Executive Summary of
A Critical Evaluation of Bus Rapid Transport System (BRTS), Indore
(Major Research Project sanctioned by UGC)
Principal Investigator: Dr. CA Pramod Kumar Jain
Co-Investigator: Dr. CA Prashant Jain
Project Fellow: Mr. Bhagwati Charan Shukla

Around the world, cities face enormous problems of transport sustainability. Rapidly increasing populations and vehicle use have created gridlock and sprawl, even in very poor cities, as well as rapid growth in oil use and unacceptably high levels of air pollution. This project shows how better bus systems, incorporating new approaches to system design and new technologies, can put urban transportation on a more sustainable path. It covers the area: new bus systems in Indore that are tackling very difficult traffic-related problems.
While many new technologies are emerging to improve buses, perhaps the most important story to be told is that the systems in which buses operate can be dramatically improved. Bus transit can be a premier form of urban travel. A new paradigm in delivering bus services, becoming known as ***bus rapid transit***, is being developed in a number of cities, particularly in Latin America, and shows promise for revolutionizing bus systems around the world. Getting buses out of traffic, increasing their average speeds, improving their reliability and convenience, and increasing system capacities can ensure high ridership levels and increase the profitability of systems. All in all, the package of improvements described in this book, and being tested and implemented in various cities around the world, holds the potential to make all cities more efficient, cleaner, less gridlocked and more sustainable. But it will not be easy. It will require technical assistance and the transfer of experience and learning from successful cities to those just Starting out. Perhaps most of all it will require political will.

The **BRTS** or **Ahilya Path** is the Bus Rapid Transit System for the city of Indore, Madhya Pradesh by AICTSL. It became operational from May 10, 2013. The Indore BRTS project started in 2007 under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). It involves the participation of the Governments of India and Madhya Pradesh, and the World Bank.

The UK-based Serco has won the operation and maintenance contract of the BRT from Atal Indore City Transport Services Ltd (AICTSL), a joint venture between Indore Development Authority and Indore Municipal Corporation, which was set up to operate and manage the public transport system in the city. The Company will operate and maintain the fleet of the 50 low-floor and air conditioned buses. It will also manage the operations control center and a depot for the corridor.

Under the SUTP (**Sustainable Urban Transport Project)**, the Global Environment Facility will fund the setting up of the GPS-enabled Intelligent Transport System (ITS) on the BRTS.

The ITS architecture will boast, among other high-tech features, of advance signal systems based on data-centric algorithms for emergency pre-emption and network surveillance with CCTV cameras. The SUTP also envisages support for the BRTS through two Traffic Signal Prioritization and Automatic Fare Collection plans. These include traffic signal co-ordination

with adaptive signal control and a centralized traffic control centre managing 46 traffic signals and priority for BRTS buses.

The BRTS will have Automatic Fare Collection System (AFCS), which will facilitate off-board fare collection. There will also be a Ticket Office Terminal for issuing "contactless smart cards." Under the AFCS, fares will be collected by a private company on behalf of Indore City Transport Services Ltd.

The company, under a 10-year contract, will be responsible for the supply, installation, maintenance and operation of the AFCS, besides providing the commuters required. A similar contract-based system is planned for the AFCS of BRTS-Ahmadabad.

While the completed BRTS will cover 106 km, connecting all major corridors in Indore, Phase-I of the project proposes three corridors:

1. The AB Road pilot corridor,
2. The Vijayanagar Chowraha-Ujjain Road junction
3. Ujjain Road junction-the Airport.

The current Rs. 130-crore AB Road pilot corridor runs along 11.7 km and will cater to around 70,000 passengers daily.

Indore is a city with a population of about 21,67,447 (as per the latest census of 2011) and has an area of about 3898 sq. km. Currently the travel demands in Indore are met by private modes of vehicles and Para-transit public modes of vehicles (e.g. auto-rickshaws, taxis, short distance mini-vans, and private operator driven mini-buses). There is no organized public sector transport system at the time of conceptualizing of project activity. The project activity is the creation of Bus Rapid Transit System (BRTS) in the city of Indore, the business capital of Madhya Pradesh.
The major elements of bus rapid transit are described below.

Running ways-running ways drive travel speeds, reliability and identity. Options range from general traffic lanes to fully-grade separated BRT transit ways. Stations –Stations, as the entry point to the system, are the single most important customer interface, affecting accessibility, reliability, comfort, safety and security, as well as dwell times, and system image. BRT station options vary from simple stops with basic shelter to complex intermodal terminals with many amenities. Vehicle-BRTS system can utilized a wide range of vehicles, from standard buses to specialized vehicles. Options vary in term of size, propulsion system, design, internal configuration, and horizontal/longitudinal Control, all of which impact system performance, capacity and service quality. Aesthetics, both internal and external are also important for establishing and reinforcing the brand identity of the system. Off-bus fare collection: Conventional on board fare collection slows the boarding process, particularly when a variety of fares are collected for different destinations and/or classes of passengers.

An alternative would be the collection of fares upon entering an enclosed bus station or shelter area prior to bus arrivals (similar to fare collection at a kiosk prior to entering

a subway system). This system would allow passengers to board through all doors of a stopped bus. This also includes smart cards and payment through credit cards. Service and operation plan-designing a service plan that meets the needs of the population and employment centers in the area and matches the demand for service is a key step in defining a BRT system. How it is designed can impact system capacity, service reliability, and travels times, including wait and transfer times.

Bus Rapid Transit System (BRTS) is an innovative, high capacity, lower cost public transport solution that can significantly improve urban mobility. Public Transport System in most Indian cities is rapidly deteriorating because of the increasing travel demand and inefficient transportation system. There are various problems related with public transport such that tremendous increase in number of accidents, Environmental degradation, Congestion, Overcrowding due to inadequate system, Frequency of service and schedule is not strictly adhered. The problem of pollution, safety and inefficiency have reached at a alarming level in most of the major cities in India due to unabated growth of its population -both of people and motor vehicles, combined with inefficient public transport system and poor enforcement of environmental laws etc. Thus, there is a great need to ensure clean, efficient, affordable, effective and safe public transportation system and for this Bus Rapid Transit System could become an appropriate solution. Bus Rapid Transit (BRT) Systems have emerged as one of the important modes of public transport. They are Motorized Transport comparatively flexible, easily accessible, and efficient and also cost effective in terms of being able to transport a large number of people (rather than vehicles). BRT systems can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that result in more passengers and less congestion. This paper presents an overview of BRTS and the salient features of BRTS.

On the basis of socioeconomic factors, travel demand pattern, road network characteristics and corridors are identified for developing the bus rapid transit system extending to a length of 89 Kms. within the city.

Central business districts (CBDs) have continued to prosper and grow in ways that require more transport capacity and improved access. Given the cost and environmental impacts associated with parking and road construction and the traditional urban form of most CBDs, improved and expanded public transport emerges as an important alternative for providing that capacity. In addition, many suburban cities exceed the aggregate employment base of many urban city CBDs but do not currently have the focus and density to make rail-based rapid transit a cost effective investment.

BRTS can often be implemented quickly and incrementally. For a given distance of dedicated running way, BRTS is generally less costly to build than rail transit. Moreover, where BRTS vehicles can reliably operate at high speeds on high-occupancy vehicle (HOV) lanes or general-purpose highways and streets over significant proportions of a given route, running way capital costs will be even lower compared to those for rail modes, which must be purpose-built over the entire distance covered.

BRTS can be the most cost-effective means of serving a broad variety of urban and suburban environments. BRTS vehicles, whether they are driver-steered or electronically guided, can operate on streets, in freeway medians, on railroad rights-of-way, on aerial structures, and underground. BRTS systems can also provide a broad array of express, limited-stop, and local all-stop services on a single facility without complex signal and guide-way switching systems.

Articulated buses could be used with ease. However, BRTS in other countries can handle passenger flows in the range of 5,000 to 25,000 passengers per hour per direction. BRTS is designed and developed to tackle all the drawbacks of the existing bus system in an economical and efficient manner. It is a low-cost option for providing cities with a quality transit option.

BRTS Project was planned to construct Six Lane Roads in Indore City. The Project was targeted to be completed by 2009. But, due to encroachments in various areas, political interference and many other reasons, even 50% of it is not completed. Hence, there is a need to evaluate BRTS Project critically and identify the reasons of success and failure of the same. After 2009 there are many dates proposed for the completion of BRTS project but still the work is incomplete. Ajit Nagar, retired chief engineer in PWD, has experience of overseeing several civic projects in the city. He says selection of the contractor company for such an ambitious project was wrong. Proper rate analysis was not done at the time of issuance of work order. This is clearly visible on construction sites.

The Indore BRTS in-principal was approved with an estimated cost of Rs 96 crore by the central sanctioning and monitoring committee under Jawaharlal Nehru National Urban Renewal Mission (JNNURM). Seven corridors were identified for developing the BRTS within the city for developing in phases. Other public transport routes, which would serve as feeder routes were also identified as per the comprehensive mobility plan.

The incomplete works comprise construction of five culverts and 23 bus stops, flyovers at Bhanwar Kuan and Naulakha, while work on one side of Palasia is yet to start, at Rasoma it started only recently

Construction of 21 bus stops by Indore Municipal Corporation. Contract for constructions has been given to BR Goal, who is not reported to have shown any interest so far. Bus stops will be at Rajeev Gandhi Square, Aditya Nagar, Indrapuri, Bhawarkuan, Holkar College, Zoo, GPO, MY Hospital, Geeta Bhavan, Palasia, Palasia Thana, Industry House, LIG Circle, Press Complex, Shalimar Residency, Orbit Mall, Vijay Nagar, Satya Sai School, Scheme 74, Shalimar Township, Scheme 78 and Lasudiya Mori l All the squares under BRTS are to be redesigned by the IDA. But this work has not begun. Initially, it was started at Naulakha Square but after opposition from the BJP, the rotary was left incomplete.

“The main reason behind inordinate delay in the BRTS is lack of proper sequencing of works. Besides, Tember (system to drain water) is incorrect. Width of the corridor should be uniform across the road but this is not the case here. Therefore, there should be a flyover at

Palasia area." Pithampur industry association president Gautam Kothari is baffled by administration's inability to get encroachments cleared for the project.

" The BRTS project is progressing much faster in Bhopal compared to Indore. Here small hurdles are taking a lot of time to be cleared while in state capital the issue was resolved before actual construction work started.There should be flyover from Geeta Bhavan to LIG square as traffic flow is high there."

The institutional, financial and operational aspects of bus systems must be strengthened. In many poor cities, most buses are run by small independent companies, some of which survive from day to day. These companies are rarely able to make major investments. Systems must be reformed to improve service and profitability, by moving from "bus versus bus" competition on the same route to competition for a license to serve entire routes.When lanes and entire corridors are given over to buses, bus travel becomes increasingly attractive. With such additional features as bus priority treatment at intersections and traffic signals, buses can become a premium form of urban travel, rather than a last resort. "Smart card" ticketing systems can allow easy transfers and multiple trips with one electronic fare card. In such cases, technology "leap-frogging" makes good sense for many cities in the developing world. But unless strong policies to dampen the growth in car travel and, in many places, motorcycle travel are *also* applied, the fight for sustainable transport will be a losing battle. Increasing vehicle and fuel taxes, strict land-use controls and limits and higher fees on parking are important to ensure a sustainable urban transport future. Equally important is integrating transit systems into a broader package of mobility for all types of travellers, for example non-motorized vehicle lanes. Pedestrians and bicyclists are important users of transit, if they can get to it. Finally, all travel is rooted in the electric-drive structure of a city. Electric-drive development should be geared toward avoiding car dependence and putting important destinations close to public transit stations.