

Transport and Regional Development

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Executive Summary

General

This report has three objectives:

- To identify the appropriate role for transport in regional development;
- To identify the transport bottlenecks and operational deficiencies that would prevent transport fulfilling its role in regional development; and
- To present proposals for appropriate remedial action both within the context of transport between the regions and in relation to the strategies that should be adopted for transport access to key urban centres.

Thus the report assesses the relevance of transport investment policy to regional development. Such an assessment must be underpinned by a view as to the importance of transport in regional development. As a result, the report first investigates the relationship between transport and regional development, so as to inform regional transport investment policies. The adequacy of existing transport infrastructure and services in respect of roads, airports, the railway system and the interurban and local bus systems is then assessed.

Transport and Economic and Regional Development

Transport improvements have impacts on the productive sector through the product and labour markets. With regard to the product market, transport improvements impact on firms not only through transport cost reductions but also through the scope for cost reductions throughout the logistics chain. Changes to the logistics chain mean that the reliability of transport networks is important as well as the speeds that they offer.

Because of significant spillover effects, transport improvements have potential impacts on the economy in excess of the benefits to individual firms. The extent of these spillover benefits is determined by the structure of the economy. Where competition is imperfect and economies of scale exist, spillovers will be high.

While transport improvements have the potential to yield significant economic benefits, the regional distribution of these benefits is dependent on the level of transport costs. Unless the transport costs are very high, peripheral regions will stand to benefit to a greater extent than core regions from transport improvements.

Transport infrastructure improvements may be a less risky policy instrument than other policies for promoting regional development.

Ireland's economic success has given rise to tighter labour markets and the emergence of agglomeration diseconomies particularly in the Dublin area. These changes mean that regions that have been lagging in development look increasingly attractive as locations for industrial development. As a result, transport now has a more important role to play in helping deliver such development.

Because access to the labour market is now a much more important factor in the locational decision making of the firm, intra-regional links within the peripheral regions should be a focus for investment.

Transport investment to ensure access to east-coast ports will be an important contributor to regional development, because of the export orientation of much of Irish industry. As Dublin port is the largest gateway, the radial route system emanating from Dublin should continue to be a focus for regional development.

Roads

Current road policy for the major radials would seem to be very compatible generally with regional development objectives, in that it will provide high capacity, high speed, and reliable links between Dublin and the regions.

However, the decision not to build the link to the northwest to dual carriageway standard throughout may be deserving of further consideration within the context of the National Spatial Strategy, If significant urban growth were to occur in the northwest, then a reduced dual carriageway standard road could become necessary.

In general terms, the adoption of level of service C, rather than D as currently planned, would deliver a higher standard for inter-regional road links. In any event, it will be important, as road design decisions are being made, that the results of the traffic demand analysis undertaken as part of the National Spatial Strategy be taken on board. This may have an impact on the appropriate road standard for these links. Where provision of a higher road standards is borderline on traffic grounds, regional development objectives would warrant adoption of the higher standard, as this would ensure greater uniformity of road standards with greater benefits in terms of reliability of the system.

There is a concern that the improvement of inter-urban connections may result in conflicts at those points in the transport networks where the improved inter-urban routes connect with the lower capacity urban areas. Resolving such conflicts will require that a range of measures be put in place. These will include higher levels of public transport provision, improved traffic management, and a high level of integration of land use and transportation policies

Airports and Air Services

There is a considerable degree of overlap in the hinterlands of the existing airports, at both the 40-mile and 60-mile time travel bands. This pattern is particularly prevalent in the West and Northwest regions, where the hinterlands of Shannon, Galway, Knock and Sligo airports overlap to a high degree.

The level of provision of regional airports in Ireland is relatively high in comparison with other countries. There would appear to be no gap in the system. The adoption of a higher level of service C for the national primary road system and the consequent journey time improvements on inter-regional routes will increase the access of the population to a regional airport.

In general terms, with the exception of Cork and Shannon, service levels at regional airports are relatively low. Similarly, none of the regional airports, with the exception of Cork and Shannon, have the potential to be commercially viable in the short term.

Given the overlap in catchments, Government support through PSO services or grant aid might be better focussed on a smaller number of airports. In particular, is Government support for Galway, Sligo and Donegal airports merited, given the possibility of serving their catchments from Shannon, Knock and Derry?

Finally, given the poor levels of service from regional airports, the question arises as to whether the current scale of Government support for regional airports and air services in particular is adequate in the context of regional development.

Rail

The major deficiencies on mainline radial routes out of Dublin are in relation to services to the west and northwest. In the context of the spatial strategy, there may be a need to improve these services, if towns in that region are designated as growth centres. One of the options would be to convert to railcar operation on these routes.

The rail mode is currently very competitive with road in the Dublin-Border, Dublin-Cork and Dublin-Limerick markets. These markets are rail routes that were subject to significant upgrade during the National Development Plan 1994-99, largely as a result of Cohesion funding. However, the competitive position of rail in other inter-city markets is relatively poor.

The National Development Plan will see considerable investment on interurban road and rail links, which will impact on the competitive position between the two modes. As currently planned, rail journey times will not improve to the same extent as road journey times, with a consequent loss of rail competitiveness generally including the Dublin-Belfast and Dublin-Cork markets. Its position in the other markets will continue to be poor. The prospect is for a significant reduction in rail patronage, other things being equal.

In this regard, there is now a need to develop a long-term plan for the railway, which would identify its future role and consider the level of capacity and service that it should provide.

Non-radial mainline connections are of mixed standard. While the Limerick-Cork and Cork-Tralee-Killarney routes are well served by virtue of connections to the Dublin-Cork line, other inter-regional service levels e.g. Limerick-Waterford are low.

A strengthened inter-regional rail service network has a role to play in regional development. This will mean not only an increase in rail service levels, but also ultimately could involve the re-opening of lines to passenger traffic.

With regard to the latter, in the longer term there is the prospect of a 'Western Rail Route' linking Cork to Limerick, Galway Westport, Ballina and Sligo. This could involve re-opening of the Limerick-Claremorris line to passengers, reinstatement of the Claremorris-Collooney line, and the introduction of a more direct link between Charleville and Limerick.

There is potential for the development of commuter rail services in Cork and Limerick. This raises the issue, in the context of regional development, as to whether rail system improvements should precede land use developments. While this policy would involve significant short term operating losses, it might be worthwhile in the long term if it helps shape land use development in the Cork and Limerick areas.

Bus

In general terms, there is a high level of bus service (in terms of frequencies) between Dublin and the major urban centres. However, urban centres in the northwest are relatively poorly served. Sligo and Letterkenny for example have only 4 and 5 daily services from Dublin respectively. While there are private operators on these routes, the evidence is that they are not operating on a daily basis, so that the overall level of service would appear to be low.

While service levels are high in terms of frequencies, the bus offers a much lower quality of service than rail in terms of journey times, especially in corridors, such as Dublin-Cork where the rail system has been significantly improved. However, with the proposed improvements in the road system, it is likely that bus journey times will improve relative to rail, creating further pressure on the rail modal share.

The role of local bus services in urban areas other than Dublin is limited. While the potential for an increased role for urban bus services is being increasingly recognised, a major issue yet to be tackled in these areas is that of priority for buses in the use of road space.

I Introduction

I.1 This report has three objectives:

To identify the appropriate role for transport in regional development;

- To identify the transport bottlenecks and operational deficiencies that would prevent transport fulfilling its role in regional development; and
- To present proposals for appropriate remedial action both within the context of transport between the regions and in relation to the strategies that should be adopted for transport access to key urban centres.

Thus it is envisaged that the report will assess the relevance of transport investment policy to regional development. Such an assessment must be underpinned by a view as to the importance of transport in regional development. As a result, the report first investigates the relationship between transport and regional development, so as to inform regional transport investment policies. The adequacy of existing transport infrastructure and services in respect of roads, airports, the railway system and the interurban and local bus systems is then assessed.

The paper is organised as follows. In Section 2, the role of transport in economic and regional development is assessed. Section 3 discusses the implications for the development of spatial policies in Ireland. Section 4 considers road investment policy and regional development. Sections 5, 6 and 7 undertake a similar analysis in respect of regional airports and the railway and bus networks. Conclusions are presented in Section 8.

2 Transport and Regional Development

2.1 Introduction

In addressing the relationship between transport and regional development, this report first examines the role of transport in economic development as a whole. That is, it looks at the extent to which transport contributes to ‘making the cake bigger’. This is followed by a discussion of transport’s role in determining the distribution of those benefits, or ‘how the cake is shared’ regionally. By doing this, we are able to bring several different strands of economic thought to bear on the issue.

The role of transport in the distribution of economic gains as between countries, and regions within countries, is a topic that has received renewed interest in recent years. This interest is reflected in a burgeoning literature relating to endogenous growth theory¹, on the one hand, and economic geography on the other.²

As a result, understanding of these issues and the role of transport in influencing them is increasing. One outcome is that whereas traditionally there has been considerable scepticism among economists about the contribution of transport to economic development in mature economies, this is being replaced by a more positive view.

However, much work remains to be done, and this limits the insights that can be derived. This report attempts to synthesise the literature and draw some, hopefully, robust conclusions of relevance to the development of a spatial strategy for Ireland.

Improvements to transport systems impact on firms through increasing:

- the efficiency with which firms source materials and deliver their products – **product market** effects; and
- firms’ access to a labour supply and reducing the costs of that access – **labour market** effects.

Much of the economic literature has been concerned with transport impacts on the product market. However, the labour market aspects are also very relevant especially in a regional policy context, given the fact that labour supply is invariably sourced within the region.

1. Endogenous growth theory suggests that economic growth is an outcome generated primarily by the internal characteristics of the economic system rather than the result of the external forces to which it is exposed. It relies on uncovering the public and private sector choices that cause the growth rate to vary across countries. The theory implies the possibility of sustained differences in the levels and growth rates of national income. Because of externalities, mainly productivity gains obtained from specialised research-driven inputs, diminishing returns to human and physical capital do not occur and neither do countries converge in income terms. Endogenous growth theory is more realistic in its core assumptions than neo-classicism with imperfect competition, increasing returns to scale and international interdependence all playing roles.

2. Economic geography provides an economic explanation of the spatial structure of the economy.

Both product and labour market effects can act to increase the efficiency and market effectiveness of existing firms, leading to an expansion of output and employment. They can also influence the locational behaviour of firms giving rise to inward investment into regions or countries (see Figure 2.1)

With regard to transport and economic development (the size of the cake), there can be little doubt that well judged transport investments will have a positive effect. With regard to regional distribution impacts (how the cake is shared), the role of transport is less certain. This is because transport investments are a 'two way street', so that for example linking a core to a peripheral region might be more to the benefit of the former rather than the latter. This is an issue that the economic geography theorists seek to illuminate.

2.2 Benefits to Firms of Transport Investments

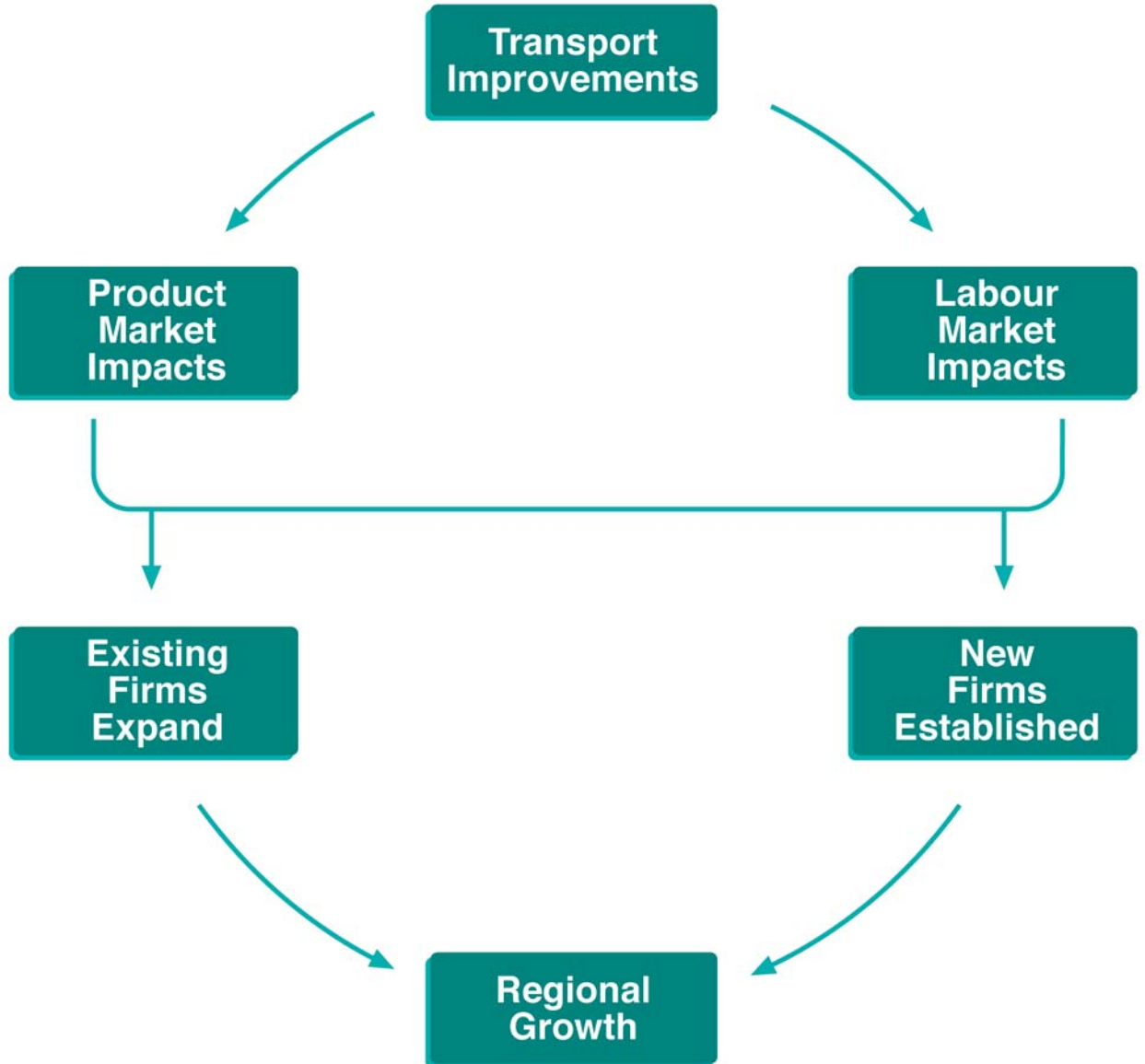
2.2.1 Cost savings

The scale of product market effects will in part be determined by the benefits to firms of such investments.

Traditionally, transport investments have been assumed to result primarily in cost savings to firms that feed through into lower product prices and increased output. This has caused economists to look at the proportion which transport costs are of output prices.

Generally speaking, the estimated share of transport costs has been shown to be small, leading some economists to conclude that transport is relatively unimportant in the determination of productive efficiency. For example, Illeris (1991) notes that while sectors that deal with very heavy or perishable goods may be exceptions, improvements in goods transport reduce the total cost of firms only marginally and therefore have only a modest influence on the location of economic activities. Durkan and Reynolds-Feighan (1992) estimated that transport costs account for just 4 per cent of Irish manufacturers' sales revenue. McKinnon (1995,1996) finds that manufacturers spend, on average, only 1.5 to 2 per cent of sales revenue on transport. He concludes that even if a significant reduction in transport costs were translated into lower prices, the prices of manufactured goods would fall by an amount so small so as to be unlikely to have much effect on the level of economic activity. One of the problems with these conclusions is that they conflict with the views of industrialists who invariably argue that deficiencies in the transport system impact negatively on their competitiveness.

Figure 2.1: Overview of Transport Impacts



In fact, there are a number of problems with the conclusions drawn by these economists, viz.

- They are often based on transport cost estimates that are deficient; and
- Transport costs give a very incomplete picture of the impacts on the firm.

Estimates of the share of transport costs are often deficient because of the failure to include:

- The in-house transport spend of firms on goods transport;
- The spend of firms on passenger transport for their employees (e.g. sales representatives); and
- The transport costs of delivering product to the market through the wholesale and distribution sector.

While different studies include these elements to varying degrees, virtually all suffer deficiencies that lead to an understatement of transport costs.

The US Department of Transportation has recently concluded the development of a set of transportation satellite accounts³, which seeks to establish the full picture with regard to the scale of transportation costs in the economy. Table 2.1 summarises the results. The first column of results indicates the transport costs per £ of output at producers prices. Agriculture and Construction are the most intensive users of transport at 8.0 per cent and 7.7 per cent respectively. Manufacturing is considerably less at 3.5 per cent. Within manufacturing there is a range of values: for example, computing and office equipment (1.1 per cent), food processing (3.8 per cent) and paperboard containers and boxes (5.8 per cent). In view of the changing structure of economic activity, it is worth noting that the transport intensity of the Service sector does not lag much behind that of Manufacturing.

The second column shows the direct and indirect transport costs embodied in final consumption of goods and services. It thus includes the transport costs in the wholesale and retail sectors and the indirect transport costs in material purchases. While the pattern of transport intensity is similar to that for industry output, it is significant that the transport intensity of manufacturing increases proportionately more than others. This reflects, in part, the role that the wholesale and retail distribution sector plays in the final delivery of manufacturing products.

3. These are accounts that expand the analytic capacity of the basic national accounts, without interfering with the general-purpose orientation of the latter.

2.2.2 Time Value of Goods

The need to transport goods to customers not only imposes direct money costs on manufacturers but also gives rise to time costs. Where goods are not delivered to customers on time, there are costs to the producer in terms of both lost business and the tying up of working capital. To gain certainty of delivery, producers and distributors tend to hold stock close to the customers. These inventories incur costs, not only in warehousing and storage but also in terms of working capital. Investments that improve the speed and reliability of transport networks create the scope for maintaining prompt delivery to customers without the need to stockpile. Thus, producers value transport network improvements for their potential to reduce not only transport costs, but logistics costs generally.

Table 2.1: Transport Costs by Industry Type

IndustryT	Transportation Costs per £ of Output in Pence	Transportation Costs and Embodied in each £ Purchased by Consumers and Other End Users
Agriculture, Forestry and Fishing	8.0	14.9
Mining	4.3	7.9
Construction	7.7	12.8
Manufacturing	3.5	9.1
Communication and Utilities	1.9	8.2
Wholesale and Retail Trade	4.7	11.6
Services	2.9	5.4
Finance, Insurance and Real Estate	0.7	2.2
All	3.3	N.a

Source: Transport Satellite Accounts. US Department of Transportation, 1999.

Note: The transport costs embodied in final purchases relates to purchases of commodities and not from particular sectors.

McKinnon (1995) suggests that there is a complex relationship between transport improvements and business costs, which should be considered at a number of levels. The are four main levels are as follows:

- Restructuring of logistical systems;
- Realignment of supply chains;
- Rescheduling of product flow; and,
- Management of transport resources.

Consideration of these factors has given rise to just-in-time, outsourcing and centralised distribution strategies, which have reinforced the need for high quality transport services. In implementing these strategies, reliability of transport networks as well as their speed becomes important. The producer requires that transport networks are sufficiently reliable to ensure just-in-time delivery.

2.2.3 Overview

The indirect effects on business costs taken together with the direct effects on transport costs suggest that transport investments can have a major impact on economic activity.

The presumption that only those sectors with high transport cost intensity are likely to be significantly affected by transport improvements is wrong. Even where transport costs are low, such as in the computers or software sectors, the scope for reducing logistics costs may be high. This means that the locational behaviour of such sectors will be influenced by the quality of the transport infrastructures available.

This is an important conclusion, because it is often held that the changes in the structure of industrial output in favour of high value to weight goods will mean that transport will be less important to industry going forward. Consideration of the wider role of transport in logistics strategies suggests that this may not be the case to the extent envisaged, if at all.

2.3 Product Market: The Role of Transport in Economic Development

2.3.1 Introduction

The previous section concluded that transport has a more significant impact on the efficiency and market effectiveness of firms than has often been supposed. This section addresses the question as to whether the benefits to individual firms capture the full extent of the transport impact. In fact, there is a growing body of economic opinion that supports the view that transport improvements give rise to a significant spillover of benefits to the economy as a whole. This spillover arises from two sources: the first relates to externalities and the second to the fact that firms may not be operating in a competitive environment.⁴

2.3.2 Externalities

In the past decade or so, economists have sought a new explanation as to why some economies grow faster than others. This has led to the emergence of a 'new growth theory' which has proved to be a rich source of insights into the determinants of economic success. New growth theory shares the perspective of the traditional approach that sustainable increases in a country's growth rate are only possible with an enhanced rate of productivity brought about by technological change. The crucial difference is that new growth theory attempts to explain the process of enhanced productivity (endogenous growth).

4. The discussion in this and the next sections draws heavily on the work of A J Venables and M Gasiorek, *The Welfare Implications of Transport Improvements in the Presence of Market Failure*, DETR, 1999.

In the context of considering the links between economic growth and transport investment, the 'spillover' or 'externality' strand of the new growth literature is particularly relevant. This area of the literature (Barro (1990), Plosser (1992), Romer (1994)) contends that investments undertaken for particular purposes either by the state or the private sector generate additional unintended (i.e. external to the main motivation for the investment) in the economy's rate of productivity. This theory can also be invoked to rationalise divergences in economic performance between countries and regions.

Externalities may be either technological or pecuniary. Technological externalities arise where the actions of one firm directly benefit the efficiency of another. A very obvious externality of this kind is the spillover of knowledge from one firm to another. Thus, if a transport project attracts, say, a high tech firm to one location, then other such firms may also be attracted by the knowledge pool that is formed. Pecuniary externalities arise where competition in the market is less than perfect and a transport improvement sets off a chain of events that improve competition. For example, if a transport improvement causes a new firm to enter a particular market, this may induce a new entrant in the upstream materials supply market. This may in turn improve competition in the upstream supply market, with spillover benefits to downstream producers as a whole.

The next paragraph explores in more detail the situations in which imperfect competition creates these spillover effects.

2.3.3 Imperfect Competition

Increased Competition

Where competition is imperfect, firms earn excess margins and prices exceed the marginal costs of production. Transport improvements may increase the intensity of competition between firms in different locations. Dominant positions in local markets can be eroded as each firm finds it easier to sell into the other's home region. A consequent reduction in prices tends to increase firms' sales in all regions. This 'pro-competitive' effect of a reduction in transport costs provides a source of output expansion and welfare gain.

Economies of Scale

Bougheas and Demetriades (1996) extend the discussion by highlighting the effect of transport infrastructure on Foreign Direct Investment (FDI), specialisation in production, and regional trade. Essentially they recognise that, in a world of imperfect competition, economies of scale have a basic role in justifying minimum plant size and, therefore, a minimum size in market area. The interaction between a reduction in transport costs and these factors creates forces that lead to more efficient production and welfare gains, as well as facilitating the concentration of industries in specific locations.

If firms operate under increasing returns to scale, then reductions in transport costs may facilitate the re-organisation of production into larger units supplying wider geographical market areas.

Agglomeration Economies

When transport costs are high, firms tend to locate close to their customers.⁵ Lower transport costs may enable firms to locate close to suppliers and where specialisation of labour and various business services provide a pool of efficient inputs. This process, which leads to ‘clustering’ of firms due to competitive advantages in agglomeration, is well documented in the literature.

Venables and Gasiorek (1998) makes the key point is that, even if two regions are identical in their underlying characteristics, agglomeration of activity may create differences in their economic structure and real incomes. Moreover, this agglomeration may be triggered by a reduction in transport improvements and that the aggregate welfare gains from more efficient production maybe quite large.

2.3.4 Overview

The benefit of transport investments to industry exceeds that to individual firms, because of the existence of external effects. These external effects have greater force where the economy is less than perfectly competitive and where economies of scale exist. The quality of transport systems plays an important role in the determining the location of firms and the development of clusters, with the agglomeration economies that follow. Thus, transport improvements generate welfare gains through better exploitation of comparative advantage between regions.

However, while the economy as a whole benefits from transport improvements, the presence of differences between industries and regions may mean that particular regions suffer a real income loss as economic activity relocates. That is the two-way street may act to the detriment of peripheral regions. This issue is taken up in the next paragraph.

5. This is strictly true only for firms that produce goods that are more transport intensive than their inputs.

2.4 Product Market: The Role of Transport in Regional Development

2.4.1 Core and Periphery

Assuming regional inequality (differentiated by different endowments of production factors as well as agglomeration economies), Krugman and Venables (1996) argue that the impact of lower transport costs on the pattern of specialisation and the location of economic activity is difficult to assess. Economic geography literature (Krugman, 1991; Martin and Rogers, 1995;) deals with these issues by characterising the world as consisting of a rich core and a poor periphery.

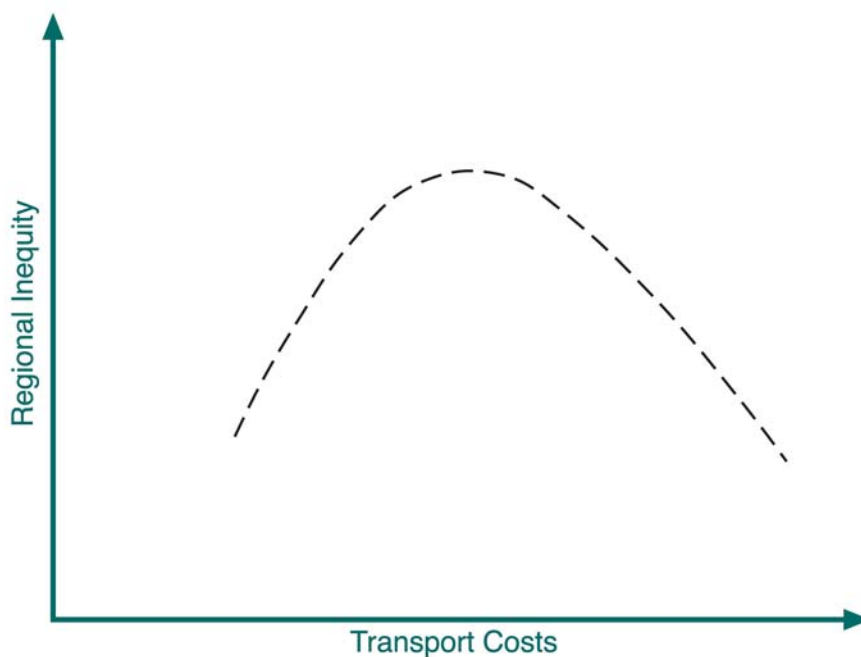
Reduction in transport costs has two effects. Firstly, it facilitates the location of production to where it is cheapest and then transporting goods to all markets from there. However, it also facilitates concentration of production in one location so as to obtain economies of scale. While the periphery has cheaper production costs (wages, land etc.), the core has a larger market and thus benefits from economies of scale. Within this framework, the key question is whether reducing transport costs between the core and the periphery allows the periphery to capitalise on its production cost advantage or whether economies of scale predominate.

Venables and Gasiorek (1998) find that the impact of a transport improvement on the relative welfare of a core and a peripheral region depends on the initial level of transport costs. From a position of very high transport costs, a reduction can initially lead to increases in regional inequalities as economies of scale in the core region overcome the initially prohibitive transport costs. However, further reductions in transport costs beyond a certain level would lead to the expected reduction in regional inequality, as the cost of transporting goods from the core to the periphery outweighs the gain from economies of scale. This suggests that there is an inverse U-shaped relationship between transport costs and regional inequalities, with transport cost reductions first increasing regional inequality then reducing it (see Figure 2.2). Transport improvements narrow output and wage differentials between the two regions only if initial transport costs are not too high.

In the context of a core and a periphery region, Venables and Gasiorek (1998) suggest that the turning point of the 'U' occurs at a level of transport costs considerably larger than those that are likely to be seen in inter-regional transport in developed economies. The conclusion is then that regional inequalities between the core and the periphery are likely to be reduced by transport improvements.

As well as economies of scale and transport costs, diseconomies of agglomeration are also important in determining regional balance. Where gains from economies of scale dominate transport costs, any reduction in transport costs may lead to a greater concentration of economic activity in larger core regions up to the point where diseconomies of agglomeration arise. Glaeser (1998) argues that the main constraints on the growth of cities arise from external costs associated with increased congestion and environmental degradation. Newman, Kenworthy et al (1997) produce data to support the hypothesis that, after a certain point, the diseconomies associated with car use and low density suburban sprawl reduce the economic performance of cities, compared to those with more balanced transport systems and less dispersed land use.

Figure 2.2: Impact of Transport Cost Reductions on Regional Inequality



Depending on the relative influences of economic factors such as production costs, economies of scale, and urbanisation, some regions will be potential gainers and some potential losers. Vickerman (1991) argues that an understanding of the economic resources and typology of regions is needed to identify the extent to which particular types of region may receive cumulative benefits or cumulative disbenefits of a particular project.

The broad conclusion, however, is that where significant diseconomies of agglomeration have arisen, further improvements to (already good) transport networks are likely to be to the benefit of peripheral regions.

2.4.2 Regional Networks

The three-region network case (one core and two periphery regions) considers the same factors as our core-periphery case. Where both links between the centre and the two peripheral regions are improved, both peripheral regions are expected to gain at the expense of the central region for which the initial dominant position is reduced. DETR (1999), using UK data, shows empirically that both peripheral regions make substantial welfare gains. The overall improvement in welfare from improving both links is greater than the sum of the improvements associated with each link independently as the effect is to enlarge the total market. This property is known in the literature as ‘super-additivity’.

A second situation is where links between two peripheral regions are improved, but the links to the core remain unchanged. The effect of this is to create the benefits of a large market in the peripheral regions, increasing their welfare relative to that of the core.

It is clear that any analysis that is carried out from the standpoint of one region, typically a lagging region in terms of economic development, is inadequate. This point is significant as it implies an impact on regions other than the one in which the investment in new infrastructure is made. and that this will contribute to the reduction in disparities in economic performance between regions.

2.5 The Labour Market

2.5.1 Introduction

Thus far, the discussion has centred on the response of firms in terms of output and the likely regional impacts of such a response. In this section, we focus on how individuals are likely to respond to improvements in transport infrastructure through their labour market and housing market behaviour. If transport improvements can reduce commuting journey times, there will be impacts on wage levels, the availability of labour and the price of land/housing. These can have profound effects on the production and location decisions outlined in the previous sections.

Assuming that improvements in transport infrastructure reduces commuting costs, Pearson and Lee (1993) outlines two complementary streams of response. These are:

- a commuting response; and,
- a migration response.

2.5.2 The Labour Market Effect

The commuting response causes labour markets to increase in size and efficiency. As transport costs fall, the search area for jobs increases as workers are prepared to make longer journeys for the same cost. This may lead to lower wages, lower unit output costs, and increased employment. There may also be a better matching of jobs to people with appropriate skills.

However, the regional distribution of these gains is uncertain. The impact on nominal wages and unemployment is ambiguous and depends on the relative characteristics of workers and jobs in core and periphery regions.

If inter-regional transport links are improved, workers in a poor peripheral region may commute to jobs in the core region, increasing incomes in the peripheral region while expanding output in the core region. Thus, while there is an income flow to the peripheral region, there is no impetus to the creation of economic activity or dynamic economic structures in that region. Long distance commuting to large urban centres is an example of this effect, which also has negative consequences for sustainable development.

If intra-regional transport links are improved, this will create a larger intra-regional labour market with benefits to industry in the region as a whole. This will manifest itself in an increase in inter-town commuting within the region. However, it will also impact on the relative economic success of towns within the region as improved transport enables some towns to exploit their comparative advantage. This may be the price to be paid for regional success.

2.5.3 The Migration Effect

If local transport networks in an undeveloped region are improved, then there are a number of possible impacts on the housing market. Lower commuting costs may:

- cause migration into the region from those employed in other regions searching for lower house prices or improved living standards; and
- Induce residents in the region to move outside it and commute longer distances to avail of lower house prices.

In the former case, the increased local labour supply may have a downward impact on real wages due to downward pressure on nominal wages and upward pressure on house prices. Thus, unless the housing market is flexible, regional welfare will not necessarily improve.

In the latter case, production is not lost to the regional economy although spending is reduced. An example would be if the numbers commuting to an area were to increase with little or no linkages to the economy in terms of spending and the development of the services sector.

The evidence is that the former effect is not very important. Transport factors do not tend to influence migration decisions significantly. Housing market factors and personal and family circumstances are much more important. For example, Cameron and Muellbauer (1998) suggest that the housing market has a strong effect on decisions to migrate between regions.

The impact of the latter effect is dependent on there being significant intra-regional differences in house prices. This may occur as between urban and rural areas within a region. Any such negative impacts would also be influenced by housing and planning policies, which could be used to limit the opportunities for workers to move residence in this way.

2.6 Synthesis

The impacts of the both the product and labour markets on the balance of development between the core and periphery may be summarised as in Table 2.2.

Table 2.2: Economic Factors and their Impact on the Core

Factors Promoting Growth in the Core	Factors Inhibiting Growth in the Core
Market size effects (linkages)	Thick labour markets
Pure external economies	Immobile factors (e.g. labour)
Land rents	Pure external diseconomies (congestion)

While it is clear that significant diseconomies are arising in the Dublin Region in particular, it is difficult to be definitive on whether they are sufficiently large to warrant restraint of Dublin’s economic growth. In fact, the Dublin region may need to grow in economic size to reap further external economies, so as to enable it to compete with other major conurbations abroad. If Dublin were to be restrained, then inward investors may choose not to locate in Ireland at all, because the option of locating in Dublin is not open to them.

In the context of the spatial strategy, a much less high-risk approach would be one of promoting other regions rather than restraining Dublin. However, industrial policy initiatives that reduce the rate of grant aid for the Dublin region carry some risks in diverting inward investment not to the regions, but to other countries. A less risky policy would be to intervene to improve infrastructural services in the regions. Such a policy would facilitate investment and not have negative consequences in diverting inward investment elsewhere.

3 Implications for Spatial Policies in Ireland

3.1 Summary of Findings

Before assessing the impact of transport on the development of a spatial strategy for Ireland, it is worthwhile trying to summarise the analysis presented above:

- Transport improvements have impacts on both the product and labour markets;
- With regard to the product market, transport improvements impact on firms not only through transport cost reductions but also through the scope for cost reductions throughout the logistics chain;
- The presumption that only high transport-cost industrial sectors are likely to be affected by transport network improvements is not well founded;
- Changes to the logistics chain mean that the reliability of transport networks is important as well as the speeds that they offer;
- Because of significant spillover effects, transport improvements have potential impacts on the economy in excess of the benefits to individual firms;
- The extent of these spillover benefits is determined by the structure of the economy; where competition is imperfect and economies of scale exist, spillovers will be high;
- Spillovers may lead to significant agglomeration economies;
- While transport improvements have the potential to yield significant economic benefits, the regional distribution of these benefits is dependent on circumstance;
- For core and periphery regions, the distribution of benefits arising from transport improvements depends on trade-offs between the lower input prices that prevail in the peripheral region and the economies of scale and diseconomies of agglomeration in the core region;
- A key finding is that unless the transport costs are very high, peripheral regions will stand to benefit to a greater extent from transport improvements;
- The overall improvement in welfare is much enhanced if transport links from the core to two or more peripheral regions are improved; this effect which is known as super-additivity arises because the enlargement of the total market that results from network improvements.
- Where links between two peripheral regions are improved, this increases their combined welfare relative to the core.

- If transport improvements reduce commuting journey times, there will be positive impacts on the labour market through a lowering wage levels and increase in the availability of labour;
- Some of these labour market benefits may be lost if out-migration increases; this means that supportive and appropriate planning and housing policies must be applied.
- Transport infrastructure improvements may be a less risky policy instrument than others for promoting regional development.

3.2 Application to the Irish Economy

The Irish economy could be characterised as comprising a core - the SE region – and a periphery - the BMW region⁶. However, the high export orientation of the Irish economy means that the core-periphery analysis cannot be applied without qualification. The dualistic industrial structure of the Irish economy has often been noted. This reflects a divergence in performance between the foreign owned export intensive sector and the indigenous domestic market oriented sector.⁷

The core-periphery analysis, based as it is on the existence of two regions with different market sizes and input resources, is more directly relevant to the indigenous sector.

With regard to the foreign sector, the appropriate model would be that of two peripheral regions – the SE and BMW regions – competing with a core region - the rest of Europe.

One of the features of the last decade is that the SE region has benefited more substantially than the BMW region. As a result, whereas at the start of the decade, both regions suffered high unemployment, the SE region has been more successful in reducing it to very low levels. The SE region has also been significantly more successful in attracting foreign inward investment.

6. The economy is characterised in this way for ease of exposition. This is not to suggest that the arguments put forward are valid only in this context.

7. It is recognised that this is a crude characterisation of Irish industrial structures.

3.3 Transport and Regional Development in the 1990s

During the 1990s, there was also a significant increase in transport and particularly road investment, which was focussed on the radial routes emanating from Dublin.

What was the regional impact of this investment? For the indigenous sector, it could be plausibly argued that because of the relatively loose labour markets in both regions, the market size advantages of the SE region would tend to dominate. That is, the underlying advantages of the SE region would tend to dilute any impact of transport improvements.

With regard to the foreign sector, the SE region would also have been very attractive because of the availability of a pool of labour, relatively low wage costs, and proximity to the main export markets of the UK and continental Europe. Again, in these circumstances, the internal transport improvements would not have been a potent force in redressing the disadvantages of the BMW region.

3.4 Regional Development and Future Transport Investment Strategies

The economic context in which a spatial strategy is now being developed is a very different one. The labour market is now very tight, especially in the SE region. Within parts of the BMW region at least, labour is more plentiful and wage costs and housing costs are lower. It is now evident that the success of the SE region is giving rise to agglomeration diseconomies, in terms of congested transport networks and housing problems.

The underlying advantages of the SE region are thus diminishing. This will naturally tend to encourage both indigenous and foreign firms to favour the BMW region to a greater extent than heretofore. If the latter region is now 'in play', transport may now have a more important role as an instrument for promoting its development.

If this is the case, where should transport investment be focussed? Economic theory would suggest that intra-regional links within the BMW region should be a focus for investment. There are two reasons for this. Firstly, access to a labour market is now a much more important factor in the locational decision making of the firm, whether foreign or indigenous. Good local transport networks will enhance labour market catchments. Secondly, to compete with Dublin, regional growth areas will have to achieve market scale. By linking regional towns, local transport networks can support the integration of regional markets.

At one level it might be argued that because the increasing traffic congestion problem of Dublin will tend to make the BMW region more attractive, significant resources should not be devoted to addressing it, thereby releasing resources for regional investment.

Vickerman (1991) claims that, to some extent, the lack of investment in London's transport system in the late 1980s could be seen as a deliberate policy to secure such a regional development effect. However, he warns that such a policy can have negative consequences. Although rising costs may make London less attractive vis-à-vis say Newcastle in the UK, they also make it less attractive than Paris or Frankfurt. The real competition is thus between cities or regions of the same type or functional significance and not between those at different levels of the functional hierarchy. If a core region such as London becomes less competitive at a European level, then not only these regions, but also all the cities and regions that are functionally dependent will also become less competitive.⁸

This is doubled reinforced in the Irish situation by the fact that the vast bulk of Irish exports exit through east-coast ports, with Dublin port being the largest gateway. Access to these ports is vital for exporting firms in the BMW region and to encourage inward investment to that region. This means that the radial route system emanating from Dublin and local access to east-coast ports have much to contribute to regional development.

Cappellin (1990) emphasises a further aspect of this issue. Transport systems are no longer important only for the carrying of finished goods, but as part of the production process itself carrying intermediate goods and raw materials. In this case, reliability is of the utmost importance to ensure 'just in time delivery' of inputs to users. Often, this can only be achieved by an integrated transport system. The more peripheral a region is, the more it relies on the efficiency of the transport links in other regions to ensure its reliability.

The above arguments make the case for a significant role for transport in promoting regional development. This will require explicit recognition in the prior appraisal procedures applied to transport programmes and projects. In the light of the need for high quality and reliable transport networks, infrastructure design standards may also need to be reviewed.

8. This issue will be further addressed in the study of Dublin in Europe

3.5 Conclusions

Because of significant spillover effects, transport improvements have potential impacts on the economy in excess of the benefits to individual firms. However, the regional distribution of these benefits is dependent on a number of factors.

Ireland's economic success has given rise to tighter labour markets and the emergence of agglomeration diseconomies particularly in the Dublin area. These changes mean that regions that have been lagging in development look increasingly attractive as locations for industrial development. As a result, transport now has a more important role to play in helping deliver such development.

Because access to the labour market is now a much more important factor in the locational decision making of the firm, intra-regional links within the peripheral regions should be a focus for investment.

Transport investment to ensure access to east coast ports will be an important contributor to regional development, because of the export orientation of much of Irish industry. As Dublin port is the largest gateway, the radial route system emanating from Dublin should continue to be a focus for regional development.

The regional development role of transport will require explicit recognition in the prior appraisal procedures applied to transport programmes and projects. In the light of the need for high quality and reliable transport networks, infrastructure design standards may also need to be reassessed from this viewpoint.

4 Road Investment Policy and Regional Development

4.1 Introduction

The previous section of the report argued the case for the use of transport as an instrument of regional policy. It emphasised the need for a high level of investment not only in the radial routes emanating from Dublin, but also in the links between the regions, and the peripheral regions in particular. This raises the possibility that policy should aim at providing higher levels of service on roads than might have previously been considered necessary.

This section examines the current road investment strategy and assesses its adequacy in broad terms for this role.

4.2 Policy on Road Capacity

Current policy, as enunciated in the National Development Plan, is to:

- Develop five National Primary routes to at least high quality dual carriageway standard by the year 2006; these routes are Dublin-Border (M1), Dublin-Galway(N4/N6); Dublin-Cork (N8), Dublin-Limerick(N7) and Dublin-Waterford; and
- Ensure a minimum level of service D on the remainder of the National Primary network.

The concept of level of service that is used in road planning is related to a number of attributes of the road, including operating speed, passing conditions, and driving conditions. Levels of service A, B, C, D, E, and F are defined, with A representing the highest level of service.

4.3 The Radial Road Network

The current policy of providing level of service C on the major Inter-Urban Routes represents a departure from previous policy, which was based on achieving a service level of D.⁹

In the context of promoting regional development, the speed and reliability of roads are the two most important attributes. These are, in practice, determined by both the level of service targeted and the standard of road built (e.g. motorway, dual carriageway and two lane). Table 4.1 sets out the estimated average vehicle speed associated with roads of different standards and levels of service. Thus, the decision to build certain radials from Dublin to at least dual carriageway status at level of service C will ensure a minimum average speed of 94 kph. This will deliver very significant improvements in journey times (for

9. Sometimes referred to as Mid D.

further discussion of this, see Section 6). As road planning has a twenty-year horizon, these journey time improvements will be maintained over the period to the year 2020.

It is intended to construct these radials largely on new alignments. This will ensure that, where dual carriageway standard is constructed, junctions and local accesses will be kept to a minimum. Existing roads along these routes will also be retained for local traffic, thereby further enhancing capacity for through traffic. These policies will increase the reliability of the road system significantly, a factor which Section 2 identified as of increasing importance to transport users, and particularly freight transport. Reliability will also be increased by the 20-year design horizon. As traffic volumes will be lower than the design volumes in the early years, the level of service offered will be very high initially. This will mean that congestion associated with seasonal and daily peaks will largely be avoided.

Table 4.1: Average Speeds (kph) for Different Road Standards and Levels of Service

Level of Service	Two Lane Road	Dual Carriageway	Motorway
B	88	96	110
C	84	94	105
D	80	90	97
E	72	65	65

Current road policy for the major radials would thus seem to be very compatible generally with regional development objectives, in that it will provide high capacity, high speed, and reliable links between Dublin and the regions.

However, the decision not to build the link to the northwest to dual carriageway standard throughout is deserving of some comment in the context of the National Spatial Strategy. The current intention is that the N4 will be motorway as far west as Kinnegad and dual carriageway up to and including the Mullingar bypass. The remaining section of the N4 to Collooney will be a mix of wide and standard two lane. This decision no doubt reflects the relatively lower traffic volumes on the N4 West of Kinnegad and the N5, where traffic volumes of 3,000 to 5,000 AADT are the norm. Even with a doubling of traffic volumes, they will not exceed the capacity of a wide two lane at level of service C (13,800 AADT) by the design year. Thus, a high level of service in terms of speeds and journey reliability will be achieved. However, if within the context of the National Spatial Strategy, significant urban growth were to occur in the northwest, then a reduced dual carriageway standard road could become necessary. This issue would need further consideration, as the National Spatial Strategy takes form.

4.4 The Inter-Regional Road Network

If the National Spatial Strategy seeks to promote regional development through enhancing road links, then the level of service on the following routes is important:

N25: Waterford – Cork

N24: Waterford – Limerick

N20: Cork – Limerick

N22: Cork – Killarney- Tralee

N21: Tralee – Limerick

N18: Limerick – Galway

N17: Galway – Sligo

N15: Sligo-Lifford-Letterkenny

The N20 and N18 are the links between the major centres of population of Cork, Limerick and Galway. Final decisions on the standard of road on much of these routes have yet to be made. The Roads Needs study, which adopted a level of service D, envisages that the bulk of the route would be developed to dual carriageway status. The exceptions are the section between Charleville and Patrickswell on the N20 and Ennis and Gort on the N18 for which wide two-lane standard was envisaged. In the context of regional development, there is a case for developing these routes to a uniform standard throughout.

For the other routes, with the exception of short sections of the N25 and N17 where dual carriageway standard will be achieved, the Roads Needs study envisages a variety of standards, ranging from existing (unimproved) two lane to wide two lane. A decision to provide level of service C would have a profound impact on road standards on these routes. Taking the N17 Galway to Sligo for example, level of service C would require, in all probability, dual carriageway standard from Galway as far as Claremorris, or half the total route length.

In general terms, the adoption of level of service C rather than D, as currently planned, would deliver a high standard for inter-regional road links. In any event, it will be important, as road design decisions are being made, that the results of the traffic demand analysis undertaken as part of the National Spatial Strategy be taken on board. The analysis when complete may show predicted traffic growth rates for the regions in excess of that for the national primary route network as a whole. This may have an impact on the appropriate road standard for these links. Where provision of a higher road standards is borderline on traffic grounds, regional development objectives would warrant adoption of the higher standard, as this would ensure greater uniformity of road standards with greater benefits in terms of reliability of the system.

4.5 Urban Road Networks

There is, however, a concern that the improvement of inter-urban connections may result in conflicts at those points in the transport networks where the improved inter-urban routes connect with the lower capacity urban areas. Such conflicts could include:

- Increased delays and congestion due to the increased volumes of traffic;
- Increased environmental problems;
- The mixing of long distance and local commuter based traffic;
- Road safety concerns; and
- Problems associated with an increase in the number of heavy vehicles.

If the National Spatial Strategy is to be successful in achieving its stated objectives, then the potential concerns identified above need to be evaluated and, where necessary, addressed.

In the first instance, it would be necessary at a local level to quantify the extent of the potential problems. In simplistic terms, this may involve the following approach:

- Quantification of the scale of current network restrictions, in terms of transport capacity and road safety;
- Consideration of the existing environmental restrictions prevailing at each location; and
- Identification of the scope for future network enhancements.

A number of integrated land-use transportation studies for major towns have been completed¹⁰. These are an important means of identifying both the scale of urban access problems and the potential solutions.

If future concerns are identified, consideration could be given to a range of measures dependent upon the type and scale of problems. The process should, however, be considered in a holistic manner. As the rural economies grow, and travel demand increases, the development of the areas should take place in a co-ordinated fashion, which takes account of the potential interaction between the local and non-local traffic. This should form part of the normal Development Plan review process.

¹⁰Including studies for Galway, Cork, Limerick and Tralee.

Potential measures and related issues include the following:

Park and Ride

- The threshold size of urban area should normally be excess of 100,000 for park and ride to be feasible. Cork, and perhaps Limerick are the likely venues for such measures;
- There is a need for complementary measures (parking restrictions in the central area, improved bus services on the radial routes);
- Park and ride will result in a reduction in capacity on radials due to introduction of bus priority measures;
- It may also lead to a reduced level of service for competing rural and local bus services;
- Economic impact of restrictive car policy. Studies in the UK suggest that a proportion of town centre users could travel elsewhere, though this is dependent on a range of factors. This aspect may not be as critical due to the relatively large distances between competing urban centres in Ireland.

Land Use Considerations

- The location of existing and future employment/industrial sites will determine the extent of the impact;
- Land use strategies must be viewed in a holistic manner, with consideration of such issues as total corridor development strategies

Road Network

- There will be a need to squeeze increased capacity from the main radial routes to accommodate additional traffic;
- Consideration will have to given to the use of alternative routes, either through the upgrading of existing roads or provision of new infrastructure, to gain access to the more peripheral areas;
- Enhanced signage to minimise the impact of non-local traffic will be required;
- The introduction of road safety measures to minimise the impact of Increased traffic flows will be necessary.

Reduction in Local Commuter Travel

- An improved level of local bus/train services;
- An increase in the adoption and implementation of Green Travel Plans and Safe Routes to Schools projects, to reduce traffic flows;
- The development of a car park management for the urban centre (short stay versus long stay).

Rail Services

Increased capacity to accommodate local and long distance traffic.

4.6 Conclusions

Current road policy for the major radials would seem to be very compatible generally with regional development objectives, in that it will provide high capacity, high speed, and reliable links between Dublin and the regions.

However, the decision not to provide a dual carriageway link to the northwest may be deserving of further consideration within the context of the National Spatial Strategy. If significant urban growth were to occur in the northwest, then a reduced dual carriageway standard road could become necessary.

In general terms, the adoption of level of service C, rather than D, as currently planned, would deliver a high standard for inter-regional road links. In any event, it will be important, as road design decisions are being made, that the results of the traffic demand analysis undertaken as part of the National Spatial Strategy be taken on board. This may have an impact on the appropriate road standard for these links. Where provision of a higher road standards is borderline on traffic grounds, regional development objectives would warrant adoption of the higher standard, as this would ensure greater uniformity of road standards with greater benefits in terms of reliability of the system.

There is a concern that the improvement of inter-urban connections may result in conflicts at those points in the transport networks where the improved inter-urban routes connect with the lower capacity urban areas. Resolving such conflicts will require that a range of measures be put in place. These will include higher levels of public transport provision, improved traffic management, and a high level of integration of land use and transportation policies

5 Regional Airports

5.1 Introduction

There are twelve airports in Ireland (both North and South), six international airports and six regional airports¹¹. In the discussion that follows, Shannon, Cork and Knock airports have been classified as regional airports, because of the need to consider their role in regional development.

Because the regional airports are not in public ownership (with the obvious exceptions of Shannon and Cork), their development is largely a matter for commercial decision making by the relevant airport authorities. Similarly, the levels of service at airports are determined by the commercial policies of airlines. However, the Government does intervene to support essential air services to the regions in accordance with the EU Council Regulation No.2408/92. The government also provides support for the provision of facilities at airports, where they are deemed inadequate from the viewpoint of national policy considerations.

In the context of the development of an appropriate spatial strategy, the key issue is whether the current levels of intervention are appropriate in the context of an increased concern to promote balanced regional development.

This issue is evaluated below by examining:

- The coverage of regional airports; and
- The levels of air services at existing airports.

It must also be recognised that the scope for Government to intervene to support air services is circumscribed by European Union legislation and that Government interventions to support the regional airports does not extend to providing operational subsidies for those airports.

¹¹The six regional airports in Ireland (both North & South) include: City of Derry, Carrickfin, Sligo, Galway, Farranfore (Kerry), and Waterford Regional.

5.2 Airport Coverage

5.2.1 Introduction

The viability of any airport is critically related to the population and economic strength of the local catchment. Where the local population is large and economic activity levels are sufficiently high, it is likely that private entrepreneurs will seek to establish a local airport provided that the market is not being served already. In this section, we consider whether the pattern of airport provision, which has emerged in Ireland as a result of this process, has given rise to a sufficient level of airport provision for the country as a whole.

International Comparison of Levels of Airport Provision

How does airport provision in Ireland compare with that in Europe generally? Table 5.1 below highlights the number of airports per million inhabitants and per million square kilometres in various European countries. From this, it is apparent that Iceland and Norway have the highest number of airports per million inhabitants, totalling 47.8 and 11.5 respectively. Such a high level of provision is no doubt related to the terrain and climate, which inhibit road transport. From the 14 countries surveyed, Ireland has the fifth highest number of airports per million inhabitants. Germany and the Ukraine have the lowest number of airports per million inhabitants, with 0.41 and 0.26 respectively.

Greece and the United Kingdom have the highest number of airports per million square kilometres, totalling 287.9 and 232.7 respectively. From a total of 14 countries surveyed Ireland has the third highest number of airports per million square kilometres. Finland has the lowest number of airports per million square kilometres from the countries surveyed.

Table 5.1: Levels of Airport Provision in Europe

Country	Total Number of Airports	Airports per million inhabitants	Airports per million sq. Kilometres
Austria	6	0.75	71.5
Finland	21	4.11	62.1
France	68	1.17	123.3
Germany	33	0.41	92.5
Greece	38	3.63	287.9
Iceland	13	47.80	126.2
Ireland	13	3.58	184.9
Italy	36	0.63	119.5
Norway	50	11.47	154.4
Portugal	15	1.51	162.3
Spain	36	0.92	71.3
Sweden	44	4.98	97.8
Ukraine	13	0.26	21.53
United Kingdom	57	0.97	232.7

Source: European Airport Infrastructure – Fewings 1999 (Air Transport in Europe's Remote Region, Cranfield University – June 1999) & Goodbody Economic Consultants. Note – The analysis presented in above document identifies 13 airports in Ireland (assumed to include St. Angelos Enniskillen).

5.2.2 Airport Catchments

In order to make an informed assessment of the geographical coverage of regional airport provision, a time travel analysis was conducted. For each of the nine regional airports distance measurements were made along the national routes connected to the airports, or to the nearest town/city. Catchment areas of 40 miles and 60 miles were determined. These distances were selected to represent journey times of one hour and one and one half hours respectively.

The analysis showed a considerable degree of overlap in the hinterlands of the existing airports, at both the 40-mile and 60-mile time travel bands. This pattern is particularly prevalent in the West and Northwest regions, where the hinterlands of Shannon, Galway, Knock and Sligo airports overlap to a high degree. For example, urban areas such as Galway, Castlebar, Tuam and Boyle are included within the 40-mile time travel bands of more than one regional airport. Regional airports in the Southeast and Southwest regions also demonstrate a considerable degree of overlap at the 60-miles time travel band, with urban areas such as Cork, Tipperary, Mallow and Clonmel being incorporated within the 60-mile travel bands of more than one regional airport.

The catchment areas for each airport were merged to identify the total area served by the regional airports (see Figure 5.1). From this, it is apparent that there is an area in the midlands and border regions that lies outside the 40 and 60 mile catchments. However, most of the area outside the catchments of the regional airports lies within a 70-mile radius of Dublin airport, where there is a very high level of service.

International Comparison of Airport Catchments

A similar time travel analysis has been conducted on a European level. Table 5.2 below depicts the percentage of the population that resides within one and two hours surface travel time from an airport. The table shows that 55 per cent of the population of Ireland are within one hour's travel time of an airport, the lowest of the twelve countries surveyed. However, 90 per cent of the population of Ireland are within two hours travel time of an airport, which is very similar to most of the countries surveyed.¹² One of the reasons for the lower coverage within one hour's travel time may be the low-density settlement pattern in Ireland.

Table 5.2: Percentage of Population within One and Two hours Surface Travel Time

Country	1hr (%)	≤ 2hrs (%)
Austria	70	90
Denmark	-	99
Finland	70	95
France	95	99
Germany	90	99
Greece	85	95
Iceland	85	90
Ireland	55	90
Italy	95	99
Norway	65	88
Scotland	90	95
Spain	90	98
UK	92	98

Source: Air Transport in Europe's Remote Region, Cranfield University, 1999

¹² Cranfield University - Air Transport in Europe's Remote Regions (European Airport Infrastructure (June 1999)).

Figure 5.3: Regional Airport Catchment Areas, 2000

5.2.3 Overview

In general terms, the level of provision of regional airports in Ireland would appear to be relatively high. There would appear to be no gap in the system. The journey time improvements planned for inter-regional roads will increase the access of the population to a regional airport.

5.3 Levels of Service

Service levels at regional airports are determined by commercial decisions taken by individual airlines, taking account of any available State compensation to support air operations under the EU regulations referred to earlier. Because of this, the level of service at these airports reflects both the demand for these services and the costs to the airline of their provision. Thus, service levels are not in the control of the airport authorities.

In the past, the demand for regional air services has been relatively low, resulting in a low level of provision by the airlines. If, in the future, as a result of more balanced regional development, regional populations and economic activity levels rise, then the airlines will tend to increase their levels of service.

Although current levels of service at regional airports are relatively low, we need to consider whether they are so low as to hinder regional development.

In general, the business traveller prefers to travel to his destination, conduct a full day's business and return to his place of origin within a single day. Thus, in an ideal world, early morning departures and late evening return flights are generally preferable. This suggests a minimum daily frequency of two flights each way.

The service levels provided by the airlines from each of the regional airports within Ireland are set out in Table 5.3 below, which provides a summary of the weekly departures, arrivals and locations served from each airport. An explanatory paragraph is included for each regional airport in Appendix 1.

Most of the airports now have a minimum daily frequency of two Dublin flights each way and also have some direct connections to other destinations, principally in the UK.

The essential air services programme is operated under Article 4 of the EU Council Regulation No. 2408/92. It allows EU states to impose Public Service Obligations (PSO's) on and contract the provision of air services to peripheral or development regions in their territories, where the commercial operation of such routes would not be a viable proposition. The programme provides for a certain level of service to be specified by a member state (e.g. in relation to air fares, the number of seats offered and frequencies) on a designated route. Prospective suppliers tender to provide the service and access to the route is limited to the selected carrier. The Government compensation paid to PSO air carriers allied with fare revenue, covers the costs of operations.

Table 5.3: Regional Airports: Weekly Departures and Arrivals

Airport	Departures	Arrivals	Locations Served
Galway	30	30	Dublin
Sligo	14	14	Dublin
Donegal	7	7	Dublin
Knock	26	26	Dublin/Manchester/Stansted
Waterford	12	12	Luton
Derry	48	48	Dublin/Glasgow/Stansted/Manchester
Kerry	32	32	Dublin/Stansted
Shannon	226	231	Belfast/Birmingham/Dublin/Stansted/Belfast/ Birmingham/Dublin/Stansted/ Brussels/Frankfurt/ Gatwick/Heathrow/ Manchester/Paris/Transatlantic
Cork	314	317	Amsterdam/Birmingham/Bristol/Dublin/Frankfurt/ Glasgow/Gatwick/Stansted/Heathrow/Jersey/ Plymouth/Manchester/Newcastle/ Paris/Transatlantic

Source: compiled by Goodbody Economic Consultants

The average annual subventions for the six PSO routes for the years 2001 to 2003 inclusive are as follows:

Kerry:	£1.81m
Galway:	£2.38m
Sligo:	£1.97m
Derry:	£1.92m
Knock:	£1.35m
Donegal:	£1.3m
Total:	£10.74m

Table 5.4 below provides an illustration of the PSO and non-PSO traffic at the regional airports throughout Ireland during 1999. From this, it is apparent that PSO traffic forms a large proportion of overall passenger traffic, accounting for 28 per cent of overall passenger traffic using the regional airports in 1999.

Table 5.4: Comparison of 1999 PSO and non-PSO Passenger Traffic

Airport	PSO Traffic	Non-PSO Traffic	Total	% of Total
Donegal	11,713	11,423	23,136	51
Galway	73,501	17,775	91,276	81
Kerry	69,715	95,027	164,742	42
Knock		197,358	197,358	0
Sligo	21,002	3,232	24,234	87
Waterford	0	17,824	17,824	0
Derry	0	105,194	105,194	0
Total	175,931	447,833	623,764	28

Source: Department of Public Enterprise

5.4 Commercial Viability of Regional Airports

It is accepted in the airport industry that a passenger traffic level of greater than 1 million is generally required to ensure profitability on a fully costed and stand-alone basis. Table 5.5 sets out the passenger throughput at the regional airports over the period 1993-99. With the exception of Cork and Shannon, none of the airports achieve the viability threshold. While there has been significant growth in passenger numbers thorough Knock, Farranfore and, to a lesser extent, Galway, it is clear that none of the other regional airports will achieve the necessary scale in the foreseeable future. In addition, some of this growth is due to the support provided to PSO services.

Table 5.5: Regional Airport Passenger Traffic, 1993-99 (000's)

Airport	1993	1994	1995	1996	1997	1998	1999
Shannon	1,710	1,534	1,571	1,741	1,822	1,840	2,196
Cork	723	800	971	1,124	1,196	1,315	1,501
Carrickfin	8	8	9	14	22	15	23
Galway	76	81	80	75	74	91	91
Farranfore	21	38	77	88	124	157	165
Knock	95	129	138	161	172	187	197
Sligo	18	18	21	22	21	24	24
Waterford	17	20	29	23	21	19	18
Derry	*	*	*	68	61	55	105
Total	2,668	2,628	2,896	3,316	3,513	3,703	4,320

Source: Irish Aviation Authority (2000) and Goodbody Research Report "Takeoff for AerRianta"

March 1999.

Note *: Passenger Traffic Numbers for Derry unavailable prior to 1996.

All of the regional airports, apart from Shannon and Cork are in private ownership. Traditionally, with the exception of Shannon and Cork, the primary role of the government of Ireland in relation to regional airports has been the granting of targeted financial support via capital and marketing grants. As indicated above, the regional airports also benefit indirectly through the support of air services via Public Service Obligations, i.e. state supported air services.

Table 5.6 below illustrates the total value of marketing grants paid over by Government to the regional airports over the period 1998-2000. Table 5.7 illustrates the support by Government for capital works at the regional airports under the 1998 support scheme. A further fund of £11m was set up under the National Development Plan 2000-2006. This support has undoubtedly contributed, along with voluntary local contributions, to ensuring that the regional airports remain in business.

Table 5.6: Marketing Grants to Regional

Airport	1998	1999	2000
Carrickfin	75	75	100
Galway	40	40	125
Farranfore	300	300	450
Knock	62.5	62.5	570
Sligo	70	70	100
Waterford	40	152.5	155
Total	587.5	699.5	1500

Table 5.7: Capital Grants to Regional Airports 1998 (£000)

Airport	1998
Carrickfin	456
Galway	3,100
Farranfore	0
Knock	924
Sligo	145
Waterford	375
Total	5,000

5.5 Conclusions

There is a considerable degree of overlap in the hinterlands of the existing airports, at both the 40-mile and 60-mile time travel bands. This pattern is particularly prevalent in the West and Northwest regions, where the hinterlands of Shannon, Galway, Knock and Sligo airports overlap to a high degree.

The level of provision of regional airports in Ireland is relatively high in comparison with other countries. There would appear to be no gap in the system.

The journey time improvements planned for inter-regional roads will increase the access of the population to a regional airport.

The extension of the essential air services programme in 2000 has contributed to improved service levels at regional airports. Minimally adequate levels of service are being achieved at regional airports with the exception of Knock and Waterford.

Given the overlap in catchments, Government support for the regional airports and for regional air services might be better focussed on a smaller number of airports. In particular, is Government support for Galway, Sligo and Donegal airports merited, given the possibility of serving their catchments from Shannon, Knock and Derry?

If more balanced regional development occurs, then with rising levels of population and economic activity, the provision of additional services at regional airports by air carriers will become commercially viable. Whether additional PSO services are warranted to stimulate such regional development in advance needs further consideration, taking account of the fact that such support is possible only through the PSO regime, the extension of which is subject to the strict supervision and approval of the European Commission.

6 The Railway System

6.1 Introduction

This section of the report examines the role of mainline and suburban rail services in regional development. In respect of mainline services, the adequacy of existing service levels and the capacity of the rail system to be competitive with rail are examined.

With regard to suburban services, the focus is on their role in reducing urban access problems.

6.2 Mainline Rail Service Levels

The level of service on the primary mainline routes of Dublin-Cork and Dublin – Belfast is relatively high. Similarly, the high frequency of the Dublin-Cork services facilitates a high level of service to destinations such as Limerick, Tralee and Killarney, which are connected to this route (see Table 6.1).

The major deficiencies on radial routes out of Dublin are in relation to services to the west and northwest. The towns of Sligo, Ballina and Westport, and to a lesser extent, Galway, have lower levels of service.

In the context of the spatial strategy, there may be a need to improve radial rail service levels to the west and northwest, if towns in that region are designated as growth centres. One of the options would be to convert to railcar operation on these routes. This would allow greater frequency of service, without significant additional rolling stock costs. However, to gain the maximum benefit from increased frequency, operating speeds would also have to be improved. The Dublin-Sligo journey time is approximately 3 hours and fifteen minutes at present. This means that, for example, a mid morning departure (11.30 am) from Sligo would not arrive in Dublin until close to 3pm. This would not enable a traveller to engage in significant business in Dublin and return the same day.

Non-radial connections are of mixed standard. While the Limerick-Cork and Cork-Tralee-Killarney routes are well served by virtue of connections to the Dublin-Cork line, other inter-regional service levels e.g. Limerick-Waterford are low.

Because the Limerick-Claremorris line is closed to passengers north of Ennis, there are no Limerick-Galway and Limerick-Westport-Ballina connections. Connections to Sligo are also impossible because the Claremorris-Collooney branch line is in disuse.

A strengthened inter-regional rail service network has a role to play in regional development. This will mean not only an increase in rail service levels, but also ultimately could involve the re-opening of lines to passenger traffic.

With regard to the latter, in the longer term there is the prospect of a ‘Western Rail Route’ linking Cork to Limerick, Galway Westport, Ballina and Sligo. This could involve re-opening of the Limerick-Claremorris line to passengers, reinstatement of the Claremorris-Collooney line, and the introduction of a more direct link between Charleville and Limerick.

Table 6.1: Number Mainline Rail Services on Selected Routes

Route	Direct Daily Services	Connecting Daily Services	Total
To Dublin:			
Cork – Dublin	7	2	9
Limerick – Dublin	4	6	10
Galway – Dublin	5	0	5
Waterford – Dublin	4	0	4
Sligo – Dublin	3	0	3
Tralee – Dublin	2	2	4
Killarney - Dublin	2	2	4
Athlone – Dublin	8	0	8
Westport – Dublin	3	0	3
Ballina - Dublin	0	3	3
Inter – Regional:			
Cork – Killarney –Tralee	3	2	5
Cork – Limerick	0	7	7
Limerick – Waterford	1	0	1

Source: Iarnrod Eireann Timetable

6.3 The Competitive Position of the Road and Rail Modes in the Inter-Urban Passenger Market

Table 6.2 summarises current road and rail journey times for travel between Dublin and the major urban centres. The rail journey times are the fastest time-tabled end to end and are inclusive therefore of delays due to stops at intermediate stations. The figures in brackets represent Iarnrod Eireann estimates of the fastest possible time. Current journey times for the primary routes of Dublin-Cork, Dublin-Belfast, and Dublin-Limerick are relatively good, with an average operating speeds (inclusive of station dwell times) close to 100 kph. However, secondary routes such as Dublin-Galway and Dublin-Waterford have relatively longer journey times, and operating speeds of approximately 70 kph.

The road journey times were measured using the floating observer method and are end to end journey times for off peak periods, exclusive of time spent in built-up areas. The estimates are not door to door journey times. In the case of roads, they exclude the time spent accessing and egressing the built-up area; for rail, time spent accessing and egressing railheads is excluded. However, as these exclusions are to some extent offsetting, it is considered that the comparisons have value.

The Table shows that the rail mode is currently very competitive with road in the Dublin-Border, Dublin-Cork and Dublin-Limerick markets. These markets are rail routes that were subject to significant upgrade during the National Development Plan 1994-99, largely as a result of Cohesion funding.

The competitive position of rail in the Dublin-Waterford market is relatively poor. It must be recognised, however, that as peak car journey times could be considerably longer than those indicated, the rail disadvantage would be reduced in the peak. In the case of Dublin-Galway, the competitive position of rail in end-to-end market is poor as time-tabled, but could be significantly improved by the introduction of limited stop services.

Table 6.2: Road and Rail Journey Times, 1999/00

Route	Current Road Journey Time (Minute)	Current Rail Journey Time (Minutes)	Rail Journey Time Advantage (Minutes)
Dublin – Border	79	53 (50)	26 (29)
Dublin – Galway	157	168 (144)	-11 (17)
Dublin – Limerick	145	134 (120)	11 (25)
Dublin – Cork	205	161 (140)	44 (65)
Dublin – Waterford	125	153 (150)	-28 (-25)

Source: NRA and Iarnród Éireann

The National Development Plan will see considerable investment on interurban road and rail links, which will impact on the competitive position between the two modes. Table 6.3 sets out the predicted improvements in journey times road and rail for the post 2006 period, arising from the NDP investments.

Table 6.3: Predicted Post NDP Road and Rail Journey Times

Route	Predicted Road Journey Time (Minutes)	Predicted Rail Journey Time (Minutes)	Rail Journey Time Advantage (Minutes)
Dublin – Border	55	53 (50)	2 (5)
Dublin – Galway	121	164 (140)	- 43 (-19)
Dublin – Limerick	114	134 (120)	-20 (-6)
Dublin – Cork	147	156 (135)	-9 (12)
Dublin – Waterford	94	143 (140)	-49 (-46)

Source: NRA and Iarnród Éireann

Due to the decision to improve the major inter-urban routes to at least dual carriageway standards, road journey times are predicted to improve considerably by over 50 minutes for Dublin – Cork, for example. Rail journey times will not improve to the same extent, with a consequent loss of rail competitiveness generally. While rail will remain broadly competitive in the Dublin-Border and Dublin-Cork markets, its position in the other markets will be poor.

6.4 Modal Choice Elasticities

In order to assess the impact of these changes on rail patronage, it is necessary to have an understanding of the elasticity of the demand for rail travel with respect to rail and road journey times. There is a growing body of research in the UK and elsewhere on this subject¹³. The only estimate to hand that relates to the Irish market (Oscar Faber, 1996) suggests an elasticity of demand for rail with respect to rail journey times of -0.45 , and a cross elasticity of rail demand with respect to car generalised cost of $+0.43$. UK research suggests that journey time elasticities vary between 0.3 to 1.2, with a range of 0.6 to 0.8 being more typical. The research also indicates that journey time elasticities are higher the lower the current level of service, the longer the journey length, and the fewer the interchanges.

6.5 Policy Implications

Using a rail time elasticity of -0.5 , and applying this to the increase in rail journey times relative to road journey times, suggests that there will be *ceteris paribus* a reduction in rail patronage of about 20 per cent on Dublin-Cork and Dublin-Belfast, and between 9 per cent and 13 per cent on the other routes. This means that a substantial reduction in patronage will occur on the most heavily trafficked lines.

The above analysis suggests that based on current plans, the mainline rail system's competitive position will deteriorate over the medium term. Some might argue that this does not represent a problem in that a high quality road network will be available. The opposite viewpoint recognises the need to maximise the use of sustainable transport modes and avail to the maximum extent of the railway's capacity to penetrate city centres, thus reducing urban access problems. A key issue for the Spatial Strategy is the extent to which rail services should be improved as a means of promoting regional balance and reducing the negative external effects associated with the car.

¹³ See for example: Oscar Faber. *New Cross Border Rail Service Market Research*. Report to Northern Ireland Railways and Iarnród Éireann, 1996; Fowkes and Nash. *Analysing the Demand for Rail Travel*. Avebury, 1991; Wardman. *The Effect of Rail Journey time Improvements*. Institute of Transport Studies WP 388, 1993; Queral. *Intermodal Competition on Inter urban Rail*. *International Journal of Transport Economics*, vol. XXII, no.2 1995. Wardman, Toner and Whelan. *Interactions between Rail and Car in the Inter Urban Leisure Travel Market in Great Britain*. *Journal of Transport Economics and Policy*. 1997. Jones and White. *Modelling of Cross-Country Rail Services*. *Journal of Transport Geography*. 1994.

At present, it would appear that there is no long term planning perspective on the role of the mainline rail system. This is in part understandable by virtue of the fact that until the recent decision to renew the rail system, investment in the system was very low, and there was uncertainty about the future of the system itself. The decision to renew the system has copper fastened its future. In this regard, there is now a need to develop a long-term plan for the railway, which would identify its future role and consider the level of capacity and service that it should provide.

6.6 Commuter Rail Services

6.6.1 Introduction

Apart from the Dublin commuter services, the only other dedicated commuter services are those for Cork-Cobh. There is potential for the further development of suburban services in the Cork and Limerick areas, as identified in two recent reports.¹⁴

6.6.2 Cork Rail Commuter Services

A number of options have been considered for the development of suburban services in the Cork area. These include:

Cork-Mallow: there are 14 trains per day in each direction serving this route, the majority of which are inter-city trains that stop at Mallow. There is the possibility of introducing a dedicated commuter service on this route with the re-opening of stations at Blarney and Blackpool.

Cork-Midleton-Youghal: this line is at present closed to passenger traffic and there is potential to re-open it, with new stations at Carrigtwohill, Mogeely and Killeagh.

A full economic evaluation of these proposed investments has not been carried out. However, there is doubt as to their viability in cost-benefit terms because of the low level of predicted patronage. This could change in the near future if land use developments close to these routes increase the potential catchment population. Within the context of promoting sustainable development and transport, it is clear that land use policy in the Cork area should focus development on rail catchments to the greatest extent possible. In this context, there will be a need to keep the viability of expanding the commuter rail system under regular review.

¹⁴ Goodbody Economic Consultants. Potential for Commuter Rail Services in the Limerick Area.

It is important to recognise that the existence of a commuter rail service is in itself a spur to land use development within its catchment. This raises the issue, in the context of regional development, as to whether rail system improvements should precede land use developments. While this policy would involve significant short term operating losses, it might be worthwhile in the long term if it helps shape land use development in the Cork area.

6.6.3 Limerick Rail Commuter Services

There are approximately 21 trains serving Limerick each day. Nearly all of these trains are inter-city and because of their time tabling do not provide services to commuters to and from Limerick.¹⁵

Limerick is very well endowed with railway infrastructure and in there is scope for the introduction of commuter services on the Foynes, Ballybrophy, Limerick Junction, and Ennis Lines.

A recent report concluded that there is sufficient demand to justify a basic commuter service on the Ennis line. However, with regard to the other lines, a similar situation applies as in Cork: catchment populations are currently too low and land use policies have not focused on maximising the potential of the rail system.

The introduction of basic commuter services to Ennis would be a valuable first step in the development of the rail system in the area. Increased commuter patronage on the line would act as a spur to eventual re-opening of the line north of Ennis, and the possible introduction of a spur to Shannon. It is understood that increased use of the rail system in the area is a particular focus of the land use transportation study currently being carried out and that options being considered include re-routing of the Ennis rail line to serve Newmarket on Fergus.

6.7 Conclusions

The major deficiencies on mainline radial routes out of Dublin are in relation to services to the west and northwest. In the context of the spatial strategy, there may be a need to improve these services, if towns in that region are designated as growth centres. One of the options would be to convert to railcar operation on these routes.

The rail mode is currently very competitive with road in the Dublin-Border, Dublin-Cork and Dublin-Limerick markets. These markets are rail routes that were subject to significant upgrade during the National Development Plan 1994-99, largely as a result of Cohesion funding. However, the competitive position of rail in other inter-city markets is relatively poor.

¹⁵. There is one morning service from Ennis to Limerick but a suitable evening return service is not available.

The National Development Plan will see considerable investment on interurban road and rail links, which will impact on the competitive position between the two modes. As currently planned, rail journey times will not improve to the same extent as road journey times, with a consequent loss of rail competitiveness generally including the Dublin-Belfast and Dublin-Cork markets. Its position in the other markets will continue to be poor. The prospect is for a significant reduction in rail patronage, other things being equal.

In this regard, there is now a need to develop a long-term plan for the railway, which would identify its future role and consider the level of capacity and service that it should provide.

Non-radial mainline connections are of mixed standard. While the Limerick-Cork and Cork-Tralee-Killarney routes are well served by virtue of connections to the Dublin-Cork line, other inter-regional service levels e.g. Limerick-Waterford are low.

A strengthened inter-regional rail service network has a role to play in regional development. This will mean not only an increase in rail service levels, but also ultimately could involve the re-opening of lines to passenger traffic.

With regard to the latter, in the longer term there is the prospect of a 'Western Rail Route' linking Cork to Limerick, Galway Westport, Ballina and Sligo. This could involve re-opening of the Limerick-Claremorris line to passengers, reinstatement of the Claremorris-Collooney line, and the introduction of a more direct link between Charleville and Limerick.

There is potential for the development of commuter rail services in Cork and Limerick. This raises the issue, in the context of regional development, as to whether rail system improvements should precede land use developments. While this policy would involve significant short term operating losses, it might be worthwhile in the long term if it helps shape land use development in the Cork and Limerick areas.

7 The Bus system

7.1 Introduction

One of the features of the bus market in Ireland is that there is substantial private sector provision of services, some of which are of dubious legality. This means that the latter segment of the market is not well documented. It also results in a certain reticence on the part of Bus Eireann in divulging details of passenger carryings, for fear of releasing commercially valuable information. As a result, it has not proved possible to identify passenger demand on particular markets or routes.

The analysis below focuses on two markets: the inter-urban market and the local urban bus market.

7.2 The Inter-urban Bus Market

Bus Eireann (BE) provides an inter-urban service between the major centres of population, rural stage carriage, urban commuter services, and local city services. In 1999, the company operated 50.5m vehicle kilometres on these services carrying 19m passengers.

Private bus operators also service these markets. Under the 1932 Road Transport Act, private operators are obliged to have a licence to operate on each route. Licences are granted on rural and long distance routes, when BE does not provide a scheduled service on that route. Until recently, very few such licences were issued. Private operators are thus mainly restricted to operating non-scheduled charter services.¹⁶ These are largely focussed on services between provincial centres and Dublin, operating mainly at weekends. Industry estimates are that these operators have a patronage level of about one-third of that of Bus Eireann, but the accuracy of such estimates is open to doubt.

Because much of the private bus operation is officially non-scheduled, it is not possible to obtain indicators of service levels from timetables. However, Bus Eireann do publish timetables and these form the basis of the analysis of interurban bus services below.

¹⁶ They also service 70 per cent of primary and secondary school transport on behalf of BE.

7.2.1 Inter-urban Bus Service Levels

Table 7.1 provides a summary of Bus Eireann daily weekday services between urban centres.

In general terms, there is a high level of service between Dublin and the major urban centres. For example, there is an hourly service each way between Galway and Dublin, with other services such as Dublin-Cork, Dublin-Rosslare, and Dublin-Tralee approaching this level. Limerick is particularly well served with almost 30 services to and from Dublin each day. This high level of service reflects the fact that other services to the southwest, such as those to Tralee and Killarney, are routed through Limerick.

In contrast to the above, urban centres in the northwest are relatively poorly served. Sligo and Letterkenny for example have only 4 and 5 daily services from Dublin respectively. While there are private operators on these routes, the evidence is that they are not operating on a daily basis, so that the overall level of service would appear to be low. Intra-regional links to the northwest are only slightly better. There are 11 daily services to Galway from Sligo and 5 from Letterkenny.

7.2.2 Interurban Bus Journey Times and Mode Shares

While service levels are high in terms of frequencies, the bus offers a much lower quality of service than rail in terms of journey times. Table 7.2 presents journey times for a selection of routes. The bus suffers by comparison with rail especially in corridors, such as Dublin-Cork where the rail system has been significantly improved. For Dublin – Cork, the journey time by bus is 4 hours and 25 minutes compared to 2 hours and 40 minutes by rail. For other routes, such as Dublin–Galway, where the rail system has not been improved to the same degree, the time differential is less (42 minutes).

In general terms, rail and bus are competing in different markets at present, with the latter offering a much cheaper if slower service. With the proposed improvements in the road system, it is likely that bus journey times will improve relative to rail, creating further pressure on the rail modal share.

7.3 Local Urban Bus Service Levels

The urban bus system in Dublin operates well over 100 routes and in 1996 achieved an 18 per cent share of the commuting market and an annual per capita bus usage of 175 trips (1995). The role of local bus services in other urban areas is much more limited. Table 7.3 presents some indicators of the importance of the bus in those cities and towns that have a local urban bus service. It would be anticipated that outside Dublin bus service levels would be lower reflecting lower population levels and smaller town sizes. However, the lack of penetration of local bus services in terms of the share of the commuting market and bus journeys per capita gives rise to a concern that the bus mode may be relatively under-utilised outside Dublin.

The potential for an increased role for urban bus services is being increasingly recognised. The National Development Plan contains a provision for 110 new buses to upgrade BE's fleets in Cork, Limerick, Galway and Waterford. The Cork public transport investment review and the Galway Land Use Transportation study have both recognised the need for reform of bus networks in their respective areas. Increased frequencies and new routes are being introduced in the four county boroughs. However, a major issue yet to be tackled in these areas is that of priority for buses in the use of road space. The success of the quality bus corridors in the Dublin area should serve as an incentive to adopt bus priority measures.

Increased use of mini and midi buses would also increase the potential to enhance services levels in the smaller urban areas.

Table 7.1: Number of Daily Weekday Services

	Dublin	Rosslare	Waterford	Cork	Tralee	Limerick	Galway	Sligo	Letterkenny
From									
Dublin		11	10	7	7	28	15	4	5
Rosslare	11		5	5	3	4	4	0	0
Waterford	10	6		8	5	5	5	0	0
Cork	9	6	10		8	26	25	3	0
Tralee	12	4	5	6		23	12	0	0
Limerick	31	3	6	27	21		44	3	0
Galway	15	3	5	25	10	44		8	3
Sligo	4	0	0	4	0	4	11		5
Letterkenny	5	0	0	0	0	4	3	4	

Table 7.2: Bus Journey Times on Selected Routes

Route	Journey Time	
	Hours	Minutes
Dublin – Cork	4	25
Dublin – Limerick	3	30
Dublin – Galway	3	30
Dublin – Westport	4	55
Dublin – Sligo	3	25
Dublin – Letterkenny	4	00
Cork – Limerick	1	55
Cork – Waterford	2	20
Limerick – Galway	2	15
Galway – Sligo	2	30
Tralee - Cork	2	15

Table 7.3: Indicators of Urban Bus Service Levels and Patronage

Urban Area	Number of Bus Routes	Number of Bus Departures	Bus Share of the Commuting Market 1996 (%)	Bus Journeys per Capita per Annum 1995
	2000	2000		
Cork County Borough	14	732	8.2	65
Limerick County Borough	13	375	9.2	84
Galway County Borough	12	376	6.6	58
Waterford County Borough	6	213	4.0	19
Navan	4	80	4.7	n.a
Sligo	4	95	1.9	n.a
Dundalk	3	42	3.5	n.a
Athlone	1	40	2.9	n.a

Sources: compiled by Goodbody Economic Consultants, Census of Population, 1996

7.4 Conclusions

In general terms, there is a high level of bus service (in terms of frequencies) between Dublin and the major urban centres. However, urban centres in the northwest are relatively poorly served. Sligo and Letterkenny for example have only 4 and 5 daily services from Dublin respectively. While there are private operators on these routes, the evidence is that they are not operating on a daily basis, so that the overall level of service would appear to be low.

While service levels are high in terms of frequencies, the bus offers a much lower quality of service than rail in terms of journey times, especially in corridors, such as Dublin-Cork where the rail system has been significantly improved. However, with the proposed improvements in the road system, it is likely that bus journey times will improve relative to rail, creating further pressure on the rail modal share.

The role of local bus services in urban areas other than Dublin is limited. While the potential for an increased role for urban bus services is being increasingly recognised, a major issue yet to be tackled in these areas is that of priority for buses in the use of road space.

8 Conclusions

8.1 Transport and Economic and Regional Development

Transport improvements have impacts on the productive sector through the product and labour markets. With regard to the product market, transport improvements impact on firms not only through transport cost reductions but also through the scope for cost reductions throughout the logistics chain. Changes to the logistics chain mean that the reliability of transport networks is important as well as the speeds that they offer;

Because of significant spillover effects, transport improvements have potential impacts on the economy in excess of the benefits to individual firms. The extent of these spillover benefits is determined by the structure of the economy; where competition is imperfect and economies of scale exist, spillovers will be high;

While transport improvements have the potential to yield significant economic benefits, the regional distribution of these benefits is dependent on the level of transport costs. Unless the transport costs are very high, peripheral regions will stand to benefit to a greater extent from transport improvements.

Transport infrastructure improvements may be a less risky policy instrument than other policies for promoting regional development.

Ireland's economic success has given rise to tighter labour markets and the emergence of agglomeration diseconomies particularly in the Dublin area. These changes mean that regions that have been lagging in development look increasingly attractive as locations for industrial development. As a result, transport now has a more important role to play in helping deliver such development.

Because access to the labour market is now a much more important factor in the locational decision making of the firm, intra-regional links within the peripheral regions should be a focus for investment.

Transport investment to ensure access to east-coast ports will be an important contributor to regional development, because of the export orientation of much of Irish industry. As Dublin port is the largest gateway, the radial route system emanating from Dublin should continue to be a focus for regional development.

8.2 Roads

Current road policy for the major radials would seem to be very compatible generally with regional development objectives, in that it will provide high capacity, high speed, and reliable links between Dublin and the regions.

However, the decision not to build the link to the northwest to dual carriageway standard throughout may be deserving of further consideration within the context of the National Spatial Strategy, If significant urban growth were to occur in the northwest, then a reduced dual carriageway standard road could become necessary.

In general terms, the adoption of level of service C, rather than D, as currently planned, would deliver a high standard for inter-regional road links. In any event, it will be important, as road design decisions are being made, that the results of the traffic demand analysis undertaken as part of the National Spatial Strategy be taken on board. This may have an impact on the appropriate road standard for these links. Where provision of a higher road standards is borderline on traffic grounds, regional development objectives would warrant adoption of the higher standard, as this would ensure greater uniformity of road standards with greater benefits in terms of reliability of the system.

There is a concern that the improvement of inter-urban connections may result in conflicts at those points in the transport networks where the improved inter-urban routes connect with the lower capacity urban areas. Resolving such conflicts will require that a range of measures be put in place. These will include higher levels of public transport provision, improved traffic management, and a high level of integration of land use and transportation policies

8.3 Airports and Air Services

There is a considerable degree of overlap in the hinterlands of the existing airports, at both the 40-mile and 60-mile time travel bands. This pattern is particularly prevalent in the West and Northwest regions, where the hinterlands of Shannon, Galway, Knock and Sligo airports overlap to a high degree.

The level of provision of regional airports in Ireland is relatively high in comparison with other countries. There would appear to be no gap in the system. The journey time improvements planned for inter-regional roads will increase the access of the population to a regional airport.

In general terms, with the exception of Cork and Shannon, service levels at regional airports are relatively low. Similarly, none of the regional airports, with the exception of Cork and Shannon, have the potential to be commercially viable in the short term.

Given the overlap in catchments, Government support through PSO services or grant aid might be better focussed on a smaller number of airports. In particular, is Government support for Galway, Sligo and Donegal airports merited, given the possibility of serving their catchments from Shannon, Knock and Derry?

Finally, given the poor levels of service from regional airports, the question arises as to whether the current scale of Government support for regional airports and air services in particular is adequate in the context of regional development.

8.4 Rail

The major deficiencies on mainline radial routes out of Dublin are in relation to services to the west and northwest. In the context of the spatial strategy, there may be a need to improve these services, if towns in that region are designated as growth centres. One of the options would be to convert to railcar operation on these routes.

The rail mode is currently very competitive with road in the Dublin-Border, Dublin-Cork and Dublin-Limerick markets. These markets are rail routes that were subject to significant upgrade during the National Development Plan 1994-99, largely as a result of Cohesion funding. However, the competitive position of rail in other inter-city markets is relatively poor.

The National Development Plan will see considerable investment on interurban road and rail links, which will impact on the competitive position between the two modes. As currently planned, rail journey times will not improve to the same extent as road journey times, with a consequent loss of rail competitiveness generally including the Dublin-Belfast and Dublin-Cork markets. Its position in the other markets will continue to be poor. The prospect is for a significant reduction in rail patronage, other things being equal.

In this regard, there is now a need to develop a long-term plan for the railway, which would identify its future role and consider the level of capacity and service that it should provide.

Non-radial mainline connections are of mixed standard. While the Limerick-Cork and Cork-Tralee-Killarney routes are well served by virtue of connections to the Dublin-Cork line, other inter-regional service levels e.g. Limerick-Waterford are low.

A strengthened inter-regional rail service network has a role to play in regional development. This will mean not only an increase in rail service levels, but also ultimately could involve the re-opening of lines to passenger traffic.

With regard to the latter, in the longer term there is the prospect of a 'Western Rail Route' linking Cork to Limerick, Galway Westport, Ballina and Sligo. This could involve re-opening of the Limerick-Claremorris line to passengers, reinstatement of the Claremorris-Collooney line, and the introduction of a more direct link between Charleville and Limerick.

There is potential for the development of commuter rail services in Cork and Limerick. This raises the issue, in the context of regional development, as to whether rail system improvements should precede land use developments. While this policy would involve significant short term operating losses, it might be worthwhile in the long term if it helps shape land use development in the Cork and Limerick areas.

8.5 Bus

In general terms, there is a high level of bus service (in terms of frequencies) between Dublin and the major urban centres. However, urban centres in the northwest are relatively poorly served. Sligo and Letterkenny for example have only 4 and 5 daily services from Dublin respectively. While there are private operators on these routes, the evidence is that they are not operating on a daily basis, so that the overall level of service would appear to be low.

While service levels are high in terms of frequencies, the bus offers a much lower quality of service than rail in terms of journey times, especially in corridors, such as Dublin-Cork where the rail system has been significantly improved. However, with the proposed improvements in the road system, it is likely that bus journey times will improve relative to rail, creating further pressure on the rail modal share.

The role of local bus services in urban areas other than Dublin is limited. While the potential for an increased role for urban bus services is being increasingly recognised, a major issue yet to be tackled in these areas is that of priority for buses in the use of road space.

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Appendix I Service Levels at Regional Airports

Galway

The only scheduled service operating from Galway airport is the Dublin route. Aer Lingus operates three PSO round trips per day. More recently, with the agreement of Aer Lingus, Aer Arann introduced two additional round trips per day. The introduction of Aer Arann provided for an early arrival in Galway from Dublin and an early evening departure from Galway and Dublin. In addition, it is possible – using either airline – to leave Galway early in the morning, travel to Dublin and conduct a full day’s business before returning to Galway in the evening.

Sligo

Like Galway regional airport, the only scheduled service from Sligo is the PSO route to Dublin. In total there are three return trips provided. The original successful supplier was unable to proceed with the tender and Aer Lingus provided the service in their absence. Aer Arann has provided the PSO service since December 1999. There is scope for individuals to leave Dublin in the morning at 09.55, travel to Sligo, conduct a full day’s business and return to Dublin at 16.30 where they can make onwards connections if necessary. The main disadvantage with this schedule is that people leaving Sligo on the first available departure only have three hours in Dublin before making they make the return trip to Sligo.

Donegal

The only scheduled service from Donegal is the PSO route to Dublin. There is only one return trip provided per day. The PSO service is operated by Aer Arann. There is no scope to undertake a one- day business trip. An overnight stay is essential.

Knock

Knock regional airport does not provide a Dublin service. Its two scheduled services are to Manchester and Stansted, operated by British Regional Airways (BRA) and Ryanair respectively. BRA operates three flights per week to Manchester and Ryanair operates one flight per day to Stansted. There is no scope to undertake a one-day business trip to either Manchester or Stansted. An overnight stay is essential.

Waterford

Waterford regional airport does not provide a Dublin service. The only scheduled services from Waterford regional airport is to London Stansted. There is no scope to undertake a one-day business trip to London Stansted. An overnight stay is essential.

Derry

Aer Arann has recently begun a once daily Derry/Dublin service. A number of connecting flights are available on arrival in Dublin airport. Derry airport also offers scheduled services to and from Manchester, Glasgow and Stansted. There is no scope for a one-day business return trip to Dublin, Glasgow or Manchester. An overnight stay is essential. It is however possible to get the 08.50 flight to Stansted, conduct a day's business before returning on the same day to Derry on the 18.15 flight.

Kerry

Kerry airport provides two round trips per day to Dublin. There is scope for individuals to leave Kerry airport in the morning at 06.05, conduct their business in Dublin before returning on the 22.10 flight from Dublin to Kerry. An overnight stay is not essential.

Shannon

There is an extensive range of air services to and from Shannon regional airport. There are a number of alternatives that allow for a morning departure to Dublin and an evening return. It is also possible to take an early flight to London Heathrow, conduct a full day's business before returning to Shannon in the evening.

Cork

Like Shannon regional airport there is an extensive range of air services to and from Cork regional airport. There are a number of alternatives that allow for a morning departure to Dublin and an evening return. It is also possible to take an early flight to Birmingham, Gatwick and Heathrow, conduct a full day's business before returning to Cork in the evening.