

Motorways: Highway Robbery!

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Daniel Molloy takes aim at the huge investment in roads in the National Development Plan (NDP). The author applies the economic tools of Cost-Benefit Analysis to this investment and concludes that the government have not heeded economic advice, and have focused too much on roads at the expense of the total supply chain, thereby missing the opportunity to reduce the negative effects of our peripheral location.

'As a peripheral island, transport infrastructure, services and systems logistics are crucial elements in Ireland achieving a high level of international competitiveness. The importance of transport and logistics arises also from our high trade dependence and increasingly, because of world-wide business trends in a number of areas'¹ and 'because Ireland is an island on the edge of Europe it is axiomatic that Irish producers incur greater transport costs than many of their competitors in virtually every European marketplace'². Against such constraints, suppliers have to seek ways to improve speed and flexibility while continuously driving down distribution costs. (This trend is becoming more and more evident in many publications, example, see The Economist, Feb. 2nd, 2002, 'Chain Reaction').

Firms themselves must rapidly react to these developments, however, there is also a need for the government to intervene. The State response has come in the form of The National Development Plan, (NDP).

The Government's NDP involves *'an investment of over €52 billion of Public, Private and EU funds (in 1999 prices), over the period 2000-2006'³. From this, £4.7bn or €5.97bn, will be spent on road improvements which represents almost a threefold increase on the expenditure of £1.6bn or €2bn in the period 1994-1999⁴. (Under the Economic and Social Infrastructure Operational Programme)⁵.*

¹ NESG, Nov., 1996, p36

² Forfás Transport and Logistics Group, 1996, p.3

³ www.ndp.ie

⁴ The National Roads Authority, 14 Dec 2001, p.1

⁵ National Development Plan, 2002, p. 49

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Specifically, this will involve the completion of 752km of motorway/dual carriageway between the periods 2002-2006. The improvements will occur along the five major inter-urban routes between Dublin and Cork, Galway, Limerick, Waterford and the M1 to the border with Northern Ireland. The improvements are aimed at dramatically cutting travel time and improving safety, and ultimately, to *'help ensure that difficulties of access will no longer inhibit the attraction of investment and employment opportunities to all parts of the country.'*⁶ Is this investment based on sound economic analysis?

Nobody denies that we need public investment in many areas. However, what I shall argue is that much of this investment (focusing on roads in this paper), is not based on sound economic analysis, even though such research was available before the NDP was drawn up (the National Road Needs Study⁷ to mention just one). Furthermore, the current infrastructure strategy is not sufficient as it stands, because roads infrastructure is only part of the problem.

Mr Colm McCarthy noted that in 1978 an economist colleague described the policy then in vogue as spending your way out of a boom. Any mistakes in Irish economic policy in the nineties should be new mistakes. Investments made in the public sector are being made with citizens' cash and the criteria to be applied to them should be no less demanding than those which citizens would apply themselves. If we insist on the highest possible design standards, we will wind up with fewer projects than we can afford to complete. *'Standard of design relates to capacity as well as engineering standards...we should aim at affordable design standards and not always at top of the range (motorways!).'*⁸ These wise words by Mr McCarthy seem to be the words of a prophet. However, this "prophet" who came to us almost a decade ago to warn us about our future investment plans, was unaccepted in his own land and ignored. What Mr McCarthy was arguing for, was the use of economic tools such as Cost-Benefit Analysis (CBA), which, *'is designed to take account of market failures, i.e., where market prices do not fully correspond to social value-issues of transport congestion, value of time, safety regulations and the value of a life, and such like, continue to require a cost-benefit type approach. Also,*

⁶ The National Roads Authority, 14 Dec 2001, p.2

⁷ The National Roads Authority, July 1998.

⁸ De Courcy, J.W, April 1990, p. 23

*environmental concerns have increased the need for CBA*⁹ and these factors call for the creation of shadow prices. *'CBA asks the same question of investment which a firm asks of its investment. It substitutes, however, social benefits for the revenue of the firm and, instead of costs to the firm, it uses social or opportunity costs as a yardstick...what we aim for is a Pareto optimal improvement for society as a whole, (an improvement in economic welfare is a change which leaves at least one person better off without making anyone worse off...gainers can (hypothetically) compensate the losers'¹⁰.)'* If we arrive at such a situation, then the project we are deciding upon should be completed while always taking account of all the alternatives.

Honohan notes that two broad issues have emerged in terms of road construction:

- Cost overruns, or rather initial cost under-estimation. It appears that the initial outline costings were over optimistic, and that a more realistic budgeting would have allocated more funds for the quality and quantity of roads envisaged.
- The first issue is partly offset by the second, namely, an *'apparent tendency to design to an unnecessarily high road quality'*¹¹.

As we shall learn later, the NDP has failed greatly with respect to these two issues. It has ignored a sound economic analysis of future road needs and progressed with the development of roads which are of *'an unnecessarily high road quality'*¹², benefiting nobody only the design engineers. While at the same time, ignoring the bigger picture - the total logistics supply chain.

Although infrastructure needs have undoubtedly increased as a result of economic growth, *'this does not provide a blanket endorsement of all and any infrastructure projects.'*¹³

The potential for reducing the demand for infrastructure through reform of taxation

⁹ Honohan, P., Nov. 1998, p.4

¹⁰ Barrett, S.D, 1982, p.28

¹¹ Honohan, P., July 1997, p.67.

¹² Honohan, P., July 1997, p.67.

¹³ Honohan, P., July 1997, p.67.

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and pricing mechanisms should also be investigated¹⁴.

The MIE points out that several roads that are being completed to dual carriageway or motorway standard would provide adequate service quality at a lower design standard. In fact, the MIE stresses that there is scope for greater economy in road design.¹⁵

In designing interventions, formal cost-benefit analysis, which measures the main distortions and credits the project for unpriced benefits, which it conveys, is useful, especially for large projects¹⁶. This is exactly what the National Road Needs Study did.

The National Road Needs Study was aimed at determining '*the appropriate type of roadway for each segment of the network in order to cater for projected traffic flows over the twenty year period, 2000-2019*¹⁷', and this analysis was designed to influence future policy on road design. Its key findings are the following:

- The fact that roads are the dominant mode of internal transport in Ireland- 80% of freight, 96% passenger traffic.
- The provision of an adequate transport infrastructure to support necessary economic growth is a fundamental objective of a sustainable transport policy. This requires integration with the needs of the environment and conservation...where practical upgrading of existing alignments where there is an option rather than new routes, effective public consultation in the planning stage.
- Reference to European and other international best practice...with a view to an informed decision in relation to road types and capacities¹⁸.

(Note that these satisfy Forfas's conditions, as we shall see later.)

¹⁴ Honohan, P., July 1997, p.67.

¹⁵ Honohan, P., July 1997, p.104.

¹⁶ Honohan, P., July 1997, p196.

¹⁷ The National Roads Authority, July 1998, p.1

¹⁸ The National Roads Authority, July 1998, p.8-9

These considerations (along with more in-depth considerations available to the reader of the study), point to the fact that this was a very carefully carried out study making effective use of CBA and international best practice. Therefore, its findings can be considered to be extremely reliable for future policy design.

The Level of Service (LOS), on the existing primary network in 1995 was found to be 91% satisfactory. This means that 95% of the primary network could accommodate travel at the average inter-urban speed of 80kph, taken to be equivalent to the U.S. Highway Capacity Manual (HCM) level of service “D”. However, it was noted that by 2019 a large percentage of this network would, in the absence of investment, fail this standard¹⁹. At the end of the last transport initiative, Operational Programme for Transport 1994-1999 (OPT), after spending an estimated £2.587m, that further improvement was still drastically needed.

A capacity study was then carried out (see table 1.1 below), showing the expected capacity until the year 2020. A saturation level was also included; representing the likely level having regard to realistic upper limits on population, car ownership and use, average income growth and truck fleet levels. This theoretical level would be reached at some time beyond the design period of the study - 2019, with the date ultimately dependent on future economic growth rates and policies impacting on road vehicle use. If we look at the data below it is noticeable that there is only a slight deviation between the estimated saturation and projected traffic levels at 2020 and therefore, this would suggest that serious consideration should be given to the saturation projections when deciding on future road policies.

Table. 1.1: Future Traffic Forecasts²⁰

	1995		2000		2010		2010		Saturation	
	PC	HV	PC	HV	PC	HV	PC	HV	PC	HV
National Primary	100	100	135	128	195	168	224	168	240	200
Tourists Routes	100	100	134	121	190	152	216	167	230	175
National Secondary	100	100	123	121	156	152	171	167	180	175

¹⁹ The National Roads Authority, July 1998, p.9

²⁰ The National Roads Authority, July 1998, p. 10

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PC = Passenger car traffic
HV= Heavy vehicle traffic
1995 is the base year

An exponential growth pattern is expected with 6% per annum growth in the early stages, gradually reducing through the design period, with very low levels of growth as the maximum limits are reached. A sensitivity analysis was then carried out to assess the effects of growth rates lower/higher than those derived.

After giving due consideration to a number of influencing factors and after carrying out an in-depth analysis of estimated future road needs, the National Roads Authority (NRA), recommended two road types:

- Reduced two-lane; 7.0m carriageway and 2 x 0.5m hard strips (for secondary routes).
- Reduced dual carriageway; twin 7.5m carriageway, 1.0m hard strips (inner and outer) and 2.5m median (for primary network)²¹.

This would be combined with bypasses in towns where congestion was evident. (For a more specific look at the road types for each of the individual sections of the network, see the National Road Needs Study pages 55-73.)

These road types would satisfy the level of service (LOS “D”) objective of providing an inter-urban 80kph journey speed on all inter-town routes.

Traffic growth leads to congestion on the network, with the following effects:

- Economic costs associated with delays in the transport of people and goods.
- Safety impacts as National Route traffic conflicts with local traffic, cyclists, pedestrians and other road users, with increased accident costs.
- Environmental impacts including increased noise, fume emissions, energy consumption and disruption to community living.

²¹ The National Roads Authority, July 1998, p.12

In reaching its decision on road type, the NRA, used these factors as inputs to their CBA as well as the National Policy objective carried forward from the OPT 1994-1999 Programme.

A crucial element on deciding how reliable The National Roads Needs Study is, would be the accuracy of the capacity projections or, more importantly, the saturation level. Barrett notes *'road needs forecasts depends crucially on forecasts of car numbers.'*²² If we make use of Tanner's logistic curve²³, we can get an extrapolated answer on capacity.

The model assumes that the level of car ownership will eventually reach a level beyond which it will not increase, irrespective of changes in income, prices or other factors (an assumption attacked by the Leitch Report²⁴). The annual rate of car ownership is assumed to be proportional to the difference between the current ownership and the saturation level. Thus, the higher the level of ownership, the lower the growth of ownership. As we can see, the model will be highly sensitive to the saturation level chosen. Therefore, for The National Roads Needs Study to be accurate, it too will have to have an accurate estimate of the saturation level. This level will also be affected (though the Logistic Model assumes otherwise) by many other factors such as, income, population, retirement, second car ownership etc. The study accepts this fact (see page 10 of the study). So, for the capacity projections to be accurate, the saturation level chosen, taking all influencing factors into account, must be estimated most carefully. If it has, and I expect it has, then the logistics curve will tend to agree with the study's projections and the projected saturation level will equal or come close to the actual level.

So, based on capacity projections to 2020, the above road types were recommended combined with bypasses. However, the Government, in their NDP, have ignored this study *'(even though admitting that the National Road Needs Study is a comprehensive assessment of the works required to bring the national roads network as a whole up to the necessary standards and to maintain these standards as traffic volume increases'*²⁵). They went instead (on many routes), for the more

²² Barrett, S. D., 1982, p167.

²³ See Barrett, S.D., 1982, p167.

²⁴The Leitch Report, 1977, p.168

²⁵ The National Development Plan, 2000, p.50.

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costly and disruptive (in terms of construction) road type, namely, motorways. To take the N6 route as a case in point. The National Roads Needs Study recommended a dual carriageway on this route, which would mean widening the existing route and combining this with bypasses at major towns, satisfying capacity requirements on this network. The government have planned to build a motorway instead. This will mean much more disruption in initial construction (compulsory purchasing etc), the abandonment of the existing N6 (which was only recently resurfaced) and will involve a much higher level of investment delivering nothing to the country only excess capacity. Who is deciding on this expenditure, the Government or engineers? After CBA was carried out for the M1 (London-Birmingham) in the UK, it was noted, *'for some time at least the benefits obtained through the construction of the M1 could have been matched by a more modest two-lane dual carriageway'*²⁶. Should the Irish Government not have learned from such mistakes?

Capacity should also be curtailed by the European Union's (EU) combined transport initiative, that is, greater integration between rail and road, currently being examined. It is noted that *'long distance rail freight combined with short distance road transport to customers or final distribution is potentially cheaper than long distance road haulage...EU and national transport policies will focus to an increasing extent on developing effective alternatives to road transport with a particular emphasis on rail...road transport may become relatively more expensive as policy makers attempt to discourage use'*²⁷. Thus, leading to a decrease or at least a saturation level being reached similar to that projected by The National Roads Needs Study.

Mr. P. Dowling noted *'within the framework of good macro-economic policy, investment takes place at the micro level, and our mistakes in the past relate more to wrong choices and bad management than to over-investment'*²⁸. This is precisely what is happening within the NDP framework, as far as supply chain management is concerned (of which transport is only a small component).

If Ireland's manufacturing and services sectors are to achieve their full potential over the next 15 years, a clear focus is required on all issues which impact on competitive advantage. As Ireland is an island on the edge of Europe, it is axiomatic

²⁶ Barrett, S.D., 1983, p39

²⁷ Forfás Transport and Logistics Group, 1996, p. vi

²⁸ De Courcy, J.W., 1990, p. 25

that Irish producers incur greater transport costs than many of their competitors in virtually every European marketplace. Therefore, the creation of a world-class transport and logistics capability for Irish exporters requires substantial additional effort²⁹.

In Forfás's assessment, policy in Ireland has tended to focus on transport infrastructure and has not adequately addressed the other components of the overall supply chain, namely:

- Infrastructure (including: roads; ports; rail and airports).
- Transport services (including: road haulage; sea shipping; air services and rail services).
- Systems logistics or overall management of the management of the logistics chain.³⁰

Logistics is '*the strategic process of managing efficiently and economically, the flow and storage of materials and the information necessary to meet customer requirements*³¹'. The reactions that occur within the supply chain are often referred to as "the bullwhip effect", named after the way the amplitude of whip increases down its length, just as variations in orders tend to get amplified along the supply chain.³² The Irish economy is in danger of getting "whipped" by its competitors if it does not make its total supply chain more flexible. (See footnote for a micro example³³)

The group goes on to note that '*as presently operated, the Irish planning framework does not address adequately the requirements of the total supply chain, tending to focus on infrastructure initiatives which qualify for EU assistance-excessive focus*

²⁹ Forfás Transport and Logistics Group, 1996, p.3

³⁰ Forfás Transport and Logistics Group, 1996, p.3

³¹ NESC, 1996, p.32

³² The Economist, Feb. 2nd 2002.

³³ In the mid nineties, Volvo found itself with excessive stocks of green cars. To move them along, the sales and marketing department began offering attractive special deals, so green cars started to sell. But nobody told the manufacturing department about the promotions. It noted the increase in sales as customer preference for green cars and ramped up production. (The Economist, Feb. 2nd 2002)

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on infrastructure-ignores other important elements in the supply chain-consolidation and distribution facilities, transport services and systems logistics³⁴.

The diagram below gives us some idea of the supply chain. The key is the integrated management of this chain, not just one of its components in isolation. Transport 'is not usually an end product in itself. It permits other activities to be undertaken³⁵'. Therefore, the integration of transport into this model is what is important.

Inputs → Production → Inventory → Customer

Logistics involves controlling this supply chain, from manufacturer to end customer. Systems logistics or chain management skills are essential for Irish exporters to reduce the negative impact of location and distance on transport and other logistics costs.³⁶

A more long-term perspective is also needed. Forfás recommends a minimum 15-year period be used in infrastructure planning, to be operated on a rolling basis with reviews every five years. This would facilitate the improved assessment of key strategic issues such as competitive benefits of increased investment in existing facilities as *opposed to* investment in new alternatives³⁷. The NDP is only a six-year plan.

So what does this mean for Irish policy makers?

With too much emphasis on road transport we will be making our economy less competitive relative to our EU counterparts. Also, we will be in danger of becoming a more distant periphery economy as our domestic policy will not be in sync with EU policy, and thus we risk being ignored when important policies are being decided and funds being distributed.

Forfás recommends *'the establishment of a joint Irish/UK executive and policy transport initiative to ensure smooth integration of port facilitates with road and rail*

³⁴ Forfás Transport and Logistics Group, 1996, p.34

³⁵ Barrett, S.D., 1982, p. 28

³⁶ Forfás Transport and Logistics Group, 1996, p.5

³⁷ Forfás Transport and Logistics Group, 1996, p. 34

links on both sides of the Irish sea, to ensure full integration with the trans-European rail and road network as envisaged in the EU white paper on growth competitiveness and employment.³⁸ And this should be combined with improvements to the total supply chain by:

- Achievement in world leadership in systems logistics.
- Implementation of best practice throughout the transport services industry.
- High quality infrastructure; roads, rail, ports and airports³⁹ (and this means paying more attention to studies like the National Road Needs Study).

NESC agrees with these recommendations⁴⁰.

It is important to note that we must strive to become a world class leader in logistics. No matter how well we handle our infrastructure deficit we will always be at a disadvantage in terms of distance. Therefore, while not ignoring the fact that *'as a peripherally located economy, transport costs and the quality of transport infrastructure are critical to overall competitiveness (in the food sector alone, an exporter will be at a transport cost disadvantage of around 2%)'*,⁴¹ we must remember that *'while location cannot be changed, the skill with which we manage the consequences of the location can be enhanced through systems logistics...by becoming a centre of excellence in systems logistics we could compensate for the negative impact of location and gain competitive advantage.'*⁴²

It is interesting to note what Dr Sean Barrett said in 1990: *'infrastructure is now an outdated word in economics. Modern thinking about the infrastructure concept would have saved Ireland much economic anguish in the eighties. Policy makers must keep in touch with this new thinking if the early nineties are not to repeat the mistakes of a decade ago'*⁴³. The realisation that infrastructure was an outdated

³⁸ Forfás Transport and Logistics Group, 1996, p.vii-x

³⁹ Forfás Transport and Logistics Group, 1996, p.6

⁴⁰ NESC, Nov. 1996, p. 34

⁴¹ Forfás, 1995, p.22

⁴² Forfás Transport and Logistics Group, 1996, p.iv

⁴³ De Courcy, J.W., April 1990, p.14

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concept has now been known for over a decade. Why then has the Irish government, as of yet, not woken up to this reality and seen the bigger picture the total supply chain?

Conclusion

The Irish government needs to see the bigger picture. With so much emphasis on transport costs they are missing out on at least two thirds of the total logistics costs. One might be forgiven for assuming that the government is merely concerned with taking the tip off the iceberg (i.e., roads, and even here, not following the guidelines of sound economic analysis), as this is what is visible to the electorate. However, the real danger is lurking beneath, and the Irish economy needs increased investment in the total logistics supply chain or else face possible collision with the hidden iceberg that is, loss of competitiveness.

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