

## **Benchmarking: An Tool to Evaluate the Performance of Information and Fare Integration in a City**

*Gaurang Joshi<sup>1</sup>, Shriniwas Arkatkar<sup>2</sup> and Nandan Dawda<sup>3</sup>*

### **Abstract**

Rapid urbanization, a rise in population, and a booming economy have stimulated the growth in cities and resulted in higher dependence on private vehicles for personnel mobility. This has raised issues over the sustainability of transport infrastructure in cities. Public transportation systems (PT) can help achieve the goal of sustainable transportation, but they face tough competition from other private and informal modes of transport. Hence, to ensure sustainability, the existing transport systems, i.e., both public and private, need to re-plan their operations to complement each other. To achieve this aim, the development of multimodal transportation has emerged. Technically, a multimodal transport system (MMTS) has five levels of integration, i.e., physical, operational, institutional, information and Pricing or fare setting. Among these, the Informational and fare setting (I&F) can be achieved easily by developing a trip planner and unified fare collection system. As a result, various cities across the globe have tried to achieve I&F integration and developed trip planners. However, if we evaluate these trip planners, they have considerable variations in their features and characteristics. With this background, the present paper attempts to evaluate the performance of trip planners of twenty-six cities across the globe using benchmarking technique. For the evaluation of I&F integration, based on the detailed literature review, the checklist was designed to measure the degree of I&F integration. The checklist contained six major components, i.e., design of Trip Planner, Information available in Status Updates, Availability of Maps, fare integration, help & contact, and other information. Twenty Indian (Surat, Vadodara, Kolkata, Nasik, Nagpur, Chennai, Chandigarh, Bhopal, Bangalore, Ahmedabad, Kanpur, Prayagraj, Agra, Varanasi, Indore, Amritsar, Pune, Mumbai, Bhubaneswar, and Delhi) and six international cities (London, Singapore, Hong Kong, Paris, New York, and Munich) were evaluated. Finally, their composite information & fare performance index was obtained. To design the I&F performance index of the city, the information available in the mobile-based application was compared with the available checklist. It was observed that Indian cities lag in status updates and other information components. Further, a composite information & fare integration index for all cities was calculated (CI&FII), representing the information and fare integration level achieved in the cities. The CI&FI values of only two Indian cities, i.e., Delhi and Mumbai, were competitive with international cities while the other Indian cities were lagging. Availability of dynamic real-time information of transit stops and transit routes, development of distance-based fare structure for all the public modes of transport, and designing a definitive guide book related to I & F setting are the essential recommendations proposed to improve the MMTS of the (cities).

**Keywords:** *multimodal transport system, information and fare integration., sustainable transport system*

Authors Details;

1. Professor, Sardar Vallbhbhai National Institute of Technology, Surat,  
[gjsvnit92@gmail.com](mailto:gjsvnit92@gmail.com)
2. Associate Professor, Sardar Vallbhbhai National Institute of Technology, Surat,  
[sarkatkar@gmail.com](mailto:sarkatkar@gmail.com)
3. Research Scholar, Sardar Vallbhbhai National Institute of Technology, Surat,  
[nandandawda@gmail.com](mailto:nandandawda@gmail.com)