policy and finance. the London School of Economics and Political Science.
- [9]. (n.d.). Fostering low-carbon strategies and energy efficiency in specific Interreg MED territories: cities, islands and remote areas. Interreg Publisher.
- [10]. Gender and Urban Transport: Smart and Affordable, Sustainable Transport: A Sourcebook for Policy-makers in Developing Cities. (2007). In G. S. Service.
- [11]. Golden, A. (2014). Governance of regional transit systems: Observations on Washington, New York, and Toronto. Wilson Centre, Canada Institute.
- [12]. Gupta, S. (2013). Urban metropolitan transport authority (UMTA) of different states in India. Cppr-Centre for urban studies.
- [13]. Habitat, U. (N.D.). The role of ICT in the proposed urban sustainable development goal and the new urban agenda. Ericsson.
- [14]. Iaione, C. (2009). The law, economics and policy of urban congestion. new york: new york university school of law.
- [15]. Jusoh, H., & Abdul Rashid, A. (2008). Efficiency in Urban Governance towards Sustainability and Competitiveness of City: A Case Study of Kuala Lumpur. World Academy of Science, Engineering and Technology.
- [16]. Kamphof, R., & Voorn, S. (n.d.). A Strategic Knowledge and Research Agenda on Sustainable Urban Mobility Urban. Hague: European Metropolitan Network Institute.
- [17]. Mahapatra, G. D., & Puntambekar, K. (2015). ICUPRD 2016: 18th International Conference on Urban. International Science Index (pp. 2972-2976). Dubai: International Scholarly and Scientific Research & Innovation (WASET).
- [18]. National Transport Development Policy Committee, N. (2013). Institutions for Transport System Governance. New Delhi: Government of India.
- [19]. Ng, M. (2013). World cities summit 2012. liveable & sustainable cities integrated urban solutions. Singapore: Centre for Liveable Cities and Urban Redevelopment Authority.
- [20]. Planning and Design for Sustainable Urban Mobility.
- [21]. Preston, J. (2012). Integration for seamless transport. Southampton: International Transport Forum.
- [22]. Rajaariffin, R. N., & Zahari, R. K. Urban Transportation Systems and Governance in the Klang Valley, Malaysia.
- [23]. Rankin, N. R. (2012). Transportation: TFIE Regulation and funding of metropolitan atlanta rapid transit authority (marta) and transportation equity (ph.d report). atlanta: faculty of clark atlanta university.
- [24]. Scheurer, D. J., & Curtis, P. C. (2008). Spatial Network Analysis of Multimodal Transport Systems: Developing a Strategic Planning Tool to Assess the Congruence of Movement and Urban Structure - A Case Study of Perth before and after. Melbourne.
- [25]. Services, I. M. (2015). Urban Transportation in Indian Cities. New Delhi: National Institute of Urban Affairs.
- [26]. Thynell, M. (2007). Social Change and Urban Transport. Bonn: GTZ.
- [27]. Tosics, I. (2011). Governance challenges and models for the cities of tomorrow. Budapest: Metropolitan Research Institute, Budapest.
- [28]. (n.d.). Urban Transport in India, Challenges and Recommendations. New Delhi: Indian Institute for Human Settlements.
- [29]. Zhao, X., Mahendra, A., Godfrey, N., Dalkmann, H., Philipp, R., & Graham, F. (2014). Unlocking the Power of Urban Transport Systems for Better Growth and a Better Climate. Global Commission on the Economy and Climate.
- [30]. 2006 Towards Faster and More Towards Faster and More Towards Faster and More, An Approach to the 11 th Five Year Plan New Delhi Government of India, Planning Commission.