Transformation in Road Transport System in Bogota: An Overview†

P Nair* and Deepak Kumar**

This article talks about how the transportation system in Bogota has been changed over the years after the introduction of the services of TRANSMILENIO. With TRANSMILENIO coming into operation, the public transit has been increased because it provides better service to the daily commuters. It talks about how management and operation are being done vis-à-vis how the revenue is being distributed. It is really remarkable to note how* Pedestrian *in Bogota is an important arrangement having well–defined guiding principles which aim at using* Pedestrian *as a tourist attraction since best stores and shopping are always on pedestrian streets. The article concludes saying that India must learn the best practices being adopted in the transport system of Bogota.

"We want a city with more public space for children than for motor vehicles; a high population density and relatively short travel distances; people in public spaces; autonomy and freedom of movement for the children and the elderly; very low levels of noise and air pollution; small children walking out of home to the safety of pedestrian streets; homes with nearby stores, restaurants, movies and cultural activities; abundant parks, pedestrian streets, wide sidewalks, bicycle paths."

– Bogota's vision for city (Planners in the master plan for Bogota).

1. A Background

Transport sector plays an important role in any economy. As far as urban transport is concerned, it is much beneficial if the facility is good to handle the traffic chaos and a fun to the tourist. A good transport facility gives a sigh of relief to city-dwellers in fast moving life and provides quality of life. A good transport facility is the product of a master plan the policy makers and planners have in mind before creating a city. It is a fact that almost every Indian city is non-planned and with the increasing population, the city finds difficulty

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* Consulting Editor, *The ICFAI Journal of Infrastructure*.
** Associate Consultant, The ICFAI University Press.

in handling the traffic. It is because of narrow roads, narrow streets and undefined paths for pedestrian and private/public vehicles. But there are many examples in the world which have managed the city traffic very beautifully and have taken care of pedestrian and the tourist. One of those cities is Bogota, which was not like today. It can be the role model for Indian city planners.

Bogota city is the capital of Colombia having a population of 7 million at 2,600 m above sea level, spread in an area of 340 sq km and having a density of 210 pp/ha.

In the 1980s, it successfully transformed road space. Roads used to be closed to car traffic every Sunday for seven hours, allowing only non-motorized transportation. Today 120 kms. of road space is closed on every Sunday to motor vehicles, and over two million cyclists, walkers, joggers, and bladers take over the streets and make life pleasure to this section.[1]

During the 1990s, Bogota faced critical transportation problems such as:

- Neglect of road maintenance
- A large portion of budget was being swallowed up for road widening and flyovers and despite this there was no visible improvement in traffic congestion. Thus making road maintenance worsen.
- Bogota also faced other critical urban problems like rising pollution levels, high accident rates, increasing population, high crime rate, increasing slums, poor infrastructure and absence of public spaces.

In 1997, Bogota was overwhelmed by its outstanding transportation problems and budget was only allocated for road expansion, construction of overpasses in a few critical intersections.

In 1998, Japan International Cooperation Agency (JICA) thus presented Bogota a "Transportation Master Plan" having:

- A metro system,
- An urban highway and
- Elevated streets

JICA proposed that there are needs beyond survival: "We need to walk, to see people, and spend time with people. We, humans, are walking animals. Public Space—cars parked on sidewalks, or parking bays where there should be sidewalk, are evidence of lack of respect for human dignity. Sidewalks are not simply for getting from one place to another. To say that in a sidewalk there is enough space to carve out parking bays as well as for people to walk by, is equivalent to saying that the city's main plaza can be turned into an open air parking lot, just as long as enough space is left between cars for people to walk by." But Bogota rejected this capital intensive plan.

[1] http://www.greenspiration.org/Article/BogotaBeat.html

After this, the city came out with a comprehensive transport and pollution control plan viz;

- To have a Bus Rapid Transit System, pedestrian, increasing use of bicycles and
- To discourage the use of private automobiles.

This approach demonstrated a viable alternative and thus the concept of Bus Rapid Transit System (BST) came into picture. Bus Rapid Transit is more than a simple operation of public bus services. It now uses:

- Segregated bus ways, rapid boarding and alighting,
- Clean, secure and comfortable stations,
- Efficient pre-board ticketing,
- Giving priority to buses over private vehicles.

2. Transformation in Bogota's Transportation System

Bogota's transportation system consists of:

- A Bus Rapid Transit System
- Pedestrian
- Increasing use of bicycles
- Disincentives for the use of private automobiles.

BRT (Bus Rapid Transit) in Bogota is popularly known as the *TRANSMILENIO*.

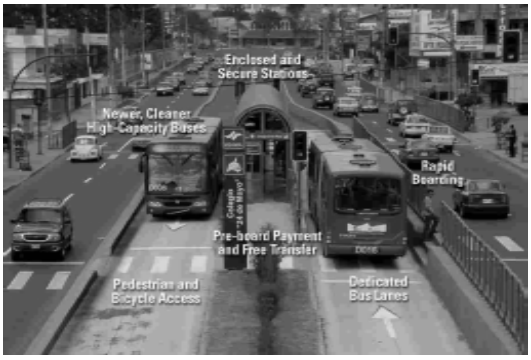
The need of having wide bus network was felt as the private vehicles take more space and create traffic jams. Thus, better bus service was encouraged and discouraged the private car uses. This also gave sufficient space to the pedestrians. The cost was incurred at $5 mn /km (INR 23 cr/km) in 55 km excluding bus ways having 77 stations with eight integration points which now carry 8,75,000 passengers/ work day at 35,000 pp/hour/direction. The project was completed in a time frame of 54 months.

2.1 Bus Rapid Transit System at Bogota has

- Enclosed and secure stations,
- Newer, cleaner and high capacity buses,
- Pedestrian facility,
- Dedicated bus lanes,
- Pre board payment and free transfer facility and
- Rapid boarding facilities.

With *TRANSMILENIO* coming into operation, the public transit has been increased due to a decrease in movement of private vehicles. This shows that the public have found the TRANSMILENEO service better than using personal vehicles. With the decrease in the private

Figure 1: Bus Rapid Transit System at Bogota



vehicles, the time taken to reach between two destinations has also decreased (Refer Table 1).

2.2 Management Control and Planning

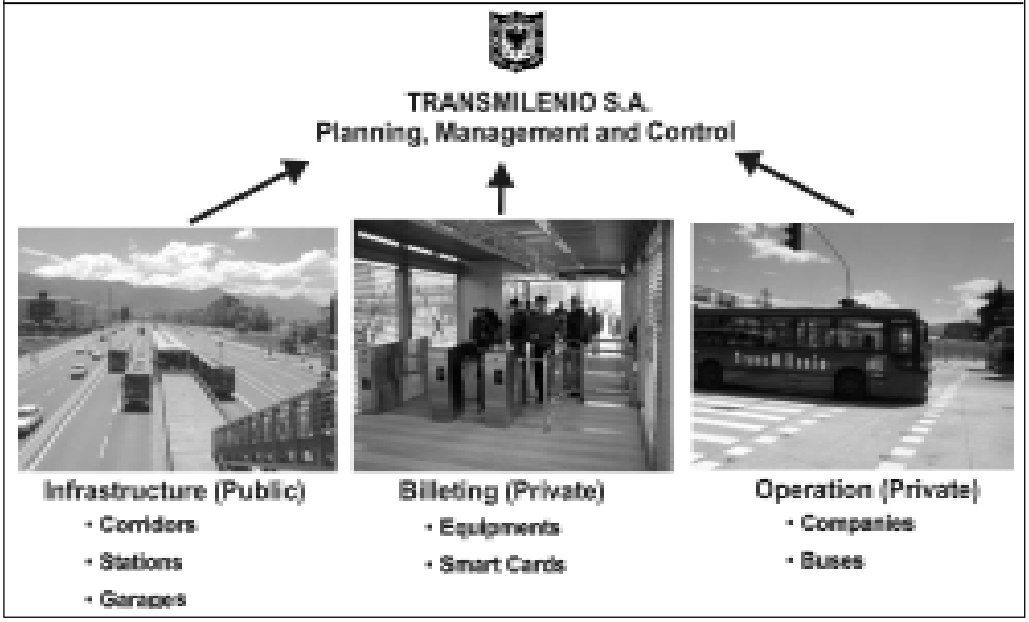
The infrastructure, billeting and operations are important parts of any transport facilities. Infrastructure facilities like corridor, stations, garages, are handed by the government while billeting and operational activities like equipment, smart cards, trust funds, buses and employee care are taken care of by the private sector. Figure 2 elaborated the same.

Average velocity of buses now is as high as 26.2 kilometers per hour and the system moves 35,000 passengers in peak hours but it has been expected to increase the traffic up to 45,000 in a year. The system carries more than 8,75,000 passengers per day. As of now, 55 km of

Table 1: Share of Vehicles in Transit

Modal Share	1998	2002
Modal Share		
Transit	72%	73%
Private Vehicle	16%	11%
Non-Motorized	9%	13%
Other	3%	3%
Average Travel Time BCV	48 min	42 min
STT (2000-2003)	58 min	51 min
Public Perception Transport System	2,78/5,00	3,47/5,00

Figure 2: Transmilenio



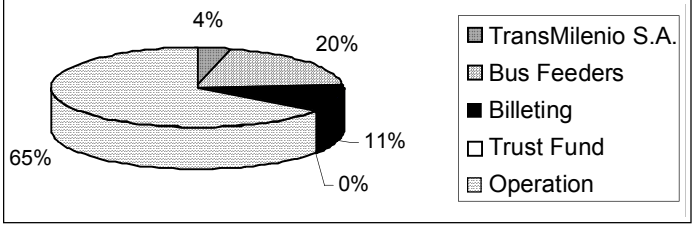
network is there having 77 stations in operation and 560 buses running. But still the noise and air pollution have been reduced by 30% where the network of TRANSMILENIO runs. Recently, the National government has assured US$ 990 mn for the system's construction for the next 14 years.

System operator in BRT, Bogota has a greater role where signaling systems are managed and following operations are done:

- Trunk services use red articulated buses
- Feeder services use green midsize buses
- Buses operated by private companies—payment proportional to kilometers served
- State-of-the-art fare collection operated by private company.

There are two types of buses—red and green. The red buses run in the main road which get the traffic from the green buses. These green buses run off the main road which pick up the passengers and leave them at the red buses. Thus, defining the network between green and red buses has decreased the chaos and the people get fast and reliable services.

Figure 3: Revenue Distribution



Revenue Distribution

As far as revenue distribution is concerned, TRANSMILENIO S.A. gets 4%, Bus feeders 20%, Billeting 11% and Operation companies get 65% (Refer Figure 3). The distribution of this revenue is based on the investments.

3. International Examples

It is worth looking at other such projects to see how Bogota measures up. Such BRTS Projects have already been successful in cities like Jakarta, Beijing, Accra, Dakar, Cape Town, Dar-es-Salaam, Cartagena, and Mexico City. Delhi is also planning a high capacity bus system, bike lanes, and better sidewalks. Delhi has also ordered six Tata Prototype Low Floor, high capacity buses.

Investment Cost in Building the Road Network

From Table 2, it can be found that the cost of lining and bus transit system is comparatively cheaper than Hong Kong Metro, Bangkok, Caracas Metro and Kuala Lumpur LRT Putra. This shows that Bogota has been successful in implementing such transit projects by TRANSMILENIO.

From Table 2, it is clear that TRANSMILENIO has been successful constructing the network in lower cost than many others.

Table 2: Bus Rapid Transit vs. Metro/LRT		
Line	**Capital Cost/Km ($ mn)**	**Actual Capacity (Passengers /Hour/Direction)**
Hong Kong Metro	$220 (Rs. 1012 cr.)	81,000
Bangkok Sky train	$74 (Rs. 340 cr.)	25,000–50,000
Caracas Metro	$90 (Rs. 410 cr.)	21,600–32,000
Mexico City Metro	$41 (Rs. 190 cr.)	19,500–39,300
Kuala Lumpur LRT Putra	$50 (Rs. 230 cr.)	10,000–30,000
Bogota TRANSMILENIO	$5 (Rs. 23 cr.)	35,000–45,000
Sao Paulo Bus ways	$2 (Rs. 9.2 cr.)	27,000–35,000
Porto Alegre Bus way	$2 (Rs. 9.2 cr.)	28,000
Curitiba Bus way	$2 (Rs. 9.2 cr.)	15,000
Quito Bus Rapid Transit	$2 (Rs. 9.2 cr.)	9,000–15,000
TransJakarta	$1 (Rs. 4.6 cr.)	8,000

4. Bogota's Achievements

Pedestrian in Bogota is an important arrangement and it has certain guiding principles which aim pedestrian to be used as tourist attractors as best stores and shopping are always on pedestrian streets. In Bogota *Pedestrian* comfort and safety are more important and streets are kept safe for tourists, children, senior citizens and disabled.

Bogota built a long promenade for pedestrians and cyclists. This has rejuvenated old and dilapidated areas of the city as *Pedestrian* streets are now integrated with *TRANSMILENIO* for better transport. It is a sense of pride and belongingness. In 2002, 7,000 families paid an additional 10% property tax to be invested in education, public space, bikeways and public transport.

4.1 Bicycle Paths and Car-free Day

Bogota built 300 km of bicycle paths. Construction of bicycle paths is an important step to control and manage the city traffic. Bicycle paths make streets safe and comfortable for bicycles. It also promotes cycle trips at the cost of motorized trips and provides high quality, a continuous cycle path which integrates cycle paths with the TRANSMILENIO. By providing a different stand to bicyclers, *TRANSMILENIO* ensures that people meet in public transport, public spaces, during walking thus creating awareness of "equality" amongst citizens.

Bogota's first Car-Free Day was observed on Thursday, February 24, 2000. The whole urban area was restricted to cyclists, pedestrians, rollerblades and users of public transit. Public pressure, with help from the police, ensured that no cars entered the car-free streets. It was a smashing success. It moved seven million people by public transit and bicycle. Over 800,000 cars were left at home, and 1.5 million people moved by bicycle.[2]

4.2 Transport Solutions for a More Egalitarian and Environmentally Sustainable City

Over the next 30 years, the urban population of the developing world will increase by two billion inhabitants. The environmental and social sustainability of the world depends

[2] http://www.greenspiration.org/Article/BogotaBeat.html

to a large extent on what is to happen in the developing world. It is much less clear to all of us what the ideal environment is for a happy child. We cannot design a transport system unless we know what kind of city we want. If a city is good for children, for them to move about and play freely, it will be good for everybody else.

The *TRANSMILENIO* states that cities in the Third World are different as the population is increasing and there is high populated density with extreme poverty and inequality. TRANSMILENIO believes however that a new city must be based on higher equality, happiness and competitiveness.

Provided this reality, *TRANSMILENIO clears* that "our possibilities and aspirations are different, in order to advance towards greater social justice and happiness". It says that we need an appropriate urban model; different from that of economically advanced countries. It further adds, "The way we build our cities and organize city life can be a powerful tool for constructing a more egalitarian and integrated society. Quality of life distribution is more important than income distribution." *TRANSMILENIO* believes in creating a model in which *HAPPINESS*, rather than consumption levels is the measure of success as the traditional scheme of looking for equity, increasing taxes to provide social services has a limit. A country cannot have taxes above international levels, because investments, that generate employment and wealth, leave to elsewhere. We are in the knowledge and creativity era. We need to build cities that attract our best professionals. A city experience can be memorable when there is good *pedestrian* and then it becomes a tourism attraction. When shopping malls replace the public space as a meeting place, it is a clear symptom that a society is sick. In all great cities, the most exclusive stores are located along public spaces and not in shopping malls. We must build cities for children's happiness rather than cars' mobility. Traffic jams without public transport are relatively useless; so is public transport without traffic jams or some other form of automobile use restriction.

With the above facilities, it has been found that velocity of buses has increased by 44% and there is a reduction of 29 minutes in travel time (from about 1 hour daily). With the restriction of circulation of 40% of cars during peak hours, there is 16% reduction in pollutant agents and 10.3% reduction in gasoline consumption (Refer Figure 4). During these13 hours, all citizens meet as equals in public transport, bicycling or walking. It builds community. In the referendum of October 2000, nearly 64% of Bogotanos approved an annual car free day. Majority voted in favor of a proposal to ban the circulation of all the cars every weekday between 6 A.M. and 9 A.M. and between 4:30 P.M. and 7:30 P.M. from January 2015 onwards.

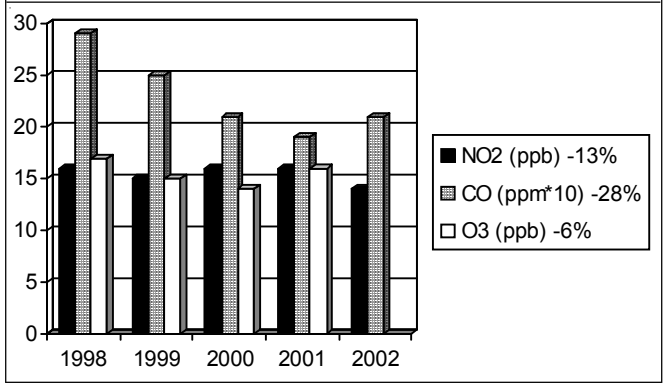
Because of the above things in action, there is reduction of pollution levels from 1998 to 2001. However, there has been a slight increase in pollution in the year 2002 (Refer Figure 4) as Bogotá riders have increased from 0.4% to 5% of population. On the other hand, Bogota's bicycle ways are symbols of equality and respect for human dignity.

5. What India can Learn from Bogota?

The case of Bogota was not dissimilar to Indian cities. In 1998, Bogota had a disorganized road network with totally no scope to move for pedestrians. Now, with little cost, a sea

change has taken place. There is no reason why India should not have such an impressive and cost-effective system. The need of the hour is to think of the type of city profile India needs. With the service sector playing a larger role and with increasing education, a pollution free environment, is becoming an absolute necessity. Simultaneously, we have to change attitudes. Is it always wise to travel by the private cars and create traffic jams? Such road jams can always be seen during the peak hours in Indian cities. There is also an ego issue, in traveling by bus, which is not present in many developed countries of the world. A clean and comfortable bus, offers many advantages, not least the chance to rest, and converse with friends. Once this culture catches on, the roads will de-clog and the environment will improve considerably.

Figure 4: Pollution Level Over the Years in Bogota



Bogota has been successful in checking the private vehicles during the peak hours, because it has developed an excellent system, which is attractive to the travelers. It has been consistently found (even in India) that the end user is willing to pay, if he is assured of quality service. He does not like to pay more for the same product. In some cities there are three ranges of buses—metro, general and Volvo buses. People do not mind paying an extra rupee if the halts are less as in the case of Metro buses.

It was felt that the city of Ahmedabad could be a good starting point for trying out this experiment in India. The 132 ft road is a good place to start, as there would be sufficient space to start these tracks. The outer ring road could also have such options and possibilities This would convert Ahmedabad into a walking and bicycling city, at least in the suburban areas, with substantial reduction in the pollution and improvement in the quality of the environment. It can have:

- Dedicated bus lanes on trunk routes
- Well designed bus stops with ticketing
- Stations for interchange with urban/suburban trains and with feeder bus routes
- Rolling stock of bi-articulate buses for trunk lines, regular buses for feeder routes
- Maintenance facilities for the buses

6. Conclusion

What we conclude from this study therefore is that it is not necessary to make very expensive investments to have a good mass transit system in a developing country. It

is not necessary to ape the developed countries all the time. Their *needs are different and their perspectives are different*. What is really necessary in a developing country is to get people from one place to another in the cheapest, and most cost and time saving manner. *Comfort and personal convenience may be less of a priority than cost and time*. It is most necessary that planners take account of this and look for more economical and cost-effective solutions.

This is precisely what the planners had done in Bogotá. By focusing on proper buses, cycle tracks and busways, they have not only catered to the common man, but encouraged others to stop their regular use of cars, and use public transport instead. The kind of monumental savings made, and passenger load, is to be seen.

Now the question is how to translate all this into Indian conditions. Some of the key parameters would be:

- The cost-effectiveness
- The social acceptability
- The involvement of Private Partners
- The integration of the "hub" and "spoke" of Urban Transportation i.e., how all the various parts fit together and proper coordination for the same.

A mass transit system is certainly a mighty challenge of Urban Planning, but Bogota has certainly shown the way, and emerged as a success story. It is up to the Indian planners to see how much can be learnt from this experience.

There has been some attempt to compare the situation with Ahmedabad, but surely such comparison would hold good with other cities such as Bangalore, Hyderabad, Pune, NCR etc., which are absolutely crying out to have such comparable urban transport.

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