

# State of Art Literature: Feasibility Study of Urban Mass Transit Facility for Dahod City

Dr. A. S. Trivedi<sup>1</sup>, Zoeb Taizoon Dohadwala<sup>2</sup>

<sup>1</sup>Professor, Civil Engineering Department, IPS Engineering College, RGPV

<sup>2</sup>M. Tech. Student, Civil Engineering Department, IPS Engineering College, RGPV

**Abstract:** *In recent years, traffic congestion, traffic accidents, and deterioration of the environment because of growing population, increase in urbanization, and increase in car ownership have become serious problems in the urban cities of India. Urban transport crisis is faced by almost every Indian city, of all sizes. All cities face the ever-increasing problems of congestion, traffic accidents, air, and noise pollution despite investments in road development and infrastructure, and plans for land use and transport development. There is an increase in growth of personal vehicles and different forms of intermediate public transport provided by the informal sector which are struggling to meet the mobility demands of city residents. Thus, there is a need to provide a suitable city bus service system or urban mass transit system for towns which are growing at a rapid pace and are also a part of urban area. This urban mass transit system should be convenient, affordable and accessible. Therefore, this study defines the need of feasibility and demand for public transport system.*

**Keywords:** Urban mass transit service or City bus service, feasibility, urbanization

## 1. Introduction

Transportation system has been expanding rapidly in current Century in India, yet it has not been able to cope up continuous growth and increasing congestion in our cities at an alarming rate. The urbanization has increased from 31.1% to 42.6% i.e. an increase of around 37% in urbanization over the last three decades. [4] Similarly growth in vehicular registration is growing at a rapid pace over the last two decades, combination of these together are putting pressure on existing transport infrastructure facility in the urban area. Further, it is also deteriorating environment in the urban area. The rapid growth in privatized motorized vehicle also led to an increase in the number of accidents and rising demand for petroleum products. Today in the age of environment concerns, and rapidly growing cities with limited space, there is a need to provide a system by transport planners which can assure safe and clean transport facility to all city residents. Thus, there is a requirement of planning a system, which is efficient, economical, and dependable from the perspectives of both user and operator.

## 2. Urbanization

Urbanization refers to movement of mankind from rural areas to urban areas and how society adapts the changes. Urbanization refers to movement of mankind from rural areas to urban areas and how society adapts the changes. India is facing serious problem of rise in urban population presently such as it leads to socio-economic problems due to unplanned growth in urban population and lack of infrastructural facilities. Growth of urban population is around at an average rate of 3% in present annum in India, which has almost increased twice during the period 1981 to 2001 from 160 million to 285 million (Table 1). [14] For next two decades the urban population growth rate is not expected to change significantly. By assuming an increase of around 37% in a decade, about 2021 urban population in

India is likely to be expected around 540 million. Growth in the urban population in 1951 was seen about 17% which has increased to 29% in 2001; it is expected to grow at a rapid pace around 37% by the year. [14]

**Table 1:** Growth of India's Population

Year	Urban Population (in millions)
1951	62
1961	79
1971	109
1981	160
1991	217
2001	285
2011	377
2021 (forecasted)	540

Numbers of cities are showing a considerable increase, and also sizes of these cities. Characteristics of urbanization are different for different cities. Hence, there is a great variation in pattern of urbanization across different states, out of which the main factor which contribute to this variation is transportation. There is a positive correlation ship between urbanization and economic development; therefore, it is seen that states having a high level of urbanization has high economic development. Distribution of urban population varies widely by size of city and is skewed towards larger cities. One of the prominent features of urbanization in India is in the growth of metro-politization that can be defined as the increase in sizes and number of cities with a population more than million.

## 3. Aim of Study

The main aim of the study is to plan mass urban transport facility for development of Dahod city which includes; a well-planned city bus system that could provide a high level of mobility to a large fraction of the population with least cost.

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#### 4. Role of Transportation

Transportation is a non-separable part of our society. It has a very close relation to the life style, standard of living, the range and location of activities and the goods and services which will be available for consumption. Advancement in transportation has made possible changes in the way of living and the way in which societies are organized and hence have a great influence in the development of civilizations. [10]

Transportation is responsible for the development of civilizations from old times by coping up with travel requirement of people and requirement of goods. It has changed the way people live and travel. Almost everywhere in the world, people travel daily for work, shopping and social reasons, however transport also consumes a lot of resources like time, fuel, materials and land. [10]

An important part of India's economy directly depends on transportation. After economic liberalization of the early 90s, infrastructure development within our country has increased at a high rate, and today there are wide ranges of modes for transportation. However, accesses to these modes of transport are not uniform due to low GNP i.e. Gross National Product per capita in India. A uniform and reliable mode of transport is a solution that uses a certain type of vehicle, its operation and infrastructure.

#### 5. Importance of Public Transport in Urban Areas

There is an extreme need of effective public transport in urban areas in India as urbanization is highly decentralized. These urban areas are mainly market areas. Trips generated to these urban areas i.e. main market areas are large in number. But due to low capacity of roads to contain these trips there is requirement of transportation system. Almost every city in our country is experiencing growth and in foreseeable future this are not likely to develop in one high density business district. Many trade activities in almost every city plans are decentralized with relatively low rise development. [4]

The marginal cost of operating a motorized two-wheeled vehicle is about Rs. 0.70 – 1.00 per kilometer at 2005 prices. Maximum fare box levels for public transport are determined by this. If fares are set higher than this, it will be rather difficult for users to get attracted to public transit systems. So if an assumption is taken that as per 2005 prices in Indian cities an average of 30% families earn less than 5000 rupees per month, then these families are highly unlikely to spend anything more than Rs5.00 per trip on transport.[4] Individual with low incomes are also unlikely to use public transport for short distances. Trips with long distances would easily cost 3 to 4 times this amount on use of metro. Hence, for a significant segment of India's urban cities for some time to come metro transit system are not affordable. Almost every Indian city has use of land in mix patterns and we will not be able to succeeding in

implementing any strict zoning for land use, even if it is desirable. So, many people who live closer to their respective work place can conveniently use bicycle or walk or buses or para transit. [6]

#### 6. Importance of Bus Transport

The rapid growth of urban transport is uneven and uncontrolled. In our cities total area occupied by roads is not sufficient as per demand. It is primary importance for the movement of vehicles. Hindrance is caused in smooth traffic flow due uneven and unregulated modes of transport such as private vehicles, auto rickshaw, two wheelers mopeds, cars, buses etc. with their different. This directly leads to traffic congestion and accidents on the road. Commuters are widely using private vehicles as personal mode of transport due to which there is a rapid growth in of personalized vehicles. [5] It has an adverse effect on the roads by increase in the percentage of vehicles on the road which will directly lead to road traffic congestion. Public transportation system such as bus service uses lesser space of road per person when compared to private mode of transportation, resulting in less congestion on roads. Thus, the road width can be adequately used and congestion can be minimized. There will be reduction in traffic problems because of reduction of number of vehicles on roads. So, from system's perspective bus transportation results in better utilization of road and is more favorable.

#### 7. Literature Survey

Various studies and researches are carried in the field of feasibility of public mass transit system and scheduling and routing. Some of them are following: -

(a) *Review of Capacity Improvement Strategies for Bus transit service (2006)*: [5] Geetam Tiwari and Mukti Advani have studied that due to growth in population and changes in patterns of traveling there is a rapid growth in transportation. Thus, there is a requirement of planning a system, which is efficient, affordable and from the perspective of both users' as well as operators. An opportunity can be created for meeting multiple demands of users and operators by a road based bus service system. This paper is the presentation for review of recent planning programs or practices of selective decisive support systems for improvement of urban bus transit service system. These programs or practice offers an accelerated improvement in bus system to cop up with the requirement capacity of different size cities. For that, it is essential that the bus transit system must be well planned such that they satisfy the demand requirements of users' as well as operator's within the available resources. People are expected to shift to public transport from private vehicles if a flexible, economical, easily accessible and reliable bus transport system is provided. The paper presents an operational strategies and Infrastructural modifications which can be deployed to meet the needs or demands of different cities as Route optimization, Transfer optimization, Feeder buses, Timetable preparation.

(b) *Introduction of Public Bus Transit in Indian Cities*

- (2014): [4] Electricwala Fatema and Rakesh Kumar has studied one of the major thrusts of the Bus Rapid Transit System is to reduce the commuter's dependency on private vehicles and to shift to public transport to make urban transportation system environmentally sustainable. In this paper it is studied that, commuter mode choice analysis is performed that examines behavioral responses to the proposed Bus Rapid Transit System (BRTS) in Surat, with estimation of the probable shift from private mode to public mode. Further, different scenarios of Bus Rapid Transit System (BRTS) were evaluated, using Surat's transportation ecological footprint. A multimodal simulation model was developed to accurately consider private users' behaviors and non-linear environmental impact. The data of the different variables and its impact that might create a modal shift of private mode users to proposed Bus Rapid Transit System (BRTS) were collected through home-interview survey using revealed and stated preference approach. A multi modal logit model of mode-choice was then calibrated using the collected data and validated using proposed sample. From this study, a set of perception factors, with reliable and predictable data base, to explain the variation in modal shift behavior and their impact on Surat's ecological environment has been identified. A case study of the 29 proposed Bus Rapid Transit System (BRTS) connecting the Surat Industrial Hub to the coastal area is provided to illustrate the approach
- (c) *Study on Urban Transportation System for Surat City (2013)*: [1] Bhavesh N Patel, Jigar K Sathawara & M. R. Bhatt carried out the study of existing transport facility for Surat city, feasibility study for the public mass transport users. They also analyzed and evaluated the urban transportation modal share. They concluded that bus systems such as Gujarat State Road Transport Corporation GSRTC and private buses are only in operation, but other modes of public mass transport such as Bus Rapid Transit System (BRTS) or Light Rail Transit System (LRTS) should also be proposed. Along North South and East West corridors, bus mass transit routes proposed with BRTS and LRTS.
- (d) *Availability & Accessibility assessment of public transit system in Jaipur (2014)*: [2] Dharmin. H.Bhatt, Dr. L.B.Zala, & Dr F, S. Umarigar studied that due to the increase in use of more private vehicles in urban cities; cities are facing severe problems such as of traffic accidents, traffic jams and congestion, increased travel time etc. Thus, it has become essential to provide an effective public mass transit system such as bus transit system. They also evaluated and analyzed VITCOS Bus transit service's performance in the Anand city of Gujarat state, India. The results are presented using software as Trans CAD and Geographic Information System (GIS) software. The main objective of this study is to optimize the route of the bus service, by determining the existing characteristics of bus transit system. They carried out spatial and non-spatial data analysis. According to their study VITCOS bus service is unable to run sufficiently throughout the city, there are certain areas where this bus service is not able to operate. So for everyone to take the benefit of city bus service they suggested to provide city bus service in circular manner.
- (e) *Solutions for urban traffic issues by ITS technologies (2018)*: [7] Hiroshi Makino, Kazuya Tamada, Koichi Sakai, Shunsuke Kamijo have studied that Certain cities are using intelligent transport Systems (ITS) to solve the urban traffic issues by utilizing state-of-the-art information communication technologies, and some of them have achieved success. In this paper, it is proposed that the introduction of intelligent transport Systems (ITS) aims at alleviating congestion and easing air pollution by collecting and providing traffic information. Starting from electric toll correction (ETC) to collect funds spent on road development at low cost, it is possible to achieve zero traffic accident. Intelligent transport Systems (ITS), additionally, has the potential to lead to mobile services indispensable for the smart development of cities such as MaaS (Mobility as a service).
- (f) *Impact of New Public Transportation System in Nagpur City (2014)*: [11] Narendra M. Hatwar and V. K. Gajghate have studied that the NPTS i.e. new public transport system is an efficient method to cope up with the city transportation problems as congestion, accidents, environment problems and depleting energy resources, etc. They analyzed society demands and users' as well as operators demands, and proposed centers for management and monitoring design for city bus system in Nagpur city. The main objective for the study is to analyze and evaluate the travelling time and stops and control city bus traffic system. Primary surveys for suitable corridors were conducted by them for developing a network possible for corridors of public transportation and Estimated Travel Cost, Vehicle operation Cost using IRC: SP: 30-2009.
- Further travel time, speed before and after implementing public transport were estimated in city through IRC standards and simulation process. Therefore, there investigation implemented a new plan for introduction of bus service which will provide sustainable transport system which will encourage public to shift from private vehicles towards public transport resulting, reduce congestion problems and a safer cleaner environment.
- Public Transport Research Challenges in India Geetam Tiwari (2010)*: [5] She Studied about public transit systems pose a strong appeal to transportation engineers because they contribute less pollution and congestion, and provide an egalitarian solution to the mobility needs of a city. Encouraging use of public transport as a choice mode is must to meet the future mobility demand. This has to be achieved in the context of high ownership of motorized two-wheeler, presence of informal sector in urban areas and high residential density of slum population in Indian cities. Urban transport and urbanization are nearly interlinked. Consequently, making arrangements for urban transport begins at comprehension the urbanization procedure. India is just 30% urbanized at present, in any case, is relied upon to twofold its urban populace in next a quarter century. An essential normal for Indian urbanization has been development of casual area as an indispensable piece of urban framework. On the off chance that open transport needs to wind up focused as a decision mode, it must be

planned as a framework not simply presenting greater vehicles (transports) or rail innovation. The framework parts incorporate base outline, activity operational methodologies, vehicle plan, institutional structure and money related model intended to meet the particular necessity of public transport uses and administrators.

## 8. Conclusion for Problem Statement

Traffic congestion has been increasing in Dahod city due to use of more private vehicles on road. Due to lack of public transport facility people switch to private vehicles such as rickshaw, chhakdas, two wheelers and car. Being selected in smart city mission as per norms the city should have Bus Rapid Transit System (BRTS) kind of public transport but looking at the present situation it seems very unlikely in the city where not even a city bus system is planned.

As education facility has been increasing in Dahod city, the number of education trips are also increasing on high rate as nowadays mostly student prefer bikes or other two wheeler for education trips because of that traffic congestion also increase in city and moreover students of colleges and government employees working in Government College, Seva Sadan, Panchayat and District Court usually travel by rickshaw, diesel auto or their own private vehicles which also increase traffic problems in peak hours in Dahod city. The pollution level of Dahod city is on curse due to more use of private vehicle so to reduce pollution and sustainable development, city bus system is required. The population of Dahod city is increasing rapidly, as population is growing requirement of city bus service is necessary.

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## Author Profile

Zoeb Taizoon Dohadwala has sterling experience and on field knowledge in Civil Engineering. Zoeb served on various projects of residential and industrial sector as Senior Site Engineer and Quantity Surveyor Engineer.