Strategic Transport Choices

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Introduction

Why does transport deserve its own conference, its own government department and delivery agencies, its own trade journals, academic journals and books? The reason is not because transport is valued particularly in its own right. Instead, transport is a critical means to an end; in fact, to a multiplicity of ends.

Transport services enable people to access necessities, amenities and employment. Transport services are critical inputs for firms in order to raise their productivity by enabling access to employees, suppliers, materials and markets.

Regions that offer productive opportunities, and where people wish to live, need reliable transport services to cater for an influx of people and firms. If transport acts as a bottleneck in the face of increased demand, the increase in people, firms and production will be stifled and stay below potential. Accordingly, provision of transport services to enable firms and individuals make the most of productive opportunities and amenities increases incomes and general wellbeing.

These increases are not limited to the incomes and wellbeing just of existing residents. Population follows opportunities; thus South-East Queensland and Victoria (especially Melbourne) are investing heavily in transport infrastructure in order to facilitate the flow of extra population into their regions.

By the same token, however, provision of superfluous transport services will not make a make a silk purse out of a sow's ear. The Bridge to Nowhere in the Whanganui valley could not transform uneconomic land into prosperous pasture.

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It is imperative, therefore, that we think strategically about the availability of transport services and the demands that will be placed on them. Given the longevity of many transport routes, this strategic thinking has to be conducted over a long-term horizon. Furthermore, since the thinking must be long-term, we cannot restrict analysis solely to expected outcomes; we must also consider how judicious investments may create options for future developments.

Some Examples

In the 1870s, Sir Julius Vogel made a series of nation-building investments for New Zealand. He invested in the construction of over 1,000 miles (1,600 kilometres) of railway lines, 4,000 miles (6,400 kilometres) of electric telegraph wires, a deep sea cable to Australia, and the establishment of a regular shipping service to San Francisco. Impacts of these infrastructure investments on New Zealand's development have been discussed elsewhere.[1] Today, I wish to illustrate the power of infrastructure investments, and especially transport investments, to change the population and economic landscape with some further examples.

In 2006, The Alexander Turnbull Library released a book, *Map New Zealand*, a

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[1] Grimes, Arthur. 2009. The Role of Infrastructure in Developing New Zealand's Economy, Motu Note #1, www.motu.org.nz

collection of 100 historical maps from their collection.[2] Plate 80 of that book presents *The Charlie Haines Newspaper and Population Map of New Zealand*, a map from 1936. It shows two dominant cities in the North Island (Auckland: population 211,913 and Wellington: population 149,816). It also lists the next seven largest North Island towns, each of which had populations of between 16,000 and 26,000. In order of largest to smallest they were: Whanganui, Palmerston North, Hamilton, Napier, New Plymouth, Hastings, Gisborne.

Figure 1: Population Growth vs Time to Major Centres

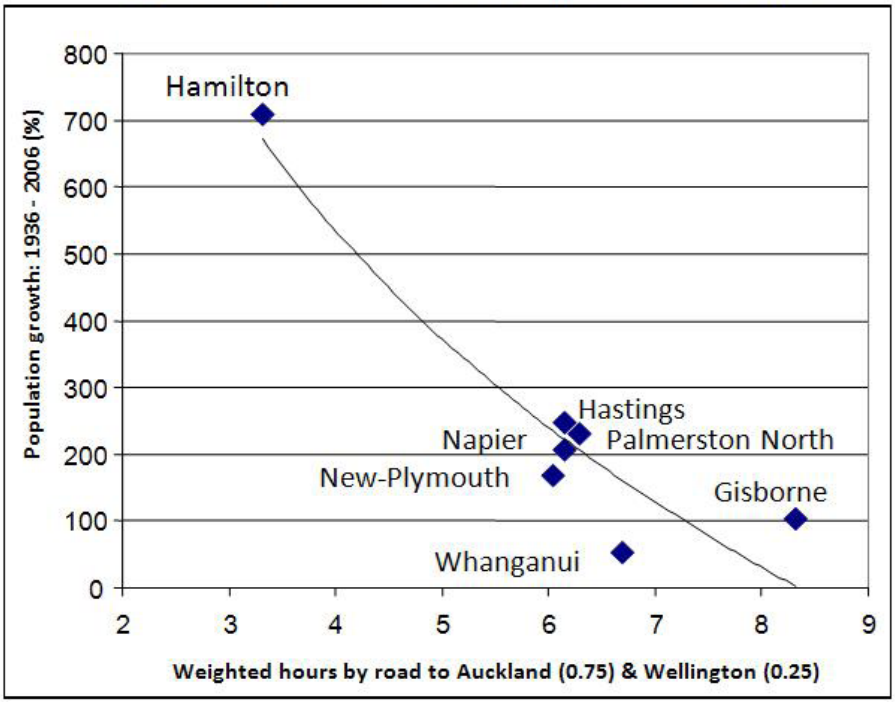

Figure 1 shows what happened to the population of these towns over the next 70 years (to 2006). Hamilton's population increased by 709%; Palmerston North, Hastings and Napier each had population increases of between 200 and 250%, with New Plymouth a little further behind at 169%. The laggards were Gisborne (104%) and Whanganui (53%).

The growth rates of the seven towns bear a strong relationship to their travel times by road to the two major North Island urban centres. Figure 1 also shows the weighted travel times by road (as at 2005) for each of the seven towns to the two main urban areas (where we give Auckland a weight three times that of Wellington to reflect relative population sizes over the period). The figure shows that Gisborne and Whanganui are the two most isolated towns amongst the seven. New Plymouth, Napier, Hastings and Palmerston North form a second group, while Hamilton is best connected.

The correlation coefficient between travel times and population growth is (negative) 0.90; i.e. a very close inverse relationship between travel times and population growth. Of course, we cannot claim a conclusive causal relationship here (given the few observations). However it is no surprise, given its adverse transport links, that Gisborne – a town with arguably the best climate and natural amenities in New Zealand – has grown so slowly while towns such as Hamilton and Palmerston North have grown much faster. To turn an old aphorism on its head, Gisborne is an excellent example of "Don't build it, and they won't come."

Plate 87 of the same book reproduces a hand-drawn map of the *Proposed Auckland Harbour Bridge*, produced in the late 1940s or early 1950s. It shows a combined "North Side"

[2] Map New Zealand: 100 Magnificent Maps from the Collection of the Alexander Turnbull Library. 2006. Godwit, Random House

population (Devonport through to Browns Bay) of 26,820. By 2006, the population of North Shore City alone had reached 217,000, and the combined population of North Shore City and Rodney District was 309,000. The population of areas serviced by the bridge therefore increased approximately tenfold over 60 years. This compared with a 2.4-fold increase in New Zealand's population over the same time.

Recently, in work published with my colleague, Yun Liang, we examined effects of the extension of Auckland's Northern Motorway from Albany through to Silverdale.[3] Population in the parts of North Shore City that were within three kilometres of a new motorway exit increased by 57% in the 15 years to 2006, compared with an increase of just 21% for the rest of North Shore. Similarly, employment within three kilometres of a new exit increased by 67% compared with an increase of 34% in the remainder of North Shore. In each case, the population and employment increases for areas close to a new exit considerably exceeded the increases for Auckland Region as a whole (38% and 55% respectively). Population and employment effects of the motorway extension in Rodney District were even more material, especially around Orewa/Whangaparoa and Warkworth.

Lessons

The population and employment changes shown by these illustrations are important for understanding the strategic payoffs to major transport investments. Commonly, cost-benefit analyses concentrate on benefits such as travel time cost savings, vehicle operating cost savings, accident cost savings, seal extension benefits, driver frustration reduction benefits, vehicle emission reduction benefits, and other external benefits.[4]

But these are all second order benefits compared with the first order effect of major transport upgrades, i.e. the transformation of population and production in areas serviced by the new transport services. The benefit from building the Auckland Harbour Bridge did not arise primarily because it enabled 26,000 people to travel faster into Auckland; its primary benefit was that it enabled a tenfold population increase north of the harbour, greatly extending Auckland's urban area.

Albany was once at the end of a windy road, well north of the end of the Northern Motorway; now it is a major commercial, educational, sporting and residential node within Auckland. The benefits of the transport upgrades are not attributable primarily to reduced driver frustration for the few hundred people that once lived there. The benefits are due to a vastly improved transport network to the north of Auckland that has enabled the city to expand beyond its initial confines to encompass places such as Albany and to improve connections with places beyond.

The greater Hamilton urban area now comprises 200,000 people, almost twice the population of Dunedin. By contrast, in 1936,

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[3] Grimes, Arthur & Yun Liang. 2010. "Bridge to Somewhere: Valuing Auckland's Northern Motorway Extensions", *Journal of Transport Economics and Policy*, 44(3), 287-315. Earlier version released as Motu Working paper 08-07, Wellington, www.motu.org.nz.
[4] New Zealand Transport Agency (2008) Economic Evaluation Manual, Volume 1.

"Strategic investments must be considered within the latter context recognising that New Zealand, and any of its constituent regions, is a relatively insignificant attachment to a much larger, dynamic economy. The strategic task in New Zealand transport planning is to make New Zealand, and at least some of its regions, more attached to - and competitive with - the central economic core of Australasia and beyond."

its population was less than a quarter that of Dunedin's. Hamilton's improved – but far from ideal – transport links through to Auckland are a key factor in enabling firms and households to locate in Hamilton near excellent scientific and educational facilities, while still being able to access the international airport, commercial services and other advantages of Auckland.

Strategic transport planning must place these first order benefits at the top of the list when prioritising major investment projects that have payoffs one or two decades into the future. The Roads of National Significance (RONS) are a step in this direction.

International Aspects

One argument that is sometimes mounted against considering these first order effects as true benefits, is that population and firm growth in one location (due to a new transport investment) just cannibalises growth that would have occurred elsewhere. In one sense, this criticism is correct: New Zealand's investment in infrastructure will not materially affect the world's population, so growth in Auckland, Christchurch or Hamilton must draw population from somewhere else on the planet.

But a mistake is often made of equating New Zealand as an independent *country* with New Zealand as an independent *economy*. The former is correct; the latter is erroneous. Consider, for instance, New Zealand's economic role within Australasia (leaving aside its role in Asia-Pacific and wider geographical regions).

Australasia has two primary cities, Sydney and Melbourne, and four major secondary cities (in order of size): Brisbane, Perth, Auckland, Adelaide. Melbourne, through its infrastructure and other strategic investments, is increasingly rivalling Sydney for dominance in this network of cities. Brisbane, through its massive infrastructure investments is catching up with both, but its widely defined urban population is still less than three-quarters that of the big two. That leaves Perth, Auckland and Adelaide, plus the smaller centres in each country.

A New Zealand firm located outside of Auckland - say in Dunedin - may find that it lacks access to the high-end commercial services, personnel and market size that it requires to grow (or to survive). Given free mobility of capital and labour within Australasia, the firm must make a choice as to which of the six large cities it should shift its headquarters to.

For a host of cultural and legal reasons, Auckland is likely to be the easiest of the six to relocate to, so initial costs of shifting are less if Auckland is the chosen locality. But Sydney, Melbourne and Brisbane all have greater market depth than Auckland, and this greater market depth constitutes an ongoing advantage. The firm has three choices: (i) stay put; (ii) shift to Auckland; (iii) shift to one of the three largest Australian cities. Given the ongoing advantages of being in one of the big three Australian cities, the extra initial cost of moving to Australia may be amortized against the future payoffs of relocating to one of Sydney, Melbourne or Brisbane.

In order to attract firms from elsewhere within New Zealand and to retain its own firms, Auckland needs ongoing advantages that at least match those of Sydney, Melbourne and Brisbane (and outweigh those of Adelaide and Perth). Similarly, to retain personnel – especially high-end personnel – Auckland must have ongoing net advantages as a place to live than the competitor cities across the Tasman.

Investment in high quality infrastructure – including transport infrastructure – is one avenue through which cities compete for firms and personnel, especially top-end firms and personnel. Seen in this light, the cannibalisation argument is largely a nonsense. Its erroneous application to major infrastructure projects arises from

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the confusion between *country* and *economy*. Strategic investments must be considered within the latter context recognising that New Zealand, and any of its constituent regions, is a relatively insignificant attachment to a much larger, dynamic economy. The strategic task in New Zealand transport planning is to make New Zealand, and at least some of its regions, more attached to - and competitive with - the central economic core of Australasia and beyond. Investment in productive transport systems in New Zealand is therefore required to prevent our major cities falling further behind those of Australia in terms of competitiveness.

Additional Issues

There are several other aspects of transport strategy that I will touch on here, without having the time to develop more fully. The first two are discussed in greater detail in a recently released paper.[5]

First, strategic transport investments are often complementary to other existing or potential projects in the sense that completing two projects has a greater combined net benefit than the sum of completing either project by itself. An example that I have already alluded to is the Hamilton – Auckland road link. Traditionally, cost-benefit analysis has been applied project-by-project within this corridor rather than assessing the net benefits of developing the entire corridor. The latter approach would represent a more strategic method for considering major transport investments.

Ideally, this network approach would be within the context of joint analyses of rail, road and coastal shipping options of the entire freight and passenger corridor from Tauranga to Auckland (or even to Whangarei). Such a strategic approach would be commensurate, for example, with Australia's approach of considering infrastructure investment across South-East Queensland, not just Brisbane. The need to learn from the successful Australian competition – so as to maintain or improve New Zealand's competitiveness with key Australian cities – is illustrated by this example.

Second, major strategic investments – whether in transport or broadband – sometimes cannot be analysed solely within a traditional cost-benefit analysis (CBA) framework. CBA does not cater adequately for the responses by private agents to the opportunities that may be created by game-changing infrastructure initiatives. When decision-makers today are uncertain about the nature, timing or degree of payoffs to a new investment, the traditional method of averaging out possible returns (to arrive at expected net benefits) may understate or overstate actual potential benefits.

To return to the Auckland Harbour Bridge example, the benefits of the bridge were realised partly through building the bridge, and partly through additional subsequent public infrastructure investments plus a myriad of private investments. Many of these subsequent investments were decided upon only once the reactions to the opening of the bridge were observed; they did not have to be committed to in advance. Furthermore, they were often actioned by firms that did not even exist at the time of building the bridge, and so they could not indicate the benefits that it might bring to them.

The building of the bridge gave what is called a *real option* over future development paths – an option that was not available without first building the bridge. Real

[5] Grimes, Arthur. 2010. The Economics of Infrastructure Investment: Beyond Simple Cost Benefit Analysis, *Motu Working Paper* 10-05, Wellington, www.motu.org.nz.

options analysis (in an analogous sense to financial options analysis) is a crucial input to planning for strategic infrastructure projects, but is one that is still in its infancy in New Zealand.

Third, any service that is not priced or that is mis-priced will have levels of demand that do not reflect efficient use of resources. While pricing of many transport services (e.g. use of domestic roads outside of major urban areas) may currently be difficult, it is now feasible to price road use for passenger vehicles on major routes and within cities, and for trucks everywhere. Introduction of differential pricing by type of vehicle, type of road, time of day and degree of congestion needs to be considered if efficient transport investments are to be made. The strategic issue that must be grasped here is the need to embark on such a pricing strategy as soon as it is technologically feasible.

Fourth, I have said nothing about private versus public transport services. A strategic approach would favour neither one nor the other, provided the context for decision-making is sufficiently wide to consider all costs and benefits that arise through the various options. Similarly, within the spectrum of public passenger transport options, favouritism to particular transport modes (e.g. buses versus trains) is unwarranted, again provided that the context for decision-making is sufficiently wide to consider all relevant costs and benefits.

Conclusions

The international competition for firms and personnel makes it crucial that transport is considered as a strategic input into nation-building and economic competitiveness. Concentration on second order issues such as driver frustration, seal extension benefits, and the like, may allow us to contain costs and are important, but are not central to positioning New Zealand as a place in which to locate one's business or family. Instead, the first order issue of attracting and retaining productive firms and workers – and the revenues that they bring in – needs to be a key focus of strategic transport policy. This approach has not been central to transport planning in New Zealand in recent decades.

Whether transport services are provided publicly or privately, and whether by rail, road or sea, is secondary to the realisation that transport is an aspect in which some of our Australian cousins are out-competing us. Their desire to increase the attractiveness of locating firms and families, especially in Brisbane and Melbourne, cannot be ignored by those considering infrastructure policy in New Zealand.

Sir Julius Vogel, in the late-nineteenth century, and the proponents of the Auckland Harbour Bridge in the mid-twentieth century, concentrated on the first order issues. Their contributions to New Zealand's development were monumental. By contrast, the history of gradual upgrades to the Hamilton-Auckland highway – between New Zealand's largest and fourth largest cities – has been one of concentrating on detail at the expense of the greater strategic picture.

We now seem to be witnessing a change in approach so as to accommodate nationally significant projects. What is still required, however, is a well-formulated strategic approach to the role that major transport investments can play in raising New Zealand's competitive position within Australasia and beyond.