

**GOOD TRANSPORT PROVISION IS  
ESSENTIAL FOR SUSTAINABLE GROWTH**

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**ABSTRACT**

A synergy exists between economic growth and transport supply. It has been well recognised that a growing economy will stimulate travel demand. However as travel demand increases there is a feedback into the dynamics that drive economic growth that may render the economic growth unsustainable if adequate provision for transport is not made.

Land use projections are sometimes formulated by analysing the underlying economic and demographic patterns in a region. In reality if travel conditions in future years become intolerable there will be a community response which may include a change in work, residential and recreation patterns. Therefore in any land use projection for a region there is an implicit underlying assumption about the communities response to increasing travel costs. If the necessary transport needs are not specifically addressed it is likely that the future land projection may not be achievable.

Coping with an explosion in travel growth requires a careful understanding of the interrelationship of the economic forces and land use patterns driving the demand for travel. Conversely whether long term economic growth can be sustained in an environment of managing or providing for increased travel demand will invariably involve measures that will have consequences for the economic forces and land use plans of a region.

Do we have the right decision making process and means to address these issues or is this an area of transport that requires reform.

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## **Introduction**

The transport system is an all pervasive element in the modern society. The transport system is intertwined with diverse areas of modern society's interests. For example the transport system interacts with economic, land development, safety, social and equity and environmental issues. These interactions are typically complex. Therefore, the development of a society's transport system is not a simple matter and will involve considerations in some quite diverse areas.

Conversely, national, regional or a city's growth must also address the role of transport if the growth is to be sustainable.

This paper discusses the role of transport in the planning of sustainable societies. It asks the question whether we have the right decision making processes to deliver the outcomes we seek.

## **Economic Development and Transport Investment**

In times of economic stringency Governments and Local Authorities are required to reassess their priorities for expenditure. As a consequence of this process, the funding of transportation infrastructure often is a target for reduced expenditure. This can be illustrated by the recent history of transport funding in New Zealand. Difficult economic times in recent years have led to a significant reduction in real terms in transport funding. Such is the level of chronic under-funding in the transport sector that projects require a cost-benefit ratio of 5.0 or better to attract Government financial assistance.

An investigation into the relationship between economic growth, the development of a nation and the provision of transportation infrastructure indicates that the plan to cure the economic ills of a nation by reduced expenditure in transportation infrastructure provision is somewhat naive and is likely to further exacerbate the economic ills of the nation.

On this point, it is interesting to cite Owen, (1987), p157 "transportation deficiencies ... stand in the way of all other efforts to accelerate development."

Forkenbrock and Plazak, (1978), p143 argue "Conventional wisdom holds that ample, well-maintained highways, streets, and roads are important to an area's development potential because they provide access to resources, goods, and markets. In any form of economic activity, accessibility is a critical need."

They go on to say “A reasonable supposition is that good transportation is a necessary but not sufficient condition for economic development to occur. Put another way, transportation facilities contribute significantly to a competitive advantage for an area. The stronger the overall competitive advantage an area has, the more likely employment-generating investment is to occur.”

Another interesting statement on the subject was made by Skinner, (1990), p707 when discussing the level of investment in transportation infrastructure in the United States “The fact is, solving our infrastructure deficit is critical to the future of the United States, just as solving our budget and trade deficits is critical. And we’ll be more successful in making economic progress if we attack all three deficits in a coordinated way.

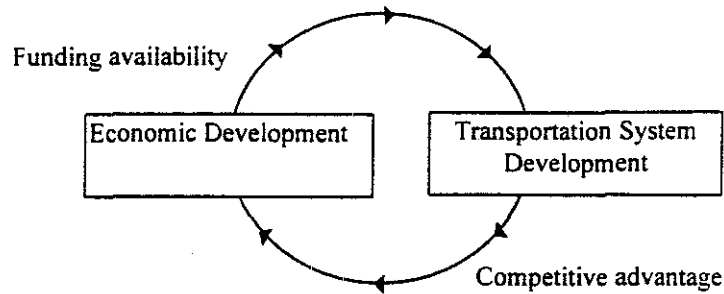
The equation is clear. Investment in infrastructure equals economic growth and productivity. Failure to invest in infrastructure equals economic decline.”

It is apparent that economic prosperity creates the availability of funding so that the expansion and improvement of the transportation infrastructure is financially feasible. In this way there is a synergy between economic development and the provision of transportation infrastructure in that a strong economy is able to afford a well developed transportation infrastructure.

However, the point made by the people cited above, inter alia, is in fact there is a strong link between economic development and the provision of an efficient transportation network in that the transportation infrastructure not only is able to support economic growth, but is in fact a key essential in making economic growth possible. Put in another way, a highly developed transportation infrastructure that provides efficiently for the needs of the nation, the region or city will, using the currently popular economic terminology, provide the competitive advantage that leads to economic growth. Without suitable investment in the transportation infrastructure to maintain the competitive advantage, the nation, region or city risks economic decline.

It is apparent that there is a complex two way linkage between economic development and investment in a transportation system (refer Figure 1). It is perhaps appropriate to conclude this section of the paper with a statement by Wilson, (1977), p339 who when speaking on the subject of the need to adequately invest in the transportation infrastructure said “The sound standard to which all reasonable men can repair is one that promotes both adequacy of transport capacity by all modes for the future and optimum efficiency. The right answers are not all that difficult to find; but nothing will more surely guarantee the wrong answers than a policy of neglect.”

**Figure 1**



## **Historical Context**

The history of transportation is as old as mankind himself. The earliest records of the development of the associated infrastructure do not occur till later. The first hard surfaces appear in Mesopotamia soon after the discovery of the wheel about 3500 BC. On the island of Crete, a stone-surfaced road constructed before 1500 BC has been found. The direction given in the Bible, (Isaiah 40:3-5) "make straight in the desert a high road" refers to a road constructed between Babylon and Egypt around 539 BC. Much of the roading infrastructure developed in ancient times was developed for the several purposes of providing an efficient and quick means of transporting military personnel and equipment to zones of interest, to provide an efficient means of communication, and to improve transport of goods and merchandise along the ancient trade routes. These three aims were inherently linked as military strength and efficient transfer of information invariably led to the control of wealth and power.

One of the clearest examples of this point from ancient times is that of the Roman Empire. The Romans built an extensive system of roads and viaducts including such famous roads as the Via Appia, (some of which still operate today) in order to exercise the military, political and economic control of their empire. Without such a well developed system of roads, it is clear that the Romans would not have been able to maintain the military, political and the economic dominance of the ancient world for the length of time that they did.

It was not until the eighteenth century that Tresaguet (1716 - 1796) in France developed improved construction methods of roads, that France under Napoleon developed a major network of roads. This undoubtedly contributed significantly to the military and economic strength of France at the time.

In Britain, the construction of roading infrastructure and particularly the railway system enabled the quick and efficient bringing together of large quantities of raw materials and the eventual transfer of the end products to the desired market, that fuelled the industrial revolution in that country.

The economic development of the United States is historically closely linked with the development of transportation infrastructure. After the American revolution, much of the United States was poorly connected, with travel to the outposts in especially the west being very difficult. Overland travel was generally via poorly defined trails. As a result, the development of these areas was very difficult and slow.

Two forms of transportation infrastructure produced major impacts on the development of the outlying areas and the economic growth of the country as a whole during the nineteenth century. These were the construction of the canal systems and the railroads.

Goodrich et al., (1972), p225 comments concerning the impact of the canal system "Between the terminal points, the canal may, as the most efficient mode of transportation in the area through which it passes, stimulate local development through its power to attract economic activities that are heavily dependent upon external transport economies. The process may first begin with a concentration of commercial farming in the vicinity of the canal..."

On the subject of the impact of the railroads, Stilgoe, (1983), p63 comments "Reaching from the very hearts of great cities across industrial zones, suburbs, small towns, and into the mountain wilderness, the metropolitan corridor objectified in its unprecedented arrangement of space and structure and wholly new lifestyle. Along it flowed the forces of modernisation announcing the character of the twentieth century, and abutting it sprouted new clusters of building."

During the 1950's, the extensive development of the highway system in the United States commenced. Skinner, (1990), p706 comments concerning the railways and the highway system "Historically, America's strength rested in the vigour of its research and development, and its vast infrastructure of railroads and highways and airports that kept our economy on the move."

With the rise of the British Empire, Britain enjoyed global military, political and economic dominance. Much of its economic power was generated from raw materials found in its colonies that were transported by land and sea to Britain. The land transportation was accomplished by the construction of railroads and roads. As a result, the British constructed major railroads and highways in East Africa, the Indian sub-continent, North America (to name but a few examples), that made significant contributions to the wealth and might of the empire.

## Modern Case Studies

The following are a selection of case studies that illustrate the inter-relationship between economic growth and the development of the transportation system.

### Pennsylvania and the Impact of the Interstate Highway System

In a study undertaken by Eyerly et al., (1987), pp1-20 the economic changes that occurred from 1970 to 1980 in communities adjacent to selected non-urban interchanges on the Interstate highway system of Pennsylvania are investigated. These changes are compared with those in the counties in which the interchanges are located and in the state as a whole. Indices of economic growth, both conventional (housing, income, employment, population) and unconventional (assessed market value of property) are examined.

Eyerly et al., (1987), p5 present the following table which records the changes in the economic indices for the state, counties and local communities (in the immediate vicinity of non-urban interstate interchanges).

Economic Indices	Non-urban Interstate Interchange Areas		
	State (67 Counties)	Counties (32)	Local Communities (182)
Population	0.5	6	22
Housing	17	22	43
Income	16	23	27
Employment	9	15	NA
<b>Assessed Market Value</b>			
Residential	30	35	52
Commercial	18	38	86
Industrial	3	6	70
All Developments	25	32	56

### Percentage Changes In Economic Indices For The State, Counties, And Local Communities

It is apparent from the above table, that those areas located near the interchanges experienced a much improved economic performance over those areas located further away. This is true for all the economic indices measured. The improved economic performance was found to be very large in some instances. It is also significant to note the trend from state to counties and local communities (with non-urban Interstate Interchanges). The closer the location is to the transportation infrastructure, the greater the measure economic performance. Of particular interest, is that percapita income is positively correlated to the existence of non-urban Interstate Interchanges in the county.

## Tennessee

Moen, (1988), pp 58-67, discusses economic growth in the state of Tennessee. The growth in the state's economy since the recession in manufacturing the author partly attributes to the support provided by the state's well developed transportation infrastructure. Of particular interest is the information concerning Tennessee's growth in personal income which is compared to that of the nation. This data shows a superior than national average performance for Tennessee in personal income growth.

Some of the comments in Moen's paper are very helpful. "Despite the historical predominance of manufacturing in Tennessee, the state has, over the last decade, side-stepped problems that have plagued other manufacturing-dependent parts of the nation. The recipe for ongoing balance in Tennessee's economic growth includes such ingredients as furthering the shift from basic manufacturing toward a mix of services and more technologically-advanced manufacturing, maintaining its highly competitive transportation and distributive network, and continuing to foster its flexible labour force ...

While manufacturing stands as the state's most important sector, its conjunction with a well-developed and centrally located transportation network has made Tennessee attractive to foreign as well as domestic investment. This combination of production and distribution should continue to bolster the state's economy in the future. Every significant type of transportation is available in Tennessee. Nashville, one of four US cities where three interstate highways intersect, is a hub for American Airlines, which has in the past few years almost doubled overall capacity there. Northwest Airlines recently has stepped up its operations in Memphis, the headquarters city for Federal Express, an overnight delivery service. Tennessee is also linked to the rest of the nation by several rail lines and two major waterways - the Mississippi River and the Tennessee-Tombigbee Waterway. In fact, the state's emergence as a hub has pumped up employment in its transportation sector by over 50 percent since 1970, as compared to a 37 percent rise in total state employment.

Furthermore, because almost three-quarters of the nation's population is within a day's drive of Tennessee, the state serves as an important regional distribution centre. Despite the recent decline in residential and commercial construction, Nashville area builders have been sustained by strong demand for warehouses. Another indicator of Tennessee's central distribution position has been the rising importance of wholesale and retail trade. The state's retail trade employment rose 69 percent between 1970 and 1987, while employment in wholesale trade grew at the state average.

Tennessee's well-developed transportation system also feeds its strong travel and tourism industry. Tourist attractions in the state benefit directly from the state's travel network and channel tourists' dollars to hotels, restaurants, and other retail and service establishments."

## **Transportation and Economic Growth in Eastern Europe**

Tismer et al., (1987) have written a book that deals with the beleaguered state of the Eastern European economies (prior to the breakup of the Soviet bloc) and their relationship to transportation infrastructure development.

In their investigations they conclude that the transportation infrastructure is backward and outdated. They conclude that the Soviet network responds flexibly to short-run changes in demand, when the demand comes from high-priority sectors of the economy, but weakly to cries from low-priority users. They also conclude that Soviet transportation "can continue to meet the slowly changing demand placed upon it." In particular, the authors present data to illustrate that the standards currently in practice for rail freight operations are approximately equivalent to American heavy-freight train operations of the year 1925!

Three chapters focus on Poland which highlight the systematic nature of transportation problems with most Soviet style economies : transportation is backward, investment is too low, infrastructure is weakly developed, too many standing empty cars, too high a percentage of empties en route, and so forth. The authors conclude that such problems are so systematic because in order to maximise growth of GNP per capita within these economies, "the development of the material production, particularly within industry, was emphasised over the needs for infrastructure."

## **Business Decisions of some Multinational Corporations**

The decisions made by business interests are often greatly influenced by the condition and availability of transportation infrastructure. Moon, (1987), pp 8-14, illustrates this point with the following example. "Multinational corporations (Toyota and General Motors) have recently announced plans to locate industrial complexes at interchanges in Kentucky and Tennessee, respectively. Officials from both firms identified the superhighways and interchanges as prime factors in their location decisions "

## **The Economics of the Transportation System**

In general terms, economic advancement involves increased physical volumes of production and consumption, as well as increased differentiation and specialisation in production. Specialisation generally implies increased spatial separation of economic activities, and economies of scale generally require geographically larger market areas. As a result, not only are the volumes to be transported typically increased in the process, but the distances over which they must travel are also increased. The end result is that the underlying demand for transportation in physical terms increases in an economy at least as fast, but usually faster, than the growth in GNP.



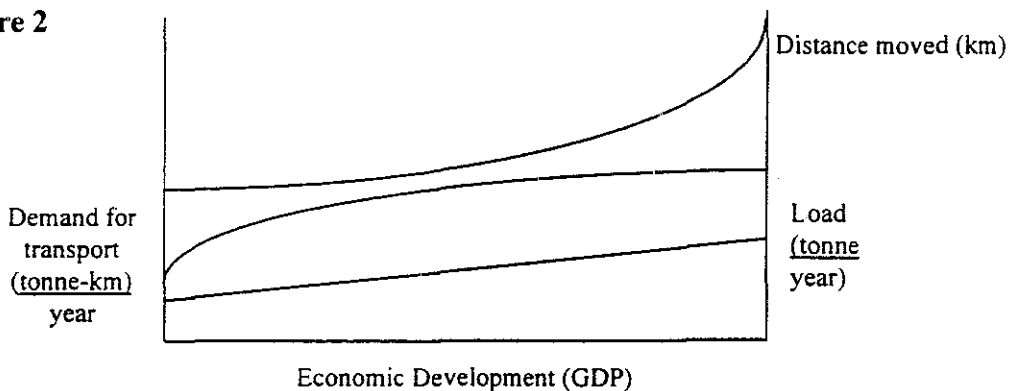
If the transportation system cannot keep up with this growth in demand for transportation, it risks becoming the means of strangling economic growth and development. Similarly, if the increased demand for transportation causes transportation costs (time, vehicle operating costs and safety) to become prohibitive, the product loses competitiveness and economic growth is stifled.

Transportation acts in at least three capacities to foster economic development. Firstly, transportation is basic economic and physical infrastructure : it enables raw materials and intermediate products from varying locations to be brought together and transformed through the industrial process; it delivers the final products to their users both locally and abroad; and it expands the geographical extent of markets, thereby making possible the scale of production that modern industry often requires. Secondly, transportation is also basic political and social infrastructure enabling the flow of people, information ideas (until this century, all communications involved transportation and even today significant amounts and types of communications use transportation) as well as goods. This process makes possible the political and social integration of regions that allows the improving of the levels of health, education and awareness of people that would otherwise remain isolated. Finally, transportation can itself be a driving factor in economic development through its requirements for infrastructure and equipment, thereby providing employment and demand in other sectors of the economy.

### Transportation as Economic and Physical Infrastructure

As discussed above, economic growth places an increasing demand on the transportation network through increasing production and specialisation that result in the need to transport greater quantities of raw materials, from spatially greater separated sources to larger markets. In addition, the increase in population, management and organisation, urbanisation and to a degree the human desire to travel, work to increase demand for passenger transport. Even where physical tonnages or number of persons moved is only directly proportional to the total value or production, the larger physical areas of the markets and greater spatial separation of activities associated with specialisation lead to an increase in the average distance moved. So the physical volume of transport measured in mass by distance is likely to increase faster than the total production (refer Figure 2)

**Figure 2**



Therefore sustained economic growth invariably requires a growth in per capita transportation in the economy and very often growth in physical levels of transport per unit of GDP. Where the transportation system does not develop at a sufficient rate, economic growth risks being slowed and ultimately stopped.

Dalton, (1991), pp21-24, examined the economic benefits of accelerating construction of major highways in Wisconsin. His study examined three direct sources of economic growth

- (i) expansion of existing business
- (ii) attraction of new business
- (iii) increased tourism

The following table summarises the reasons for economic growth and lists the methodology and data used to evaluate each source.

<b>Impacts On Economic Development</b>	<b>Reasons For Benefit</b>	<b>Data/Methodology</b>
Benefits to Existing Business	<ul style="list-style-type: none"> <li>• Reduced trucking costs</li> <li>• Increased market area</li> <li>• Increased competitive edge and capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Trucks survey</li> <li>• Truck user benefits</li> <li>• Traffic simulation model</li> <li>• Interviews with industry and trucking firms</li> <li>• Regional economic simulation model</li> </ul>
Attraction of New Business	<ul style="list-style-type: none"> <li>• Business advantage of location</li> <li>• Good connections to population centres and suppliers/buyers</li> <li>• Better links to highway networks for expansion</li> </ul>	<ul style="list-style-type: none"> <li>• Interviews with business officials</li> <li>• Relative fuel, capital, labour costs</li> <li>• Interindustry links</li> <li>• Comparison with nearby states</li> </ul>
Increased Tourism	<ul style="list-style-type: none"> <li>• Reduced travel time</li> <li>• Increased safety</li> <li>• Easier, more relaxed travel</li> </ul>	<ul style="list-style-type: none"> <li>• Existing reports and statistics</li> <li>• Interviews with tourism officials</li> </ul>

The most important way transportation infrastructure developments contribute to economic output are by reducing the cost of transportation.

Fuglie, (1991), pp331-346, comments concerning cassava production in northeast Thailand "A major constraint to cassava expansion was farm to market transportation cost. As late as 1960, the transportation network to and within the Northeast Region was almost non-existent. The first all-weather road (the Friendship Highway) linking the region to the rest of the country had only been completed in 1958, complementing a

rail line that had been established prior to World War II. The lack of rural roads was a severe constraint to the expansion of commercial crop production, especially for perishable commodities such as cassava.”

However, it should be appreciated that these “costs” appear in various forms (such as travel time costs, vehicle operating costs and accident or damage costs). For example, Moavenzadeh and Geltner, (1984), p106, present the following table that related the economic benefit obtained from reduced costs associated with transportation infrastructure improvement.

Infrastructure Improvements	User Benefit	Economic Benefit
<ul style="list-style-type: none"> <li>- Increase maximum speed</li> <li>- Shorter distance route</li> <li>- Increase maximum weight or draught supported</li> <li>- Increase traffic capacity</li> <li>- Smoother pavement or alignment speed</li> </ul>	<ul style="list-style-type: none"> <li>(i) Freight Users               <ul style="list-style-type: none"> <li>• Rates</li> <li>• Average transit time</li> <li>• Variability to transit time</li> <li>• Damage and loss</li> </ul> </li> <li>(ii) Passenger Users               <ul style="list-style-type: none"> <li>• Fares</li> <li>• Out of pocket cost Ownership cost (private)</li> <li>• Travel time</li> <li>• Travel discomfort</li> <li>• Accident rates</li> </ul> </li> <li>(iii) Transport Operator               <ul style="list-style-type: none"> <li>• Profits and wages</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Increased productivity</li> <li>• Increased Income and welfare</li> <li>• Increase consumption and investment</li> </ul>

Of special interest is the contribution that transportation makes to foreign trade. Exports and imports of merchandise must move via international transportation between countries and via domestic transportation within countries to and from the ports of entry and exit. International activities such as tourism and the business of expatriates are often dependent of domestic passenger transport.

### **Other Contributions to Economic Growth by Transportation Infrastructure**

Other contributions that transportation infrastructure can make to the economic development include the distribution of wealth and social services. Transportation infrastructure has the ability to reduce the isolation of outlying or difficult to get to areas so that the benefits of a rising standard of living may flow to these areas

The demand for transportation infrastructure also can benefit other sectors of the economy. Transportation infrastructure has a demand for such basic commodities as labour, steel, cement, machinery, petroleum products, rubber etc. By stimulating domestic demand for such commodities, transportation infrastructure development can often help facilitate development of domestic industry.

The general quality of life supported by an efficient transportation system can be an important consideration in business interests deciding to locate in a particular location. Concerning this point, Mahmassani and Toft, (1985), p265 report concerning high technology industry: "Generally, the types of professionals that are vital to high-tech industries prefer communities offering a certain 'quality of life' and associated lifestyle. For instance, a recent study found urban quality of life to be a strong positive correlate of the creation of new firms. While 'urban quality of life' may not be quantifiable, easy access to work (freeways and parking availability) and to recreational facilities is believed to be one of its components.

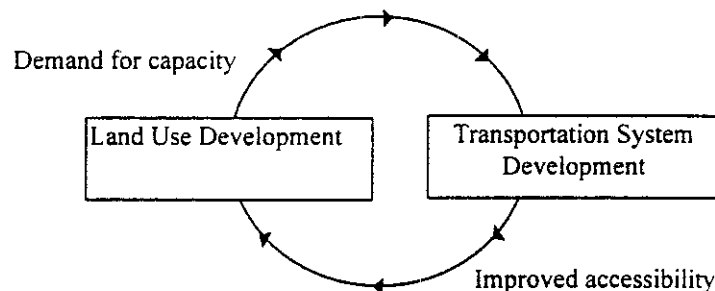
Essentially this issue involves the quality of transportation service in a given city that makes life in that environment generally pleasant and free from undue aggravation, particularly in the home-to-work commute. For the types of professionals under consideration, the primary mode is the private automobile. Thus every city (with or without high technology aspirations) faces the same concern - the present adequacy of its transportation network and its ability to meet anticipated demands at acceptable service levels."

In this respect, the ease of use a city's transportation system affects the quality of life offered to employees of a business, which then impacts on the attractiveness for that business to locate in that city. In other words, in this way the transportation system of a city actively contributes or detracts from the competitive advantage of that city.

## The Transport Supply - Land Use Interaction

Closely allied to the issue of economic growth is the question of land use development and its relationship to transport. The development of land places an increasing demand for the supply of transport capacity. Also the provision of transport supply can make land more attractive for development. (refer figure 3)

**Figure 3**

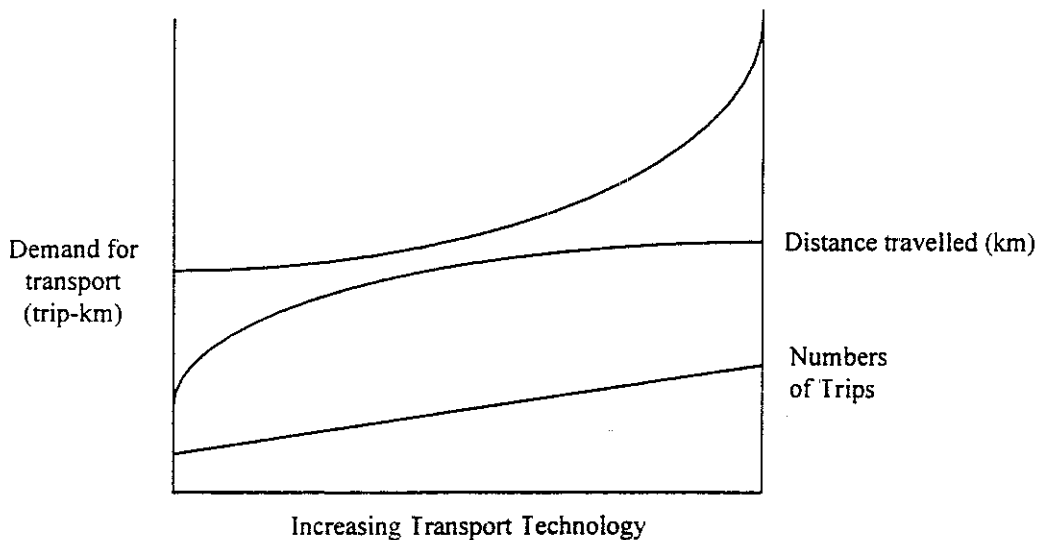


A good example of this relationship is illustrated by the construction of the Auckland Harbour bridge which was opened in 1959. The construction of the Auckland Harbour bridge made the North Shore a very attractive area for development. In time the development on the North Shore progressed to such a level that the original four lane bridge required expansion. The bridge now has eight lanes.

The pattern of development has been interesting. Initially when the Auckland Harbour bridge was first opened the development on the North Shore was primarily residential. Employment for these people was almost exclusively on the southern side of the Harbour Bridge. In time employment began to develop on the North Shore and this has continued. The North Shore now is a true employment centre in its own right and a key sub regional centre within Auckland. A similar pattern of development appears to have been true for other parts of the Auckland Isthmus and in the Wellington region. In particular this pattern could be argued as being partly responsible for the population and employment growth of the Kapiti Coast District.

Before the age of motorised transport, villages and towns developed in a way that was compatible with the limits of pedestrian travel. Towns and cities were typically compact. As transport technology progressed rail and bus based passenger transport became readily available to the public before motorised private transport was generally available. Public transport allowed the towns and cities to spread so that people were now able to live further from their place of work. In time car ownership levels increased which further accelerated the spreading of our cities. The consequence then of more sophisticated transport technologies has not only been an increase of the number of trips being made per capita - resulting from the undertaking of more discretionary trips - but also a growth in the average length of trip making. (refer Figure 4)

Figure 4



Again there is a feedback cycle at work. The greater the availability of longer range travel the response in land use form is to spread. The greater the spread in the land use form the greater the demand for the availability of long range travel. Consequently, as a city expands through spreading there is a corresponding reduction in walking, cycling and public transport use as a proportion of total trips accompanied by a growing degree of private car use.

The above is the general picture of the interaction of transport and land use. There are many factors in the decisions that reflect the relative locations of employment and residential areas. Cater, (1983) identifies the following as key parameters affecting residential choice:

- the quality of the residential environment
- their social makeup
- access to household services
- home-work travel times and costs

In making decisions on residential location individuals are making trade offs between these parameters. In effect they are valuing the quality of the residential environment, the social makeup and access to household services against the value of home-work travel times and costs.

Consider the issue of travel on State Highway One between Wellington and the Kapiti Coast. The growing travel costs for travel along this corridor, if nothing is done to reduce them, will continue to increase. What will be the response of the public to growing travel costs? They can either:

- change mode ie, travel by rail
- re-time their trip - which has a disutility to the trip maker
- review their residential - workplace situation.

Ultimately, as travel costs on the Wellington - Kapiti corridor continue to grow it is conceivable that the growth which is generating the increasing travel costs cannot be sustained. It is quite possible that unless the transport infrastructure is provided, the population and employment growth on the Kapiti Coast which is happening now (and forecasted to continue in the future) will not occur. It should be appreciated that the growth of people seeking work living in Kapiti is expected to grow faster than the rate of employment growth on the Kapiti Coast meaning that a growing number of people are expected to look for work outside the Kapiti Coast.

## Evaluation of Strategic Transport Projects

Transport projects that have significant interactions with economic development and land use development will tend to be strategic projects. The crucial question is then do we have the right tools and decision making processes in place to correctly evaluate strategic transport projects?

Currently, under the Transit New Zealand Act and its amendments each Region Council is required to prepare a Regional Land Transport Strategy. Government funding of a project will not be available for a project if it is deemed to be inconsistent with the prevailing Regional Land Transport Strategy. The decision as to whether Government funding is made available rests on whether the project has a high enough benefit cost ratio.

Benefit cost analysis has been the subject of much debate in recent years. Examination of the National Land Transport Programme shows that few, truly strategic projects are funded through the current process.

A number of commentators have shown that the benefit cost process as it is currently applied reflects an incremental or low cost tinkering approach (BERL, (1996), Wellington Regional Council (1996)). The reason that the benefit cost process favours small incremental projects is a function of several factors. These factors include:

- a chronic shortfall in transport funding in New Zealand
- an unreasonably high discount rate
- inconsistent length of benefit stream
- an inability of the process to adequately deal with strategic issues such as economic development, land use issues, and an integrated approach to transport planning.

The high discount rate of 10 percent acts to suppress benefits in the medium and long term. It focuses on benefits that are delivered in the short term. In essence a medium and long term view is sacrificed for short term (and perhaps short lived economic expediency). Both Travers Morgan, (1992), p5 and BERL, (1996), p9 comment that the use of a 10 percent discount rate is clearly too high, and is inconsistent with current practice elsewhere in the world. It is interesting to note that information produced in the Land Transport Pricing Study by the Ministry of Transport (1995), p46 would suggest that a discount rate of 6.44 percent may be appropriate for New Zealand.

Projects are evaluated over a 25 year evaluation period which includes construction period. Large strategic projects which have a long construction period will have a shorter benefit stream than the low cost incremental alternative which has a short construction period. The initial years of benefits of the large strategic projects will also be much more heavily discounted than the low cost incremental alternative. The 25 year evaluation period is also too short to recognise the true economic life of a large strategic project.

Economic development and land use are very complex issues particularly in the context of transport. Clearly there are some strong interactions that need to be evaluated carefully if the impact of a transport project or strategy is to be well understood.

The question is how can these issues be meaningfully incorporated into a benefit cost analysis. Economic and land use development as a response to transport investment is very difficult to forecast and value and is likely to be site specific. Who could have anticipated the magnitude and nature of the development of Auckland's North Shore in response to the construction of the Auckland Harbour bridge? What is the economic value of that development? Similarly, what would be the response to a high standard upgrade of the Rimutaka Hill road between Wellington and the Wairarapa? How would the tourism attractiveness of the Wairarapa be upgraded? What would be the benefits to the Port of Wellington of increased freight volumes? Would the Wairarapa be a more attractive location for Wellington's workers to live in? What are the economic values of all these items? Clearly, commuters value the quality of the residential environment, its social makeup and access to household services highly if they are prepared to endure high home-work travel times and costs to live in a particular area. Hidden, also, in the economic benefit question is the issue of regional versus national benefits. The current benefit cost process purports to maximise national economic and social benefits. However, some of the benefits associated with major strategic projects will be of a regional nature and will not be recognised by the benefit cost process but will still be important to the surrounding community.

Symonds Travers Morgan, (1996), p20 have commented that the benefit cost approach is not compatible with soundly based Regional Land Transport Strategies. A soundly based land transport strategy is the vehicle for an integrated approach to land transport planning that can bring together the wide range of policy measures in a coherent way. Soundly based land transport strategies are designed to recognise issues of accessibility, economic, land use, safety, social and equity, and energy efficiency and environmental impacts. A soundly based strategy can bring together the full range of tools such as multi-modal planning, travel demand strategies and land use planning to make the appropriate trade offs between objectives and to take advantage of synergies between measures. A soundly based land transport strategy is clearly a multi-objective strategy that cannot be reconciled with an approach that is singularly economic in its outlook.

Therefore, to truly evaluate in a meaningful way a strategic land transport project and its implications on accessibility, economic development, land use development and the other key parameters a multi-objective analysis must take place. Decisions must be based on the consideration of a broad range of criteria, of which benefit cost is a valid part. However, benefit cost is only part of the evaluative framework and should not be seen as the only measure of a valid project.



## **Conclusions**

There is a complex inter-relationship between transport investment and economic development. Similarly the inter-relationship between transport investment and land use development is also complex. These inter-relationships involve strong feedback processes and by nature are difficult to understand and forecast reliably.

Many of the issues related to transport investment that should be considered are of significance to local communities. These issues are often complex and difficult to quantify in a meaningful way and require some judgement by the local community. After all they have to live with the consequences of these decisions. It is apparent that if progress is to be made on facilitating strategic transport projects as part of an integrated transport strategies and their impacts on local economic growth and land use, then local communities will need to be much more actively involved in the decision making

Progress in land transport in New Zealand requires a move away from the centrally controlled decision making process and a devolution of decision making to the local communities through their appointed representatives. Such a new process will require checks and balances to ensure transparency and accountability.

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