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National Economic and Social Council
An Chomhairle Náisiúnta Eacnamíocl agus Sóisialach

The Importance of Infrastructure to Industrial Development in Ireland

No. 59
July 1981

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(v) the balanced development of all regions in the country, and
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7. The Council shall regulate its own procedure.

NATIONAL ECONOMIC AND SOCIAL COUNCIL

The Importance of Infrastructure to Industrial Development in Ireland — Roads, Telecommunications and Water Supply

by

Professor C. D. Foster
Dr. N. Segal
Mr. J. Dorgan
Mr. S. Dewar

DUBLIN:
PUBLISHED BY THE STATIONERY OFFICE

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GOVERNMENT PUBLICATIONS SALE OFFICE, G.P.O. ARCADE, DUBLIN 1

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Professor C D Foster, Dr N Segal,
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PREFACE

The Council is undertaking a study of policies for industrial development. This study will give rise to a Council report which will evaluate and make recommendations on industrial policy. In this context a number of background studies on matters relating to industrial policy have been initiated by the Council. The first of these was a survey of the literature and of policy changes in Irish industrial policy since the early 1960s. It has been undertaken by Mr. Eoin O'Malley of the Institute of Development Studies, University of Sussex. Mr. O'Malley's findings are published in report No. 56 of the Council.

The second background study is an evaluation of the infrastructural constraints which hamper existing Irish firms and may act as a barrier to the attraction of new industrial projects to Ireland. The focus of the study was on physical infrastructure and it was decided to concentrate on three basic services – roads, telecommunications and water supply. The study was undertaken by Professor Christopher Foster, Mr. Jim Dorgan, Mr. Stephen Dewar and Dr. Nick Segal of Coopers and Lybrand Associates. Their findings are published in this report.

In January 1981 the Government set out its programme for public investment in *Investment Plan 1981*. This programme was subsequently outlined in more detail in *Public Capital Programme 1981*. The Investment Plan provides for a considerable increase in the overall level of public investment and a shift in the balance between industrial and infrastructural investment in favour of the latter. Total public investment in 1981 is forecast to increase by 36%, while investment in the three infrastructural areas examined in this report: roads, telecommunications and water supply and sewerage, is forecast to grow by 68%. In the time available it was not possible for the authors to consider the likely effect of this increased infrastructural investment on future industrial growth in the regions examined or even at a national level, or its implications for the policy issues raised in the report. However, given the magnitude of the increase and the likely carry-over effects beyond 1981, it is clear that it will make a material contribution towards relieving existing deficiencies in our infrastructure and facilitate continuing expansion of the industrial base.

CHAPTER 1

INTRODUCTION

A ORIGINS OF THE STUDY

1.1 Ireland's economic performance over the past two decades has been fairly good compared with other European countries, though growth of per capita GNP has tended to fall relatively in recent years. Growth of manufacturing industry has been the leading element of Ireland's achievement, and it is widely accepted that the Industrial Development Authority (IDA) has been among the most effective industrial promotion agencies in western Europe and beyond.

1.2 This success has not been without the problems that one would expect to go with rapid industrialisation, and indeed it has been a cause of some of them. For instance, largely because the industrial promotion effort has attracted multinational companies to Ireland, any deficiencies in physical and social infrastructure have been more evident because infrastructure is now readily compared by them with what is available in other countries. Moreover, the frequency of complaints from Irish industry that the provision of some industrial services and infrastructure is inadequate has increased, while some of the public authorities responsible have reported greater and worsening difficulties in executing projects necessary to sustain the momentum of the industrial development programme.

1.3 It was against this background that the National Economic and Social Council commissioned the present study to examine "the constraints (particularly deficiencies in infrastructure) which hamper existing Irish firms and may act as a barrier to the attraction of new industrial projects to Ireland".

B PURPOSE AND SCOPE OF THE STUDY

1.4 The aims of the study have been to gain a balanced appreciation of the extent and importance that deficiencies in infrastructure may have had on Ireland's past and prospective industrial development, through hampering the growth of existing firms and acting as an obstacle to the attraction of new industrial prospects; to analyse the factors responsible; to identify their implications for policy; and suggest further work and analysis that the relevant agencies might undertake.

1.5 It was agreed with NESC that achieving these aims would require a programme of interviews with industrialists, central and local Government depart-

ments and other public agencies directly concerned with the industrialisation effort. The interviews were to be supplemented by statistical analysis of the chosen infrastructural programmes, especially to put them in an international perspective.

1.6 The time and resources available for the study made it essential to take a selective rather than a comprehensive approach. Thus it was also agreed with NESC that:

(a) the focus would be on physical infrastructure alone – thus the influence of training was excluded – and even within physical infrastructure it was decided to concentrate on what appeared to be the most important programmes;

(b) the study would need to take account of the physical and industrial heterogeneity of the country, even though not all regions could be included;

(c) the purpose of the interview programme would be to gain insight into the problem as seen from the different perspectives concerned; the interview sample would be selective because it could not be mounted on a sufficient scale to provide a large enough random sample and it seemed at this point most important that the firms interviewed should represent a number of different perspectives and therefore should be selective;

(d) examination of the procedures and criteria for planning the allocation of resources between different programmes, and for monitoring and ensuring their effective utilisation, would be outside the scope of the exercise.

1.7 It was understood that it was not our aim in the interview programme to undertake a detailed analysis of industrial development and the associated infrastructure problems facing the regions chosen, or of the regional policies operated by the Government and its agencies. It was simply to gain an understanding of how the infrastructural position impinges on industrial development in different circumstances, so as to have as sound a base as possible for generalisation at the national level. We were conscious of the fact that our approach did not allow the direct analysis of a number of important environmental issues, e.g., the disposal of toxic waste. Thus any generalisations must of course be appropriately qualified, though it will be seen later that the limitations are less than might have been supposed.

C ORGANISATION OF THE STUDY

1.8 The study was initially organised in two phases. In the first we consulted Government Departments, other central and local authorities, representative private bodies and individual experts, and also reviewed the literature. The purpose of these consultations was to form a view on the country's industrial infrastructure as perceived by the main public and private bodies concerned. This would enable us to focus the subsequent enquiries on the most important issues and to conduct them in a way which would provide as sound a base as possible for generalisation.

1.9 The second phase comprised investigation of infrastructure problems in two selected regions, supplemented by particular enquiries in other parts of the country as required, together with analysis of past and prospective investment in the main infrastructural programmes considered.

1.10 After a draft report based on the first two regions had been considered by the Council's Economic Policy Committee it was decided to add a further area, the West Region and to interview another twenty-four firms. This was to see if extending the geographical scope of the study modified its first conclusions. This extra opportunity to pursue the important issues involved was valuable. While it has not radically altered the conclusions first reached, it has modified, and indeed complicated, some of them at least as far as the West Region is concerned. It has also reinforced the case for some extra enquiries.

1.11 Throughout the whole exercise we kept in close touch with the NESC secretariat and the strategic direction and content of the work programme were determined in agreement with them. Actual conduct of the exercise and the resulting findings and conclusions are of course our responsibility alone.

D STRUCTURE OF THE REPORT

1.12 Following this introductory chapter, Chapter 2 sketches out the conceptual framework within which we conducted the study. Chapter 3 then presents an overall perspective on Irish industrial development to provide a suitable backcloth against which appraisal of the individual programmes can be undertaken.

1.13 Chapters 4-6 respectively present our findings on the three main programmes considered: roads, telecommunications and water supply. Finally, Chapter 7 contains the key conclusions and policy issues that emerge from the study. A number of more technical matters are dealt with in appendices.

E ACKNOWLEDGEMENTS

1.14 We have consulted many individuals and organisations in both the public and private sectors, and have received particular assistance and guidance from both NESC and IDA officials. We wish to acknowledge our debt and thanks to all those concerned, who gave generously and constructively of their time. In particular we would mention the useful comments by the Council's Economic Policy Committee and Secretariat on the draft report to which we have done our best to respond.

CHAPTER 2

APPROACH TO THE STUDY

2.1 Investment in physical infrastructure is clearly an important part of the process of industrial and indeed of economic development. The scale, quality and timing of such investment, as well as how, where and when it is provided are important determinants of how industrialisation proceeds. Moreover, development itself generates new demands for infrastructure: for wider and faster roads, advanced telecommunications systems, better water supplies, specialised effluent disposal facilities, and improved availability of housing, education and social and cultural amenities.

2.2 But these relationships – both causal and consequential – between infrastructure provision and industrial development are by no means simple. There is no simple way in which we can say that infrastructure of a certain quantity and quality is needed to achieve or sustain a given increase in the rate of economic development at either national or local level, or that providing a given level and standard of infrastructure will have a determinate effect in increasing economic growth.

2.3 Since World War II there has been a drive for industrialisation among a large and growing number of countries in which the public sector, often backed by international aid agencies, has generally been the driving force. Physical infrastructure has also accounted for a substantial share of public capital expenditure. In these circumstances, it is perhaps surprising that more systematic attention has not been paid to the role of physical infrastructure in industrial development, with the partial exceptions of the transport sector and of the body of economic literature that has grown up around the investment location decision and the spatial pattern of economic growth. By comparison, considerable attention has been paid to the role of social infrastructure, notably education and more recently to health. But even then, simple causal relationships between increases in provision and growth in per capita income or employment are elusive.

2.4 Even if there were well-established relationships connecting provisions of infrastructure and economic growth, their evaluation would not be unambiguous. As is common in economic argument the results may be valued differently by various parties:

(a) the individual firm, whether already in Ireland and considering relocation or expansion on site, or a potential new inward investor, is presumably most interested in the relative profitability of the different locations (though other factors are found to influence choice). It follows that if a location is deficient in some respects by comparison with others, it must have other compensating advantages if it is to be the most preferred (where a firm has a choice). It also follows that a location may be deficient in some respects without those deficiencies affecting the decision, because on balance the location is sufficiently favoured to be preferred;

(b) however, what is best for the firm may not be best for the national economy. National economic efficiency and firms' profitability may differ because of the existence of unemployed resources, and because of other reasons for a divergence between real and money costs. Of particular importance for this study is such a divergence caused by the fact that much of the infrastructure to be discussed is not typically provided at market prices or prices related to marginal costs. And there is often cross-subsidisation. There is frequently some tendency for potential beneficiaries from better infrastructure to ask for more than they would be prepared to pay for, if they had to meet its full cost. In most cases, users pay less than marginal cost; and it is often particularly relevant that the (long run marginal) cost of providing new facilities in new areas or for new sites is often averaged over all consumers or shared between all consumers and the tax-payer. Quite apart from this, any approach to firms which merely asks them what factors most adversely affect their performance without attempting to form a view on how important they are for profitability, must be of limited use for public decision-making,

In what follows it has therefore seemed important to get some measure, however inexact and impressionistic, of the impact of infrastructural deficiencies on a firm's profitability; as that is a measure of the cash value to it of improvement. It has been suggested to us that it is unreasonable to expect a firm – often quite small – to be able to quantify the effect on their profitability of poor telecommunications or bad roads. In the first case there is a difficulty, since a telephone call attempted but not put through may be lost forever and never known to the firm; but our experience suggests that where, as in the case of poor roads, deficiencies add tangibly to the costs of distribution or production, one would expect firms to have made some estimate, however impressionistic, of their size, if they are important. While we asked firms if they could quantify the effects of various infrastructure deficiencies on their profitability, our main concern was not to get exact estimates but rather rough orders of magnitude;

(c) though our concern in this report is inevitably mostly with the impact of infrastructure as it affects both the profitability of the firm and national economic efficiency – with the second having priority over the first whenever there is a clear divergence between the two – there is at least another set of parties whose interests should be noted, though excluded from the scope of this enquiry. Thus, the issues may also be seen from the standpoint of other firms whose competitiveness may be affected. This could be because other firms lose some monopoly power; or because they are undercut by new firms, or by old firms in new locations, benefiting from inducements which in total cannot be justified on efficiency grounds, (for example, higher grants for firms in remote areas);

(d) finally, other national policy considerations may influence national location policy. There may be a wish, for example, to favour some areas over others, on regional policy grounds, even at the expense of some overall loss in economic efficiency. It must be appreciated that the exercise was in no sense an attempt at quantification of the costs and benefits of infrastructure provision. Such an exercise – involving detailed analysis of company financial structures and the impact of actual and assumed changes in their costs and revenues – together with adjustments to reflect social costs and benefits – was clearly far beyond the time and resources available for this study.

2.5 Because of the absence of a well-established body of causal relationships and an absence of studies referred to in the literature with similar terms of reference, our approach was essentially exploratory. It had four principal components:

(a) overall review and selection of the programmes for study: the initial phase of consultations with central bodies, both public and private, revealed a disparity of views on which programmes were the most important candidates for examination and on what particular aspects we should concentrate; nevertheless, the capital programmes in roads, telecommunications and water supply did eventually stand out as those of greatest common concern and they were the three chosen for study;

(b) examination of the supply situation and capital expenditure in these sectors, both in the past and where possible in the future, and also where possible a comparison of them with those in other countries;

(c) review of policies towards provision in the three programmes chosen, chiefly by means of consultations with the Government Departments concerned and with regional and local authorities in selected parts of the country;

(d) assessment of the impact of these sectors on industry, especially of the costs, both direct and indirect, imposed by any deficiencies in infrastructure provision. This assessment was undertaken through a programme of interviews with industrialists in the same areas of the country referred to in (c) above, and with public authorities, most particularly with the IDA.

The companies interviewed comprised both Irish and foreign-owned enterprises. We were unable to interview companies that had seriously appraised Ireland as a potential location but in the event had established elsewhere because of expected infrastructure deficiencies. In consultation with the IDA we were unable to identify any such companies to which we could have easy access and the limited resources available to us made it impossible to mount a special exercise to overcome this omission, especially as the great majority of the interviews would have had to be conducted abroad. In our discussions with firms, we asked them to consider the questions we put from the corporate standpoint.

2.6 At the start of the study it was anticipated that the present or near-future capacity of the country's main ports might merit close investigation. After discussions with the responsible authorities and with industry, however, it did not seem to us that physical constraints in the ports as distinct from difficulties of access to them constituted a sufficiently important factor to warrant inclusion in the present study and hence the topic was pursued no further. This is not to say, however, that there were no problems relating to the efficiency of ports. But they seemed to arise from organisational and labour relations aspects, and so fell outside our terms of reference.

2.7 During our discussions other physical infrastructure deficiencies were mentioned. One was the limited development of regional air services but this complaint was not common. While undoubtedly worth further examination as part of a national long term study, its priority did not seem high enough for extensive investigation in this report. Others were the lack of specialist effluent disposal facilities for certain industries and especially in Galway problems with rail, post and electricity supply. While we did not pursue these points in detail as they were outside the agreed scope of our study, we doubt if any of them would have been more important as obstacles to development than those programmes on which we concentrated.

2.8 There are many statistical pitfalls in using international comparisons to judge Ireland's infrastructure provision, since it is not easy to decide with which countries should Ireland be compared and what factors should be taken into account in making any comparisons.

2.9 It would clearly be too simple to compare Ireland's provision of telephones per head directly with that of, say, Germany. The two countries are at

different stages of economic development, and Germany's having more telephones per head may readily be associated with its far greater affluence. But a country's relative prosperity is by no means a sufficient indicator of how much infrastructure it has. Relative to other OECD countries, for instance, Britain has a far higher provision of telecommunications infrastructure than would be expected on the basis of its GNP per capita, and France a correspondingly lower provision. Clearly other factors – such as past history, Governments' priorities and a people's attitudes and preferences – are also involved.

2.10 There is a further consideration. Irrespective of its relative prosperity, Ireland is industrialising within a competitive world, and has to compete with many other countries to attract internationally mobile investment projects. These projects usually originate in countries whose per capita GNP and infrastructure provision are higher than those of Ireland, and whose sponsors and management personnel implicitly use their own country's circumstances as their point of reference. In this sense, Ireland's low GNP per head relative to that of countries such as the USA, Germany and Japan may be irrelevant.

2.11 Finally, it should be noted that Ireland has a relatively high dependency ratio in its population which arguably tends to give a downward bias to Ireland's position in international comparisons based on per capita ratios. Despite this, and other difficulties, we have found it helpful to use per capita measures of GNP and other variables as a crude means of judging Ireland's provision of infrastructure in an international framework. Table 2.1 shows Ireland's position in terms of GNP per capita, from which it may be seen that its position is well below that of other EEC countries and North America and more in line with southern European countries such as Spain and Greece.

2.12 As noted, much of the interview programme was conducted in particular areas rather than spread throughout the country as a whole. This was because it was important to recognise that infrastructure provision varies from one part of the country to another; because the resources available for the study prevented a country-wide survey and necessitated a selective approach; and because we judged that to interpret the comments of our industrial and other interviewees, it would be essential to understand the local physical and economic context in which they were operating.

2.13 In consultation with NESC and IDA officials, at first two and ultimately three regions were chosen in which to conduct the bulk of our field enquiries: Donegal, the South East and the West Regions. They are sufficiently different to reflect some of the important variations in circumstances that prevail in the country. The West Region is remote, predominantly rural with a small

and dispersed population. It has recently made more progress in gaining manufacturing employment than any other region. Donegal is also remote, rural and with a small and dispersed population. It has made relatively little progress towards industrialisation; and, as will appear, the adequacy of its infrastructure in some respects is affected by its geographical nearness to Northern Ireland. The South East on the other hand is more populated, much more developed both industrially and physically and also closer to the hub of the country's economic activity in Dublin.

TABLE 2.1
GNP per capita of selected countries

	US$ 1978
Switzerland	12,100
Sweden	10,210
Denmark	9,920
United States	9,590
Germany	9,580
Norway	9,510
Belgium	9,090
Netherlands	8,410
France	8,260
Japan	7,280
United Kingdom	5,030
Italy	3,850
Israel	3,500
Ireland	3,470
Spain	3,470
Singapore	3,290
Greece	3,250

Source: World Bank, *World Development Report 1980.*

2.14 Because of the dominance in the country of the Eastern region, and of the Dublin metropolitan area in particular, we backed the Donegal, South East and West fieldwork with a small number of industrial interviews in and around Dublin. We also undertook a brief review of infrastructure in the Shannon area where special industrial development arrangements apply.

2.15 Our approach relied heavily on interviews with central Government Departments and agencies, local authorities and regional organisations in the two regions chosen for the study, representative private sector organisations and industrial companies. A list of those interviewed – excluding the last category to preserve the necessary confidentiality – is given in Appendix A.

2.16 In choosing the companies for interview in consultation with the IDA at both national and regional levels, we sought a sample that would reflect a reasonable balance in respect of:

(a) industrial sector;

(b) size;

(c) indigenous industry and the operations of foreign companies;

(d) the nature of functions carried out at the location concerned, from assembly-only at one extreme to total business operations at the other; and

(e) among foreign-owned enterprises, those recently established in Ireland and those established for a considerable period.

In Donegal, the South East and the West we also sought that the companies interviewed should together represent a substantial proportion of industry in each region.

2.17 In total we interviewed 62 carefully selected companies whose characteristics, in accordance with the above criteria, are given in Appendix B. The picture that emerged from the interviews was sufficiently similar in all important respects to make us confident that a larger, random sample in each region would broadly have endorsed our overall conclusions for each region.

2.18 There are two caveats to this. First, as has already been mentioned, while we talked to foreign companies already or currently being established here, we did not have the resources to interview ones that had seriously appraised Ireland as a location, but in the event may have established elsewhere because of expected infrastructure deficiencies.

2.19 Secondly, while more often than not we could not talk directly to those who had been directly involved in the investment decision that resulted in the company concerned locating in Ireland, those whom we met were mostly familiar with the reasons why Ireland had been chosen, and most had at least been present from the start of the operation.

2.20 In all the interviews we adopted an informal though structured approach, using an aide-memoire to guide discussion rather than a questionnaire to which there had to be rigid adherence. The aide-memoire we used for the most important group of interviews, those with companies themselves, is available on request from the NESC.

2.21 Throughout this report the cost to Ireland of an inadequate infrastructure is conceived of in terms of the impact on the country's industrial development, and not in terms of the wider concept of the cost or benefit to the economy as a whole. In other words, we have been concerned to ascertain whether and how the country's infrastructure impedes the operation of individual industrial projects as well as the country's attractiveness to potential investors from abroad; and we have not attempted to assess the value to the overall economy of that industrial development, the value of infrastructure to sectors other than industry, and consequently the case for infrastructure development on wider grounds than the narrow interest of industrial growth alone.

2.22 Finally, despite the limited theoretical and empirical development of the particular subject matter with which this study is concerned, it is possible to make some general comments about the location decision for new industrial investment which will help to put physical infrastructure in an appropriately wider perspective. In most circumstances the single most important determinant of a project's location is access to its market. (This only tends not to be the case when the process is strongly dependent on a single input and there are substantial economies in transportation from processing it at source). It is only after the market aspect is satisfied that factors on the supply side — such as financial incentives, labour supply, and sites and premises — become important. Of these supply factors, it is typically the case that detailed consideration of sites, premises, public utilities and other physical inputs takes place only at the last stages of the decision-making process; this is because few projects have such individual requirements that they cannot find a satisfactory location that is already available or that could be made so without difficulty.

2.23 There are of course important exceptions to these generalisations. Some projects have safety, effluent disposal or other specialised needs that cannot be readily met, and in such cases the search for a suitable physical location is elevated to earlier and greater prominence in the investment decision. But such cases are not common, and in broad terms the availability of infrastructure influences the choice of a particular site within a generally acceptable location rather than the prior choice of the general location.

CHAPTER 3

IRISH INDUSTRIALISATION AND INFRASTRUCTURE PROVISION – AN OVERALL PERSPECTIVE

3.1 By historic standards Ireland has achieved rapid economic growth over the past two decades; the leading element in this growth has been the manufacturing sector. Admittedly it started from a very low base because there was almost no industrialisation in the nineteenth century within what is now the Republic and because of the dominant presence of the far more developed UK economy.

3.2 The drive to industrialisation has attracted strong support from the major political parties and there has been stability in both the policies and the institutional framework for development. This has essentially been because of the overwhelming need to generate new jobs to:

(a) absorb the increase in population – in the 1970s. Ireland has had one of the highest population growth rates in Europe, compounded by a high rate of natural increase and a substantial fall in the net migration loss. In some years there was an actual net migration gain;

(b) find work for the large number of people leaving agriculture (which has continued despite the boost given to this sector after Ireland's accession to the EEC) – proportionately employment in agriculture is still very high, some ten times higher than that in the UK for instance; and

(c) replace the jobs being lost in traditional manufacturing industry as a result of the lowering of tariff barriers, with especially serious decline in textiles, clothing and footwear.

3.3 Prime responsibility for implementation of the country's industrial promotion programme, with the overriding objective being job creation, lies with the IDA; with Údarás na Gaeltachta and the Shannon Free Airport Development Company having particular responsibilities in designated parts of the country. Operating with a high degree of autonomy, the IDA has considerable financial, development, planning and other powers to attract new industry to Ireland from abroad, to assist industry already established in Ireland whether domestic or foreign in origin and to stimulate formation of entirely new enterprises.

3.4 The IDA also has responsibility for planning and promoting industrial development on a regional basis. This has special importance because of the deliberate national strategy for retaining a spatially dispersed pattern of industry and settlement, and, so far as possible, of taking jobs to people rather than vice versa. In its current five-year plan (1978-82) the IDA breaks down its overall job creation targets into a target for each of the nine planning regions; it has even presented corresponding targets for individual groups of towns in each region.

3.5 The IDA has been successful both in attracting new projects from abroad and in consolidating and expanding existing industry; in 1979 for instance the IDA approved projects that were expected to result at completion in some 35,000 new jobs, split roughly 40/60 between these two categories. (It should be noted however, that some 55% to 60% of job approvals turn into actual jobs.) In the same year industrial employment increased absolutely by nearly 9,000 (about 2½%), despite the worsening international recession and Ireland's high dependence on foreign markets for its output. Looking back over the past decade such achievements on the part of the IDA are not exceptional, though there was a prolonged period in the mid-1970s when job losses more than offset the gains from new projects. In the IDA's 1973-77 planning period the net increase in manufacturing employment was only 1,900.

3.6 Perhaps inevitably, the IDA's achievements at regional level have been more varied. Some regions (notably the West, North West and the Midlands) have done well in terms of absolute increases in manufacturing employment and also in attaining their IDA new job targets; while others (such as the East and North East) have done exceptionally badly and have suffered serious job losses without attaining their new job targets.

3.7 The IDA has set itself ambitious targets for the next several years, quantitatively in terms of new projects and jobs to be secured and qualitatively in terms of the types of new industries and companies to attract and promote. The quantitative aspect is immediately evident from the 1978-82 target of project approvals with an ultimate job potential of 145,000. That would represent an increase of over 40% on the actual achievement of gross job approvals during the previous five years.

3.8 The significance of this ambitious job target in the present context can be seen from Table 3.1. This shows the steep increase in public capital expenditure on industry that has already taken place since the mid-1970s: for instance such expenditure accounted for only some 16.8% of total public investment in the period 1971-75, but 20.3% (and on a rising trend) in the following five years. This does not take into account the tax foregone as part of Government policy to aid manufacturing industry. In the same two periods

capital expenditure on roads, telecommunications and water supply and sewerage declined slightly from 15.8% to 15% of total public capital expenditure. In 1981 a reversal of these trends is planned.

TABLE 3.1

Public Capital Expenditure on Industry and on Roads, Telecommunications and Water Supply and Sewerage, as proportion of total public capital expenditure

(% current prices)

	Industry[4]		Roads, Telecommunications, Water Supply and Sewerage
	Total	of which loans are[5]	
1971/72[1]	20.9	3.2	13.6
1972/73[1]	17.0	2.8	14.9
1973/74[1]	15.1	3.4	16.2
April-Dec. 1974	16.5	4.4	16.1
1975[2]	16.3	4.5	16.9
1976[2]	17.2	6.9	15.6
1977[2]	17.3	7.6	14.6
1978[2]	18.5	6.9	13.7
1979[2]	24.2	8.0	14.8
1980[2]	24.3	6.7	16.5
1981[3]	20.7	6.2	20.3

1 Year ended 31 March
2 Year ended 31 December
3 Budget estimate
4 Expenditure on the Nitrigin Eireann Teo project is excluded in order to illustrate the underlying trend.
5 Loan Finance for Industry (Industrial Credit Company and Foir Teo)

Sources: Public Capital Programme 1971/72 – 1980
Statistical Abstracts 1971/72, 1974/75
Annual Budgets 1975 – 1980

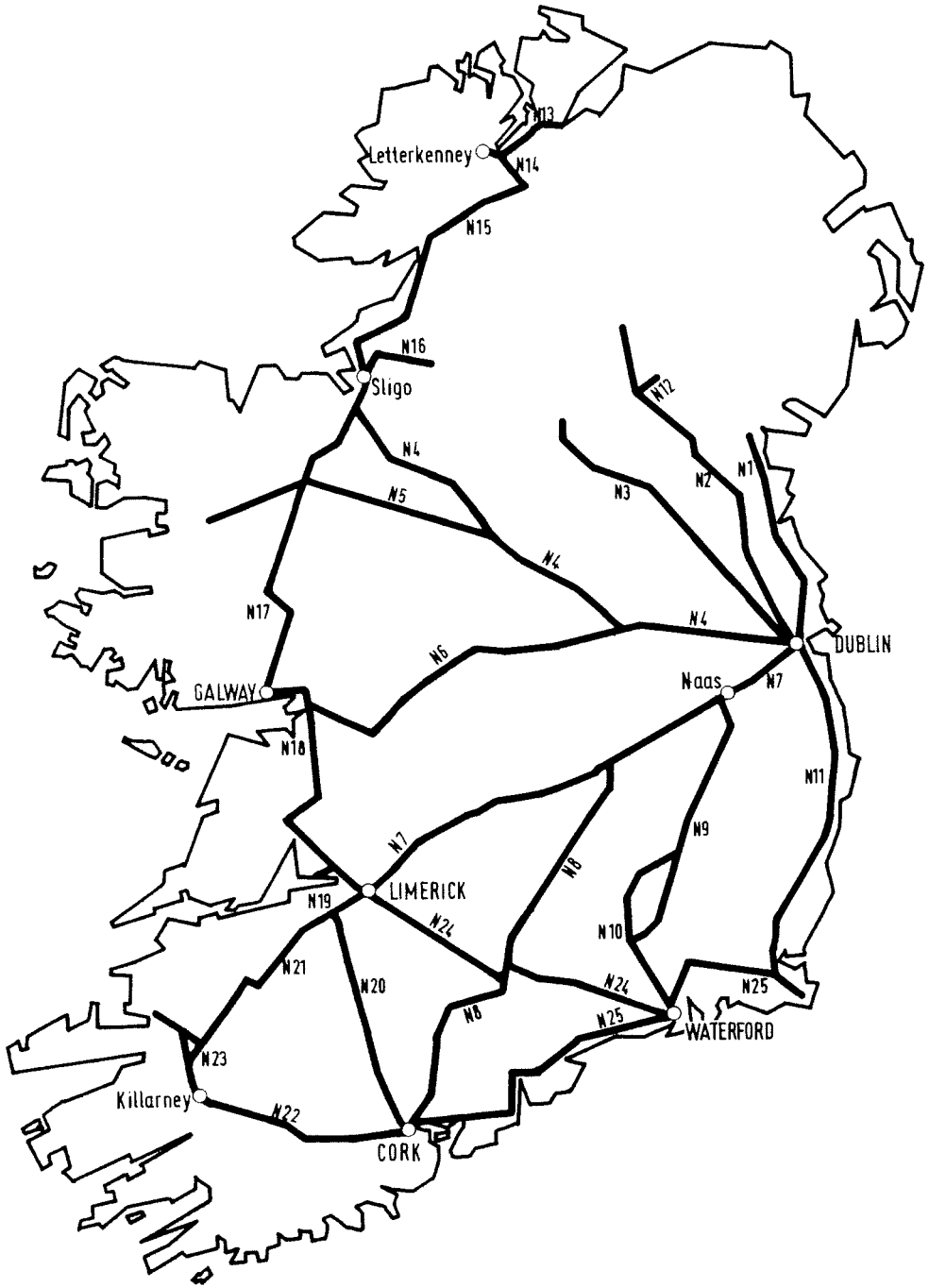
3.9 The regional quantitative targets are also relevant. Notwithstanding the uneven and indeed unsatisfactory performance in achieving the regional targets of the 1973-77 plan, the IDA remains committed to a high degree of dispersion of economic activity. This has direct implications for the planning of new infrastructural requirements as will be discussed later.

3.10 The qualitative element in the IDA's plans is also pertinent. The IDA believes that it must attract more projects that are either skill-intensive or high technology in nature or are total business operations covering processing, marketing, research and development as well as most, if not all, headquarters functions. Even if new developments do not start on such a comprehensive basis, the IDA is keen that they should be able to develop in that direction. Such projects invariably impose higher demands on infrastructure, than the more straightforward assembly- or production-only projects typical of earlier foreign investment. They are more likely to have specialised servicing needs and to require specialised effluent disposal facilities; rapid communications with headquarters, with suppliers and markets; or backup for R&D and testing facilities; as well as to employ personnel who expect international standards in housing, education and in other social and cultural amenities. As will appear, this raises issues of very great importance for the authorities providing infrastructure.

3.11 It is not in our brief to attempt to examine the validity and potential value of the IDA's quantitative and qualitative plans. Our previous experience, however, serves to endorse the approach they have adopted to attract internationally mobile, high value added industries. It is vital for long-term development that the present momentum of development be at least maintained and, perhaps more important, that Ireland establish an industrial structure that itself has the capability to innovate in its products and markets rather than be dependent on R&D activities, marketing choices and other strategic decisions taken elsewhere.

3.12 But, as indicated in paragraphs 3.10, such a course clearly has important implications for infrastructure provision, both quantitative and qualitative, in the longer term. The next three chapters examine three main infrastructure programmes more closely. They are roads, telecommunications and water supply.

Figure 4.1 IRISH PRIMARY ROAD NETWORK



CHAPTER 4

ROADS

A THE ROAD NETWORK AND ITS UTILISATION

4.1 The Irish road system comprises a total of around 92,000 km.[1] In relative terms this is high by international standards. While Ireland has by far the lowest population density and the lowest incidence of car ownership among EEC member countries, its roads density (km of road per km^2 of the country's area), is higher than that of Italy and not much below that of the United Kingdom or Denmark.

4.2 A classification of the system into different categories of road is shown in Table 4.1. The most striking feature of the classification is the very high proportion of county roads (which make up the rural network, connecting small villages and towns); and correspondingly the low proportion of major roads. Ireland has no motorways whatsoever, and in this compares most unfavourably with other European countries (Table 4.2).

TABLE 4.1

Road Categories 1979

	km	% of total
National Roads	5,256	5.7
(of which primary	(2,630)	(2.9)
secondary)	(2,626)	(2.8)
Main Roads	10,726	11.6
County borough roads	1,358	1.5
Urban roads	981	1.1
County roads	74,000	80.2
TOTAL	92,321	100.0

Source: Department of the Environment, *Road Development Plan for the 1980s,* 1979

[1] In this chapter, unless otherwise indicated the statistics are taken from the Statistical Abstract.

TABLE 4.2

Percentage of Road Length in Motorway Class, 1977

Belgium	0.90
Denmark	0.69
France	0.57
Germany	1.47
Great Britain	0.69
Ireland	0
Italy	1.92
Netherlands	2.34
Greece	0.25
Spain	0.85
Portugal	0.14
Turkey	0.08

Source: International Road Federation, *World Highway Statistics, 1977.*

4.3 Although mileage is not the only measure of capacity there has been remarkably little development of the road system in recent years. Since 1971 the total length of roads as well as that of the particular category of national roads which accommodates some 35% of total vehicle traffic, has increased by less than 1%. This slow growth in the system occurred at a time when traffic growth was substantial. Over the period 1971-78, for instance, the number of registered vehicles increased by 42%. And in the even shorter period 1976-79, traffic growth (measured in vehicle - kms) grew by 26%. Most significantly, the greater part of traffic growth was on the national roads – an increase of 41% over the three-year period. There has also been a steady increase in commercial traffic on all parts of the system, with a strong trend towards heavy goods vehicles.

4.4 The value of investment in roads has tended to fall both absolutely and relative to Gross National Product since the early 1960s (see Table 4.3). Further, as already indicated what investment there has been, has been overwhelmingly concentrated on improvement of existing roads. Only about half (54% in the period 1975-79) has been on national roads, with the balance on other road categories listed in Table 4.1.

4.5 In addition there has been somewhat higher expenditure on road maintenance (£271m in the period 1975-79, in 1978 prices) than on improvement and new construction (£144m). Again, the bulk of it (86% in 1975-79) has been on non-national roads.

TABLE 4.3

Public Expenditure on Roads Improvement and New Construction

	£m (1975 prices)	% of GNP (current prices)
1960	18.6	0.77
1962	22.8	0.89
1964	24.5	0.85
1966	23.4	0.77
1968	20.8	0.60
1970	23.2	0.64
1971	22.6	0.61
1972	19.9	0.49
1973	21.6	0.51
1974	23.4	0.66
1975	19.3	0.52
1976	12.6	0.33
1977	16.7	0.43
1978	20.0	0.48

Source: National Income and Expenditure

4.6 Total expenditure on roads has not kept pace with growth in road traffic. In real terms, expenditure per registered vehicle in 1979 was only half that in 1960 (see Table 4.4).

TABLE 4.4

Total Roads Expenditure per Registered Vehicle (1980 Prices)

Year	£/vehicle
1960	255
1965	176
1970	171
1975	138
1977	131
1978	126
1979	128

Source: Department of the Environment

4.7 There has also been a low rate of expenditure by international standards. Table 4.5 shows that in the late 1970s Ireland's expenditure per million vehicle-km, along with that of Spain, was the lowest among the Western European countries for which data are available. The comparison is more striking when maintenance expenditure is set aside. All the countries shown except one are spending at twice the rate, at least, of Ireland; and Germany at the prodigious rate of twelve times Ireland's rate. Comparable data for the early 1970s show a similar picture, though Ireland then spent less than Spain.

TABLE 4.5

Ratio of Roads Expenditure in Millions of SDRs* at Current Prices to Road Traffic Volume in Million Vehicle Kilometres

		Maintenance	New construction and improvement	Total
Belgium	(1975)	na	na	0.021
Denmark	(1978)	0.010	0.012	0.022
France	(1977)	0.007	0.009	0.016
Germany	(1978)	0.001	0.024	0.025
Great Britain	(1978)	0.004	0.004	0.009
Ireland	(1978)	0.004	0.002	0.006
Italy	(1976)	0.005	0.007	0.012
Netherlands	(1978)	0.006	0.003	0.010
Greece	(1978)	0.001	0.007	0.008
Spain	(1978)	0.002	0.004	0.006

na = not available

*SDRs = Special Drawing Rights at end of year rates as determined by the IMF

Source: International Road Federation, *World Highway Statistics*

4.8 Given the low density of major roads with which Ireland starts, the pace of its economic growth during the 1970s until recently, and the growth of traffic, and considering the probability, that car ownership rates, now relatively low, will rise substantially, it is difficult to escape the conclusion that there has been under-investment in Ireland's primary road network. The system compares unfavourably with that of other European countries. These observations are in accordance with often expressed opinions about the quality of road surfaces and alignments, the relative absence of urban by-passes on many routes and congestion in the cities of Dublin and Cork. The condition of minor roads in rural areas is also widely considered to be poor. The same conclusion was reached in an earlier NESC report after a review of the evidence on rates of return from road improvement.[1]

[1] *Transport Policy* by C. D. Foster, T. J. Powell and D. Parish, NESC Report No. 48, 1980.

4.9 Studies of the road network by An Foras Forbartha in 1970 and subsequently have shown its inadequacies and indicated the substantial volume of financial resources needed to achieve even modest progress towards international standards. The Government too, in several White Papers, has noted the deficiencies of the national primary routes and growing congestion in urban areas.

4.10 In May 1979 the Government's "Road Development Plan for the 1980s" acknowledged such deficiencies of the road system and conceded there had been further deterioration. It emphasised the importance of an improved network for economic efficiency, environmental protection and a reduction in road accidents. In drawing up the proposed investment programme the Government set out to achieve:

(a) maintenance of overall road network up to a generally satisfactory level of service;

(b) provision of an adequate strategic inter-urban system for the major towns, seaports and airports;

(c) adoption of a minimum two-lane standard for the National Primary Network and significant sections of the National Secondary Network;

(d) provision of by-passes for towns on national roads; and

(e) implementation of a special programme to meet the need for new bridges, ring roads, relief roads, etc.

4.11 The plan provided for a total outlay by central government of £685m (1978 prices). Table 4.6 summarises the planned outlays and also gives the outlays actually made in the late 1970s.

4.12 Table 4.6 relates to expenditure made directly by central government, including a block grant to local authorities to supplement expenditure from their own resources on non-national roads. If local authority roads spending in the 1980s were to be broadly the same in relation to central government's direct expenditure in the 1980s as it was in the 1975-79 period, then we estimate that the grand total of public expenditure on roads under the published development plan might be of the order of an average of £108m a year (1978 prices) in the 1980s as against £82m a year in the 1975-79 period.[1]

4.13 It is thus clear that if the development programme were to be implemented there would be:

[1] See also W. S. Bruen in 'The Impact of The Heavy Goods Vehicle in Ireland', An Foras Forbartha 1980.

(a) a significant increase in the resources devoted to roads;

(b) a substantial share of the increased expenditure going to improvement and new construction rather than to maintenance; and

(c) a higher proportion of resources going to national roads.

TABLE 4.6

Central Government Expenditure on Roads

	(£m, 1978 prices)	
	Actual 1975-79	**Planned** 1980-89
MAINTENANCE		
National roads	37	74
Other roads	33	60
Total	70	134
IMPROVEMENT		
National roads – major works	78	282
National roads – normal improvements		166
Other	43	103
Total	121	551
TOTAL	191	685

Source: Department of the Environment, *Road Development Plan for the 1980s.*

4.14 In January 1981 the Government presented its *Investment Plan 1981* to the Oireachtas. It provided for expenditure of £60 million for road improvement and £20 million for maintenance. While a welcome increase, in real terms it remains below that required to achieve the Government's longer term targets.

B IMPACT OF THE ROAD SYSTEM ON INDUSTRY

4.15 While there is the evidence that less has been spent on Irish roads than on those of most other European nations, the critical question for present purposes is the extent to which such shortcomings in the Irish roads system are damaging to the industrial development effort. In accordance with the approach set out in Chapters 2 and 3, we set about answering this question by interviewing the concerned public bodies and selected manufacturing companies in the Donegal, South East and West regions. We supplemented this by discussions with public bodies in the Shannon area as well as with eight other firms outside these two regions. Three were specialist national transport operators or else heavily engaged in transport as part of their overall business and the remainder multinational companies in the Dublin area.

Donegal

4.16 In Donegal, the companies' responses to questions about roads varied strongly depending on the particular location of the firm in the county. Two broad categories can be distinguished. First, companies in the eastern part of the county despatched their output eastwards through Northern Ireland to Belfast and Larne ports and then on to the UK and beyond. Imported materials and components for these firms were also carried along the same route. These firms therefore made little use of Donegal roads; what they did, was confined to a few miles of the national primaries N13, N14 and part of the N15. (See Figure 4.1 showing the primary road network.) In all, not more than 50 miles of roadway were involved, and for none of the firms in this survey was the travel distance to the Northern Ireland border more than 20 miles distant. Thereafter, transport was across Northern Ireland on roads of comparatively high quality in alignment, capacity and surface. The entry to Belfast city is by a recently opened motorway.

4.17 Where the firms in the eastern part of the county had to despatch or receive goods from the south, we found that their route was also through Northern Ireland. Thus, vehicles going to or coming from Dublin entered the North at either Derry or Strabane and departed at Aughnacloy in Monaghan. Either way, travel over Donegal roads constituted a small proportion of the total journey, and use of Southern Irish roads was minimised by using the Northern Ireland A5 or A4 roads.

4.18 The availability of high quality Northern Ireland roads is an advantage to the operations of these firms. However, the route for those vehicles travelling to Belfast is selected on the basis of the quality and proximity of the sea service to Britain rather than the quality of the roads. Likewise, opting for the cross-border route to Dublin is due mainly to the fact that this is the shortest way to Dublin for most companies.

4.19 The second category of response came from firms established in other parts of the county for whom the position is less attractive. Firms in the north and west have to travel significant distances on the N56, the secondary road, before connecting with the primary roads and so proceeding onwards either to the border or south to avoid crossing the border and connect with the N4 at Sligo. For transport to Belfast, the Donegal roads would constitute about one third of the journey. For firms going to Dublin, the proportion would be about the same, but the journey would be longer. Firms in the south of the county would have relatively short distances to travel, mainly on the N15 to Sligo. Thereafter the journey to Dublin is on the N4. The problems involved in customs formalities at the border are such that it is not worthwhile for their transport to cross the border unless they are travelling to Belfast.

4.20 In summary, therefore, firms in the north and west are disadvantaged in that they have to travel substantial distances over patently inferior Donegal roads that are seldom of national secondary road standard. However for such firms, travel across Northern Ireland roads either to Belfast or in the Dublin direction is often a real possibility. For firms in the south, however, crossing the border may not be worthwhile unless the destination is Belfast. For such firms, therefore, the route must be the long way around the "corner" to Sligo and thence to Dublin.

4.21 Industrialists were more critical on average of the roads in Donegal than those in other parts of the country. The complaints related to all aspects of road quality, including alignment, surface and width. They claimed the poor roads imposed excess costs from higher fuel usage, more wear and tear on engines and bodywork, and longer travel times. Interestingly, however, none interviewed could quantify these alleged cost penalties even very approximately, or set them against the cost and other advantages of operating in Donegal. We were not expecting exact costs, but some expression of orders of magnitude and we believe this not unreasonable if the cost penalties had been substantial.

4.22 Industry's perception of the problem is less acute because of the use of contract hauliers whose rates have often not risen much recently. There may be limited appreciation of cost penalties caused by remoteness or the condition of the roads because most firms are satisfied with the service they get and its price. However, most firms in the more remote parts of Donegal are not transport-intensive; they tend to manufacture high value/low volume products and thus transport is a small element of their total costs. This is not attributable simply to the quality of the Donegal road system; it results also from the remoteness of Donegal and its distance from export markets. This remoteness must not be exaggerated, however, for the degree of industrial development is much greater in the east than the west even though the

distance between them is comparatively small. While many factors determine the location of industry, on the basis of our consultations in the area we feel confident in concluding that while the poor quality of the road network does have a limited effect in deterring development in the country especially away from the border, its relative impact is not great when account is taken of other factors such as labour supply which in aggregate tend to be more important.

4.23 It emerged from our field enquiries that access to Northern Ireland's superior roads is a positive advantage for the county as a whole. Even so, in cases where the destination is Dublin or elsewhere in the east of the Republic, traffic suffers from the county's poor roads – the routes involved, usually through Sligo or Aughnacloy, are regarded as having very poor alignment and as imposing heavy time delays.

4.24 Many of our interviewees said that some of the most serious road problems encountered by them are on roads outside the county. The N4 from Sligo to Dublin was repeatedly cited as highly deficient in a number of areas, notably in Leitrim and in Dublin county and city. Particularly poor road conditions are encountered on about the final 50 km. of the N4 into Dublin. Likewise the N2, though less heavily trafficked, was stated to have deficiencies in Monaghan.

4.25 Objective means of examining these critical areas are not easily found. As already noted, the industrialists we interviewed were unable to reinforce their views with hard facts or to place any quantitative estimate on the impact of any transport cost penalties.

4.26 Some measure of the extent of deficiency in the county's roads is given by the estimate of the Regional Development Organisation (RDO) that nearly £28m (1979 prices) is needed to bring the national roads in the county up to what it regards as an adequate standard to handle the growth of traffic up to 1995; of this about one third is for national primary roads, the balance for secondary roads. Comparable expenditure in the 1973-1977 period was only £1.3m (current prices) and a little less than £1m in 1979 (1979 prices). Even allowing for the fact that the RDO's estimate is an overall sum without clear priorities of phasing or location, the scale of future investment required is very large in relation to past experience.

South East

4.27 We also consulted industrial firms in the South East region. There was a division of views between those companies which were operating in the vicinity of one of the three ports in the region, and those located in the more inland parts of the region. For those in Waterford, Wexford and southern Kilkenny, the road transportation problem was relatively minor.

Almost all of the exports and most of the imports of those enterprises we talked to came through Waterford port in containers or from Rosslare on RO-RO. For these firms, the distances involved were slight and any disabilities involved a relatively small extra cost.

4.28 Firms using Cork harbour tend to have a medium length haul by Irish standards (100 km), but the N25 road (See Figure 4.1) is said to be reasonably good. On the other hand firms located in Tipperary South and Kilkenny also face a run of some 100 km to Waterford and to Dublin respectively, but road conditions are held to be poor and we found that most of the firms involved elected to route their merchandise through Waterford or Rosslare. The firms we talked to complained of the bad alignment in the vicinity of Kilkenny town and also near the city of Waterford; the bad patches in Carlow; the major bottleneck at Naas; further along the route towards Dublin and the other bottlenecks at Kilkenny itself; and in Waterford where there is at present only one river crossing.

4.29 One of the general observations that emerged from our consultations in the South East was that the drawbacks of the roads were more keenly felt by domestic rather than foreign enterprises. This is not because of the ownership of the firm as such, but results from the fact that domestic enterprises are more likely to be found in those industries (like food and drink) where transport of raw material and distribution of final products are largely, if not entirely, within the region. Foreign firms, on the other hand, tend to be oriented to export markets and make relatively less use of inland surface communications. They may also be to some degree self-selecting inasmuch as comparatively transport-intensive foreign firms may not select a site in Ireland.

4.30 The domestic food processing firms, which are an important sector in industry in the region, are a case in point. Some of these firms pointed to specific cost penalties on their operations resulting from the road network. These costs which arise from loss and damage on the road in addition to vehicle wear and tear, did not relate only to the main and county roads where their vehicles must travel to procure raw materials and distribute the final product. Even on the national roads, the firms complained of a high incidence of damage to their vehicles from poor surfaces and also of long transit times for comparatively short journeys. In adverse weather conditions, they also said that the condition of some roads was such that transportation had to cease and the continuity of production was at times threatened. We are fully persuaded of the difficulties created for such firms by a poor road system, and of the extra costs imposed. Interestingly, however, when measured in relative rather than absolute terms the cost penalties appear much less significant, even in the case of such a transport-intensive industry. Therefore while firms mention the drawbacks, they are unlikely to give much priority to overcoming them.

The West

4.31 Many firms remarked adversely on the quality of the roads to other parts of Ireland as well as locally. Many complained of serious and growing congestion on the roads to Dublin. Ballinasloe and Athlone were referred to as often particularly bad. However, the N6 route, considered adequate for most of the distance, becomes extremely congested when it merges with the N4 at Kinnegad which is a distance of 37 miles from Dublin. Despite being the principal road from the West and North West this road has no stretch of dual carriageway mileage, passes through three small towns, and in some of the intervening stretches comprises two 7.3m lanes with no shoulders. Thus a journey from Galway to Dublin, a distance of 140 miles which can take three hours at an off peak time, can take four hours or more on a week day afternoon. The journey from North Mayo to Dublin is even more protracted since alignment of the N5 road is inferior to that of the N6 although the volume of traffic on it tends to be relatively low. Firms in the more remote towns of the West region or off the main road, complained of the poor alignment, surface and bends of the minor roads they had to use. Their comments put to us tended to confirm what is surely well established: that on normal cost-benefit grounds there is a strong case for improving many of Ireland's roads, especially the major highways and urban by-passes.

4.32 In general, the movement of freight, where consignments were of one container load or more, seem to cause few problems for the firms in the sample. The principal routes for freight traffic were to Eastern Coast ports, principally Dublin and Waterford, with Cork, Larne, Belfast and Warrenpoint attracting smaller volumes of traffic. They have all found one or more hauliers to carry their regular traffic whom they find reliable and they regard the speed and cost of moving large consignments of freight to and from the East as satisfactory. Two firms remarked on the keen competition there was to get their business, hauliers frequently making contact to offer their services. None of the firms interviewed felt that they were at an undue competitive disadvantage because of the cost of transport given that their location is relatively remote from their markets and their suppliers. Nor did any of them report that their customers were dissatisfied with the reliability or speed of delivery from the West. This includes firms delivering goods to the U.K., the Continent and North America. Therefore, problems encountered because of the poor alignment, surface or carrying capacity of roads in the country are, by implication, of relatively minor significance. They knew that journey-times were slow and that there was appreciable congestion; but their concern was that they got regular service on time. This their hauliers achieved for them; and this was as true with quite small as it was with large firms. One firm on the outer periphery of the region had worked out that its remoteness from Dublin had probably added from about 25% to 30% to its transport costs in selling in the rest of Europe but regarded this as an accept-

able cost penalty. Several firms mentioned the transport rates they paid as not unreasonable; and one firm that imported inputs from Continental Europe and exported products back there, remarked that Irish rates for the return journey were very favourable compared with ones they had been quoted in Europe.

4.33 Some firms remarked that since it could take a goods vehicle five to six hours to travel from Dublin to Galway itself, the round-trip took two days when in the U.K. for example, such a return journey could be made in a day. This seemed general throughout the region. The most interesting comment was from a small firm which had calculated it lost about a day's production each month because it had to get its consignment for Dublin ready by mid-day Thursday to be sure to get them to a groupage depot in Shannon in time for them to catch the boat from Dublin on the Saturday. If the roads between Galway and Shannon, and between Shannon and Dublin were better, they would have been able to deliver to Shannon on Friday rather than Thursday. However, the problem would definitely seem to be one of small loads needing to be grouped (see next paragraph) and the firm itself recognised that it had this problem because it had only been set up recently and was in an early sub-optimal stage in its operations. Plainly, there would be savings if such journeys could be completed in a day but it remains true that the firms interviewed had accommodated themselves to this; and did not regard regular freight flows as a serious problem for them. It is also interesting that the very few firms that mentioned rail as a possibility they had considered or used, regarded it as expensive and unreliable.

4.34 On the other hand, the movement of small quantities of freight of less than container load size, did appear to give rise to problems. There seems to be a very limited and rather unsatisfactory service for the movement of small quantities of freight to and from plants in the West. For some of the smaller firms the purchase and operation of one or two relatively small commercial vehicles, seemed an adequate response. But other firms with a large number of such consignments going to and from ports and airports and around the country, appeared to be faced with a problem. The usual difficulty was that the services provided were erratic, unreliable and relatively expensive. Again, however, this deficiency has less to do with the quality of roads, than of the ability of the haulage industry to cope with the movement of relatively small quantities of goods between highly dispersed locations. It should be added that the problems in this area were rated relatively insignificant by the larger firms encountering them. For some of the smaller enterprises, even including those with some transport equipment of their own, the deficiency was somewhat more significant. Other firms in Galway beside that mentioned in the last paragraph mentioned the difficulty of always getting effective groupage for small consignments. The problem was greater in the more remote parts of the region. Several firms mentioned that there was no regular scheduled

transporter network for small goods. (CIE Fastrack was mentioned by some as useful for small parcels.) A rush job from North Mayo to Shannon for example might cost as much as £60 to £100 a ton, though even here there were signs that the problem might be overcome, since there were indications that some small operators had, or were about to, set up services for this kind of traffic – for example from Ballina to Dublin. Shannon was important for a number of firms for rush jobs and urgently needed spare parts. However, many of these problems were overcome by appropriate stocking policies. One firm which exported almost all its output mentioned that its distributors carried two months' stocks against strikes, stoppages and delays in the transport chain. Another firm had overcome its early problems in ensuring they had the products in time to meet the deadlines of groupage services by closer attention to stocking levels in the factory. While it is undoubtedly the case that better roads would help firms required to make urgent, small deliveries, or which need to secure spare parts or scarce material quickly, this kind of problem has generally been alleviated by appropriate stocking policies. A process of self-selection is also important. Firms, much of whose orders consist of urgent requests for unpredictable items from a range of products, or who need to alter their raw material mix at short notice, are less likely to locate in the West region. Nevertheless, the freight problems of smaller firms, operating from dispersed locations in non-urbanised regions, might repay further study, particularly in the context of a policy to promote small industry in the regions.

4.35 To this general conclusion, however, it is important to add the qualification that the interviews were conducted at a time when the volume of industrial activity in the country was declining and when it is probable that the total volume of freight and the total volume of road traffic were contracting. This would mean that congestion on the roads, delays in ports, and demands on the carrying capacity of hauliers were all less than they may have been say, twelve months ago. In such circumstances, it might be expected that freight will move relatively smoothly. As against that, again, it must be recorded that none of the firms suggested that the present level of service was either a recent development or unusual. Apart from that, any problems that might arise from a resurgence of economic activity would only partly be related to the inadequacy of roads as such. It might be speculated that any delays which might occur in such circumstances might be attributable, not only to the roads, but also to the capacity of the ports to handle documentation and the ability of hauliers to meet a sudden surge in demand. Neither of these factors is within the scope of this report since they relate to the use that is made of ports and roads rather than the physical adequacy of them.

4.36 The respondents had more problems with the movement of personnel. In this sense, the movement of personnel includes movement of executives of the company to or from head offices or fellow subsidiaries overseas; the move-

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4.33 Some firms remarked that since it could take a goods vehicle five to six hours to travel from Dublin to Galway itself, the round-trip took two days when in the U.K. for example, such a return journey could be made in a day. This seemed general throughout the region. The most interesting comment was from a small firm which had calculated it lost about a day's production each month because it had to get its consignment for Dublin ready by mid-day Thursday to be sure to get them to a groupage depot in Shannon in time for them to catch the boat from Dublin on the Saturday. If the roads between Galway and Shannon, and between Shannon and Dublin were better, they would have been able to deliver to Shannon on Friday rather than Thursday. However, the problem would definitely seem to be one of small loads needing to be grouped (see next paragraph) and the firm itself recognised that it had this problem because it had only been set up recently and was in an early sub-optimal stage in its operations. Plainly, there would be savings if such journeys could be completed in a day but it remains true that the firms interviewed had accommodated themselves to this; and did not regard regular freight flows as a serious problem for them. It is also interesting that the very few firms that mentioned rail as a possibility they had considered or used, regarded it as expensive and unreliable.

4.34 On the other hand, the movement of small quantities of freight of less than container load size, did appear to give rise to problems. There seems to be a very limited and rather unsatisfactory service for the movement of small quantities of freight to and from plants in the West. For some of the smaller firms the purchase and operation of one or two relatively small commercial vehicles, seemed an adequate response. But other firms with a large number of such consignments going to and from ports and airports and around the country, appeared to be faced with a problem. The usual difficulty was that the services provided were erratic, unreliable and relatively expensive. Again, however, this deficiency has less to do with the quality of roads, than of the ability of the haulage industry to cope with the movement of relatively small quantities of goods between highly dispersed locations. It should be added that the problems in this area were rated relatively insignificant by the larger firms encountering them. For some of the smaller enterprises, even including those with some transport equipment of their own, the deficiency was somewhat more significant. Other firms in Galway beside that mentioned in the last paragraph mentioned the difficulty of always getting effective groupage for small consignments. The problem was greater in the more remote parts of the region. Several firms mentioned that there was no regular scheduled

transporter network for small goods. (CIE Fastrack was mentioned by some as useful for small parcels.) A rush job from North Mayo to Shannon for example might cost as much as £60 to £100 a ton, though even here there were signs that the problem might be overcome, since there were indications that some small operators had, or were about to, set up services for this kind of traffic – for example from Ballina to Dublin. Shannon was important for a number of firms for rush jobs and urgently needed spare parts. However, many of these problems were overcome by appropriate stocking policies. One firm which exported almost all its output mentioned that its distributors carried two months' stocks against strikes, stoppages and delays in the transport chain. Another firm had overcome its early problems in ensuring they had the products in time to meet the deadlines of groupage services by closer attention to stocking levels in the factory. While it is undoubtedly the case that better roads would help firms required to make urgent, small deliveries, or which need to secure spare parts or scarce material quickly, this kind of problem has generally been alleviated by appropriate stocking policies. A process of self-selection is also important. Firms, much of whose orders consist of urgent requests for unpredictable items from a range of products, or who need to alter their raw material mix at short notice, are less likely to locate in the West region. Nevertheless, the freight problems of smaller firms, operating from dispersed locations in non-urbanised regions, might repay further study, particularly in the context of a policy to promote small industry in the regions.

4.35 To this general conclusion, however, it is important to add the qualification that the interviews were conducted at a time when the volume of industrial activity in the country was declining and when it is probable that the total volume of freight and the total volume of road traffic were contracting. This would mean that congestion on the roads, delays in ports, and demands on the carrying capacity of hauliers were all less than they may have been say, twelve months ago. In such circumstances, it might be expected that freight will move relatively smoothly. As against that, again, it must be recorded that none of the firms suggested that the present level of service was either a recent development or unusual. Apart from that, any problems that might arise from a resurgence of economic activity would only partly be related to the inadequacy of roads as such. It might be speculated that any delays which might occur in such circumstances might be attributable, not only to the roads, but also to the capacity of the ports to handle documentation and the ability of hauliers to meet a sudden surge in demand. Neither of these factors is within the scope of this report since they relate to the use that is made of ports and roads rather than the physical adequacy of them.

4.36 The respondents had more problems with the movement of personnel. In this sense, the movement of personnel includes movement of executives of the company to or from head offices or fellow subsidiaries overseas; the move-

ment of executives to Dublin for meetings with Government Departments, state agencies, professional firms etc., the movement of salesmen to overseas markets and, in some cases, the movement of customers to plants in the West for the purposes of inspection. These movements were, of course, principally to and from Dublin city and airport, and Shannon from where they are flights to the U.K., the Continent and North America. Shannon is, of course, a good deal closer than Dublin, but the level of services is smaller. For many firms the passenger train service is available given their location but because of the schedule of services to and from Dublin only limited use is made of it. Some use is also made of light aircraft flying from the air fields in Galway and Castlebar to the international airports. However, apart from the fact that the expense tends to limit the demand for this, the two air fields have daytime only facilities which in conjunction with the timing of departures and arrivals of international flights in Dublin and Shannon curtails their usefulness.

4.37 Our findings reinforced our earlier conclusion that the fewest problems were faced by firms all or most of whose headquarters function were elsewhere; and whose contacts with those headquarters and with overseas markets were fairly routine.

4.38 The sites we visited in County Mayo tended to be remote and were recognised as such by those concerned. One firm said they had a steady flow of visitors to view the plant usually brought by salesmen. They normally flew to Dublin where they stayed overnight before catching the morning train. This was described as slow and with poor rolling stock. The round-trip generally took two and a half days. While an experience for first time visitors, they were grateful their sales methods did not require frequent visits since what sold their product was quality, and price, not accessibility of the purchaser to the plant. Another foreign-owned firm chartered light planes to carry their executives using the Castlebar air strip. They found this expensive as the air strip was only open during daylight and a pilot had to fly down and stay overnight if an early morning start were needed. Much of the executive travel of the same firm meant going to and from Brussels and Chicago. Its U.S. executives found average speeds on the road to Dublin of 30 to 40 mph very slow; but the firm did not regard this as a serious problem. As a world-wide operator the firm had many operations in remote places.

4.39 Some of the strongest complaints at the difficulty of executive travel came from firms in and around Galway, but varied according to the nature of the firm. One firm felt that the worse problem for them was the difficulty its salesmen had in getting round Dublin and Cork. Another, the only overseas operation of a foreign company, noted that executive travel was not easy, especially as there were no Continental services from Shannon, but the nature of its operation did not require much executive travel either between Galway

and Dublin or between it and Continental Europe; so there was no real problem. A third for whom executive and customer uses were important had solved the problem by chartering light aircraft which used a local airfield. Other firms affected by the difficulty of personal journeys to and from Dublin or Shannon were critical of the inconvenient times of departures and arrivals of many trains and aeroplanes from Dublin to Shannon. One firm mentioned the problems they had in persuading potential customers who visited them that they could actually ensure reliable delivery of goods given the hazards of personal travel. Exceptionally, one company, a foreign-owned subsidiary, believed that it had lost sales because of buyers' transport problems and that other firms had been deterred from investing in Galway for this reason. Another foreign-owned company made an unfavourable comparison with the accessibility of another of its plants elsewhere in Europe. Still another foreign-owned firm, which felt itself less enthusiastic about its location than before it started operations, listed executive travel as one of the reasons but appeared to give more weight to inflation, pay increases and the effect of exchange rate movements. As a small firm it also found that for one of its managers to have to take two days off to go to Dublin on any occasion, was very difficult. The impression we gained once more was that while the difficulties of personal travel were often a considerable nuisance, almost all had used their ingenuity to come to terms with this, even at some expense.

4.40 In conclusion while few of those interviewed could give an exact measure of the costs they were caused by poor communication, it was clear to us that all the firms interviewed did not regard regular flows of freight traffic as presenting them with severe problems; though there were some who were still experiencing problems with small consignments. Operations to cater for small consignments were starting to emerge in some areas; and this probably promises to be a more cost effective solution than road improvement in itself. While most firms reported greater difficulty with personal transport, most firms interviewed regarded the situation as unsatisfactory but only a minority felt that it was an important factor. Of those which did think it was important, the principal factor was the loss in executive time. For example, because of the long time taken to travel to Dublin on business, it would not be considered possible to attend morning and afternoon meetings and make a return trip in one day. The difficulties involved in driving around Dublin itself and finding parking also reduced the effective time of executives and sales people working in the city. Finally, a reference, which may have more general application, was made by one firm to the potential adverse affect on customers arising from the problems encountered by them in travelling from Dublin to the West to inspect the plant prior to deciding on whether to place orders or not. It seemed that the time taken for the trip strained the credibility of the firm's promise to deliver goods on time.

4.41 In general, it might be concluded that the problems involved in executive transport may be more apparent than real in the sense that the predominant pattern of establishment in the West is of production facilities rather than of head offices or of plants with production and marketing responsibilities. The position here is an exact parallel with the situation we will find in telecommunications. The more sophisticated the managerial functions discharged in an establishment, the greater the need for personal and telephonic contact. Since the West of Ireland is fairly remote by any standard, investments have tended to be production-only facilities. A self-selection process is therefore involved which means that firms which need high levels of personal contact simply do not come to the region at all. The apparent problem is that executives of firms in the West spend a lot of time travelling to and from the capital city. The real problem is that some firms may never come to the West and those that come may be limited in their development to production-only functions. It must be an issue how far in present circumstances the West region is the right location for other firms unless there are very strong compensating advantages in other directions. Even so, by use of charter flights and in other ways, most firms seem to have overcome these problems. Undoubtedly, faster roads or more reliable and convenient rail services or air services using light aircraft would be helpful; but which, if any of them, should be given priority, lies outside the scope of this study.

Other interview findings

4.42 Our general conclusion on the relatively small importance of freight costs was confirmed in our discussions with road transport operators themselves, though we encountered a variety of different practices and views. One firm charged a premium of 50% for haulage along particular routes or to particular destinations, and said it found no customer resistance to this cost penalty. Another operated a standard pricing policy across the country as a whole, and maintained that its vehicles could average as much as 45 mph on national roads (which is surprisingly high) compared with the speed limit of 40 mph and that notably included the route from Dublin to Cork. Others generally cited much lower speeds.

4.43 It is important to realise there is no conflict between our findings that the road haulage industry is providing a generally satisfactory service for industry even in remote areas of Ireland; and the arguments in, for example, *The Impact of the Heavy Goods Vehicle in Ireland* that there would be substantial net benefits from road improvement[1] or even from greater de-regulation of the industry[2]. The net effect on industrial costs would of course be affected by how much improvements cost and how they are financed as well as by possible changes in the incidence of taxation between classes of vehicles by weight or by axle-load[3]. It has also been suggested to us that the effect

[1] See T. Jermyn and W. S. Bruen in An Foras Forbartha, 1980.

[2] S. Barrett *op. cit.*

[3] B. Feeney *ibid.*

of harmonising Ireland's transport policies with those of the EEC and the consequential adoption of EEC policy on drivers' hours, and weights will also affect freight costs adversely.

4.44 Our interviews with manufacturing firms in the Dublin area were concentrated on subsidiaries of major foreign corporations. Typically, they use Dublin port and airport for their main import and export requirements and make little use of the inland road network. While they were strong in their criticism of Dublin's roads and traffic management, and of the poor national road network, they all felt that the congestion and other costs were too often exaggerated. One enterprise pointed out that trucks could still average 35 mph in cross-country travel, which was perfectly acceptable in a small country, and several said that poor roads were more a source of personal inconvenience than of extra commercial costs.

4.45 A general point that emerged from our discussions with executives, especially from foreign rather more than domestic companies, was the importance they attach to their own travel convenience and time, particularly to airports. We found complaints along these lines most frequent in the South and West where distances to airports can be very long. The point was made to us several times that Waterford, as one of the country's five county boroughs, is unusually badly placed for personal transport since the roads to Dublin are poor and the rail service is also held to be unsatisfactory in respect of duration, frequency and general quality. Cork and Limerick, on the other hand, were held to be superior in both road and rail services and in addition each has its own airport. While Shannon was used, the timing and frequency of the services was not good. Chartering smaller aircraft to fly to other smaller airfields was done but was expensive. Whether this and other potential traffic will justify the development of an airport or of air services, of course, needs to be considered on its merits in each case.

4.46 A small number of firms mentioned the difficulties they had because there were no or inadequate bus services to bring workers to and from work. The firms had had to make their own arrangements or occasionally had to accept that they could only draw workers from the immediate vicinity.

4.47 We encountered a somewhat specialised consideration in one or two of our interviews with chemical companies. This was that development of certain branches of the chemical industry – notably those concerned with toxic and other dangerous materials – was being hampered because the roads system was not of the capacity and quality to ensure safe transport. The point was also made, apparently a more serious one, that the country also lacks the necessary dumping and effluent disposal facilities to support this industry in accordance with modern safety standards. As the point was outside the scope of our analysis we did not pursue it further. However, it would seem to be *prima facie* evidence of an absolute constraint to certain types of investment.

C CONCLUDING COMMENTS

4.48 There is no doubt that growth of the primary road network in Ireland has fallen seriously behind the growth in traffic. It is equally clear that the road system compares highly unfavourably with that of other European countries, even after taking into account different traffic densities; and that the continuing low level of public expenditure, absolutely and relatively on primary roads means that this gap is probably widening.

4.49 It is less clear, however, what the impact of these deficiencies is on the country's industrial development. This question must be considered in two parts:

(i) the impact on existing industry, and
(ii) the impact on the attraction of new industry from abroad.

4.50 That industry suffers direct extra costs as a result of the poor roads is not at issue. But the lack of even approximate, quantitative evidence that almost all the companies we interviewed could furnish us with, even when pressed to back-up their qualitative assertions, has made us doubtful of just how serious the cost penalties are. This doubt was reinforced by the calculations we could make based on the quantitative information obtained in a few interviews, notably with transport-intensive enterprises; the cost penalties even if seeming large in absolute terms, amounted to only a very small proportion of turnover or even of profit. And those few firms who had calculated their own extra costs appeared to find them acceptable when set against compensating advantages. This would point to the conclusion that the direct extra costs imposed on industry are probably not an important consideration in appraising the inadequacies of the roads system. However, there is no doubt that the accumulation of these costs across all sectors would constitute a significant cost to the economy as a whole; and studies have shown that a good economic return would result from carefully chosen investment in roads. Moreover, the observations of firms about roads relate to 1980 which happens to be a period of relatively slow industrial growth. The situation could change dramatically for the worse over future years of sustained expansion. For while growth of industrial output could rise quite sharply in the short run the period required to purchase land for road schemes, draw up plans, and effect major improvements is long. The economic costs to the existing road system might then be felt to rise quite steeply.

4.51 It is clearly difficult for firms to estimate such costs. Only very rarely do they keep such accounts or undertake a special analysis that would provide definite answers to this question. We believe also that the main savings most firms gain from transport improvements tend to result more from reduction in the variances in journey-time than from shorter journeys themselves. The direct cost savings are unlikely to be a significant proportion of delivered price except in the most transport-intensive industries. While time

savings are a large part of the benefit from road improvement to business and leisure travellers by car, it is rare that journey-time savings affect the delivered prices of goods either. What can increase efficiency is a greater unifying of journey-times which enables lower stocks to be kept at various points in the production and distribution process, and which allows for a reduction in the number of works or depots. As far as we can judge, there would appear to be greater benefit from such savings to be realised in the West region than in the two others, because freight and many passenger journeys to and from Dublin now take two days. The benefits, from being able to make the trip in one day, could be considerable. Experience elsewhere suggests they tend to be realised most by motorways of which, of course, Ireland has none.

4.52 A rather different consideration but important for industrial policy is the extent to which particular industrial development opportunities may be lost because the country's roads cannot cope with their specialised needs. The distribution of certain chemical products was one such instance we identified (though roads were not the only or necessarily the most important constraint), and there could well be others. A larger study than this one would be needed to examine how far what we found applied throughout Ireland, but we believe the general point must be treated seriously, viz. that the roads in some areas are inadequate for some kinds of transport intensive development.

4.53 This leads directly to the second aspect of the impact of the inadequate road system, its effect on the attraction of new industry from abroad. Our discussions with foreign companies already established for some years in Ireland, revealed a few key differences compared with the experience of domestic companies – the extra time and costs of executive travel stand out as perhaps the most significant difference. For very newly established foreign companies – which must serve also as a surrogate for those currently appraising Ireland as a location – the picture that emerged is again broadly the same, but in these cases there is evident a much keener awareness of how slow and uncertain the primary road network is. Even if these deficiencies impinge more on the personal convenience of foreign executive than on the regular operations of their companies, they cannot be discounted for it is the total perception of Ireland as an industrial location that is relevant. It may seem that this is not always rational. Can the occasional major inconvenience of the executive or his frequent irritation be so important for the firm? Can it justify substantial road investment? The value of executive time is often far higher than that time multiplied by his salary. The absence of a particular executive at a particular time through delay may neutralise the value of other executives waiting to work with him, or mean that some other important opportunity is lost. Executives are likely to need to schedule their days intricately as they move from one place to another, and thus will put a high premium on good transport communications but on the other hand, it is

relatively rare that even the high value they set on accessibility will justify a substantial road improvement. They are usually too few to affect the return from such an investment materially. The implication of this, however, is not that they will necessarily put up with bad roads, let alone that on economic grounds roads should be improved for them; but the firms that do put a premium on accessibility will tend to locate where roads (and other forms of transport) are good.

4.54 Since it was outside the scope of the study to interview foreign firms that eventually decided not to settle in Ireland, we do not know how many were put off by the deficiencies they saw in the road system, but in general the impact would be more likely to be more keenly felt for executive travel and personal convenience rather than through the effects of any additional costs of transporting raw materials or products on final delivered prices — though the balance between these factors will vary according to location and type of product.

4.55 Our conclusion may seem paradoxical. There would seem to be very strong reasons for improving the Irish road system which does seem to lag behind that of other broadly comparable nations. But as is normally the case elsewhere in the world, the strongest economic arguments for road improvement are based on the needs of passenger traffic rather than freight, for it is to people as passengers that the time savings brought about by road improvements are most important. The C.I.I. have put it to us that the state of many Irish roads used by freight traffic is such that if maintenance expenditure is not increased, very serious deformations will occur which will be a major obstacle to traffic. We would agree that where this is a prospect, priority must be given to better maintenance. Otherwise the consequences for industry could be very severe. But to accept this, does not imply that raising the standard of the road system beyond that which would be achieved now with proper maintenance, could be justified for its effect on industrial development alone through faster movement of freight. Thus industry will benefit from an improved road system but normally not by so much as to have a marked effect on its profitability.

4.56 The Government's *Road Development Plan for the 1980s* seems to show a good appreciation of the country's road problems and of the need to implement a substantially larger investment programme. We have elsewhere questioned the basis on which its priorities have been established while agreeing with its general proposal that the volume of resources invested in roads should be significantly higher in the 1980s than in the 1970s.

4.57 It was undoubtedly disturbing that in 1980, the first year of its implementation, the central Government's provision for roads investment was drastically reduced (to £36m from an originally intended £57m, in 1978 prices), as part of the general economy measures. The 1981 *Investment Plan*

does provide for an increase to £60 million in the current year. While an improvement, it does in real terms represent a decline from the annual level of expenditure originally planned. There is no doubt in our minds that failure rapidly to get under way a roads programme along the broad lines indicated in the plan will have an adverse effect on the industrial promotion effort by limiting industry's choice of location, and in particular by creating an image of Ireland as an inefficient economy poorly suited to executives' business needs.

CHAPTER 5

TELECOMMUNICATIONS

A INTRODUCTION

5.1 Good telecommunications greatly extend the locations open to a firm. Since it economises on the physical movements executives need make, it compensates to some extent for shortcomings in the road system. On the other hand, poor telecommunications may force firms back on older forms of communications, by road and by letter, which slow down their response time to changes in their final goods and input markets. Firms vary greatly in their ability to substitute telecommunications for other sorts of contact, and also in the frequency of their need to communicate – which alters their vulnerability to breakdown in service.

5.2 Ireland's general need for development of good telecommunications in line with development of the economy is reinforced by its high dependence on exports and on direct foreign investment (relative to GNP). Among OECD countries in the late 1970s Ireland had the second highest dependence on the former and the highest on the latter. Both place a premium on the efficient and rapid handling of information not only within Ireland but also between Ireland and the rest of the world.

5.3 The core of a modern telecommunications system comprises telephone and telex facilities, and consequently it is on these two services that this chapter concentrates. There are, of course, many other services a modern telecommunications system provides, but it is the ordinary telephone and telex which is of the first importance for most businesses.

B DEVELOPMENT OF THE IRISH TELECOMMUNICATIONS SECTOR

5.4 Table 5.1 shows the substantial development of the Irish telephone service in recent years. The size of the system, measured by the number of main exchange lines, has just about trebled in the past decade and a half. The trunk system, measured by the number of trunk lines, has quadrupled.

TABLE 5.1

Development of the Telephone Service

Year[1]	No. of Exchange Lines ('000)	No. of Telephones ('000)	No. of Exchanges	No. of Trunk Circuits
1964	143.8	195.2	1,097	7,806
1965	152.5	206.2	1,108	9,344
1966	161.1	217.1	1,131	10,283
1967	171.3	230.0	1,112	11,383
1968	184.7	245.9	1,098	12,520
1969	207.9	274.1	1,093	13,183
1970	223.2	291.5	1,083	14,404
1971	238.0	312.4	1,075	15,755
1972	251.4	328.5	1,058	17,485
1973	268.1	348.3	1,049	19,076
1974	289.8	372.8	1,039	21,111
1975	329.0	444.0	1,032	25,823
1976	357.3	480.0	1,031	27,850
1977	385.6	519.0	1,026	30,270
1978	411.7	554.0	1,021	30,816
1979	436.0	586.0	1,024	32,250

[1] 1964 to 1973, year ends 31st March in succeeding calendar year, 1974 and subsequent years refer to position at 31st December.

Source: *Irish Statistical Abstract*
Government Stationery Office
Department of Posts & Telegraphs

5.5 Information on changes in traffic volume is harder to come by and to interpret. The system of recording calls has been changed recently and the number of local and trunk calls is no longer recorded. Instead an automatic system records local and dialled trunk calls in terms of metered units without distinguishing which are local and which trunk or how many calls were made. The number of calls obtained through the operator are also recorded but because the conversion of exchanges to automatic working results in the transfer of such calls to the Subscriber Trunk Dialling (STD) system such calls comprise a reducing proportion of total trunk traffic. However, Table 5.2 shows that use of the system is intensifying: call traffic is rising more rapidly than the number of lines. For example, between 1968 and 1978 the number of metered units increased roughly threefold while the number of lines increased two and a quarter times. Data on total and trunk calls for the 1963-75 period suggest that trunk business is rising more rapidly than local traffic; the increase in such calls was roughly fourfold compared with about threefold for local calls.

TABLE 5.2
Telephone Traffic

Year[1]	Number of Calls (millions)			Automatic Calls Metered Units (millions)	Operator assisted Calls (millions)
	Local	Trunk	Total		
1963	164.4	18.2	182.6	na	na
1964	177.8	20.9	198.7	na	na
1965	197.5	22.6	220.1	na	na
1966	212.4	24.6	237.0	na	na
1967	233.6	28.4	262.0	317.0	19.2
1968	260.1	32.9	293.0	367.4	21.6
1969	262.5	37.5	300.0	372.8	23.2
1970	285.0	41.7	326.7	413.5	25.3
1971	320.4	46.9	367.3	481.3	27.7
1972	351.0	54.0	405.0	576.1	30.0
1973	421.2	68.4	489.6	662.6	34.3
1974	346.9	52.8	399.7	726.8	36.6
1975	461.0	70.0	531.0	772.4	36.6
1976	na	na	na	827.1	36.0
1977	na	na	na	973.1	34.6
1978	na	na	na	1,130.0	31.7

na = not available

[1] For 1963 to 1973 the year ends 31st March in succeeding calendar year. The 1974 figures refer to the nine months 1st April to 31st December 1974. Subsequent years refer to the calendar year.

Source: *Irish Statistical Abstract*
Government Stationery Office
Department of Posts & Telegraphs

5.6 One area of particularly rapid progress has been the provision of international calling facilities. The first direct international telephone lines other than to Britain were installed in 1962 between Dublin and the USA. Subsequently Ireland joined Intelsat and bought a share in the British Earth Satellite station at Goonhilly Downs. From 1971 onwards direct lines were established between Ireland and a number of European countries. In the same year, STD from Dublin to London and Belfast was introduced. In 1974 the first automatic international exchange was opened in Dublin enabling operators to call overseas numbers directly. In 1975 International Subscriber Dialling (ISD) was introduced for callers in the Dublin city centre enabling them to call countries in Europe, North and South America, the Middle East and Asia. In 1977 this was extended to all of Dublin and to Shannon. In the

past 18 months ISD has been still further extended to Athlone, Cork, Drogheda, Dundalk, Galway, Limerick, Sligo and Waterford. In sum, nearly half of all exchange lines now offer full ISD facilities. Table 5.3 gives details of the progress of STD and ISD facilities in recent years.

TABLE 5.3

Extension of Automatic Lines, Subscriber Trunk Dialling and International Subscriber Dialling

	End 1975		End 1978		End 1979	
	Lines (000s)	% of total lines	Lines (000s)	% of total lines	Lines (000s)	% of total lines
Exchange lines	329.0	100.0	412.0	100.0	436.0	100.0
Manual lines	44.0	13.4	45.0	10.9	45.0	10.3
Automatic	285.0	86.6	367.0	89.1	391.0	89.7
of which						
No STD[1]	29.4	8.9	37.5	9.1	39.6	9.1
Internal STD only	106.4	32.4	50.5	12.3	–	–
Internal and UK STD[2]	118.6	36.1	125.0	30.3	147.4	33.8
Internal, UK and ISD	30.4	9.2	154.0	37.4	204.0	46.8

[1] The vast majority of these are coin boxes.
[2] STD to the UK covers seven major cities in Britain and Northern Ireland.

Source: Department of Posts and Telegraphs

5.7 The telex service was first introduced in 1955 and is now fully automatic offering an international service to nearly 100 countries. The first fully automated electronic computerised telex exchange in Europe was installed in Dublin in 1974 and a second such exchange will be opened shortly. In rough terms the number of subscribers has grown twenty-two-fold while the number of calls has risen by about 22 times between 1964 and 1980. The international business has shown even more explosive growth. (See Table 5.4 for details.)

TABLE 5.4
Growth of the Telex Service

Year	Total	No. of Telex Calls (000s)			No. of Telex Subscribers
		Internal	UK	Foreign	
1964	286	140	100	46	241
1971	1,695	640	636	419	1,340
1972	1,800	667	674	459	1,672
1973	2,091	725	691	675	2,069
1974	2,488	871	745	872	2,534
1975	2,346	821	701	824	3,051
1976	3,210	1,124	1,143	943	3,467
1977	3,817	1,336	1,369	1,112	3,941
1978	3,701	1,295	1,289	1,117	4,382
1979	5,949	2,082	2,092	1,775	4,832
1980	6,163	2,157	2,032	1,974	5,399

Sources: *Irish Statistical Abstract*
Government Stationery Office
Department of Posts & Telegraphs

TABLE 5.5
Investment in Telecommunications

Year	(£m) Current Prices	(£m) Constant 1975 Prices	% GNP (current prices)
1966 [1]	6.0	14.9	0.58
1967 [1]	6.1	14.6	0.54
1968 [1]	6.4	14.8	0.50
1969 [1]	7.5	16.1	0.51
1970 [1]	9.5	18.7	0.58
1971 [1]	11.1	26.3	0.59
1972 [1]	17.2	28.9	0.76
1973 [1]	24.0	36.0	0.89
1974 [2]	30.7	36.7	1.03
1975	47.2	47.2	1.28
1976	48.0	40.9	1.07
1977	50.5	36.8	0.95
1978	53.5	35.2	0.86
1979	78.3	45.0	1.09
1980	123.4	60.2	1.48
1981 [3]	220.0	92.8	2.27

1. Year ends 31st March in succeeding calendar year.
2. 1st April to 31st December 1974 grossed up to 12 months.
3. *Public Capital Programme, 1981.*

Sources: Central Statistics Office, *National Income Accounts;*
Department of Finance, *Review of 1979 and Outlook for 1980; Public Capital Programme.*

5.8 Table 5.5 shows the investment in telecommunications. It is evident that expenditure rose to high levels in the early 1970s compared with the 1960s, though growth in the later 1970s has been somewhat uneven. There was even a decline in 1976 and 1977 due to stringencies in the public capital programmes. As a percentage of national output, investment in the system has shown considerable volatility, though there has been a rapid increase since 1978.

TABLE 5.6
Telephone Capital Acts 1960-1973

OBJECTIVES	1960-65	1963-68	1968-73	1973-78
New lines (nos)	65,000	80,000	115,000	190,000
Automation of Exchanges (nos)	50	"Hundreds"	300	200
Investment (current prices)	£10.0m	£30.0m	£50.0m	£175.0m
ATTAINMENTS	**1960-63**	**1963-68**	**1968-73**	**1973-77**
New lines (nos)	45,000	76,000	78,000	104,000
Automation of Exchanges (nos)		220	202	63
Investment (current prices)	£ 8.3m	£28.9m	£51.5m	£158.0m

Source: Dail Debates

Planning in Telecommunications

5.9 Planning of telecommunications development takes place within the framework of successive Telephone Capital Acts (TCAs). These are enabling statutes for the Minister for Posts and Telegraphs to expend specified sums of money on telecommunications subject to the annual approval of the Dail. Since the 1960s the object has been to provide sufficient funds to cover development during the ensuing five years. In introducing TCAs, ministers

have adopted the practice of reviewing progress under the preceding TCA and outlining the objectives to be attained in the proposed TCA.

5.10 Table 5.6 provides some indicators from the recent TCAs in terms of the number of lines, automation of exchanges and funds committed to capital development. It can be seen that in rough terms the outturn in successive TCAs has fallen short by about one third.

5.11 The inadequacy of the funds provided in the 1960 and 1973 Acts – which meant that the TCAs had to be introduced before the end of each 5-year period concerned – was attributable, according to the ministerial statements, to a combination of unanticipated inflation, which cut down the real value of the funds provided, and to unanticipated demand, which raised investment needs to unplanned levels. However, the fact that in other TCAs the amounts invested broadly correspond to the amounts provided for the 5-year period, does not mean that these problems did not occur in these periods also. There is evidence that the response to inflation was to curtail the real value of the outlays within the money value of the funds provided. In introducing the 1963 Act, the then Minister reported that congestion experienced since 1960 had dictated the need to raise larger amounts than had been expected. The congestion was in part attributable to capital cutbacks in the late 1950s during a period of budgetary stringency. Introducing the 1973 Act the then Minister made a similar observation, relating to cut-backs in the 1970-71 period; again, the cause was pressure on the budget. The 1973 TCA also fell victim to the same pressures during the recession of 1975-76 and there were reductions in the absolute size of investments in telecommunications in 1976 and 1977 (see Table 5.5 above).

5.12 In the current TCA, it was planned to invest a total of £350m in the period to 1982, to increase the number of lines by 30% and to raise the extent of automation to 96% (see Table 5.7). However, the growth in demand in 1977 and 1978, when the economy was growing very rapidly, combined with industrial relations problems in the Department led to congestion and widespread demand for radical action. In addition to the pressures of supply and demand there was a growing belief that new forms of organisation were required for the development of the service, other than through the existing civil service structures. It was felt that on the brink of a period of exceptional technological development, with the service lagging behind demand in terms of quantity and quality, a more commercially oriented type of structure would be more suitable. In July 1978, the Minister established the Posts and Telegraphs Review Group (PTRG) to report on the form of organisation most suited to the provision of expanded and improved postal and telecommunications systems.

TABLE 5.7

Telephone Development Plans 1977 and 1979

	Actual position end 1979	1977-82 TCA: Target for end 1982	1979-84 ADP[1]: Target for end 1984
Working exchange lines	436,000	575,000	770,000
Telephones	586,000	775,000	1,040,000
Telephone density (telephones / 100 population)	17	23	30
Automation (% of lines)	90%	96%	100%
Connections (exchange lines in final year)	32,000	85,000	140,000
Number of buildings to be converted or built		260+	500
Total cost of programme	£78m (year)	£350m	£650m

[1] ADP = Accelerated Development Programme

Source: Department of Posts and Telegraphs

5.13 In their assessment of the quality of the existing system, and on the establishment of desirable standards of performance the PTRG drew on the data of the Department, a survey by independent market research consultants, and the services of a team from the Bell System. The definition of the "marketing status" or target level of service set down by the Review Group, and the actual level of service reported around the end of 1978, are shown in Table 5.8.

5.14 In their observations on the Review Group's work, the Department stated that if an accelerated programme costing about £600m could be completed by the end of 1983, then the marketing status defined by the Group would be approximately attainable. However, the Department doubted whether such a programme could be implemented in such a short time. The Bell System

team on the other hand believed that the programme could be implemented in this period, but only if significant changes took place in planning, organisation and labour relations. A central recommendation of the Group was that the telecommunications branch of the department should be constituted as a state company, separate in all respects from the postal branch and the Department as such. The PTRG concluded that within five years of the acceptance of its interim recommendations concerning the structure of the new state company, the marketing status could and should be attained.

TABLE 5.8

Actual and Target Levels of Service defined by Post & Telegraph Review Group

		ACTUAL	TARGET
A	TELEPHONES		
	Applications	Average wait is 14 months	98% of applications met in 2 months
	Standards		
	Local Calls	4% fail to connect first time.	Not more than 2% fail to connect first time.
	Trunk Calls	26% fail to connect first time.	Not more than 4% fail to connect first time.
	Operator Calls	Average delay is 20 seconds.	Not less than 90% answered in 10 seconds.
	Faults	1.13 faults per phone per annum.	1 fault per phone per annum.
B	TELEX		
	Applications	Average wait is 16 weeks	100% of applications met in 2 weeks.
	Standards		
	Calls	4.8% fail to connect	Not more than 2% fail to connect.
	Repairs	na	50% to be fixed in 4 hours 100% to be fixed in 24 hours

na = not available

Source: Report of Post and Telegraphs Review Group, 1979.

5.15 The report of the Review Group was published in July 1979 and simultaneously the Government announced its acceptance of its recommendations. The Government also announced the start of an Accelerated Development Programme (ADP), costing £650m (1979 prices) and aiming at the attainment of the marketing status by the end of 1984. The principal elements in this ADP are also shown in Table 5.7 above. In summary, the new programme aims to eliminate manual exchanges, reduce failure rates in dialling, eliminate the waiting list, and expand the annual rate of connections to 140,000 by 1984 (as compared with 32,000 in 1979). The programme will involve the construction or reconstruction of over 500 buildings and the trebling of capacity on trunk circuits. The Government's 1981 *Investment Plan* provides for an expenditure of £220 million (in current prices) in the current year, and this does represent an appreciable increase in real terms.

TABLE 5.9

Telephone Density and GNP per capita, 1977

Country	No. of telephones per 100 persons	GNP per Capita ($ US)
Australia	41.5	7,340
Austria	32.0	6,130
Belgium	31.5	7,590
Canada	63.2	8,460
Denmark	52.9	8,040
Finland	42.8	6,160
France	32.9	7,290
Germany	37.4	8,160
Greece	25.1	2,810
Ireland	16.1	2,880
Italy	28.5	3,440
Japan	44.2	5,670
Netherlands	42.1	7,150
New Zealand	54.5	4,380
Norway	38.6	8,550
Portugal	12.0	1,890
Spain	26.3	3,190
Sweden	71.7	9,250
Switzerland	65.9	9,970
Turkey	3.3	1,110
UK	41.5	4,420
US	74.4	8,520
Yugoslavia	7.1	1,960

Source: Bell Journal; World Bank, *World Development Indicators* 1979.

International Position of Irish Telecommunications

5.16 Measures of the relative development of telecommunications systems are available from a number of sources. While there are the inevitable problems of comparability, the data are of sufficient quality to enable a broad impression to be formed of the relative growth of the Irish telecommunications system. There are no measures available, however, of the quality of the telecommunications systems in terms of the incidence of failure to make connections, audibility, speed of repairs and frequency of faults.

5.17 Table 5.9 shows that Ireland has an extremely low incidence of telephones per 100 population by Western Europe and OECD standards. The available data show that in 1977 its telephone density was only about two thirds that of Greece and Spain, which had roughly the same GNP per capita as Ireland.

TABLE 5.10

Growth of Telecommunications in Industrialised Countries 1968-77

(Annual Average Percentage Growth)

Country	Telephones		Telex	
	Lines	Calls	Lines	Calls
Belgium	5.8	3.4(1)	12.5	12.5
Canada	4.5	5.5	9.0	na
Finland	8.2	na	10.6	13.2
France	11.3	na	16.7	14.6
Germany	10.2	8.0	6.2	4.8
Greece	12.9	10.0	20.0	19.4
Ireland	7.4	9.0(3)	22.0	15.6(4)
Italy	7.8(2)	na	18.9(2)	16.1(2)
Japan	12.6(5)	5.0(6)	19.1(5)	na
Netherlands	8.7	5.8	11.6	na
Norway	4.3	na	8.8	7.9
Portugal	6.5	na	23.5	24.0
Spain	10.4	na	18.9	24.0
Sweden	3.4	na	9.1	na
Switzerland	4.6	na	11.9	9.6
UK	7.5(5)	9.1(5)	12.0(5)	12.9(7)
USA	3.2	5.2	4.3	na

(1) 1968-74; (2) 1968-76; (3) 1971-79; (4) 1968-75; (5) 1969-78; (6) 1969-77; (7) 1967-74.
na = not available

Sources: International Telecommunications Union
Department of Posts and Telegraphs (figures for Ireland)

5.18 Table 5.10 gives measures of the rate of growth in the number of exchange lines and telex subscriber lines, as well as in telephone and telex traffic. In terms of the growth of telephone lines, Ireland (with an annual average growth rate of 7.4%) is in the middle of the "league". It is a notable feature that the slowest growing 'phone systems are, in general, to be found in the most developed countries like the UK, Sweden, Canada and Switzerland. As these are also the countries with the highest densities of telephones, the inference would appear to be that there they are approaching a saturation point.

5.19 The data given in Table 5.10 suggests that the growth of traffic in Ireland is high relative to the growth in traffic in other countries. There also appears to be a notable difference between the rate of growth of traffic in Ireland and the growth in the number of telephones. The conclusion to be drawn from this is that the Irish system has been subject to growing congestion over the period under review — a conclusion that comes as no surprise to everyday users of the system.

5.20 With respect to the telex service, the Irish situation would appear to be better, due no doubt to the early priority given to it by the Department in order to facilitate business needs. The data show that during the period covered, the growth in the Irish telex system surpassed that of the other countries listed, with only one exception. It also seems, though this is vitiated to some extent by the fact that the data cover only part of the period, that the growth of the system exceeded the growth of the traffic. Again, day-to-day experience with the telex service seems to bear out the conclusion to be drawn from these data, that the telex service is relatively free from congestion in Ireland.

5.21 Table 5.11 gives data on international exchange line densities or exchange lines per 100 population. These show that Ireland has and has long had, a much lower level of density than other countries. The fact that the growth in exchange lines in Ireland has been around the average for industrialised countries would point to the conclusion that relatively speaking, the density of Irish phones has made little progress. At the beginning of the period, for example, the Irish density was equal to that in France, well over half that in Germany, and just about half the density in the Netherlands. At the end of the period, the Irish density was down to about two-thirds that of France, well under half that in Germany and about 40% of the level in the Netherlands.

5.22 Another comparative measure of the quality of the Irish telephone system, is the waiting list for service. Table 5.12 shows that Ireland's waiting list is long by European standards with the number of applicants amounting to no less than 18.4% of the total number of subscribers in 1979. Moreover, Ireland's relative position seems to have deteriorated in the period under

review. Whereas in 1968 the Irish waiting list was about the median of the countries in the table, by 1977 it had become the highest.

TABLE 5.11

Exchange Lines per 100 Population

	Belgium	France	Germany	Ireland	Italy	Nether-lands	UK	USA
1969	13.3	7.8	12.3	7.5	11.2	15.4	14.3	33.0
1970	14.0	8.4	14.0	8.0	12.0	16.8	15.5	33.7
1971	14.9	9.0	15.8	8.2	12.9	18.2	16.7	34.2
1972	15.8	9.8	17.2	8.6	14.0	19.5	18.2	34.6
1973	16.9	10.7	18.5	9.1	15.3	20.9	19.7	36.7
1974	18.6	11.8	19.6	9.7	16.3	22.5	21.1	37.0
1975	19.1	13.4	20.8	10.3	17.2	24.3	22.5	37.5
1976	19.8	15.8	23.1	11.0	18.0	26.2	23.5	38.3
1977	20.8	18.8	25.7	11.7	19.0	28.3	25.2	39.4
1978	22.1	22.4	28.2	12.3	20.2	30.6	27.2	40.3
1979	23.5	25.9	30.8	12.8	21.4	32.7	29.5	41.2
1980	na	na	na	14.1	na	na	31.7	na

Source: International Telecommunications Union

TABLE 5.12

Telephone Waiting List (Applicants as % of exchange lines)

Year	Belgium	France	Germany	Ireland	Italy	Nether-lands	UK	US	Japan
1968	0.6	8.7	3.5	2.9	2.3	6.2	1.1	.1	23.7
1969	0.5	8.1	4.4	3.5	2.9	6.0	1.3	.07	22.5
1970	0.5	8.5	6.8	4.9	3.0	6.4	1.3	.06	19.3
1971	0.5	10.0	6.3	7.0	3.7	5.2	2.2	.35	13.7
1972	0.5	13.1	3.6	9.8	3.3	3.8	1.8	.09	10.4
1973	0.9	13.1	2.0	12.0	2.4	3.8	0.9	.08	7.1
1974	1.2	15.3	0.7	13.4	4.4	4.0	0.8	.06	3.4
1975	1.0	11.5	0.4	12.9	2.1	4.3	0.4	.05	1.5
1976	1.0	11.7	0.6	11.2	2.8	4.9	0.3	.04	0.7
1977	0.9	10.5	0.6	11.3	na	5.0	0.7	.04	0.5
1978	na	na	na	15.3	na	na	na	na	na
1979	na	na	na	18.4	na	na	na	na	na

na = not available

Sources: International Telecommunications Union; Department of Posts & Telegraphs

5.23 Finally, the extent of automation provides another indicator of the quality of the telephone service. Again, Ireland has made relatively less progress than other countries including other countries at a comparable or lower level of economic development (Table 5.13). In 1968 82% of Irish phones were connected to automatic exchanges while France, Norway, Portugal and Spain had lower percentages. By 1977, the Irish percentage of automation had risen to 89% which was, however, the lowest of all the countries shown – including those which started off in a worse position than Ireland.

TABLE 5.13

Extent of Automation in Telephone Service

(% of automatic exchange lines)

Country	1968	1977
Belgium	98.5	100.0
Canada	98.2	100.0
Finland	89.1	96.2
France	73.1	99.2
Germany	100.0	100.0
Greece	97.8	99.1
Ireland	81.9	88.9
Italy	100.0	100.0
Japan	90.5	99.7
Netherlands	100.0	100.0
Norway	77.1	89.4
Portugal	81.1	94.8
Spain	79.4	94.9
Sweden	99.5	100.0
Switzerland	100.0	100.0
UK	98.0	100.0
USA	100.0	100.0

Source: International Telecommunications Union

C TELECOMMUNICATIONS AND INDUSTRIAL DEVELOPMENT

5.24 As was the case in the other infrastructure programmes studied, a main aim of the study was to explore the nature, extent and impact of any telecommunications problems actually encountered by industry. To this end we talked to the relevant public bodies in Donegal and the South East and to firms in the three case study regions, as well as to five recently established

foreign firms in the Dublin area, all in high technology sectors and all known to have encountered difficulties in getting the requisite telecommunications facilities. Table 5.14 gives a brief description of the telephone exchange systems available to the firms interviewed.

TABLE 5.14

Telephone Exchange Facilities available to Firms Interviewed

	Manual	STD	ISD	Total
Donegal	13	4	0	17
South East	–	12	4	16
West	7	9	8	24
Dublin	0	0	5	5
	20	25	17	62

5.25 One general point must be borne in mind in interpreting the evidence of our field enquiries. This is that the postal and telephone strikes of recent years, most notably the extended strike of 1979, coloured the views expressed to us, though to a lesser extent in the West since our interviews there were undertaken later. We suspected that some of the complaints voiced reflected the acute difficulties experienced during the strikes rather more than the general deficiencies of the service as a whole. We had to distinguish between the two as best we could and were usually able to do so.

5.26 In assessing the impact of telecommunications systems on the potential development of industry in Ireland and on its ability to attract new firms, the following model of plant development suggested itself on the basis of the interviews conducted. In the initial stages of development a subsidiary will need to make many telephone calls to various people – public authorities, potential clients and suppliers, as well as many more – while it is establishing its operations. Thereafter, its demands are likely to become more routine and better satisfied. The firm will have found ways to establish the telecommunications it needs. By a process we have described as self-selection, most of the factories we visited were initially production units – the marketing and most other headquarters functions being elsewhere. The less rapidly changing the nature of the products they produced, the more easily they could surmount the problems involved in establishing satisfactory communications. Often large international firms established plants of this kind in Ireland; though there were a few that expected the same plant to have complete or partial control over marketing and other headquarters functions in Ireland. Such firms were more likely to be impeded by the shortcomings of the telecommunications system. Some firms either from the start or because of a changing market, found they needed to alter their input mix or their product more frequently than had been expected. They too were

likely to have greater telecommunications problems and though such problems were overcome there were more hazards. Quite often it was the Irish-owned firms which were most likely to be concentrating headquarters functions at or near the plant; and therefore sometimes found the vagaries of the telecommunications system most difficult to cope with.

5.27 In more general terms a new company may be expected in the initial stages to concentrate output on the longer established products of the company with the production of which it is familiar and which are expected to give rise to few technical problems. It might be expected that technical advance, and increasing incomes, will tend to make such products less viable in the Irish environment. In any case with growing experience, the plant can be increasingly orientated to more elaborate products, perhaps requiring shorter production runs and more frequent changes in production lines. The technical input, in terms of production management and work force skills, to this type of production is certain to be much higher than in the first stage of development. A similar process of development will take place on the non-technical side of the business. While the executives of the company will at first have responsibility only for plant management and some purchasing, as time goes on, more functions can be added including distribution, marketing and R & D and perhaps even some role in the management of other subsidiaries in other countries.

5.28 The successful transition of a firm along these lines constitutes a large part of economic development bringing with it a rising proportion of skilled versus unskilled, management versus direct production, white collar versus blue collar workers. It also implies higher per capita earnings. The transition depends on a variety of factors, including factors external to the region and country such as the parent company. But one of the factors under the national control is certain to be the quality of communications in general and telecommunications in particular, since the informational content of these activities is higher, as is the geographical extent.

Donegal

5.29 The majority of firms in Donegal are connected to manually operated telephone exchanges. This was reflected in our interview sample: of the 17 firms interviewed, 13 were connected to manual exchanges and four to automatic exchanges of which only the latter provided STD facilities. No ISD facilities are yet available in the county. International calls therefore have to be routed through the operators. Of the four firms interviewed which had STD service, three had recently acquired it with the recent automation of the Letterkenny exchange. The other firm concerned has had the service for some years, being connected to one of the automatic exchanges in the south of the county.

5.30 Arguably telecommunications are even more important in Donegal than in most other parts of the country given the county's distance and isolation from the main centers of population. Much of industry in the county is dependent on imports for its raw materials and on exports for its sales. The traditional dependence of the area on clothing and textiles was not based on the local availability of raw material; almost all of the inputs were and still are imported from the UK or the continent. The newly established industries in electronics, engineering, plastics and so on are also dependent on imports and exports. Thus in addition to the general need for telecommunications to cope with remoteness, there is the further particular need to be well organised in respect of imports from overseas of raw materials and for disposal on foreign markets of a high proportion of the output of local industry.

5.31 All the firms interviewed complained in one respect or another of their telephone service. The strongest complaints came from firms on manual exchanges. Their complaints were of difficulties getting the operators at the local exchanges, failure of trunk calls in mid-conversation, frequent breakdown in trunk lines leading to the absence of service, and poor quality of the lines when calls are put through. On the other hand the firms connected to the automatic exchanges reported a significant improvement in the quality of the service following automation including the reduction of delays and the ability to dial a number of cities in Northern Ireland and the UK.

5.32 Eight of the firms interviewed stated that they had suffered actual loss as a result of telephone problems. These losses chiefly comprised the loss of sales due to difficulties in contacting customers and *vice versa*. But the evidence for this was not very concrete; and the firms understandably could not cite specific cases or estimate the frequency and scale of such losses. Nevertheless the firm strongly suspected that complaints from some customers about difficulties in making contact probably understated their losses because rather more did not complain but simply gave up trying. In other cases the losses took the form of increased costs arising from the delays in making decisions because of communications problems and from the need to maintain duplicate facilities nearer to markets in order to avoid reliance on imperfect communications with Donegal.

5.33 The problems encountered with telephones were probably most acute for firms carrying out marketing and general management functions rather than for those concentrating on production. The latter firms, mainly foreign owned, had relatively simple communications requirements in that they needed mainly to communicate with their parent companies (admittedly most of them overseas). One such firm, while admitting that the service was deficient claimed to be unaffected because being a production-only plant the need for communication with its parent was very limited in frequency and scope. Again we believe self-selection is at work. Such firms are more likely to locate in Donegal.

5.34 For firms engaged in marketing, and still more for those discharging the full range of management, the problems were of a different character. Such firms were mainly Irish owned. In addition to exercising a broad range of management functions, these firms also differed from the foreign owned enterprises in that they draw some, at least, of their raw material from a number of sources in Ireland, and disposed of their output to a number of outlets both in Ireland and overseas. These firms therefore had higher communications requirements both in volume and diversity. Particularly where undertaking their own marketing, whether overseas or at home, firms stressed the need for high quality communications to keep in touch with customers and to negotiate about deliveries, prices, qualities and after-sales servicing. Even where STD was available, such firms found they had to make heavy use of operator services, either to call non-automatic subscribers locally or to make international calls. It is therefore not surprising that all firms coming into this category believed they had suffered losses in the recent past because of problems in telecommunications.

5.35 In coping with their communications problems, all firms relied heavily on telex services. Indeed, several firms suggested that without this service it would not be possible to continue in business given the problems experienced with telephones. Some delays were reported in making calls and interruptions of service were also experienced. However, in general the telex service was considered good, though for many purposes it was a far from perfect substitute for the telephone. In general telex is most suitable for routine instructions or reports, much less so for negotiations and joint problem-solving.

5.36 Another way around telephone problems, used by firms on the east of the county especially during the strikes, has been to drive over the border and use the excellent facilities in Northern Ireland. For firms with only limited requirements, this solution has proved effective even if inconvenient.

5.37 In the main, the problems experienced by firms in Donegal with the telephones stem from inadequate capacity in the exchanges. They are attributable to the fact that the manual exchanges have been scheduled for replacement for some time and thus the Department has been unwilling to invest in further manual equipment. Because of limited funds and industrial disputes, this automation programme has been delayed with the result that congestion has built up. Further difficulties relate to inadequate capacity on the one trunk cable which connects Letterkenny with Sligo and which therefore carries all trunk calls from north Donegal other than those to Northern Ireland. Finally, a big proportion of trunk calls from Donegal have to be routed to Dublin through the single underground trunk cable now in service, which has proved somewhat unreliable.

5.38 Table 5.15 shows that there has been considerable expansion in the number of subscribers in Donegal in recent years. However, demand has risen more rapidly with the result that there has been a major increase in the number of applicants on the waiting list. The result of this is that in relative terms the waiting list in Donegal has risen from less than half the national average in 1974, to well above it in 1979. The system has shown little improvement up to the end of 1979. The number of automatic exchanges has risen from two to four and the proportion of subscribers on automatic exchanges has risen from 10% to 20%. The automatic exchanges in Donegal up to the end of 1979 are Ballyshannon, Bundoran and Pettigo in the south and connected directly to the Sligo exchange, and Letterkenny. More recently, Bridgend exchange has been automated and additional applicants for service in the Letterkenny area have been connected to the automatic system. It remains true nonetheless that the system in Donegal is underdeveloped by Irish standards.

5.39 However, Table 5.15 also shows that a large number of exchanges and a high proportion of the non-automatic subscribers are scheduled for automation in the near future. Forty-seven manual exchanges, comprising over 90% of the remaining subscribers on manual service, are due to be automated. It is also expected that by early 1981, a new radio trunk link with 900 lines will be established between Letterkenny and Sligo. This will supplement the underground cable which has at present 300 lines. It is then planned to raise the capacity of the cable to 900. Thus, the trunk capacity in the county will be greatly increased in the near future. An 1800 channel radio link between Sligo and Dublin will also be brought into service early in 1981.

TABLE 5.15

Telephone Development in Donegal

A. System supply and demand

	Number of Exchanges	Working Lines (WL)	Waiting Applicants (WA)	WA as % of WL	National Position WL	WA	WA as % of WL
AT 31.12.1974	68 Manual 2 Auto	5,568 621	361 18	6.1	306,000	42,000	13.7
Totals	70	6,189	379				
AT 31.12.1979	66 Manual 4 Auto	7,158 1,928	1,299 558	20.44	436,000	80,000	18.35
Totals	70	9,086	1,857				

B. Conversion to automatic exchanges, March 1980

	Number of Exchanges	Number of subscribers lines	% of total working lines
Already Automatic	4*	1,928	21.2
Contracted for conversion	47	6,309	69.5
Not yet contracted	19	849	9.3
Totals	70	9,086	100.0

*Not including Bridgend – 122 subscribers lines converted 28.3.1980.

Source: Department of Posts and Telegraphs

South East

5.40 The position of telecommunications in the South East is much different from that in Donegal. As Table 5.14 shows, all of the 16 firms interviewed in this area have automatic service and several of them (those in the Waterford area) have recently acquired full ISD facilities. In these circumstances the force and content of the complaints about the service were much less than in Donegal. Of the 16 firms interviewed, six had no complaint to make about the service at all. This is not to say that these firms regarded the service as ideal, but simply that even in their own reckoning the problem was more of a nuisance than a serious cost.

5.41 Of the 10 firms which did complain, only three suggested that they had suffered loss from the system's deficiencies. One of these firms was selling part of its output on the Irish market and believed that it was losing to competitors in the Dublin area who have fewer communications problems with their customers. Another case was of a firm, also organising its own marketing, which felt that the problems which customers had in reaching its office suggested that some sales were being lost in a highly competitive market. The third case was of a foreign owned firm manufacturing in Ireland for export. The local management of the firm had been seeking to take over from the head office the organisation of the distribution of these international sales. However, their proposal was turned down, ostensibly on the grounds that the communications in Ireland were too poor for a "communications-intensive" function of this kind.

5.42 The complaints made about the system were the usual ones of delays in getting calls, interruptions in service due to failure of the trunk cables, and poor quality on the lines as a result of congestion or other factors. These problems were not confined to one area but were found fairly generally throughout the region. The problems related to the STD system for making

ment of the business. This view would certainly seem to be justified in the case of plants working on shifts, or subsidiaries of U.S. parents where the time difference tends to lead to phone conversations after hours.

5.49 The effect of these problems can be divided into two categories. On the one hand there are extra financial outgoings and on the other, losses from lost sales, delayed start-up or, possibly, imperilled development. The extra costs take the form of heavier investment in telecommunications than would be necessary with a better system. It is perhaps noteworthy that all plants, including those employing less than 20 people, had telex machines, although the volume of traffic on the machines was sometimes rather small. A number of firms had also invested fairly heavily in direct lines to automatic exchanges in order to circumvent what was seen to be the deficiencies in the local manually operated system. A few of the smaller enterprises also stated that they had acquired a relatively large number of lines in order to ensure an adequate service, particularly against the possibility of a breakdown in one of the lines. Thus, in some of the larger plants the ratio of employees to lines was about 50 to 1. But in the smaller establishments, the ratio was more like 20 to 1, while in the very small plants, the ratio was below 10 to 1. In some of the very small plants, the ratio reflected capacity installed in anticipation of expansion. However, the delays widely experienced in getting lines would suggest that the firms acquired the extra lines at the outset, and in advance of needs, because of fears about getting adequate facilities as and when expansion proceeded.

5.50 The other manifestation of extra cost, and arguably the most important one, is the loss of staff time in making calls. Naturally, this is difficult to estimate. However, a few respondents were able to give at least some indication of the costs. For example, one firm stated that though it has only six executives, the switchboard operator was fully engaged in making calls. (This firm found that although it was on STD, it frequently had to make use of the exchange operator to make connections.) Another (small) firm estimated that of three executives a total of 30 hours time a week was absorbed in delays in making phone calls. A third firm estimated that a proportion of the cost of overtime working was due to staff staying on after hours in order to avail themselves of the less congested lines.

5.51 The threat which poor communications could pose to sales and development of firms is potentially the largest problem. However, very few firms believe that significant volumes of sales have been lost because of poor phones. A number of the smaller enterprises, and those with their own sales activity based in the West believed that some losses might have occurred, but that in general these losses were small.

5.52 More serious consequences of the phone system appear to have been experienced during the start-up phase of a number of the more recently

established firms. These encountered a good deal of difficulty in getting adequate facilities and reported that in the initial stages the phones were a major constraint. The problem is, of course, that facilities are likely to be at least satisfactory and at the same time in most demand during the construction and commissioning of a plant. The latter factor is due to the need to contact a large number of suppliers seeking quotations, negotiating with them, recruiting staff, supervising building work and so on.

5.53 There remains, finally, the impact of telecommunications systems on the potential development of industry in the West and on its ability to attract new firms to the region. In general, the structure of industry in the region would appear to have relatively simple communications requirements. But for those firms which did have head office or marketing responsibilities it is not surprising that the disabilities of the system were most keenly felt. Moreover, some of the remaining companies envisaged a gradual development of their activities, somewhat along the lines suggested, and indicated that improved communications would be a condition for this development. A number of firms which were subsidiaries of U.S. firms indicated that the country was perceived as bad from the communications viewpoint and that this perception was bound to have some sort of adverse effect on the attractiveness of the country as an investment location. It would be reasonable to infer that parent companies would be likely to think twice about encouraging the more elaborate types of activity in their subsidiaries if there were problems in contacting these firms, or if the firms themselves were likely to run into problems communicating with other parts of the company throughout the world.

5.54 As has been noted in the other regions, there were a number of respondents in the West who were quick to point out that the problems caused by the phones are far from insurmountable. A number indeed classed the problems as nuisances and sources of irritation rather than a cause of financial loss. Others pointed out that the existence of the telex and better scheduling of international calls could reduce delays quite effectively. These executives often expressed their belief that the system seemed a good deal worse than it actually was and that foreign managers, especially those from the U.S., who were used to a high quality of communications, reacted unduly when confronted by delays and break-downs in communications. The reality was, so it was argued, that a business could be conducted with a standard of communication a good deal below that prevailing in the U.S.

5.55 However, these points can be interpreted as evidence for suggesting that the criticisms of the existing system have been exaggerated or for confirming the point about the deterrent effect of bad communications on incoming investment. For, if the system seems bad, and even if the standards expected by U.S. investors are unwarrantedly high, then inward investment may be deterred. Moreover, while the system may indeed be adequate at the moment

for the type of industry which now exists in the region, there still remains the probability that it will not be adequate for the future development of more sophisticated types of enterprise in the region. How far it is sensible to provide the necessary infrastructure for all such developments in the West region or indeed throughout the more sparsely populated regions is, of course, another issue.

Dublin

5.56 By design, the firms selected for interview in the Dublin area were in high technology industries, with a high requirement for good telecommunications and known to have, or to have had, difficulties in obtaining it. Nevertheless, the results of the interviews were not as unfavourable as had been expected. All said that the telephone service had been or was still unsatisfactory; that there had been delays or difficulties in obtaining service and that the resulting service was sometimes of poor quality. The difficulties in obtaining service in the start-up period of their plants had in some cases occasioned a degree of inconvenience and frustration. Still, with the assistance of the IDA the firms concerned had been able to make arrangements which enabled them to carry on until the Department could provide a better service.

5.57 However, most of the firms were considering, in various degrees of certainty, the possibility of undertaking further investment in Ireland which would involve diversification as well as expansion of their functions. Such investment, should it go ahead, would require further telephone lines and data transmission lines. Notwithstanding the difficulties experienced in obtaining their initial facilities, the firms seemed confident that they would obtain their extra requirements in reasonable time. In general, firms regarded the problems with telephones as one of a number of obstacles which were more or less inevitable in the establishment of a new manufacturing facility. They were aware of the problems likely to be met in this regard when they came to Ireland in the first place, and they accepted that it was part of their responsibility as managers to solve this, as well as any other problems associated with start-up.

D CONCLUDING COMMENTS

5.58 The following principal conclusions emerge from the above discussion of telecommunications and industrial development in Ireland:

(a) the Irish telephone system has expanded slowly by comparison with other countries and there has long been undercapacity relative to demand. The telex system is, however, more advanced, both in availability and quality of service;

(b) there are widespread complaints about the quality of the Irish telephone service from industrialists, though it is often hard to establish

whether the cause is the difficulties caused by the strikes of recent years or more general system deficiencies; in any event, the two factors are closely interrelated since the undercapitalised system has made it more difficult to operate and also more vulnerable to industrial disputes. In extreme cases, it is possible there may have been direct losses to business either in the form of lost sales or increased costs; and we found a few who could point conclusively to the occurrence and extent of such penalties. But generally we believe it would be very unwise to assume they are negligible;

(c) we came across no firms where the shortcomings of the telephone system had made it regret its decision to locate in Ireland, but, particularly in the wake of the strikes of recent years, it is likely that some firms will have decided to go elsewhere because a reliable telecommunications system was important to them, and indeed we have some evidence of this. The nature of the Irish telephone system will have affected the kind of firm (or part-firm) that will have chosen to locate in Ireland. It will have favoured firms that are less susceptible to quick changes in market environment or which do not have to make rapid changes in products or inputs. This is most true of remoter areas like Donegal and the West, though there were cases in the West where firms had questioned the wisdom of further expansion;

(d) an accelerated development programme has been announced by the Government covering both increased capacity and improved quality in the service. If attained, this programme would involve a major acceleration in the development of the system by comparison with the trend of recent years. In terms of the number of telephones installed, the programme seems likely still to leave Ireland badly off by comparison with other countries. The programme should ensure significant improvements in the quality of the service in terms of reduced congestion on trunk lines, automation, and wider access to International Subscriber Dialling;

(e) in the Post and Telegraph Review Group's report a number of preconditions were laid down for the successful completion of an accelerated development programme. As of yet, it is too early to say whether these will be met. However, the prompt establishment of An Bord Telecom, the appointment of a chief executive, the passage of the Telephone Capital Act of 1979 and the increased provision made in the *Investment Plan* of January 1981 are hopeful indicators that the programme will be implemented on target.

5.59 It is tempting to conclude that first-class telecommunications throughout Ireland is unequivocably desirable. While it is probably true that raising standards will pay commercially, the economic case for such improvement

will depend on many consumers and not only the industry which is the subject of this study. Our inquiries in the Western region particularly made us realise the importance of encouraging new activities to go where the international system was relatively uncongested and where the local exchange was either STD or shortly to become so. In this respect it would be sensible to consider future telecommunications investment priorities very carefully, bearing in mind the needs of industry. Clearly, there must be priorities and it is not obvious that there is a commercial case for a first-class service in all areas of the country, including the remotest ones. It is true that there may well be a social case for the telecommunications investment – and this is explicitly recognised by the May 1980 Green Paper on reorganisation of the postal and telecommunications services – but even then there must still be priorities.

CHAPTER 6

WATER

A INTRODUCTION

6.1 Our analysis of water supply as a constraint on industrial development is essentially along the same lines as that of roads and communications in the two preceding chapters. The work comprised a review of the national capital programme and consultations with industrialists and public agencies in the Donegal and South East regions and with Government Departments and the IDA centrally.

6.2 There are, however, two main differences in the treatment of the water supply sector. First, the sector is fragmented and heterogeneous, with significant variations in circumstances from one locality to another; it would be misleading to talk of a national system in the same way as one can in the other two sectors. For these reasons, it has proved less easy to make generalisations based on our limited field enquiries.

6.3 Second, we have been unable to assemble sufficient data on a consistent basis to make valid comparisons between Ireland and other countries with respect to public expenditure, supply capacity and consumption in the sector.

6.4 Despite these limitations we feel confident that the conclusions that emerge would stand up to more extensive and detailed analysis than has been possible here, and hence that they may be regarded as indicative of the national situation.

B THE WATER SUPPLY SECTOR

6.5 Ireland has a large supply of freshwater reserves, both surface and underground. Annual rainfall averages around 1,000 mm and is well distributed over the country, with somewhat heavier rainfall in western areas. The five largest rivers (Shannon, Barrow, Suir, Blackwater and Boyne) have a total length over 600 miles from source to head of estuary and the six largest lakes have an area of nearly 400 square miles.

6.6 The co-ordination, approval and financing of the water supply and sewerage facilities programme is the responsibility at central Government level, of the Department of the Environment. The actual works (water and sewerage pipe-

lines, pumping stations, effluent and water treatment plants etc.) are planned and carried out by local authorities and financed by State loans from the Local Loans Funds. Since 1977, over 200 major public water and sewerage schemes estimated to cost over £150 million have been approved.

6.7 In addition to these major schemes, there is also a small schemes programme. It is also financed from the Local Loans Fund but, being for minor works (projects costing less than £30,000), is subject to less stringent review procedures. Approximately £5m was allocated to small schemes throughout the country in 1978 and 1979.

6.8 The scale and nature of water supply facilities vary considerably from area to area. Another important influence on the current position was the campaign to provide regional water schemes throughout the country, which was introduced by the Government in 1959 and continued into the mid-1960s. The objective was to bring piped potable water to as many members of the community as possible by constructing head works, trunk mains and local piping for entire areas. These schemes were implemented by county councils in co-operation with other local authorities whose areas were affected. The degree of implementation varied considerably from area to area depending on the county council's commitment to the programme. In the south east, by way of illustration, Tipperary South Riding carried out a substantial programme while Waterford County Council and Tipperary North Riding did not attempt to introduce any regional schemes at all but adopted a more localised approach.

6.9 Policy since the 1960s has been for local authorities to provide head works and trunk mains only and to encourage local private groups to finance their own local piping with the aid of State grants generally covering two-thirds of the cost involved. Group schemes, on completion, may be taken over by the local authorities. All non-capital expenditure incurred by local authorities is funded by local rates and other local income.

6.10 No data are available on the total water supply capacity in Ireland, although we understand that the Central Statistical Office is currently preparing a time series. We have thus been unable to measure how capacity has changed over time and to see how this might be related to any indices of economic development.

6.11 It has been possible, however, to compile information on public capital expenditure on water supply and sewerage. It has unfortunately not been possible to separate out the water supply component alone from the combined figures. (The Department of the Environment estimates that water supply accounts for about 60% of total capital expenditure on water supply and sewerage.) The data are given in Table 6.1.

TABLE 6.1

Public Capital Expenditure on Major Water and Sewerage Schemes 1971/72 – 1980

Year	TOTAL (£m 1975 prices)	% GNP
1970/71 [1]	15.1	0.40
1972/73 [1]	17.7	0.44
1973/74 [1]	22.3	0.52
1974 [2]	19.9	0.54
1975 [3]	19.7	0.51
1976 [3]	22.2	0.58
1977 [3]	19.7	0.51
1978 [3]	22.1	0.53
1979 [3]	23.2	0.56
1980 [3]	24.3	0.62
1981 [3]	29.0	0.75

1. Years ending 31 March
2. 9 months only, ending 31st December
3. Calendar years.

Sources: Department of the Environment
National Income and Expenditure
Public Capital Programme, 1981.

6.12 The data show a somewhat erratic pattern of expenditure since 1973/74 within the range £14–24m (1975 prices). The ratio of expenditure to GNP has generally been in the band 0.50–0.54%, with a jump to 0.58% in 1976 (when large increases occurred on schemes in the Dublin area and in the South West, more than offsetting declines elsewhere), and again in the period since 1978.

6.13 By and large it can be said that water supply expenditure has kept up reasonably well with overall economic growth. Unfortunately, as already noted, it has not been possible to judge the adequacy of Ireland's expenditure by reference to expenditures in other countries. It is, however, possible to comment on this adequacy by drawing on the findings of other field enquiries in the South East and Donegal and our wider consultations. This is the subject of the next section.

C WATER SUPPLY AND INDUSTRIAL DEVELOPMENT

Donegal

6.14 In Donegal there are, apart from the Erne which cuts across the narrow base

of the county at Ballyshannon, no major rivers comparable with those in the South East. There are numerous smaller river systems and lakes distributed throughout the county so that surface water is fairly widely available. However, much of it contains a high level of bog water imparting considerable acidity and a brownish tinge which is difficult to treat. Underground sources are relatively scarce. Donegal's hilly terrain and highly dispersed population in small communities throughout the county (the lowest level of urbanisation in the country), create difficulties of water supply and tend to result in high unit costs of provision.

6.15 In the first half of the 1970s Donegal had a fairly substantial water supply programme; it accounted for nearly 6% of total national water and sewerage schemes, which may be compared with its population share of around 3.5%. Since then, however, its share has fallen drastically to an average of only 2.5%. It is difficult to be certain of the reasons underlying this particular expenditure pattern. Certainly the recent decline in investment cannot be the result of any judgment of the region's having sufficient capacity. We encountered numerous local communities dependent on their own water schemes, several towns (especially those with a high influx of summer tourists) experiencing shortages, and several instances of water shortages being a problem for industry.

6.16 Among the industrialists we talked to, we found that water problems could be classified into three main categories:

(a) absence of a public water supply;

(b) connected to a water supply but experiencing recurrent shortages or inadequate pressure; and

(c) poor quality of water.

6.17 We found that these problems affected different firms in varying ways. For instance, we came across a foreign firm recently established in a rural area, which was pumping its own supply directly from a small river for its processing operations. This arrangement does, however, appear to have been anticipated by the company at the time of making its investment decision and, despite its somewhat *ad hoc* nature, the scheme does work satisfactorily. There is the disadvantage, however, that since the water is not pure enough to drink, an employee has to go half a mile to a neighbouring cottage to obtain drinking water several times daily.

6.18 This would not seem to be an isolated instance and we encountered several similar situations, albeit among essentially single factory developments in rural areas.

6.19 Nevertheless, we believe it would be quite wrong to exaggerate the significance and the costs of such cases. While the companies concerned (or more likely the local plant manager) were understandably irritated and occasionally inconvenienced by the special and sometimes unusual measures they had to resort to, we found no instance where such difficulties had not been anticipated and where the companies could demonstrate that there had been anything more than minor interruptions in supply and consequent losses of output and revenue. As was the case in our investigation of the other sectors, we found that when pressed companies were not able to support their complaints with hard facts and figures of the costs imposed on them of inadequate public water supplies, though this should not have been particularly difficult in this case.

6.20 It would also be unrealistic to argue that public authorities should automatically have responsibility for providing water to small or medium-scale industrial projects which, provided they are not water-intensive, can generally cope adequately with their own supplies. Such projects are often well suited to the policy of "bringing jobs to the people" in the small communities of Donegal, and it would place a very substantial strain on public financial and administrative resources to have a developed water supply capacity ready in advance in all possible locations.

6.21 We encountered a potentially more serious problem in Donegal, faced by large industrial units that are heavy water users. The growth of population in the province in the past decade, together with the introduction of new even if smaller industrial projects, has placed an increasing strain on water supply capacity. Were it not for the severe recession in the textiles industry – which accounts for some 30% of the county's manufacturing employment and which is concentrated in large units in the main towns – there is little doubt that the public water supply position would be serious. Buncrana and Letterkenny are two towns that are particularly seriously affected in this respect. As it is, some shortages and pressure falls do occur, and it is only because of their present market circumstances that textiles plants regard water supply as no more than a minor problem. But certainly there is no capacity at present for the county to accommodate any new projects with substantial water requirements.

6.22 The responsible authorities in Donegal are keenly aware of the water supply problems. They appreciate too that special measures must be resorted to, including the *ad hoc* arrangements referred to earlier and even the importation of water from Northern Ireland, in order to meet local industrial demands.

6.23 One or two companies in Donegal mentioned in critical terms the quality of their water. But on examination the problem turned out to be one of unusual appearance rather than something detrimental to health or to an industrial

process; for instance, one foreign company told us that visiting executives from the parent firm were disturbed by the brown colour of their bath water. But there are circumstances where quality can be a real problem and we cite a case which we encountered in the South East below.

South East

6.24 In general terms the South East is well supplied by natural water resources, having large underground and surface supplies. Several of Ireland's major rivers and their tributary systems flow through the region (e.g. the Suir). Underground rivers and catchment areas are also to be found, such as that at Dungannon which has an estimated potential capacity of up to six million gallons a day.

6.25 The topography and the settlement pattern contrast markedly with those of Donegal and have facilitated the provision of communal water supplies. Apart from County Waterford all the counties in the region (Carlow, Kilkenny, Tipperary South Riding, Wexford) participated in the regional schemes of the early 1960s, and Tipperary South Riding has been notably successful in this regard with only a small proportion of consumers (less than 10%) not yet connected to public mains supplies.

6.26 The South East had a fairly substantial investment programme in public water supply in the 1970s. In the early part of the decade it accounted for some 14.5% of national expenditure on major schemes, declining to around 8% in the middle of the period, and rising to 13% at the end; these figures may be compared with a population share of 10.9%. Following upon the regional schemes implemented in the 1960s, the local authorities believe this has left the region in a generally satisfactory supply position, and existing investment plans would appear to ensure the capacity to cater for longer-term growth in water demand. Only in Waterford does there appear to be a less satisfactory position, resulting primarily from the county not having participated in the regional schemes of 15–20 years ago; but even here, major phased schemes have been approved by the Government and the situation promises to be much improved within a few years.

6.27 These views were confirmed in our discussions with industrialists. Water problems featured only minimally among the difficulties experienced by industry. One of the more serious complaints was made by a firm in the drinks industry which had had to instal special plant to remove colour from the mains supply that would otherwise have adversely affected the appearance of their products. But they had known of this discoloration problem in advance and it had evidently not been sufficient to influence their decision to locate there.

6.28 We talked to several very heavy water-using companies and – while it was not uncommon for them to provide their own pumping facilities, or contribute to the capital costs incurred by the local authority, or provide supplementary sources in addition to the public supply – all were well satisfied with their arrangements.

The West

6.29 Almost none of the firms interviewed reported any water problems. Few were heavy water-users; and they reported their supplies adequate. One was a moderately heavy user but had a satisfactory supply from its own well. Another used water for cooling. Occasionally their supplies were cut off and they were irritated that there was a lack of awareness that this could impose a considerable financial loss. However, the problem had been resolved and the supply was satisfactory.

6.30 A number of firms complained about the quality of the water supply either in terms of its purity or the pressure. But while some of these firms had invested in water tanks, and one was considering sinking its own well, in no case was any significant difficulty ascribed to water. One large and fairly water intensive firm did admit that in the early stages of its development, when it sharply increased its water intake, there were problems with the adequacy of the public supply. However, the necessary investment was readily forthcoming and although the installation of the new supply took a good deal of executive time in persuading the appropriate people of the necessity of the scheme, no major adverse consequences resulted. Another firm had to join with the local authority to install its own supply and to discharge effluent into the sea. Yet another is a major water user but benefits from abundant water. A fourth is about to expand and adopt a new process which will require much more water. They foresee no difficulty with quantity but will install their own plant to soften the water.

Dublin

6.31 It is evident from the foregoing that the South East and Donegal provide rather different perspectives on the national water supply position. The case of Dublin appears different yet again. We did not investigate this directly but were advised in discussions with several central agencies, chiefly the IDA, that particularly severe problems exist in Dublin at present; although large-scale investment is under way, industrial expansion has had to be curtailed because of inadequate water and effluent facilities.[1]

6.32 We are not aware of any projects as yet being lost to Ireland because of these deficiencies in Dublin but there is a clear danger that this could happen because – by virtue of its being the country's primary city and also having a large and diverse labour supply and other advantages of scale – Dublin is uniquely placed to accommodate certain types of projects that could not easily or willingly be located elsewhere in the country.

[1]The position in Dublin will be markedly improved on the completion of the Liffey Aqueduct Duplication Scheme, scheduled for 1981, and the Greater Dublin Drainage Scheme scheduled for completion in 1984.

C CONCLUDING COMMENTS

6.33 The water supply position throughout the country appears to be subject to appreciable local variations. Water supply problems clearly do arise, but by and large it seems that it has always been feasible to override them and thus avoid lost industrial production. Admittedly the solutions have sometimes involved rather makeshift arrangements, and they certainly have usually required capital contributions from the companies themselves; but there is not necessarily anything wrong in this and indeed it is probably more practical and more economic for this to happen than for grand water supply schemes to be undertaken ahead of demand throughout the country, which would then lie under-utilised for varying periods. It is apparently only in Dublin that the supply deficiencies, especially on the north of the city, are such that they have not been amenable to the case-by-case solutions adopted elsewhere.

6.34 Looking at the country as a whole, we would judge that water supply has not been a constraint on new industrial development. While there are areas where problems exist, there are many more areas where they are not. New projects are seldom likely to have to locate in an area that happens to be deficient in water supply – Dublin being a potentially important exception to this until the current water schemes are commissioned. Consequently, water supply problems have if anything done no more than influence the geographic distribution of new industry. But they would have been only one of many such influences, and seldom likely to have been the most important.

6.35 On the other hand we have heard of at least a few cases where major water-using plants have been located where water is scarce, thereby creating the need for special investment. Also where, looked at objectively, water did not seem to be scarce, the firm was such a heavy water-user that its consumption was significant in the pre-empting of further heavy water-using firms in the area. Our findings in Donegal and the West suggest that insufficient thought has sometimes been given to trends in the overall demand for water when quite major location decisions have been taken, though in Donegal the short term situation has been 'relieved' by the recession in textiles. It would seem advisable to estimate the water supply of areas considered for inward development more systematically against the projected water demand of existing users before substantial new water-users are allowed to enter them. Of course it is difficult to anticipate possible changes in product or technology which may affect a firm's demand for water. However, for those industries in which such changes in water demand are more likely, there may well be something to be said for influencing them towards sites where water is abundant. We understand that the location of a few water-intensive users posed very considerable problems. It would seem to us that there must be a very strong case indeed for preparing a special water development plan related to the needs of very heavy water-users so that they may be influenced to locate where ample water can be made available for them subject to two conditions. The

first is that the provision of such water to a new user should not jeopardise supplies to other consumers in the neighbourhood and the second is that additional water should not have to be supplied at a disproportionate cost which in effect pre-empts investment to increase water supplies elsewhere. No doubt regional priorities should influence such a development plan for heavy water users, but it should be possible to find suitable sites for such users in many parts of the country.

6.36 This raises more general questions of how priorities are decided in water supply investment, and between water supply and other infrastructural investment. These issues are discussed in the next chapter.

CHAPTER 7

CONCLUSIONS

A INTRODUCTION

7.1 A study of this nature inevitably has various limitations, both conceptual and practical. They have been discussed in earlier chapters and do not need repeating in this chapter – but they should be borne in mind as necessarily qualifying the views expressed here.

7.2 Despite such qualifications a number of conclusions and policy issues have clearly emerged from the study. These are presented below under the following main heads:

- existing deficiencies in the programmes reviewed;
- costs of these deficiencies to the industrial development effort;
- causes of the deficiencies;
- policy issues.

7.3 In this chapter for the sake of shorthand we use the term infrastructure to embrace only the three programmes (roads, telecommunications and water) covered in the study. The term clearly has a much wider meaning, but it would be cumbersome to have to spell out repeatedly that the conclusions, even if perhaps having a wider currency, are derived exclusively from review of these three programmes.

B EXISTING DEFICIENCIES IN INFRASTRUCTURE

7.4 There is no doubt that there are deficiencies in the infrastructure programmes we reviewed. The gravity varies from programme to programme – our judgment is that telecommunications is the most serious, roads next, and water supply the least serious. It also varies from area to area, or sometimes from one industrial project to another, within each programme.

7.5 Evidence of these deficiencies falls into four main categories, not all of which apply with equal force to each programme. First, there are international comparisons of physical provision and of capital expenditure, allowing for Ireland's relatively low GNP/head. These comparisons point clearly to relative under-provision in Ireland, though they cannot prove an economic case for better provision.

7.6 Second, there is the assessment of growth in supply in relation to growth in demand and actual utilisation – the former has generally fallen well behind the latter in the past decade.

7.7 Third, there are complaints by industrialists of higher costs and lost output and sales being forced on them by the low quality or sheer lack of infrastructure. There is no doubt that industry does suffer from such disadvantages. But in general our interview programme indicated that they and their costs were much less significant than has been widely supposed, given the frequency and vehemence of complaints.

7.8 Our findings point to the great bulk of infrastructure problems being more in the nature of a nuisance – requiring greater management attention than management would itself wish and sometimes also requiring makeshift solutions – rather than a constraint which deters location or, once a plant is established, materially affects either the volume or profitability of production. The only firms we came across which seemed to be questioning the wisdom of their decision to locate where they had were two small recent arrivals; but it is at least not improbable that while some of the teething problems they had had with infrastructure had been formidable, their difficulties were at least as much those of trying to set up a new operation in a worsening recession, at a time when Ireland had become a less favourable location comparatively from some points of view. In fact we did not come across a single case where a constraint of this severity has arisen, or even where an industrialist could point decisively and quantitatively to his suffering significantly higher costs or lost revenues. There is evidence, however, that among companies carrying out marketing functions the poor quality of the telephone service may have been a cause of lost contracts. The scale and nature of such losses can only be a matter of speculation; but at no time did we learn of losses derived from such a cause being a possible source of a firm's going out of business.

7.9 For these reasons, we believe that the penalties that are commonly held to be imposed on industry as a direct consequence of infrastructure problems should not be overstated though this is in no sense to deny their existence.

7.10 Fourth, there is the question of internationally mobile industrial projects – which includes expansion and diversification of foreign companies already established in the country – being lost to Ireland because of infrastructure problems. This is in our judgment a far more important consideration than that of lower profits discussed in the two preceding paragraphs – but unfortunately it is also one where our evidence is least conclusive.

7.11 On the one hand, the multinationals we talked to generally expressed their satisfaction at operating in Ireland. They tended to view infrastructure problems philosophically, recognising that problems of this kind are bound

to arise in a country with a strong rural tradition but which is industrialising fast, and recognising too that it is part of the Irish scene that senior management should have to devote considerable effort to dealing with such issues. Even where we encountered complaints, they were almost invariably tempered by explicit statements to the effect that the company would not be inhibited from investing further in Ireland or from recommending to other foreign companies that they do so.

7.12 On the other hand the size of our interview sample was not large and we were unable to talk to companies that had expressly rejected Ireland as an industrial location whether for infrastructural reasons or otherwise. But we did learn of two projects dependent on first-rate telecommunications facilities that have been lost to the country: one of them as a direct result of the 1979 strike and the other apparently because of the parent company's doubts about Ireland's ability to meet the requirements for such a project. IDA officials too stressed to us their concern that infrastructure inadequacies were coming to loom large in the issues raised by the high technology and complete business projects which they are currently aiming for in the overseas marketing effort. Finally, as elaborated in the next section, we would ourselves attach great emphasis to Ireland developing a high quality in its physical infrastructure if it is to sustain its industrialisation momentum in the longer term.

C ECONOMIC COSTS OF INFRASTRUCTURE DEFICIENCIES TO THE INDUSTRIAL DEVELOPMENT EFFORT

7.13 As implied above we doubt that the costs to industry, direct or indirect, of an inadequate physical infrastructure have as yet become significant. The question arises: what would be the costs to industrial development in the future if the inadequacies were not overcome?

7.14 Following the distinction employed throughout the report, this question can be considered with respect first to the costs imposed on already established industry and second to the new opportunities that are lost to the economy.

7.15 It follows from our earlier arguments that we would not expect the first category of costs to be of any major consequence, not unless there were a drastic reduction in infrastructure quality that cannot now be foreseen. Certainly it would be unlikely that projects fail and that firms would actually go out of business solely for infrastructure reasons.

7.16 It is essentially the second category of costs — new opportunities lost to the country — that must be of greater concern. There are several interrelated reasons for this:

(a) foreign companies have long been the basic source of diversification and growth of Irish industry. To continue to attract new companies and to encourage those already established to undertake new projects may require Ireland to make good the present infrastructure deficiencies, and progressively to move towards standards that are internationally competitive;

(b) the push by the IDA to promote increasingly sophisticated projects means that demands on infrastructure are likely to become increasingly exacting. This is partly because of the nature of the projects themselves — an excellent example would be the high information content of projects carrying out a full range of operations (especially functions like R&D, planning and marketing), and hence the need for advanced telecommunications facilities. It is also partly because such projects employ personnel who can generally be expected to have high requirements of their overall environment, of which such items as telephones and roads make up an important part;

(c) it is common practice for foreign companies searching out a new location to seek the comments on local conditions of foreign enterprises, even if competitors already established in the areas under appraisal. While it can be expected that several complex factors will determine what comments are actually made, there can be little doubt that severe infrastructural (or other) deficiencies will be mentioned;

(d) the market for internationally mobile projects is becoming more and more competitive. While our experience leads us to think the IDA to be probably the most effective promotional body operating in Europe — a view that has also been expressed to us in a different context by several multinational companies in the USA — we also are aware of the growing attractiveness of other locations in Europe for international investment. Spain in particular is an advantageous location, and is likely to become even more so when it joins the EEC.

7.17 We should stress that these concerns that we are expressing for Ireland's continuing to maintain its attractiveness to internationally mobile projects are an anxiety for the future and not the immediate present. The IDA's outstanding success in securing new projects even in the difficult market conditions of the past 1–2 years are clear testimony to that. But the few "lost" projects recently that have come to our attention, and the longer-term trends detectable in foreign investment in Europe, suggest that this success could be jeopardised unless the necessary infrastructural investment is made.

D CAUSES OF INFRASTRUCTURE DEFICIENCIES

7.18 A large number of general reasons can be adduced for the inadequacies in the country's industrial infrastructure discussed here. The following eight factors, some of them interrelated, appear to us to be the most important.

7.19 First, Ireland is by no means a wealthy country. It has also attempted in the past 20 years or so to push very fast towards industrialisation and overall modernisation. Consequently there cannot but have been, and still be, a tremendous pressure on the country's resources for investment of all kinds and not just physical infrastructure in support of industry. It would be an exceptional experience among industrialising economies, and probably one that is attainable only in theory, if Ireland's industrialisation were to proceed without supply bottlenecks of varying kinds developing.

7.20 Second, even if an overall shortage of public financial resources were inevitable, there are nevertheless grounds to question the balance of expenditure directly and indirectly on industrial development. The data given in Table 3.1, repeated in summary form in Table 7.1, identify the substantial and growing emphasis placed on direct investment in industry relative to that in the three infrastructure programmes reviewed here. The increasing expenditure on industry is a result of the Government's concern to stimulate employment growth. But investment in infrastructure is a critical complement to investment directly in industry, and the diverging trends between the two capital programmes undoubtedly suggest an imbalance that could come to jeopardise attainment of the job creation goal itself. In its *Investment Plan for 1981,* published in January 1981, the Government published proposals for increased public investment which intend to shift the balance between industrial and infrastructural investment.

TABLE 7.1

Public Capital Expenditure on Industry and Roads, Telecommunications and Water Supply

(% total public capital expenditure, current prices)

	1971/ 72	1973/ 74	1975	1977	1978	1979	1980	1981*
Industry	20.9	15.1	16.3	17.3	18.5	24.2	24.3	20.7
Roads, telecommunications, water supply	13.6	16.2	16.9	14.6	13.7	14.8	16.5	20.3

*Budget estimate

Source: Table 3.1

7.21 Third, the very success of the IDA in particular in promoting new industry has increased the pressure on infrastructure. The pace of structural change in Irish industry has been very great – it has been estimated that during the 1970s some 50% of the manufacturing jobs in existence at any one time had been in existence only five years previously – and the consequential changes in industrial infrastructure and servicing requirements have also been great.

7.22 Fourth, the success of the IDA too in overcoming infrastructural and other bottlenecks threatening to hold back implementation of new industrial projects has deflected attention from the need to establish at both central and local levels methods of resource allocation and planning better tuned to the country's fast changing needs. The IDA has been able successfully to put pressure on other public agencies to undertake special investments to overcome such bottlenecks and its after-sales service has kept it in close touch with the progress of projects to help deal with new problems as they have arisen. There is a certain logic in relying on such "fire-brigade" activity rather than an overformalised planning system, but it must be a moot point as to how long it can last. Such fire-brigade activity is only really possible when one agency is in the position to override normal priorities and this is only likely to be tolerable where the existing public authorities do not have well-worked out programmes according to their own priorities. We suggest that a tendency to avoid any precise planning of infrastructure requirements in terms of either economic priorities or even in terms of the quantified indices of consumer need has possibly made it easier for the *ad hoc* approach to continue. But even then its continuing success must rest upon relatively infrequent IDA intervention to secure infrastructural changes for particular developments; and on local authorities refraining from any more precise evaluation of other demands for their services.

7.23 Fifth, the policy of achieving as dispersed a spatial distribution of employment as possible has undoubtedly contributed to stretching the country's public resources, financial and administrative to the maximum. The long and continuing debate over the appropriate balance between concentration and dispersion is not one that we have studied in detail. But we suspect that in the event resources have been spread too thinly, so that the country has been able neither to solve the problems of urban congestion – witness the traffic and water supply problems in Dublin – nor to develop the smaller towns and rural areas that can readily absorb new industry – witness the telephone and water problems in Donegal. The question may not be so much one of how many different areas should be developed throughout the country, but of the concentration of development within those areas, given the scarcity of public funds.

7.24 Sixth, at times of public financial retrenchment it has been easier to cut capital programmes such as roads and telecommunications than the politi-

cally favoured industrial investment programme or current expenditures on, for example, health and social services. For instance, the slow progress made in development of the telephone system is in part attributable to the spending cutbacks that took place relative to earlier plans in the mid-1950s and early and mid-1970s. There has also been a tendency on the part of the authorities to cut back on land acquisition expenditure, even if it were critical for road improvement purposes, for the sake of maintaining expenditure programmes having a more direct employment benefit. While most developed countries are cutting public capital expenditure programmes, this is usually from a higher base and after a longer period during which there has been a high level of spending; it is therefore usually less damaging.

7.25 Seventh, difficulties have been experienced in implementing and then operating infrastructural projects. Problems have arisen in land acquisition, for instance, that have badly delayed implementation of some projects. Industrial disputes have been a more serious problem, and there is no doubt that the strikes in telecommunications in recent years not only exacerbated the system's difficulties but also were a prime source of the vociferous complaints made about the industry.

7.26 Several complaints have been made about delays and confusion in ports and airports arising from inefficiencies in the operations of the facilities or in the handling of customs documentation. The importance of dealing with these delays can perhaps be best appreciated by considering the cost of some alternative means of speeding freight to and from the country. For example, to reduce travel time by easing road congestion would cost many millions of pounds in land acquisition and construction. The cost and complexity of this approach is surely greater than the effort required to reduce standing time of freight and vehicles at ports by smoothing paper work and terminal operations. In this respect, it is worth noting that one study reported that up to 60% of the time of RO/RO vehicles was spent waiting at customs offices and ports.[1]

7.27 Finally, the relative neglect of infrastructure stems in part from the earlier belief that Ireland had a surplus of infrastructure. This view was most commonly heard in the 1960s when the population was still falling or at best stagnant. It was argued that, for instance, roads that had been planned for a larger population would easily be sufficient for a smaller population well into the future. The substantial population increase that actually took place in the 1970s has of course rendered the earlier arguments invalid; and along with this population growth has been a need for more employment, to which successive Governments have been committed as a major policy goal and for which industry, rather than infrastructure, was seen as a solution. Nevertheless, even if capital was less scarce than it is, there would still not be a case for an indiscriminate increase in public capital expenditure.

[1] Bradley, F. 'Analysis of Factors Affecting Costs in Roll On/Roll Off Transport'. *Irish Journal of Agricultural Economics and Rural Sociology,* Vol. 5, 1974/75.

E POLICY ISSUES

7.28 Four interconnected policy issues affecting the scale and geographical distributions of infrastructure programmes for industrial development stand out from the foregoing discussion.

7.29 First, there is a simple dilemma. The more universal the provision of the requisite infrastructure, the wider the choice which industry can be given; moreover, the political difficulty of favouring some areas at the expense of others can be avoided. On the other hand given the backlogs and the shortage of resources, it is simply not realistic to assume that high standards will be realised in all areas. The likely outcome as at present will be some compromise between lower standards and uneven coverage. Further, assuming the funds were available, such investment would make inadequate returns in many areas in the face of probable demand. There is, therefore, a strong case for concentrating the provision of infrastructure for those with intensive requirements — for roads, telecommunications and water — in limited areas, many of them probably urban. To be fair between counties the investment would need to be dispersed throughout them but on resource grounds there is undoubtedly a strong case for concentrations at points within each county where the marginal development costs are least. This does not mean that other areas will be deprived of inward investment. Experience shows that most enterprises have modest or at least conventional infrastructure requirements which can be accommodated without undue difficulty in most locations.

7.30 Both the country as a whole and particular parts of it have attracted the kinds of development for which they are respectively suited. One must presume that other developments have naturally tended to go elsewhere. As the competition for inward investment grows, there will be pressure to provide the infrastructure which will attract such firms. If pursued exclusively, this could be an extremely costly policy. Concentration would reduce its cost, but the main question that needs to be evaluated is how far it is in Ireland's economic interest — or that of any particular part of Ireland — to invest in additional infrastructure with a view of capturing more inward investment precisely because of it. No easy generalisation is possible. The issue would need to be studied in detail and would require considerable coordination between the relevant public authorities; but in principle it should be susceptible to proper analysis.

7.31 Second, we have found that the responsible bodies in both the public and private sectors have tended not to compile systematic, tested evidence of infrastructural deficiencies and their impact on industry. Consequently the bodies have not been as well equipped as might have been expected to comment authoritatively on how, and to what extent, individual infrastructure programmes should be strengthened, as well as what the balance

should be among the different programmes. There clearly is room for a more systematic and rigorous approach in these respects.

7.32 Third, following from the last point, there is a clear need for a detailed quantitative analysis of the scale and mix of infrastructure investment necessary to sustain the future industrial development programme. There is a major issue as to what the allocation of public expenditure should be between infrastructure and other sectors, which we believe should be urgently addressed if the industrial plans – and hence job creation targets – are to be realised.

7.33 Fourth, and in a sense drawing together these various points, we have detected a tendency to improvisation and to *ad hoc* decisions in the provision of infrastructure. There are infrastructure plans but especially at the local level they tend to be collections of worthwhile proposals rather than systematic attempts to anticipate needs and opportunities and to plan ahead in a more systematic manner. As the economy grows more sophisticated and more subject to international competitive pressures, actual priorities need to be determined on grounds of more than short-term political expediency alone. No planning system can or should ever be insulated from such pressures, and each country must strike its own balance between short- and longer-term interests, between industry and other sectors, and between different groups and regions.

7.34 It would therefore seem as if there is a serious problem in determining investment priorities. The style of decision-making of the past and of the present would appear better suited to times when the supply of investible resources is more ample in relation to demand. But there can be no doubt that public expenditure and in particular public capital expenditure is likely either to be curtailed, taking one year with another, over the medium term, or is likely to be expensive to finance in as much as it will involve dependence on foreign borrowing. Moreover, demand for improved public services is likely to increase, though to some extent this may be misleading in so far as expansion is provided at less than marginal cost. Thus decisions on how to allocate scarce public investment funds between competing uses are likely to be among the most difficult for the Government to take. The present mixture of national and local political decisions may appear easiest to sustain since they imply no break with past practice but their adequacy will come under greater strain as the scarcity of public funds becomes greater.

7.35 Ultimately all decisions on the allocation of public funds must be political; and there is indeed no other way to decide what weight should be given to the various factors that influence decisions between programmes and regions. Nevertheless, greater rationality in the analysis of the different programmes can make political decision-making better informed and more likely to achieve its goals. To take the three programmes to which most attention has been given in this report:

(a) the principles upon which investment appraisal of road schemes should be undertaken, are now well established; and so indeed is their practical application. Cost-benefit analysis can and should be applied to investment and major maintenance decisions to provide a basis for determining priorities. It would then be possible to give industry its due weight in deciding those priorities. In particular, it should be fruitful to explore how far concentration of transport intensive industries in particular areas would raise the returns on road investment through making it possible to realise economies of scale in road improvement. The trade-off between efficient road development and regional priorities should be investigated; and given the very severe transport problems in the Dublin area – not only requiring road improvements – the balance of investment between there and the rest of the country must be a major issue. The principles and method by which to decide investment priorities between alternative modes are not as well established as for each mode on its own and they need to be determined so that they may reflect Government policies. Nevertheless, they are capable of indicating where the greatest returns from investment most probably lie;

(b) the appraisal of telecommunications investment on the face of it is easier since telephones are charged for. It might therefore seem as if investment appraisal could be on an ordinary commercial basis. What prevents this is the inelasticity of demand commonly found for telecommunications which means that within a wide range it is often possible to achieve a pre-determined financial return on the capital expenditure at hand. On the other hand, systems effects as so often in networks make the calculation of a return to marginal changes in the system very difficult. While in principle these problems can be overcome, they have proved much more difficult to apply in practice, chiefly because this has rarely been attempted. It requires analysis to establish what are the marginal costs of various variations in the telephone system and cost-benefit analysis to determine the real return on such variations;

(c) the appraisal of water supply investment requires cost-benefit analysis in the absence of effective metering which can be used to allow prices to reflect marginal costs. Even then some benefits of better water supply will remain unpriced. There will also be considerable problems in many cases in determining the marginal costs of variations in the water supply system. Even so, it should be possible at the least to establish some notion of differences in marginal net benefit between various projects. The techniques are well established and tried.

There are, of course, other programmes which require other appraisal methods; but it is obscure and it is argued as if there can be no improvement without all programmes being properly appraised in a fully consistent

manner. No country has attained such an objective, but many are better able to reflect Government policies in capital expenditure programmes than would appear to be the case in Ireland now.

F SUMMARY OF CONCLUSIONS

7.36 In summary our findings are that:

(i) undoubtedly from the standpoint of industry in the regions we examined, there are deficiencies in the programmes we reviewed; and that their relative effect was most serious for the shortcomings in telecommunications, followed by roads and water supply in that order;

(ii) there was great variation in the adequacy of infrastructure in each programme from place to place and in any place as it affected different firms;

(iii) one stage at which some firms, usually foreign-owned, felt these shortcomings most acutely was in the early stages of setting up in their new location;

(iv) more generally, the shortcomings were most strongly felt by firms which for one reason or another were trying to control substantial and varied marketing activities from a remote location, or had particularly heavy flows of executives or of telecommunication between it and an overseas headquarters;

(v) in spite of these shortcomings most of our interviews suggested that their impact in the great majority of cases is a nuisance rather than having a serious effect on the profitability of the concern. Often they were anticipated and the difficulties they caused had been weighed against other advantages, in making the location decision. Most firms had found ways of alleviating their effects satisfactorily;

(vi) by the nature of our inquiries we had only indirect evidence that the quality of Irish infrastructure as perceived by possible overseas investors, had deterred them from locating here. The cases we heard of were very few; so we have no basis on which to determine how far any firms have been deterred by infrastructure or how far there was a process of self-selection through which firms whose activities were particularly sensitive to the quality of the infrastructure, avoid the remoter parts of Ireland;

(vii) yet the IDA is increasingly trying to attract firms which are more sophisticated technologically and which are more likely to engage in

marketing and other headquarters activities here, which require high standards of communications. They are more likely to be put off, particularly by the shortcomings of the infrastructure in the more remote regions;

(viii) another argument for improving infrastructure to help attract inward investment is that there is greater competition between nations for such investment, so that it would be one means, but not the only means, of retaining or enhancing Ireland's comparative advantages;

(ix) the main reasons for the shortcomings we found in infrastructure were:

(a) Ireland's low per capita income and relatively recent acceleration in economic growth;

(b) the fact that growth in employment and in private sector activity has not generally been matched by comparable or well matched increases in the relevant public sector capital expenditure;

(c) very many developed nations enjoyed a period of relatively high public spending on roads and other public infrastructure in the late 1950s and the 1960s. Generally this passed Ireland by; so that recent efforts to improve such infrastructures are starting from a lower base;

(d) the very success of IDA and the other development agencies in remote areas where the infrastructure had been particularly poor;

(e) the comparatively informal methods generally used to allocate resources between infrastructure projects;

(f) the influence of policies to achieve a very great spatial dispersion of new employment-generating activities have also contributed to deficiencies in infrastructure;

(g) the greater priority that has sometimes been given to retaining social rather than economic capital programmes when there has been retrenchment;

(h) problems of implementation and operation which have caused delays; and,

(i) the long-held expectation that Ireland was a country of falling or stagnant population which has in many respects a surplus of infrastructure.

7.37 To summarise the main policy issues, they would seem to be:

(i) how far it is acceptable to concentrate the provision of infrastructure in a limited number of areas. As we have found many firms are operating satisfactorily in a great variety of remote areas, but there would be major economies and less frustration for the firms that have greater need for better infrastructure if such a policy of concentration were pursued. If desirable on general policy grounds, such locations could be provided in all regions; this does not imply that such activities should be concentrated in the greater Dublin area, or even in a very few areas. It would be possible to practice a policy of dispersed concentration in each region, or even in each county, if priority could be given to certain locations in providing the infrastructure required. A few locations might be picked out for firms with special needs, for example in water supply and effluent disposal. The number and geographical distribution of such locations is a matter for regional policy and lies outside the scope of this study. We would recommend, however, that there should be some tendency to encourage more concentration of industrial development generally, and especially for firms with special infrastructure needs;

(ii) what effort should be put into compiling a more systematic and comprehensive record of infrastructure deficiencies and their impact on industry; in particular to complement what we have done by similar studies in other regions, and for infrastructure programmes other than those we considered, e.g. electricity supply, effluent disposal, railway and local air services as well as training programmes and other issues concerned with labour supply. This could be supplemented by interviewing a sample of foreign firms that ultimately decided not to locate here and establish the influence of infrastructure on that decision. We believe that the results of the study have been sufficiently interesting and various, that similar inquiries should be made in other regions and in respect of some kinds of infrastructure, to get a more accurate picture of industrial needs. It might also inquire into the infrastructure available for countries that are in active competition with Ireland for inward investment;

(iii) what resources should be put into achieving a better understanding of the scale of investment in infrastructure required to sustain the industrial development programme nationally and in different regions. We would recommend that inventories are drawn up of the infrastructure programmes that would be needed to meet various standards of provision throughout the remoter regions. This should pay special attention to differences in the cost of achieving these standards in different locations not only for each programme, but in relation to the total infrastructure required. As important is the examination of trends in

the real cost of providing these programmes and some assessment of comparative costs elsewhere in order to establish how far provision in Ireland is cost-effective;

(iv) to what extent it would now be sensible to replace *ad hoc* decisions on what infrastructure should be provided by more systematic appraisal which would not only attempt to quantify the costs, revenues and other benefits as far as possible; but take into account more systematically the weights to be given to the various client groups affected. We believe that the needs and costs of providing infrastructure have reached such a point that urgent attention should be given on how to establish priorities and improve methods of provision so as to make the best use of scarce resources; and that this should take into account both possibilities of cost reduction and the need to consider overall cost effectiveness of different programmes for each locality. Piecemeal provision is not only likely to be wasteful but can result in plans being excellent in relation to some programmes and deficient in relation to others. Even in terms of better public sector management there would seem to be a strong case for more of this kind;

(v) how far it would be sensible to reconsider the financing and pricing of infrastructure provision. We remarked earlier that there is a tendency for some would-be beneficiaries to ask for better provision than they might be prepared to pay for if they had to meet the full (long run marginal) cost. A more effective system would be one in which charges for infrastructure were better related to the actual cost of provision, so that there might be a better expectation that industry might get reasonably quickly the quantity of services whose costs it was prepared to meet. The charges levied – especially connection charges where appropriate – might vary with differences in the cost of provision. This is not to deny the political and economic wisdom of subventions to infrastructure in particular areas on regional policy or on other grounds, but it should help to ensure that within such regions, resources are saved by meeting the needs of industrial development where it is most cost-effective to do so. At present, the sources of local finance, the workings of the grant system and the financial position of the other public authorities concerned mean that the financial incentives to provide infrastructure are often seriously defective or even perverse. It may be impossible to improve the situation radically without investigating and overhauling those incentives, to both consumers and producers of public demand.

7.38 We make no pretence at insight into all these and other aspects of the Irish political economy – but can only suggest that if the country wishes to sustain the momentum of its drive to industrialisation, these issues need to be addressed.

APPENDIX A

LIST OF ORGANISATIONS CONSULTED

The following is a list of the organisations we consulted during the course of the study. The list excludes for reasons of confidentiality the private firms we talked to. Relevant information on these companies is given in Appendix B.

GOVERNMENT DEPARTMENTS

Departments	Division
Finance	Public expenditure and planning
Environment	Sanitary Services Roads
Transport	Marine
Posts & Telegraphs	Telecommunications
Taoiseach	Central Statistics Office

STATE-SPONSORED BODIES

Industrial Development Authority	Planning and Development Regions and Project Services Industries Divisions 3 + 1 Donegal Region South East Region Building Operations
An Foras Forbartha	Planning Roads Water Resources
Coras Trachtála	Planning Transport Services
Údarás na Gaeltachta	
Shannon Free Airport Development Company	

LOCAL AUTHORITIES

Donegal County Council
Carlow County Council
Kilkenny County Council
Waterford County Borough
Waterford County Council

CONFEDERATION OF IRISH INDUSTRY

REGIONAL DEVELOPMENT ORGANISATIONS

Donegal
South East

HARBOUR AUTHORITIES

Dublin Port and Docks Board
Cork Harbour Commissioners
Limerick Harbour Commissioners
Waterford Harbour Commissioners

APPENDIX B

Characteristics of Firms Interviewed

The tables in this appendix present in statistical form the relevant characteristics of the manufacturing firms we consulted. Those recently established firms, still in the start-up phase are categorised according to the characteristics planned in the first stage of their projects.

TABLE B.1
Ownership of Firms

	Donegal	South East	Dublin	West	Total
Irish-owned	8	8	0	10	26
Foreign-owned	9	8	5	14	36

TABLE B.2
Start-up Date of Foreign-Owned Firms

	Donegal	South East	Dublin	West	Total
1978 to date	3	1	5	5	14
1975 - 78	1	2		1	4
1970 - 75	2	2		7	11
Pre 1970	3	3		1	7

TABLE B.3
Sectoral Composition of Firms

	Donegal	South East	Dublin	West	Total
Food, Drink & Tobacco	3	7	0	3	13
Clothing, Textiles, Footwear	8	3	0	4	15
Wood, Furniture	0	0	0	0	0
Paper, Printing	0	0	0	0	0
Chemicals	0	2	0	3	5
Clay Products, Glass, etc.	1	1	0	1	3
Metals & Engineering	0	2	0	8	10
Electronics	3	1	4	2	10
Other Manufacturing	2	0	1	3	6

TABLE B.4
Size Distribution of Firms*

Number of Employees	Donegal	South East	Dublin	West	Total
0 - 100	6	1		13	20
100 - 200	8	1		5	14
200 - 300	0	1	3	1	5
300 - 400	2	5		2	9
400 - 500	1	3	1	1	6
500 +	0	5	1	2	8
	17	16	5	24	62

*Small firms were under-represented in Donegal and the South East. Care was taken to correct this in the West.

TABLE B.5
Functions carried out in Firms

	Production		Production and Marketing		Head Office	
	Irish	Foreign	Irish	Foreign	Irish	Foreign
Donegal	1	8	0	1	7	0
South East	2	6	0	1	6	1
Dublin	0	5	0	0	0	0
West	0	13	1	1	7	0
	5	32	1	3	20	1

NATIONAL ECONOMIC AND SOCIAL COUNCIL PUBLICATIONS

NOTE: The date on the front cover of the report refers to the date the report was submitted to the Government. The dates listed here are the dates of publication.

	Title	*Date*	
1.	Report on the Economy in 1973 and the Prospects for 1974	April	1974
2.	Comments on Capital Taxation Proposals	July	1974
3.	The Economy in 1974 and Outlook for 1975	Nov.	1974
4.	Regional Policy in Ireland: A Review	Jan.	1975
5.	Population and Employment Projections: 1971-86	Feb.	1975
6.	Comments on the OECD Report on Manpower Policy in Ireland	July	1975
7.	Jobs and Living Standards: Projections and Implications	June	1975
8.	An Approach to Social Policy	June	1975
9.	Report on Inflation	June	1975
10.	Causes and Effects of Inflation in Ireland	Oct.	1975
11.	Income Distribution: A Preliminary Report	Sept.	1975
12.	Educational Expenditure in Ireland	Jan.	1976
13.	Economy in 1975 and Prospects for 1976	Oct.	1975
14.	Population Projections 1971-86: The Implications for Social Planning—Dwelling Needs	Feb.	1976
15.	The Taxation of Farming Profits	Feb.	1976
16.	Some Aspects of Finance for Owner-Occupied Housing	June	1976
17.	Statistics for Social Policy	Sept.	1976
18.	Population Projections 1971-86: The Implications for Education	July	1976
19.	Rural Areas: Social Planning Problems	July	1976
20.	The Future of Public Expenditures in Ireland	July	1976
21.	Report on Public Expenditure	July	1976
22.	Institutional Arrangements for Regional Economic Development	July	1976
23.	Report on Housing Subsidies	Feb.	1977
24.	A Comparative Study of Output, Value-Added and Growth in Irish and Dutch Agriculture	Dec.	1976
25.	Towards a Social Report	Mar.	1977
26.	Prelude to Planning	Oct.	1976
27.	New Farm Operators, 1971 to 1975	April	1977
28.	Service-type Employment and Regional Development	July	1977
29.	Some Major Issues in Health Policy	July	1977
30.	Personal Incomes by County in 1973	July	1977
31.	The Potential for Growth in Irish Tax Revenues	Sept.	1977
32.	The Work of the NESC: 1974-1976	Sept.	1977
33.	Comments on Economic and Social Development, 1976-1980	July	1977
34.	Alternative Growth Rates in Irish Agriculture	Oct.	1977
35.	Population and Employment Projections 1986: A Reassessment	Oct.	1977
36.	Universality and Selectivity: Strategies in Social Policy	Jan.	1978
37.	Integrated Approaches to Personal Income Taxes and Transfers	Mar.	1978
38.	Universality and Selectivity: Social Services in Ireland	June	1978
39.	The Work of the NESC: 1977	June	1978
40.	Policies to Accelerate Agricultural Development	Sept.	1978
41.	Rural Areas: Change and Development	Sept.	1978
42.	Report on Policies for Agricultural and Rural Development	Sept.	1978
43.	Productivity and Management	Feb.	1979
44.	Comments on Development for Full Employment	Dec.	1978
45.	Urbanisation and Regional Development in Ireland	June	1979
46.	Irish Forestry Policy	Sept.	1979
47.	Alternative Strategies for Family Income Support	April	1980
48.	Transport Policy	Mar.	1980
49.	Enterprise in the Public Sector	May	1980
50.	Major Issues in Planning Services for Mentally and Physically Handicapped Persons	Oct.	1980
51.	Personal Incomes by Region in 1977	July	1980
52.	Tourism Policy	Dec.	1980
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