The value of individual services to the public transport network

Developing a more comprehensive approach for measuring the value of individual services within the public transport network was the aim behind recent research.

Conducted by Abley Transportation Consultants in Christchurch, the study sought to understand and appraise the additional incremental value that is added to a public transport network by services that in isolation may be comparatively inefficient.

'Through identifying and understanding the elements that influence the value of public transport, the research aimed to develop a more comprehensive approach to quantifying the broader economic and social impact of the removal or addition of network services,' the report says.

Having access to this information will enable practitioners to measure more consistently the broader social and accessibility value of public transport, in addition to economic value. It will also enable them to compare the benefits and costs of making changes to the network, taking into account the many trade-offs that any such change inevitably involves.

'Developing a comprehensive mechanism for measuring the value of public transport is important to gain a greater understanding of existing networks and plan optimal future networks,' the report says.

The research

The New Zealand Government has a key strategic goal of improving the effectiveness and efficiency of public transport, and in recent years has made substantial investment in systems and infrastructure designed to improve network efficiency. While peak services on high-frequency corridors with high patronage are generally operating efficiently, other services, such as evening or feeder services, typically have low fare-box recovery, and as such are perceived as having low efficiency. However, these services are likely to be contributing to higher passenger numbers elsewhere across the network and in doing so, adding value to the network as a whole.

At present, mechanisms for measuring the value of public transport in New Zealand are limited and generally only consider the financial aspects of service provision. The research project aimed to address this situation by developing an approach for appraising public transport provision that assessed the tangible economic value, based on revenue and operating costs, as well as reflecting the social impacts of a public transport service. In particular, the research set out to:

- determine the best method for appraising the value of isolated services, considering their contribution to the wider network, and the economic and social value of the service to the community
- improve clarity around the links and synergies between individual services, the community and the public transport network as a whole
- develop a framework to help network planners understand and value the contributions of individual services, and to assess the impact that reducing or increasing low-patronage services will have on the value of the public transport network as a whole.

The research drew on literature reviews and stakeholder consultation to understand the elements that contribute to, or impact on, the value of public transport. These elements fell into eight broad impact categories, as shown in the table below.

Elements that impact on the value of public transport	
Impact	**Benefit/dis-benefit**
Cost	Change in development cost due to parking supply/demand
	Traffic enforcement variation resulting from change in traffic volume
Land use	Relationship with property value
	Land use accessibility/integration
	Accessibility, connectivity and coverage of transport network
User/social	Travel and vehicle ownership cost savings
	Social inclusion – accessibility to jobs, education and other facilities
	Community cohesion
Health	Access to healthcare
Mobility	Low cost, affordable transport option

Elements that impact on the value of public transport	
Impact	**Benefit/dis-benefit**
Environmental	Pollution (air, noise) through change in private vehicle use
	Energy efficiency or resource cost change in per capita vehicle mileage
Road safety	Improve general road safety through reduced traffic crashes
	Crash reduction through congestion relief
Mode shift	Patronage change

The research then drew on data from several data sets, including Auckland Transport HOP Card and General Transit Feed Specification data, within a geographic information system environment, to evaluate an isolated component of a transport network. From this process, a proposed framework was developed.

The framework

The framework presents an integrated network approach for considering the economic and social implications of a change in service provision, which can be used to support investment decisions and funding applications and assessments. The approach modifies one of the simplified procedures in the NZ Transport Agency's Economic evaluation manual (EEM) to take into account the additional contribution to the network of a spatial or temporal change in service provision, through considering the value of a service to the network as a whole, and supplements this by addressing the social value of the change.

Two case studies are presented in the research report, one in Auckland and a second in Hamilton, to demonstrate the application of the approach and how it modifies the EEM simplified procedure. A proof of concept, developed as part of the research, provides guidance, and using the case studies as examples, demonstrates the ability to develop an understanding of the value of a service, and the additional value it adds to the network and the community it serves.

The report also contains recommendations for how the findings of the research could now be built on and implemented, including the development of an assessment tool for practitioners. The aim will be to develop a tool that closely aligns with, and complements existing economic evaluation tools provided by the Transport Agency, to inform assessments of public transport service reviews in the future.