LMA Convention Journal
Vol. 11, No. 1, 2015, 21-24

SMART MOBILITY FOR INDIA: NEEDS, OPPORTUNITIES & CHALLENGES

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India finds itself in a precarious situation. While the lack of efficient and effective mediums of mobility for public-at-large outside metropolitan cities continues to cause loss of productivity and stifle economic growth in a considerable manner; the economic growth in major urban centres and the resultant growth of passenger vehicles and two-wheelers is leading to heavy traffic jams and pollution, again causing loss of productivity and chocking of economic growth. This article argues that a viable solution to these entwined and complex challenges lies in implementing "smart mobility" solutions. This could prove to be the next growth driver and present immense opportunities for Indo-German collaboration, in both private and public sectors.

An acquaintance recently posted an exasperated message on Facebook after she had required a full 12 hours to cover a distance of less than 240 kilometres from Delhi to Rishikesh. Situations like this are still commonplace notwithstanding the enormous progress that has been made in the development of road and other transport networks in recent years. The mobility challenge in India spans all mediums of transport in all spheres, be it the intra-city travel within metropolitan areas or the inter-city travel by road, railway or air between two given places (cities, towns or villages). The lack of efficient and effective mediums of mobility is leading to loss of productivity and other socio-economic costs, even as long and cumbersome journeys on a regular basis negatively affect productivity.

For example, while a person in an industrialized country can easily travel a distance of 500-600 KMs by road, rail or air, attend a business meeting and return the same day, in India it is possible that there is no airport in the town; and travelling by road or rail may cost two to three days for a return-trip. Especially the frequency of connections is also thinner. That shows that a working professional would spend much more time on travelling than on his original "productive" task. The long-distance would also require a greater period of regeneration to return to his normal level of productivity. Intra-city travel too can cause loss of productivity due to precious time lost in traffic jams. Additionally, there are also non-economic costs, e.g. working professionals have to spend a considerable part of their precious vacation time travelling, effectively reducing the period of recreation. The non-economic social and personal costs can be even considerably higher when, for example, ambulances get caught in traffic jams, in some cases leading to loss of life.

IMPORTANCE OF AFFORDABLE AND EFFICIENT MOBILITY

Historically speaking, affordable and efficient means of mobility for public-at-large have been found to be crucial enablers of economic growth. In their seminal work "How the West Grew Rich", Nathan Rosenberg and L.E. Birdzell have identified affordable and efficient means of transportation as a crucial factor for economic transformation of the industrial world. India continues to register significant socio-economic losses on this front, despite the substantial growth of the previous decade. With a large population of the youth, India is a "young" and aspiring nation on the

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path to economic development and urbanization. Mobility is going to become a key requirement in the time to come, as India prepares to become the third largest economy of the world by 2050. As Table 1 shows, the number of households owning a transport vehicle increased significantly, both in absolute numbers and as a percentage of all households, between 2001 and 2011. Even then, there is a significant scope of growth for 2- and 4-wheelers in the time to come.

Table 1: Ownership of transport assets in India's households

Category	Census 2001		Census 2011	
	No. of Households	Share	No. of Households	Share
Total Households	192 million	100.0%	247 million	100.0%
4-wheeler owners	4.8 million	2.5%	11.6 million	4.7%
2-wheeler owners	22.5 million	11.7%	51.9 million	21.0%
Bicycle owners	83.9 million	43.7%	110.7 million	44.8%

A study of India's national innovation system co-authored by this author (published in 2008 by Hawaii-based East-West Center) discovered that firms faced negative repercussions of the mobility challenge in India. Management of several domestic and foreign firms cited long traffic jams and rush-hour travel as negatively affecting the innovative capacities of their employees. The study reported: "Traffic jams etc. lead to loss of valuable time. One possible solution is thought to be to shift the facilities to smaller cities or rural areas. This however is fraught with the risk of higher attrition. Experience shows that 20 to 30% of the employees leave the firm if moved to hinterland." Another study of the ease of urban mobility in 66 major cities worldwide conducted by business consultancy firm A.D. Little (in 2009) ranked Indian cities in the lower half of all cities investigated. While Mumbai was best placed with a rank of 37, followed by Kolkata (41), Delhi (45) and Hyderabad (50); Bangalore (59) and Chennai (61) tailed the list. Only Bangkok, Jakarta, Manila, Tehran and Atlanta fared worse in that order. Hong Kong (1), Amsterdam (2) and London (3) topped the list; Shanghai was placed 11th on the list.

The challenge related to smart mobility in India may be illustrated by Figure 1. Continuing population growth, the high level of economic growth of the previous decade and the interrelated trend of urbanization are increasing pressure on a transport infrastructure, which was already suboptimal in the first place. "Smart mobility" solutions can enable and/or enhance affordable systems of public transport and the means of personal mobility in areas where an extensive network of public transport is not feasible; while simultaneously catering to environmental concerns. Such solutions have the potential to increase public and private welfare while unleashing a new wave of economic development.

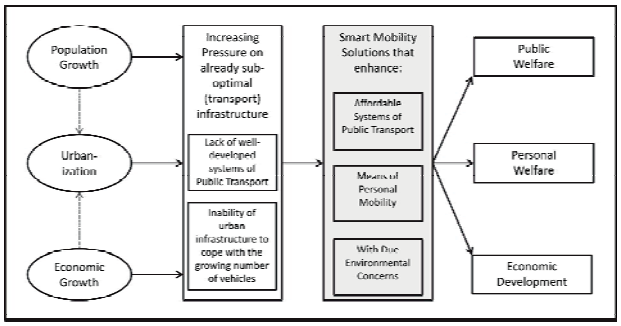

Figure 1: The "smart mobility" challenge in India

A study by co-authored by this author published in in the Swiss Journal of Business Research and Practice (2012, Vol. 6, Issue 3) found that affordability-driven frugal innovations present an excellent opportunity for Indo-German collaboration in open global innovation networks.

DEFINING SMART MOBILITY FOR INDIA

Whereas the use of term "smart mobility" "in the context of developed countries generally refers to employment of intelligent, ICT-based solutions (telematics) that can ensure ease of individual transport in megacities while attending to environmental concerns, in India's context the term has to be redefined to include all modes of transport that can potentially enable ease of individual transport in rural and semi-urban areas as well as in urban megacities while attending to environmental concerns. Achieving this purpose requires creation of sustainable mass transportation systems, as well as a greater penetration of environment-friendly motorized

vehicles for personal use, keeping in mind that the distances to be covered in India may be large, both intra-regional and inter-regional.

SCOPE FOR INDO-GERMAN COOPERATION

The challenges described above point towards possibilities of significant magnitude for Indo-German collaboration that can take place on three planes. First, India's passenger car market is expected to continue growing in the medium to long run and is expected to outperform most other car manufacturing nations according to studies of the Economist Intelligence Unit (see Figure 2, author's illustration).

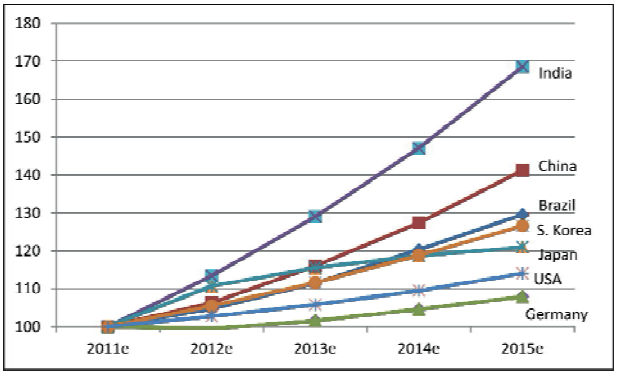

Figure 2: Expected growth in the car market in selected countries (base 2011 = 100)

German carmakers have so far failed to capture on this opportunity. The cumulated share of four large German carmakers in India, i.e. Audi, BMW, Mercedes and Volkswagen in India, languished at below 5% at the end of FY 2012-13. This is not surprising because India's market is dominated by small cars (80%), but there is hardly any small car in the product portfolio of German carmakers in India. This was even when India's car market boasted of nearly 60 small car models in about 250 variants. Successful examples of small cars from the stables of Hyundai and Toyota are selling at around $16,000 a piece, which shows that the products need not always be "cheap", rather it is about the overall *cost-of-ownership* including fuel efficiency and maintenance costs. Accessing customer segments in the small car market could provide India with an affordable mobility while providing attractive business opportunities for German carmakers and component suppliers.

Second, the segment of commercial vehicles, especially buses, has been largely neglected in India. For example, the share of buses in all registered motorized vehicles in India is estimated to have stood at merely 0.9% in 2011, way down from 11.1% in 1951. In this same period the share of goods vehicles also went down from 26.8% to 3.8%, as data from Society of Indian Automobile Manufacturers (SIAM) reveal. German manufacturers and component suppliers of commercial vehicles could try to exploit this vast opportunity as Volvo is doing in the segment of buses (passenger carriers) in the luxury and semi-luxury segments.

Finally, India's infrastructure sector provides a great opportunity for investment and private-public partnerships (PPP). According to the author's calculations based on India infrastructure Report 2011, India's annual investment in the infrastructure sector have grown three-fold in the past 12 years, from less than $30 billion in FY 1999-00 to more than $100 billion in FY 2010-11. Tapping this sector could help India expand its transport infrastructure and make it more efficient, while opening new business opportunities for German firms.

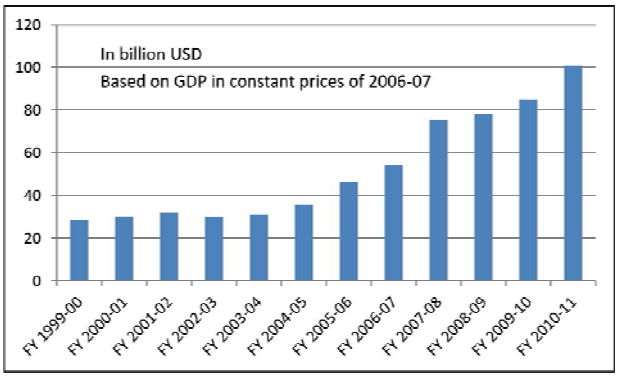

Figure 3: Investments in India's infrastructure sector

SUMMARY

Summarizing, it may be stated that India faces an enormous challenge for ensuring smart mobility. But the other side of the coin is the enormous chance, probably not present anywhere else in the world, a one-time opportunity. The mobility sector in India – in all facets and variations – is a sunrise industry and provides for excellent growth opportunities. Solutions developed for India could be ideally used in other

developing countries at a later stage. Since environmental issues concern all and have a global impact, it is imperative for everyone to strive for solutions that contribute to long-term sustainability of the ecological balance and economic welfare.

Note : An earlier and shorter version of this article was published in GermanyContact India (Issue 02/2012, August), p. 16-17.
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(Sept. 2015)