

Frequently Asked Questions (FAQs) in Public Transport Research

What are the qualities of public transport that are relevant for users?

Planning for low-carbon mobility that promotes public transport, walking and cycling modes is a key step towards sustainable mobility in cities. Choosing the right pathways to sustainable mobility is of particular importance to growing cities, which are faced with a high population growth rate, pressurized public transport systems and a heavy reliance on the private car. Congestion and a transport planning culture that places more prominence on the private car, has created a vicious cycle of increased private vehicles on the road, followed by an inclination to expand the road network, which leads to users buying even more cars. It is thus vital for stakeholders in these cities to interrogate what measures need to be taken to influence changes towards a decrease in private mobility to mass mobility through promoting low-carbon public transport.

The following are the most important requirements of the public transport system from users of medium sized cities: *reliability, frequency, fare levels, personal security, the extent of routes and information.*

Reliability refers to how consistently and predictably the public transport system operates. It was found that regardless of the geographical context of users or the actual performance of the transport system in their regions, the need for reliability was of utmost priority. Frequency came in second pointing to the need for continuous supply of public transport service to users. Fare levels and personal security was third but subjective as it varied based on local and/or national circumstances. Some contexts which were perceived to be safer, had a higher income level or subsidized transport did not cite this reason. However, contexts with a higher probability for high fares and cases of insecurity in public transport reflected this in their results.

The location of stops and stations, transfer issues, comfort, facilities of vehicles-stations-stops, and safety from accidents were of moderate to varying importance. This is interesting as it shows the subjective nature of user requirements based on personal experience. This becomes increasingly clear in other non-ranked results of the study which showed that different lifestyles and/or psychological make-up had a large effect on the ability and willingness of users to make a shift from private to public transport.

User perception and behaviour is significant in public transport planning and should therefore be given due consideration. Research shows that user perception is subjective and varies based on a multiplicity of factors. However, certain qualities remain consistent regardless of the variations in factors. These are: reliability, frequency, security (both personal and from accidents), connectivity (the extent of routes) and information.

What is the ridership attraction for bus and rail services?

Research on the ridership attraction of rail and bus reveals that the qualities that are relevant for users remained consistent with other research on other modes but with some minor variations in terms of order of priority. The qualities that impact the ridership attraction of bus and rail services are reliability, information availability, comfort, safety from accidents, security from crime and availability. There is a slight preference for use of rail over bus due to the reduced instances of transfers in the former. However, it is also seen that a high-performance bus service can potentially be a substitute for rail service.

What is the user willingness towards public transport?

Various factors influence users' decision to use either private or public transport. Research has investigated on what factors influence commuters to ride an integrated public transport system. These factors have been categorized into three: Psychological, operational and policy factors.

The theory of planned behaviour is key in understanding psychological factors. Psychological factors stem from the characteristics of the trip such as the reason or purpose of a trip, the timing and frequency of the trip and the demographic of users for example, their age, gender, or socio-economic status. Older people are less likely to choose public transport as their preferred mode of travel. Likewise, as users improve their socio-economic status, so does their willingness to use public transport decline. Women are also seen to be more likely to use public transport for reasons other than commuting. Other psychological factors include quality of services, connectivity, budgetary considerations, accessibility, and distances both from an access perspective as well as a commuting perspective. Interestingly, research has shown that users often demonstrate a psychological resistance to switching to public transport with private vehicles being preferred from their perceived instrumental function of comfort, freedom, and convenience; symbolic function of socio-economic status and affective function since users derive pleasure from driving.

Operational factors such as personal safety, reliability of connection, transfer time and information related to transfers are established as the most important.

Policy factors can be distinguished as "push" and "pull" measures. The aim of "push" measures is to reduce the attractiveness of private vehicles, while "pull" measures seek to increase the attractiveness of sustainable public transport. Policies are categorized into legal policies, information and educational policies, economic policies, and physical-change policies (e.g., infrastructure).

How is the Cost-Benefit Analysis used in public transport planning?

High quality transport systems often require high investments due to the important role that the sector plays in the development of any economy. The transport system today consists of users, destinations (nodes) and infrastructure with the latter being the backbone. In fact, there is no transport system without transport infrastructure. According to the International Transport Forum, the quality of transport infrastructure is a key indicator of performance and the development of transport infrastructure supports strong economic growth. It is for this reason that countries and governments expend significant portions of their annual budgets to build, maintain or improve their transport infrastructure.

Huge volumes of project proposals for infrastructure investments are constantly being formulated and submitted for public funding in a bid to meet the ever-growing, ever-changing mobility needs of the society. This creates pressure on decision makers to identify the most viable projects that promise significant benefits to society at a reasonable cost calling for informed decision-making. Consequently, various tools and methods have been formulated over the years to support decision making in the transport sector particularly in megaprojects. The cost-benefit analysis method is one such tool.

As the name suggests, the Cost-Benefit Analysis (CBA) is a tool that estimates and totals the costs and benefits of a project to the society in order to demonstrate, in principle, the worthiness of a project. To do this, there needs to be a common unit of measurement or 'bottom line', which is expressed in monetary terms in the CBA. Cost Benefit Analysis must be defined within a physical area e.g. a city, region or country.

By reducing the positive and negative impacts of a project to their equivalent money value, Cost-Benefit Analysis determines whether on balance the project is worthwhile... When all has been considered a worthwhile project is one for which the discounted value of the benefits exceeds the discounted value of the costs, i.e., the net benefits are positive. This is equivalent to the benefit/cost ratio being greater than one and the internal rate of return being greater than the cost of capital.
(Watkins, 2020)

What are the pros and cons of the cost-benefit analysis?

Researchers have identified several advantages and disadvantages associated with the use of the cost-benefit analysis in large transport infrastructure projects. The benefits are that the CBA provides a tool for decision making, enables screening and ranking of projects to create priority lists, helps in developing more cost-efficient investments, and provides a harmonized method of analysis across jurisdictions for similar or future projects.

Some of the major criticisms of the tool are that the cost-benefit estimations are consistently different from the actual costs and benefits, the tool has in-built technical weaknesses, it is subject to bias, can easily be manipulated to suit preferred interests and it does not capture all relevant factors.

The cost-benefit analysis is a useful tool that has aided decision making in mega projects for many years. However, as with many others, it is not a perfect tool. In order to mitigate against the weaknesses of the CBA, it is important for decision makers and investors to carry out independent studies before taking the promises of a CBA at face value.

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