Stephen Selwood

Strategic Decision Making Frameworks

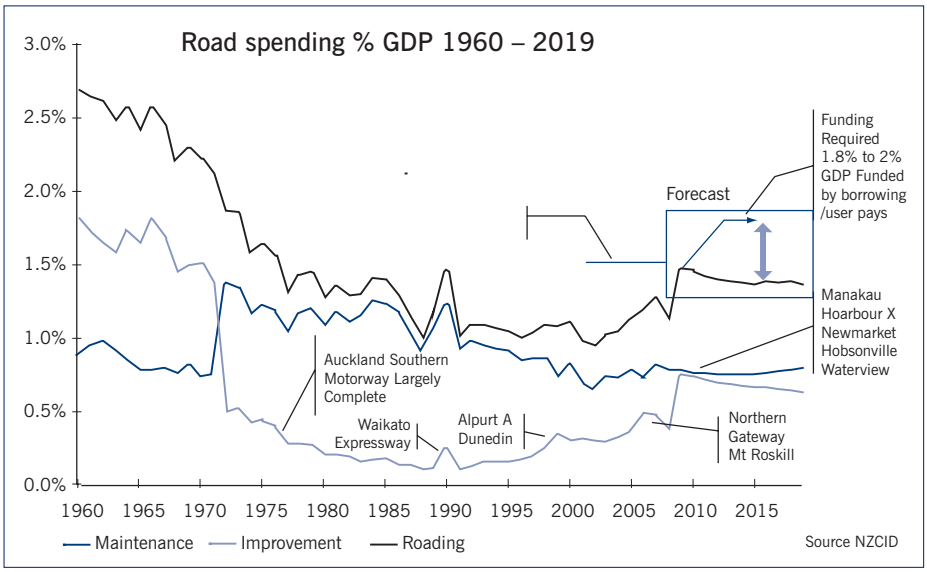
The New Zealand Council for Infrastructure Development (NZCID) considers that there is a need for a much more strategic, more sophisticated and better balanced approach to prioritisation of infrastructure investment in New Zealand. This was one of the key reasons why NZCID was a cornerstone funder of the New Zealand Centre for Advanced Engineering (CAENZ) study into improving capital investment decision-making frameworks. In commenting on the need for reform of decision-making frameworks, this article traces the history of public sector project prioritisation methods, with a particular focus on transport. It critically assesses the approach used in conventional cost-benefit analysis (CBA), as applied during the 1990s and early 2000s. CBA is then compared with the much more politically driven approach adopted from 2003 onwards. The paper concludes by arguing that New Zealand must develop more strategic project prioritisation and decision-making methods which appropriately value economic, social/cultural and environmental benefits and costs.

Looking at investment in national infrastructure as a percentage of GDP since the early 1970s, some interesting trends emerge (see Figure 1 in John Boshier's paper in this *Policy Quarterly*). The first decade was characterised by a significant level of investment in transport and energy infrastructure. Gross fixed investment as a percentage of GDP ranged between 4% and 6%. Major projects completed included the Manapouri hydro scheme (1972), Auckland's Southern Motorway, largely completed by the late 1970s, and the 'think big' projects, including the Huntly coal generation plant, in the early 1980s. But the decade of the 1990s and early 2000s were characterised by a comparative low level of investment. There were three main drivers of this. First, having built some national infrastructure capacity, we were able to live on this for some time. Secondly, the less successful 'think big' projects created a reactionary trend against central planning in favour of the decentralised market approach. Most significantly, the nation faced significant capital constraints because of a high level of national debt, a legacy of some profligate spending during the 1970s.

Perhaps the most notable example of this capital constraint is the transport sector. Rail went through a decade of divestment during the late 1980s and early 1990s under its new corporatised and then privatised structures. In roads, only projects with a benefit-cost ratio (BCR) of 4:1 were even considered for funding. Benefits assessed in the traditional BCR analysis were heavily weighted to travel time savings and safety improvements. In addition, a high discount rate of 10% was

Stephen Selwood leads the New Zealand Council for Infrastructure Development's advocacy of and investigation into key infrastructure development issues in NZ and abroad. He is an expert on infrastructure policy issues and a regular adviser, commentator on these subjects. Until his CEO appointment with NZCID, Stephen held various senior management positions with the Automobile Association in both operations management and policy areas.

Figure 1: Road expenditure



applied. Consequently, most expenditure went on rural curve realignments, passing lanes, road widening and urban intersection improvements. Notwithstanding significant worsening congestion in Auckland, only a small number of capital projects were undertaken during this time, including modest extensions of the Northern Motorway, the upper harbour corridor, State Highway 20a airport extension, the South Eastern arterial and Grafton Gully (Figure 1). On the wider network the only significant state highway improvements were partial extensions of the Waikato Expressway, the ALPURT-A motorway extension north of Auckland and the Fairfield Motorway extension in Dunedin – all semi-rural extensions of the existing state highway corridor.

Ironically, although there was, and still is, wide acceptance of the need to complete the four-lane Waikato Expressway between Auckland and Hamilton, only a small number of discrete sections of this road were completed during this decade and only where improvements achieved a benefit-cost threshold of 4:1. Whereas other, more costly sections of the expressway resulted in a lower BCR these sections were left unfinished. Consequently, the Waikato Expressway now includes various stretches of four-lane, three-lane and two-lane sections.

CBA proved to be highly effective as a capital rationing tool during the 1990s. However, it was far less successful in achieving the highway agency's overarching objective to 'deliver a safe and efficient state highway network'. Instead of the economically strategic connections between Auckland and Hamilton being completed or the provision of an alternative north–south route through Auckland being realised, only small piecemeal sections of these nationally significant transport links were completed during this time.

By 2003, under considerable pressure from Auckland business and local government representatives, and with a desire to make some substantial progress in Auckland, the Labour government decided to take a more strategic approach to the allocation of transport funding. An improved financial situation allowed the government to have less reliance on CBA in the allocation of funds. With the injection of additional Crown funding, a number of projects were started, including the Mt Roskill extension and ALPURT-B2 north of Auckland, and substantial planning was done for the Manukau Harbour Crossing, Newmarket Viaduct upgrade and the Waterview project, among others.

A major shift in decision-making frameworks occurred during this period. In its desire to achieve a higher level of environmental and social outcomes, the government, through Transit New Zealand, substantially increased funding for social and environmental mitigation. This was clearly evidenced by projects like the Northern Gateway, which included expensive viaduct and tunnel solutions, and by the decision to construct the Victoria Park tunnel rather than an additional viaduct. Neither project would have had any possibility of proceeding under the former 4:1 BCR regime. The move to improved environmental mitigation avoided the need for lengthy legal battles through the courts to obtain the necessary approvals. However, the significant additional expenditure on these major projects inevitably meant that numerous other projects across the country had to be deferred.

The ministerial report on roading costs produced in 2006 (Ministerial Advisory Group on Roading Costs, 2006) clearly identified that the costs of a number of major roading projects undertaken during this period escalated significantly (sometimes more than doubling). By and large this was the result of attempts by Transit New Zealand to avoid litigious delays in order to resolve political and community concerns in regard to environmental and community impacts of the projects.

The advisory group found that scope change resulting from community and environmental impact mitigation

Table 1

Project	Time to approve	Cost change in $millions as identified in 2006
Northern Gateway (Alpurt B2 Toll Road)	9 years, 1997 to 2006	82 to 340
Victoria Park Tunnel	5 years, 2001 to 2006	165 to 320
Waterview Connection	14 years, 1996 to current (The project is to be called in under the RMA in 2010.)	72 to 1,380
Manukau Extension	6 years, 2000 to 2006	125 to 225

measures were a key driver of cost increases for a number of the roading projects they studied, as shown in table 1.

The group reported on two key projects in detail. In respect of the Northern Gateway project it found that:

> It appears that the environmental enhancements incorporated in ALPURT B2 at a cost of $65 million were in response to the risk that the Manu Waiata Restoration Protection Society (the Society) would challenge the project's compliance with the requirements of the LTMA. In response to a February 2004 letter from the Society, the Board looked for environmental enhancements to the project, which ultimately led to the inclusion of the Nukumea viaduct and Johnsons Hill tunnels. The inclusion of these features appeared to the Advisory Group to be in order to expedite the project, and ultimately resulted in a significant cost increase. (p.13)

In respect of the Victoria Park Tunnel (Option D) which is now under construction the group found that:

> An objective assessment of environmental effects prepared in September 2002 for Transit NZ showed that 'Option D [northbound tunnel option] retains the status quo within Victoria Park, and therefore has no significant reduction in effects compared to Option A [viaduct option]'. On this basis, there appears to be no objective reason to provide additional funds to construct Option D instead of Option A. In fact, analysis indicates that significant environmental improvement will only occur if all traffic is moved underground. However, there is currently no plan to replace the existing viaduct.

And that:

> Transit NZ appears to be making decisions to speed up projects that have high cost implications. There does not seem to have been a systematic process to establish the scope of this project based on the assessment of environmental effects. (p.15)

While not explicitly stated in the report, it seems reasonable to conclude that the behaviour of Transit New Zealand in selecting project design options was and arguably still is (as evidenced by the design of the Waterview tunnels) being significantly influenced by risks and time costs associated with protracted legal processes, involving both the Resource Management Act and other legislative requirements. In other words, while it might be possible to gain necessary approvals for projects by taking an adversarial approach through the courts, the costs of delay and the political risks associated with the contentiousness of the process make it easier and faster (if not necessarily cheaper) to make the necessary changes to the project scope.

Past experience underlines the need for a much more sophisticated, more balanced decision-making framework that is driven by overarching national strategy and which appropriately values economic, social/cultural and environmental benefits and costs.

The key question to be addressed is whether this approach is achieving an optimal balance between economic, social and environmental imperatives, and whether a more streamlined, integrated approach to project approvals might yield a better outcome.

The history shows a substantial change in policy direction, from very narrow assessments of national benefit, which almost totally excluded social and environmental imperatives and which had only limited assessment of economic returns, to a politically expedient assessment of economic, social and environmental needs. In both cases the strategic implications and opportunity costs of these decisions were not substantially considered. On the one hand the traditional CBA approach sought to maximise value but failed to address wider economic benefits or network effects. On the other hand, the politically expedient decisions to improve social and environmental mitigation on specific projects meant that there was insufficient funding for the construction of other strategically important network projects.

Forward projections of road spending, as illustrated in Figure 1, show a ramp-up of investment in 2010 which will see completion of the Western Ring Route in Auckland by 2015 and the roads of national significance towards the end of the decade. But investment declines and flatlines for the balance of the decade, despite significant need for new investment in local roads and public transport services in the major centres. NZCID forecasts a substantial deficit over the next decade, requiring an increase in funding from 1.5% of GDP to 2% in order for this new capital investment to be delivered. Not only will more capital be required; optimal application and prioritisation of that additional investment will be a critical success factor.

Past experience underlines the need for a much more sophisticated, more balanced decision-making framework that is driven by overarching national strategy and which appropriately values economic, social/cultural and environmental benefits and costs. This is the primary purpose of the CAENZ research project: to find much more robust decision-making tools that provide an optimum balance between economic, sociocultural and environmental imperatives.

It is interesting to note that comparable nations, including Denmark and Sweden, and the Canadian province of British Columbia have adopted a more strategic approach to project prioritisation and investment. While CBA methods are used to inform the decision-making

process, strategy is the primary driver of project prioritisation. CBA is used to test and inform the financial viability of a project business case and the delivery alternatives that have been considered. The discount rates used reflect the life cycle of the investment being made, with lower discount rates for long-term investments of strategic importance. Unlike New Zealand, which now applies an 8% discount rate, with sensitivity testing at lower and higher thresholds the discount rates used in Europe are much lower – typically in the 3%–6% range.

A principal conclusion of the CAENZ report is the need to augment the government's long-term vision and strategy for infrastructure investment with quantified performance indicators and national criteria for project selection, and include these in the National Infrastructure Plan. NZCID strongly supports this policy recommendation. In our view, the establishment of a strategic vision for New Zealand's infrastructure must be the overarching guiding imperative for project selection and prioritisation. Since we are seeking a balance between economic, sociocultural and environmental outcomes, the decision-making frameworks and the tools and methods that we deploy to evaluate capital investment choices must adequately address all three criteria. Sector plans should identify the set of investments in existing and new infrastructure that are required to deliver the strategic goals of the nation. In supporting policy processes, full social cost-benefit analysis should inform key decisions by identifying the most suitable project delivery methods from a range of alternatives. Where CBA is unable to monetise benefits and costs adequately, more robust multi-criteria attribute and non-market valuation methods will have to be deployed.

Not only will this enable better, more rational investment choices, determination of a more balanced long-term strategy provides the opportunity to engender broader multi-party political support for the investment programme and enable a shift away from the politically-driven project-by-project piecemeal implementation of infrastructure delivery that has characterised the investment over the last three decades.

References

Ministerial Advisory Group on Roading Costs (2006) Final Report, Wellington: Ministry of Transport