Preface

Introduction

This report is intended to provide basic reference material for the National Competitiveness Council and for policy makers. It presents a comprehensive and structured evaluation of Ireland's international competitiveness and updates, on the basis of the most recent data from authoritative international sources, a large number of competitiveness indicators, which were included in the first Annual Competitiveness Report published last year. It is intended to provide a status report on the competitiveness of the Irish economy, in terms of the fundamental determinants of long-run economic success identified as the main themes in the Council's work programme for this year. The strong quantitative dimension to the report is intended to underline its role as a reference document. The statistical analysis contained in the report also underpins, along with other work previously carried out by the Council, the Council's analysis of, and recommendations on, competitiveness issues for the Irish economy.

Annual Competitiveness Report complements international reports

The Annual Competitiveness Report is entirely based on objective and factual, internationally comparable data drawn from authoritative international sources such as the OECD and Eurostat. The Annual Competitiveness Report complements the findings of its international counterparts such as the World Economic Forum's Global Competitiveness Report and the Institute of Management Development's World Competitiveness Yearbook. According to these studies Ireland moved up between 11 and 15 places in the international league table of national competitiveness between 1996 and 1998 to rank 11th overall.

Ireland's recent economic performance has been remarkable

The recent performance of the Irish economy has been remarkable. Over the past three years export growth has been almost double growth in Ireland's export markets. This large gain in export market share has helped Ireland to the top of the OECD growth league for the past four years[1]. Over the same period employment growth has run at over seven times the EU average and the unemployment rate has been halved, falling to 7 per cent. Notwithstanding Ireland's remarkable growth performance, however, the level of income (GNP) per person in the Irish economy remains almost 10 per cent below the EU average and is about 20 per cent lower than the average for the four small high income EU economies[2]. In order to close this gap, further progress must be made in areas critical to the medium-term competitiveness of the economy, where Ireland when benchmarked to international best practice is lagging behind.

EMU

The competitive environment is transformed by EMU

This Report is framed against the backdrop of the fundamental transformation of Ireland's competitive environment initiated by the launch of Economic and Monetary Union (EMU). The adoption of the euro by Ireland is a defining step in Ireland's economic development. The competitive forces unleashed in the European economy by the establishment of the euro, in particular the final completion of the Single European Market (SEM), will have profound implications for the competitiveness of the Irish economy and for Irish enterprise. Greater price transparency, lower transaction costs and the relentless search for cost economies will lead inexorably to a marked intensification of competition. This will be compounded, as we move into

the next century, by the accelerated pace of structural change in the world economy, driven by the information revolution, rapid technological change, the continued expansion of international trade, capital mobility and the ever-closer integration of world capital and financial markets.

Strength of the indigenous sector is critical to competitiveness success

A vibrant, dynamic and flexible indigenous business sector is crucial to Ireland's competitive success in EMU. In order to reap in full the benefits presented by EMU, enterprise must continue to recast key elements of business strategy in distribution, logistics, marketing, finance, quality, and innovation. Emerging opportunities for both sourcing imported inputs and selling to core euro markets must be exploited. The pursuit of investment opportunities in the euro area will assist firms in achieving internationally competitive scale. These developments will help engender a much more diversified economy, more closely integrated into the euro core.

EU enlargement and budget reform now centre stage

With EMU now launched, the EU has moved on to a new phase in its development with Agenda 2000 moving centre stage. The Agenda 2000 package encompasses EU enlargement and concomitant budget and institutional reform. The final outcome of this process will have a major influence on the competitive environment for the Irish economy. Ireland should recognise the desirability of EU expansion and of CAP reform that takes cognisance of the development needs of the Irish economy and the unique adjustment problems faced by Irish agriculture. It is essential that Ireland positions itself to take advantage of the opportunities provided by EU enlargement. Trade and investment links with Eastern Europe should be strenghtened. Strategies to ensure attractiveness to high-calibre foreign investment will shift Ireland away from the pool of foreign direct investment (FDI), seeking for example low labour costs for which the Eastern European countries will increasingly compete. The role of the Council is to focus relentlessly on the big issues. Lasting competitiveness is achieved by work, often painstakingly slow, on these issues, identified by the Council as:

- social partnership
- skills
- infrastructure - transport and telecommunications
- costs
- science, technology and innovation
- competition and regulation

1. Social Partnership

Social partnership central to Ireland's economic transformation

Successive social partnership agreements have been one of the key factors underpinning Ireland's remarkable economic performance over the 1990s. The success of social partnership has been rooted in the consistency of the overall economic and social policy framework, and a shared understanding of the relative ineffectiveness of traditional instruments of economic policy for a small, highly open economy. This has resulted in the creation of a virtuous cycle in the economy where wage moderation, low inflation and very strong employment growth has provided scope for large tax reductions and significant increases in take-home pay.

But system now under pressure

The system of social partnership is now under strain as manifested in the marked acceleration in wage costs and expectations, in excess of the pay terms of P2000, across all sectors of the economy. In the new EMU environment, higher wage costs and/or increased industrial unrest will lead to a deterioration in Ireland's external

competitiveness, curtailing the prospect of further increases in Ireland's export market share. It will, in addition, detract from Ireland's attractiveness to FDI flows into the EU economy.

New forms of partnership required to meet the needs of a rapidly changing economy

The major challenge in preparing the ground for the next agreement is to design a new form of partnership which, while building on the achievements of the last decade, is consistent with a more flexible, dynamic and competitive economy and also with the core objectives of social partnership. Social partnership must also, in the context of the new EMU environment, develop mechanisms to deal with economic shocks impacting disproportionately on Ireland.

2. Skills

Skills shortages now a competitiveness bottleneck

Skills will be a key determinant of future competitiveness in the context of accelerating technological change. The National Competitiveness Council (NCC) Statement on Skills published in December 1998, detailed a broad range of actions required to increase the supply of people with the skills to enhance Ireland's competitiveness and sustain economic growth. The primary elements underlying a successful strategy for ensuring that Ireland retains its competitive advantage in the provision of skilled labour over the longer-term are clearcut.

The NCC Statement on Skills

The Council's report could be summarised as follows:

- A good understanding of future skills requirements is essential to provide a firm foundation for better planning in the education and training systems. Better forecasting of future skills needs can play a vital role in this context. However, this must be supplemented by quicker adaptation to the accelerating pace of structural change affecting the workplace. Closer dialogue and co-ordination between the enterprise and education sectors is essential to bring about greater institutional flexibility in educational provision.
- A major contribution can be made by new initiatives on the part of the enterprise sector itself, since many training requirements are best met by specific provision to the workforce of training opportunities by companies themselves.
- There is also a pressing need for the basic foundations of the educational and training systems to be strengthened through continued improvements in the basic educational curriculum, especially in the area of foreign languages, science, mathematics and technology subjects.
- At a broader level the whole concept of education and learning must be re-evaluated in view of the need to incorporate lifelong learning as more than a slogan in the educational process but a reality in terms of facilities, opportunities and participation.

Above all there is a pressing need to combat any complacency regarding the quality of the Irish educational system. Clearly, we have made massive progress in upgrading the quality of human resources in the Irish economy over the past three decades but on some measures still lag other countries. The high returns yielded by investment in human capital are now widely recognised and no country is standing still. We must be prepared to set ambitious targets for the future in education in order to provide a solid foundation for enduring economic success and social progress.

3. Infrastructure

Telecommunications infrastructure must be strengthened particularly in the regions

On the telecommunications front much has been achieved. But as detailed in the Council's Statement on Telecommunications published in November 1998 much more has yet to be done in order to ensure that the Irish economy can share fully in the enormous opportunities, particularly e-commerce, presented by the information revolution. The Council's telecommunications statement identified a number of competitiveness gaps in the telecommunications field, most notably in the national broadband infrastructure, which must be addressed to facilitate Ireland's development as an e-commerce hub. The regional distribution of broadband is of particular concern in order to allow balanced regional development. If the appropriate telecommunications infrastructure for advanced, information-intensive industries is not put in place in the regions, already densely populated centres will continue to attract a disproportionate share of investments. This will accentuate problems of urban congestion and overloaded infrastructure, wage inflation and the housing crisis. International broadband links are also an area where significant improvements are needed in order to cater for expected future demand. The national broadband-planning framework needs to be complemented with both public and private funding to ensure continued focus on increased international connectivity. Without such measures, the necessary infrastructure will not be in place to exploit the huge opportunities in knowledge-intensive industries and in e-commerce.

Poor transport infrastructure is adversely impacting on the labour market

The poor quality of public transport and the congested road network is reducing labour availability and impeding labour market flexibility. The high price of housing in the Dublin area has produced a large expansion of housing development in contiguous regions. This is placing a further strain on the transport infrastructure. Moreover, with housing costs continuing to increase sharply, inward migration that has acted as a critical safety valve for the labour market over recent years is being affected. There is a compelling need for improved co-ordination in long-term infrastructure planning and in the development of road, rail and air transport. This must include an integrated approach in transport infrastructure and in land use policies.

4. Costs

Costs remain central to competitiveness

Costs are a key issue for competitiveness. The Council will be issuing a statement later this year specifically devoted to this issue. The costs of doing business in Ireland must be continuously monitored and action taken to ensure that they remain competitive with our major competitors. With labour costs by far the largest single element of total costs, social partnership and skills shortages are critical issues in Ireland's cost competitiveness. At enterprise level, market repositioning with a new emphasis on the EMU region rather than the UK may be appropriate in some instances. Equally, investigation of new sourcing opportunities may also be a means of diversifying imports. Competition will be critical in encouraging lower costs in utilities and services. Investment in infrastructure will help ease skills shortages and improve telecommunications services, roads and other services thereby reducing overall costs. Balanced regional development will also help reduce cost pressures.

5. Science, Technology and Innovation

Ireland must develop stronger technological capabilities

Technological innovation is the key underlying determinant of structural change in the economy. The challenge for Ireland is to develop and maintain its technological capability. The importance of a system of national innovation needs to be more widely recognised. Essentially, the different sectors of the economy - industry, government, education and the financial system must work closely together so that innovation in the economy is increased. There are in Ireland significant gaps in R&D linkages to industry. Multinational companies in Ireland account for two-thirds of industrial research carried out, while many companies conduct no R&D. Incentive, training and grant schemes are in operation but a renewed emphasis is needed to encourage first time R&D performers, promote greater collaboration with the research base and strengthen expectations that technical excellence can be found in Ireland.

6. Regulation and competition

Economic policy is likely to be increasingly focused on competition and regulatory issues

Urgent consideration needs to be given to the regulatory regime and the structures through which it is implemented. Some utilities are tightly regulated, others less so. Similarly, some industries and almost all professions are essentially self-regulating, and the degree to which the competitiveness needs of the economy as a whole are being met is in many cases highly questionable. There is no clear co-ordination between regulatory activity and competition policy, which ensure that basic regulatory principles are implemented across different sectors of the economy in a uniform way. Instead of responding to external pressures at EU level, public policy should be pro-active in identifying areas where an improved regulatory regime is needed.

Competitiveness Strategy

Competitiveness policy must straddle all dimensions of economic performance over time

Ireland's remarkable economic transformation is in the main the consequence of policies adopted and implemented over a long period of time. This highlights a key requirement of competitiveness strategy, to straddle all dimensions of economic performance across time:

- in the short-term while continuing to bolster and build on our competitive advantages, by endeavouring to remedy pressing competitive weaknesses, particularly in the area of economic infrastructure, which are now posing a serious threat to the sustainability of Ireland's growth
- in the medium-term by constructing a regulatory and competitive framework in the economy that boosts productivity and potential supply and helps us achieve consistent top quartile rankings for key measures of international competitiveness
- in the longer-term by transforming the Irish economy into a source of international best practice through continued investment in the capabilities of the Irish people, the development of a true enterprise society, and the creation of so-called knowledge assets through the promotion of research and development (R&D) and innovation

In all, the task is to focus relentlessly on the major competitiveness issues and to push for actions which will sustain our competitiveness in the rapidly changing environment of global competition.

Brian Patterson
Chairman
National Competitiveness Council

The Work of the National Competitiveness Council

Introduction

The National Competitiveness Council was established by the Government in May 1997 under the Partnership 2000 Agreement. The Council is required in its terms of reference to report to the Taoiseach on key competitiveness issues for the Irish economy, together with recommendations on policy actions required to enhance Ireland's competitive position.

The shifting pattern of economic success evidenced internationally over the past decade emphasises that the achievement of national competitiveness is not a static *once and for all* thing but rather a dynamic and highly fluid determinant of economic performance. Unless international competitiveness is continuously reinforced it can easily be forfeited. Ireland's competitiveness strategy must therefore be continually re-appraised in the light of:

- the changes in the competitiveness framework for the Irish economy
- the competitiveness of Ireland's main current and prospective trading partners
- and in particular the structural policies they pursue to boost their own international competitive positions

This continuing re-assessment of competitiveness represents the major task of the Competitiveness Council.

Terms of Reference

The terms of reference of the Council, as set out on its establishment are:

- to prepare and submit to an Taoiseach a report on the main challenges facing the enterprise sector over the medium term and the policy responses required to meet them
- to examine and monitor policies and actions that impact on the competitiveness of the enterprise sector and prepare reports on priority competitiveness issues, as appropriate, with the recommendations required to improve competitiveness

The Council's Approach

In seeking to fulfil adequately its terms of reference the Council has adopted the following guiding principles for its work:

1. strategic - in its thinking and in developing and influencing policy
2. action oriented - analysing not merely to explain but to change
3. independent and inclusive
4. adding-value by setting the recommendations of other groups within an overall competitiveness framework
5. focused - ranking competitiveness issues in terms of their priority for action and following through on their implementation
6. efficient - building on, rather than duplicating the work of other bodies

Outputs

The Council's first Annual Competitiveness Report was published in March 1998. In this report the Council defined competitiveness as "...success in markets that translates into general increases in welfare". The report highlighted the diverse range of issues, spanning all dimensions of economic policy, relevant to maximising the performance of the Irish economy in the coming years. It appraised Ireland's

performance vis-à-vis the rest of the developed world in respect of a large number of quantitative indicators of both competitiveness performance and potential.

The Council also issued a separate summary statement on competitiveness, entitled "The Competitiveness Challenge". This set out a range of policy actions, drawn from the assessment carried out in the Competitiveness Report, that the Council regarded as priorities for maintaining and improving Ireland's international competitiveness in world trade and foreign investment.

The priorities identified by the Council were incorporated into a work programme, which focused on the four main themes of:

- telecommunications
- skills
- costs
- the Information Society

A Statement on Telecommunications was published in November 1998. The main findings are summarised in Chapter 5 of this Report.

A Statement on Skills was published in December 1998. Its findings are incorporated in Chapter 3 of this Report.

A Statement on Costs will be published later this year. This will appraise Ireland's cost competitiveness in an international context and analyse a number of key policy issues in this area.

In response to the Council's first Annual Competitiveness Report and to its summary statement on competitiveness, the Government in May 1998 established an Inter-Departmental Group to facilitate follow-through on the recommendations of the Council. The Inter-Departmental Group reported in September 1998 that the great majority of the Council's recommendations were accepted by Government Departments and agencies and that action was being taken to implement them.

This second annual Competitiveness Report:

- updates the indicators presented in the first report
- provides an assessment of progress achieved over the last year
- analyses key issues in Ireland's international competitiveness

Council's Work Programme in 1999

The Council's 1999 work programme concentrates on seven critical issues for public policy that are expected to make a major contribution to Ireland's medium-term competitiveness performance:

- social cohesion
- people
- costs
- infrastructure
- e-commerce
- competition and regulation
- science and technology

Summary and Overview

Progress and performance

Measures of economic performance illustrate in broad terms how Ireland's competitiveness performance has been translated into improvements in living standards for its citizens. The main macroeconomic indicators point to remarkably good progress during the 1990s. GDP per capita relative to the EU average[3], a headline measure of the improvement in living standards, has increased from an average of 66 per cent over the 1980s to 94 per cent in 1995 to in excess of 100 per cent at the present time. However, this figure includes high level of profit repatriations by foreign multinationals located in the Irish economy and interest payments on foreign debt. A better indicator of how Ireland's economic success has been translated into improvements in living standards for all is the cumulative increase in employment of about one-fifth and the halving of the unemployment rate since 1994. Long-term unemployment, a major cause of poverty and social exclusion, has declined from over 9 per cent in 1994 to less than 4 per cent at the end of 1998.

However, in assessing Ireland's exceptional performance it is essential to differentiate clearly between the rapid progress that certainly has been achieved and Ireland's absolute standing in terms of key measures of national well-being. GNP per person[4] in Ireland, remains around 10 per cent lower than the EU average and up to one-fifth lower than that of the small high-income EU economies.[5] Ireland's unemployment rate, while low by reference to the EU average and historically low by Irish standards, remains high (even at the peak of Ireland's economic cycle) when compared to that of most other small EU member states.

In essence, notwithstanding very rapid income growth over the 1990s, Ireland must now bridge a significant gap in relative income levels and economic and social infrastructure at a time where the pressures of success are posing a serious threat to the sustainability of Ireland's growth performance over the medium-term. In this light five key messages can be drawn regarding the present state of Ireland's international competitiveness:

- A complex set of interrelated issues, including serious skills shortages, poor transport infrastructure, underdeveloped environmental infrastructure, inadequate housing supply and unbalanced regional development are now working together to threaten the capacity of the economy to fulfil its medium-term economic potential - the basis for future social progress.
- Ireland's growth performance has been strongly engineered by a highly successful industrial development strategy based on attracting foreign investment. In aggregate terms Ireland is far less well placed in achieving enduring competitive advantages anchored in the indigenous sector of the economy, in particular, in terms of overall positioning in key growth sectors, operational scale and capabilities in research and development (R&D) and innovation.
- While recent developments in the sector are encouraging, Ireland lags behind more advanced economies in telecommunications infrastructure - a prerequisite for future success in key growth sectors, and in particular e-commerce.
- Regulatory reform and competition policy must become more central to efforts to boost the competitiveness of the Irish economy. Market liberalisation has the potential to deliver sustained increases in productivity and living standards in the economy.
- In the transformed competitive environment for the Irish economy in EMU competitiveness policies - in human resources, R&D and innovation, trade and

investment, infrastructure and telecommunications - focused on boosting the economy's potential[6], hold the key to closing the wealth gap with other advanced economies.

International rankings and changes in rankings

Structured framework for benchmarking competitiveness

International benchmarking provides a structured framework for assessing Ireland's competitiveness performance. Two methods are used to present a balanced picture of progress in competitiveness since the first Annual Competitiveness Report was published in March 1998. Progress in Ireland's competitiveness is measured by changes in the competitiveness indicators as follows:

- the change in Ireland's international ranking
- the change for each indicator in the percentage that Ireland comprises of the "best performing" (or first ranked country) in each case

The data analysed in this Report are obtained from authoritative international sources such as the OECD and Eurostat (as detailed in Annex 2). It should be noted that the figures for Ireland will sometimes differ somewhat from national data and in some instances may not, in order to ensure international comparability, be as timely. Where this occurs and Ireland's current position diverges significantly from that set out in international data this is drawn attention to in the text.

Some significant improvements in Ireland's international rankings have occurred over the time period covered in the report:

- Ireland has moved up twelve places from 20th to 8th place (of 29 countries) in respect of the reduction in the top rate of **corporation tax** to 32 per cent in the 1998 Budget. The reduction to 28 per cent announced in the 1999 Budget last December should bring Ireland into the top quartile of countries, and of course the introduction of a 12.5 per cent rate by 1 January 2003 will place Ireland in a highly competitive position in this area.
- Ireland has achieved a large improvement in its international ranking in its good performance for the unemployment rate. Ireland moved up five places in the league table from 16th to 11th of 20 OECD countries, on the basis of average unemployment in 1998 of 7.8 per cent. However, Ireland's current unemployment rate at 6.8 per cent (February 1999) would be unlikely to push Ireland's ranking from the third into the second quartile of the countries surveyed.

Ireland has maintained its strong performance in several indicators:

- The continued improvement in Ireland's **public finances** relative to the remainder of the EU, highlighted by Ireland's climb by three places into 3rd position in terms of the General Government Debt ratio, standing at 52 per cent of GDP at the end of 1998, the maintenance of its 2nd position in terms of the General Government Balance reaching over 2 per cent of GDP in 1998 and top position in the EU for both the share of government expenditure and receipts at 32 per cent and 34 per cent of GDP respectively in 1998.
- Ireland's **export performance**[7] in 1998, at 12.6 per cent was ranked 3rd out of 27 countries, up one place from the previous year. Ireland's performance was strongly driven by the exceptional performance of some of the leading

sectors of manufacturing industry in particular organic chemicals and computer equipment.

Measured relative to the *"best performing"* (first ranked country) some of the more noteworthy improvements arise in relation to:

- **gas prices for industrial users** which jumped from about 70 per cent of the best performer, in 1997 (the UK) to overtake it in 1998 as the top ranked country of 11 EU member states. As 50 per cent of Irish gas purchases came from the UK in 1998, Ireland has benefited from historically low gas prices in the UK wholesale market.
- the share of **science and engineering degrees** in total degrees awarded increased from over half of the proportion in the best performing country in 1994 to almost four-fifths in 1996, to stand at almost one-third of total degrees awarded in Ireland in that year. The proportion of science and engineering degrees in the leading country, Finland, in 1996 was almost 40 per cent of the total degrees awarded.

There have been some notable disimprovements in Ireland's international competitiveness over the time-period reviewed:

- For **consumer prices** Ireland's international ranking slipped eleven places from 9th to 20th of 27 countries, reflecting the deterioration in Ireland's inflation performance from an annual increase of 1.5 per cent in 1997 to 2.4 per cent in 1998. Although Ireland's annual inflation rate fell back to 1.6 per cent in February 1999 from its peak of 3.2 per cent in August 1998, this reflected in large part the impact of mortgage interest rate reductions under the convergence of Irish interest rates to euro levels. In January of this year there was a gap of 1.3 percentage points between Ireland's inflation rate (2.1 per cent) and that of the euro zone average (0.8 per cent) when measured on a comparable (HICP8) basis. Ireland's HICP inflation rate increased to 2.3 per cent in February. UK inflation currently stands at 1.5 per cent (February 1999) on the same basis, 0.8 percentage points lower than in Ireland.
- Ireland's position in relation to **Internet development** also appears weak. Ireland's ranking in terms of Internet hosts per thousand has declined two places when compared to the 19 countries surveyed in last year's report. Ireland stood, in July 1998, in 16th position in the third quartile of 29 countries for which information on this indicator is now available.[9] Future success in key growth sectors of the digital economy, especially e-commerce, demands a position among leading countries in the top quartile.
- In the case of **interest rate spreads,** the gap between deposit and lending rates was high in 1997. On this indicator Ireland's ranking fell from 9th in 1996 to 19th for 1997, slipping from the second to the bottom quartile of 24 developed countries. While interest rate convergence in EMU progressively improved Ireland's position from the final quarter of 1998 onwards, the spread, which now stands at about 3.5 percentage points, is likely to remain outside the top quartile.
- Ireland has slipped four places from the top to the second quartile in terms of (the percentage change in) **unit labour costs**[10]and is now ranked 10th of 24 advanced economies. In 1997 the increase in unit labour costs in Ireland at 0.3 per cent was 2 percentage points higher than the first ranked country Finland (where unit labour costs declined by -1.7 per cent) and Ireland was ranked 6th in the OECD. In 1998 unit labour costs in Ireland are estimated to have increased by 1.7 per cent, 2 percentage points higher than the best performer Italy (where unit labour costs fell by -0.3 per cent) and also higher than both the OECD and EU averages (1.6 per cent and 1 per cent respectively

- the figure for the euro area is just 0.2 per cent). The OECD project that Ireland will fall to joint 15th position for this indicator in 1999[11].
- Ireland is ranked 8th in the EU in 1998 for growth in **compensation per employee** over the preceding five-year period, down three places from its 5th position in 1997. Ireland has declined by almost 14 percentage points relative to the best performer from 72 per cent of compensation growth in the Netherlands in 1997 to 58 per cent of the figure for Finland in 1998. Projected continued strong growth in wage compensation is likely to result in a further deterioration in Ireland's relative performance in 1999[12].

Lack of progress in some key areas

Key areas of competitive weakness in the Irish economy, where little or no improvement has been secured, are a serious cause for concern. Ireland's continued poor standing in terms of road and rail infrastructure highlights, as discussed below, one of the major bottlenecks threatening to constrain Ireland's growth performance over the medium-term.

Competitiveness Targets

Competitiveness targets focus policy debate

The construction of explicit competitiveness targets, formulated in terms of the competitiveness indicators analysed in this report, can help focus policy debate towards the achievement of improvements in Ireland's competitiveness standing and contribute to the creation of a medium-term competitiveness strategy for the economy.

A successful targeting approach requires the identification of explicit objectives, which are clearly associated with higher investment levels in the economy (or the removal of barriers to investment), and hence in improved competitiveness performance. Targets also help to clarify policy choices and priorities such as, for example, the structure of taxation. It necessitates a careful assessment of the instruments, which can be used to achieve the targets adopted. A feedback process is also essential in order to allow monitoring, on an on-going basis, of progress achieved. No single country is likely to provide the correct benchmark for Ireland across the broad spectrum of appropriate competitiveness indicators. Competitiveness targeting drawing on best performance and experience across a cross-section of countries is a more useful and pragmatic approach to developing Ireland's national competitiveness agenda.

The priority issues identified by the Council for 1999, and around which Ireland's competitive performance requires to be improved at the present time, provide a structured framework for the construction of an explicit set of competitiveness targets. The seven critical issues for public policy action, which at the present time can make a major contribution to Ireland's medium-term competitiveness performance are:

- social cohesion
- people
- costs
- infrastructure
- e-commerce
- competition and regulation
- science and technology

The achievement of enduring competitive success and consequent economic and social progress depends on Ireland's capacity to secure sustained improvements in its international ranking in these broad areas. In order to build on the progress achieved in income convergence[13] to date, Ireland must aim for a top quartile ranking (i.e. among the top 25 per cent of countries) in each of these areas of national competitiveness.

A first step in operationalising this objective requires the identification of a preliminary set of clear, sensible and workable competitiveness targets for Ireland encompassing the priority areas outlined above. This should be undertaken using country groupings, in order to ensure an adequate degree of consistency and coherence between the targets chosen. Analysis suggests that Ireland's competitiveness would benefit particularly at the present time from measures to improve its international standing in relation to the following indicators:

- tax wedge (% difference between gross and net pay)
- top rate of income tax
- female participation rate
- percentage of working age population educated to third level
- science and technology degrees (% of total degrees awarded)
- business R&D (% of GNP)
- export diversification by country and by sector
- Internet hosts per 1000 of the population
- telecommunications charges
- transportation infrastructure

Further work by the Council will examine how other elements of a targeting approach as outlined above could be put in place. This will include consideration of the impact on current public policy priorities, resource implications (if any) and the appropriate time frame for achievement of the targets in each case.

Pace of economic reform dictated by developments in competitor countries

The goal of developing longer-term targets should not deflect attention from the pressures of existing competition in both trade and foreign direct investment (FDI). Free trade has yielded enormous benefits to the Irish economy over recent decades by fostering Ireland's competitive advantage and specialisation in skill intensive, high technology activities in which exporters based in Ireland can compete successfully in international markets. However, in an era of globalisation and intensified international competition the pace of structural reform in current and prospective trading partners will increasingly dictate the necessary pace of reform for the Irish economy. The maintenance of Ireland's strong trading performance depends in a fundamental sense on the steps taken to maximise the efficiency of resource use and raise overall productivity levels in the economy. No country is standing still. Areas in which Ireland appears to have a competitive advantage in a particular year can quickly be undermined if continuous analysis and investment in maintaining that advantage does not take place. It is important to recognise that Ireland is also being benchmarked by other countries.

Competitiveness in 'competitor' countries

Heterogeneous nature of Ireland's competitors

Three very different types of country, knowledge of which can provide useful insights to guide Ireland's national competitiveness agenda can be identified:

- The UK, Ireland's single most important economic partner at the present time, accounting for about 30 per cent of Ireland's total trade, although linkages are weakening over time concomitant with Ireland's integration into the core EU economy
- Hungary, which illustrates the rapidly emerging competitiveness threat emerging from the Central and Eastern European countries (CEECs), particularly in the area of FDI
- The Nordic countries, embodying some elements of a successful strategy for sustained long-term competitiveness, particularly in terms of the role of social cohesion and the development of strong indigenous firms

Analysis of 'competitors' provides guidance for competitiveness policy

Ireland's competitiveness strategy must be based on the identification of best practice wherever it exists. An assessment of the competitiveness performance, potential and policies of three different types of current (and prospective future) competitors to Ireland - the UK, Hungary and to a lesser extent the Nordic economies - provides some useful guidance relating to how Ireland's competitive climate is likely to evolve, and strategies that should be developed to respond to that changing environment.

UK is Ireland's main competitor in trade and foreign investment

Ireland's economic horizons have progressively broadened beyond the UK over the past three decades reflecting the internationalisation of Ireland's trade and flows of investment. One quarter of Ireland's exports now go the UK. At the time of Ireland's accession to the then EEC in 1973 the share was over one-half. One third of Ireland's imports are now sourced in the UK. In 1973 half of Ireland's imports originated in the UK. These trends should not be allowed to obscure the continuing importance of the UK economy and UK competitiveness to Ireland's medium-term economic performance. The high degree of integration between the Irish and UK labour markets, evidenced by strong migratory flows, has long been a major feature of the Irish economy. While trade linkages with the UK have weakened, the UK remains Ireland's single most important economic partner, in particular for the traditional, Irish owned sectors of manufacturing industry. Product market linkages between Ireland and the UK have been strengthened by the high penetration of UK retailers of the Irish market. The UK is clearly Ireland's most immediate competitor for trade and inward investment at the present time and thus there is a continuing need to focus, in particular on cost competitiveness, in relation to the UK market and the climate for FDI. A Council Statement on Costs will be completed over the next few months concentrating on a number of case study comparisons at plant level between Ireland and the UK.

UK White Paper focused on building capabilities

The primary focus of the recent UK White Paper on Competitiveness[14] is on building capabilities in the UK economy in entrepreneurship, R&D, skills and digital technologies, in developing competitive, modern markets and encouraging collaboration among firms, which will help build enduring competitive advantage in the knowledge driven economy of the 21st century.

UK competition in high growth sectors of trade, and foreign investment likely to intensify

It is clear that the UK is attempting a new departure in competitiveness policy. The UK is now focusing on building up strong capabilities, which are perceived as essential to enduring competitive success in the high-growth, knowledge-intensive sectors of the economy that increasingly will drive overall economic performance in advanced economies. A strong institutional and administrative framework has been developed over time, which coupled with a high degree of political commitment is firmly oriented towards achieving sustained improvements in the competitiveness (or supply side

capacity) of the UK economy. Efforts are being focused in areas such as education, which over a long period of time have acted as a brake on overall UK economic performance. Additional resources of stg£19bn. are being provided for raising achievement in education and improving skill levels[15]. Moreover, the new framework developed for monetary and fiscal policy in the UK, and the prospect of UK entry into EMU in the early years of the next century make it more likely that the UK will secure a higher degree of macroeconomic stability over time, which in turn will provide a boost to UK economic performance. The UK is ahead of much of the EU in its commitment to competition, market liberalisation and deregulation. The "New Deal" initiative[16], the commitment to make work pay emphasised by the introduction of a starting rate of 10 per cent for both income and corporation tax (affecting over a quarter of a million companies with taxable profits tapering up to stg£50,000), the 1 penny reduction in the standard rate of income tax (to 22p) introduced in the recent UK budget, together with the recently published employment bill promoting a co-operative approach to industrial relations, are intended, in line with the intention of the White Paper, to create a culture of labour market flexibility underwritten by the principles of fairness and trust.

Ireland's competitiveness versus the UK will increasingly be on grounds *other* than costs alone

By virtue of its large size, geographical proximity and cultural affinity, the cost and competitiveness performance of the UK provides an immediate and forceful reference point for competitiveness policy in Ireland. Notwithstanding the prospect in EMU of reduced market dependence through diversification into core European markets, Ireland's economic performance is likely to remain strongly influenced by the UK. However, competition will increasingly occur on grounds additional to costs alone, such as for example skills, R&D capability and the scope for establishing supply chain linkages.

Significant buffer currently exists against sterling weakness

The risk to Ireland's competitiveness from a large and sustained devaluation of sterling well below its 'fair' value against the euro[17] remains. The likelihood of such a scenario is diminished at the present time by the high level of sterling relative to its estimated 'fair' or medium-term sustainable level.18 This provides a significant buffer for Irish firms against sterling weakness. In the longer-term the threat to Ireland's competitiveness from sterling weakness is weakened, given the high priority now afforded to macroeconomic stability in the conduct of UK policy, and also by the degree to which UK firms embrace euro pricing as the UK's 'gear change' towards EMU membership gathers momentum.

Hungary possesses all the prerequisites to becoming a "tiger" economy

Hungary is of interest as possibly the most advanced among a substantial number of emerging Central and Eastern European countries (CEECs) but is also illustrative of a range of emerging CEECs. Competition in trade at the present time for Ireland from Hungary is not pronounced. However, in investment, according to the latest European Investment Monitor (published by Ernst & Young), over the period April-December 1998 Hungary won 6th position (with 80 inward investment projects) as compared to Ireland's 5th position (with 81 projects) in the European investment league. While these aggregate figures do not convey any information regarding the quality of investment, it is noticeable that Hungary won a larger share of expansion projects (26 as compared to Ireland's 21). Hungary appears to possess all of the prerequisites to emerge as the next "tiger" economy, including for example prospective EU membership, low cost base, highly skilled labour force, established industrial tradition and proximity to core European markets. Strong growth in Hungary's exports to the EU and other developed economies at the present time characterise Hungary's international competitiveness rooted, at the present time, in a very low level of labour

costs. Hungary has already attracted significant foreign investment in some advanced manufacturing sectors, clearly illustrating its future potential in competition with Ireland. This draws attention to what must become the main theme of Ireland's competitive strategy, the imperative of specialising up the value-chain while at the same time keeping a strong focus on costs.

Hungary characteristic of competitiveness threat from Central and Eastern European countries (CEECs)

The competitive threat to Ireland's FDI and trade, which is likely to be posed by Hungary in the future, can be regarded as illustrative of the nature of the prospective competition that will emerge from the CEECs in the years ahead. A key factor in Ireland's attractiveness to a broad range of foreign investments during the 1990s resided in its access to core European markets, through its membership of the EU. US investors, in particular, wished to establish a manufacturing presence within the Single European Market (SEM). The leading CEECs having made good progress in their transition process and, crucially, having established political stability are very well positioned to compete aggressively in the future against Ireland for the bulk of inward investment projects coming into the EU. Ireland may experience losses in manufacturing capacity to these countries as pressures to consolidate manufacturing activities across Europe intensify over time. The main message for Ireland is that there is a prospect that Ireland's economic growth will not be supported in the future to the same extent as heretofore, by continuing very strong flows of inward investment.

Human Resources

Ireland's overall position in human resources mixed

Ireland compares particularly well in terms of enrollment in third level education and also performs well in third level attainment. However, it is among the lowest ranked countries in respect of participation in upper secondary level education, and also for the relatively low proportion of persons aged between 21 and 29 years in full time education. According to the OECD, in Ireland in the mid-1990s the share of students undertaking vocational education (in overall upper secondary education) was the lowest in Europe.

Level of human capital central to long-term prosperity

Human capital is a vital strategic resource in an increasingly "knowledge-based" economy. The education system can build long-term competitive advantage for the economy as illustrated by the benefits derived from the introduction of "free" secondary education at the end of the 1960s. The availability of a large skilled labour pool in the Irish economy has been central in the attraction of FDI, and the development of Irish-owned enterprises in high-tech, high growth sectors that have underpinned the growth and income convergence of the Irish economy over the 1990s.

Skills shortages major constraint on medium-term economic performance

Skills are an essential element of long-term competitiveness. The Council's *Statement on Skills*[19] published in December last focused on the need to alleviate pervasive skills shortages in the economy. These seriously threaten Ireland's capacity to realise its medium-term growth potential, through their impact on wage cost-competitiveness, prospective FDI flows and the development of high value-added Irish-owned enterprise. The problem of skill shortages at the present time is closely intertwined with those related to the serious shortage of affordable housing and poor transport infrastructure in the economy, which are currently seriously impinging on Ireland's prospective economic performance.

Statement on Skills set out five-point strategy

The Council's skills statement advocated a five-point strategy to alleviate skill shortages:

- Increasing the numbers of people available to work
- Strengthening the links between education and the world of work
- Increasing the numbers qualifying each year with high-technology skills
- Increasing the numbers of people with the required low-medium level skills
- Raising enterprise investment in training for those already at work

The statement incorporated detailed recommendations designed to implement the Council's strategy. The detailed recommendations from the Council's Statement on Skills should be implemented as a matter of urgency, in order to increase the supply of skilled labour necessary to sustain economic growth and the competitiveness of the Irish economy. These objectives must, of course, be pursued in the much broader context of developing a system of education that equips each individual in society with the capabilities they need to fulfil their learning potential and hence allows them to make their own unique and individual contribution to the development of Irish society.

Difficult challenges must be addressed

Increasing the numbers of people available for work presents some difficult challenges for economic and social policy. There is need to re-allocate resources within overall education spending both to increase investment in the primary and pre-school education, where early disadvantage will not subsequently be reversed easily, and also to break the destructive cycle of early school leaving. The recent initiative to reduce the size of all primary classes below thirty pupils is welcome in this regard. Efforts must be intensified in order to boost numbers with high-technology skills in the Irish economy by implementing the proposals of the Expert Group on Future Skills needs and expanding Forfás' Skills Awareness Programme as recommended in the Council's skills statement. Several recommendations of the Expert Group have already been implemented resulting in increased training places. Measures to increase the availability of sufficient persons with low-medium skills are just as important to sustaining Ireland's growth over the medium-term. At present the Expert Group is preparing recommendations for meeting needs in this area. In this respect vocational skills must be a key element of the secondary education system integrating with, and complementary to, the academic orientation of the curriculum. Rigidities in the Irish educational system, which limit access to further education for those who complete full-term education with a vocational specialism, must be eliminated. Promotion of life-long learning in the economy also has a crucial role to play in ensuring the continued upgrading and renewing of human capital in the economy, to meet future skills needs.

Research and Development (R&D) and Innovation

Ireland's position in R&D indicators weak

Although the output of science and engineering graduates is reasonably satisfactory in comparison with other countries, this is an area where Ireland could achieve competitive advantage by continuing to increase the output of these graduates. However, Ireland's international ranking for non-business R&D expenditure in GNP is in the third quartile (of 28 countries) as it is for the number of scientific publications per thousand of the population. Business sector R&D activity has increased strongly in recent years, but is narrowly focused and concentrated primarily in foreign owned firms. Most companies do not appear to have a serious commitment to R&D. The GDP share of business sector R&D in Ireland should be considerably higher than the EU

average given the specialisation of the Irish economy in high-tech sectors. Moreover, patenting activity, a key indicator of the R&D output is relatively poor and commensurate with low levels of R&D performed in industry. Ireland is placed in a "mid-range" position in the adoption of IT. In order to improve Ireland's position in R&D and innovation, national investment initiatives should be undertaken in line with the recommendations of the recent ESRI report on national investment priorities for the next national development plan.[20]

Sustained competitive advantage can be built through investment in R&D and innovation

Competitive advantage in the future will increasingly be determined by success in the generation of ideas, knowledge, information and innovation. Investment in R&D and innovation will help build competitive strengths in this area. R&D as the major precursor of technological progress is an important route to higher productivity growth and rising living standards in the economy. Technology transfer through FDI cannot on its own build sustained competitive advantage, as Ireland's competitive advantage in high-tech manufacturing industry is eroded by the emergence of lower cost locations with a good endowment of skilled labour. Ireland, as an important location for the production of high technology goods, remains downstream in the value chain. The knowledge assets in which sustained competitive advantage resides in these sectors remain, by and large, outside the Irish economy.

The recommendations of the Irish Council for Science, Technology and Innovation (ICSTI) aim at raising level of investment in R&D

There are gaps in the different elements making up the system of national innovation. The implementation of the new science syllabus in primary education is urgently needed. In secondary education there has been a worrying decline in the number of students taking physics and chemistry. In this regard, the recent initiative announced by the Minister for Education and Science to reverse declining numbers and improve the poor performance of second level physics and chemistry students is very welcome. At third level education, there is a need for improved quality in education and research and at post-graduate level ("fourth level") more investment in equipment and facilities is needed. At the primary and secondary level, the new syllabi need to be properly supported and at third and fourth levels, international benchmarks should be used to encourage targeting. With regard to public policy priorities, important steps have been taken in establishing the technology foresight scheme. The recently published findings of this work should be harmonised with those of the Expert Group on Future Skills and should feed directly into educational planning, as well as the development of Government R&D programmes.

The major focus of the recommendations made by the Irish Council for Science, Technology and Innovation (ICSTI) is to raise the level of investment in R&D in the business sector and in public sector organisations, including third level colleges. Major concerns are the relatively poor R&D and/or technological innovation performance in many sectors, and in many indigenous and foreign owned companies. A particular concern is the relatively low R&D performance of multinational firms in Ireland in high-tech sectors. While foreign owned companies account for two-thirds of all business sector R&D expenditure, only one in five foreign owned companies are involved in R&D on a continuous basis, and the top ten performers account for over half of the total R&D spend by the foreign sector.

Some key ICSTI recommendations that are endorsed by the Council are:

- Establishment of a 'technology intelligence' network to help firms that undertake no R&D to define and access their technology needs.

- Investment to create world-class research groups or centres in key scientific or technological areas important to achieving Ireland's development objectives. Ireland does not have a world-class research university and has very few research groups with the size and expertise to have a significant impact. This is a major impediment to efforts to build a knowledge-intensive, high-tech enterprise sector.
- Renewed emphasis on developing strategic collaborative partnerships between industry and third level/state institutions.
- More focused direct support for in-company R&D to encourage first-time R&D performers, help smaller firms achieve a critical mass in R&D investment, and to help firms progress up the R&D capability ladder and become world-class R&D performers.

Trade

Diversification of Ireland's manufacturing trade very weak

Ireland's trade dependency and openness is among the highest in the world. Ireland's export performance is in the top quartile in the OECD. Trade openness is also among the highest of all countries in the OECD. This has helped underpin the competitiveness, flexibility and innovative capacity, that has characterised the performance of the Irish economy over recent years. However, manufacturing trade diversification, whether of exports or of imports, whether by country or by sector, is uniformly low for Ireland, always among the lowest ranked (fourth quartile-bottom 25 per cent) countries internationally. For example over the first 10 months of last year, six of Ireland's most important trading partners[21] were the destination for over 70 per cent (£26.1bn) of Ireland's total manufactured exports of £36.8bn. Two markets alone, the UK and the US, accounted for 36 per cent of manufactured exports. Over the same period over 70 per cent (£18.4bn) of Ireland's manufactured imports of £25.5bn were sourced in six foreign markets[22] with the UK and the US accounting for almost half of the total. As far as sectoral diversification is concerned, a small number of foreign owned sectors of manufacturing industry have played a major part in the exceptional growth in manufactured exports recorded in recent years. This remains true of the very strong export performance achieved in 1998. Over the period January-October 1998 almost two-fifths of total manufactured exports (£36.8bn) originated in two sectors of manufacturing industry, office machinery and automatic data processing (ODP) and organic chemicals. The top four leading sectors[23] accounted for well over half (£20bn) of total exports.

Ireland's competitive environment transformed by EMU

The competitive environment for Irish business is transformed by Ireland's EMU membership. The establishment of EMU, leading to the elimination of exchange rate risk and uncertainty between participating member states will bring about an intensification of competition in both domestic and external markets. Prospects for EU enlargement and the UK's membership of EMU will accentuate this process in the early years of the next century, as will the pressures engendered by the strengthening of globalisation in the world economy. These forces should also provide further impetus to Irish owned enterprises, particularly small and medium enterprises (SMEs), wishing to avail of market opportunities in domestic, UK and Continental European markets.

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Success in EMU requires diversification into the core euro zone markets

EMU presents both opportunities and threats, highlighting the core requirements in EMU of international cost-competitiveness and adjustment capacity in both individual enterprise and for the economy as a whole. The industrial promotion agencies must increase their support to indigenous enterprise, assisting them in developing the capabilities required to diversify into the core euro zone markets in line with market opportunities. Greater trade diversification focused on markets experiencing stronger growth will reduce Ireland's exposure to economic shocks, increase firm-level competitiveness, by forcing Irish firms to match best practice internationally, and promote the expansion of Irish SMEs to an internationally competitive scale. It requires Irish enterprise, with the support of the industrial development agencies, to redefine their market presence in other countries not merely by seeking out exporting opportunities but also through such mechanisms as joint ventures and technology licensing agreements. Irish enterprises failing to taking advantage of the opportunities to diversify, both in terms of their importing and exporting activities, will increasingly in the context of the evolving Single Market, find themselves at a competitive disadvantage relative to their euro zone competitors.

Ireland one of many countries attempting to win global competitive advantage in e-commerce

The increasing importance of the digital economy, reflecting rapid technological change in the area of information and communications technologies (ICTs), will bring about a transformation of the business environment for much of the services sector over the coming decade. There are significant opportunities for Irish enterprises to expand their export trade in services based on the supply of knowledge resources, the growth in international demand and the technological developments facilitating their interaction, including the enormous potential presented by e-commerce. Ireland is, however, just one of many countries attempting to win global competitive advantage in the area of e-commerce. The high-level Advisory Committee on Telecommunications, appointed by the Minister for Public Enterprise, highlighted a number of key areas for immediate action in its report of November 1998. This included unbundling of the local loop, (separation of network management and service provision), developing Internet access and international connectivity and developing human resources and entrepreneurship for e-commerce. The Council's Statement on Telecommunications also published last November drew on these recommendations in devising a strategy for Ireland to achieve a leadership position internationally in enterprise in the digital economy. Swift action is essential for Ireland to exploit the enormous opportunities that exist in this area.

Major strategic need to increase the contribution of the indigenous sector to Ireland's trade performance

FDI flows can be expected to remain an important element in supporting Ireland's trade performance over the medium-term. In the longer-term Ireland's trade performance must be underpinned to a greater extent by a strengthening in the performance of the indigenous sector of the economy. Strong, forward-looking enterprise in the Irish economy should examine, with the support of the relevant agencies, how best to maximise Ireland's future market share with the Central and Eastern European countries (CEECs). The travails of the Asian economies should not be allowed to detract attention from the massive potential of the region, particularly

that presented by China. The report of the Asia Strategy Group established by the Taoiseach following his visit to China last September, to strengthen Ireland's trade linkages with the region, is an important input to this process. There has been a significant improvement in the employment, output and export performance of the indigenous sector of the Irish economy since the late 1980s, outperforming other industrial countries. Sustained national competitive advantage in the future must be built on this achievement, by the development of core competitive capabilities in the indigenous sector.

Investment

Ireland has an excellent record in attracting foreign investment but investment by Ireland abroad is much weaker

Ireland's excellent performance in attracting FDI is confirmed by its international ranking, which is one of the best in the OECD (6th out of 27 countries surveyed). The stock of FDI in the Irish economy is estimated to amount to almost one quarter of GDP, giving an international ranking in the top quartile of OECD countries. Outward FDI from the Irish economy has, however, been weak, with the stock amounting to just 8 per cent of GDP, producing a ranking in the third quartile of the 28 countries for which data is available.

Ireland's growth and convergence performance highly dependent on foreign sector

Ireland's remarkable growth performance over the 1990s was highly dependent on its success in attracting large inflows of FDI in high productivity, high demand sectors. In 1997, for example, Ireland won almost 8 per cent ($2.6bn) of total US foreign investment in manufacturing. Ireland's specialisation in particular sectors is evident, gaining in 1997 almost one-fifth of total US foreign investment in electronics and in excess of 10 per cent of total US foreign investment in the chemical sector. Two fifths of Ireland's real GDP growth since 1991 is directly attributable to the leading sectors of manufacturing industry - chemicals, computers and instrument engineering and electrical engineering.

Foreign sector is more anchored in Irish economy

While structural factors such as improved human capital have helped to boost productivity levels in the Irish economy, FDI has played a crucial role on account of its strong export orientation and the impact of technology transfer. There have been large, positive spillovers from these investments. The strong linkages between foreign and domestic firms and other agglomeration economies benefiting the foreign sector will continue to help anchor it in the Irish economy. Irish economy expenditures by foreign-owned companies amounted to almost one quarter of GDP in 1997.

Nature of FDI shifting towards knowledge based activities

The nature of FDI is changing in line with the shift in the competitive advantage of the Irish economy towards higher value-added, knowledge based activities, based on such factors as skills, infrastructure, flexibility and innovative capacity of indigenous firms, as Ireland's low labour cost advantages are eroded. The environment for FDI is also changing under the changed regime for state aids and significantly reduced structural fund transfers in one future. Industrial promotion activities should focus on the scope for clustering of foreign investment around, for example, third-level educational institutions and groupings of related activities, which will encourage the development of specialised pools of skilled labour and a more balanced pattern of regional development. There is, in addition, a need to continue to move up the value-chain in the nature of FDI flows attracted into the Irish economy, by seeking to attract core strategic activities of multi-nationals, in particular R&D.

Industrial policy must focus on fostering knowledge assets in the Irish economy

In order to ensure the sustained attractiveness of Ireland as a location for strategic FDI, industrial policy in Ireland must become more successful in fostering the production of so-called knowledge-based assets in the economy. Creation of knowledge assets located in the Irish economy, through investment in R&D and innovation, is the strongest guarantee of long-term success in attracting high-calibre FDI. In competing for FDI, the highest priority should be given to winning strategic projects with the scope for generating technological spillovers and longer-term competitive advantage in the wider economy.

Foreign investment by Irish companies can help grow Irish firms to internationally competitive scale

Outward FDI from the Irish economy, where up to now Ireland's performance has been weak, could play an important part in helping indigenous firms to grow, by foreign M&As, to an internationally competitive scale. In addition, it can provide Irish enterprises with a strong market presence in large foreign markets. Strategic partnerships, as a complement to traditional FDI, may be particularly suited to the requirements of Irish firms particularly by strengthening indigenous technological capacity. Some public resources should be re-allocated to assist firms in overcoming informational asymmetries that arise in assessing foreign investment opportunities.

Business Finance

EMU interest rate convergence has eased financing constraints for business

The spread between deposit and lending rates in Ireland was among the highest in the advanced world in 1997 but interest rate convergence in EMU has considerably reduced the gap and has also led to sharp reductions in both nominal and real (inflation-adjusted) interest rates. The main beneficiaries of reduced interest rates are likely to be large corporate borrowers, as opposed to small and medium enterprises (SMEs). The size of the venture capital market in Ireland, relative to GNP, compares reasonably well with other EU countries but is well behind the UK and US, the leaders in this field.

Business finance is the lifeblood of enterprise sector

An adequate supply of finance on suitable terms is essential for the growth and development of enterprise. National financing mechanisms tend to reflect the business culture and institutional structures of individual countries. In contrasting the UK model of business with its emphasis on short-term financial performance, and the German model, which gives more priority to long term developmental needs, the UK model appears to be more effective in channelling equity capital to support the growth of fast growing businesses in rapidly changing market conditions. However, the relationship nature of German banking and its emphasis on the provision of long term fixed cost finance is beneficial to many SMEs.

Business finance is the lifeblood of enterprise sector

Business finance in Ireland subject to clear structural weaknesses In Ireland, venture capital investment in start-up and early stage businesses accounts for less than 5 per cent of the total, compared to 37 per cent in the US. This indicates a clear need for more funds to be made available for firms at the start of their life cycle. In Ireland 90 per cent of venture capital investment is allocated to business expansions and is funded by Government agencies to a greater extent than in leading economies such as the US, Germany, UK and Holland. There is a gap at the seed and start-up level of development where risks are high. This market need is being provided at present by the State, in partnership with the private sector on equal terms, and it is hoped that

the private sector will gradually increase its exposure in this area in line with investment experience.

Emergence of single European capital market could accentuate financing constraints

The emergence of a single European capital market could result in a diminution of investment funds available for small business in the Irish economy. Enterprise in a small, peripheral euro zone economy such as Ireland may become disadvantaged in accessing financial resources, supporting expansion to an internationally competitive scale, on terms that are competitive with those available to firms in the core economies of the EU.

Specialised financing mechanisms abroad place them at competitive advantage

Financing mechanisms available in other countries to expand and develop the long-term competitive strength of firms in the SME sector appear to place them at an advantage to Irish firms, where such mechanisms are weak. For example, the financing of SMEs in Ireland is often undertaken on a basis that has more similarities with personal banking than with corporate lending. There is an emphasis on overdrafts and short term lending at variable rates of interest, which are close to the rates charged to personal borrowers. In contrast, SMEs in other European countries such as Germany have greater access to longer-term lower cost finance at fixed rates. This puts them at a competitive advantage in terms of funding their long-term development needs. Public/private mechanisms used in other European countries such as mutual guarantee and refinancing schemes have not evolved here as yet, although the Government has successfully implemented two subsidised long-term loan schemes in the recent past.

International experience provides no clear solutions

However, comparative analysis of the main models of business finance does not provide any clear-cut answers as to how these problems can be addressed. Mechanisms that have evolved over time for the financing of business in different countries will reflect a complex set of economic, institutional, historical and cultural factors that are not necessarily transferable to Ireland. However, it is considered that there is a need to encourage the maximum level of competition in the provision of banking services to SMEs, and that fixed rate long term borrowing to this sector should be increasingly encouraged.

Infrastructure

Infrastructural deficit major threat to the sustainability of Ireland's growth performance

As detailed in the recent ESRI report *(National Investment Priorities for the Period 2000-2006)*, the present infrastructural deficit in the Irish economy is a major threat to the medium-term sustainability of Ireland's growth performance. While much of this has been due to the fact that economic activity in recent years has been greater than anticipated, and so has put unprecedented demand on the entire infrastructural system, it is essential that the constraints arising now are addressed with the utmost urgency. The cumulative impact of poor transportation infrastructure, underdeveloped environmental infrastructure, inadequate housing supply and unbalanced regional development is intensifying and if not dealt with urgently will threaten the capacity of the economy to fulfil its medium-term economic potential. This demands a structured, systematic and coherent response that takes full account of the complex interaction of all relevant factors.

Telecommunications

Low ranking in Internet development - ranking for international telecommunication costs improved

Ireland has a low, third quartile, international ranking in terms of Internet development (17th of 29 countries). According to the most recent OECD data, Ireland has less than 20 Internet hosts per 1,000 inhabitants as compared to Finland (with over 100), the US (almost 80) and the OECD country average (approaching 50). Online access in Ireland is estimated to be in the region of 11 per cent. This again lags behind world leaders such as Finland and the US (both 28 per cent) and also lags the UK (16 per cent). Local calls in Ireland (excluding Internet access costs) are still among the most expensive in the OECD. For international calls, recent price reductions have partially closed the gap with other countries.

Information and Communication Technologies (ICTs) main engines of economic growth in new digital economy

The rapid growth in information and knowledge products and systems for managing information are providing the impetus for the rapid growth of the digital economy. ICTs enabled by advanced telecommunications are now among the main engines of economic growth in the developed world and the continued expansion in international trade and investment.

Failure to excel in telecommunications - competitive disadvantage in digital age

These developments present enormous opportunities for Ireland providing Ireland's telecommunications infrastructure and costs can keep pace with the highest standards internationally. Ireland's success in achieving a leadership role in the emerging high growth sectors of the digital economy demands a consistent and sustained performance among the leading nations of the world. In the case of telecommunications, failure to excel is a competitive disadvantage.

Ireland's position in telecommunications infrastructure leaves room for improvement

Ireland's position in the provision of telecommunications infrastructure leaves room for improvement. The rapid introduction of the new flat rate cost structure for Internet access would help Ireland to make up ground.

Transformation of telecommunications sector driven by technological and regulatory change

Transformation of the telecommunications sector is being driven by technological and regulatory change. As a result of market liberalisation the business sector is now providing the initial stimulus for increased investment in developing information infrastructure.

Council's Statement on Telecommunications identified twofold challenge for Ireland

In its Statement on Telecommunications[24] the Council identified the following twofold challenge for Ireland:

- to be amongst the leaders in the provision of broadband telecommunications services and digital business
- to develop Ireland as a hub for e-commerce

Action urgently required to compete for leadership position

In order to meet this challenge action is urgently required in order to ensure that Ireland's telecommunications infrastructure keeps pace with other leading economies, vigorously pursuing a competitive edge in the telecommunications sphere:

- Substantial investment in upgrading networks to provide broadband telecommunications facilities as widely as possible in the regions is now essential.
- Government must adopt a leadership role in the economy through the development of and investment in e-government.
- The rapid implementation of flat rates charges for Internet access can provide a major impetus to Internet access in Ireland, which is lagging behind the highest international levels.
- Regulation of the telecommunications market should have as its primary objective free competition where all the benefits of a competitive market are available to consumers. The development of competition in telecommunications, especially at the level of the local loop is a lengthy process. Government, with the regulatory authorities, must continue to play a pro-active role in the creation of a competitive environment.

To achieve these objectives, the detailed recommendations set out in the Council's statement on telecommunications, should be implemented as a matter of urgency.

Telecommunications charges lowest where competition sharpest

It is critical that Ireland achieves the objective of a position in the top quartile of both OECD and EU countries by the year 2000. Competition is extremely important to lower costs for national and international telecom services. This is illustrated both by the lower pricing structures in those countries that have fully liberalised markets and the recent reductions in the costs of international calls from Ireland that resulted from market liberalisation and increased competition. Despite good progress in the cost of international calls and leased lines to the UK and the US, further improvements with other key trading partners are now required. Those countries with competitive markets also tend to have the most buoyant growth in Internet hosts and access. Flat rate charging for high capacity Internet users should improve Ireland's competitive positioning.

Transport

Congestion will intensify in absence of radical action

The indicators for transport support the widely held view that Ireland's transport infrastructure is poor relative to other advanced EU countries. Ireland has a high dependency on road traffic compared with the rest of the EU with below average road density, low levels of primary roads and motorways (the second lowest in the EU). This has led, during a sustained period of very rapid economic growth, to high congestion and severe traffic bottlenecks. On current projections intensification in traffic congestion is, in the absence of radical action, inevitable.

Transport costs important determinant of national competitiveness

An effective well-functioning transportation system is crucial to overall competitiveness. Ireland's peripheral location, its high dependence on trade and the importance of inward investment brings the transport system - roads, rail, seaports and airports - to the fore, even in normal circumstances, as one of the main determinant of Ireland's international competitiveness.

Exceptional growth in economy has outstripped capacity of transportation infrastructure

However, in a situation where exceptional growth in the economy has resulted in growth in demand to a level over and above the capacity of the existing infrastructure, the highest priority must now be given to alleviating severe transport bottlenecks and resulting congestion in the economy. Failure to do so will, in view of projected further strong growth in car ownership over the next decade, impact significantly on the economy's medium-term growth potential by accentuating labour shortages and the housing crisis, raising labour costs and discouraging foreign investment. Current high levels of expenditure on the road network must be increased further to make good the current infrastructure gap. This highlights the potential role of public private partnerships (PPP) in financing Ireland's future investment needs in roads.

Major investment required across all broad infrastructural categories

As very strong growth in house prices in Dublin city and inner suburbs force first-time buyers into the outer suburbs and surrounding regions, major initiatives are required to ensure that the public transportation infrastructure can meet rapidly expanding demand. This will require major investment, in particular in the rail infrastructure to extend the suburban rail, and also in the urban bus network. The prospect of continued strong economic performance is likely to sustain the momentum of housing demand over the medium-term. Major investment is therefore also required in environmental infrastructure, water and sewerage, to ensure an adequate supply of serviced land for development.

Significantly higher degree of strategic planning and co-ordination of state activities required

An assessment is also required of how best to ensure the essential high degree of strategic planning and co-ordination of state activities in the areas of transportation, housing and the provision of environmental infrastructure. The approach taken in some other countries is highly relevant in this regard. The operation of the planning system requires further review to expedite the planning process, particularly in relation to key strategic projects in national transportation infrastructure for example the Dublin Port Tunnel and the completion of the Motorway Ring for Dublin. The question of whether a more liberalised market structure for public transportation would be better suited to meet future needs should also be reviewed.

Supply measures alone will not solve the roads problem

Although the road network requires major upgrading, if supply is not to diverge even further from demand, international experience is that supply side measures alone will never solve the problem - private car usage is likely to be highly responsive to increased road capacity. Measures are clearly also required to restrain demand for scarce road space requiring fundamental changes in traffic management practices. A system of road pricing should be considered in heavily congested urban areas. Clearly, one of the best ways of discouraging private car usage in congested urban centres is the provision of quality public transport. This raises the question of the contribution that deregulation and liberalisation of bus and rail services could make to the provision of better quality and more cost efficient services.

ESRI national investment priorities report recommended major investments in inter-urban roads and public transport

The ESRI investment priorities report has recommended a major increase in investment in inter-urban roads in order to both ease the existing backlog of projects and to begin to put the road infrastructure in place, which is required to sustain future growth of the economy. The ESRI also recommend a very large allocation of resources to investment in the next National Development Plan to urban public

transport, to meet all remaining projects under the Dublin Transportation Initiative, new investment in suburban rail and for ensuring proper access to Dublin airport.

Regional air services inadequate

The Report of the Forfás Air Services Group concluded that relative to both business needs and the needs of regional competitiveness, the level of air services is inadequate at both Cork and Shannon airports. The report also identifies the scope for improving the quality of eastward air services into and out of Cork and Shannon airports on a commercial basis.

Ireland must aim for a leadership position in logistics

Logistical systems are facing a transformation as long-established supply chains conventions are revolutionised by technological change. Ireland must, therefore, now aim specifically for a leadership position in skills and expertise across the broad logistical area. This can be best achieved through partnership, drawing on the complementary expertise possessed by business and third level researchers.

Energy

Industrial electricity costs higher than in Britain

The level of energy costs is a key factor for competitiveness in terms of its impact on international cost-competitiveness, the attractiveness of the Irish economy for foreign investment and firm-level profitability. In terms of electricity costs, Ireland is below the EU average for medium- and large users and above the EU average for smaller users. However, overall electricity costs exceed those in Britain.

Ireland lagging behind leaders in pace of energy market liberalisation

The only natural monopoly aspect of the energy market in Ireland is the transmission/distribution network yet there are monopolies over both downstream supply markets and upstream generating markets. Market liberalisation is essential in order to generate greater price competition and cost competitiveness. This is emerging with the advent of EU energy market liberalisation. However, in terms of the pace of liberalisation Ireland and most of the EU are lagging behind leading countries such as the UK.

More rapid market opening raises many important issues

The partial opening-up of the electricity market under the Electricity Regulation Bill should deliver a more efficient and dynamic electricity industry, at least for the three hundred largest electricity users in the country. Progress towards an open market is at the minimum pace required under the EU directive. In assessing the need for more rapid deregulation a range of other issues must now be addressed, including the need to achieve cost-competitiveness with Britain, re-balancing of the electricity tariff structure between domestic and commercial users, the appropriate distribution of adjustment costs from environmental regulation and the need to ensure adequate investment in generating capacity to meet future needs, including those using environmentally friendly energy resources.

Small and Medium Enterprises (SMEs)

Indicators point to a relatively underdeveloped SME sector in Ireland

Ireland appears to lag behind other countries in SMEs having a below average number of very small enterprises (less than 90 per cent of total enterprises have fewer than 10 employees as compared to the EU average of 93 per cent) and also in

the rate of business formation. This signifies a weak supporting environment for entrepreneurship in the Irish economy, which limits the diversity and richness of Ireland's enterprise structure. Ireland also possesses the highest employment share in Europe for large enterprises, at over 50 per cent, as compared to the EU average of just over one-third. SME productivity is below average, but profitability is not. Value added growth in Ireland's SMEs has been higher than in large firms and is the highest in Europe.

Flexible and dynamic SME sector critical to economic success

The pivotal role of the SME sector in the economy in enhancing national competitiveness is well known. In the new EMU environment a vibrant, dynamic and flexible SME sector is crucial to Ireland's competitive success. In encouraging the growth and development of this sector the promotion of entrepreneurship, individual risk taking, should be an increased focus of support.

Collaborative strategies should be adopted to strengthen specialisation

The competitiveness of this sector of the economy can be enhanced significantly if SMEs can adopt collaborative strategies, to realise collectively the advantages of economies of specialisation that they do not possess individually because of their small size. Successful groups of small firms have aggregated networks internationally, thereby networking local clusters. Research suggests that SMEs in Ireland appear to have increased the extent of their international linkages or connectivity in the last five years. However, they have also been more affected by the operation of the Single Market, the impact of which is likely to intensify under EMU.

Structural weaknesses highlight need for major policy initiatives

An assessment of the position of SMEs in Ireland relative to other European countries and their main structural weaknesses points to the need for a number of policy initiatives to improve their future performance:

- The operation of the scheme for new entrepreneurs to recover previous PAYE tax paid requires review as to its impact in encouraging entrepreneurship.
- The County Enterprise Boards could be encouraged to seek to build on existing strengths in particular regions in order to encourage growth in enterprise scale.
- Plans for the implementation of the next round of EU structural funds should incorporate explicit targets for SME development as part of regional development strategy, including changes to reflect sectoral specialisation at county level and institutional development (R&D, marketing and advisory support services) for small firms.
- Infrastructural development (transport, telecommunications) plans should take explicit account of the needs of small firms, especially in the areas of logistics and labour supply.
- Training systems for SMEs in marketing, financial management and other disciplines need to be developed that take account of the wide variety of training requirements in SMEs, and the limited availability of key staff to undergo training.
- Distance learning options for SMEs should be examined.
- A special review of education and training in entrepreneurship is needed.
- Programmes on e-commerce should give priority to the SME sector, because the development of the information society will encourage the development of international linkages for these firms and overcome deficiencies related to the small scale of their operations.
- The Business Development Action Programme being prepared by the Department of Enterprise, Trade and Employment in connection with the

implementation of the information society should reflect SMEs as a key priority.
- Development of public service access interfaces within the e-government process should have the needs of SMEs in a central position, with a focus on the full range of information that a small firm has to provide.

Public Administration

Ireland - low tax and sharply declining debt ratio

In 1998 Ireland ranked 3rd of 15 countries in terms of general government debt (5th in 1997) and 2nd for the general government balance (as a percentage of GDP in both cases) and continues to be ranked first in the EU for both the share of public expenditure and receipts in the economy.

Regulatory reform central to the reshaping of the public sector and broader economic performance in EMU

The quality and efficiency of public administration impacts directly on the environment in which businesses operate and hence on the competitiveness of the economy as a whole. Regulatory reform is central to the process of reshaping the public sector and Ireland's EMU membership greatly increases its importance as a policy tool. The objective of any programme of regulatory reform should include enhanced international competitiveness and flexibility in the economy leading to a stronger adjustment capacity in responding to economic shocks. Regulatory reform has the potential to increase productivity, lower prices, stimulate innovation and ultimately raise GNP. Government must however create the right administrative infrastructure for promoting regulatory reform and new flexible institutions must be designed to adjust quickly and flexibly to market developments. The proper balance must be established between high quality social regulation (e.g. quality and safety) and low level economic regulation (e.g. quantity) as well as between the regulatory and ownership role of Government Departments. In the future the interaction between competition, deregulation and regulatory quality will be central to the conduct of policy. The exact nature of the relationship between the Competition Authority and sector specific regulators will be pivotal to the success of regulation and competition policy.

Faster adoption of ICTs will accelerate restructuring of the public sector

ICTs will also play an important role in the necessary restructuring of the public sector. The faster uptake of ICTs by Government is crucial to enhancing public sector productivity and will act as a catalyst for the adoption of ICTs by business and the general public. The implementation of ICTs should be coupled with new organisational arrangements within the public sector in order to derive maximum benefit for the public from their introduction. There is also a clear need to address the accountability of public servants in association with the development of more flexible and innovative reward systems. Finally, the public sector must continue to re-define itself in terms of its quality of service to the public.

Survey of Irish enterprise presents a mixed picture

According to a survey of Irish business[25] assessing enterprise perceptions of Government support, investment priorities and competitiveness issues generally, the most positive impact of Government policy is in education and training with environmental regulation the most negative. Businesses see the highest priority for structural fund investments in roads and transport (43 per cent), with education in second place (22 per cent). With regard to the competitive position of Irish firms themselves, some indicators are encouraging, with very high use of e-mail and the Internet. However, investment by enterprise in three key areas varies: it is highest in

IT equipment (8.3 per cent of current expenditures), 5.6 per cent for training and 4.5 per cent for R&D. With regard to foreign linkages, 44 per cent have no co-operative or investment links with foreign firms. This may be related in some cases to proficiency in foreign languages: 61 per cent of firms have no foreign language capabilities

1 Progress and Performance

1.1 Socio-economic Performance

Key Points

- Ireland has a leading position in growth and employment generation
- Ireland lagging behind in per capita income levels

Indicators in Top Quartile	Rank 98	Rank 99
• GDP growth (GNP for Ireland)	1st out of 28	1st out of 28
• Cumulative employment growth 1996-98	1st out of 28	2nd out of 28
Indicators in Second Quartile		
Indicators in Third Quartile		
• Consumer prices	6th out of 28	20th out of 27
• (Standardised) Unemployment rate (SUR)	16th out of 20	12th out of 21
Indicators in Fourth Quartile		
• GNP per capita compared to the EU average (GDP per capita)	14th out of 17	14th out of 17

The definition of competitiveness used in the first Annual Competitiveness Report was "...success in markets that translates into general increases in welfare." Using this criterion Ireland's competitiveness at the present time appears outstanding. The economy has gained large increases in export market share. Over the past three years, growth in the volume of exports has been almost twice growth in Ireland's export markets. This section briefly examines some indicators of improved living standards, which attempt to measure the extent to which Ireland's exceptional exporting performance has been translated into favourable socio-economic outcomes, such as strong output and employment growth, low inflation and unemployment and rapid income convergence in terms of GNP per capita, measured relative to the EU average level of GDP per capita.

Table S19 Socio-Economic Performance

		1	2	3	4	5
	Indicator	**Cumulative employment growth %**	**Consumer prices, average annual rate (%)**	**GDP growth (%) (GNP for Ireland)**	**GDP per capita/EU GDP per capita (PPS) (%) (GNP for Ireland)**	**Standardised unemployment rate (%)**
	Year	**1996-1998**	**1998**	**1998**	**1998e**	**1998**
Country	Observations	28	27	28	17	21
Denmark	Value	5.60	1.8	2.4	116.4	5.1
	Rank	9	16	22	3	9
Ireland	Value	14.11	2.4	8.5	89.3	7.8
	Rank	2	2	1	14	12
Japan	Value	1.50	0.6	-2.6	115.1	4.1
	Rank	20	3	26	4	4
Netherlands	Value	6.54	2.0	3.8	105.3	4.1
	Rank	7	18	10	8	4
New Zealand	Value	4.64	1.2	0.2	0	7.4
	Rank	12	11	26	0	11
UK	Value	3.33	3.4	2.7	98.7	6.3
	Rank	18	22	20	12	10
US	5.19	1.5	3.5	144.9	4.5	
	11	13	13	2	7	

Under the first indicator cumulative employment growth over the three-year period 1996-98 Ireland is ranked second among all OECD members countries. Ireland's ranking, for reasons of international comparability, does not take into consideration the latest Quarterly National Household Survey figures from the Central Statistics Office released late last year which showed growth in employment of almost 100,000 in the year to April 1998.

Ireland ranks 20th out of 27 countries in terms of its inflation performance in 1998. Ireland's annual inflation rate increased sharply during the first half of 1998. It peaked in August 1998 at an annual rate of 3.2 per cent, compared with an average of 1.5 per cent for the whole of 1997. However, by December 1998 inflation had moderated significantly to 1.7 per cent with inflation averaging 2.4 per cent for the year as a whole. However, excluding the impact of recent cuts in mortgage interest rates, arising from the convergence of Irish interest rates to core euro levels, Ireland's annual inflation rate stood at 2.5 per cent in December.

On the basis of the internationally comparable Harmonised Index of Consumer Prices (HICP) which is a more meaningful measure of Ireland's comparative inflation performance, Ireland's inflation rate was 1.2 per cent, on average, in 1997. It rose sharply relative to the Euro 11 average in the course of 1998 to 3 per cent, but by January of this year had fallen back to 2.1 per cent. This was still considerably higher than either the EU15 or the euro zone average which stood, at that time, at 0.9 per cent and 0.8 per cent respectively. Ireland's HICP inflation rate rose to an annual rate of 2.3 per cent in February, 0.8 percentage points higher than that of the UK at 1.5 per cent.

In terms of GDP growth (GNP in the case of Ireland), Ireland is ranked first in the OECD. Indeed in terms of GDP growth Ireland has topped the OECD growth league for the past four years, a performance projected to be repeated again in 1999.

The cyclical divergence between Ireland and many of its EU partners should, however, be borne in mind in evaluating Ireland's output, employment and inflation performance.

GDP per capita relative to the EU average[1], a 'headline' measure of the improvement in living standards, has increased from an average of 66 per cent over the 1980s to 94 per cent in 1995, to well in excess of 100 per cent at the present time. However, in assessing Ireland's exceptional performance it is essential to differentiate clearly between the rapid progress that certainly has been achieved, and Ireland's absolute standing in terms of key measures of national well-being. As is well known, high levels of net factor outflows from the Irish economy, mainly reflecting large profit repatriations by foreign multinationals located in the Irish economy (and to a lesser extent interest payments on foreign debt) drive the level of GNP in the Irish economy about 15 per cent below that of GDP. Hence, GNP per person in Ireland, the measure of income convergence used in this Report remains around 10 per cent lower than the EU average and up to one-fifth lower than that of the small high-income EU economies[2]. Ireland ranks 14th of the 17 countries comprising the EU, the US and Japan with just Spain, Portugal and Greece being less well off.

The unemployment rate comparison in the fifth column of Table A19 is based on the internationally comparable standardised unemployment rate (SUR). This is a critical indicator of economic and social progress as it measures the degree to which human resources in the economy are being fully utilised and the benefits of economic success are being shared among the whole population. By this measure, Ireland is still not performing strongly, ranking 12th out of 21 countries. Ireland's position under this heading suffers from the exclusion, for purposes of international comparability, of the most recent unemployment figures. The latest CSO SUR estimate for the Irish economy for February 1999 is 6.8 per cent, a decline of 1.4 percentage points over the preceding year. However, this more recent data would be unlikely to push Ireland's international ranking into the second quartile (top 50 per cent) of OECD countries.

1.2 Progress in competitiveness

1.2.1 Overall performance

This Report examines over one hundred and twenty indicators to assess progress in Ireland's competitiveness relative to the position detailed in the first Annual Competitiveness Report published in March 1998[3]. Progress in competitiveness is measured using the indicators in two ways:

- the change in Ireland's international ranking[4]
- and also, where appropriate, by the change in the percentage achieved of the "best performing" (or first ranked) country[5]

The second measure tracks Ireland's performance relative to best practice internationally. It highlights the need for Ireland to both improve its international ranking overall, but also to make progress relative to leading countries.

As can been seen from Table 1.1 below Ireland's ranking has improved for 35 indicators, disimproved for 25 and remained unchanged for 17. As a percentage of the "best-performing" country Ireland's standing has improved for 36 indicators, disimproved for 33 and remained unchanged for 4[6]. Over thirty indicators first presented in the 1998 Report could not be updated due to a lack of more recent data. Fifteen new indicators have been added, however and nine indicators have been replaced[7]. Annex 3 sets out the detailed tables in each case, including all countries for

which data is available. Annex 2 of the Report provides detailed definitions and sources for all the competitiveness indicators analysed in this report.

Table 1.1 Progress in Ireland's competitiveness performance

	Change in Ranking	Change of Best Performing country
Improved	35	36
Disimproved	25	33
Unchanged	17	4
Not Applicable	-	4
No Update Available	31	31
New	15	15
Replaced	9	9
Total Indicators	123	123

1.2.2 Main competitiveness improvements

Table 1.2 sets out the ten largest improvements in Ireland's competitiveness rankings. As can be seen some significant improvements in Ireland's international rankings have occurred over the time period covered in the report.

Table 1.2 Ten most improved indicators - ranking

(where rank has improved most since the 1998 report - three indicators tied in tenth position)

	Rank 1998	Rank 1999
Top rate of corporation tax	20	8
Incidence of part-time employment[8]	19	12
Researchers in higher education and government institutions per 1000 labour force	11	5
Percentage of population (25-64 years) that has attained 3rd level education	14	8
Standardised Unemployment rate (SUR) (%)	16	11
2 M/bits leased lines national circuit - annual rental 100 KM (US$)	8	3
Letter costs - EU domestic tariffs (Irish pence)	9	4
Gas Prices - industrial rate excl. VAT (41860 GJ/250 days/4000 hours)	6	1
Analogue leased lines national circuits - annual rental 100 KM (US$)	7	2
Long term interest rate	14	10
Analogue leased lines international circuit to the USA (US$)	7	3
Income tax plus employees social security contribution rate - as a percentage of average earnings (married, 100, 0, 2 ch.)	11	7

- Ireland has moved up twelve places from 20th to 8th place (of 29 countries) in respect of the reduction in the top rate of corporation tax to 32 per cent in the 1998 Budget. The reduction to 28 per cent announced in the 1999 Budget last

December should bring Ireland into the top quartile of countries and, of course, the introduction of a 12.5 per cent rate by 1 January 2003 will place Ireland in a highly competitive position in this area.

- Ireland has achieved a large improvement in its international ranking in its good performance for the **unemployment rate.** Ireland moved up five places in the league table from 16th to 11th of 20 OECD countries on the basis of average unemployment in 1998 of 7.8 per cent. However, Ireland's current unemployment rate at 6.8 per cent (February 1998) would be unlikely to push Ireland's ranking from the third into the second quartile of the countries surveyed.
- There have also been significant improvements in Ireland's ranking for some of the indicators of **telecommunications costs**[9]. However, this data refers to the position in February 1999 and includes large reductions in leased line prices made in Ireland towards the end of 1998. Price structures elsewhere are changing rapidly on an ongoing basis so these indicators must be monitored closely in order to ensure Ireland's maintains its position.

Strong measured progress in indicators of 3rd level **educational attainment**[10] (from 14th to 8th of 22 countries) and in the number of researchers in **higher education and government**[11] (from 11th to 5th of 22 countries) is welcome. However, these rapid improvements are probably overstated (but not the current level of the indicators) since these type of indicators tend to change only slowly over time. According to the OECD there was a 4 percentage point improvement in the share of the working age population in Ireland with a third level education, from 19 per cent in 1994 to 23 per cent in 1996. Similarly the number of researchers in higher education and government per 1000 in the labour force is estimated by the OECD to have risen, by 2.6 per 1000 in 1993 to 3.4 per 1000 in 1995, an increase of 30 per cent. These increases, over a relatively short period of time, are implausible and probably reflect the under-estimation of the indicators in the first year in each case.

Table 1.3 lists the ten indicators where the largest improvement relative to the best performing country has taken place.[12]

Table 1.3 Ten most improved indicators - % best performing country

(where most improvement has been made since the 1998 report as a percentage of the best performing country)

	% of best performing country 1998 Competitiveness Report	% of best performing country 1999 Competitiveness Report
Net lending (+) or borrowing (-) of General Government as a percentage of GDP	30	95
2 M/bits leased lines national circuits - annual rental 100KM (US$)	23	56
Analogue leased lines - international half circuits to the USA (US$)	45	78
Gas Prices - industrial rate for large users	68	100
Mobile subscriptions per 1,000 capita	25	56
FDI inflows as a percentage of GDP	24	52
Manufacturing exports - concentration, standard deviation of exports by sector	38	65
Incidence of part-time employment	32	57

Science and engineering degrees awarded as a percentage of the total number of degrees awarded	55	79
Long term interest rate	14	10
Analogue leased lines national circuits - annual rental 100 KM (US$)	22	44

Measured relative to the *"best performing"* (first ranked country), of the ten most improved indicators four are for telecommunications costs. Other improvements have been recorded in the areas of public finance, trade and FDI, science and technology, employment and energy.

Some of the more noteworthy improvements arise in relation to:

- gas prices for industrial users which jumped from about 70 per cent of the best performer, the UK in 1997 to overtake it in 1998 as the top ranked country of 11 EU member countries. As 50 per cent of Irish gas purchases came from the UK in 1998, Ireland has benefited from historically low gas prices in the UK wholesale market
- the share of science and engineering degrees in total degrees awarded increased from over half of the proportion in the best performing country in 1994 to almost four-fifths in 1996, to stand at almost one-third of total degrees awarded in Ireland in that year - the proportion of science and engineering degrees in the leading country Finland in 1996 was almost 40 per cent of the total degrees awarded
- FDI inflows as a percentage of GDP have increased from about a quarter of the best performing country to over half. This partly reflects the surge in US FDI into the Irish economy from $2.4bn in 1996 to $4.5bn in 1997, an increase of 89 per cent. US direct investment in the Irish manufacturing sector increased by two-thirds over the same period (from $1.5bn in 1996 to $2.5bn in 1997) - the most recent data from the US Commerce Department on US direct investment abroad shows that US investment in Ireland in 1998 was slightly weaker than the record inflows of $4.5bn in 1997 despite an increase in total US foreign investment in manufacturing of 7 per cent worldwide in the year (chemicals +13%, electronics +8%).

1.2.3 Main competitiveness disimprovements

The main indicators for which Ireland's competitiveness has deteriorated are exhibited in Table 1.4 in terms of international ranking, and in Table 1.5 as a percentage of the best performer.

Table 1.4 Ten most disimproved indicators - ranking

(where rank has disimproved most since the 1998 report)

Disimproved Ranking From 1998	Rank 1998	Rank 1999
Consumer prices	9	20
Interest Rate Spread - Absolute	9	19
Industrial Occupancy Costs (IRP£ per sq m)	5	10
Heavy Fuel Oil Prices for Industry (US$ per toe)	17	22
School Expectancy for a 5 year-old child (years)	15	19
Unit labour costs in the total economy	6	10
Office Occupancy Costs (IRP£ per sq m)	5	9

Building Costs - Offices (per sq m - IRP£)	8	12
Days lost in industrial disputes per 1000 civilian employment	18	21
Compensation per employee (annual average change) 1992-97	5	8

Table 1.5 Ten most disimproved indicators - % best performing country

(ten largest disimprovements since the 1998 report as a percentage of the best performing country - two indicators tied in tenth position)

	% of best performing country 1998	% of best performing country 1999
Nominal unit labour costs (annual average change %)	100	31
Cumulative Employment, growth %	100	62
Office Occupancy Costs (IRP£ per sq m)	76	45
Interest Rate Spread - Absolute	52	23
Building Costs - Offices (per sq m - IRP£)	55	31
Marginal (income plus employees social security) Tax Rate - Married, 100, 0, 2 ch.	58	36
Income Tax plus Employees Social security contribution rate as a percentage of average earnings (single, 100, no ch.)	57	35
Industrial electricity prices 24GWh per annum - VAT excld. (ECU)	65	48
Tax as a percentage of GDP	96	81
Industrial occupancy costs (IR£ per sq. m.)	67	53
Compensation per employee (annual average change %) 1992-97	72	58

There have been some notable disimprovements in Ireland's international competitiveness over the time-period covered.

- For **consumer prices** Ireland's international ranking slipped eleven places from 9th to 20th of 28 OECD countries reflecting the deterioration in Ireland's inflation performance from an annual increase of 1.5 per cent in 1997 to 2.4 per cent in 1998. Although Ireland's annual inflation rate fell back to 1.6 per cent in February 1999 from its peak of 3.2 per cent in August 1998, this reflected in large part the impact of mortgage interest rate reductions under the convergence of Irish interest rates to euro levels. In January of this year there was a gap of 1.3 percentage points between Ireland's inflation rate (2.1 per cent) and that of the euro zone average (0.8 per cent) when measured on a comparable (HICP[13]) basis. Ireland's HICP inflation rate increased to 2.3 per cent in February. UK inflation currently stands at 1.5 per cent (February 1999) on the same basis, 0.8 percentage points lower than in Ireland.
- Ireland's position in relation to **Internet development** also appears weak. Ireland's ranking in terms of Internet hosts per thousand has declined two places when compared to the 19 countries surveyed in last year's report. Ireland stood in July 1998 in 16th position in the third quartile of 29 countries for which information on this indicator is now available.[14] Future success in key growth sectors of the digital economy such as e-commerce demands a position among leading countries in the top quartile.

- In the case of **interest rate spreads,** the gap between deposit and lending rates was high in 1997. On this indicator Ireland's ranking fell from 9th in 1996 to 19th for 1997, slipping from the second to the bottom quartile of 24 developed countries. While interest rate convergence in EMU progressively improved Ireland's position from the final quarter of 1998 onwards, the spread, which now stands at about 3.5 percentage points, is likely to remain outside the top quartile.
- Ireland has slipped four places from the top to the second quartile in terms of (the percentage change in) **unit labour costs**[15] and is now ranked 10th of 24 advanced economies. In 1997 the increase in unit labour costs in Ireland at 0.3 per cent was 2 percentage points higher than the first ranked country Finland (where unit labour costs declined by -1.7 per cent) and Ireland was ranked 6th in the OECD. In 1998 unit labour costs in Ireland are estimated to have increased by 1.7 per cent, 2 percentage points higher than the best performer Italy (where unit labour costs fell by -0.3 per cent) and also higher than both the OECD and EU averages (1.6 per cent and 1 per cent respectively - the figure for the euro area is just 0.2 per cent). The OECD project that Ireland will fall to joint 15th position for this indicator in 1999[16].
- Ireland is ranked 8th in the EU in 1998 for growth in **compensation per employee** over the preceding five-year period, down three places from its 5th in 1997. Ireland has declined by almost 14 per cent relative to the best performer from 72 per cent of the Netherlands in 1997 to 58 per cent of Finland in 1998. Projected continued strong growth in wage compensation is likely to result in a further deterioration in Ireland's relative performance in 1999[17].
- The measured deterioration of four places to 19th in the OECD in terms of **school expectancy**[18] is a statistical anomoly (discussed in more detail in Chapter 2) as is the finding that Ireland's tax share has risen relative to that of the best performer for this indicator. The tax share in Ireland in 1998 estimated by Eurostat at 33.7 per cent was the lowest in the EU and only slightly higher than that of the first ranked country, Japan (33.0 per cent).
- Three important indicators of **commercial property costs** are in this group of indicators where Ireland's performance has been poor. Ireland's position has worsened considerably, both as a percentage of the best performing country and in its international ranking. For office occupancy and building costs Ireland's ranking has fallen four places and by 31 and 24 percentage points respectively. For industrial occupancy costs Ireland's ranking has slipped five places and by 14 percentage points as compared to the best performer. This has significant implications for the competitiveness of the Irish economy particularly for small and medium enterprises (SMEs). Moreover, this data refers to 1997. The current situation is highly likely to be even worse.
- According to Tables 1.4 and 1.5 above Ireland has experienced a worsening of its position in relation to some average and marginal tax rates relative to the best international performers. However, this data refers to 1996 and subsequent budget changes will have changed the position considerably. In any event for both indicators Ireland's international ranking has, according to the OECD data, improved in 1996 although it remained in second and third quartile positions overall. In fact the average tax rate for a single person earning £14,000 per annum (full rate PRSI contributor) has fallen almost 12 percentage points from 31.7 per cent in the tax year 1994/95 to 19.9 per cent in 1999/2000.

There are in addition a large number of indicators in respect of which there has been a small deterioration in Ireland's international ranking of one or two places. This could be of concern if it reflects an emerging trend. Key areas of competitive weakness in the Irish economy, where little or no improvement has been secured, are a serious cause for concern. Ireland's continued poor standing in terms of road and rail

infrastructure highlights, as discussed below, one of the major bottlenecks threatening to constrain Ireland's growth performance over the medium-term.

1.2.4 Conclusions

The approach used in this section provides a structured framework for the analysis of competitiveness issues in the Irish economy. The goal of national competitiveness is essentially concerned with facilitating the achievement of Ireland's potential for economic growth and social progress over the medium-term by improving the productivity of labour and capital resources and the efficiency of their use in the economy. The competitiveness agenda considered in this report therefore encompasses a broad spectrum of policy objectives. The main advantages of representing these objectives by a relatively small number of quantifiable indicators are twofold:

- firstly, notwithstanding the inevitably high degree of simplification involved in the process, it reduces the scale of the analysis to a more manageable proportion
- secondly, it facilitates the setting of clear and explicit targets in the sphere of national competitiveness in respect of which progress can be easily and relatively costlessly monitored overtime

The next steps in developing this methodology, initiated in the next section but to be continued over the next year, will be:

- to examine the reasons underlying the achievement of a top ranking under the various headings
- to identify, in a qualitative fashion, the key competitiveness indicators most frequently associated with the achievement of sustained competitive advantages internationally
- and to study the consistency of the diverse range of indicators with particular models of economic and social development and their national institutional structures

1.3 Competitiveness Targets

1.3.1 Introduction

Targets for competitiveness are relevant for policy formulation, because they set a goal for measuring performance in improving competitiveness, overall socio-economic performance and the quality of life. Development of a set of targets helps focus the policy debate firmly toward the achievement of sustained improvements in Ireland's international standing in competitiveness.

A successful targeting approach requires the identification of explicit objectives, which are clearly associated with higher investment levels in the economy (or the removal of barriers to investment) and hence in improved competitiveness performance. Targets also clarify policy choices and priorities such as, for example, the structure of taxation. It necessitates a careful assessment of the instruments, which can be used to achieve the targets adopted. A feedback process is also essential in order to allow monitoring on an on-going basis of progress achieved. No single country is likely to provide the correct benchmark for Ireland across the broad spectrum of appropriate competitiveness indicators. Competitiveness targeting drawing on best performance across a range of countries is a more useful and pragmatic approach.

This section of the report describes a methodology for identifying as a first step in this process, a preliminary set of clear, sensible, workable competitiveness targets for Ireland. Further work by the Council will examine how the other elements of a targeting approach could be put in place. This will include consideration of the impact on current public policy priorities, resource implications (if any) and the appropriate time frame for achievement of the targets in each case.

The priority issues identified by the Council for 1999 and around which Ireland's competitive performance requires to be improved at the present time, provide a structured framework for the construction of an explicit set of competitiveness targets as part of a medium-term strategy for enhancing the international competitiveness of the Irish economy. The seven critical issues for public policy, action on which can make a major contribution to Ireland's medium-term competitiveness performance are:

- social cohesion
- people
- costs
- infrastructure
- e-commerce
- competition and regulation
- science and technology

The achievement of enduring competitive success and consequent economic and social progress depends on Ireland's capacity to secure sustained improvements in its international ranking in these general areas. In order to build on the progress achieved in income convergence[19] to date, Ireland must aim for a top quartile ranking in each of these broad areas of national competitiveness.

However, setting targets for competitiveness is a complex task. It is difficult to determine useful targets on an individual basis. If the targets are chosen on a functional basis there may be a lack of consistency between the target chosen across different dimensions of competitiveness (e.g. targets chosen for employment may not be consistent with targets adopted for education or taxation for example). Targeting the competitiveness indicators of another more successful country may appear to provide a solution to this, because there is already some consistency and coherence between the different elements of its competitiveness performance. But a geographic approach to targeting raises questions regarding the homogeneity of social and cultural values and/or institutional structures. It may be more appropriate, in this context, to consider country groupings.

The following section of this report sets out a structured analytical approach to identifying an explicit set of competitiveness targets for Ireland based on country groupings encompassing the priority areas chosen by the Council. A statistical technique, cluster analysis[20], is used to determine what group of countries Ireland currently is closest to, and indicates in broad terms what target levels for the indicators Ireland should aim for in the future which helps ensure an adequate degree of consistency and coherence between the targets chosen.

1.3.2 Analysis of data

A number of competitiveness indicators were selected from this Report which are associated closely with the broad priorities identified by the Council in its 1999 Work Programme (set out in the above section) as strongly influencing the international competitiveness of the Irish economy over the medium-term. These indicators and the Council priorities to which they relate are set out in Table 1.6 below.

Table 1.6 Competitiveness indicators and related competitiveness priorities

	Social Cohesion	People	Costs	Infrastructure	E-commerce	Competition & Regulation	S&T
% working age population with 3rd level education	*	*					
Hourly Compensation Costs	*	*	*				
Tax wedge A.P.W	*	*	*				
Income tax (top rate)		*	*				
Female participation. rate (%)	*	*	*				
Long-term unemployment rate	*	*	*				
S&T degrees (% total)							*
Business R&D (% GDP)							*
IT market growth (%)				*	*	*	*
FDI inflow (% GDP)			*				*
Internet hosts per 1000 capita				*	*		
Index of telecommunications costs				*	*	*	
CO2 energy user emissions	*						
Manuf. Exports Diversification (by country)	*	*	*	*	*	*	*
Manuf. Exports Diversification (by sector)	*	*	*	*	*	*	*

A total of fifteen indicators were chosen[21]. As can be seen from Table 1.6 above, many of them encompass more than one of the Council's priorities[22]. While more indicators would have been desirable, this would have resulted in a smaller sample of countries in the analysis and resulted in a good deal less tractability in target setting.[23]

The list of the nineteen countries included in the analysis is set out in Table 1.7. At the highest level, all countries are part of the one group, but on closer examination they fall into groups and subgroups of these. Cluster analysis, essentially takes the total group of countries and on the basis of the values of each of the indicators for a country and how similar they are to another country (using an average or other summary statistic), arranges them into groups and sub-groups of "similar" countries.

Table 1.7 Countries in the sample		
Australia	Germany	Portugal
Austria	Greece	Spain
Belgium	Ireland	Sweden
Canada	Italy	Switzerland
Denmark	Japan	United Kingdom
Finland	Norway	United States
France		

1.3.3 Identification of groups

The cluster analysis, applied to the countries and data, led to the emergence of a number of clearly distinguishable groups. Moreover, the groups shared easily identifiable geographic or macroeconomic characteristics. The first group (Spain, Portugal, Italy and Greece) has often been called the "Club Med" group in the context of EMU (at least as far as the first three countries are concerned). The second group Ireland, Belgium, and Austria, could be called the small open economies group (SOE). The third group (Norway, Sweden, Denmark and Finland) is the Nordic group. The remaining countries are large and diversified economies: Australia, United States, France, United Kingdom, and Japan. With the exception of Australia they all belong to the G-7. A final small group is of Germany and Switzerland. The remaining countries are not sufficiently similar with one another or with any of the other groups and hence are not members of any group. The five groups are given in Table 1.8.

Table 1.8 Competitiveness country groups	
Group	**Countries**
"Club Med"	Italy, Spain, Greece, Portugal
Small open economies (SOEs)	Austria, Ireland, Belgium
Nordic	Norway, Sweden, Denmark, Finland
Large economies	Australia, United States, France, United Kingdom, Japan
Advanced	Germany, Switzerland
Ungrouped	New Zealand, Canada

1.3.4 Targets

Table 1.9 below sets out the average value of each indicator for the five groups identified above and the overall rankings in each case.

Table 1.9 Values for the indicators and overall rankings

Indicator		Advanced	Large economies	Nordic	SOE	"Club Med"
Percentage of 25-64 year olds with third-level education		22.00	24.12	24.50	17.33	13.00
	Rank	3	2	1	4	5
Hourly compensation costs		30.10	17.76	24.63	21.73	11.42
	Rank	5	2	4	3	1
Tax wedge		53.00	35.00	59.00	54.30	49.48
	Rank	3	1	5	4	2
Top rate of income tax		32.20	46.68	49.18	47.53	48.00
	Rank	1	2	5	3	4
Female activity rate		65.15	62.46	73.63	56.23	49.28
	Rank	2	3	1	4	5
Long term unemployment		3.10	2.28	2.57	5.41	7.44
	Rank	3	1	2	4	5
S&T degrees as percentage of total		35.75	27.02	29.55	30.73	22.60
	Rank	1	4	3	2	5
Business R&D percentage of GDP		1.70	1.46	1.44	0.99	0.32
	Rank	1	2	3	4	5
Growth in IT market (compound annual growth rate)		12.10	9.12	6.23	9.80	5.68
	Rank	1	3	4	2	5
Diversification by country		0.13	0.10	0.11	0.14	0.10
	Rank	4	2	3	5	1
Diversification by sector		0.04	0.04	0.04	0.06	0.05
	Rank	2	3	1	5	4
FDI inflow percentage of GDP		0.45	1.58	2.18	2.80	0.98
	Rank	5	3	2	1	4
Internet hosts per 1000 capita		21.50	17.25	62.95	14.57	5.04
	Rank	2	3	1	4	5
Index of telecommunications charges		106.60	106.06	46.93	124.27	147.40
	Rank	2	3	1	4	5
CO2 energy user emissions		8.35	12.14	9.13	9.60	6.53
	Rank	2	5	3	4	1

As can be seen, the SOE group to which Ireland is found to belong achieves just one top ranking (FDI inflows % GDP) and two second place rankings (S&T degrees % total

and growth in IT market). Two indicators for the SOE grouping are ranked 3rd of the five groups and the remainder are either in 4th (8 indicators) or 5th (2 indicators) position. Comparing Ireland's indicators to those of the SOE grouping as a whole, Ireland is not significantly better than the SOE average other than for long-term unemployment (reflecting the very high level of structural unemployment in Belgium) and to a lesser extent hourly compensation costs (which still exceed those of the top ranked grouping "Club Med") and in respect of some indicators, in particular female labour force participation, is a good deal worse.

1.3.5 Suggested targets

The above methodology yields plausible results. A distinct set of country groupings is revealed by the cluster analysis. The targets are easy to understand and are drawn from a number of key areas related to competitiveness performance and sustained positive socio-economic outcomes. The challenge for Ireland, therefore, is to achieve a top quartile ranking in respect of each of the indicators identified above (i.e. in broad terms corresponding to the average for the top ranked country grouping in each case) which would considerably strengthen the international competitiveness of the Irish economy.

The analysis suggests that Ireland's competitiveness would benefit particularly at the present time from measures to improve its international standing in relation to the following indicators:

- tax wedge (% difference between gross and net pay)
- top rate of income tax
- female participation rate
- percentage of working age population educated to 3rd level
- S&T degrees (% total degrees awarded)
- business R&D (% GNP)
- export diversification (by country and by sector)
- Internet hosts per 1000
- telecommunications charges

Clearly, these should be supplemented by targets for Ireland's transport infrastructure given the major competitiveness weaknesses of the Irish economy in this area at the present time.

At the same time some limitations of the approach should be recognised. Economic and social progress is the outcome of a complex interaction of policies, institutions and social and cultural values which is imperfectly understood. The formulation of competitiveness targets has to be broadened to include consideration of the role of underlying institutional and structural factors in sustaining strong economic performance. There is, in addition, a need to explore the role of public policy interventions in efficiently achieving the desired objectives.

1.3.6 Competitor Countries

Ireland faces competition on a day to day basis, both in trade terms and also in its efforts to attract foreign direct investment.

It is important to emphasise that the open, free trade environment has yielded enormous benefits to the Irish economy. Free trade has forced the Irish economy, particularly since Ireland's accession to the then EEC in 1973, to foster its competitive advantage and to specialise towards activities in which it can compete successfully in world markets. The maintenance of Ireland's strong exporting performance depends in a fundamental sense on Ireland's international competitiveness and on the steps

taken to maximise the efficiency of resource use and hence raise overall productivity in the economy.

It is important to monitor developments in the policy sphere in current and prospective trading partners in order to determine their impact on Ireland's competitiveness. In an era of intensifying competition and globalisation of the world economy, the pace of structural change in national economies will increasingly be dictated by external developments. It is particularly important to monitor developments in costs reflecting the particular importance of cost competitiveness to a small highly open economy such as Ireland. Any deterioration in cost competitiveness will be reflected rapidly in output and employment losses in the trading sector of the economy.

As highlighted in the first Annual Competitiveness Report last year, it is essential to establish who the market leaders are in those sectors in which Irish enterprise is also active, which enterprises encapsulate regional and global best practice and from what countries do they originate. This will facilitate the identification of key policies and competitiveness factors in those countries and allow any relevant lesson for Ireland to be absorbed. Ireland competes in two markets: in trade and in foreign direct investment (FDI), as the world economy progresses quickly towards a single marketplace not only for manufactured goods but for many services also and as many nations now compete aggressively for FDI projects.

The identification of Ireland's competitors in trade is becoming more difficult. Despite the growing integration of the world economy, Irish owned manufacturing firms are much more likely to export to the UK, than to any other single country, with exports to the UK amounting to 42 per cent of total exports of Irish-owned firms. Foreign-owned firms exporting from Ireland are less dependent on the UK market (accounting for 23 per cent of manufactured exports from foreign owned firms located in the Irish economy) being more oriented to Continental European markets (the destination of 50 per cent of the manufactured exports of foreign owned firms). In the UK market the principle competitors are UK firms, whereas on the continental market they tend to be firms from third countries. In trade terms, there is growing competition from producers in developing countries, especially Asia, and from the Central and Eastern European countries.

Ireland's principal competitors in Europe for foreign investment are usually in the UK (especially some regions such as Wales, Scotland, and the North East of England), and also the Netherlands, but, with increasing globalisation, Asian and Eastern European countries should now also be seen as competitors for Ireland in FDI.

Table 1.10 shows the major importers to Ireland for total manufacturing and for each industrial branch, as a percentage of the total in each case. The UK is almost always the single largest source.

Table 1.10 Share of Ireland's manufacturing imports by country and by sector

Total Manufacturing	**UK**	**36.0**	**USA**	**19.4**	**Germany**	**7.2**
Food, Drink and Tobacco	UK	56.6	Netherlands	8.4	USA	8.3
Textiles, Footwear and Leather	UK	53.4	Rest of the World	6.8	Italy	4.8
Wood, Cork and furniture	UK	34.3	Rest of the World	13.6	Sweden	10.2
Paper and printing	UK	59.0	Sweden	9.0	Finland	7.0
Industrial Chemicals	UK	36.1	USA	18.5	Germany	11.2
Pharmaceuticals	UK	39.3	USA	19.8	Germany	12.2
Petroleum products	UK	83.2	USA	4.0	Netherlands	3.2
Rubber and plastic products	UK	46.3	Germany	10.2	USA	7.4
Stone, clay and glass	UK	49.4	Germany	10.2	USA	10.0
Basic metals	UK	54.3	USA	10.0	Germany	7.1
Ferrous metals	UK	67.9	Germany	4.5	Finland	4.3
Non-ferrous metals	UK	40.3	USA	18.1	Germany	9.7
Fabricated metal products and machinery	USA	26.5	UK	25.3	Japan	9.1
Scrap metal (discrepancy)	UK	65.0.3	Germany	27.3	Rest of the World	2.2
Fabricated metal products and machinery	UK	56.4	USA	11.1	Germany	8.1
Computers and office machinery	USA	33.9	Singapore	19.7	UK	14.7
Non-electrical machinery	UK	35.9	USA	20.0	Germany	12.0
Communications equipment and semiconductors	UK	27.9	USA	23.8	Germany	10.4
Electrical machinery	UK	24.3	USA	22.1	Japan	13.1
Shipbuilding	Norway	82.5	UK	9.1	USA	5.8
Other transport	Canada	56.3	UK	21.9	Japan	4.5
Motor vehicles	UK	38.3	Japan	19.9	Germany	19.0

Aerospace	USA	82.1	UK	6.6	Rest of the World	3.1
Instruments	USA	44.3	UK	25.1	Japan	9.4
Other manufacturing industries	UK	37.8	USA	12.7	China	7.8

Successful penetration of export markets indicates that the Irish sector is competitive. But it also points to the importance of sustaining that competitiveness. The prominence of the UK amongst those countries to which Ireland successfully exports draws attention yet again to the need, at least in the short-term to focus especially on Ireland's competitiveness with respect to that market. Table 1.11 summarises the position, showing that in twelve cases where Ireland achieved more than 5 per cent of any national import market, four of these were in the UK.

Table 1.11 **Export market penetration:** where Ireland's share of a country's sectoral imports is more than 5 per cent of the total

Food, Drink and Tobacco	UK			
Industrial Chemicals	UK			
Pharmaceuticals	UK	Belgium/Luxembourg	Denmark	Netherlands
Computers and office machinery	UK	Norway	Sweden	Switzerland
Communications equipment and semiconductors	UK	Norway		

As illustrated in Table 1.12 Ireland has performed reasonably well in attracting FDI flows but in terms of a broader definition of FDI which includes flows related to foreign acquisitions and investment in property (which are not at all as significant for Ireland as elsewhere) countries such as Austria, Belgium, Luxembourg, Norway, Sweden and the UK have, in relative terms, performed better.

Table 1.12 **Foreign direct investment inflows 1996 ($m)**

Host country/region	FDI inflows	Population	FDI per capita	Rank
Austria	3806	8.1	469.9	5
Belgium/Luxembourg	13920	10.6	1313.2	1
Denmark	773	5.3	145.8	12
Finland	1227	5.1	240.6	10
France	20809	58.6	355.1	8
Germany	3851	82.1	46.9	16
Greece	1004	10.6	94.7	13
Ireland	1455	3.6	404.2	6
Italy	3739	56.8	65.8	14
Netherlands	6290	15.7	400.6	7
Portugal	607	9.9	61.3	15
Spain	6396	39.1	163.6	11
Sweden	5486	8.9	616.4	3
UK	30053	57.6	521.8	4
Iceland	4	0.3	13.3	17
Norway	3424	4.4	778.2	2
Switzerland	2534	7.2	351.9	9

1.3.7 Conclusions

Ongoing analysis of trade and investment data is needed to establish Ireland's competitors with a greater degree of precision. However, it would not be desirable to target these countries directly, i.e. to propose as policy objectives in Ireland the achievement of exactly the same set of indicators as in the United Kingdom, for instance. Firstly, medium-term development requires medium term targets, and targeting has to recognise that they also will change over time. Secondly, appropriate targets for one country may not be desirable, or indeed achievable, reflecting country-specific factors.

The suggested approach is therefore to continue to maintain the targets in the preceding section based on the country groupings and to add additional targets based on the main factors involved in export success and success based in attracting foreign direct investment. These include cost elements, infrastructure, investment incentives, skills availability, etc. The full range of competitiveness factors should be considered. Conditions in Ireland's main competitors would give signals as to how targets in

Ireland might be modified or new ones introduced. A first step in this direction is to conduct systematic monitoring of conditions in other countries, building on the day to day experience of the development agencies in achieving success in FDI and in export markets against the backdrop of intensified competition.

Finally, it is essential in view of the small size and regional nature of the Irish economy, against the backdrop of Ireland's EMU membership, to shift to a stronger regional orientation in assessing competitive performance. Some recent assessments of the Irish economy have highlighted some of the key regional dimensions to recent Irish economic performance. Clearly, the comparison of national policies, institutions and structures will remain a very important element of assessments of the competitiveness of the Irish economy in the future. However, it will become increasingly important, particularly in the context of the deepening of the single European market, to examine Ireland's performance relative to other regions in both the EU and indeed the US economy.

1.3.8 International Competitiveness Publications

1.3.8.1 World Competitiveness Report

The World Competitiveness Report is produced by the IMD. It uses 259 (of which 223 are used to rank the countries) indicators for 46 countries. The indicators are divided into 136 quantifiable (hard) data and 87 qualitative (soft) data. The remaining 36 indicators are all hard data but are used for background information. The soft data is compiled from an Executive Opinion Survey. This is an in-depth questionnaire sent to 4,314 executives in all the countries. These indicators are divided into eight factors, domestic economy, internationalisation, government, finance, infrastructure, management, science and technology, and people and are weighted to give the competitiveness ranking. Ireland was ranked 11th in 1998 out of 46 countries, up from 15th in 1997 and 22nd in 1996. Table 1.13 shows the change in rankings under the different headings over the past few years. The improvement in Irelands ranking can be most attributed to significant improvements in the areas of domestic economy, government, management and internationalisation and science and technology, while our competitiveness ranking in infrastructure has disimproved.

Table 1.13 **Ireland's international competitiveness rankings in World Competitiveness Report 1994-98**

	1994	1995	1996	1997	1998
Domestic Economy	19	17	16	5	6
Internationalisation	12	10	10	12	7
Government	24	27	23	12	6
Finance	19	22	23	20	15
Infrastructure	22	22	21	22	23
Management	22	24	21	12	10
Science	21	21	14	7	8
People	20	23	24	20	19

Source: IMD

1.3.8.2 The Global Competitiveness Report

The Global Competitiveness Report is produced by the World Economic Forum. Since 1996, the rankings are based on a clear definition of competitiveness as "the ability of a country to achieve sustained high rates of growth in GDP per capita". The competitiveness index is designed to assess which countries have the best prospect for economic growth over the next five to ten years - on the basis of each country's

current economic conditions and institutions. This report uses 203 quantitative and survey indicators for 53 countries. These are divided into eight factors, openness, government, finance, infrastructure, technology, management, labour and institutions and weighted to get the competitiveness ranking. Quantitative data are chosen to give a reasonable comprehensive view of the overall state of the economy. Special interest is given to data that has proven significant in the economic literature. The survey data includes responses from over 3,000 executives in over 53 countries. The survey puts special emphasis on questions for which the alternative quantitative data is not available. Ireland is ranked 11th in 1998 out of 53 countries up from 16th in 1997 and 26th in 1996.

2 Competitiveness in Other Countries

2.1 Competitiveness in the United Kingdom

Historically, Ireland's economic relationship with the UK has been very closely intertwined and often overshadowed by their political relationship. The main theme of Ireland's economic development over the past three decades has been the progressive broadening of Ireland's economic horizons beyond the UK through the internationalisation of trade and investment flows. Ireland's EU membership has been a central element of this process. The breaking of the link with sterling through Ireland's participation in the ERM from 1979 onwards was a particularly symbolic manifestation of Ireland's emergence into the broader European, and indeed world economy. Ireland's decision to participate in EMU from the outset, with the UK remaining at least initially outside, was a particularly striking demonstration of how far that process has now progressed.

These developments should not however be allowed to obscure the continuing importance of the UK economy and UK competitiveness to Ireland's economic and social development over the medium-term. The purpose of this section is to:

- outline the continuing importance of the strong economic linkages which exist between Ireland and the UK
- summarise and synthesise the results of three recent assessments of UK competitiveness
    - the UK Government White Paper *Our Competitive Future-building the knowledge driven economy*
    - *Driving Productivity Growth in the UK Economy* by the McKinsey Global Institute
    - *A Study of the Competitiveness of the United Kingdom* carried out for the Council by Dr. Christine Oughton of the University of Birmingham
- discuss the implications for Ireland's economic performance of developments in UK competitiveness

2.1.1 Ireland's economic relationship with the UK

2.1.1.1 The labour market

The strong degree of integration between the Irish and the UK labour markets, has long been a major feature of the Irish economy. The high degree of elasticity of Ireland's labour supply which has allowed Ireland to grow significantly in excess of the OECD average over the 1990s, is partly attributable to the migration mechanism operating between Ireland and the UK.

2.1.1.2 Trade linkages and goods market integration

Trade linkages with the UK have progressively weakened over the past thirty years. At the beginning of the 1970s about two-thirds of Irish exports were sent to the UK while over half of our imports were sourced there. However, the geographic diversification of Ireland's trade remains, as outlined in Chapter 4 of this Report, quite low. The UK remains Ireland's single most important economic partner accounting for about one quarter of Ireland's manufactured exports, almost half of manufactured exports of Irish owned firms and one third of Ireland's imports. Exports to the UK comprise about one-fifth of Ireland's GDP.

Aggregate trends tend to understate in any event the particular significance of the UK economy to indigenous enterprise in the Irish economy. The ESRI EMU study[24]

estimated that one-fifth of total manufacturing employment was directly attributable to the UK market. This employment is concentrated in traditional and Irish owned sectors of manufacturing industry.

Product market integration is probably best illustrated by the strong presence of UK retailers in the Irish market. This has resulted in significant intensification of competition in the retail market. The increasing integration of wholesale, distribution and retail networks between the two islands is responsible for a strengthening in economic ties despite Ireland's participation in EMU.

There are important structural and compositional reasons for the declining trade share with the UK. Indigenous firms engaged in exporting to the UK, which often comprise small and medium-sized enterprises (SMEs) that do not export elsewhere, will in general be operating in lower margin sectors where the scope to increase market share significantly will be small. Strong growth in exports away from the UK also reflects the changing structure and export orientation of Irish manufacturing industry, which is driven by the pattern of foreign direct investment into the Irish economy:

- firms in leading (i.e. chemicals, computers and instrument engineering, electrical engineering) sectors of Irish industry are often engaged in intra-firm trade, which on account of the global structure of these firms has led to large measured diversification in Ireland's trade structure
- a major reason underlying these firms' location in Ireland was access to the Single European Market (SEM) and Ireland is used by these firms as an export base to serve the whole of this market

2.1.1.3 UK White Paper on Competitiveness: Our Competitive Future - building the knowledge driven economy

Knowledge Driven Economy Relevant to All Enterprise

The UK White Paper on Competitiveness was published last December. Its central theme is the need for British business to compete by exploiting capabilities, for example knowledge, skills and creativity, which the UK's competitors cannot match. This will help create high productivity business processes, goods and services transforming the UK into a "knowledge driven economy". A fundamental principle underlying the UK's new competitiveness strategy is the opportunities and challenges presented by the emergence of the knowledge driven economy are relevant for all businesses, not merely the new creative industries and the high-tech sector. The core of the argument is that knowledge is now a key element in economic growth reflecting four mutually reinforcing developments:

- rapid advances in information and communications technology
- the increased speed of scientific and technological advances
- the intensification of global competition
- the shift to more sophisticated patterns of demand resulting from growing prosperity

Competitive Challenges for the UK Economy

There are several long-standing shortcomings diminishing the international competitiveness of the UK including:

- the failure to match the performance of overseas competitors in productivity, innovation and quality

- under-investment in physical assets but also in R&D and other intangible assets
- low skill levels

Roles of Government and Business

The global market encompassing competition from low cost economies using new technologies, skilled people and mobile capital poses the primary challenge to UK competitiveness, which must be met primarily by the business sector. The government's role is to create a new model for public policy providing a stable and enterprising economic framework that will underpin business success through:

- investing in capabilities such as science, skills, innovative finance and digital technologies to promote enterprise and stimulate innovation
- enhancing and developing entrepreneurial culture
- strengthening innovative capacity and risk taking
- investing in the knowledge base
- improving the skills and capabilities of the work force by raising educational standards
- assisting business in making the best use of information technology and R&D

Central to improving the UK's performance is the maintenance of a stable macro-economic environment supportive of long-term investment by both the business and the government sector. Moreover, to meet the requirements of the knowledge driven economy markets must be modernised and made more competitive to make them work better.

UK's Competitiveness Strategy: Capabilities, Collaboration, Competition

There are three main strands to the strategy to realise the potential of the UK economy:

- building the UK's capabilities in entrepreneurship, R&D, skills and crucially digital technologies
- effective collaboration for effective competition
- competitive modern markets

R&D

Although the UK has a world class science, engineering and design base, university R&D is rarely translated into UK commercial success. UK industry spend on R&D has declined relative to the UK's major competitors. To sustain excellence, research training in the science and engineering base must be enhanced and the knowledge infrastructure must be bolstered by, according to the White Paper, creating, exploiting and transferring knowledge as well as taking advantage of overseas R&D and promoting business R&D.

The Digital Economy

Digital technologies are described as the "nerve system of the knowledge driven economy". Information is now cheap and plentiful but it is not enough for business simply to collect information, it has to learn to use it effectively to raise productivity, develop new products and processes and serve customers more intelligently. Based on a detailed study benchmarking the UK's performance in the digital economy, the UK appears well positioned for the information age having:

- a world class IT and communications infrastructure
- thriving digital industries
- relatively low telecommunications prices

The main barriers identified, impeding uptake of new technologies are:

- a lack of understanding
- insufficient skills

The White Paper sets a target for the UK to have the best environment in the world for electronic trading by 2002, which in turn will require a radical overhaul of the regulatory environment. It also commits the UK Government to appointing an e-envoy who will act as a special representative for the digital economy.

Capabilities

In order to address one of the fundamental competitive weaknesses of the UK economy, the need to create a learning culture in the UK is highlighted, which will both meet business skill needs and also encourage business to promote skill development and good management. The UK appears to have a comparative advantage in entrepreneurship but too few businesses achieve high growth. The main barriers identified to better progress in this area are:

- fiscal and cultural barriers which lead people to avoid or misjudge risk
- lack of access to the right finance for growth and the business skills to manage it
- regulations which impose excessive or unnecessary burdens on new business

The government must also engage in innovation by creating new mechanisms for sharing ideas and best practice.

Competition

A basic premise of the White Paper is that the UK's competitive success depends on the operation of open, transparent and effective markets in order to encourage efficiency and innovation. The success of the UK telecommunications industry illustrates the benefits of liberalisation. Competitive home markets and market liberalisation boosts flexibility unleashes ideas, capabilities and innovation and can act as a crucial springboard for global success. The modernisation of markets to meet the challenges engendered by the knowledge driven economy will be an important component of this process. This applies particularly in the area of e-commerce.

Collaboration

The need for effective collaboration across several different dimensions to ensure the UK's competitive success is clear-cut:

- few companies possess all the skills required to develop technologically advanced products and to market their output effectively
- all businesses are already involving their suppliers to a much greater extent in product design, development and delivery

In dynamic regional economies, the best example being Silicon Valley, businesses while still competing intensely rely on each other to solve shared problems.

Collaboration comes into play in supporting competitive success in several different ways:

- networks linking business to universities and research institutes which are increasingly a source of innovation
- co-operative approaches to employment relations, which unlock the workforce's skills and knowledge potential - the White Paper notes that a culture of flexibility underwritten by principles of fairness and trust creates the right conditions for business success
- collaboration can be catalysed to assist firms gain competitive advantage by improving, developing and marketing products through benchmarking and best practice
- regional, local and sectoral outside partnerships can help promote quality through the supply chain
- encouraging clusters can create a critical mass of growth collaboration and investment opportunities but clusters cannot be created by public policy and must be business driven. Government can only create the right conditions that encourage their formation and growth

UK Competitiveness Council

The establishment of a Competitiveness Council and the development of a set of competitiveness indicators to measure the UK's progress is recommended, along with the establishment of a Cabinet Committee on Productivity and Competitiveness to ensure the UK's performance stays on track.

2.1.1.4 McKinsey Global Institute: Driving Productivity Growth in the UK Economy

Introduction

The report highlights the UK's position at the bottom of the G7 league table in terms of output per head, largely reflecting low labour productivity in the economy. However, it claims that the UK economy has a unique opportunity among OECD economies to raise its sustainable or potential rate of economic growth. A main finding of the report is that conventional explanations of UK economic underperformance such as low capital investment, poor skills and low scale of operation, are more often the secondary consequence of other distortions rather than the primary root causes of economic underperformance. UK labour market reforms and capital market deregulation during the 1980s merely halted the relative decline of the UK economy. A significant improvement in productivity can only be achieved through an action plan leading to *"…a modern framework of commercial regulations, penalties and incentives that overcomes the existing barriers to rapid adoption of global best practices and unleashes latent growth potential. In essence the UK needs product market and land use reforms that match and capitalise on the labour and capital market reforms that have already been achieved."*

UK Benchmarking

UK management often fails to adopt global best practices even in circumstances where these are readily understandable and achievable. A widespread problem is the impact of product market and land use regulations on competitive behaviour, investment and pricing. Lack of competition limits the capacity for entry or expansion by best practice operators, which reduces competitive pressures and the necessity to boost labour productivity. Excessive regulation also discourages adoption of best practice or render it uneconomic.

Product Market and Land Use Restrictions

The UK economy is generally perceived to be deregulated, competitive and open. The report concludes that this is indeed the case in labour and capital markets. However, in the area of product market and land use regulations the UK has more in common with the rest of Europe than the US. These distortions manifest themselves in the UK, given labour market flexibility and efficiency, as low labour productivity. In Continental Europe the same distortions, combined with labour and capital market regulation, are apparent in lower levels of employment and lower capital productivity.

Conflicts between social and economic objectives

The study is very optimistic regarding economic prospects for the UK if constraints to higher economic growth were removed. This will require a transformation of key elements of existing economic and social policy infrastructure and the creation of a modern framework for commercial regulation. The problems of the UK economy at a more fundamental level stem from unresolved conflicts between objectives of social and economic policy, which cannot be resolved on grounds of economic efficiency alone.

Action Plan

The report concludes by pointing to six areas where action could be taken to improve the productivity performance of the UK economy:

- preserve the UK's platform of flexible labour markets and well-developed capital markets and ensure continuing macroeconomic and fiscal stability
- reform product market and land-use regulation
- develop a modern approach to competition
- invest in the capability and flexibility of the working population
- remove barriers to entrepreneurialism and technological innovation

However, the report concedes that this is a formidable array of challenges and the improvements in productivity and economic growth that such a programme is likely to deliver will take years to materialise and will prove difficult to maintain as the gap with global best practice closes.

2.1.1.5 Study by Dr. Christine Oughton

Key Features of the UK Economy

From a long-term perspective, there has been a deterioration in the UK's comparative economic performance and relative living standards. Its GDP per capita fell from 123 per cent of the EU average level in 1960 to 97 per cent in 1980, rising to 100 per cent in 1985. In the 1990s it has stabilised at marginally below the 100 per cent level.

As regards trends in foreign trade, in 1950 the UK had a large trade surplus in manufacturing amounting to 10 per cent of GDP, but this had turned into a deficit by 1983 and the total balance of trade (including services) has been negative since 1986. However, the trade deficit has stabilised in the 1990s at around $20 billion, or 1.1 per cent of 1995 GDP. The UK still ranks fifth in the world in terms of its share of world exports, but its share has declined somewhat from 5.6 per cent in 1980 to 5.4 per cent in 1990 and 5.0 per cent in 1996.

The UK has had a policy of encouraging inward foreign direct investment (FDI) and is a major recipient of such investment. It has one-third of all inward investment in the

EU and over 38 per cent of US investment in the EU. Nevertheless, the flow of outward FDI from the UK nearly always exceeds the inward flow. Since 1979, the total outflow has been over 60 per cent greater than the total inflow and the UK now accounts for 12 per cent of the world stock of outward direct investment.

Foreign-owned enterprises accounted for 23 per cent of turnover in British manufacturing, distribution and agriculture in 1997 and they have become even more significant in manufacturing alone. From 1979 to the late 1980s, their share of manufacturing sales fluctuated slightly around the 20 per cent mark, but this increased rapidly to 31 per cent by 1994. Similarly, their share of British manufacturing employment was fairly stable at around 14 per cent until 1989 and it then rose to 19 per cent by 1994. However, since total UK manufacturing employment fell by approximately 40 per cent over the period 1979-94, employment in foreign-owned manufacturing actually declined by almost 20 per cent.

Human Resources Development

The UK's educational performance compares favourably with that of countries such as France, Germany, the USA and Singapore in terms of the proportion of the population with third-level qualifications. However, the UK lags behind these other countries in terms of educational performance at intermediate and lower levels and there is an under-performing tail of low achievers. It is also considered that there are weaknesses in the vocational training system, with the lack of a national system-wide form of assessment leading to variation in standards.

Compared to France, Germany and the USA, the UK has a lower level of labour productivity, but also lower labour costs in manufacturing. The combination of these two factors generated UK labour costs per unit of output which were lower than Germany and France but higher than the USA in 1993. UK relative unit labour costs compared to most other countries have declined in the 1990s.

Active labour market policies in the UK have tended, in the past, to focus attention and resources more on employment services (e.g. matching job-seekers to vacancies, counselling, advising) rather than on training. Considerable attention was also paid to introducing greater flexibility into the labour market by labour market reforms. However, since the general election of 1997, active labour market policies under the Welfare to Work initiative appear to be shifting away from this approach towards greater emphasis on training, employment subsidies and childcare/pre-school education.

Efforts are being focused in areas such as education[25], which over a long period of time have acted as a brake on overall UK economic performance. Additional resources of £19bn are being provided for raising achievement in education and improving skill levels[26]. The New Deal initiative[27], the commitment to make work pay emphasised by the introduction of a starting income tax rate of 10 per cent announced in the recent UK budget, together with the recently published employment bill promoting a co-operative approach to industrial relations, are designed to introduce greater equity while maintaining the flexibility of the UK labour market.

Prior to 1988, the UK had a persistently higher rate of unemployment than the EU or OECD average. Since then, the UK's relative performance has been more mixed. As Table 2.1 shows, Britain's unemployment rate dropped below the EU average in 1988-90, rose above it in 1991-92, and fell below it again since 1993. UK unemployment now stands at 6.2 per cent compared to the EU average of almost 11 per cent.

Table 2.1 **Standardised Umemployment Rates (% of labour force)**

	1988	1989	1990	1991	1992	1993	1994	1995	1996
UK	8.6	7.2	6.9	8.8	10.1	10.5	9.6	8.8	8.2
EU	9.6	8.7	8.1	8.5	9.4	10.7	11.1	10.8	10.9
OECD	6.7	6.2	6.1	6.7	7.4	8.0	7.9	7.5	7.6

Source: OECD

Business Support

The UK has a strong science base and indicators of research publications and frequency of citation suggest that it ranks second in the world in this respect, ahead of larger countries including Japan and Germany. However, there are concerns that this strength of the science base is not fully utilised by British industry. The UK's expenditure on R&D as a percentage of GDP, at 2 per cent in 1995, is a little below the OECD average and ranks seventh in the world, down from third position in 1981. Expenditure by government on R&D has declined in real terms since the early 1980s, while real R&D expenditure by business enterprises is below the peak level reached in 1989. The UK's share of patents in the USA has been on a declining trend for the past two decades.

Table 2.2 shows state aid to business, as defined by the EU, as a percentage of GDP and as a percentage of total public spending. It is apparent that UK government support for industry is relatively low by EU and Irish standards. UK state aid is concentrated mainly on the manufacturing sector but despite this its aid as a percentage of manufacturing value-added was the lowest in the EU in 1990-92, at 1.5 per cent, compared to 3.7 per cent for the EU average and 2.9 per cent for Ireland.

Table 2.2 **Total state aid to business by EU member states (average 1990-92)**

	% of GDP	% of Total Public Spending
Belgium	2.3	4.5
Denmark	1.0	1.7
Germany	2.4	4.8
Greece	2.2	4.2
Spain	1.3	2.9
France	1.8	3.6
Ireland	1.5	3.6
Italy	2.8	5.1
Luxembourg	3.9	7.8
Netherlands	0.9	1.7
Portugal	1.4	3.0
United Kingdom	0.6	1.5
EU-12	1.9	3.8

Source: Fourth Survey on State Aid in the European Community, Commission of the EC (1995)

For sources of finance, UK firms make less use of retained earnings than German or US firms. Interest rates in the UK have also tended to be relatively high over the past decade compared to most leading competitor countries. For these and other reasons there has been a record of relative under-investment. For every £100 per worker invested in the UK in 1983-93, Germany and the USA invested nearly £140, France almost £150 and Japan over £160.

Infrastructure

British Telecom was privatised in 1984 and deregulation of the telecommunications market has followed. The UK telecommunications infrastructure, in terms of features such as number of lines per head and network quality, ranks in the middle of the league table of competitor countries. However, telecommunications prices in the UK are among the cheapest in international comparisons.

The UK has had lower levels of investment in transport infrastructure as a percentage of GNP than most other European countries.

As regards energy costs, natural gas prices in the UK were 18 per cent lower, but electricity prices were 5 per cent higher, than the EU average in 1995. The rate of change in energy prices in 1985-95 was very similar in the UK and the EU as a whole, despite relatively early privatisation of British energy utilities.

International comparisons of costs of industrial and commercial buildings indicate that such costs in the UK compared to other European countries are reasonably competitive for industrial factories and warehouses, about average for offices and high technology/research premises, and above average for air-conditioned offices.

Small and Medium Enterprises (SMEs)

Historically, the UK had a particularly high level of concentration in large companies, but the importance of SMEs has increased more recently. SMEs employing less than 500 people accounted for 40 per cent of total employment in 1979, rising to 51 per cent by 1991. This has been seen as a sign of dynamism in the UK economy but there are concerns about the implications of this trend, given certain aspects of SME performance. Table 2.3 shows productivity per head by employment size class, as a percentage of average productivity in UK manufacturing. It can be seen that productivity per head is lower in smaller firms and this gap has been widening.

Table 2.3 **Gross value-added per head, by size class, as a percentage of gross value-added per head of all firms in UK manufacturing**

Employment Sizs Class	**1972**	**1991**	**1994**
< 100	85.0	76.7	74.5
1-499	87.5	81.1	84.5

Source: Census of Production Summary Tables

SMEs also have lower rates of innovation and a lower proportion of graduates in their employment compared to larger firms. Only about 35 per cent of British SMEs export, a figure which ranks only 13th among EU countries.

2.1.1.6 Assessment of UK competitiveness

UK's relative economic performance

There have been signs of an improvement in the UK's economic performance in the 1980s and 1990s. Perhaps most notably, the long-standing decline in its GDP per capita relative to the EU average level appears to have ceased, and its GDP per capita has stayed close to the EU average since the early 1980s. Given that the UK is still Ireland's most important single export market, this is a welcome development since demand growth in that market is no longer relatively subdued. While the UK has been maintaining its position in terms of GDP per capita relative to the EU since the early 1980s, it has not actually achieved significant positive improvements in its competitive position, either in terms of relative living standards or its overall ability to compete in international markets. Its share of world exports has declined in the 1990s.

The UK as a competitor for Ireland and the risk of sterling volatility

This does not particularly suggest that the UK should be viewed as a source of generally strengthening competition for Ireland, although Ireland could potentially face at least short-term difficulties if there is a substantial sterling devaluation and UK exporters allow the sterling devaluation to feed through into export prices, rather than attempting to restore profitability levels eroded by high levels of sterling[28]. The likelihood of a large and sustained devaluation of sterling taking place is, however, diminished by the high priority now given to macroeconomic stability in the conduct of UK policy. Moreover, the impact of a large sterling devaluation on the competitiveness of UK manufacturing will be affected by the degree of penetration of euro pricing in the UK economy. Current indications that larger firms in particular are anxious to embrace euro pricing will force UK firms to carry the risk of sterling volatility, particularly as the movement towards early UK membership of EMU gathers momentum. Smaller firms will therefore come under pressure to be euro compliant allowing currency risk to be passed down the supply chain. The UK has been the recipient of a disproportionate amount of FDI in the EU. It has commonly been identified as Ireland's closest competitor in attracting inward investment, and trends in the 1990s confirm that Britain presents an attractive location for foreign investors.

Competitive weaknesses

The UK has suffered from a number of competitiveness weaknesses including weaknesses in the intermediate and lower education levels and in training, ongoing slippage in R&D and innovation performance and a record of relative under-investment. These factors may explain why the UK has lower labour productivity than other major industrial countries and has not made progress in reducing that gap. The UK has tended to compensate for lower productivity through lower labour costs and labour market flexibility. The UK's unemployment rate has improved significantly relative to the EU average although it remains higher than the rates in some smaller EU countries. However, as discussed in the McKinsey report on the UK (summarised in Section 2.1.1.4 above) the question of relative productivity levels is complex. Most analysts accept that there is a large gap between labour productivity levels in the UK and those in countries such as Germany and France. However, when account is also taken of capital productivity, which is relatively high in the UK, the gap between the UK and other large advanced economies as measured by total factor productivity, the ultimate determinant of economic performance, is significantly reduced. Moreover, the gap shrinks even further when account is taken of demographic differences, disparities in the respective size of manufacturing sectors and the labour-capital mix. It has also been pointed out that measurement problems affecting particularly the services sector and hours of work, can distort international comparisons highlighting the weaknesses of economy wide measures of productivity. There has been a strong upturn in labour productivity in manufacturing in the UK economy driven by product

market deregulation and privatisation[29]. However, the impact on overall productivity has been muted since it has not been accompanied by stronger productivity growth in the services sector of the economy. In any event the idea that a major element of the UK's labour productivity problem could be eliminated by means of higher investment levels and a higher capital-intensity of production per se seems outmoded. There is no guarantee that increasing investment in the economy will yield higher total factor productivity or greater competitiveness.

Productivity and unemployment

Differences in international labour productivity also reflect, as discussed above, the UK's preference for lower unemployment (where low productivity jobs are maintained by keeping labour costs low), compared to the situation in France and Germany where very high labour costs have not only squeezed out low productivity jobs in the economy, but have also led to a low employment intensity of economic growth overall. The UK has sustained an excellent performance in relation to unemployment while much of continental Europe continues to struggle with high unemployment. The UK's success has been accompanied by greater wage inequality but the low level of unemployment has facilitated the current government in following through on its election commitments to combat unemployment and social exclusion.

UK's competitiveness strategy

The new approach in the UK to competitiveness detailed in the White Paper, if properly implemented, will lead in time to a significant improvement in the UK's overall economic performance. It focuses sharply on the need to support the development of a knowledge driven UK economy through investment in education, skills and R&D in order to underpin sustainable long-term economic success. The White Paper departs from traditional analyses of the UK's economic weakness, which tend to emphasise problems such as that of low investment. It contains a raft of commitments to promote entrepreneurship, modernise the science and engineering base, develop the skills base, encourage companies to collaborate effectively and increase competition and consumer choice. It is intended that these initiatives will meet the demands of knowledge driven economy by facilitating better knowledge transfer.

Anglo-Saxon versus Social Market Model

There is no stark choice between what are often caricatured as the Anglo-Saxon and Social Market models of economic and social policy. Both these models, to the extent that they ever existed in pure forms, are being swiftly adapted to a rapidly changing environment. The importance of labour market flexibility to overall economic performance and the promotion of employment growth and the reduction of unemployment is broadly undisputed. However, there is also a broad appreciation that labour market flexibility cannot be secured on a sustainable basis in the absence of social cohesion, one manifestation of which is partnership between employers and employees. The question of whether this collaboration is best achieved at a highly centralised national level, a highly decentralised firm level, or some intermediate level is not yet resolved, but in answering it social and cultural factors are likely to be just as important as those suggested by the criterion of economic efficiency. The recently published employment bill in the UK, for example, is designed to move the UK closer to continental European employment practices.

2.1.1.7 Implications for Ireland

There is a high degree of economic integration between Ireland and the UK as evidenced by strong trade links and the degree of integration of their respective labour markets. Over the past three decades there have been powerful structural

forces, which have tended to weaken this relationship to some extent. Ireland's euro membership, with the UK choosing to remain for the time being outside the euro zone, is likely to accentuate this trend over the medium-term. Clearly, as manifested by Ireland's economic performance over the last decade, Ireland has benefited significantly from closer economic integration with the EU as a whole. This development has been very important in the context of Ireland's adoption of stability orientated macroeconomic policies (low inflation and low budget deficits) that have helped underpin robust economic growth over the decade and has now culminated in Ireland's EMU membership. Strong inflows of FDI in high productivity, high-tech, high growth sectors have resulted in diversification in Ireland's exports away from the UK. However, Ireland's geographical export diversification remains low by international standards. Ireland remains heavily dependent on the UK for its imports.

Low labour costs, in particular non-wage labour costs, have helped to maintain relatively rapid growth in employment and low unemployment in the UK. But Ireland has achieved the same outcome under social partnership. The UK White Paper advocates a greater degree of partnership in the UK economy between firms and their employees, but this is envisaged primarily at enterprise level, a highly decentralised approach, in order to copperfasten the benefits of labour market flexibility. The intensification of competitive pressures and the acceleration of globalisation in the world economy renders many low productivity jobs unsustainable even in a highly flexible labour market. Policy must therefore encourage firms and employees to move up the ladder of comparative advantage into higher productivity activities. This is the same challenge faced by the Irish economy at the present time.

In conclusion, the UK's large size, its cost performance, its geographic proximity and cultural affinity provides an immediate and forceful reference point for the development of competitiveness policy in Ireland. Notwithstanding the prospect of a diminished relative importance of the UK to Ireland in trade, the structural economic linkages between Ireland and the UK in labour and goods markets can be expected to remain strong in the years ahead, particularly in the context of the likelihood of the UK's entry into EMU sometime during the first half of the next decade. Ireland's economic performance is likely to remain strongly influenced by that of the UK, notwithstanding the prospect of reduced market dependence through diversification into core European markets.

2.2 Competitiveness of the Hungarian Economy[30]

2.2.1 Key Features of the Economy

The 1990s have been a decade of major economic and social transformation in Hungary. The transition to a market economy has been largely completed in the corporate sector, and private enterprise now accounts for around 80 per cent of GDP, following the privatisation of state enterprises and the emergence of many new SMEs. The economy has been opened to international trade and market forces now largely prevail. However, the process of reform in public administration and government services is slower.

The transition to a market economy involved some severe difficulties and the volume of GDP is now 10 per cent lower than it was in 1989. However, medium-term forecasts for the Hungarian economy suggest that, over the period to 2002, real GDP could rise by 4-6 per cent annually, the government's budget may go into surplus and inflation could fall to below 10 per cent. This depends on a fairly optimistic scenario, but if it is achieved Hungary will be ready for EU membership by 2002.

The liberalisation of Hungary's international trade has been accompanied by rapid growth of both exports and imports. Hungary's monetary strategy has included a deliberate devaluation of the Hungarian currency, the forint, to a crawling monthly peg rate of around 1 per cent which has helped export growth to outpace import growth over the last two years. However, a negative trade balance persists, as the import content of domestic production, rising investment demand and growing personal consumption have all stimulated strong import growth. Exports increased from $9.6 billion in 1989 to $19.1 billion in 1997, while imports grew from $8.8 billion to $21.2 billion. Exports have increased from 31.6 per cent of GDP in 1991 to 42.2 per cent in 1997, while imports rose from 35.0 per cent of GDP to 46.5 per cent over the same period.

Export growth masks a major shift in the destination of exports away from Central and Eastern Europe and the former Soviet Union and towards the EU and other developed market economies. Trade with the Western economies has doubled since 1990 and now accounts for 70 per cent of total trade. Hungary's share of OECD imports has also grown from 0.20 per cent in 1989 to 0.27 per cent by 1994. Table 2.4 shows the breakdown of exports by destination in 1996. More than 70 per cent of Hungary's industrial exports now come from companies with some element of foreign ownership. Significant shifts have also occurred in the composition of exports, particularly a decline in the share of agricultural products and increases in the share of chemicals and machinery.

Table 2.4 **Percentage breakdown of Hungarian exports by principle destination 1996**

Germany	**33.7**
Austria	10.9
Former Soviet Union	8.0
Italy	7.0
Former Yugoslavia	.4
UK	3.9
France	3.8
Czech Republic	3.5
USA	3.2
Netherlands	2.9
Belgium - Luxembourg	2.8
Poland	2.5
Switzerland	1.2

Source: Hungarian Central Statistics Office

Hungarian imports were largely liberalised by the mid-1990s at which time the average tariff rate was much the same as the OECD average. The speed of import liberalisation resulted in sharply increasing competition that severely affected domestic producers. Significant non-tariff barriers still remain however, the most restrictive of which are global quotas on consumer goods and regulations governing car imports.

The inflow of foreign direct investment (FDI) into Hungary has been a key feature of its economic experience in the 1990s. In the period 1990-97, inward FDI amounted to $16,643 million, or an average of $2,080 million per year, compared to just $1,170 million over the whole period 1972-89. Hungary's share of world FDI inflows has greatly exceeded its share of world trade. Hungary has received more FDI than the whole of the former Soviet Union. Its stock of FDI is the highest in Eastern Europe and its stock of FDI per capita is the highest by a very large margin, although Poland (a much larger country) has attracted more FDI in 1996 and 1997. Since 1995 the risk premium to Hungarian currency instruments has also declined substantially, indicating that investor confidence continues to increase and that FDI may not yet have peaked. The USA is the most important source of FDI for Hungary, followed by Germany and Austria.

About 40 per cent of FDI in 1990-97 involved state enterprises as privatisation proceeded. The remaining 60 per cent has been a combination of further investment in these enterprises to improve products and production processes to competitive standards, reinvestment of profits, and significant investment in new greenfield projects. FDI in manufacturing has been particularly marked in the automotive industry and electronics sectors, which have seen additional FDI in sub-supply activities.

Foreign firms now account for more than 20 per cent of total employment in the business sector, and their wage rates are almost 40 per cent above average at $5,300-$5,800 per annum. A number of foreign firms conduct significant R&D in Hungary, and in aggregate they accounted for 41 per cent of business sector R&D in 1993. As yet substantial profit repatriation from the foreign owned sector of the economy has not taken place.

There are several reasons why Hungary has attracted so much FDI. Compared to other Eastern European countries, it made an earlier start in economic reforms. The level of Hungary's indebtedness also strongly influenced its privatisation policy, causing it to seek sales of state enterprises to cash purchasers including foreign interests. Moreover, it has been widely observed that "investment breeds further investment", e.g., by competitors, by suppliers and by associated services. In addition, many foreign investors see Hungary as a desirable location to establish a foothold in Central and Eastern Europe.

2.2.2 Human Resources Development

The Hungarian school system fails to deliver a high average level of education to the student population. A declining majority of students at secondary level remain in vocational schools, where education often has very low transferability. In 1996, 47.7 per cent of the Hungarian population in the age group 25-64 had acquired secondary level education. This was a considerable increase from the figure of 37.0 per cent in 1990. The proportion of the population aged 25-64 who had acquired third level education was relatively low at 13.6 per cent in 1996. There had been a modest increase from 11.5 per cent in 1990, while further increases can be expected in the future, since the number of students in the third level education system was twice as high in 1996 as in 1990.

Wage levels in Hungary are low by Western European standards. The average annual wage was just over $4,000 in 1996. Although other labour costs, such as social security contributions typically add a further 75 per cent to this amount, total labour costs are only about half of the lowest level found among EU countries. Hungary's position in this respect relative to the EU has changed little in recent years.

Unemployment continues to decline. Aggregate unemployment fell to 9.8 per cent in April 1998, the first time unemployment had fallen below 10 per cent since May 1992. Unfortunately the incidence of long-term unemployment has actually increased. The OECD has suggested that the trend in long-term unemployment may reveal structural rigidities in the Hungarian economy, including inflexibility in the technology and education sectors. Until very recently, there was little part-time employment and it is still uncommon.

2.2.3 Business Support

The system of support for innovation in Hungary is regarded as rather inefficient. The level of R&D expenditure as a percentage of GDP used to be relatively high at 2-2.5 per cent, but it fell substantially to 1 per cent in 1991 and to 0.7 per cent by 1996. Only about one-third of this is financed by companies, since the government still plays the main role. Partly reflecting this, the proportion of R&D expenditure going to basic research, as opposed to applied research or development, is high by international standards. The sharp reduction in R&D during the economic transition occurred as a result of cuts in state expenditures and the disintegration or privatisation of large state enterprises that previously carried out independent R&D. It is difficult to assess the effectiveness of Hungarian R&D owing to inadequate data in areas such as citation indices and patents.

The financial system in Hungary has been transformed over the past decade. There is now a particularly high level of foreign ownership in the banking system, with foreign firms accounting for 61 per cent of the sector in 1997. According to the IMF much of the infrastructure necessary for an efficient financial system that is well integrated with world capital markets is now in place. Even so, the corporate sector tends to borrow abroad to a considerable extent, and the stock of direct foreign borrowing by the corporate sector amounts to about 50 per cent of total company loans from the Hungarian banking sector. There are still significant difficulties for Hungarian-owned SMEs in gaining access to bank loans. Research indicates that due to high inflation and out of date property registers, banks are requiring as much as three times the value of a loan in collateral, a prohibitive amount for many SMEs. Larger companies, particularly if foreign-owned, have much easier access to bank loans, although they are more likely to borrow abroad.

The insurance sector has developed very rapidly in the 1990s, from a situation where there was only a single insurance company until 1986 and business insurance was virtually unknown. Insurance income amounted to 2.3 per cent of GDP in 1997. There is now very substantial foreign involvement in the insurance business and seven of the ten largest international insurers are present in Hungary, while there is just one Hungarian-owned insurance company. It is expected that the insurance sector will continue to expand and that companies in the sector will become increasingly important institutional investors in Hungarian capital markets. The Budapest Stock Exchange has also developed rapidly in recent years, but market capitalisation is still relatively limited in comparison with developed industrial countries.

As regards investment trends, the level of fixed capital investment has been around 20 per cent of GDP in the 1990s. The flow of inward FDI, referred to above, has been a decisive element and it is expected that FDI will remain important in the medium-term, continuing at a level of about $2,000 million per year. About half of corporate investment has been in construction, but this proportion is significantly lower for companies with foreign ownership.

2.2.4 Infrastructure

The telecommunications infrastructure has undergone rapid development since the beginning of the transition to a market economy. In the late 1980s private customers

had to wait more than ten years for a telephone line, there were over 600,000 people on the waiting list and there were only 7 telephone lines per 100 inhabitants (in 1985) compared to over 40 in the EU. Waiting lists for telephones have now been eliminated, there are 30 telephone lines per 100 inhabitants, the network is totally automated, and the degree of the system's digitalisation reached 70 per cent by the end of 1997.

However, telecommunications charges are high compared to the developed countries' average. Taken together with the limited purchasing power of the population, this has put a brake on growth in usage of the network. A variety of business communication, data transmission, satellite terminals and cable TV services have been introduced, but telephone services still accounted for over 90 per cent of all telecommunications income in 1996.

There are substantial deficiencies in the Hungarian railway network compared to EU standards, such as low levels of electrification, poor technical levels of rolling stock and track, old equipment, and consequent widespread speed restrictions. While there has been quite significant investment in modernisation, Hungary's position relative to EU railways has deteriorated because EU countries have been improving their railway systems more rapidly. In these circumstances, the share of rail transport in total transport of goods declined from 41 per cent in 1992 to 31 per cent in 1997, although this remains well above the figure of 11 per cent for the EU as a whole.

For the most part, the quality of postal services in Hungary is now approaching EU standards of average delivery time. There is still a significant deficiency in the area of parcel deliveries, but it is expected that this service will be up to EU standards by 2003.

In terms of road density and the length of the road system, Hungary is not lagging significantly behind the EU, but there are important deficiencies in road quality. National public roads are of much better quality than local roads, which lack regular maintenance and repair. Future membership of the EU will require major investment in roads, since nearly half of even the national public roads have inadequate load bearing capacity by EU standards.

The proportion of total freight carried by inland waterways fell from 5.4 per cent in 1989 to 3.3 per cent in 1994, and it has declined further since then primarily because of their poor condition.

Air transport has been developing quite rapidly, and the Hungarian national airline has had an annual increase in passenger kilometres of 10 per cent or more in recent years, although it remains one of the smaller European airlines.

Energy costs are relatively low in Hungary. Compared to the Irish energy prices quoted in the National Competitiveness Council's Annual Competitiveness Report '98 (Table 14), Hungarian prices are 62 per cent of the Irish level for automotive diesel oil, 75 per cent of the Irish level for heavy fuel oil for industry, and 52-65 per cent of the Irish level for electricity.

2.2.5 SME performance

During Hungary's transition to a market economy a very large number of SMEs emerged, and there are now about a million of these (in a country with a population of 10 million). Most are very small with inadequate capital and poor competitiveness. Many small business people are "forced entrepreneurs", meaning that they started their businesses to replace the jobs they lost in the state sector.

Survey evidence indicates that smaller firms are less willing than larger ones to invest and expand. More than half the companies say that weak demand in the domestic market is an important obstacle to their expansion. A substantial minority of companies also refer to each of the following as important barriers to expansion: lack of capital, strong competition (following import liberalisation), unpredictable government behaviour, and "unfair competition" (meaning, not only breaches of competition law, but also including payment defaults, difficulties in asserting contractual and property rights, corruption and fake bankruptcies).

Survey evidence also shows that in the view of SMEs, the most useful government measures in order of importance, would be to reduce social security contributions, to reduce taxes, to provide direct state aid for development, to reduce administrative burdens, to enforce the law against economic crimes, and to provide cheap and reliable information.

2.2.6 Socio-economic performance

Although there had previously been a decline in Hungarian GDP, its growth record since 1992 has been comparable to the performance of the EU overall. Hungary's GDP, at current prices and exchange rates, was equal to 0.49 per cent of total EU GDP in 1992, and it was also 0.49 per cent of the EU's GDP in 1996.

2.2.7 Implications for Ireland

The experience of Hungary is of interest as possibly the most advanced case among a substantial number of Central and Eastern European countries (CEECs) which are in transition to a market economy. Hungary already has extensive international trade with EU countries and it is committed to attaining EU membership in the future. As such, it represents one of the leaders among a number of transition economies that are becoming relevant for Ireland's competitive position and are likely to become more so in the future.

The growth in Hungary's exports, and particularly the growth in exports to the EU and other developed market economies, indicates that Hungary can be competitive in the international markets that are relevant for Ireland. A significant part of Hungary's competitive advantage is its low level of labour costs relative to even the lowest level found among EU countries. However, there are still considerable competitive disadvantages in areas such as third-level educational qualifications, R&D and innovation, important aspects of infrastructure, finance for SMEs in particular, the general management and quality of SMEs, public administration and the general enforcement of business law.

There are signs of progress in overcoming a number of these disadvantages, which would tend to make Hungary a more potent competitor. However, as this process occurs it is also likely that wage levels would tend to rise, particularly when there is free movement of labour between Hungary and EU member states. The overall balance of these trends will be important in determining Hungary's future competitiveness and the implications for Ireland's competitive position.

The fact that Hungary has attracted a large amount of FDI makes it of special interest from Ireland's point of view. It is clear that a good deal of the FDI going to Hungary has been different from the type that Ireland normally attracts. About 40 per cent of FDI in Hungary has involved the purchase of Hungarian state enterprises, with a further proportion of it taking the form of additional investment in upgrading those enterprises. Nevertheless, there has also been a significant amount of new greenfield investment, although again at least part of this has been of a type which Ireland normally does not attract, e.g. car assembly. There have also been signs of a "deepening" of FDI in Hungary, in the sense of investment in further expansion of

companies, as well as associated direct investments by sub-supply companies. This appears to indicate that foreign firms are finding that they can operate successfully in Hungary.

Hungary's competitiveness in attracting FDI should be acknowledged. Despite the differences between the profiles of FDI in Hungary and Ireland, Hungary does compete against Ireland in attracting some types of overseas investment. The strength of this competition is likely to intensify significantly in the coming years and in particular following Hungary's EU membership. Ireland's best defence against such competition should be to build on areas of expertise and specialisation, so as to strengthen activities in which Ireland has competitive advantage that are not particularly vulnerable to competition based on cost factors.

2.3 Assessment of the Nordic Economies

The Nordic economies, in overall terms, score highly in terms of the main indicators of socio-economic development. Income per person is high, unemployment is low and the distribution of income is more equal than in most other developed economies. The Nordic economies can be characterised by their very high level of commitment to social cohesion and income equality. This is manifested in very high levels of social protection and public provision financed by an extremely high tax share in GDP in these countries. All the Nordic countries place a very strong emphasis on partnership and co-operation in all areas of social and economic life.

However, there is a consensus albeit stronger in some countries than in others, that systems of social protection are in need of radical reform. The looming pensions' "time bomb" is a major element undermining the sustainability of the Nordic welfare states. There is agreement across the political spectrum that greater labour market flexibility and deregulation must be undertaken and the tax share in national output must be reduced, while maintaining social cohesion and social protection.

Two of the Nordic countries, Finland and Denmark, have produced their own competitiveness reports in which they benchmark themselves against specific countries, assess their performance and identify areas where they need to improve.

This section gives a synopsis of these studies describing how these countries perceive themselves relative to their competitors under some key headings, along with a brief assessment of the overall competitiveness of these countries.

2.3.1 Finland

The Finnish economy has been transformed in the past decade reflecting the fundamental shift in its trade away from the former Soviet Union. Finland now concentrates on high-tech electronics, epitomised by the success of Nokia, currently valued at about $70bn placing it among the 100 largest companies in the world. High-tech exports now account for more than a quarter of Finland's total exports, ahead of traditional exports of paper and pulp (23 per cent) and machinery and metal products (19 per cent).

Unemployment in Finland remains high at 10 per cent reflecting high wage and social costs and a highly regulated labour market. However, a wage freeze until 2000 has been agreed with the trade unions and scope for more flexible wage setting is being enhanced through plans for decentralised wage bargaining, so that pay and terms of employment can vary by enterprise and by region. Short term contracts and flexible

working hours are already becoming easier to arrange. The heavy tax burden is being addressed slowly through small reductions in income taxes.

2.3.1.1 Education

While there is high government spending on education it is not concentrated on the sciences and mathematics with only a moderate number of students taking maths at upper levels. This is also true for chemistry and physics. Finland's expenditure on higher education is the highest of the comparator countries used in the report[31] and general expenditure on education is higher than most. Staff training programmes are considered to be of a very high quality in Finland. While the level of investment in these programmes corresponds to the international average, nearly half of all employees participate in work-related education. Finland devotes relatively greater resources to labour market training than do most of the reference countries or the OECD as a whole. Finnish vocational education is based on a model where education and work are separate. The number of apprentices is expanding in Finland but mainly in the areas of supplementary vocational education and vocational adult education.

2.3.1.2 Labour Market

Collective bargaining is viewed as important in Finland in maintaining stability in the labour market. This was demonstrated during the recession of the early 1990s, as wages across the economy adjusted quickly. Local agreements also exist supplementing the national agreements. There is no statutory minimum wage but separate minimum wages for individual branches of industry.

Within the labour market there is a small number of 55-64 year olds active in the economy. This is mainly due to the lack of part-time work. Expenditure on active labour market policies as a percentage of GDP is relatively high. A new labour policy reform initiative was introduced at the beginning of 1998 stressing the importance of a well functioning, dynamic labour market with particular emphasis on the role of active job search.

Recent reforms in the social welfare mean that people under 25 years are entitled to labour market supports only if they have professional training. This has reduced unemployment and increased young people's participation in further education.

2.3.1.3 Tax

Finland has a relatively competitive corporate tax rate at 28 per cent. Corporate taxes account for 5.3 per cent of total tax revenue. However, the total tax ratio to GDP is high at 46.1 per cent, nearly 9 per cent above the OECD average. Half of this is made up of tax on earned income and social security contributions. Finnish marginal tax rates can be very high, up to 60 per cent.

2.3.1.4 Telecommunications and IT

Finland is the leading country in the world with respect to mobile phone penetration and Internet servers per capita. This is due to competition and low prices leading to greater diffusion of IT to households and workplaces.

Finland continues to invest heavily in R&D. This reflects a diversified industrial structure and an emphasis on technology-intensive activities. Patent applications have increased rapidly suggesting that investment in R&D is yielding returns. There has been a shift away from the traditional sectors of paper and pulp manufacturing to information-intensive and technology-intensive fields and Finnish high-tech exports have increased more rapidly than in any other industrialised country in the 1990s.

Public sector investment in research has continued to increase in the 1990s. In September 1996 the Government decided to increase public sector research by one quarter between 1996 and 1997. This together with increased business sector

investment should increase investment in this area to nearly 3 per cent of GDP by 1999. While most of the focus on technology policy has been on inputs there have also been steps taken to increase accessibility and productivity of technology, especially for SMEs.

During the recession of the 1990s, government funding of universities slowed down, but this was offset by rapid increases in external funding. Companies are sponsoring academic research as it is increasingly shaped to their needs. R&D investment as a percentage of GDP increased from 1.8 per cent in 1989 to 2.7 per cent in 1997 placing Finland among the top rank in the world, while private sector R&D investment increased at a nominal rate of 17 per cent per annum between 1993-97. Investment is still very concentrated, as the electrotechnical industry accounted for 50 per cent of Finland's total R&D investment in 1997 and the five largest companies accounted for 40 per cent of total R&D investment.

Between 1990 and 1996 the number of university degrees awarded increased by 33 per cent, doctorates by 74 per cent and the number of researchers as a percentage of the total labour force is now among the highest in the world.

2.3.3 Denmark

Denmark is more of a service based economy than its Nordic neighbours, with far more medium and small- sized firms than the other Nordic countries and a host of very successful companies and producer owned co-operatives in agri-business.

On face value the Danish economy appears one of the strongest in the EU. Recent reductions in corporation tax emphasise its business friendly environment. However, Denmark's balance of payments position is weak and strong wage growth is eroding international competitiveness. The Danish stockmarket has underperformed relative to the European average reflecting the sluggish performance of the Danish corporate sector. There are signs of emerging inflationary pressures and bottlenecks in the engineering and IT industries. When account is taken of the effect of active labour market policies in Denmark the unemployment rate is over 6 per cent.

Taxes and labour costs remain high in Denmark. A number of new reform initiatives with respect to taxation, active labour market policies, education and competition policy are being launched in order to build on the success of labour market reforms during the mid-1990s. These raised potential output and lowered structural unemployment in the economy. There is broad cross party consensus regarding the need for continued adjustment of Denmark's welfare state.

2.3.3.1 Labour Market

Structural unemployment has decreased since 1995 to a lower level than for the period 1991-95. Long-term unemployment as a percentage of total unemployment is around the average for the countries to which Denmark is compared.[32] High participation rates, especially by women, and the fact that youth unemployment is low suggests that the Danish labour market is functioning well. The apprenticeship system as well as the fact that Denmark is strong in supplementary vocational education accounts for a low level of third level participation.

After being six months unemployed, persons under 25 years without work experience or education must train for at least 18 months. The replacement ratio (social security benefits compared to previous income) is high in Denmark at 80 per cent for the first year of unemployment, higher than in the UK and the US. The replacement rate can either limit the financial incentive to seek new employment or encourage people to change jobs, as the cost from temporary unemployment is lower. This, combined with

a low degree of protection against dismissal compared to other Nordic countries, means that Danish firms face modest costs of hiring and firing contributing to greater labour market flexibility.

2.3.3.2 Innovation

The proportion of total Danish manufacturing employment in the high-technology sectors was 40 per cent in 1991, compared to 50 per cent in the comparator countries. This, however, does not include the service sectors, which would increase this share. High-tech manufacturing and knowledge intensive services are the strongest growth sectors in terms of output and employment in the OECD area.

Limited industrial research is due to the structure of the Danish economy, which has a large number of SMEs. Only a few firms have the resources required to undertake independent research and product development on a large scale.

2.3.3.3 Trade and FDI

There is a need for Denmark to exploit other non-EU markets, especially the emerging markets to remain competitive. It will be more difficult to gain access to these markets in the future in the absence of some market presence at the current time. Wage competitiveness in Denmark has deteriorated on account of adverse exchange rate movements and competition from emerging countries have also contributed to a decline in Danish market share. The three largest markets for Denmark account for around 40 per cent of total exports, and therefore Denmark is less likely to be affected by economic fluctuations in these markets as compared to less diversified economies.

Denmark's performance in relation to outward direct investment has improved since the early 1990s. However, only 1.5 per cent of Denmark's FDI goes to the CEECs and only 4.2 per cent goes to emerging economies. Denmark attracted an average amount of FDI over the period 1990-94 as compared to the countries against which it benchmarks itself.

2.3.3.4 Tax

Due to the high priority afforded to social protection the total tax burden is high in Denmark. The rate of corporate tax averages about 34 per cent.

2.3.3.5 Education

In international studies Danish students perform below average in maths and science while performing above average in languages. Of third level places, 60 per cent are in humanities while 40 per cent are in science and technology. This positions Denmark between the US which has a higher percentage in humanities and Germany with a higher percentage in the sciences. The rate of participation in tertiary education has increased in Denmark and is now approaching the average rate for the countries compared.

2.3.3.6 Research and Development

The Danish Government aims to increase R&D levels to those of the benchmark countries by the year 2000. Denmark ranks average for public sector expenditure on research compared to the comparator countries, while it ranks below average for the private sector. Research in Denmark is mainly concentrated in the service sector, which is seen as a positive factor since future employment growth is expected to be concentrated in services.

2.3.3.7 IT

Denmark has also set itself the objective of being an international leader in the IT field. However, this will require a higher level of IT skills in the workforce. Denmark is also targeting the objective of becoming a competitive supplier of IT services such as

telecommunications. In this regard Denmark has the advantage of low telecom charges for business but also needs to increase the number of digital lines, which is relatively low at the moment. In addition Denmark also has only an average number of Internet hosts compared to the other countries.

3 Human Resources

3.1 Education and Training

Key Points

- Quality of human resources key determinant of competitiveness success
- Education system can build long-term competitive advantages
- Skills shortages major threat to the sustainability of growth
- Council's Statement on Skills recommended a detailed five point strategy to increase the supply of skilled labour necessary to sustain economic growth and the competitiveness of the Irish economy
- Vocational education not fully integrated into the education system
- Lifelong learning a priority for human resource development in the economy

Indicators in Top Quartile	Rank 98	Rank 99
• Percentage of people aged 25-34 with higher education qualifications	2nd out of 15	4th out of 25
• Net enrolment in tertiary education	7th out of 24	6th out of 24
Indicators in Second Quartile		
• Percentage of Population aged 25-64 that has attained 3rd level education	14th out of 22	8th out of 25
• Average achievement in maths(age 11-12)	11th out of 23	
• Average achievement in science(age 11-12)	7th out of 23	
• Number of teaching hours per year in lower secondary education	8th out of 18	9th out of 19
Indicators in Third Quartile		
• Educational Participation-age 16	14th out of 25	16th out of 26
• Ratio of Students to Teaching Staff - secondary education	16th out of 19	13th out of 19
Indicators in Fourth Quartile		
• Percentage of Population aged 25-64 that has at least upper secondary level education	17th out of 22	19th out of 25
• Average number of foreign languages per pupil	New Indicator	14th out of 14
• School Expectancy for a 5 year old child	5th out of 23	19th out of 24

Human capital represents a vital strategic asset for all countries. The quality of human resources in the economy is a key determinant of economic success and dynamism given the marked shift over recent years towards the knowledge-based

economy. The success of the Irish economy in the 1990s reflects in large part the return from the introduction of "free education" at the end of the 1960s. The consequent improvement in the economy's stock of human capital has played a vital part in underpinning the competitiveness of the Irish economy in the 1990s, in particular by significantly increasing the attractiveness of the Irish economy as a destination for foreign direct investment (FDI). In developing a medium-term competitiveness strategy for the Irish economy improved standards of educational achievement must be a central objective. This will ensure that the Irish economy can benefit fully from the transformation of the world economy now being wrought by technological change.

Sustained long-term competitive advantage will be created by an education system, boosting the level of human capital in the economy by delivering:

- superior standards of basic education for all children at first level
- a second-level system which caters for the needs of all students and does not copperfasten educational and longer-term economic and social disadvantage
- a third-level system which
    - leads to sustained improvements in the level of university education relative to the highest international standards
    - meets the short-term skills/vocational needs of the economy to ensure the sustainability of growth in the economy, in line with the recommendations of the National Competitiveness Council's Statement on Skills published last year
    - and supports the development of centres of research excellence in areas with the potential to underpin the development of competitiveness success

These objectives must, of course, be pursued within the much broader context of developing a system of education which equips each individual in Irish society with the capabilities they require to fulfil their learning potential, and hence allows them to make their own unique and individual contribution to the development of Irish society.

3.2 Education Levels and Performance

Table S1 **Education Levels**

		1	2	3	4	5	6
	Indicator	**Education participation age 16 (%)**	**Net enrolment in tertiary education - age 18-21 (%)**	**% of population 25-64 years) that has attained third level education (%)**	**% of population 25-64 years) that has at least upper secondary level education (%)**	**School expectancy for a % year-old child (years)**	**% of people aged 25-34 with higher education**
	Year	1996	1996	1996	1996	1996	1996
Country	Observations	26	24	25	25	24	25
Denmark	Value	92.8	8.5	22	66	17.1	22
	Rank	12	21	10	12	10	16
Ireland	Value	88.9	31.4	23.8	50	15.6	31
	Rank	16	6	8	19	19	4
Japan	Value	97.9	0	0	0	0	0

	Rank	4	0	0	0	0	0
Netherlands	Value	98.4	24.0	23	63	17.5	25
	Rank	3	11	8	13	4	10
New Zealand	Value	97.7	29.4	25	60	17.2	24
	Rank	5	8	5	15	8	12
UK	Value	82.3	26.9	22	76	17.3	24
	Rank	22	10	10	6	7	12
US	Value	85.6	34.6	34	86	16.8	35
	Rank	20	5	2	1	14	2

An important indicator of the use of and access to the educational system is the expected number of years a five-year old child will, on average, spend in education up to the age of twenty-nine[33]. School expectancy in 1996 was 15.6 years, compared to 15.2 years in 1995. However, this small improvement has been insufficient to prevent some deterioration in Ireland's international ranking. Ireland now stand at 19th position out of 25 countries and is also below the OECD average of 16.4 years, placing Ireland in the bottom quartile in the OECD lagging behind the UK which has an average school expectancy of over 17 years. This finding appears counter-intuitive given Ireland's superior ranking to the UK in both educational participation at age 16 (88.9 per cent in Ireland as compared to 82.3 per cent in the UK) and also for net enrolment among 18-21 year olds in tertiary education (31.4 per cent in Ireland as compared with 26.9 per cent in the UK). According to the OECD, for the whole of the age cohort aged between five and twenty-nine years educational participation in the UK in 1995 was slightly higher than that of Ireland, reflecting significantly higher levels of participation in upper secondary education in the UK on a part-time basis among older age groups up to twenty-nine years of age. However, when examining the education expectancy in full time education only (i.e. excluding those in part time education) the Irish figure is 14.7 years compared to 14.2 in the UK. Hence, Ireland's low ranking for this indicator does appear to be distorted by the failure to differentiate between full-time and part-time students[34]. However, it does draw attention to the scope for improved take-up of "second-chance" educational opportunities. Indeed the enrolment rate in Ireland for those aged twenty to twenty-nine years at 14.6 per cent falls well below the OECD country mean of 19.3 per cent.

Educational participation by 16 year olds in Ireland in 1996 was 89 per cent, a decline from its level of 91 per cent in 1995. Ireland is now ranked 17th of 27 countries, having being 14th of 25 countries in the 1998 Competitiveness Report.

Although the 23 per cent share of the working-age population (25 to 64 years of age) that has completed third level education is equivalent to the OECD average, the proportion of the working age population in Ireland having completed upper secondary levels is only 50 per cent, as compared with a country mean of 60 per cent in the OECD. Ireland's relatively low international standing reflects the more recent introduction of universal secondary education.

Ireland does sit in the upper quartile in the percentage of 18-21 year-olds enrolled in tertiary education at 31.4 per cent. This compares to the figure of 30.5 in the 1998 Competitiveness Report. However it should be borne in mind that this figure may distort Ireland's position somewhat since entry into third level tends to occur at an older age in many EU countries. Ireland is also placed in the first quartile for the percentage of 25-34 year olds that have obtained higher education qualifications.

Table S2 **Education Policy and Performance**

	1	2	3	4	5
Indicator	**Number of**	**Ratio of students**	**Average achievement**	**Average achievement**	**Average number**

		teaching hours per year in lower secondary education	to teaching staff - secondary education	in maths (age 11-12)	in science (age 11-12)	of foreign languages per pupil
	Year	1996	1996	1995	1995	1995
Country	Observations	19	19	23	23	14
Denmark	Value	750	11.0	502	478	1.85
	Rank	6	4	18	23	4
Ireland	Value	735	15.8	527	538	1.01
	Rank	9	13	11	7	14
Japan	Value	0	15.9	605	571	0
	Rank	0	14	1	2	0
Netherlands	Value	910	18.6	541	560	2.42
	Rank	2	18	5	3	3
New Zealand	Value	776	16.1	508	526	0
	Rank	5	15	15	15	0
UK	Value	740	15.6	503	535	0
	Rank	8	12	17	10	0
US	Value	964	16.1	500	534	0
	Rank	1	15	19	11	0

The number of teaching hours in lower-secondary education is unchanged from the 1998 Competitiveness Report at 735 hours. This is above the OECD average of 700 hours and Ireland's ranking has remained broadly unchanged. The US has the highest number of teaching hours, followed by the Netherlands and Spain. The UK is also slightly ahead of Ireland, with an average of 740 teaching hours per year.

Ireland has 15.8 students to every teacher at secondary level. This represents an improvement on the figure reported in last year's report of 16.3. The average of the countries compared in the above table is 14.6. Ireland's ranking has improved from 16th to 13th position out of the 19 countries examined. Austria has the least number of students per teacher at 8.9. The recently announced Education Package of £57m, with £14m allocated for 450[35] new teachers, should lead to further improvements in Ireland's position.

The retention rate in second level education has risen from 70 per cent in 1986 to around 82 per cent at the present time. It is intended to raise this figure to 90 per cent by the year 2000.

The minimum legal school leaving age is 15 years at the present time. It is intended to raise this to 16 years. The introduction of the Leaving Certificate Vocational Programme (LCVP) and the Leaving Certificate Applied (LCA) may have helped contribute to higher retention rates. More than 8,700 students took the LCVP in 1998 compared to 2,300 in 1997. The LCA course was taken by 1,696 students in 1998 compared to 753 in 1997.

International comparisons of educational quality should be regarded with caution as test results of basic skills in, for example, maths and science can be distorted by a wide range of social, cultural and institutional factors. Individual countries, in setting their own educational policy objectives, may afford different subjects different emphasis than is the case in other countries. Also, a higher priority might be given to developing children's imagination, creativity and life skills and there are no tools for measuring these essential capabilities. Ireland is ranked in the second quartile of 23 countries for average achievement in maths and science for children aged 11-12 years. Notwithstanding these difficulties it is critical to continue to focus attention on

the quality of education provided in Ireland. Enhanced educational standards are a clear and direct route to long-term competitiveness. Children falling behind at primary level will find it almost impossible to make up the gap later, giving rise to long-term educational, economic and social disadvantage. The tail of under-achievement at primary level – a persistent and pervasive problem among socially disadvantaged groups in Irish society - must continue to be a priority for policy.

3.3 Strategy to increase the supply of people with skills

Strong labour force growth in Ireland, at several times that of the EU overall, has been an important factor in the acceleration of Ireland's trend growth rate during the last decade. Demographic factors are projected to lead to a moderation in labour force growth in the Irish economy over the medium-term. This is projected to occur against the backdrop of continued strong demand for skilled labour in the Irish economy. This divergence between the demand for skilled labour in the Irish economy and the supply is leading to skills shortages and wage inflation, which now threaten to undermine the competitiveness of the Irish economy.

Skills are an essential element of long-term competitiveness:

- Skills raise productivity at enterprise level, thereby improving cost-competitiveness and export performance, contributing to sustained employment creation and long-term competitiveness success.
- The availability of well-educated, well-trained and highly skilled personnel is essential to attracting investment inflows in sectors, which are likely to yield longer-term competitiveness advantage to the economy. In a survey conducted of multi-national firms[36] located in Ireland, firms were asked to rank the importance of thirty factors that might affect their performance. Issues related to the development of human capital were by far the most important, filling six of the top ten places. The quality of the education system was ranked in third position.
- Well-designed education and training measures may be an effective mechanism for combating long-term unemployment, as potential workers develop skills and obtain experience which enhance their prospects of long-term participation in the labour force.

Skills Survey

Table 3.1 illustrates the results of a survey of business leaders conducted by ESRI/Forfás. Respondents were asked to nominate two priority areas where they considered improvements in skill levels were required. The results indicate some sectoral variations. For example, the financial services sector appear to place less emphasis upon basic ability and practical skills opting instead for foreign language and general communication skills. Overall 30 per cent of firms indicated that skill deficiencies were a problem. This view was strongly held in high-tech, international services and other manufacturing sectors. However a substantially lower percentage of firms in the financial services sector concurred with this view. The survey indicated that some employers believe that too little emphasis is given in the educational system to what might be termed "life skills", such as attitudes, flexibility, communication and initiative.

Table 3.1 **Top priority areas in which firms would most like to see an improvement in the skills of their workforce (%)**	
Basic Ability that can be built on	30.6
Practical Skills	25.9
Literacy	0.6
Numeracy	0.2
Foreign Language Skills	3.7
Management Skills	11.7
General Communication Skills	5.1
Computer Literacy	11.5
Personal Skills	10.7
Total	100

The Competitiveness Council in its Statement on Skills recommended the following five-point strategy to increase the supply of skilled labour necessary to sustain economic growth and the competitiveness of the Irish economy:

- Increasing the numbers of people available to work
- Strengthening the links between education and the world of work
- Increasing the numbers qualifying each year with high-technology skills
- Increasing the numbers of people with the required low-medium level skills
- Raising enterprise investment in training for those already at work

3.3.1 Increasing the numbers of people available to work

The main actions set out by the Council to increase the supply of people at work are:

- Future tax reductions should be focused on those at average or below industrial earnings.
- The Employment Services function should be strengthened by integrating FÁS and LES operations.
- The placement service should be in a position to determine that sufficient bridging courses and individual counselling are available for the long-term unemployed to equip them for entry to both education and training options, including those FÁS training courses designed to meet the needs of companies.
- The disabled should be given a high priority in training and employment service programmes.
- The recommendations of the reports from the Expert Group on Childcare[37] and the Working Group on Woman's Access to Labour Market Opportunities[38] should be considered and decided upon as a matter of urgency.
- A comprehensive migration policy should be developed.
- As part of the National Employment Action Plan, progress towards a target for reducing long-term unemployment should be kept under review. As total unemployment continues to fall, the share of long-term unemployment in total unemployment must be maintained below 50 per cent. This objective relating to the share of long-term in total unemployment should be kept under review.

3.3.2 Strengthening the links between education and the world at work

A main objective of the education system is to provide future labour force entrants with the qualifications needed by them in the labour market. This does not imply a strict and mechanical planning approach with centralised setting of skills quotas on the basis of uncertain forecasts of skills needs. However, it is crucial to provide good guidance for young people with regard to their choices of study in order to ensure that skills and capabilities provided by the educational system are in keeping with labour market need, and also to foster a closer relationship between the education system and the labour market. If skill requirements can be forecast correctly and the educational and training output is planned to deliver the required skills, then Ireland will have achieved a major competitive advantage[39].

The Council in its Statement on Skills identified the following key issues in order to strengthen linkages between education and work.

- Increase investment in primary and pre-school education

As adverted to above, the performance of the system of primary education is critical to individual educational development and also to providing the core foundations for all other elements of the educational system. Investment in Ireland in education on a per capita basis is one of the lowest in the developed world. £1.5m has been allocated for early childhood education initiatives as part of the Education Package announced in December 1998.

- Eliminating the flow of early school leavers

Each year 3,200 leave school without completing the Junior Cycle and 10,800 leave after the Junior Cycle, without having completed the Senior Cycle. Early-school leaving is inextricably linked to the persistent problem of long-term unemployment in the Irish economy. As long as this pattern persists the existing stock of long-term unemployed will continue to be supplemented by young entrants into the labour market, with little or no prospect of any sustained period of employment experience over time. In the last year measures have been introduced to resolve this problem at a cost of £20m over 3 years. The National Economic and Social Forum have proposed a strategy including measures to ensure wider access to pre-school education, improved monitoring and follow up of non-attendees, greater acknowledgement of non-academic achievement, and also “second chance” measures, targeted at those who have already left school, including extra provision for training and work experience.

- Increasing the number of Leaving Certificate science and languages students

There has been a worrying decline in the number of students taking science for the Leaving Certificate in recent years. In this regard the recent initiative announced by the Minister for Education and Science to reverse declining numbers and improve the poor performance of second level physics and chemistry students is very welcome. The number of students studying foreign languages is low compared to what is required. 61 per cent of second level students study French but the numbers studying German, Spanish and Italian are substantially lower. The Expert Group on Future Skills Needs has examined Ireland’s future IT skill needs. They estimate that 8,300 additional technologists will be needed by the economy up to 2003.

3.3.3 Increasing the numbers qualifying each year with high- technology skills

The actions required to increase the number of students qualifying with high technology skills are:

- The proposals of the Expert Group on Future Skills Needs must be implemented as soon as possible
- The Skills Awareness programme, initiated by Forfás on a limited scale to encourage more Leaving Certificate students to enroll in science and technology courses, should be expanded

3.3.4 Increasing the numbers of people with the required low-medium level skills

The actions required to increase the supply of people with low-to-medium skills are:

- The Expert Group on Future Skills Needs, in conjunction with the representatives of the social partners, should quantify the skill needs of the construction, retail and tourism industries and formulate responses to meet these needs[40]
- The phased introduction of the National Traineeship Programme over the years to 2001, announced in the 1997 White Paper on Human Resource Development, should be accelerated to achieve the target of 5,000 as quickly as possible.
- Urgent action should be taken to ensure adequate off-the-job training places for apprenticeships
- FÁS should work closely with companies to ensure that its courses are directly related to the needs of enterprise

3.3.5 Raising enterprise investment in training for those already at work

Updating skills and knowledge is essential in order to maintain a qualified and high-skilled workforce. In an era of rapid structural and technological change depreciation of human capital can be swift. In such circumstances the objective of lifelong learning is central to ensuring the continued upgrading and renewal of the level of human capital in the economy. Investment in employee training leads to a renewal of the enterprise's knowledge base and human capital, raising firm level productivity, facilitating innovative activities and boosting long-term competitiveness. From the employee perspective, lifelong learning boosts lifelong earning potential.

The main barriers to the pursuit of lifelong learning and the adoption of in-company training include:

- Time constraints
- High training costs
- Under-developed systems of training supply, partially reflecting financing and certification issues
- Uncertain benefits of work-based training – training investments must be very focused with good systems of evaluation and feedback in order to ensure best use of scarce training resources.

Where there is evidence of market failure in the provision of lifelong learning, where the social benefits and positive spillovers (externalities) from such activities are high, there may be scope for state intervention. This could involve some form of fiscal incentives but great care would need to be exercised in this area to minimise dead-weight costs, where the training would have been provided/undertaken even in the absence of intervention. In most cases the return from such investments to the employer or employee should be sufficient to obviate the need for state involvement. Other incentives might include coupling working-time regulation with the possibility of increasing work-based training and encouraging the granting of training leave.

The Qualifications (Education and Training) Bill was published on the 3rd March 1999. The primary purpose of the Bill is to put into place a legislative framework that will:

- Establish and develop standards of knowledge, skill or competence
- Promote the quality of further education and training and higher education and training
- Provide a system for co-ordinating and comparing education and training awards
- Promote and maintain procedures for access, transfer and progression

The Bill is the culmination of a lenghty period of consultation and consideration by Government. The Bill provides for the setting up of the National Qualifications Authority to establish and maintain a framework of qualifications, to act as the overall guarantor of the quality of awards and to facilitate and promote access, transfer and progression. A Further Education and Training Awards Council and a Higher Education and Training Awards Council will also be set up to provide certification, within the framework of qualifications. The development of a national framework of qualifications is a key part of the Bill and this will set out arrangements for access, transfer and progression for students. Thus each student will be able to determine her or his own educational goals and see how they can be fulfilled. This will make education and training goals a continuing and lifelong ambition.

Continuous vocational training should be seen as a shared responsibility between state and enterprise. In the Netherlands the practice of ‘training funds’, established by the social partners has been developed. Arrangements are agreed in collective bargaining agreements with respect to contribution rules and the use of funds.

There is evidence of a high-degree of under-investment in training in the vast majority of small and medium enterprises (SMEs). This is a major structural weakness, which must be alleviated given the importance of the SME sector in the Irish economy. It will be very difficult for such firms to achieve competitive advantage unless they build on their existing human resources through skills development. In addition to the barriers already mentioned, SMEs often do not have a training policy because their employees fulfil multiple roles which allow them little time or incentive to engage in training. Also, the highly specific training required by SMEs may not be supplied in the marketplace. Rapidly-growing SMEs and high-tech enterprises differ fundamentally from the bulk of SMEs in their approach. Such companies invest heavily in human resource development because of their specialisation in knowledge-intensive activities. Investment in human capital is critical to their competitiveness success.

The approach followed in Finland provides a useful basis of comparison. The objective of the *Skill Finland Project* is to raise skill levels and knowledge in SMEs. One hundred SMEs are involved in the project. Specialists from different sectors assist those working in human resource development at firm level to identify skill needs. Workers’ existing skill levels are first measured. These are then compared with both the skill

level required by the enterprise and the relevant skill level defined in the system of national qualifications. Where a gap clearly exists between the actual and desirable level a personal study is drawn up and an adult education institution will be found which is able to provide the specific training required.

There is a need in Ireland to develop a much stronger consensus on the importance of education and training as a vehicle for improving productivity and competitiveness at enterprise level. SMEs which, at present, are not devoting sufficient resources to human resource training and development may be persuaded by the dissemination of information regarding the successful experiences of other firms. The role of lifelong learning, within the overall structure of education, training and skills and human resources, should continue to be examined with a view to its on-going structured development in the future.

The Competitiveness Council in its Statement on Skills proposed that particular consideration should be given to the following issues:

- whether initiatives on training awareness campaigns, training networks, and increased levels on traineeships and training support are leading to substantially increased levels of company-based training or whether alternative or/and additional initiatives need to be undertaken
- the strategies needed to ensure a substantial increase in enterprise training within a short and defined timeframe
- in the context of the substantially increased public funds already allocated, the scale of resources required, and possible funding sources for further investment
    - the current usefulness of, and/or the changes needed, in the levy/grant system
    - developing a benchmarking system, which would set down the required benchmarks of achievement, such as a specific number of off-the-job training days for existing employees, training budget as a percentage of sales, occupational skills relative to best practice competitors and the impact of training on productivity

3.4 Vocational Training

Vocational education must be a key element of the secondary education system. A system of vocational education prepares young people for swift entry into the labour market. Effective and efficient higher secondary vocational education can help ease the transition from school-to-work. Figure 3.1, based on 1995 figures from the OECD, illustrates the proportion of upper secondary students in both vocational and general education in EU countries. As can be seen, Ireland has the lowest percentage of students in vocational education in the EU.

Figure 3.1 **Share of vocational education in overall secondary education**

Some important rigidities exist in the Irish educational system in limiting access to further education to those who complete full-time education with a vocational specialisation. Student places in higher level education are rationed on the basis of academic achievement alone. In Ireland the main emphasis from a labour market perspective is on the level of education achieved, whereas in countries such as Germany and the Netherlands the emphasis is on the content of education.[41] The

relatively low weighting given to vocational/technical second-level qualifications places those with lower academic abilities, but perhaps with rich vocational/technical aptitudes and other general aptitudes, at a serious disadvantage. The range of subjects/modules for which credits can be accumulated should be extended to encompass a much wider definition of knowledge, including atypical learning, and the concept of multi-intelligence.[42] It is important to ensure that the value of vocational and technical subjects is fully recognised within the educational and full time training system. In assessing individual students for admission to third-level courses, it is vital that structured mechanisms are established to appropriately and objectively take into account other qualities relevant to their suitability, other than formal academic qualifications in isolation.

3.4.1 Vocational systems of education in other countries

3.4.1.1 German Dual System

The vocational education and training system in Germany is often referred to as the "dual system", since the general education system and vocational training are inextricably linked. At age 11 students have the choice of entering a purely academic secondary school or a vocational school. Graduates from both types of institution have the option to enter vocational training at 15 or 16 but they are legally obliged to also continue with some form of school based education until they are 18 years of age. This system was often in the past regarded as an example of international best practice. However, several weaknesses have now been identified in this system. Firstly, the system is now perceived as too slow in adjusting to changes in the labour market. It has proved difficult to increase the responsiveness of the system to emerging skills needs in the economy. A second concern refers to the costs of funding vocational education and training. Employer organisations argue that training costs are too high, while the trade unions maintain that there are insufficient training places and have suggested the imposition of a training levy for those firms not undertaking training themselves. Finally, the rigid academic/vocational divide in the German educational system has resulted in very little horizontal mobility between the vocational and academic streams. Other countries such as, for example Scotland, appear to have been more successful in integrating the two systems.

3.4.1.2 The Scottish National Vocational Qualification (NVQ) System

The NVQ system in Scotland has led to a much higher degree of flexibility in the provision of vocational education. The NVQ system has allowed the integration of almost all aspects of the entire Scottish education system into a single system of qualifications which allows easy transferability between what in other countries, including Ireland, are mutually exclusive systems. For example, it is relatively easy to transfer from a "PLC" course into a university course without having to revert to the first year. The system is built around the five EU vocational classifications. Another major innovation is that the entire range of vocational training in the system, amounting to 600 courses, was re-designed in consultation with industry interests.

4 Business Support

4.1 Research and Development (R&D) and Innovation

Introduction

R&D as the major precursor of technological progress is an important route to high productivity growth and rising living standards in the economy. R&D aims explicitly at pushing outward the potential level of output in the economy for a given level of conventional economic inputs. R&D's contribution may take the form of creating new inputs (which improve productive efficiency) or new consumer goods. In assessing investment activities which are likely to yield a long-term competitive advantage to the Irish economy, all investment in the creation of knowledge and its exploitation should be considered, not merely conventional R&D activities but also investment in innovation.

All enduring competitive success is built on knowledge and innovation, the process of adding value to knowledge, resulting in the creation of what are known as "knowledge assets" in the economy.

The innovation process which translates resources or economic inputs such as skilled labour, venture capital and investment in R&D into results or economic outcomes is quite opaque. There exists a dynamic interdependence between and among resources and innovation processes, which produces positive economic outcomes. Hence, it is not sufficient to know what resources to support. It is also essential to understand the mix of resources and the interaction between them, which will generate economic growth. There is therefore a compelling need to recognise the feedback loops, which will help generate a self-sustaining pattern of success.

The interaction of international trade with R&D and innovation is a very important mechanism promoting technology transfer into the Irish economy. Increased market size such as the creation of the Single European Market (SEM) and market liberalisation generally, increases the reward for investment in R&D, the prospective return to a successful innovation, as well as permitting a better exploitation of scale economies. In addition, it adds impetus to the process of product innovation since it gives an incentive towards invention of new products rather than towards the imitation of already existing products.

Technology transfer through FDI alone cannot build sustained competitive advantage. Ireland's competitive advantage in high-tech manufacturing industry will be eroded by the emergence of lower cost locations with adequate skills levels to meet the demands of increasingly automated high-tech manufacturing. As a location for the production of high-tech manufactured goods the Irish economy remains relatively low down the value chain, notwithstanding the relatively high amount of applied R&D carried out in the foreign owned sector of the economy. The knowledge assets in which sustained competitive advantage resides remain in these sectors outside the Irish economy. Competitive advantage in the future will to an increasing extent be determined by success in the generation of ideas, knowledge, information and innovation. This is essentially the output of R&D and innovation activities.

One of the features that characterises the world's most prosperous and competitive countries is the presence of a strong "national system of innovation". This refers to the environment in which firms innovate, where supportive conditions in terms of finance, skills, technological capability and a positive government attitude are present. The enterprise sector in a strong national system of innovation is supported and complemented by an effective knowledge-based infrastructure. This

infrastructure is typically made up of research, advisory and innovation-support bodies located in the public sector, in higher education institutions and in the private sector.

This section examines, in the first place, Ireland's technological innovation potential by presenting a number of the available indicators that describe the output of technologically qualified graduates from the education system and the levels of research being performed in the higher education sector and other parts of the public sector. Following this, a number of indicators of Ireland's technological innovation performance are presented. These indicators focus on the commitment of industry to technological innovation and its capacity to adopt new technologies and systems.

4.1.1 Technological Innovation Potential

Key Points

- Ireland's output of scientific and engineering graduates is relatively strong. However, the challenge still remains to match the supply of scientists and engineers with industry demand
- Research in higher education and other public institutions has tended to receive a comparatively low level of funding in the past. There are positive signs that steps are now being taken to rectify this problem

Indicators in Top Quartile	Rank 98	Rank 99
• Researchers per 1000 labour force in higher education and government institutions	11th out of 22	6th out of 27
Indicators in Second Quartile		
• Science and engineering degrees awarded as a percentage of all degrees	11th out of 27	7th out of 22
• Bachelor degrees in science and engineering as a percentage of 24-year-olds in the population	New Indicator	8th out of 25
Indicators in Third Quartile		
• R&D expenditure in higher education and government institutions as a percentage of GNP	19th out of 27	18th out of 28
• Number of scientific publications per 1000 population	New Indicator	17th out of 29
Indicators in Fourth Quartile		

The capacity for technological innovation within a country is strongly influenced by the strength and nature of its science and technology base. The indicators examined in Table S6 below show that the output of science and engineering graduates is reasonably satisfactory in Ireland, both in terms of the share of all graduates from the education system and expressed as a share of the relevant age cohort. The leading countries on these indicators are Finland and Germany, countries which have placed a considerable emphasis on the importance of science and technology for many years. Of the two, it would seem that that Finland is the more appropriate country to consider in terms of international benchmarking. In Finland, 39 per cent of graduates are from science and engineering disciplines (Ireland 31 per cent) and the output of science and engineering bachelor degrees equates to 9 per cent of the 24-year-old population (Ireland 5.7 per cent).

Table S6 **Technological Innovation Potential**

		1	2	3	4	5
	Indicator	**Science and enginneering degrees awarded as a percentage of the total number of degrees awarded**	**Bachelor degrees in science and engineering as a percentage of 24 year olds in the population**	**R&D expenditure in higher education and government institutions as a percentage of GNP (GNP for Ireland**	**Researchers in higher education and government institutions per 1000 labour force**	**Number of scientific publications per 1000 population**
	Year	1996	1995	1996	1995	1995
Country	Observations	22	25	28	27	29
Denmark	Value	22	6.5	0.74	3.3	1.12
	Rank	16	4	9	8	3
Ireland	Value	31	5.7	0.47	3.4	0.43
	Rank	7	8	18	6	17
Japan	Value	31	6.4	0.91	4.1	0.42
	Rank	7	5	4	3	18
Netherlands	Value	21	4.4	0.98	2.7	0.96
	Rank	7	14	1	10	5
New Zealand	Value	20	0	0.71	2.6	0.82
	Rank	20	0	12	11	8
UK	Value	29	8.5	0.66	2.1	0.93
	Rank	9	3	13	17	6
US	Value	19	5.4	0.62	1.4	0.77
	Rank	21	9	15	24	12

The other indicators presented under the heading of technological innovation potential describe the level of research being performed in higher education and government institutions. This provides a measure of the strength of the knowledge-based infrastructure in the country. Ireland is placed 18th out of 28 OECD countries in the share of national income devoted to non-business R&D, spending half the proportion found in the leading countries. The Government recognises this as a problem and initiatives included in the £250 million Scientific and Technological Education (Investment) Fund launched in 1997 and an announcement in November 1998 of a £180 million Research & Development Initiative for higher education are likely to bring about a significant improvement in Ireland's position.

The figure for the number of researchers outside of the business sector paints a reasonably positive picture of Ireland's science and technology base. There is an apparent anomaly between Ireland's 6th place ranking on this indicator and the 18th place ranking on financial expenditure in this area. The explanation is the rather unique situation in Irish higher education research, which is heavily dependent on the use of post-graduate students and is weak in the level of post-doctoral researchers and technician support provided. Since post-graduate students receive relatively low incomes, this results in a lower aggregate expenditure share than in other countries.

Another measure of the science and technology base can be gauged by looking at the output of scientific publications from Ireland. Ireland is placed 17th out of 29 countries in the number of scientific publications per thousand of the population. This is a third quartile ranking in respect of which considerable improvement is required. There are many caveats associated with the use of these data and the aggregate figure for Ireland masks relatively good performance in some areas, such as medical

research. However, it is an appropriate indicator as it focuses on the output of research, which is as important an indicator as the financial input.

In terms of potential therefore, Ireland has a satisfactory ranking in the number of science and engineering graduates and in the number of people active in research in colleges and other institutions. The main gap that has existed in the past has been in the funding allocated for research and the maintenance of a strong knowledge-based infrastructure in the country. The recent funding initiatives by the Government are an acknowledgement of the importance of closing this gap. There is a growing recognition that in order for Ireland to maintain its attractiveness as a location for high-technology enterprise, it will be necessary to further develop knowledge-based infrastructure with particular emphasis on the key technologies employed by such enterprises.

4.1.2 Technological innovation performance

Key Points

- Companies that invest in R&D are more likely to survive longer and generate more employment than companies which do not make such investments
- Business sector R&D activity has increased strongly in recent years but most companies in the country do not have a serious commitment to R&D
- Patenting activity is relatively poor but is commensurate with levels of R&D performed in industry. Ireland is placed in a “mid-range” position in the adoption of IT

Indicators in Top Quartile	Rank 98	Rank 99
• ISO 9000 certificates per capita	4th out of 26	
Indicators in Second Quartile		
• Business R&D expenditure as a percentage of GNP	9th out of 26	10th out of 28
• Business R&D researchers per 1000 of the labour force	13th of 23	13th out of 27
• Inventiveness Coefficient (resident patent applications per 10,000 population)	New Indicator	11th out of 28
Indicators in Third Quartile		
• Patents granted in US per million capita	16th out of 26	18th out of 28
• Size of information technology market as percentage of GNP	18th out of 24	17th out of 24
• Compound annual growth in IT market	13th out of 24	13th out of 24
Indicators in Fourth Quartile		
• Manufacturing R&D as a percentage of sales	New Indicator	12th out of 15

The main measures for assessing the innovation performance of the enterprise sector on an international basis are R&D statistics and patent statistics. R&D statistics are considered to be a good proxy for technological innovation and much analysis has taken place on the returns to be gained from investment in R&D both to the firm itself and to the wider economy. Research demonstrates that R&D-active firms tend to

outperform non-active firms on a range of commercial and competitive criteria. In Ireland, it has been shown that firms investing in R&D have higher survival rates than non-R&D performers. 86 per cent of R&D-active indigenous firms in 1986 were still trading ten years later compared to 66 per cent of non-active firms[43].

Similarly, it has been shown that R&D performers tend to have a superior record of maintaining and creating jobs compared to their non-R&D performing counterparts[44]. Table 4.1 shows the change in employment between R&D performers and non-performers that were trading in 1986. For foreign-owned companies, employment grew by 16 per cent in R&D active companies and declined by 25 per cent in the non-active companies. For indigenous companies, employment declined in both groups but the decline was significantly greater among the non-R&D active group of companies. This correlation requires further examination in order to establish whether there is any robust causal relationship between R&D expenditures and employment performance.

Table 4.1 Employment change 1986-95 for firms trading in 1986

	R&D Active	Non-R&D Active
Foreign Firms	16.3%	-25.2%
Irish-owned Firms	-5.1%	-30.6%

Source: Ruane and Kearns. 1997

Ireland is ranked 10th out of 28 countries in terms of business expenditure on research and development (BERD) as a percentage of GNP and this is similar to the ranking for the number of researchers in industry per thousand in the labour force. This represents a significant leap in Ireland's performance compared to the situation ten years ago when Ireland was placed towards the bottom of the international league tables on these indicators. The lead countries in terms of industrial R&D performance are Sweden, Japan, Switzerland, the US and Finland. Given the specialisation of the Irish economy in high-tech sectors the GNP share of business sector R&D in national income should be considerably higher than the EU average.

Table S7 **Technological Innovation Performance**

		1	2	3	4
	Indicator	**Business R&D expenditure as a percentage of GNP (GNP for Ireland**	**Business R&D researchers per 1000 of the labour force**	**R&D as a percentage of sales in manufacturing**	**IS0 9000 Certificates per million capita - total to DEC. 1995**
	Year	1996	1995	1994	3/12/95
Country	Observations	28	27	15	26
Denmark	Value	1.25	2.39	1.6	252
	Rank	9	12	9	7
Ireland	Value	1.13	2.33	1.1	456
	Rank	10	13	12	4
Japan	Value	2.01	6.01	2.7	30
	Rank	2	1	3	22
Netherlands	Value	1.08	1.79	1.7	344
	Rank	11	16	8	5
New Zealand	Value	0.26	0.91	0	480
	Rank	24	20	0	3
UK	Value	1.26	2.80	1.8	901

	Rank	8	8	7	1
US	Value	1.92	5.91	2.9	34
	Rank	4	2	2	21

While Ireland's business sector R&D performance is moving in the right direction, it is important not to make generalisations about the technological capability of all of industry based on these aggregate measures. Business sector R&D activity is narrowly focused. More detailed analysis by Forfás has shown, for example:

- Foreign-owned companies account for two-thirds of all business sector R&D expenditure. However, only one in five foreign-owned companies are involved in R&D on a continuous basis and of these, the top 10 performers accounted for over half of the £256m spent in 1995. In fact, there are only around 40 foreign-owned companies spending over £1m per annum on R&D.
- Only 300 indigenous companies spend over £100,000 per annum on R&D and of these, the top 10 performers account for one-third of the £141m spent by indigenous firms in 1995. There are only around 20 indigenous companies spending over £1m per annum on R&D.

This analysis of the distribution of R&D activity should help avoid complacency about the general level of technological competence in firms in Ireland. There are still many indigenous and foreign-owned firms that have yet to make serious and sustained commitment to technological innovation.

Figure 4.1 shows the balance of R&D performed in public and private sectors in OECD countries. It is clear from the graphic that those countries that have high levels of industrial R&D tend to also have relatively high levels of public sector R&D. It is sometimes suggested that high levels of industrial R&D can substitute for low levels of public investment in R&D. However, the absence of any countries from the upper-left quadrant of the figure suggests that these two types of research complement, rather than substitute for, each other. This reinforces the claim regarding a strong national system of innovation where all actors, private and public, work together to strengthen technological capability in the country. Ireland needs to continue to invest public money in R&D to build capability in key technologies and so underpin and stimulate further R&D investment by industry in Ireland.

Figure 4.1 **The balance between public and private R&D in OECD countries**

The third column in Table S7 shows the R&D spend of manufacturing companies as a percentage of sales. This indicator can only be compared for a limited number of countries that provide data to the OECD. Table 4.2 provides sectoral comparisons of R&D intensity across a number of countries.

Table 4.2 **Business Sector R&D expenditure as a percentage of sales in selected countries**

	IRL	JPN	NTL	FIN	SWE	UK	USA
Total Manufacturing	1.1	2.7	1.7	1.9	3.5	1.9	2.9

Food, drink and tobacco	0.5	0.6	0.5	0.5	0.4	0.3	0.3
Paper and printing	0.2	0.3	0.1	0.5	0.7	0.1	0.5
Chemicals excl. pharmaceuticals	0.3	6.0	3.8	2.5	1.9	2.9	3.0
Pharmaceuticals	4.2	13.1	7.5	16.0	18.9	16.4	13.1
Rubber and plastics products	1.1	2.1	0.7	2.3	2.2	0.2	1.2
Non-metallic mineral products	1.3	1.9	0.3	1.9	0.7	0.3	0.8
Metal products	1.6	0.7	0.4	0.9	0.8	0.4	0.6
Non-electrical machinery	1.3	3.4	0.8	3.4	3.6	1.9	1.7
Office and computing equipment	0.3	8.3	10.4	3.6	25.0	2.9	13.5
Electronics	7.7	5.5	n/a	9.4	14.8	5.2	8.1
Other electrical machinery	1.8	4.6	n/a	5.1	2.1	4.1	2.7
Transport equipment	1.3	2.6	2.5	1.4	6.2	3.8	6.3
Instruments and professional goods	2.9	8.2	1.6	6.8	11.7	1.5	8.5

Source: OECD, STAN Database, data relates to 1994; data for Ireland for 1995 computed using Forfás R&D data and CSO output data

These data show that overall, business R&D as a percentage of sales in Ireland's total manufacturing is the lowest within the group of seven countries selected. In all but three of the thirteen sectors, Ireland's performance is in the three lowest ranked countries. This difference is most marked for some overseas-dominated sectors. The low levels overall in Ireland reflect both low R&D commitments amongst many indigenous plants and the presence of many overseas production subsidiaries, since R&D is an activity that still tends to be located to a large degree in the home country.

Industrial policy aims to raise the level of R&D and existing technological innovation in indigenous industries, to grow indigenous companies in rapidly growing technology based sectors (with a reasonable start already made in software) and to encourage greater levels of R&D to be performed within Irish subsidiaries of multinational enterprises. There is certainly scope to raise the R&D intensity of Ireland's technology sectors, as well as the R&D intensity and technological innovation of the economy at large.

The commitment of industry to quality standards is a proxy indicator of technological competence. Ireland ranks 4th out of 26 countries in the number of ISO9000 certificates issued per capita. This standard may not have a high profile in some countries so the indicator must be treated with caution. There is no doubt, for example, about the quality of Japanese manufacturing despite its low take-up of the ISO9000 standard.

Patent statistics provide another insight into levels of technological innovation in industry by measuring inventive activity. They are at best, however, a partial measure of inventiveness as the propensity to patent differs across industry sectors and across countries. It is also suggested that defending patents is as important as acquiring them but there are no international statistics throwing light on this issue. That said, Ireland ranks 11th out of 28 countries on the OECD's "Inventiveness Coefficient" - the number of patent applications made by residents of the country per 10,000 population.

Table S7 **Technological Innovation Performance** (continued)

		5	6	7	8
	Indicator	**Inventiveness coefficient (resident patent applications per 10,000 population)**	**Patents granted in US (per million capita)**	**Size of information technology market (% of GDP) (GNP for Ireland)**	**Growth in information technology market (compound annual growth rate)**
	Year	1995	1997	1995	1987-94
Country	Observations	28	28	24	24
Denmark	Value	2.4	71.0	1.6	9.8
	Rank	11	7	9	11
Ireland	Value	2.4	21.4	1.4	9.1
	Rank	11	18	17	13
Japan	Value	26.6	195.5	1.6	11.5
	Rank	1	1	9	8
Netherlands	Value	1.4	56.3	1.9	11.8
	Rank	15	9	8	7
New Zealand	Value	3.6	26.4	2.9	14.4
	Rank	8	16	1	4
UK	Value	3.2	47.5	2.1	7.6
	Rank	9	13	6	18
US	Value	4.7	0	2.9	8.7
	Rank	3	0	1	15

Figure 4.2 shows the link between investment in R&D (represented by BERD as a percent of GDP) and levels of patenting (represented by the inventiveness coefficient). There is, in general, a strong positive relationship between the two variables and this provides some evidence of the relationship between R&D by business and patenting activity. Ireland has some way to go to move up towards the level of R&D and invention found in the “best practice” countries of Switzerland, Sweden and Finland. However, Ireland is broadly on a par with Denmark and Norway.

Figure 4.2 **The link between business R&D and propensity to patent in OECD countries**

In terms of the number of patents granted in the US to parties resident in Ireland, the situation is less satisfactory with Ireland placed 18th out of 28 countries. Given the significance of the US market, this is an important indicator of the output of commercially significant innovations. It is not surprising that it is the countries with strong R&D performance (e.g. Switzerland, Sweden and Finland) which rank highest on this indicator. Analytical work by the OECD which attempts to evaluate the quality and impact of the patents granted in the US paints an even poorer picture of Ireland’s performance. The OECD produces a measure of “technological strength” which positions Ireland 18th out of 20 countries in their analysis, ahead only of Mexico and Portugal.

Finally, two indicators are provided which attempt to address the issue of technology diffusion in industry. The size of the market for IT products and the growth of the market give some indication of the willingness of industry to acquire these important new technologies. In terms of the size of the IT market relative to national income it is interesting to note that New Zealand, Australia and Canada are among the world leaders on this indicator. Ireland’s position is unsatisfactory at 17th place out of 24 countries and this is at variance with the level of trade taking place through Ireland in

these technologies. In terms of the growth of the IT market, an important indicator in terms of future competitiveness, less developed countries such as Hungary, Turkey and Mexico are at the top of the league table. This is not so surprising given that they are growing from a low base but it is important to be aware of the rapid development taking place in these economies.

In summary, therefore, there are indications that Ireland's technological innovation performance is moving towards the average for other small economies. Indicators of business expenditure on research and development and various indicators of patenting activity show Ireland to be in line with countries such as Norway and Denmark. However, given that it is Ireland's aim to be among the leading countries in the world in all aspects of the "national system of innovation", it is not sufficient to just approach the average. This analysis reveals competitiveness gaps in terms of the number of companies seriously involved in technological innovation and in the R&D-intensity of certain high-tech sectors. Schemes such as the Research, Technology and Innovation Initiative in place during the period 1994-99 have contributed to bringing Ireland up to an average level of innovation performance. The challenge for the future is to build on this work so that the aspiration to be a leading country in innovation performance can be realised.

4.1.3 Conclusions

In order to improve Ireland's position in R&D and innovation, national investment initiatives should be undertaken in line with the recommendations of the recent ESRI report on national investment priorities for the next national development plan[45].

The main focus of the recommendations of the Irish Council for Science, Technology and Innovation (ICSTI) is on raising the level of investment in R&D in the business sector and in public sector organisations, including third level colleges. Major concerns are the relatively poor R&D and/or technological innovation performance in many sectors, and in many indigenous and foreign owned companies. A particular concern is the relatively low R&D performance of multinational firms in Ireland in high-tech sectors. While foreign owned companies account for two-thirds of all business sector R&D expenditure only one in five foreign owned companies are involved in R&D on a continuous basis and the top ten performers account for over half of the total R&D spend by the foreign sector.

Some ICSTI key recommendations that are endorsed by the Competitiveness Council are:

- Establishment of a 'technology intelligence' network to help firms which do no R&D to define and access their technology needs
- Investment to create world-class research groups or centres in key scientific or technological areas. Ireland does not have a world-class research university and has very few research groups with the size and expertise to have a significant impact worldwide. This is a major impediment to efforts to build a knowledge-intensive, high-tech enterprise sector
- Renewed emphasis on developing strategic collaborative partnerships between industry and third level/state institutions
- More focused direct support for in-company R&D to encourage first-time R&D performers, help smaller firms achieve a critical mass in R&D investment, and to help firms progress up the R&D capability ladder to become world-class R&D performers

4.2 Trade

Key Points

- Ireland's trade performance in 1998 has been exceptional reflecting very large growth in exports in a relatively small number of sectors, the aggregate impact of economic crisis in emerging markets appears to be small
- The establishment of EMU from 1 January and the prospect of EU enlargement will intensify competition both at home and abroad but will also bring good opportunities for Irish owned exporters
- There is scope for large expansion of services exports
- The diversification of Ireland's exports both by country and sector remain relatively weak – the opportunities presented by EMU for diversification into core European markets must be exploited to maintain international competitiveness
- Irish enterprise should remain focused on opportunities in emerging markets, Asia (in particular China) and also in Eastern and Central Europe as these latter countries prepare for EU membership

Indicators in Top Quartile	Rank 98	Rank 99
• Export performance for total goods (% change from last year)	4th out of 27	3rd out of 27
• Trade openness – (exports plus imports)/GNP	2nd out of 26	2nd out of 28
Indicators in Second Quartile		
Indicators in Third Quartile		
• Producer prices – manufacturing	14th out of 23	14th out of 23
• Trade openness in services	8th out of 12	
Indicators in Fourth Quartile		
• Manufacturing exports – concentration by country	20th out of 24	18th out of 23
• Manufacturing imports – concentration by country	New Indicator	21st out of 23
• Manufacturing exports – concentration by sector	22nd out of 24	19th out of 23
• Manufacturing imports – concentration by sector	New Indicator	20th out of 23

Ireland's trade dependency is among the highest in the EU and the developed world. Ireland ranks as the third largest exporter in the world on a per capita basis (after Singapore and Belgium/Luxembourg). In 1998, total merchandise trade is estimated to have amounted to 165 per cent of GNP making Ireland one of the most open economies in the OECD. Ireland's openness to external trade is a key factor underpinning the competitiveness, flexibility and innovative capacity that characterise the Irish economy.

4.2.1 Trade and EMU

The launch of EMU from 1 January of this year formally initiates a fundamental transformation of the competitive environment for the Irish economy. With monetary policy now set by the European Central Bank (ECB) by reference to the objective of price stability for the euro area as a whole, the scope for exchange rate policy to offset competitiveness losses is eliminated for all time. Competitiveness shocks impacting disproportionately on the Irish economy, such as for example a precipitous, large and sustained devaluation in the value of sterling against the euro, cannot now be accommodated by a compensating change in the exchange rate. Instead they must be offset by a combination of currency risk management strategies, reduced profit margins, cost reductions, losses of market share or will result in output and employment losses.

The implications of Ireland's EMU membership are strongest at the sector and enterprise level in the economy. In terms of the Council's definition of competitiveness, it is at this level that the impact of EMU will be most relevant and enduring. The removal of the last major obstacle to the creation of the Single European Market (SEM), which in economic terms is second only in size to that of the US, takes place against the backdrop of the accelerated globalisation of the world economy. This new global trading environment is being driven by the ongoing process of trade liberalisation, growth in FDI, the revolution in information and communications technology and the harmonisation of technical standards. This process will intensify notwithstanding the fallout from the Asian/Russian/Latin American economic and financial crises. In order to compete effectively in this environment, Irish exporting firms must redefine their market presence in other countries, not merely by seeking out new exporting opportunities but also by forging ahead in such areas, for example, as joint ventures and technology licensing agreements.

The competitive forces unleashed in the European economy by the establishment of the euro will have profound implications for the competitiveness of the Irish economy. The final completion of the SEM under EMU will provide a major impetus to this process. Greater price transparency, lower transactions costs and the relentless search for cost economies will lead inexorably to a marked intensification of competition and must act as a catalyst for Irish enterprises to avail of market opportunities in the domestic, UK and Continental European markets. In the years ahead this process will be accelerated with the accession of the countries of Central and Eastern Europe into the EU.

The implications for Irish trade competitiveness of UK non-participation in EMU were discussed in Chapter 2. Given the strong trading linkages which exist between Ireland and the UK, a number of enterprises remain exposed to sterling risk. There are, of course, several factors making such a depreciation less likely, such as for example the high priority now afforded in the UK to the maintenance of macroeconomic stability and the prospect of UK entry into EMU in the early years of the next century. Nevertheless, enterprises exposed to such a depreciation need to plan for such an eventuality.[46] This also highlights the importance of enhancing the adjustment capacity of firms in the Irish economy to competitiveness shocks.

It also focuses attention on the opportunities presented for Ireland to diversify and reduce its reliance on the UK in line with market opportunities. Clearly, increased diversification of Ireland's trade is desirable on several grounds:

- it reduces Ireland's exposure to economic shocks, which might impact disproportionately on the Irish economy
- it promotes the expansion of Irish firms to an internationally competitive size
- it allows Irish firms to participate in export markets experiencing high growth

- it increases firm level competitiveness by forcing firms to match best practice internationally

Indeed, in the SEM competitive pressures on firms choosing to restrict their trading activities to one national market will intensify significantly over-time.

Table 4.3 **Trade openness of countries in the euro area (& GDP)**

	Exports of Goods and Services		**Imports of Goods and Services**	
	Total	Outside euro area	Total	Outside euro area
Germany	23.6	13.2	22.9	12.8
France	23.5	11.3	21.2	9.9
Italy	25.1	13.3	22.2	10.8
Austria	38.6	15.7	39.0	13.0
Belgium	67.3	23.9	62.7	22.9
Finland	37.7	25.4	29.3	19.2
Ireland	79.8	45.4	68.2	55.5
Netherlands	53.3	20.2	46.6	24.9
Portugal	33.3	11.7	40.5	13.9
Spain	24.0	9.2	23.9	10.7

Source: OECD

In EMU, movements of the euro against the dollar and the yen are likely to have different effects across EMU countries, given the large variations in extra-euro area trade share across participating countries. As is illustrated by Table 4.3 above, Ireland is likely to be disproportionately affected by such fluctuations as a consequence of its strong trade linkages with non-euro zone economies. This again highlights the need for greater than average adjustment capacity among Irish enterprises in EMU.

Table 4.4 **Sources of Irish Imports 1995-97**

	1995 (%)	**1996 (%)**	**1997 (%)**
Great Britain	32.2	31.9	30.9
Northern Ireland	3.2	2.9	2.8
EU(excluding UK)	21.5	22.0	21.4
Japan	5.2	5.4	6.9
USA	17.6	15.5	15.0
Other	17.3	18.5	19.5

Rest of Europe	3.0	3.8	3.6
Total	100	100	100
Source: CSO Trade Statistics, December 1997			

Table 4.4 gives a breakdown of the main sources of Irish imports. Over fifty per cent of our imports come from within the EU (over thirty three per cent from the UK and twenty one per cent from the remainder of the EU15).

Table 4.5 **Contribution of EU countries to Ireland's intra-EU imports 1997**

Country	**Imports-%**	**Rank**
UK	61.7	1
Germany	10.9	2
France	8.6	3
Netherlands	5.9	4
Italy	3.3	5
Bel/Lux	2.0	6
Sweden	2.0	7
Spain	1.9	8
Finland	1.5	9
Denmark	1.3	10
Portugal	0.5	11
Austria	0.4	12
Greece	0.1	13
Total EU	100	
Source: CSO Trade Statistics, Dec 1997		

Table 4.5 shows the share of each EU country in Ireland's total intra-EU imports. Germany is the second-largest supplier of imports accounting for 11 per cent of Ireland's intra EU imports, followed by France (8.6 per cent) and the Netherlands (6 per cent). Over half of Ireland's imports from Germany are machinery and transport equipment and a further 21 per cent are chemicals. Table 4.6 gives a more detailed country breakdown of the composition of Ireland's intra-EU imports.

Table 4.6 **Percentage breakdown of Irish imports from the EU by country and commodity 1997**

	Agricultural	**Crude**	**Energy**	**Chemicals**	**Machinery**	**Other**	**Total**

	Products	Materials			and Transport Equipment	Manufactured Products	
SITC Code	0+1	2+4	3	5	7	6+8	Total
Great Britain	10.7	1.5	6.1	14.3	33.5	34.0	100
NI	36.1	2.7	1.4	9.3	9.7	40.8	100
France	12.2	0.4	0.1	31.7	40.8	14.7	100
Bel/Lux	14.7	4.5	0.0	42.8	12.7	25.2	100
Netherlands	17.4	3.6	0.5	17.3	49.8	11.4	100
Germany	2.4	0.8	0.0	21.1	53.3	22.4	100
Italy	5.0	0.0	0.0	5.9	52.4	36.7	100
Denmark	14.7	0.0	0.0	26.7	49.0	9.7	100
Greece	7.1	0.0	0.0	66.4	0.0	26.5	100
Portugal	0.0	0.0	0.0	1.4	22.7	75.9	100
Spain	17.4	0.0	0.0	7.1	52.4	23.1	100
Sweden	0.1	11.3	0.0	1.7	53.2	33.7	100
Finland	0.0	12.4	0.0	0.0	67.2	20.5	100
Austria	0.0	0.0	0.0	41.4	24.8	33.8	100

Source: CSO Trade Statistics, Dec 1997

4.2.2.1 Ireland's Importance as a Purchaser of (Intra) EU imports

Ireland's share of total EU imports increased from 1.5 per cent in 1990 to 1.7 per cent in 1995. Strong growth in Ireland's imports over recent years is likely to have raised Ireland's share further.

Table 4.7 **Ireland's intra EU imports (% share)**

	SITC Code	1990	1992	1993	1994	1995
TOTAL	0-9	1.5	1.5	1.6	1.6	1.7
Agricultural Products	0+1	1.7	1.8	1.7	1.8	1.7
Crude Materials	2+4	0.8	0.8	1.0	1.0	0.9
Energy	3	2.8	1.8	1.8	1.7	1.8
Chemicals	5	1.8	1.8	1.8	1.8	1.8
Machinery and Transport Equipment	7	1.2	1.2	1.3	1.3	1.4
Other Manufactured Products	6+8	1.6	1.6	1.6	1.6	1.7

Source: Eurostat

4.2.2.2 Import Diversification

The case for greater diversification in Ireland's trade applies equally to both exports and imports. A diversified trade performance, besides minimising the exposure of the trading sector of the Irish economy to national business cycles/shocks, serves as a very important discipline in fostering the international competitiveness of trading firms in the Irish economy. The need to compete across national boundaries or with a broader range of international competitors in the Irish domestic market will act as a significant impetus to enhanced firm level competitiveness through for example sharper price and cost competition, improvements in product quality, product differentiation and other innovative activities with the potential to bring about sustained increases in market share.

Table A8 (Annex 3) illustrates the extent to which Ireland's imports tend to be concentrated in certain countries in compared with other OECD countries. In this respect Ireland performs poorly, ranking as low as 21st out of the 23 countries examined. The pattern of national concentration in Ireland's imports is mirrored in terms of the sectoral distribution of imports where Ireland's ranks 20th out of 23 countries, with the UK in second position overall. Table 4.8 sets out major importers into Ireland for total manufacturing and its component industrial sectors expressed as a percentage of total imports. The UK economy is almost in all cases the single largest external source for the goods in question highlighting the strength of Ireland's trade links with the UK as discussed in Chapter 2. Ireland's dependency on the UK in terms of imports may reflect the lower transport and other costs involved in trading with the UK. It may also be the case, of course, that cheaper suppliers do exist but the distribution channels required to bring them to the Irish market do not. In this context the increased integration of the EU economy in EMU is likely to open up new sources of imports for the Irish economy leading to a continued reduction over time in the share of total imports coming from the UK. In this regard, imports from the other euro countries can be expected to increase relatively faster reflecting the elimination of exchange rate risk between participating member states in EMU.

Table 4.8 **Country share of Ireland's manufacturing imports 1995 (%)**

Total Manufacturing	**UK**	**36.0**	**USA**	**19.4**	**Germany**	**7.2**	**Japan**	**6.01**	**Singapore**	**4.59**
Food, Drink and Tobacco	UK	56.6	Netherlands	8.4	USA	8.3	France	5.6	Germany	2.1
Textiles, Footwear and Leather	UK	53.4	ROW	6.8	Italy	4.8	China	4.1	Portugal	3.3
Wood, Cork and furniture	UK	34.3	ROW	13.6	Sweden	10.2	Finland	6.2	Brazil	5.3
Paper and printing	UK	59.0	Sweden	9.0	Finland	7.0	USA	5.7	Germany	5.1
Industrial Chemicals	UK	36.1	USA	18.5	Germany	11.2	Japan	6.2	France	6.1
Pharmaceuticals	UK	39.3	USA	19.8	Germany	12.2	Denmark	6.5	Netherlands	3.8
Petroleum products	UK	83.2	USA	4.0	Netherlands	3.2	France	3.0	Germany	1.1
Rubber and plastic products	UK	46.3	Germany	10.2	USA	7.4	China	5.6	France	4.2
Stone, clay and glass	UK	49.4	Germany	10.2	USA	10.0	Spain	6.2	France	5.2
Basic metals	UK	54.3	USA	10.0	Germany	7.1	France	5.9	Finland	2.8
Ferrous metals	UK	67.9	Germany	4.5	Finland	4.3	Spain	3.3	France	2.4
Non-ferrous metals	UK	40.3	USA	18.1	Germany	9.7	France	9.5	Canada	2.2
Fabricated metal products and machinery	USA	26.5	UK	25.3	Japan	9.1	Singapore	8.2	Germany	7.4
Scrap metal	UK	65.0	Germany	27.3	ROW	2.2	Sweden	0.1	Italy	0.1

(discrepancy)										
Fabricated metal products and machinery	UK	56.4	USA	11.1	Germany	8.1	France	4.0	Italy	3.5
Computers and office machinery	USA	33.9	Singapore	19.7	UK	14.7	Japan	8.8	Taiwan	4.1
Non-electrical machinery	UK	35.9	USA	20.0	Germany	12.0	Japan	7.2	Italy	5.5
Communications equipment and semiconductors	UK	27.9	USA	23.8	Germany	10.4	Malaysia	9.2	Japan	7.3
Electrical machinery	UK	24.3	USA	22.1	Japan	13.1	Germany	9.4	France	6.3
Shipbuilding	Norway	82.5	UK	9.1	USA	5.8	Netherlands	0.6	Japan	0.6
Other transport	Canada	56.3	UK	21.9	Japan	4.5	France	4.2	USA	3.4
Motor vehicles	UK	38.3	Japan	19.9	Germany	19.0	Spain	5.3	France	5.2
Aerospace	USA	82.1	UK	6.6	ROW	3.1	Spain	0.9	Netherlands	0.9
Instruments	USA	44.3	UK	25.1	Japan	9.4	Germany	5.5	France	3.0
Other manufacturing industries	UK	37.8	USA	12.7	China	7.8	Germany	7.4	Japan	5.0

Source: OECD, Bilateral Trade Database

4.2.3 Exports

The Irish economy has undergone a transformation in the space of just thirty years from a largely agricultural economy, where only 22 per cent of merchandise exports were manufactured goods, to an advanced European economy with manufactured goods now comprise 70 per cent of merchandise exports. Many of these exports are of course concentrated in high-tech sectors. Ireland is now, for example, the second largest exporter of software in the world.

The Irish economy is also becoming more integrated with the European core. The current merchandise trade share with the UK, at less than one quarter of total manufactured exports, is the lowest on record. This is the continuation of a long-run decline. At the beginning of the 1970s, as much as two-thirds of Irish manufactured exports went to the UK. The key point illustrated by these figures is the extent of shift in the pattern of Irish trade over the past three decades in line with the changing international environment in which it operates. This process has accelerated over recent years in tandem with the increased integration of the Irish economy with the EU core against the backdrop of the consolidation of the SEM. EMU will intensify that trend as the full potential of the single market is realised with the euro.

The European Union (including the UK) is currently Ireland's largest export market accounting for 67 per cent of total Irish exports. After the UK, Germany, France and the Netherlands are the next most important export markets within the EU. Table 4.9 illustrates the destination of Irish exports within the EU and Table 4.10 respective country shares of Ireland's intra-EU exports.

Table 4.9 **Destination of Irish exports 1995-97 (%)**

	1995	**1996**	**1997**
Great Britain	22.7	22.1	21.4
Northern Ireland	2.8	2.7	2.9

EU(excluding UK)	47.2	43.8	42.2
Japan	3.0	3.0	3.2
USA	8.2	9.4	11.4
Other	10.9	12.7	13.5
Rest of Europe	5.2	6.3	5.4
Total	100	100	100

Source: CSO Trade Statistics, December 1997

Table 4.10 **EU country share of Ireland's intra-EU exports 1997 (%)**

Country	**Exports**	**Rankìÿ}**
UK	36.6	1
Germany	18.7	2
France	11.9	3
Netherlands	10.3	4
Bel/Lux	7.5	5
Italy	4.4	6
Spain	3.8	7
Sweden	2.3	8
Denmark	1.6	9
Finland	0.7	10
Portugal	0.6	11
Austria	0.6	12
Greece	0.5	13
Total	100	

Source: CSO Trade Statistics, December 1997

Table S8 identifies two key competitive weaknesses of the Irish economy at the present time. Ireland's export trade remains poorly diversified on both a geographic and sectoral level ranking 18th and 19th respectively.

The geographic concentration reflects the high degree of economic integration between Ireland and the UK as discussed in Chapter 2, notwithstanding the gradual shift away from dependence on the UK in line with Ireland's increased diversification with the EU core. The sectoral concentration of Ireland's exports reflects industrial strategy in specialising through FDI in high-tech, high productivity, high demand sectors. The economic literature draws attention to the risks of regional specialisation in a single currency area. Internationally there are many examples over the last two decades of the high output and adjustment costs experienced when such regions suffer an economic downturn.

The progressive reduction in the share of total merchandise exports going to the UK does tend to obscure the continued high dependence of Irish owned firms on the UK market. The UK economy, which is twenty times the size of the Irish economy, has been an obvious platform for Irish small and medium-sized enterprises (SMEs) wishing to expand to an internationally competitive scale by gaining the skills, expertise and experience required to succeed in international trade. However, the medium-term competitiveness of the Irish economy must be grounded in a more diversified export base. This base will be established by continuing to strengthen the exporting capacity of SMEs in the economy relative to the clear opportunities which exist beyond the UK economy in the context of the single market following the launch of EMU.

Table S8 **Trade**

		1	2	3	4
	Indicator	**Manufacturing exports - concentration, standard deviation of exports by country**	**Manufacturing imports - concentration, standard deviation of imports by country**	**Manufacturing exports - concentration, standard deviation of exports by sector**	**Manufacturing imports - concentration, standard deviation of imports by sector**
	Year	1995	1995	1995	1995
Country	Observations	23	23	23	23
Denmark	Value	0.0405	0.0432	0.086	0.088
	Rank	6	11	5	7
Ireland	Value	0.0481	0.0636	0.115	0.112
	Rank	18	21	19	20
Japan	Value	0.0463	0.0432	0.154	0.076
	Rank	15	12	23	1
Netherlands	Value	0.0468	0.0454	0.090	0.091
	Rank	16	15	7	12
New Zealand	Value	0.0447	0.0494	0.100	0.103
	Rank	14	18	13	17
UK	Value	0.0413	0.0360	0.107	0.100
	Rank	9	2	16	15
US	Value	0.0434	0.0425	0.121	0.115
	Rank	11	8	20	22

Table S8 **Trade** *(continued)*

		5	6	7	8
	Indicator	**Export Performance Producer prices for total goods - % change last period**	**Producer prices – Manufacturing (1990=100)**	**Trade openness - Exports + Imports in services - (of goods and services) / GDP (GNP for Ireland)**	**Trade openness in services - (Service Exports + Service Imports) / Service Output**
	Year	1998e	1998	1997	1994
Country	Observations	27	23	28	12
Denmark	Value	-0.7	106.0	68.6	0.8
	Rank	19	8	15	2
Ireland	Value	12.6	112.2	161.4	0.4
	Rank	3	14	2	8
Japan	Value	-2.4	93.8	21.0	0.1
	Rank	23	1	28	12
Netherlands	Value	1.6	102.5	104.9	0.5
	Rank	9	6	5	5

New Zealand	Value	-0.7	109.3	56.9	0.0
	Rank	19	11	18	0
UK	Value	-8.3	125.5	57.9	0.3
	Rank	27	19	17	9
US	Value	-1.6	109.6	25.6	0.1
	Rank	21	13	27	11

Table 4.11 gives a detailed description of the composition of Irish exports to EU member states.

Table 4.11 Percentage breakdown of Irish exports to the EU by country and commodity 1997

	Agricultural Products	Crude Materials	Energy	Chemicals	Machinery and Transport Equipment	Other Manufactured Products	Total
SITC Code	0+1	2+4	3	5	7	6+8	Total
Great Britain	19.50	2.55	1.04	16.69	38.73	21.49	100
NI	36.73	3.29	1.24	9.75	14.27	34.72	100
France	12.99	1.62	0.33	23.60	41.67	19.79	100
Bel/Lux	3.52	1.76	0.00	68.16	16.11	10.44	100
Netherlands	9.26	1.09	0.53	27.16	45.76	16.20	100
Germany	6.50	1.31	0.00	26.30	45.86	20.03	100
Italy	11.45	0.77	0.00	34.43	30.10	23.25	100
Denmark	7.05	0.00	0.00	24.48	54.67	13.80	100
Greece	30.61	0.00	0.00	58.32	0.00	11.07	100
Portugal	0.00	0.00	0.00	56.13	23.48	20.39	100
Spain	14.38	1.30	0.00	37.91	27.23	19.17	100
Sweden	4.37	0.00	0.00	15.26	56.68	23.70	100
Finland	0.00	12.44	0.00	10.78	45.42	31.36	100
Austria	0.00	0.00	0.00	13.88	54.28	31.84	100

Source: CSO Trade Statistics, December 1997

As can be seen from the pattern of export specialisation in Ireland relative to the EU average, the Irish economy appears to have a very strong revealed comparative advantage in the manufacture of computers and other IT equipment and a strong comparative advantage in the manufacture of office machinery.

Table 4.12 Export specialisation in computers, office machinery and precision instruments (relative to EU 15 average = 100)

	Office Machinery	Computers	Medical and Surgical Equipment	Optical Instruments and Photographic Equipment
EU 15	49.6	39.9	107.9	73

Bel/Lux	35.5	29.1	68.8	26.9
Denmark	22.7	44.1	151.5	81.9
Germany	66.4	50.2	121	100.7
Greece	6.7	4.4	12.2	10.4
Spain	22.6	31.2	30.1	14.4
France	67.9	66.1	73.8	62.5
Ireland	165.5	518.3	166.3	114.9
Italy	31.2	46.8	47.4	98.3
Netherlands	273.5	169.7	109.4	55.6
Austria	18.4	28.3	70.6	84.8
Portugal	5.4	3.9	28.7	40
Finland	9.3	61.5	85.9	6.7
Sweden	52.2	21.3	145.8	33.8
UK	105.3	161.4	94.5	58.4

Source: Eurostat, Panorama of European Industry

However, this comparison is somewhat misleading in that Ireland's strength in these sectors is overwhelmingly the result of the activities of large foreign owned firms in the Irish economy in these sectors. In this context Ireland appears to exhibit the characteristics of an export base for these global firms in the world economy. In this perspective global firms distribute their worldwide manufacturing capacity internationally. World demand and national cost competitiveness are two very significant influences on this production decision. In the 1990s this process has worked particularly well to Ireland's advantage reflecting a relatively benign world environment, wage moderation under social partnership, the favourable tax corporation tax regime and the acceleration in foreign direct investment flows into the EU stimulated by the establishment of the SEM. As discussed above Ireland's remarkable export performance, with export volumes rising over several years at several times growth in Ireland's export markets, is attributable to the economy's specialisation in these foreign owned high-growth, high-tech sectors. In 1996, of total manufacturing exports valued at £26bn almost 84 per cent were accounted for by foreign owned companies.

It is clear therefore, that the maintenance of a continued strong exporting performance is dependent on the continued capacity of the Irish economy to benefit disproportionately from FDI flows into the EU economy. However, in order to build-up a long-term sustainable competitive advantage for the economy, Ireland's trade performance must be underpinned by an improved exporting performance of the indigenous sector of the economy. The launch of the euro and the removal of the major barrier to the final completion of the single market provides a significant opportunity for Irish firms to take their first steps down this road by diversifying their trading activities into core EU markets.

Table 4.13 summarises the position in relation to the relative importance of Ireland's main export markets on a disaggregated basis showing that in twelve cases where Ireland achieved more than 5 per cent of the import market, four of these were in the

UK. This again highlights the need to closely monitor Ireland's competitiveness relative to the UK market.

Table 4.13 **Export market penetration:** *where Ireland's share of a country's imports is more than 5 per cent of the total*

Food, Drink and Tobacco	UK			
Industrial Chemicals	UK			
Pharmaceuticals	UK	Belgium/ Luxembourg	Denmark	Netherlands
Computers and office machinery	UK	Norway	Sweden	Switzerland
Communications equipment and semiconductors	Switzerland	Norway		

Source: OECD Bilateral Trade Database

4.2.4 Service Exports

Growth in the services sector is now an important contributor to overall GDP growth in all advanced economies. In richer economies (those with per capita GDP of at least US $5,000) the services sector accounts for more than 40 per cent of that economy's growth performance. In 80 per cent of economies having per capita GDP of at least US $10,000 the manufacturing sector contributes less than 20 per cent of that economy's growth performance.

Table 4.14 below shows the degree of internationalisation in European services markets. Technical areas show higher levels of international market penetration, but overall, there is a low degree of internationalisation in the European services' markets.

Table 4.14 **Degree of specialisation in selected European services markets**

	Domestic	**Other EU**	**Non EU**
Engineering	55%	4%	41%
Consultancy	90-95%	2-5%	2-5%
Commercial Communication	50%	40%	10%
Computer Services	90%	5%	5%
Operational	98%	1%	1%

Source: The cost of Non-Europe for Business Services

Traditionally most services businesses engage in little or no exporting reflecting the inherently domestic (or non-tradable) nature of most service sector activities. However, the increasing importance of what is sometimes termed the information, knowledge, or the weightless economy, reflecting rapid technological change particularly evident in the area of information and communications technologies (ICTs), is likely to bring about a transformation of the business environment for much of the services sectors over the coming decade. ICTs, in particular the prospective

explosion in electronic commerce (e-commerce), will make many services more tradable then ever before and provide enormous scope for a large expansion in services exports from the Irish economy.

However, these benefits will not accrue automatically. Ireland is just one of many countries attempting to win global competitive advantage in the area of e-commerce. The acceleration of the quality of Ireland's telecommunications infrastructure as set out in the Council's Statement on Communications published last November (summarised in Chapter 5 of this report) is merely the prerequisite to long-lasting success.

4.2.4.1 Geographic Market Dependence

Table 4.15 **Destination of Irish service exports (%)**

UK	38
Northern Ireland	4
North America	9
Europe	16
Rest of World	34
Total	100

Source: The cost of Non-Europe for Business Services

Notwithstanding the scope for ICTs, and e-commerce to transform the environment for international trade in services in the years ahead it is informative to examine the geographic dependence of Ireland's service exports at the present time. Great Britain is Ireland's largest services market and accounts for over 38 per cent of service exports. As is the case with Ireland's merchandise trade the very high dependence on Britain gives rise to certain strategic risks both in terms of dependence on one market and also in terms of vulnerability to exchange rate risk. Only 4 per cent of total service exports go to Northern Ireland, an indication of the potential which exists for expansion into this market. Table 4.15 also illustrates the low share of service exports going to the high income countries of Europe and North America, notwithstanding the fact that countries such as Germany, France and the US are among the largest consumers of traded services. It is clear, therefore that the geographic orientation of Irish services firms does not at present match sources of international demand.

Despite strong growth in employment and export earnings by the internationally-trading Irish services firms in recent years, major challenges face the sector in overcoming the barriers to developing service exports further.

There is remarkable dependence for the bulk of Irish services exports earnings on a very small number of firms. For example over 30 per cent of the total value of Irish service exports is accounted for by the three largest service exporters. The top eight service exporters account for almost 45 per cent of the value of total service exports. Only about 3 per cent of service business in Ireland are actively engaged in exporting. For service exporters, exports account for approximately 38 per cent of turnover. This illustrates the notable success of individual exporters in international markets and

reflects the importance of a continued expansion in exports to the longer-term success of these firms.

4.2.4.2 Sectoral Breakdown of Services Exports

Table 4.16 below sets out the sectoral importance of different service export categories.

Table 4.16 **Sectoral breakdown of indigenous services exports 1997 (%)**

Software	22%
Construction Services	16%
Consultancy/Training Services	11%
Other Services	29%
Financial Services	15%
Film Entertainment	6%

Source: ABT, Annual Report 1998

Ireland's existing competitive advantage in international services trade is likely to reside in those areas, as set out in the above table, where Irish firms have already managed to built up a strong exporting presence reflecting the possession of relevant skills and knowledge assets.

Ireland has clearly developed a strong skill base in software firms and most of these are involved in exporting. Construction related services exports including in particular contractor services (mechanical/electrical, civil, specialist) reflect long-standing specialisms in the Irish economy.

There are other areas, such as for example business support and recreational and cultural services experiencing rapid growth in demand which, although Ireland as yet lacks a strong exporting presence, would appear to be consistent with established competitive strengths of the services sector of the Irish economy.

4.2.5 Trade with Asian Countries

The impact on Ireland's export performance of the global economic and financial crisis which ignited in Asia, spread to Russia and then to Brazil appears to have been quite limited. This largely reflects the relatively low share of Ireland's exports with the rest of the world outside of Western Europe and North America. The proportion of Ireland's total merchandise exports going outside this latter region in 1997 was just 17 per cent, equivalent to about 12 per cent of GDP, with the APEC (Asia-Pacific Economic Co-operation) economies accounting for 8.5 per cent of total merchandise exports.

Notwithstanding the relatively low share of total exports going to these regions, Irish firms have, over recent years, managed to achieve very strong export growth, in particular in the APEC region, with exports increasing by over 70 per cent between

1995 and 1997. The subsequent collapse in demand in the APEC region is reflected in a marked slowdown in Ireland's exports to the region to less than 5 per cent, comparing the first nine months of 1998 to the corresponding period of 1997, with APEC's share of Ireland's total merchandise exports falling to less than 7 per cent.

Relationship marketing has been a very significant factor in strengthening trade links between Ireland and the Asian region. Irish companies have invested heavily in expanding their product range in Asia over recent years and this has enabled them to maintain sales in the face of unfavourable market conditions. Moreover, Irish firms are often selling into niche markets on the basis of quality, reliability and good customer relations. Indeed some Irish companies have actually thrived in the transformed market environment in Asia and have opened up a number of new areas of business in sub-supply, production and process engineering and data processing.

Following the Taoiseach's official visit to China in September 1998 the Asia Strategy Group was established to consider how best to increase trade and investment links between Ireland and Asia.

4.2.6 Trade with Central and Eastern European Countries (CEECs)

The process of EU enlargement will result over the next decade in the accession into the EU of at least several Central and Eastern European countries (CEECs). There are a number of shared characteristics of these countries including proximity to core EU markets, low labour costs and well educated populations, which will certainly lead to their emergence as competitors in both trade and investment for Ireland. However, this will unfold in tandem with what is expected to be a period of rapid growth in demand in these economies as they begin to experience accelerated economic convergence within the EU. Moreover, it is clear, that the continued convergence in wage levels in the Irish economy towards those of the advanced EU economies will, by that time, have eroded any residual comparative advantage for Ireland in low wage, low valued added sectors which these economies would expect, in the first instance to specialise.

The Irish economy is well positioned to share in the benefits of a sustained period of rapid growth and economic convergence in the CEECs. The CEECs, with a combined population in excess of 100 million, undoubtedly present a major opportunity for Irish exporters.

Table 4.17 details trade between the CEECs, Ireland and the EU in 1997.

Table 4.17 **Share of CEECs imports in total EU / Irish imports**

	EU Imports from CEECs as a % Total EU Imports	CEEC Exports to the EU as a % of Total CEEC exports	Irish Imports from CEECs as a % of Total Irish Imports
Bulgaria	0.10	42.9	0.01
Czech Republic	0.60	44.2	0.12
Hungary	0.54	78.9	0.08
Poland	0.75	62.7	0.23
Romania	0.22	55.6	0.02
Slovakia	0.24	56.8	0.05

Total-CEEC 6	2.46	57.2	0.61

Source: CSO Trade Statistics, Dec 1997

The radical transformation undertaken during the 1990s by the CEECs through market and trade liberalisation has led to enormous growth in trade between the EU and CEECs. However, the EU's trade relationship with the CEECs is marked by distinct asymmetry. In 1996, EU imports from CEECs accounted for 6 per cent of extra-EU imports and 2.5 per cent of total EU imports. However, the EU is now the main trading partner of CEECs accounting for 57.2 per cent of their exports. Ireland's trading links with the CEECs are lower than the EU average.

The majority of the CEECs exports to the EU tend to be primary and low technology products accounting for 61.6 per cent of the CEEC's total exports to the EU15 in 1996. Exports of clothing, textiles, furniture and footwear are the main items in this category. High-tech goods including office equipment, telecommunications and electrical equipment accounted for 15 per cent of EU imports from the CEECs in 1996. Hungary is by far the largest exporter to the EU of high-tech machinery and equipment among the CEECs. In 1996, Hungary exported 45 per cent of all exports of these products from the CEECs. The second largest exporter was the Czech Republic. Both Hungary and the Czech Republic have managed to increase the share of high-tech exports in their total exports over the past 10 years. However, by contrast, Poland, Bulgaria, and Romania have seen the share of low technology and labour intensive products increase.

This shift in the composition of exports is likely to be correlated with the pattern of FDI flows into the region. Those countries such as Hungary and the Czech Republic, which have benefited from high levels of FDI per capita, have also seen the most marked improvements in their export structure.

Table 4.18 **Technological structure of EU 15 imports from CEECs 1996**

	Hungary	Czech Republic	Slovakia	Poland	Bulgaria	Romania	Total
Total Imports (Ecu bn)	8690	9601	3919	12062	1681	3559	39512
Primary Goods(%)	17.9	13.5	21.7	18.6	20.0	6.5	16.5
Low-Technology(%)	30.5	39.4	43.2	50.4	54.0	75.4	45.1
Medium-Technology(%)	26.8	32.3	24.1	18.8	11.1	11.1	23.3
High-Technology(%)	24.8	14.8	11.0	12.1	14.8	7.0	15.1

Source: Eurostat COMEXT Database

Irish trade with the CEECs constitutes a relatively minor part of Irish trade overall. In 1997 imports and exports constituted around one per cent of total trade. Hungary, Poland and the Czech Republic account for most of Ireland's trade with the region. Ireland had a trade surplus of £350 million with these countries in 1997. Trade is restricted to a small number of sub-sectors. Imports are concentrated in rubber, textiles, machinery, coal and chemicals and exports in machinery, metal ores and a small number of food products. While exports to these countries accounted for only 1 per cent of our total exports in 1997, the trade surplus with these countries accounted for 3 per cent of the Irish trade surplus in 1997.

Table 4.19 below shows Ireland's trade performance with various CEECs in 1997. Ireland had a trade surplus with all countries, other than Hungary and Latvia.

Table 4.19 **Irish trade with CEECs 1997**

	Imports £m		Emports £m		As a % of total 1997	
	1995	1997	1995	1997	Trade	Exports
Bulgaria	2.84	1.78	7.28	3.62	0.03	0.01
Czech Republic	20.62	31.46	67.7	86.45	0.92	0.25
Estonia	1.85	3.90	5.88	8.92	0.08	0.03
Hungary	13.05	64.48	44.28	56.99	-0.13	0.16
Latvia	63.56	11.11	7.29	6.82	-0.07	0.02
Lithuania	13.00	1.87	2.21	11.51	0.16	0.03
Poland	45.44	55.71	85.66	135.73	1.34	0.39
Romania	5.66	6.55	11.87	13.30	0.11	0.04
Slovakia	3.67	7.44	11.14	15.03	0.13	0.04
Slovenia	5.07	3.94	10.57	11.86	0.13	0.03
Total	174.76	188.24	253.88	350.23	2.72	1.00

Source: Calculated from CSO, Trade Statistics December 1997

As discussed above, the CEECs are likely to become much more significant trading partners for Ireland in the future. Economic research[47] suggests that in the short run the scope for expansion of trade with CEECs appears to be modest, with EU enlargement raising Irish trade with CEECs to 1.2 per cent of GNP. However, it is estimated that there is greater potential for expansion in the medium-run to around 8 per cent of Ireland's GNP, in line with the income convergence of CEECs with the EU15 average.

4.2.7 Conclusions

Ireland's remarkable trade performance has been the main engine of growth and income convergence over the 1990s. The foreign owned sector of manufacturing has played a major part in the exceptional growth in exports experienced in recent years. Prospects for exports remain reasonably good, although a considerable slowdown from the very strong growth in exports achieved over recent years can be expected in line with an expected deceleration from high growth in FDI flows and a moderation in world demand.

FDI flows can, however, be expected to remain an important element in supporting Ireland's trade performance over the medium-term. However, there is likely to be a continuation of the gradual shift in the nature of that investment away from manufacturing in line with the shifting pattern of comparative advantage in the Irish economy. In the longer-term however, there is a major strategic need to increase the contribution of the indigenous sector to Ireland's trade performance. This is a clear lesson from the convergence experience of all other countries. Sustained national competitive advantage is built on development of core competitive strengths in the domestic economy, rather than, as Ireland largely remains at the present time, in

downstream production activities. This remains, as it has done since the foundation of the state, the foremost challenge for the Irish economy.

EMU presents both opportunities and threats, highlighting the core requirements in EMU of international cost-competitiveness and adjustment capacity in individual enterprise and for the economy as a whole. The industrial promotion agencies must increase their support to indigenous enterprise, assisting them in developing strategies building the capabilities required to diversify into the core euro zone markets in line with market opportunities. Greater trade diversification focused on markets experiencing stronger growth will reduce Ireland's exposure to economic shocks, increase firm-level competitiveness by forcing Irish firms to match best practice internationally and promote the expansion of Irish SMEs to internationally competitive scale. It requires Irish enterprise, with the support of the industrial development agencies, to redefine their market presence in other countries not merely by seeking out exporting opportunities but also through such mechanisms as joint ventures and technology licensing agreements. Irish enterprises failing to taking advantage of the opportunities to diversify both in terms of their importing and exporting activities will increasingly, in the context of the evolving SEM, find themselves at a competitive disadvantage relative to their euro zone competitors.

The travails of the Asian economies should not be allowed to detract attention from the massive potential of the region, particularly that of China. The report of the Asia Strategy Group is an important input to this process. Strong, forward-looking enterprise in the Irish economy should examine, with the support of the relevant agencies, how best to maximise Ireland's future market share with the CEECs.

Finally, there are significant opportunities for Irish enterprise to expand their trade in services based on the supply of knowledge resources in the economy, the growth in international demand and the technological developments facilitating their interaction including the enormous potential presented by e-commerce.

4.3 Foreign Investment

Key Points

- Ireland's remarkable growth performance is largely attributable to its success in attracting foreign direct investment (FDI)
- Close attention must be paid to strategic partnerships as a complement to M&As and traditional inward FDI
- Outflows of FDI must be increased to help build internationally competitive Irish owned firms
- Development of created knowledge based assets located in the Irish economy are the strongest guarantee of long-term success in attracting FDI

Indicators in Top Quartile	Rank 98	Rank 99
• FDI inflow as a percentage of GNP		6th out of 27
• FDI inflow stocks as a percentage of GNP	New Indicator	6th out of 28
• Ratio of educational expenditure to non-residential fixed investment	3rd out of 16	
Indicators in Second Quartile		

• Top rate of corporate tax	20th out of 28	8th out of 29
Indicators in Third Quartile		
• FDI outflows stock as a percentage of GNP	New Indicator	16th out of 28
Indicators in Fourth Quartile		
• Non residential fixed investment as a of GNP	19th out of 21	19th out of 22

Foreign affiliates account for one third of world exports and for 7 per cent of global GDP. Inflows of foreign direct investment (FDI) have increased for the past seven years and had reached $400 billion in 1997, up 18.6 per cent from 1996. Outflows amounted to $424 billion in 1997, an increase of 27.1 per cent since 1996. The EU received over one third of global FDI inflows in 1997 and is responsible for 45 per cent of global outflows.

As discussed in the previous section of this Report, while structural factors such as higher levels of educational achievements have helped to boost productivity levels in the Irish economy over the last decade, the direct and indirect impact of FDI inflows in the Irish economy has been particularly important to Ireland's economic development and progress in income convergence. The increased specialisation, skill expertise and knowledge which flows from the technology embodied in foreign investment has provided a strong boost to productivity in the Irish economy. There have been large positive spillovers from these investments, for example the adaptation of international best practice by Irish firms (not only those comprising part of the FDI's sector's sub-supply chain), improvements in the skill and educational level of the labour force and exposure to leading edge technologies as exemplified by the rapid development of the indigenously owned software sector of the economy.

Research[48] on the impact of FDI on the Irish economy has highlighted the impact of FDI in facilitating the decoupling of the Irish economy from an almost total dependence on the UK as a trading partner. FDI flows into the Irish economy have not gone primarily into sectors in which the economy has a traditional comparative advantage but rather sectors in which there are increasing returns to scale at the level of the firm. The integration of the foreign sector into the economy is quite strong measured in terms of backward linkages per job. The research does highlight some possible adverse effects of FDI, in particular if all the high productivity growth of the foreign sector is passed on into manufacturing sector wage demands or potential instability from over-reliance on multinationals. However, strong linkages and agglomeration economies will help continue to anchor the foreign sector in the economy.

As discussed in chapter 2, the Central and Eastern European countries (CEECs) such as Hungary will provide stiff competition for FDI flows to Ireland in the years ahead, reflecting their cost advantages, good human and physical capital infrastructure, geographical proximity to the core European markets and macroeconomic stability. In this context the future of FDI in Ireland is more likely to involve both a shift towards greater complexity (new products, emerging technologies) as well as a more symbiotic relationship with the rapidly modernising indigenous sector.

Enterprises in small countries such as Ireland with tiny domestic markets in global terms, must often expand through winning increased market share by foreign investment in order to achieve a globally competitive scale. FDI has become a key component of firms' strategies to break into foreign markets. Moreover, countries

benefiting from large FDI inflows also tend to have substantial FDI outflows. This suggests strongly that the factors underlying a country's attractiveness to FDI inflows are linked to the conditions and competitive advantage that encourage firms based in that country to expand by investing abroad.

The nature of international FDI has significantly changed over the past three decades. FDI in aggregate has shifted away from heavy manufacturing greenfield investments in developing economies. In more recent times FDI has been characterised by mergers and acquisitions (M&As) and heavy investment in Eastern Europe and the newly industrialising countries of Asia including China.

M&As have played a significant role in driving FDI in the US and Western Europe as firms strive to gain the critical mass and economies of scale that will enable them to compete internationally. In 1997 M&As were worth $342bn, with cross-border M&As totalling a quarter of M&As and 58 per cent of FDI inflows.

The Single European Market (SEM) has also played a significant part in accelerating the pace of FDI and in particular M&As in the EU, as firms can now freely acquire firms in other countries and in so doing can enter other EU markets. About half of EU FDI inflows and outflows during 1994-1996 were related to cross-border M&As. Cross-border M&As in services have increased significantly in recent years. The World Trade Organisation (WTO) Financial Service Pact signed in December 1997 has resulted in a big expansion in cross-border M&As in financial services. The prospect of EMU led to a significant pick-up in intra-EU FDI over recent years. The establishment of EMU from 1 January 1999 is likely to sustain this trend. However, EMU could lead to a decline in traditional FDI and indeed disinvestment as one of the primary traditional purposes of FDI is eroded by the emergence of a true single market in the EU.

Strategic partnerships which enable the achievement of the goals traditionally achieved by FDI are now being increasingly used, particularly by small open economies, as a complement to FDI. These arrangements are more flexible than conventional M&As and may therefore be more appropriate to a world of short product cycles and rapidly shifting patterns of demand. Strategic partnerships provide access to complementary technology at low costs with low risks, creating synergies and spillovers for the firms that participate in them. They also have the capacity to assist small and medium enterprises (SMEs) in overcoming their size disadvantage in research and development (R&D). Strategic partnerships can therefore strengthen indigenous technological capability. For small open economies therefore, strategic partnerships can offer both the benefits of inward FDI while allowing domestic firms to benefit from investments undertaken by multinational corporations. The External Co-operation Agreement signed recently between Enterprise Ireland and the US's Small Business Administration to promote strategic partnerships and alliances with American firms is an important step in boosting the role played by strategic partnerships in strengthening indigenous enterprise in the Irish economy.

Figure 4.3 encapsulates the standard model of the determinants of flows of foreign investment in the world economy. Three key factors have been identified as explaining underlying flows of FDI in the world economy:

- ownership-specific competitive advantages
- location advantages of host countries (such as market size and growth)
- superior commercial benefits than possible from solely exporting.

The first and third factor are clearly firm specific while only the second factor is location specific and thereby amenable to influences determined by the host country.

This second factor is in turn determined by three further, broad, location-specific factors:

1. Policy framework of the host country
2. Economic determinants of host country
3. Business facilitation of the host country

These three elements are strongly complementary to one another. Strength in one is a necessary, but in isolation insufficient condition for success in attracting foreign investment. As the labour cost share of total costs continues to decline, potential host countries have to offer more that just low cost, unskilled labour to attract FDI. Increasingly factors such as productivity and skill levels, good infrastructure and access to international markets have become critical determinants of the pattern of FDI flows. The single most important shift among the economic determinants of FDI has been that of the "created assets" which arise where all countries share the same knowledge base. In this context the primacy of technological and innovative capacity in developing sustained competitive advantage in the attraction of FDI becomes evident.

Industrial development policy in prospective host countries such as Ireland must therefore be prepared in the future to encompass a much broader range of issues than heretofore. Industrial policy in Ireland has been successful in extending its remit beyond narrow tax and grant issues which fall into the "policy framework" and "business facilitation" categories in Figure 4.3 into the sphere of "economic determinants" such as skills and infrastructure provision which, over the longer-term, will be the primary determinants of the destination of FDI flows. However, in order to ensure the sustained attractiveness of Ireland as a location for strategic or "cutting-edge" FDI, industrial policy in Ireland must be successful in supporting the production of knowledge assets in the economy. It is in this context that the central importance of technological innovation policy in the Irish economy is manifested. A well-calibrated and preferably unique set of knowledge assets in the economy will not only act as a potent enticement to foreign investment, but by boosting innovation and technological diffusion within the economy will enhance the competitiveness of indigenous firms in the economy. National economies which are successful in generating these created assets will be rewarded by the development of enterprise clusters and knowledge networks based on vibrant partnerships between indigenous and foreign firms building long-term competitive advantage in the economy.

Figure 4.3 **Host country determination of FDI**

Host country determinants	**Type of FDI classified Principal economic determinants by motives of MNCs in host countries**
I. **Policy framework for FDI** O economic, political and social stability O rules regarding entry and operations O standards of treatment of foreign affiliates O policies on functioning and structure of markets (especially competition and M&A policies) O international agreements on FDI O privatisation policy O trade policy (tariffs and NTBs) and coherence of FDI and	A. **Market-seeking** O market size and per capita income O market growth O access to regional and global markets O country-specific consumer preferences O structure of markets B. **Resource / asset-seeking** O raw materials O low-cost unskilled labour O skilled labour O technological, innovatory and other created assets (e.g. brand names), including as embodied in

trade policies
- tax policy

II. **Economic determinants**

III. **Business facilitation**

- investment promotion (including image- building and investment-generating activities and investment-facilitation services)
- investment incentives
- hassle costs (related to corruption, administrative efficiency, etc.)
- social amenities (bilingual schools, quality of life, etc.)
- after-investment services Type of FDI classified Principal economic determinants by motives of MNCs in host countries <

individuals, firms and clusters
- physical infrastructure (ports, roads, power, telecommunication)

C. **Efficiency-seeking**
- cost of resources and assets listed under B, adjusted for productivity for labour resources
- other input costs, e.g. transport and communication costs to/from and within host economy and costs of other intermediate products
- membership of a regional integration agreement conducive to the establishment of regional corporate networks

Source: World Investment Report 1998: Trends and Determinants, table IV. 1, p. 91

4.3.1 Ireland's FDI Performance

Table S10 **Investment**

		1	2	3	4	5	6
	Indicator	**FDI inflow as a percentage of GDP (GNP for Ireland)**	**FDI inflows stock as a percentage of GDP (GNP for Ireland)**	**FDI outflow stock as a percentage of GDP (GNP for Ireland)**	**Non residential fixed investment as a percentage of GDP (GNP for Ireland)**	**Ratio of educational expenditures to non-residential fixed investment**	**Top rate of corporation tax**
	Year	1997	1996	1996	1996	1994	1997
Country	Observations	27	28	28	22	16	29
Denmark	Value	0.8	13.4	12.9	0	0.590	0.34
	Rank	22	15	11	0	2	12
Ireland	Value	2.7	23.9	8.1	0.122	0.574	0.32
	Rank	6	6	16	19	3	8
Japan	Value	0.1	0.7	5.6	0.257	0.204	0.38
	Rank	26	28	19	1	15	22
Netherlands	Value	2.4	30.4	49.1	0.154	0.350	0.35
	Rank	7	4	2	8	12	15
New Zealand	Value	2	51.8	14.6	0.175	0	0.33
	Rank	12	1	8	6	0	10
UK	Value	2.9	20.5	30.7	0	0.31	
	Rank	5	9	4	0	7	
US	Value	1.4	8.3	10.4	0.145	0.447	0.35
	Rank	15	20	15	11	7	15

Ireland has done extremely well in attracting FDI and is placed in the top quartile. Ireland's performance in relation to outflows has not been so strong, outflows have been only 20 per cent of the inflows for 1997 which is a reduction of 10 per cent over the previous year and only 59 per cent of the 1992-96 figure. This places Ireland 23rd of the 28 countries profiled. This suggests strongly that Ireland has not yet achieved

the mature profile of FDI sketched out in the preceding section where there are both large outflows and inflow of foreign investment.

As can be seen from Table 4.20 Ireland receives the bulk of its FDI inflows from the UK and the US with smaller quantities from the Netherlands and Germany. Irish outflows are directed mainly to the US and the UK.

Table 4.20 Irish FDI inflows and outflows for 1992-96 as percentage of total flows to certain countries

Country	Inflows	% of Total	Outflows	% of Total
Bel/Lux	111.6	3.65	21.2	1.17
Denmark	95.2	3.11	109.8	6.05
Germany	381.8	12.48	33.2	1.83
Spain	3.2	0.10	60.4	3.33
France	128	4.18	162.2	8.93
Italy	78.6	2.57	18.2	1.00
Netherlands	464.2	15.17	492.4	27.11
Austria	40.4	1.32	0	0.00
Portugal	14.8	0.48	8.2	0.45
Finland	31.2	1.02	-11.2	-0.62
Sweden	-119.2	-3.90	-0.2	-0.01
UK	933.2	30.50	44.8	2.47
US	1120.8	36.63	1096.3	60.37
Total of above	3059.6	100	1816	100

Source: Adopted from European Union Direct Investment Yearbook 1997

Note:Figures for the US are not available for 1996

As discussed above, outward investment is crucial for a small open economy in order to achieve a critical mass of globally competitive scale in “national champion” firms. Table 4.21 shows the results from a survey of the most important reasons why Irish firms are planning their next acquisition.

Table 4.21 Survey of acquisition behaviour of Irish companies

Most Important Reason for Next Acquisition	Percentage of Companies
Increase earnings	16
Increase market share	15
Enter new foreign markets	11
Extend production range	10
Lower the cost base	9

Protect current market share	8
Investor expectations	8
Enter new domestic market	7
Utilise management capacity	6
Diversify into new business	6
Additional production capacity	4

Source: Chapman Flood (1997), "Acquisition Survey" page 29

The top three reasons relate to need to achieve market access, clearly illustrating the growth through foreign investment motive described above. There was in fact over £9bn[49] of M&A activity involving Irish firms in 1998 of which £5.5bn took the form of acquisitions by Irish firms. Of this 56 per cent involved two Irish firms, 24 per cent comprised an Irish firm acquiring a UK firm and only 15 per cent and 5 per cent involving acquisitions in the US and in other countries respectively. Hence, of international acquisitions by Irish firms, 56 per cent involved take-overs of UK firms, US firms accounted for 34 per cent of foreign acquisitions by Irish business and just 11 per cent was in respect of other countries. This highlights the dominance of the UK and the US economies for Irish business. The establishment of EMU may stimulate M&A activity by Irish business involving continental European firms from its current low share. It should be noted, finally, that the pursuit of cost reduction does not appear to be an important reason for undertaking foreign investment.

It is important to combat the erroneous perception that foreign investment by Irish firms displaces employment, exports and growth form the Irish economy.[50] In fact as discussed above in view of the small size and peripheral location of Irish economy, an internationally competitive scale can only be realised through foreign investment. This is borne out by the growth experience of the few existing Irish MNCs and those in other small economies like Finland. Indeed, Irish firms must, of necessity, consider growth through foreign acquisition at a much earlier stage in their development than would be the case for firms located in economies with much larger home markets, which provide them with the scale to compete in export markets internationally.

Firms wishing to be internationally competitive must be prepared to invest in high-growth locations experiencing strong income per capita growth in order to boost their prospects of achieving large gains on their investment, by winning significantly increased market share. This would in general point towards the emerging economies, including Asia and the Central and Eastern European countries (CEECs), as possible locations for foreign investment, although recent economic developments clearly highlight the risks involved in undertaking investments in these regions. For Ireland, the CEECs appear a particularly good target. The CEECs still account for a small share of world FDI at under 2 per cent of total inflows. In 1998, Irish acquisitions of CEEC firms was just over 1 per cent of total foreign acquisitions. However, as discussed earlier in this Chapter, there is estimated to be scope for Irish exports to the region to rise significantly over the medium-term. Foreign investment from Ireland should also grow in line with this trend in order to exploit the opportunities from the prospective income convergence of these economies. Failure to effect market entry at the present time will undermine the benefits derived from “early-mover advantage” in particular avoiding high entry costs and barriers at a later stage. The CEECs, especially those countries likely to comprise the first wave of EU membership, should be appraised as a focus for foreign investment-led growth strategies by Irish firms. These countries offer investors highly skilled, low cost labour, free access to the EU and EEA markets and the prospect of becoming major destinations of FDI flows from outside the EU.

According to the World Investment Report[51] low cost unskilled labour is becoming increasingly less important in the attraction of FDI. This highly plausible finding is supported by a survey of MNCs in Ireland[52] who cite labour force skill, availability and flexibility among the top factors that influence the competitive performance in Ireland. Table 4.21 above also draws attention to the same finding that a lower cost base in only cited in 9 per cent of the companies surveyed. The corporation tax regime is clearly a very important factor in influencing location decisions, but only as a complementary factor to the economic fundamentals relevant to foreign investment set out in Figure 4.3 above. Low rates of corporation tax can also be important for foreign investors in identifying high-productivity economies that are more attractive as destinations for investment.

Generally, developed countries offer financial incentives rather than fiscal ones with the reverse being true for less developed countries, while Ireland offers both at present. Incentives are not the main reason for firms decisions to invest in countries or regions but they can affect the precise location of FDI and thereby be used to ensure a coherent pattern regional development.

There is also a need for some re-allocation of resources to provide information and assistance in order to encourage Irish firms to recognise emerging foreign investment opportunities.

4.3.2 Performance Indicators

Ireland's excellent performance in attracting FDI is confirmed by its international ranking which is one of the best in the OECD (6th out of 27 countries surveyed). The stock of FDI in the Irish economy is estimated to amount to almost one quarter of GNP giving an international ranking in the top quartile of OECD countries. Outward FDI from the Irish economy has, however, been weak, with the stock amounting to just 8 per cent of GNP producing a ranking in the third quartile of the 28 countries for which data is available.

The Irish economy ranks 19th out of 22 countries in the share in national output of non-residential fixed investment share. The question of the low investment share in the Irish economy was considered in detail by NESC last year[53]. NESC concluded that evidence from the past couple of years suggests that the previous period of low and declining investment has been reversed. In addition, the aggregate rate of investment in the economy has improved significantly even in previously low investing sectors of the economy. In any event the proper measurement of productive capacity enhancing investment is difficult in an era where intangible knowledge assets and human capital play such an important role in sustaining growth potential and the main sources of economic growth increasingly resides in the services sector of the economy.

Ireland has moved up twelve places from 20th to 8th place (of 29 countries) in respect of the reduction in the top rate of corporation tax to 32 per cent in the 1998 Budget. The reduction to 28 per cent announced in the 1999 Budget last December should bring Ireland into the top quartile of countries and of course, the introduction of a 12.5 per cent rate by 1 Jan 2003 will place Ireland in a highly competitive position in this area.The planned new standard rate of 12.5 per cent corporation tax agreed with the European Commission would put Ireland into the top position in the countries compared. While the top rate of corporate tax in Hungary, the lowest country, is only 18 per cent, further regional and general investment incentives are also available for foreign investors. Several of these yield 100 per cent exemptions for foreign firms under certain conditions. Moreover foreign investors in Hungary are exempt from tax on dividends received and reinvested. This highlights the

importance, in making international comparisons of corporation tax regimes, of differentiating between actual and effective rates of tax.

4.3.3 Conclusions

The nature of FDI is changing in line with the shift in the competitive advantage of the Irish economy towards higher-value added, knowledge based activities based on such factors as skills, infrastructure, flexibility and innovative capacity of indigenous firms, as Ireland's residual low labour cost advantages are eroded. The environment for FDI is also changing under the changed regime for state aids and the prospect of significantly reduced structural fund transfers. Industrial promotion activities should focus on the scope for clustering of foreign investment, centred around for example Institutes of Technology which will encourage the development of specialised pools of skilled labour and a more balanced pattern of regional development. There is, in addition, a need to continue to move up the value-chain in the nature of FDI flows attracted into the economy, by seeking to attract core strategic activities of multi-national corporations in particular R&D.

In order to ensure the sustained attractiveness of Ireland as a location for strategic FDI, industrial policy in Ireland must be more successful in fostering the production of so-called knowledge-based assets in the economy. Creation of knowledge assets located in the Irish economy through investment in R&D and innovation is the strongest guarantee of long-term success in attracting high-calibre FDI. In competing for FDI the highest priority should be given to winning strategic projects with the scope for generating technological spillovers and longer-term competitive advantage in the wider economy.

Outward FDI from the Irish economy, where up to now Ireland's performance has been weak, could play an important part in helping indigenous firms to grow, by foreign M&As, to an internationally competitive scale. In addition, it can provide Irish enterprises with a strong market presence in foreign markets. Strategic partnerships as a complement to traditional FDI may be particularly suited to the requirements of Irish firms particularly by strengthening indigenous technological capacity. Some public resources should be re-allocated to assist firms in overcoming informational asymmetries that arise in assessing foreign investment opportunities.

4.4 Business Finance

Key Points

- Reasonably strong venture capital market by EU standards but with high dependency on public/private mechanisms
- Lack of seed and venture capital investment available to start ups and emerging firms
- Venture capital investment focused on high-tech sectors
- Lack of long term fixed rate lending from the banking system
- Lack of competition in the provision of banking services to SMEs
- Convergence of capital markets in EMU may disadvantage Irish SMEs
- High lending margins charged by banks to SMEs

Indicators in Top Quartile	Rank 98	Rank 99
Indicators in Second Quartile		

• Rate of return on capital in the business sector	7th out of 20	5th out of 19
• Long-term interest rates	11th out of 20	10th out of 23
• Cumulative venture capital raised as a % of GNP	5th out of 14	5th out of 17
Indicators in Third Quartile		
• Money market rates	11th out of 22	14th out of 22
• Short-term interest rates	15th out of 21	18th out of 27
Indicators in Fourth Quartile		
• Government bond yields	15th out of 20	16th out of 21
• Interest rate spread – absolute	9th out of 24	20th out of 24

An adequate supply of finance on suitable terms is critical to the growth and development of enterprise. The availability of capital and long-term forms of finance is related to the nature of the project for which funding is required and the track-record and credit rating of the individual firm. The way in which business is financed is strongly linked to the business culture and environment of the countries concerned. The main business finance models are often described as the German model including the Nordic countries on the one hand, and the Anglo model including the UK and the US on the other. There has been, however, a perceived shift towards the UK/US model, as the limitations of the German system become more evident in a period of very rapid change in world capital markets, and as firms working within the UK model attempt to address structural weaknesses within that system of business finance.

4.4.1 The UK/US Model

The UK model has been described as one where businesses are too-often considered to be overly preoccupied with short-term performance, as judged by stock market performance for example, to the detriment of longer-term strategic planning and the development of sustained competitive advantage. Investors are perceived to be more concerned with short-term returns rather than the long-term growth potential of the firm.

In the UK model, the main sources of financial for start-ups tend to be owners equity, mortgage finance, hire purchase or leasing of equipment and overdrafts and short-term loans designed to finance the start-up phase of the firm. There is generally a shortage of venture capital and long-term finance available to early stage firms. Traditionally, banks lend to their corporate customers either in the form of flexible overdrafts with floating rates of interest, or in the form of term loans which can carry fixed rates of interest. However, the smaller the firm the higher the margins charged on overdrafts and term loans. The firm is being treated in effect little differently to a personal borrower. In recent years the relationship between business customers and banks has had more of a focus on the developmental needs of companies with more capital being provided in form of longer-term fixed rate loans. This is more prevalent in Germany, Austria, Sweden and Norway than in the UK or Ireland where the emphasis is still on lending by way of overdraft. Firms that manage to establish

themselves and demonstrate strong growth potential can also benefit from access to venture capital finance, and well established companies can avail of investment from the stock market, including secondary stock markets which have been established in Ireland, UK, Europe and the USA. A large and well established venture capital market is an important characteristic of the US/UK model. Venture capital is extremely important for the UK economy; it is the second largest venture capital industry in the world behind the US and the largest and most developed in Europe accounting for more than 50 per cent of the European total. The UK venture capital industry invests about the same as the US relative to GDP.

4.4.2 The German Model

The German business finance model is also characterised as being conservative, but this is also claimed to be one of its main strengths as it facilitates a more long-term approach to financing business development. The debt/equity ratio in Germany is twice as high as that of the US, emphasising the high dependence of German firms on bank finance. The power of the banks in the German model lies in a combination of the proxy vote cast by banks on behalf of other shareholders at corporate AGMs, 'house-banking' that keeps firms linked to one principal bank (often regional banks), the size of the bank's overall equity holdings in other corporations and their seats on the supervisory boards of other companies. Supervisory boards control the composition of a firm's management board and their approval is needed for major financial decisions. Over 400 German companies have bank representatives on their supervisory boards and these members bring financial experience and security to the client companies. It is argued that these arrangements allow the company to have a longer-term developmental focus which is more conducive to competitiveness.

Historically, share ownership and the provision of equity finance was low in Germany compared to the business financing activities of private commercial banks. Private holdings of equity in the mid 1980s were extremely low with only 6 per cent of insurance companies investing in equity and only 5 per cent of households holding shares. This has now increased to 10 per cent for private individuals[54].

German small and medium enterprises receive financing from three main sources; the federal government, the state (regional) government and from specialist banks. Support from the federal government includes initiatives such as grants for start-up costs of establishing manufacturing enterprises in depressed regions, grants for specific sectors, training supports and tax breaks. The individual states can offer a wider variety of subsidies including technology funding to support shifts from heavy to light industry. Overall, up to 60 per cent of the start-up costs of some firms can be financed by grants and soft loans.

One of the main differences between the UK and German models for financing SMEs is the role played by State owned banks. In the Nordic countries, for example, there is a well developed system. These banks do not operate in competition with private sector banks but instead operate in a complementary fashion. The State owned bank provides only part of the total external financing requirements of the SME, usually the long term finance component. The SMEs commercial bank provides the rest. The available security may be apportioned so that the private sector bank achieves a better risk position than the State owned bank, in certain circumstances. This asymmetric sharing of financing and risk facilitates the provision of competitive and adequate loan finance by the private sector bank. The State owned bank seeks to recover its costs and any loan losses by charging a risk premium on all its loans.

4.4.3 Comparison between the UK and German Models

One of the main characteristics affecting the business environment is the nature and stability of financial markets and their effectiveness in financing enterprise. As can be seen from Table 4.22, there has in the past been a sharp contrast between the UK and German models of business finance. Firms in the UK have been caricatured as "short-termist" in their investment behaviour. This it is argued has led to under-investment, as stock market volatility has reduced the stability of the financial environment and made stock market flotation less attractive to investors. In Germany, on the other hand, it was claimed that long-term investment in the form of equity and long term credit finance provided by the banks has favoured organic growth. Differences in corporation tax regimes between the two countries are also believed to have led to important differences in the extent to which investments are financed through retained earnings.

The differing UK and German financing models were believed to offer distinct economic alternatives. In the case of the UK model, the liberal environment for finance, with a strong venture capital and stock market culture, supported a considerably more flexible and entrepreneurial business culture. It was claimed that the more conservative and structured approach in Germany was better geared to support longer-term industrial development needs.

Table 4.22 **German v Anglo model of business finance**

Liberal (UK) Low	**Structural (Germany) High**
Stability of financial environment	Stability of financial environment
Short-term management	Long-term management
More after-tax profits distributed as dividends	Less after-tax profits distributed as dividends
Impersonal ownership through stock market investment	Large presence of medium-size owner-managed firms
Legitimacy of takeovers	Organic growth
Tendency to lower vertical integration	Tendency to higher vertical integration

Source Ebster-Grosz and Pugh, 1996

However, the balance of evidence is now swinging against the German model. As suggested by Table 4.22, managerial style and efficiency can exert a very powerful effect on overall economic performance. The poor performance of the German economy has been linked in part to poor managerial performance. Essentially German management, whose experience was largely acquired within a secure and relatively protected business environment, where the discipline of maximising short-run returns was largely absent, have found it difficult to come to terms with the highly competitive and rapidly changing environment for business which now exists. While a long-term planning focus geared to enhancing competitiveness is both necessary and desirable, there is also a need to ensure that this does not detract from the need for flexibility and the ability to respond quickly to market conditions which are constantly evolving. In this respect, it may be argued that the German model is unbalanced at present.

Another important example of the difference between the UK and German models can be seen in the venture capital market. In general, strong bank-centred capital markets do not develop a strong venture capital industry, as the nature of venture

capital investment is fundamentally different to bank lending. In the US and the UK, the venture capital market is extremely important as measured by the number and relative size of the funds invested. Venture capital invested as a percentage of GDP is almost six times higher in the UK compared to Germany. In the US, 37 per cent of funds were invested in start-up and early stage businesses. This compares with only 7.4 per cent for the EU as a whole. It is interesting to note that while the overall amount of venture capital invested in Germany in 1997 was relatively small, a far higher proportion went towards the financing of start-up and emerging business (15.1 per cent), compared with the UK (2.2 per cent) or Ireland (3.8 per cent).

Table 4.23 **Venture capital percentage distribution by stage of development, 1997**

	US *	**Germany**	**UK**	**Ireland**
Seed	4.0	4.6	0.1	0.0
Start-up	15.0	10.5	2.1	3.8
Other early stage	18.0	--	--	--
Expansion	45.0	49.0	24.3	92.3
Replacement	--	--	8.8	0.0
Buy outs	12.0	35.9	64.7	3.9
Total	94.0	100.0	100.0	100.0

** Figures for the US are for 1994*

*Source: Venture Capital Yearbook and the European Venture Capital Yearbook 1998*Source: Venture Capital Yearbook and the European Venture Capital Yearbook 1998

As can be seen from the table above, early stage venture capital investments accounted for 37 per cent of total investment in the US, 5 times higher than the EU average. In Ireland the corresponding figure was 3.8 per cent, with over 90 per cent of venture capital investment occurring at the expansion phase.

This identifies a clear need in Ireland for more equity capital to be made available for firms at the start of their life cycle. This is being addressed by:

- The seed and venture capital measure included in the current EU Operational Programme under which some £33m has been allocated, and will be matched by £33m from the private sector, for investment in smaller emerging firms through venture capital intermediaries. So far, some 16 venture capital funds have been set up under this measure and the full £66m has been fully subscribed. A high proportion (up to 40 per cent) of the funds invested initially have been in start up and early stage companies operating in all industrial sectors, but in high technology areas in particular.
- The Enterprise 2000 Seed Capital Fund which was set up in 1998 as a partnership between the public and private sectors to invest in seed capital projects.
- The equity investment programmes of the development agencies, which have an early stage and developmental focus.

Cumulative venture capital funds raised to date in the UK amounted to ECU42.4bn. In 1997 alone, ECU4.4bn was invested. In Ireland, cumulative funds raised to date amounted to ECU638.0m. ECU36.2m was invested in 1997.

Investor profiles also differ considerably between the UK and Germany. In the UK, 16 per cent of investment raised came from the banks while 33 per cent came from pension funds in 1997. In Germany the main investors were the banks, accounting for 58 per cent of total investment. In Ireland some 17 per cent of funds raised came from the banks, with pension funds contributing less than 7 per cent. The highest contributor's in Ireland were Government agencies (36 per cent). The degree of State involvement in Ireland highlights a gap in the provision of venture capital by the private sector, compared to economies where the venture capital market is more established, such as UK (1.7 per cent) and Holland (0 per cent).

Initial Public Offerings (IPO) in the UK model facilitate venture capitalists to exit the market and realise their gains. In the German model, firms have to redeem the capital investment made by banks, and this does not allow firms to regain effective control over their business for a long period of time. In addition, the quantum of funds available for rapidly growing technology based firms, who would be the predominant recipients of venture capital funds in the UK and US, tends to be less in Germany. Long term lending, which is the main source of development capital in Germany, is not a sufficiently flexible source of finance for such companies. Therefore an IPO exit is important, both to venture capital investors seeking to liquidate their investment and to firms who wish to reacquire shareholding control.

Table 4.24 **Venture capital percentage raised by type of investor 1997**

	US *	**Germany**	**UK**	**Ireland**
Corporations	2.0	7.5	12.5	5.1
Private individuals	17.0	5.6	3.6	13.8
Government agencies	--	4.5	1.7	36.3
Banks	18.0	58.1	16.0	17.2
Pension Funds	38.0	11.7	32.8	6.9
Insurance Companies	--	11.3	20.6	0.0
Academic institutions	--	0.0	1.1	0.0
Other	25.0	1.3	8.9	0.0
Realised Capital gains reinvested	--	--	2.7	20.9
Total	100.0	100.0	100.0	100.0

** Figures for the US are for 1994. Banks includes insurance companies for the US*

Source: Venture Capital Yearbook and the European Venture Capital Yearbook 1998

Venture capital firms have played a crucial role in financing the growth of the high-tech sector of the UK economy, supplying them with permanent equity capital rather than repayable debt offered by the banks[55]. From table 4.25 below it can be seen that a similar proportion of venture capital investment was made in the high-tech sector in Germany. However, the absolute amount invested by way of venture capital was only ECU369m in Germany compared to ECU1.2bn in the UK in 1997. Venture capital

provides firms with a more flexible form of financing, plus a more liquid exit mechanism, while allowing promoters to retain greater control over the business. Venture capital is also particularly important for high-tech firms, due to the fact that most of the value is associated with intellectual property, rather than traditional forms of asset security such as premises and stock. In 1994, 64 per cent of venture capital investment in the US went to technology based firms. The US market is characterised by investment in technology based start-up firms supplied by pension funds. The German market on the other hand is characterised by expansion and buy-outs funded by banks, with a much lower level of venture capital investment resources being directed towards technology based industries.

As can be seen from tables 4.23-4.25, in Ireland the majority of venture capital investment is for the expansion of industries, funded by government agencies but directed to technology based industries such as communications, computer-related and other electronic sectors. However, there is a gap in the supply of seed and venture capital to start up and early stage firms, and the State has so far taken the initiative in addressing this high risk area in partnership with the private sector.

Table 4.25 **Sectoral distribution of investment in 1997 (%)**

Sector	Total Europe	Germany	UK	Ireland
Communications	5.7	6.6	4.8	14.6
Computer related	6.6	7.4	6.0	19.3
Other electronic	4.6	6.8	5.0	12.1
Biotechnology	2.6	4.6	1.8	7.5
Medical/health	4.3	n/a	7.5	0.0
Energy	0.8	n/a	1.3	9.7
Consumer related	22.2	7.9	30.1	14.3
Industrial products and services	13.1	22.8	10.1	0.0
Chemicals and materials	2.7	5.8	2.6	0.0
Industrial automation	0.9	n/a	0.6	0.0
Transportation	4.1	3.2	3.9	0.0
Financial Services	2.4	2.4	2.1	0.0
Other services	13.1	4.6	11.0	0.0
Other manufacturing	7.2	8.7	6.7	7.1
Agriculture	0.6	n/a	0.7	0.0
Construction	3.8	0.8	5.7	15.5
Other	5.3	18.4	0.0	0.0
Total	100.0	100.0	100.0	100.0

Source European Venture Capital Yearbook, 1998

4.4.4 Financing in Ireland

Table S9 **Financial Markets**

		1	2	3	4	5	6	7
	Indicator	**Government bond yields (%)**	**Interest rate spread - absolute (%)**	**Long-term interest rates (%)**	**Money market rates (%)**	**Rate of return on capital in business sector**	**Short-term Cumulative interest rates (%)**	**Cumulative ven. capraised % GDP (GNP for Ireland)**
	Year	1997	1997	1998e	1997	1998e	1998e	1997
Country	Observations	21	24	23	22	19	27	17
Denmark	Value	5.1	5.0	5.0	3.7	0.089	4.1	0.4
	Rank	4	17	10	9	18	9	14
Ireland	Value	6.5	6.1	5.0	5.7	0.170	5.8	1.1
	Rank	16	20	10	14	5	18	5
Japan	Value	1.7	2.2	1.5	0.5	0.117	0.7	0
	Rank	1	4	1	1	16	1	0
Netherlands	Value	5.8	3.0	4.7	3.1	0.189	3.5	1.3
	Rank	12	8	6	3	3	3	3
New Zealand	Value	5.8	3.0	4.7	3.1	0.191	7.4	0
	Rank	12	8	6	3	2	20	0
UK	Value	7.1	3.0	5.5	6.6	0.111	7.3	4.0
	Rank	19	9	18	16	17	19	1
US	Value	6.4	2.8	5.2	5.5	0	4.7	0
	Rank	14	6	15	12	0	13	0

As starkly illustrated by the experience of the Asian economies a sound, stable banking sector that provides adequate loan financing to the business sector is essential for macro-economic success. In this context two priorities arise in the area of public policy:

- to ensure that the banking system remains prudently lent, profitable, well managed and capable of providing the full range of banking services that are required
- to ensure that banking services are provided as cheaply and efficiently as possible

The Irish economy is dominated by firms of less than 50 employees. Only 24 per cent of firms have more than 50 employees and these are dominated by multi-national corporations. In Ireland, as in the UK, the rates charged to SMEs and the emphasis on overdrafts and short term lending is more closely linked to consumer personal banking than to banking services provided to larger corporate customers. The two major banks account for around 80 per cent of the SME banking market in Ireland.

Table 4.26 **Size and number of firms in Ireland by number of employees**

Employees	Number	% of Total
3 to 10	1568	32.44%
10 to 19	1006	20.82%
20 to 49	1119	23.15%

SMEs	3693	76.41%
50 and over	1140	23.59%
Total	4833	100.00%
Source CSO, Census of Industrial Production, 1996		

The Task Force Report on Small Business published in 1994 identified weaknesses in the availability of long-term credit finance to SMEs. In response to this report the Government introduced two schemes, the £100m Small Business Expansion Loan Scheme (SBEL) and the £200m Access to Finance Scheme (AFS), both of which have been fully utilised. It is now envisaged[56] that the banks should provide more long term finance facilities for the business sector, and this has been happening through the enterprise support programmes of the major banks. In 1997, Irish banks launched 16 initiatives to provide finance to the SME sector. A total of 60 of such schemes have been operated during the 1990s.

For SMEs to avail of commercial mortgages or finance for leasing, they must normally be in a position to provide a satisfactory level of matching equity capital as collateral with the bank or financial institution. Therefore, provided that the investor has sufficient equity capital, the supply of this form of finance is relatively competitive for the SME sector. In general, smaller firms have limited access to in-house financial expertise and therefore rely more heavily on the banks for finance advice. This tends to imply long-term relationship banking which is positive in terms of the bank becoming more informed about the clients business and being in a better position to assess the risks involved. However, it can also lead to weak competition and higher costs in the supply of finance to the SME sector. A study undertaken by Forfás of credit markets for SMEs in EMU concluded that this sector is likely to be the segment of the market which will experience the lowest level of competitive pressure in EMU, because of the relationship nature of SME banking and the dominance of the major banks in the market.

In Germany, SMEs have gained from their long-term relationship with the banks who provide them with adequate long term finance for development and expansion. In Ireland, SME financing is mainly served by overdrafts, which are offered at interest rates which can be lower than in Germany and other European countries. However, there is a significantly higher use of fixed rate lending in mainland Europe, particularly in Germany, where longer term fixed rate loans tend to be available on margins of less than 2 percentage points over wholesale cost.

There are several mechanisms through which the public sector can facilitate the flow of credit finance to the SME sector while minimising its financial exposure. Mutual guarantee associations, which reduce the risk premiums on SMEs and therefore average retail lending margins, do not usually require public subsidies to any significant extent. Although mutual guarantee schemes are well established in mainland Europe, the concept is only at the exploratory stage in the UK and Ireland. Work undertaken by Forfás in this area concluded that there was relatively little interest in mutual guarantee schemes in Ireland at present, because of the range of bank and other financial products currently available to SMEs. Another way of financing loans to SMEs is through public financing organisations that refinance bank loans and also usually do not require public subsidies. A third mechanism is through a state owned bank dedicated to financing enterprise development and providing competitive facilities to SMEs.

Financing mechanisms used in other countries to support the expansion and development of the long-term competitive strength of firms in the SME sector, appear to place an emphasis on making long term low cost finance available, in addition to other supports. The private/public mechanisms used in other European countries such as mutual guarantee schemes and refinancing have not evolved here as yet. In Ireland subsidised long term loans have been made available to SMEs on an ad hoc basis, and a public/private partnership approach has also been adopted towards the provision of seed and venture capital to smaller firms. To the extent that SMEs in other euro zone countries have greater access to low cost, long-term fixed rate financing, Irish SMEs will be at a competitive disadvantage.

4.4.5 Performance Indicators

In reviewing the performance indicators set out in Table S9 it should be noted that in some cases the comparative data refers to 1997 and therefore does not reflect the convergence of interest rates that has taken place due to EMU. Ireland's position as set out in the table appears to have worsened somewhat compared to other countries, but this must be seen in light of the prevailing cyclical economic conditions in Ireland. Ireland, unlike many of the countries compared, was enjoying a period of very strong economic growth with interest rates maintained at a high level in order to attenuate inflationary pressures in the economy, explaining the significant increase in Ireland's interest rate spread. Long-term interest rates had converged close to those of other EMU member countries reflecting the high credibility afforded by the financial markets to Ireland's bid for EMU membership. Moreover, as is clear from Japan's position at the top of the ranking for both short- and long-term real interest rate, this cannot be taken as a symbol of economic virility.

4.4.6 Conclusions

The assessment carried out in this section points to several weaknesses in the provision of finance to the business sector and in particular SMEs in the economy. However, the comparative analysis of the two main models of business finance carried out in this section (the so called UK and German models) does not provide any clear-cut answers as to how best the situation can be addressed. Mechanisms which have evolved over time for the financing of business and enterprise in different countries reflect a complex set of economic, institutional, historical and cultural factors, some of which may be quite immutable.

Gaps in the provision of long term finance and equity capital on suitable terms to the SME sector of the economy constitute a source of competitive disadvantage for the Irish economy. The current favourable interest rate environment reflects Ireland's EMU convergence and may not be sustained indefinitely. The high level of state involvement in the financing and support of enterprise also signifies a degree of market failure.

- The relatively under-developed state of the venture capital industry is a further cause for concern in the light of the long-term financing needs of new enterprise in the economy. There is a clear gap at the seed and start-up level of development that must be addressed progressively by the private sector in partnership (initially) with the State and EU.
- The trend towards the convergence of capital markets in EMU could result in a reduction of investment funds available for small business in the Irish economy. Enterprise in a small, peripheral euro zone economy such as Ireland

may become disadvantaged in accessing financial resources to expand to an internationally competitive scale.

- There is a need to encourage the maximum level of competition in the provision of banking services to the SME sector in order to improve access to facilities and services and reduce costs. This is essential to realise the long-term growth potential of SMEs in the economy.
- Fixed rate borrowing to SMEs should be increasingly encouraged and facilitated by the banking system, particularly for longer term lending.
- The scope for further development of public/private mechanisms such as the EU seed and venture capital measure in the current Operational Programme and the Enterprise 2000 Seed Capital Fund, in addition to other long term financing initiatives, should be evaluated in order to increase the funding available to small, emerging and innovative firms.

5 Infrastructure

A competitive infrastructure is clearly vital in sustaining economic growth. While Ireland has been converging with EU partners in income levels, it still diverges significantly from the EU in infrastructure provision. This deficit, and the bottlenecks it has given rise to, threaten the continuation of Ireland's strong growth and employment performance.

Infrastructural deficiencies exist in the areas of telecommunications, transport, housing and in environmental infrastructure. It will be not be possible, however, to resolve all of the individual areas of infrastructural weakness in isolation. Those relating to transport, housing and environmental infrastructure comprise part of a complex set of interrelated issues which together with the skills issue discussed in Chapter 3 must be addressed in a structured, systematic and coherent fashion.

This chapter reviews the current position in relation to Ireland's infrastructure including telecommunications, transport (road, rail, sea and airports), as well as energy (electricity and gas). It focuses particularly on areas where Ireland appears to be falling behind. The international competitiveness of the Irish economy will suffer unless these weaknesses are addressed.

5.1 Telecommunications

5.1.1 Telecommunications Infrastructure

5.1.1.1 Introduction

The rapid growth in information and knowledge products and systems for managing information are providing the impetus for the rapid growth of the so-called digital economy. Information and communications technologies (ICTs) enabled by advanced telecommunications are now among the primary engines of economic growth and the continued expansion in international trade and investment, as well as driving the major shift from traditional forms of commerce to electronic commerce (e-commerce).

The global telecommunications market has become one of the fastest growing and changing markets in the world. The technological forces driving this trend are accelerating:

- the dominance and spread of Internet/Intranet technologies
- the growing use of mobile systems and their increasing integration with fixed systems
- the increased speed and capacity of wide access networks(WAN), local access networks (LAN) and availability of broadband telecommunications
- increasing importance of video-conferencing and business TV services[57]

These developments present enormous opportunities for Ireland, provided that Ireland's telecommunications infrastructure and costs can keep abreast of the highest standards internationally.

The area of telecommunications differs from other dimensions of Ireland's competitiveness performance discussed in this report in some very important respects:

- The pace of change across the whole broad area of telecommunications is extremely rapid in terms of such key competitiveness factors as technological developments, regulatory environment, infrastructural provision and cost structure
- Ireland's success in achieving a leadership role in the emerging high-growth sectors of the digital economy demands a consistent and sustained performance among the leading nations of the world. In the case of telecommunications, failure to excel is a competitive disadvantage.

This section:

- examines how Ireland compares to our main competitors in the key areas of telecommunications infrastructure and costs
- outlines the steps being taken to improve our position and
- examines what remains to be done in order to construct enduring competitive strength in this key potential growth sector in the world economy in the next century

The indicators of Ireland's international standing in telecommunications presented in this section are drawn from the most recent and authoritative international sources available. However, in assessing Ireland's relative position it should be noted that the pace of ongoing change in this area is so rapid that even quite recent indicators may not fully reflect the up-to-date position. Notwithstanding this important qualification it is certainly possible to undertake a balanced assessment of the current state of Ireland's competitiveness position in telecommunications. Where, reflecting any recent initiatives, the position in Ireland has changed relative to that presented in the tables this is adverted to in the text. However, while any such improvements are welcome, there can be no guarantee that these represent improvements in Ireland's relative standing since no advanced economy is standing still. In this regard a structured telecommunications benchmarking process is being initiated by Forfás for the Council with initial results available in mid-1999.

5.1.1.2 How Ireland compares

The digital economy and competitiveness in e-commerce requires the availability and diffusion of high-speed interactive telecommunications infrastructure, non-discriminatory access to and use of that infrastructure for both customers and service providers along with competitive interconnection and interoperability of both infrastructure and services. This first section examines the main indicators available on how Ireland's telecommunications infrastructure compares to our competitors.[58] The Government has previously set an objective to achieve a position in the top quartile of the OECD and it is this objective that must be benchmarked from a competitiveness perspective.

Key Points

- It should be noted in the table below that some of the indicators of telecommunications infrastructure refer to the 1996 and 1997 and may not be an up-to-date guide to the current position
- Transformation of the telecommunications sector is being driven by technological and regulatory change – countries that liberalised earlier have more competitive pricing structures
- While the Internet is one of the main forces driving the global telecommunications market, Ireland appears to be lagging behind – the prospective introduction of flat rate charges for Internet access will help contribute to closing the gap

Indicators in Top Quartile	Rank 98	Rank 99

Indicators in Second Quartile		
• Per capita expenditure on telecommunications (ECU)	New Indicator	6th out of 18
• Mobile subscriptions per 1000 capita	11th out of 18	9th out of 21
Indicators in Third Quartile		
• Internet Host per 1000 capita	11th out of 19	16th out of 29
• Mainlines per 100 inhabitants	22nd out of 27	21st out of 28
Indicators in Fourth Quartile		

Table S11 **Telecommunications Infrastructure**

		1	2	3	4
	Indicator	**Mainlines per 100 inhabitants**	**Internet Hosts per 1000**	**Mobile subscriptions per 1000 capita**	**Per Capita Expenditure on Telecommunications (ECU)**
	Year	1997	July 1998	01/01/99	1997
Country	Observations	28	29	21	18
Denmark	Value	63.6	35.90	347.84	663
	Rank	5	7	4	3
Ireland	Value	42.1	12.46	218.06	600
	Rank	21	16	9	6
Japan	Value	47.9	10.84	0.00	593
	Rank	18	17	0	7
Netherlands	Value	56.6	32.78	170.16	576
	Rank	10	9	13	8
New Zealand	Value	50.5	49.38	0.00	0.00
	Rank	16	4	0	0
UK	Value	54.0	20.67	198.26	457
	Rank	13	11	10	13
US	Value	66.0	4.86	0.00	609
	Rank	3	23	0	5

Ireland's position in the provision of telecommunications infrastructure leaves room for improvement. Ireland must aim for rankings in the first quartile for key competitiveness indicators. This is required in order to avoid competitive disadvantage in telecommunications provision that could significantly retard Ireland's attractiveness for foreign investment in sectors with enormous growth potential but which demand the highest quality in telecommunications infrastructure.

The clearest manifestation of the pace of change in the telecommunications area is rapid growth in the Internet. While the number of users is increasing rapidly, the proportion of Irish businesses and people using the Internet is still relatively low by international standards, as measured by standard OECD indicators of Internet infrastructure. In July 1998 Ireland was ranked 18th of 29 OECD countries for web server sites per 1000 inhabitants and 17th[59] of the same 29 countries for Internet hosts per 1000 inhabitants. The gaps are large. Ireland was found to have 17 Internet hosts per 1000 inhabitants while the US had almost 80, Finland over 100 and the OECD had over 30.[60]

In terms of Internet access, 11 per cent of the total population is estimated to be online[61]. This is well below online estimates for Finland (28 per cent), the US (28 per cent) and also lags the figure for the UK (16 per cent).

Ireland's relatively weak position in terms of Internet development highlights the importance of the rapid introduction of a new flat rate cost structure for Internet usage to help Ireland make up lost ground.

The take-up of the Internet and related ICTs is a key indication of whether businesses are exploiting the opportunities provided by these new technologies. The take-up and use of ICTs and advanced telecommunications services by enterprise in Ireland remains low. According to a 1996 summary by UNICE[62], Ireland was ranked 11th in the EU on spending per employee on business computer networks, with expenditures per employee on business computer networks only a third of expenditure per employee in the UK. In terms of expenditures on ICTs, Ireland was placed 9th out of 19 countries. In 1997, IT expenditure as a per cent of GDP in Ireland was marginally below the EU average, but was less than half that of the US. In view of the large gap between the EU in general and the US in both ICT provision and usage, Ireland must benchmark its performance relative to the US rather than that of the EU.

The number of telephones per head of population in Ireland is very low by international standards. Ireland is ranked 21st out of 28 countries[63] in terms of mainlines per 100 inhabitants. This is one of the lowest rates in the EU. However, this reflects, to some extent, relatively larger household sizes in Ireland.

Significant growth has taken place in other infrastructures: for example, mobile phone penetration in Ireland has significantly increased and now stands at over 24 per cent (January 1999). This is slightly ahead of mobile phone penetration in Britain (22 per cent) but well below penetration levels in the Nordic countries. The integration of mobile telephones and palmtop PCs, the so-called "wireless" revolution through which the mobile phone is fast being developed to access the Internet at speeds up to forty times faster than today's "wired" modems, is expected to spark the next technological leap in the digital economy.

5.1.1.3 What is being done?

During 1998, the Irish Government took a number of decisions that will help shape the future of the telecommunications sector in Ireland. These included, in particular, an early end to the derogation on voice telephony, the full liberalisation of the market by 1 December 1998, the holding of an Initial Public Offering of State shares in Telecom Eireann in 1999 and agreement with the employees of Telecom Eireann on an Employee Share Ownership Programme of a 14.9 per cent shareholding in the company. It was also decided that Telecom Eireann and RTE should divest their holdings in Cablelink and that EU Structural Funds should be used to co-finance some broadband investments.

Telecom Eireann's public telephone network was fully digitalised in March 1999. Telecom Eireann and other new operators have undertaken significant investments in fibre and wireless networks and ATM switches during 1998. A new regulatory bill to enhance the telecommunications regulator's power is being prepared, as is a new telecommunications infrastructure bill, which provides for infrastructure sharing. These decisions underscore an emerging understanding of the crucial role of advanced telecommunications in sustaining competitiveness and of the scale of actions required to establish a leadership position especially in the area of market liberalisation.

As a result of market liberalisation the business sector is now providing the initial stimulus for essential new investment for information infrastructure development. Box 1 shows some recent investments by telecommunications operators in Ireland.

Box 1 **Examples of recent investments by telecommunication operators**

Telecom Eireann's backbone is over 90 per cent fibre and fibre backbones to the main cities are being deployed by Esat Telecom and Ocean. Since the liberalisation of infrastructure provision in July 1997 at least two other telecoms operators have laid fibre loops in the Dublin area and Telecom Eireann has also accelerated its investment in fibre and broadband technologies. The local access network, which provides connections to customer premises from the local exchange and which are still almost exclusively low bandwidth copper, remains the major infrastructure bottleneck for the provision of broadband services within the country.

Telecom Eireann
Telecom Eireann initiated a major ATM rollout from July 1998 to provide service with access speeds up to 155 Mbit/s over time. Fibre access, with up to 2 Mbit/s and multiples thereof, has already been provided to over 30 business parks and commercial areas in cities and towns around the country. Trials using SDH are underway in some sites for the provision of services at 34Mbit/s, 155Mbit/s and higher. Telecom also provides services to connect computer networks or LAN extensions at speeds of 10Mbit/s and some at 100Mbit/s. A third submarine fibre cable is currently under construction out of the country.

ESAT Telecom
ESAT Telecom is completing the construction of a fibre backbone cable, which will reach at least 25 cities and towns. An international fibre cable to the UK with onward connections to London and Amsterdam is in service. It is offering broadband and ATM services with bandwidth capacities up to 45Mbit/s.

Worldcom
Worldcom, one of the largest international telecommunications operators, has a fibre-laying programme in central Dublin. It is also targeting a number of business parks in Dublin, Cork and Limerick for fibre cabling.

OCEAN
Ocean (a joint venture between the ESB and British Telecom) plan to develop an ATM platform and offer leased lines of up to 155 Mbit/s. It is intended to rollout this infrastructure to the key industrial areas around Dublin. Using the ESB's existing microwave infrastructure, it also intended to link a number of major urban centers such as Cork, Shannon and Waterford, with slightly lower grade leased line services, i.e., up to 100 Mbit/s. In the longer term, up to 2000 and beyond, it is intended to link in to the remaining major urban centers (such as Limerick and Galway) via spurs from the ESB's microwave network.

Cablelink
With one of the highest rates of cable penetration in Europe, an upgraded Cablelink network could serve as the basis of an alternative telecommunications network offering broadband services in the Dublin area.

NTL
NTL, a UK company also operating in Northern Ireland through a subsidiary Cabletel, is laying an undersea fibre cable between Ireland and UK which will offer services to a number of Irish and international telecommunications providers. The network will be rolled-out across the country over time. This undersea fibre cable will have a link to Cabletel's fibre network in Northern Ireland, with an onwards connection to Scotland.

Telenor
Telenor, the Norwegian national telecom company is providing satellite services that can give point-to-point broadband links for enterprises in various locations across the country. It is also developing plans to rollout fibre based local loops for the provision of broadband services in Dublin.

The Information Society Commission (ISC) and IBEC and others such as Ireland On-Line, are organising a nation-wide series of seminars on e-commerce that will target SMEs, particularly those in the services sector. Funding of £230,000 is being made available for the ISC/IBEC campaign from European Union structural funds through the Department of Public Enterprise. However, much more will be required in the future to achieve a higher level of penetration of businesses with awareness campaigns to encourage all businesses to capitalise on the tremendous opportunities that exist and prepare for the threats and challenges of e-commerce.

5.1.1.4 Council's Statement on Telecommunications

The Council's Statement on Telecommunications published in November 1998 identified a twofold challenge for Ireland: to be amongst the leaders in the provision of broadband telecommunications services and in digital business and to develop Ireland as an electronic commerce hub[64]. The Council identified a broad range of actions across five priority areas that must be taken to achieve these aims. The five areas identified by the Council are as follows:

- **Increase the adoption of ICTs by business**
  Investment in ICTs to exploit broadband telecommunications must be significantly increased. A dynamic and competitive telecommunications market is the best guarantee of generating the sustained high levels of investment required. Government must play a leadership role to promote and support the use of ICTs and advanced telecommunications by enterprises.
- **Monitoring Ireland's Performance with Competing Countries**
  The gap that has emerged between Ireland and the leaders in global telecommunications in the cost and provision of broadband services and in the use of these services by business must be systematically monitored. This will help provide critical feedback to the enterprise sector, policy makers and regulatory bodies on key developments and help determine the required actions for Ireland to establish and hold a position among the global leaders.
- **National Policy Framework for Advanced Telecommunications Deployment**
  A policy framework for national broadband infrastructure must be developed to ensure that all enterprises have access to broadband services. A regulatory environment that provides for equal access and fair terms of interconnection will greatly encourage the investment levels required. Moreover, Ireland must be actively marketed as an attractive location for investment in telecommunications infrastructure. There is a need to focus on attracting major transnational operators to invest in the provision of additional national and international capacity.
- **Leadership in Adoption of Electronic Commerce**
  Electronic commerce is driving fundamental changes in business and is likely to be the most vibrant area of industrial development opportunities over the next number of years. New business opportunities that are highly dependent on broadband telecommunications are emerging. Global markets are opening for all Irish-based enterprises for business-to-business electronic commerce and for entering new consumer markets. A sustainable position among the leaders in advanced telecommunications investment, innovation and R&D can only be achieved when enterprises are exploiting advances in ICTs as and when they first become available. It also requires a clearly defined strategy for the development of e-commerce. The support of digital business activities including the attraction of leading international e-commerce businesses must be a priority. This will, in turn, require development of a strong and competitive support base of indigenous firms. This also necessitates that a comprehensive legal and fiscal framework for e-commerce is swiftly put into place.

- **Development of Digital Television**
  Ireland has fallen behind other countries in the development of digital TV, which will be a key communications platform and infrastructure from a competitiveness perspective and potentially a significant platform for the mass roll-out of the Internet. It will also be a potential platform for providing broadband services presenting new business opportunities. The convergence of broadcasting and telecommunications necessitates increased institutional co-ordination. Ultimately, the regulatory framework must ensure that the benefits of competitive markets are available to consumers and that there are no unnecessary burdens imposed on Irish industry.

5.1.1.5 What still needs to be done

Thirty-four proposed actions are detailed in the Council's Statement on Telecommunications in order to enhance Ireland's competitive advantage in telecommunications. Particular actions are now urgently required in order to guarantee that Ireland keeps pace with other leading economies vigorously pursuing a competitive edge in the telecommunications sphere.

Early availability of Broadband Technology

The ever-increasing intensity of telecommunications usage in commerce makes it essential that Ireland develops its telecommunications capacity to the highest international standards against the backdrop of the intensification of international competition for investment projects demanding high quality and high capacity telecommunication infrastructure and services at competitive prices. While there is significant investment planned and underway in the backbone infrastructure and in fibre local loops in major cities and towns, investment in upgrading national networks, in particular in the regions, to provide broadband telecommunications facilities as widely as possible is now essential. The rapid improvement of Ireland's international connectivity to global broadband networks is also essential. The availability of competitive national and international broadband telecommunications services in countries with which we compete is enabling enterprises in those countries establish a "first mover advantage" in this new digital age. While progress was made in 1998 to catch up, it needs to be understood that Ireland now faces a moving target in telecommunications infrastructure investment.[65]

Government's leadership role through e-government

Communication networks and interactive multimedia applications are providing the foundation for the transformation of existing social and economic relationships in the information age. The rapid realisation of these economic opportunities will depend on the Government designing and implementing a number of new policy frameworks, in particular through competitive market structures in the telecommunications sector, reviewing a number of existing institutional, legal and economic policies and ensuring access and providing correct incentives to private enterprises. As well as playing this role in providing the optimal conditions for the development and deployment of infrastructures, it also needs to be a catalyst in promoting and encouraging investment by the private sector and stimulating new demand. Government must therefore be prepared to assume a leadership role in the economy through the development of electronic-government (e-government).

Flat rate charging for high-capacity Internet usage

As discussed above e-commerce using the Internet will be critically dependent on the availability of low cost broadband telecommunications services. In the business sector Internet penetration rates are driven by the cost of connection, the telecoms cost of using the Internet and by the uptake and usage of ICTs and PCs. The provision of local telephone calls at a standard charge regardless of the level of usage in countries such as Canada, the United States, Hong Kong and New Zealand has contributed to high Internet penetration rates. Even though access charges in Ireland are now low

following reductions in 1998 when compared with other European countries that provide similar metered services, such metered charges have constrained take up of the Internet in Europe and may limit growth in the future. It is now being realised in other European countries that the countries that move first to flat rate charging for high capacity Internet access services in Europe are likely to gain significant first mover and competitive advantage. The rapid implementation of flat rate charges for high capacity access to the Internet can provide a major impetus to Internet usage in Ireland which is lagging behind the highest international levels.

Pro-Competitive Regulation

1 December 1998 marked the liberalisation of the Irish telecommunications market. Achieving a leadership position in the provision of broadband telecommunications infrastructure will require a pro-competitive regulatory framework. Regulation of the telecommunications market should have as its primary objective free competition where all the benefits of a competitive market are available to consumers. However, the regulatory role is still strong in a newly liberalised environment so as to manage any imbalance between previously dominant market participants and emerging participants and in order to ensure a level playing field. Nonetheless, it is important to recognise that the role of the regulator is evolutionary and should be subject to 'sun-setting' and change as the sector develops towards a fully competitive market regulated by general competition rules, as are all other sectors in the economy.

5.1.1.6 The Year 2000 Problem

Box 2 highlights some possible repercussions of the year 2000 problem, and describes the preparations being taken by the Irish Government.

Box 2 **The year 2000 problem**

The year 2000 problem - better known as Y2K or the millennium bug – places in jeopardy information networks and electronic systems worldwide. Problems may arise not only in computer systems but also in communications networks and in chips integrated into industrial control systems, consumer electronic devices and safety systems.

The December 1998 OECD Economic Outlook attempts to outline the likely dimensions of the Y2K problem for the OECD area. The OECD notes that the prospective impact of Y2K could range from temporary and isolated to severe and widespread. A worst-case scenario based on a pessimistic assessment of how preparations are progressing is for a 70 per cent chance of a serious Y2K inspired global recession. Business and government worldwide have both undertaken costly investments to minimise Y2K disruption. The range $300-$600 billion is the most widely quoted figure for the global cost of fixing the problem before the millennium.

The Government has been taking an active leadership role in managing Ireland's response to the Y2K problem. A budget of £40 million has been allocated to the alleviation of the problem. A national Y2K committee has been established encompassing a broad range of representative public and private sector interests in the economy. A business awareness campaign has been undertaken in order to ensure that the Y2K problem is treated as a priority concern by the business sector of the economy in advance of 1 January 2000.

The state of preparedness in the public sector is high reflecting the work of the Interdepartmental Year 2000 Monitoring Committee, which was established with private sector representation in 1997 to oversee the achievement of Y2K compliance in the state sector. The potential disruption to the Irish economy due to the millennium bug is viewed as low to moderate according to a recent study comparing state of readiness across a number of countries. However, the SME sector is considered internationally to be the most vulnerable business sector in relation to the threat posed by Y2K problems. Surveys indicate that while nine out of ten Irish companies in this sector are aware of the broad issues involved with the millennium bug, only seven out of every ten SMEs are preparing or implementing strategies to deal with the problem. One of the most significant problems being encountered by business in seeking to prepare for 1 January next is the shortage of skilled personnel and the consequent high cost of Y2K fixes. This problem is likely to intensify

further in the months ahead.

5.1.2 Telecommunications Costs

This second section examines Ireland's international standing in terms of telecommunications costs.

Key Points

- Competition is extremely important to lower costs. This is illustrated by the lower pricing structures in those countries that fully liberalised markets early
- Recent reductions in the cost of Irish internet charges means more competitive access costs, flat rate charging is needed to improve the position further
- National leased lines have been considerably reduced placing us among the lowest in the EU
- Local calls, rental and connection charges remain high

Indicators in Top Quartile	Rank 98	Rank 99
• 2 Mbit/s leased lines national circuits – annual rental 100Km (US$)	8th out of 10	4th out of 28
• 2 Mbit/s leased lines to USA – annual rental (US$)	8th out of 10	5th out of 25
• Analogue leased lines national circuits – annual rental 100Km (US$)	7th out of 10	6th out of 25
• Cost of Call to the US (1st minute peak time) (US$)		6th out of 27
• Cost of Call to the UK (1st minute peak time) (US$)		3rd out of 27
• 2 Mbit/s leased lines national circuits – annual rental 50Km (US$)	9th out of 10	5th out of 28[66]
Indicators in Second Quartile		
• Analogue leased lines to USA (US$)	7th out of 10	6th out of 23
• Analogue leased lines national circuits – annual rental 50km(US$)	7th out of 10	9th out of 25[67]
Indicators in Third Quartile		
Indicators in Fourth Quartile		
• ICost of local call, per minute peak time (US$)	7th out of 10	23rd out of 28

The only practical way of identifying efficient, cost based prices in an economy characterised by shared network resources is through competition. Non-competitive markets suffer from a lack of responsiveness to new demands and do not encourage

cost based pricing. Countries, which liberalised early, such as the UK and Finland that have benefited from competition since the mid-80s, now benefit from the lowest costs and sustained high levels of investment in national and international infrastructures. Those countries with competitive markets also tend to have the most buoyant growth in Internet hosts and in Internet access. Recent reductions in the cost of international calls from Ireland result from market liberalisation and increased competition. As commerce increasingly moves to electronic forms of marketing, distribution and communication, the cost of telecommunications services in the location decisions of firms and the competitiveness of business operations is increasingly important: specifically the competitiveness of telecom services to major European and world markets will be among the key determinants of Ireland's ability to develop as an e-commerce centre.

The most efficient pricing structures will develop through a competitive market. The primary aim of policy and of regulatory frameworks should be to accelerate market competition. However, the existing telecommunication pricing structure was established within a monopoly market and did not reflect either efficient price levels or structures, an illustration of this is the significant 60 per cent reduction in interconnection charges agreed between Telecom Eireann and the Office of the Director of Telecommunications Regulation(ODTR) in 1998. Further, experience has shown that the development of competition in telecommunications, especially at the level of the local loop, is a lengthy process and so Government must play a pro-active role in ensuring the creation of a competitive environment.

In the transition to a competitive environment, sector specific regulatory bodies are needed so as to monitor and control pricing for services, interconnection and access to infrastructures, but should wherever possible to allow the market mechanism to play the primary role. It is important for such regulatory bodies to continue to have reserve power to control prices, if necessary, since public switched network operators with significant market power and indeed broadcasting entities with dominant positions, could, through pricing structures, negatively affect the competitiveness of the economy as a whole.

5.1.2.1 The position in Ireland

The business benefits of the development of a competitive market were evidenced in the run-up to liberalisation on 1 December 1998 last. There was a flurry of price reductions and rebalancing of charges, following the announcement by the Minister for Public Enterprise, in national and international calls and high capacity leased lines. However, there is no room for complacency. As can be seen from the table below, local calls in Ireland are still amongst the highest in the OECD. The costs of connection and rental also remain uncompetitive. Ireland is, however, somewhat disadvantaged by low population density in this regard.

As noted earlier, the comparative cost of international calls and leased lines to major international markets is critical to the competitiveness of the internationally trading sector. Progress has been made on rapidly reducing costs to the UK and US. Similar progress is needed to other EU and global markets. Ireland now has the same cost access to the UK as the Netherlands and has lower cost access than France and Belgium. For the future it is critical that Ireland rapidly achieves its objective of a position in the top quartile of OECD and EU countries by the year 2000.

Table S12 **Telecommunications Costs**

	1	2	3	4	5	6
Indicator	**2 Mbit/s leased lines**	**2 Mbit/s leased**	**2 Mbit/s leased**	**2 Mbit/s leased**	**Voice grade leased**	**Analogue leased lines**

		national circuits connection (ECU)	lines national circuits - annual rental 50KM (US$)	lines national circuits - annual rental 100KM (US$)	lines to USA - annual rental (US$)	lines national circuits - connection (ECU)	national circuits - annual rental 50KM (US$)
	Year	01/01/96	Feb 1999	Feb 1999	Feb 1999	01/01/96	Feb 1999
Country	Observations	13	28	28	25	14	25
Denmark	Value	5347	25641	41960	199493	754	2543
	Rank	6	7	11	3	11	7
Ireland	Value	18328	22216	28756	222062	489	3077
	Rank	13	5	4	5	8	9
Japan	Value	0	84933	102890	744066	0	0
	Rank	0	25	26	24	0	0
Netherlands	Value	8889	39577	48853	213904	222	2971
	Rank	10	13	12	4	2	8
New Zealand	Value	0	41604	41604	0	0	5039
	Rank	0	14	9	0	0	17
UK	Value	10960	25193	36282	376212	1504	3994
	Rank	12	6	6	15	14	12
US	Value	0	11820	22980	0	0	1858
	Rank	0	1	3	0	0	5

Table S12 **Telecommunications Costs** *(continued)*

		7	8	9	10	11
	Indicator	**Analogue leased lines national circuits - annual rental 100KM (US$)**	**Analogue leased lines to USA US$**	**Cost of local call (per minute - peak time) US$**	**Cost of call to the UK (1st minute peak time) US$**	**Cost of Call to the US (1st minute peak time) US$**
	Year	Feb 1999	Feb 1999	Feb 1999	Feb 1999	Feb 1999
Country	Observations	23	23	28	27	27
Denmark	Value	4175	30773	0.0443	0.366	0.476
	Rank	9	12	22	8	11
Ireland	Value	3402	24225	0.457	0.226	0.346
	Rank	6	6	23	3	6
Japan	Value	0	63983	0.287	1.634	0.688
	Rank	0	23	15	27	23
Netherlands	Value	3899	22881	0.0309	0.165	0.222
	Rank	7	3	18	1	1
New Zealand	Value	5039	0	0.245	0.296	0.296
	Rank	13	0	13	4	2
UK	Value	5357	46197	0.0552	0	0.330
	Rank	14	21	27	0	0
US	Value	3391	0	0.0130	1.140	0
	Rank	5	0	4	25	0

As a result of price reductions implemented by Telecom Eireann in October 1998 Ireland's costs are now in the top quartile of OECD countries for national 2 Mbit/s leased lines and for international leased lines to the UK and the US. Leased line connection charges and voice grade leased lines are in the second quartile of the OECD. Ireland is also ranked among the second quartile of EU and OECD countries for leased lines to other key destinations such as Germany, France, the Netherlands and Japan. Similarly, for international calls further reductions in tariffs to other key EU markets are required to achieve a position in the top quartile.

5.2 Transport

This second section examines Ireland's international standing in terms of telecommunications costs.

Key Points

- Transport infrastructure is poor relative to the rest of the EU
- High dependency on road traffic compared with the rest of the EU with below average road density and high congestion
- National leased lines have been considerably reduced placing us among the lowest in the EU
- Likelihood of strong growth in car ownership over the next decade will exacerbate pressure on road capacity. Intensification of transport congestion inevitable in absence of radical action
- Transport bottlenecks major impediment to realisation of the economy's growth potential over the medium-term
- Investment in transport infrastructure recommended as major national investment priority by ESRI for next National Development Plan

Indicators in Top Quartile	Rank 98	Rank 99
• Insurance and freight as percentage of total trade	5th out of 26	
Indicators in Second Quartile		
• Letter costs – EU domestic tariffs	9th out of 15	4th out of 15
Indicators in Third Quartile		
Indicators in Fourth Quartile		
• Rail infrastructure indicator	17th out of 18	17th out of 18
• Road infrastructure indicator	17th out of 19	15th out of 19

An effective, well-functioning transportation infrastructure is as relevant to overall economic performance and competitiveness as, for example, an efficient competitive banking system or a smoothly operating labour market. In view of the Irish economy's peripheral geographic location combined with its very high dependence on international trade and flows of inward investment in sustaining economic growth, transport and logistics facilitating the movement of goods and people quickly and reliably and at a reasonable cost, are clearly essential elements to the overall configuration of Ireland's competitiveness. Lacking a landlink with the remainder of the EU, Ireland has particular requirements in terms of its transportation infrastructure including the need to ensure efficient access to seaports and airports to minimise the economic disadvantages of peripherality.

The current poor state of the Irish transportation system requires little elucidation. Notwithstanding high and increasing levels of investment over the 1990s in its expansion and upgrading[68] the quality of the existing stock of transportation infrastructure in the Irish economy remains quite poor in international terms. The capacity and quality of transport systems in Ireland now fall well short of the level

appropriate to that of a dynamic, advanced, EU economy. Ireland's transport infrastructure has clearly failed to keep pace with the demands generated by an economy which has expanded in size by more than two-thirds since 1990. High transportation and congestion costs are now evidently undermining international competitiveness.

5.2.1 Ireland's roads

As illustrated in Table 5.1 roads are the predominant mode of internal traffic in Ireland, accounting for almost 86 per cent of freight traffic and over 97 per cent of passenger traffic. Such a high dependence on roads for the movement of people and goods is atypical of most other EU member states.

Table 5.1 **Percentage of passengers and freight transported via roads**

Countries	Passengers	Tonnes Kms
Germany	83.9	44.3
France	76.3	59.2
Netherlands	73.7	78.4
Denmark	92	74.5
Italy	85.4	76.1
Spain	75.2	86.7
Portugal	76.4	90.3
Ireland	97.3	85.9

Source: National Roads Authority, 1997

Road density in Ireland is somewhat below that of the EU average. Ireland has 1.3km of road for every 1km^2 of land area, compared to 1.6km for every 1km^2 in the EU. In terms of total roads Ireland lags substantially behind other EU member states at just 88 per cent of the EU average[69]. The contribution of the road network to overall competitiveness is obviously determined by its quality rather than by the quantity of roads. In Ireland primary roads constitute only 3 per cent of the total road network with motorways making up only 0.1 per cent of Ireland's total road network. This is just 5 per cent of the EU average level, the lowest ranking in the EU. As can be seen from Figure 5.2 below, expressed per 1000 of the population Ireland's ranking in terms of the stock of roads of motorway quality is, apart from Greece, the worst in the EU.

As illustrated in Figure 5.2 the quality of the Irish road infrastructure is, unsurprisingly, perceived to be relatively low by users,[70] again one of the lowest rankings in the EU. This finding is confirmed by the results of an IBEC Survey[71] carried out to assess the views of Irish enterprises regarding the condition of road

infrastructure. A survey of Irish enterprise commissioned by the Competitiveness Council carried out late last year (which is summarised in Annex 1 of this Report) found that over half of Irish businesses identified the quality of existing roads and transport costs as having a negative effect on their activities. In this survey 43 per cent of business felt that the roads and transport area should be a priority under the next round of structural funds. The next highest suggested priority, education and training was lagging 19 percentage points behind at 22 per cent.

Table S13 **Transport and Communications Costs and Infrastructure**

		1	2	3	4
	Indicator	**Insurance and Freight (debit + credit) as % of Total Trade**	**Letter costs - EU Domestic Tariffs (Irish pence)**	**Rail Infrastructure Indicator**	**Road Infrastructure Indicator**
	Year	1992	18/5/98	1994	1994
Country	Observations	26	15	18	19
Denmark	Value	6.970	39.1	3878	12545
	Rank	24	12	15	10
Ireland	Value	2.025	30.0	287	4336
	Rank	5	4	17	15
Japan	Value	3.563	0	0	0
	Rank	12	0	0	0
Netherlands	Value	5.493	28.2	8771	22653
	Rank	19	3	10	8
New Zealand	Value	4.004	0	0	0
	Rank	15	0	0	0
UK	Value	2.138	30.0	6034	11569
	Rank	6	4	13	11
US	Value	1.942	0	0	0
	Rank	4	0	0	0

5.2.1.1 Future pressure on road infrastructure

Pressure on Ireland's road infrastructure is likely to intensify. DKM Economic Consultants have projected annual average growth in car numbers of 5 per cent until 2011, higher than that the 4 per cent per annum forecast made by National Roads Authority. These projections appear reasonable in the context of trend growth rate estimates for the Irish economy in the region of 4-5 per cent on a GNP basis over that period. Hence, the volume of cars on Irish roads could have more than doubled relative to the 1996 level by the end of the next decade. Car ownership rates in Dublin are expected by the Dublin Transport Office to rise to by over 40 per cent from 317 per 1,000 population in 1997 to 450 per 1,000 population in 2002[72]. DKM project car ownership for Ireland as a whole at 486 per 1,000 population by 2011. There is clearly, scope, in view of the current levels of car ownership in some other countries for these projections to be exceeded. In fact, recent traffic growth has been far more rapid than was anticipated relatively recently. The Dublin Transport Office have estimated that peak hour trip demand last year was about 15 per cent above the level originally estimated in the Dublin Transportation Initiative for the year 2001. In view of the wide gap that has already opened up between the capacity of Ireland's road network and the demands being made upon it, further convergence in car ownership levels in Ireland towards international norms will accentuate severely existing transport bottlenecks and congestion in the economy, acting a serious constraint on the economy's growth. Significant upgrading of the road network is therefore urgently required.

5.2.1.2 What needs to be done?

Although current investment levels are high and increasing, they will not be sufficient to meet projected needs. Investment in the national road network has increased from £232m in 1997 to £263m in 1998 and is projected to increase to £312 million in 1999. However, investment spending of £3,900m in roads has been estimated in order to fill the "infrastructural gap" by 2005[73], and the recent Roads Needs Study prepared for the National Roads Authority estimated that investment of £5,205m will be required over the period to 2019 for identified improvements work. However, as pointed out by the recently published ESRI report on investment priorities[74], although the scale of expenditure at present is broadly consistent with the long-run rate of investment spending on roads suggested by the Road Needs study, the backlog of projects that has built up (estimated at £2,000m) and the rapid pace of recent growth in traffic, requires expenditure of up to £500m per annum over the period 2000-2007 in order to close the existing backlog by 2010. Investment needs of that magnitude, against the backdrop of sharp cutbacks in structural fund transfers, highlights the potential importance of public private partnerships (PPP) in financing Ireland's future investment needs in roads.

Significant upgrading in the economy's road transport infrastructure is, clearly, essential to sustain the competitiveness of the economy but improved traffic management also has an important role to play. Innovative approaches such as have been adopted abroad should be seriously considered, particularly since engineering solutions are unavailable in the short-term and in the longer-term all the indications are that increased road capacity will be accompanied by increased road usage. International experience suggests that increased capacity is unlikely to solve the problem of traffic congestion - private car usage is likely to be highly responsive to the availability of an improved road network.

In its 1998 Summary Statement "The Competitiveness Challenge", the National Competitiveness Council called for priority in the use of the road infrastructures to be given to public transport and business use, with private car usage afforded a lesser priority. Clearly the best way of discouraging private car usage in congested urban centres is the provision of quality public transport. Unfortunately, existing bus and rail services fall far short of this standard. This raises the question of the contribution that deregulation and liberalisation of bus and rail services could make to the provision of better quality and more cost efficient services. This issue is particularly pertinent in the context of ensuring the best return in the future on scarce resources which will continue to be invested in bus and rail services.

The ESRI report on national investment priorities recommended a major increase in investment in inter-urban roads in order to both ease the existing backlog of projects and begin to put the road infrastructure in place which is required to sustain future growth of the economy. The ESRI also recommend a very large allocation of resources to investment in the next National Development Plan, to urban public transport to meet all remaining projects under the Dublin Transportation Initiative, new investment in suburban rail and for ensuring proper access to Dublin airport.

As a first step in the direction of improved urban public transport, suburban rail services in the Eastern region must be significantly improved to take some pressures off the over-burdened road network and make better use of the existing infrastructure. The recently announced £100million investment in DART and suburban railway lines should significantly contribute towards improving this situation.

Finally, the operation of the planning system must be reviewed to expedite the planning process, particularly in relation to key strategic projects in national

transportation infrastructure, for example the Dublin Port Tunnel and the completion of the Motorway Ring for Dublin.

5.2.2 Sea Ports

As can be seen from Table 5.2 below, the total capacity of Ireland's seaports exceeded traffic in 1997 by a wide margin and is projected to be well positioned to meet future capacity to 2007. However, this favourable supply balance is not distributed evenly across all seaports. Some ports, on the basis of current projections, will be subject to stricter capacity constraints.

The majority of Ireland's ports are comparatively small with turnover often less than £1m. Cork, Dublin, the Shannon Estuary and Waterford together accounted for 80.7 per cent of traffic in 1997 and 71.6 per cent of capacity. This situation is projected to hold out to 2007.

Table 5.2 **Ireland's 20 major ports traffic and capacity estimates for tonnage cargoes - 1997 and 2007 ('000 tonnes)**

Port	Traffic 1997	Capacity 1997	Traffic 2007	Capacity 2007
Arklow Jetty	281	1,188	390	1,188
Arklow	217	538	406	538
Bantry	500	3,500	694	9,800
Cork	8,178	12,543	11,259	12,210
Drogheda	826	2,849	871	4,172
Dublin	12,362	24,807	22,243	28,987
Dundalk	218	2,090	211	2,090
Dun Laoghaire	448	2,000	551	2,000
Fenit	33	470	46	470
Foynes	1,200	2,065	2,226	2,575
Galway	535	2,824	678	2,824
Greenore	344	1,531	372	1,531
Kinsale	115	300	159	400
New Ross	1,107	1,678	1,339	1,678
Rosslare	1,116	2,429	2,653	2,429
Shannon Estuary	8,324	19,777	13,436	20,290
Sligo	39	684	18	684
Waterford	1,131	6,531	2,646	6,468
Wicklow	167	753	444	972
Youghal	47	375	65	375

Total	37,188	88,932	60,707	101,681

Source Dept. of the Marine

The likelihood of continued strong growth in trade between Ireland and the rest of the world implies a continuing need for sufficient seaport capacity at competitive prices in order to minimise transportation costs for both Irish exports and imports. According to the Department of the Marine[75] few ports are in a financial position to fund any significant capital development with or without grant assistance. Therefore, new investment should only be undertaken where there exists a clear demand for additional capacity and where any particular project is likely to both generate an appropriate return on the capital invested and reduce transportation costs.

Growth in roll-on, roll-off (Ro-Ro) freight has been strongest, with Dublin Port taking over from Larne and Belfast as the biggest port on the island. The consolidation of Dublin's predominant position will require significant improvements in access to Dublin Port highlighting the importance of the Dublin Port Tunnel project.

Some restructuring of seaports may be required in the future to underpin their commercial viability. This might involve the amalgamation of existing seaports into a smaller number of larger and/or specialised seaports, the establishment of a tier of regional medium-sized ports, privatisation of smaller seaports where the port operation is already concentrated in the activities of a private operator and transferring of very small and non-trading ports to local authorities for alternative types of developments possibly tourist and leisure projects.

5.2.3 Air Services

High quality airports and air services are an important component in the competitiveness of an economy. Frequent and efficient air services are vital for encouraging new investment and sustaining existing investment. The quality of our air transport and services is especially important in Ireland in order to overcome the perception of remoteness and distance from market.

Ease of access to and from markets, visits from overseas corporate headquarters and access to air freight and air courier services are important requirements for modern business. Frequently expressed shortcomings of Irish air services[76] include the limited regularity of flights to Europe and the difficulty of flying in and out of Ireland in one day. The cost of air transport is not always as important as the ease of access to and from key destinations and the frequency of services.

The Forfás Air Services Group has produced a report[77] identifying commercially sustainable ways of improving the quality of eastward air services into and out of Cork and Shannon airports. The report expresses concern that, relative to business needs and relative to the requirements for regional competitiveness, the level of air services is inadequate at both Cork and Shannon airports and this is inhibiting the retention and attraction of FDI and the development of indigenous industry. Air services can play a critical role in the overall effort.

The East region has 2.9 times the level of output (Gross Value Added) of the Southwest but has 42.7 times the level of traffic on scheduled Europe air services (excluding the UK). The East has 5.6 times the gross value added of the Mid-west but Dublin Airport has 47.9 times the Shannon level of European traffic. Analysis carried out in the report concludes that the current gaps are unlikely to be filled by market

forces. However, as air services are important for regional development it recommends that policy interventions are required to support the level of business air services needed to sustain and improve regional competitiveness. The task will be to develop ways of supporting the initial provision of air services to achieve stated regional objectives, while being compatible with EU state aids. This will involve dialogue between business communities, airlines, airports, government and the European Commission. It is also recommended that the issue become an integral part of regional development study.

The report also recommends that a high frequency service from Cork to Dublin would:

- improve the level of services to the business sector
- improve communications between the two main economic centres in the economy
- improve access to Dublin's continental European Services (business cases show a strong commercial and strategic basis for the provision of this service)

5.2.4 Logistics

Logistical systems are facing a transformation as long-established supply chains conventions are revolutionised by technological change. Ireland must, therefore, now aim specifically for a leadership position in skills and expertise across the broad logistical area. This can be best achieved through partnership drawing on the complementary expertise possessed by business and third level research interests.

An indicator of the efficiency of the transport system is the 'lead time', i.e. the time from receipt of an order to delivery of the goods. The shorter the lead time the more efficient the distribution and transport system. A European survey conducted by LCG in 1996 found that on average companies from Denmark and the Netherlands performed best on lead time for electronics, pharmaceuticals and foodstuffs industries, while Irish companies in these industries were found to perform worst. Lead time measures both infrastructure capacity and business enterprises own ability to utilise it. As part of the Benchmarking Study on Logistics undertaken by the European Commission and led by Ireland, a survey was conducted on lead times in various sectors among different European countries. Of the companies represented in the pilot study, those from Ireland appear to have the best performance in the electronics and food sectors, given the reported lead time of 1-10 days and 1-3 days respectively according to the markets served. Spain appears best for the automotive industry with a reported lead time of 2 days. However, these observations raise an important issue in best practice determination- namely the question of the appropriate allowance to be made for the physical distance between firms and their markets.

5.3 Energy

Key Points

- The Electricity market is to be opened by 28 per cent, or for those users of over 4 GW per annum
- Gas prices have improved especially for the larger users
- Electricity prices are on average below that in the EU but higher than in Britain

Indicators in Top Quartile	Rank 98	Rank 99

• Gas prices – industrial rate excl. VAT (41860 GJ/250 days/4000 hours)	6th out of 11	1st out of 11
Indicators in Second Quartile		
Indicators in Third Quartile		
• Industrial electricity prices – 24GWh	9th out of 15	8th out of 15
• Industrial electricity prices –10GWh	10th out of 16	11th out of 16
• Industrial electricity prices –1.25GWh	10th out of 16	10th out of 16
• Gas prices – industrial rate excl. VAT (4186 GJ/200 days)	8th out of 14	7th out of 13
Indicators in Fourth Quartile		
• Heavy fuel oil prices for industry (US$ per toe)	15th out of 23	22nd out of 26
• Automotive diesel oil prices for commercial use (US$ per toe)	6th out of 11	20th out of 25

The level of energy costs is important for competitiveness. Energy is a key input for the internationally traded sector. The price of energy influences the cost of inputs to industry provided by the non traded sector. Energy costs to domestic consumers feed into overall costs through indirect impacts on wage demands and the general price level. For smaller firms in particular, operating on lower profit margins, the cost of energy can be a critical element in determining their profitability. At firm level optimum efficiency in energy usage must remain an important element of overall competitiveness strategy.

The only natural monopoly aspect of the energy market in Ireland is the transmission/ distribution network, yet there are monopolies over downstream supply markets and upstream generating markets. Market liberalisation is essential in order to generate greater price competition. Greater competition in energy markets will lead to lower user costs and greater cost competitiveness. In the energy sector stronger competition and greater transparency in the supply and distribution of energy is now emerging with the advent of EU energy market liberalisation. Where end users are free to choose their provider, the service quality will improve and energy providers will be encouraged in a competitive market to differentiate products and prices. However, in terms of the pace of market deregulation, Ireland together with much of the EU is lagging behind countries such as the UK and the US.

In spring 1999 the electricity supply market in Britain opened fully with the removal of the 100kw threshold which previously applied. All customers, including those in the domestic sector are now able to purchase their electricity from any supplier. In Britain, average prices to domestic customers have fallen by 23 per cent in real terms since 1990 and by between 26 and 30 per cent for business users. This compares to an overall real price reduction in Ireland of 20 per cent over the same period.

The British gas market is one of the most competitive in the OECD. Market liberalisation took place in 1986 under the Gas Act. This Act set up the Office of Gas Supply (Ofgas) an independent regulator for the liberalised gas market. Sixty new

competitors have now entered the market. Over the last five years average prices to industrial and commercial users have fallen by 45 per cent in real terms.

In Ireland the Department of Public Enterprise is currently developing a new regulatory structure for the electricity supply industry in Ireland in order to meet the requirements of the EU Directive on Electricity Regulation.[78] A new Electricity Regulation Bill has been drafted to facilitate this and provides for the establishment of a Regulatory Commission. The bill defines eligible customers who will be able to choose their electricity supplier, as those consuming more than 4GWhrs per annum, approximately the three hundred largest sites in the country. An Electricity Regulatory Commission is also to be established. The Regulatory Commission will license operators, issue generating station authorisations and oversee the provision of information about access to the transmission and distribution system. It will be funded by industry. The Government also intends to bring in legislation to convert the ESB from a statutory body to a public limited company.

Market liberalisation is, therefore, being adopted as the route to cost competitive electricity supply in Ireland. Competition should deliver a more efficient and dynamic industry and above all, a better deal to customers. However, Ireland is choosing, along with most other EU member states, to progress towards a more open market to the minimum extent required under the EU directive. In assessing whether a more rapid pace of market deregulation is desirable a range of issues should be considered:

- The need to ensure the international cost competitiveness of electricity prices in Ireland is paramount particularly in relation to firms/plants in competition with British competitors and counterparts.
- The question of re-balancing the electricity tariffs between domestic and commercial users to reflect the economic cost of electricity provision must be comprehensively evaluated.
- While lower energy costs will reduce the incentive towards greater energy efficiency, investment in new emission efficient generation capacity or the imposition of environmental charges to reduce the growth in carbon dioxide emissions could, in time, result in higher electricity costs. The competitive environment must be such that the enterprise sector does not bear a disproportionate share of the adjustment burden.
- A much greater priority must be given to the use of environmentally-friendly resources in electricity generation, requiring the development of a wider variety of methods of electricity generation and those based on converting non-recoverable and non-recyclable waste.
- Finally, any new industry structure must be designed to ensure adequate investment in electricity generating capacity to meet the needs of a still rapidly growing economy over the next decade.

Table S14 **Energy Costs**

		1	2	3	4	5	6	7
	Indicator	**Automotive Diesel Oil Prices for Commercial Use (US$)**	**Heavy Fuel Oil Prices for Industry US$) toe)**	**Industrial Electricity Prices– 24GWh per annum, VAT excld. (ecu)**	**Industrial Electricity Prices– 10GWh per annum, VAT excld. (ecu)**	**Industrial Electricity Prices– 1.25GWh per annum, VAT excld. (ecu)**	**Gas Prices - Industrial Rate excl. VAT (4186 GJ/200 days)**	**Gas Prices - Industrial Rate excl. VAT (41860 GJ/250 days/ 4000 hours)**
	Year	Q1 1998	Q1 1998	01/01/98	01/01/98	01/01/98	01/01/98	01/01/98
Country	Observations	25	26	15	16	16	13	11

Denmark	Value	683.9	151.9	5.50	5.76	5.93	6.3	4.1
	Rank	17	15	10	6	4	10	7
Ireland	Value	737.8	184.4	5.31	6.18	8.07	5.7	3.0
	Rank	20	22	8	11	10	7	1
Japan	Value	557.4	184.1	0.0	0.0	0.0	0.0	0.0
	Rank	7	21	0	0	0	0	0
Netherlands	Value	708.6	167.3	4.74	5.56	6.85	6.9	4.2
	Rank	18	18	5	4	6	12	8
New Zealand	Value	274.9	196.8	0.00	0.00	0.00	0.00	0.00
	Rank	1	24	0	0	0	0	0
UK	Value	1007.8	140.7	0.0	5.79	7.23	3.9	3.1
	Rank	25	12	0	7	9	1	2
US	Value	0	94.1	0.0130	0.00	0.00	0.00	0.00
	Rank	0	4	4	0	0	0	0

5.3.1 Electricity Prices

Table 5.3 **Electricity tarrifs 1998**

Users	Higher than Britain by (%)	Higher than EU Average by(%)
24GWh	-	-1
10 GWh	6.7	-2.7
1.25 GWh	11.6	3.9

Source: Eurostat, Energy and Industry 1997

Three categories, representative of a broad cross section of commercial users in Ireland, are included in the above table in assessing the level of industrial electricity prices in Ireland relative to Britain and the EU country average. Under this classification system, Ireland is below the EU average for medium and large users and above the EU average for smaller users. However, overall Ireland's electricity prices are in the third quartile for all these indicators and in all instances exceed those in Britain. It should be noted however, that the large population base and economies of scale available to the British electricity distributors tend to reduce the cost of electricity in Britain. Discounts and competitive pricing packages can be negotiated owing to the high degree of competition in the British electricity market.

5.3.2 Gas

An EU Gas Directive adopted in June 1998 requires the opening of the transmission network in Ireland to third party access (TPA) so that eligible customers can buy gas directly from producers or shippers. This must be implemented in Ireland by August 2000. The Government has published draft general directives to Bord Gais setting down conditions under which TPA will operate and consultations between the Department of Public Enterprise, BGE and other interested parties are continuing. The draft directive issued by the Department of Public Enterprise, follows from the 1995 Energy Act which introduced voluntary TPA for sites using over 25 million cubic metres per annum.

Published gas prices for small users in Ireland are at an intermediate level compared to other EU countries. Ireland was ranked 7th out of 13 countries in the EU in terms of gas prices charged to small users at the beginning of 1998. However, published gas prices for large users at the beginning of 1998 were the lowest of 12 EU countries

(the UK was the second lowest). This represents a very substantial improvement in competitiveness from a middle ranking position in the previous year. As 50 per cent of Irish gas purchases came from the UK in 1998, Ireland has benefited from historically low gas prices in the UK wholesale market.

Table 5.4 **Published industrial gas prices in the EU**

	Large Users (41860 GJ)		**Small Users (4186 GJ)**	
No of EU Countries Compared	12	13		
	Ranking	**Ecu/Unit**	**Ranking**	**Ecu/Unit**
Ireland	1	3.0	7	5.7
UK	2	3.1	1	3.9
Germany/Austria	11	5.2	13	7.4

Source: Eurostat Energy and Industry 1998. Units are measured in G/Js of gas consumed

Work by Forfás shows that some firms in the UK have access to gas at lower prices than comparable plants in Ireland. This could result from the greater economies of scale available to distributors of gas in the UK market, as well as competitive pricing in that market. The Gas (Amendment) Bill 1998 is designed to enable Ireland to ratify the competition requirements of the International Energy Charter Treaty and develop an open and competitive market for energy materials and products.

5.4 Building and Construction Costs

Industrial and office occupancy rental costs in Ireland are amongst the highest in Europe. Figures produced by Hamilton Osborne King show that Ireland was ranked 17th and 16th respectively out of 20 countries in Europe in terms of competitiveness in relation to the costs of renting industrial and office buildings in 1997.

Industrial building costs are also very high by European standards. Ireland has dropped in ranking from 7th out of 14 countries in 1995 to 14th out of 20 in 1997.

Office building costs are similarly very high, with costs in Ireland ranked 17th out of 20 European countries in 1997 compared with a ranking of 8th out of 14 countries measured in 1995.

5.5 Water Services

Adequate provision of water and waste water services is vital to industrial and economic development that is environmentally and economically sustainable. The provision of effective water and waste water infrastructure is essential to the functioning of the industrial and services sectors and the ability of these sectors to operate efficiently and competitively. The pace of economic development has created a need for investment in the water services infrastructure to meet the capacity constraints now being experienced due to the following trends:

- *Industrial Development* – increased growth in the economy has greatly increased the demand for water supply, growth has been especially strong in sectors that are relatively heavy water users.
- *Tourism* - The increase in the number of overseas tourists visiting Ireland is also placing pressure on water supply.
- *Housing* - House building is at a record level at present and with housing output increasing by over 80 per cent since 1993 are creating significant additional demand for water and waste water services.
- *Urbanisation* – increasing trend towards urbanisation is placing strain on water infrastructure that was not designed to deal with the level of demand that is currently being experienced.

The cost of carrying out the required improvements to the infrastructure has been estimated at £2.8 billion.[79] A failure to provide the appropriate levels of modern infrastructure could act as a constraint to the development of indigenous industry and the growth of foreign industry already located here, and may in addition, act as a disincentive to foreign firms to locate in this country.

6 Small and Medium Enterprises (SMEs)

Key Points

- Ireland has a below average number of very small enterprises, and the highest employment share in Europe for large enterprises
- SME productivity is below average, but profitability is not
- Value added growth in SMEs has been higher than in large firms and is the highest in Europe
- SME policy should emphasise entrepreneurship to encourage more very small firms
- SME policy should also emphasise networking/cluster development and international linkages

6.1 Introduction

Ireland's growth and exporting performance over the 1990s is primarily attributable to the foreign owned sector of the economy[80]. While the performance of the indigenous sector of the economy has improved, this is against the backdrop of buoyant growth in domestic demand in the economy and a relatively benign external environment. The pivotal role of the indigenous enterprise sector of the economy, in particular SMEs, in enhancing national competitiveness is well known. In the new EMU environment a vibrant, dynamic and flexible SME sector is crucial to competitive success. This chapter draws attention to a range of structural weaknesses affecting the SME sector of the Irish economy. Unless these are alleviated they may act as a significant drag on the competitiveness of the Irish economy in the years ahead.

Small and medium enterprises constitute the majority of enterprises in Ireland and from many points of view are the most important parts of the economy. Traditionally they have been the focus of industrial policy in most countries because, in particular, they are seen as needing support in their early years and because of their potential for job creation. Competitiveness policy embraces SMEs because they can contribute to the flexibility and resilience of the economy, and because they can be a good source of technological innovation. This chapter reviews the position of SMEs in Ireland relative to other European countries, and also considers new policy requirements for the future.

SMEs have many requirements in common with large scale enterprises (LSEs). Both groups need a supportive regulatory environment, properly functioning labour and capital markets, good telecommunications and transport infrastructure (both in terms of cost and quality), availability of skills and a stable macroeconomic framework. For this reason, analysis of the competitiveness factors in other chapters of the report applies to SMEs as well as to LSEs. However, SMEs are more vulnerable than large firms, they usually lack financial and human resources, especially for planning and analysis, and they suffer disproportionately from imperfect information. In some countries (e.g. Denmark and Ireland) the most significant difficulties faced by SMEs are of a national nature, rather than specific to their location in a less favoured rural area[81]. The most important causes of enterprise failure in Ireland, as in almost all other countries, have been cited as bad management[82], such as lack of business policy, inappropriate cost-accounting methods, errors in market forecasts, and inadequate management structure. Financial problems are the second most frequently expressed cause of failure. (In Ireland's case, exchange rate changes and shifts in bank lending policies are mentioned specifically under this heading.)

Financial problems often derive from under-capitalisation: the difficulties for small firms in raising finance are examined in Chapter 4 of this Report dealing with Business

Finance. These difficulties often lead to new businesses starting without adequate resources and thus being vulnerable in several important respects.

Policy therefore needs to address the underlying causes of these deficiencies. Bad management does not mean that the managers are bad, but that they have insufficient training and inadequate tools to do the job. Feasibility studies, business plans, training courses, decision support systems, mentoring, advisory services, information services are in principle available to small firms, and to entrepreneurs even before start-up. But the delivery systems and the form in which these supports are offered have to be co-ordinated and appropriate for the requirements of the small enterprise.

Interaction with government departments, and fulfilling regulatory taxation and reporting requirements is more difficult for small firms, which have fewer resources to shoulder the administrative burden required. For instance, in Canada it is reported that the cost of meeting federal information requirements is 8 per cent of turnover for firms with fewer than five employees, but under 2 per cent for firms with 50-99 employees. In the United States, the clerical cost of regulatory requirements is $2,080 per employee for firms with 1-4 employees, while for firms with 500-999 employees it is only $120 per employee[83]. Developments in electronic government, allowing interaction with taxation and other authorities can help SMEs to meet reporting requirements provided those developments build in consideration of SMEs needs at the outset. At present 62 per cent of small firms in Ireland use e-mail and 61 per cent use the Internet[84]. In principle therefore, much of the infrastructure is already in place for a new approach to the interaction between government and small firms, with significant savings in time and resources.

6.2 SME structure and performance

Table 6.1 **Percentage share of enterprise by size class and country 1996**

Number of Employees	Very Small <10	Small 10-50	Medium 50-249	Large >249	Total
Austria	86.1	10.8	2.4	0.6	100
Belgium	96.5	2.9	0.5	0.2	100
Denmark	92.4	6.3	1.1	0.2	100
Finland	94.4	4.5	0.9	0.2	100
France	92.9	5.8	1.1	0.2	100
Germany	88.1	10.0	1.5	0.4	100
Greece	97.0	2.6	0.4	0.1	100
Ireland	89.8	8.0	1.6	0.6	100
Italy	94.4	5.1	0.5	0.1	100
Luxembourg	84.2	12.4	3.0	0.4	100
Netherlands	90.5	7.7	1.4	0.4	100
Portugal	93.8	5.3	0.9	0.1	100
Spain	94.9	4.4	0.6	0.1	100

Sweden	91.0	7.4	1.3	0.3	100
UK	94.5	4.7	0.7	0.2	100
EU	93.0	5.9	0.9	0.2	100
Norway	92.4	6.4	1.0	0.2	100
Switzerland	85.2	12.1	2.3	0.4	100

Source: The European Observatory for SMEs, Fifth Annual Report 1997

Within SMEs, the following size classes are distinguished in EU classifications[85]:

- very small: less than 10 employees
- small: between 10 and 49 employees
- medium-sized: between 50 and 249

As Table 6.1 shows, SMEs make up almost all the total of enterprises in all European countries, constituting on average 99.8 per cent of all enterprises in the EU. Ireland is only slightly below the average, with 99.4 per cent of enterprises being SMEs. Where Ireland differs significantly from other countries however, is in the number of very small enterprises, where Ireland falls below the EU average, while being above for SMEs overall. Ireland, however, has one of the highest shares of all countries in medium sized enterprises, which are 1.6 per cent of the total.

Table 6.2 **Employment shares by size class and country 1996**

Percentage share of Total Employment	**Very Small <10**	**Small 10-50**	**Medium 50-249**	**Large >249**	**Total**
Austria	25	19	21	35	100
Belgium	48	14	11	27	100
Denmark	30	22	18	30	100
Finland	23	16	17	44	100
France	32	19	15	34	100
Germany	24	20	14	43	100
Greece	47	18	14	21	100
Ireland	18	16	14	51	100
Italy	48	21	11	20	100
Luxembourg	19	26	29	29	100
Netherlands	26	19	15	40	100
Portugal	38	23	18	21	100
Spain	47	19	12	21	100
Sweden	25	17	16	41	100
UK	31	16	12	41	100
EU	33	19	14	34	100

Norway	32	21	18	29	100
Switzerland	23	22	21	33	100

Source: The European Observatory for SMEs, Fifth Annual Report 1997

Table 6.2 shows how much of total employment is accounted for by each of the different categories of enterprise. Here Ireland can be seen to be very different from other countries. Only 18 per cent of employment is accounted for by very small enterprises. This is the lowest figure in Europe, and not much more than half the EU average. Ireland also has a low share for small enterprises, with a value of 16 per cent, compared to 19 per cent for the EU average. Similarly, Ireland has the highest employment share in Europe for large enterprises, with 51 per cent of the total this is well above the EU average of 34 per cent.

Table 6.3 **Relative productivity 1996, relative profitability 1996, and annual average real value added growth 1988-98**

	Relative labour productivity 1996 (% of Average Productivity)		**Relative profitability 1996***		**Annual average real value added growth 1988-98 (%)**	
	SME	**LSE**	**SME**	**LSE**	**SME**	**LSE**
Austria	83	130	0	0	2.1	1.8
Belgium	82	148	0	0	1.6	1.8
Denmark	84	138	-4	5	2.3	2.5
Finland	79	126	-87	69	1.3	2.0
France	79	141	-8	8	1.3	2.0
Germany	103	95	-7	11	2.6	3.2
Greece	78	181	17	-27	2.0	1.8
Ireland	68	131	1	0	8.1	7.5
Italy	79	184	-3	4	1.4	1.9
Luxembourg	98	104	2	-4	4.1	4.1
Netherlands	85	124	-3	3	2.1	2.3
Portugal	69	217	-23	28	3.2	3.0
Spain	66	230	-10	11	1.9	2.3
Sweden	82	126	-5	5	1.3	1.0
UK	87	120	-3	3	1.7	1.7
EU	84	130	-6	7	1.9	2.3
Norway	79	151	-14	18	3.3	3.9
Switzerland	83	135	-2	3	1.4	5.5

Source: The European Observatory for SMEs, Fifth Annual Report 1997

**Difference between value added and labour costs as a percentage of value added; result per size class compared with country average*

Table 6.3 gives the relative labour productivity in each country. For Ireland, SMEs labour productivity is 68 per cent of the average for all enterprises in Ireland. This is a low figure, similar to that for Portugal and Spain. Due to the fact that in general large enterprises are able to derive internal economies of scale, it can be expected that the productivity value for SMEs will be less than that for the economy as a whole. The EU average is 84 per cent. However it is notable that for Germany the value is 103 per cent, reflecting the strength of the Mittelstand.

The figures suggest also that the gap in relative productivity in Ireland between SMEs and LSEs is larger than in many other countries. Austria, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Sweden, the UK, and Switzerland all have smaller gaps between large firms and SMEs in productivity. (This gap is of course partly determined by the relative weights of the two groups in each country).

In terms of profitability, however, the picture is different. Table 6.3 suggests that SMEs approach average profitability in Ireland. The picture is similar in Austria and in Belgium, but in most other countries SMEs tend to have below average profitability and large enterprises above average profitability.

Table 6.3 provides further evidence of the good performance of SMEs in Ireland. The growth of value added in SMEs has averaged 8.1 per cent per annum over the period 1998-98. This is higher than the growth rate for large firms in Ireland (7.5 per cent) and the highest growth rate for any group in any European country. It also comfortably exceeds Ireland's GNP growth over the period. (However, many Irish firms may be coming from a much lower productivity base than in other countries, and thus the good growth figures may be reflecting a catch-up phase for Irish SMEs.)

Much of the growth has been due to the larger firms within the broad category of SMEs. Table 6.4 shows the exports for different sizes of Irish manufacturing companies. The largest contribution to total manufacturing exports is made by the enterprises with more than 249 employees, i.e. large companies according to the EU definition. Within the SME definition, however, it can be seen that enterprises within the range of 100-199 employees are the largest exporters. They export two-thirds of the production of this group, and their exports are less directed to UK markets than those of any other type of SME.

This contrasts with the average European experience, where, in the manufacturing sector, LSEs export about 40 per cent of their output, and SMEs around 23 per cent.[86]

Table 6.4 **Manufacturing local units, 1996 - gross output, percentage of exports classified by nationality of ownership and number of persons engaged**

Number of Engaged Persons	Number of Local Units	Percent of units exporting	Gross Output £'000	Percent of all output exported	Percentage Distribution of Output Exported			
					UK	Other EU	USA	Elsewhere
Under 10	1,515	33	561,415	20	31.0	35.0	24.7	9.3

10 - 19	967	44	1,057,857	25	46.2	39.4	4.3	10.1
20 - 49	1,074	62	3,020,245	34	39.2	44.5	4.9	11.5
50 - 99	501	78	3,869,410	54	31.5	40.3	12.8	15.4
100 - 199	298	89	6,337,930	66	24.8	44.5	7.0	23.7
200 - 249	56	96	1,670,912	62	38.7	30.8	17.4	13.1
250 - 499	113	94	10,366,784	85	22.1	50.2	7.7	19.9
500 and over	52	92	9,010,171	88	24.8	50.2	14.2	10.8
Non-attributable	23	26	401,066	33	10.6	17.4	0.0	72.0
Total	4,599	53	36,295,790	71	25.7	47.1	10.3	16.9

Source: CSO Census of Industrial Production 1996

6.3 Conclusions

The G-8 group of countries (which brings together the world's largest economies) has given increasing emphasis to longer term aspects of economic policy, such as the development of SMEs. They identify SMEs as having a special role as part of a system. In the G-8 view, SMEs can be competitive if:

- They focus their technological competence and marketing knowledge on specific production functions, achieving cost advantages and mastering product innovation.
- They operate in a cooperative network, making sure to find other firms having complementary specialisations, with which they can jointly offer complex products.
- There are positive local externalities, which favour the cohesion of the cluster, and sustain the growth and the innovation capacity of the group.
- There is a strong cluster identity as a productive community, allowing the entry of new firms but avoiding free riding.

In other words SMEs can be competitive if they can realise collectively the advantages of economies of specialisation that they do not have individually because of their small size. In the last ten years two parallel but contrasting phenomena have occurred[87]:

- on the one hand, large firms reorganised their own activities around the world into networks of interconnected activities
- on the other hand, successful small firms aggregated networks around the world, thereby networking local clusters

In principle, SME development is a target of all governments, and measures to assist them cover most stages of the life of SMEs and most aspects of their businesses. However, in view of the rapid growth in globalisation and the need to compete on innovation, quality, and flexibility as much as on costs, a new emphasis on schemes to help firms to co-operate, nationally and internationally, is needed. It has been noted in Canada, for instance, that important differences between SMEs and large firms' business strategies indicate that some specific government interventions might be warranted, since SMEs are less likely to engage in strategic partnerships, joint

ventures, and strategic alliances with other firms. Government can help by facilitating such linkages at both the national and international level.[88]

SME policy in Ireland has two basic (and overlapping) lines of development if it is to reflect successful experience in other countries, and also to meet the challenge of globalisation. The first is that of networking and cluster development. NESC studies have analysed the emergence of clusters in several industries, including the food industry and the music industry.

These studies have found evidence of nascent clusters developing around traditional industries such as dairy processing. The degree to which clusters can be encouraged, however, as a specific objective of policy needs careful examination. Regionalisation policy, for instance, could focus especially on the development of clusters, and could include consideration of appropriate infrastructure, training, R&D and other institutional support, differentiating by region to encourage flexible specialisation and mutually supportive, outward-oriented complexes of firms in specific sectors. These could for instance include craft-based industries, and the activities of the County Enterprise Boards and other small-scale support mechanisms could also be re-directed towards a more targeted approach. This could also help improve Ireland's relatively weak position as regards very small enterprises.

The second main focus of SME development policy should be in the area of the fostering of international linkages. In some cases this will be part of the cluster approach, where small firms could have sub-supply linkages or other co-operation with other EMU area firms in particular. For Ireland, the case for significant emphasis on international linkages for SMEs is a strong one.

Of a number of country groups, the periphery EU group including Ireland, has experienced by far the most substantial increase in international competition and international business contacts in the last five years. Enterprises in this group appear to have increased their international linkages or connectivity in the last five years significantly more than in other groups of countries. However, enterprises in this group experienced most opportunities and threats with the implementation of the Single Market programme.[89] If this is the case, then EMU will further affect SMEs from this point of view.

Ireland's trade openness, which at the moment affects large firms rather than SMEs, nevertheless provides a good basis for expansion. The international linkages programme of Enterprise Ireland, and a number of EU programmes, already provide some of the framework needed. But acceleration of existing trends is required, with a special concentration on trade diversification, partnerships and cluster formation. Measures to expand e-commerce will be especially helpful to SMEs in this regard.

An assessment of the position of SMEs in Ireland relative to other European countries and their main structural weaknesses points to the need for a number of policy initiatives to improve their future performance:

- The operation of the scheme for new entrepreneurs to recover previous PAYE tax paid requires review as to its impact in encouraging entrepreneurship.
- The County Enterprise Boards could be encouraged to seek to build on existing strengths in particular regions in order to encourage growth in enterprise scale.
- Plans for the implementation of the next round of EU structural funds should incorporate explicit targets for SME development as part of regional development strategy, including changes to reflect sectoral specialisation at

county level and institutional development (R&D, marketing and advisory support services) for small firms.

- Infrastructural development (transport, telecommunications) plans should take explicit account of the needs of small firms, especially in the areas of logistics and labour supply.
- Training systems for SMEs in marketing, financial management and other disciplines need to be developed that take account of the wide variety of training requirements in SMEs and the limited availability of key staff to undergo training.
- Distance learning options for SMEs should be examined.
- A special review of education and training in entrepreneurship is needed.
- Programmes on e-commerce should give priority to the SME sector, because the development of the information society will encourage the development of international linkages for these firms and overcome deficiencies related to the small scale of their operations.
- The Business Development Action Programme being prepared by the Department of Enterprise, Trade and Employment in connection with the implementation of the information society should reflect SMEs as a key priority.
- Development of public service access interfaces within the e-government process should have the needs of SMEs in a central position, with a focus on the full range of information that a small firm has to provide.

7 Public Administration

Key Points

- Recent developments in the Irish economy have increased the importance of regulation and competition policy as a policy tool
- The relationship between potential sector specific regulators and the competition authority needs to be defined
- The uptake of ICTs by government is critical both to improve productivity in the public sector and to act as a catalyst for the adoption of ICTs by business and general public
- There is a need to address the accountability of public servants to the general public in association with the reward system

Indicators in Top Quartile	Rank 98	Rank 99
• Government spending as a percentage of GDP	1st out of 15	1st out of 17
• Government Debt as a percentage of GDP	6th out of 15	3rd out of 15
• Tax as a percentage of GDP	3rd out of 15	2nd out of 17
• General Government Balance as a percentage of GDP	2nd out of 15	2nd out of 17

Indicators in Second Quartile	
• Share of government in total employment	11th out of 24

Indicators in Third Quartile

Indicators in Fourth Quartile

7.1 Public Sector Reform

The conduct of public administration influences international competitiveness through its impact on the business environment in which the enterprise sector of the economy operates. The potential benefits of public sector reform through, for example, lowering business costs streamlining the government sector in the economy, (and hence the overall tax burden), and improving the quality and efficiency of public administration are well established and have been demonstrated internationally.

The public sector reform agenda in Ireland has centred on the need to deliver public services in a more efficient and responsive fashion, most recently under the Strategic Management Initiative (SMI) which was launched in 1994. The Delivering Better Government (DBG) progamme established in 1996 as part of the SMI process outlines a framework of change in the Irish civil service embracing a series of interacting, independent initiatives, which are collectively aimed at improving the management of the public service in Ireland.

The key elements of DBG comprise:

- delivery of a quality customer service

- regulatory reform
- delegating authority and accountability
- a new approach to human resource management
- ensuring value for money
- using IT to support change in the public sector

Working groups composed of representatives drawn from across the civil service were established, in order to design strategies for each of these priority areas. An Implementation Group was established in 1997 to co-ordinate the implementation of the strategies. This group reports to an all party Oireachtas Committee on SMI which monitors progress in public sector reform. The most recent report of the Implementation Group, which was considered by the Government in July 1998, reviewed progress on the implementation of DBG and set out the next steps in the implementation process.

The Public Service Management Act, which commenced on 1 September 1997, is an important new departure in the management of the civil service. The Act creates the legal basis for new management and accountability structures in the civil service and therefore underpins the programme of change which is now underway.

This Chapter considers two of the most important issues in public administration at the present time: better delivery of public services and regulatory reform. The final section of the Chapter sketches out Ireland's performance in relation to the main fiscal indicators. Further work is required in order to develop appropriate performance measures for the public service which can be benchmarked to those for other countries.

7.2 Delivery of a quality customer service

A redefinition of the relationship between public servants and the users of public services is integral to successful reform of the public sector. Efficient delivery of a quality public service not only requires investment in improved delivery systems and staff training but also a large degree of organisational change. The public's access to information must be improved and the manner in which public bodies conduct their business must be made more transparent. The Freedom of Information Act (1997) has already made a major contribution, in Ireland, in this regard.

7.2.1 Improving citizen access to public services

Service charters

A charter informs the general public of their rights as to the type and quality of service that they can expect and are entitled to from the public service. Service charters also often include minimum performance standards and benchmarking of service quality. There is clear scope for wider usage of service charters right across the public service in Ireland.

One-stop shops

In today's complex advanced economy state intervention in any particular functional area can often be undertaken by several different agencies, which for the consumer of the range of services can be both costly, confusing and inefficient. Clearly, in such circumstances a higher degree of inter-agency co-ordination is desirable in order to assure integrated provision of government services. A so-called "one-stop shop"

arrangement can be a cost effective mechanism for achieving this outcome, providing, for example, local and central government services at a single contact point.

7.2.2 Greater accountability

The question of improved accountability by public service managers for their decisions and for the quality of services which they provide is inextricably linked to the conservative culture of the public service, its hierarchical grade structure and its rigid pay structure, all of which can be expected to change only slowly. In other countries straightforward mechanisms have been developed to increase accountability among public service managers along the lines of strategic and operational plans, explicit performance targets, stronger reporting requirements and more flexible reward structures. In general, flatter less hierarchical (vertical) organisation structures are likely to boost accountability and bring administrative decision making closer to the public at large. Greater co-ordination between service providers leading to better integration of state services can also make a significant contribution to the quality of public administration in the economy (greater horizontal complexity), but this in turn requires more innovative behaviour and flexibility between service providers. It is expected that the Public Service Management Act will provide greater accountability and co-ordination in the Irish civil service in the future.

7.2.3 Electronic (e-)Government

The uptake of new information and communication technologies by government is critical for a number of reasons:

- To enhance the internal efficiency and productivity of the public sector and the delivery of core public services. Information and communication technologies (ICTs) can provide an effective and efficient interface between the general public and providers of public services
- To improve access to information by the general public. Governments can play a leadership role in stimulating public demand for online services and encouraging adaptation to the information society. Government can also act as a catalyst in promoting and encouraging the deployment of ICTs by business and to stimulate new demand for ICTs.

ICTs can play an important role in improving public access to information by the public. However, they should be seen as complementary to existing information systems so as to ensure that information remains accessible to all.

Some factors that need to be taken into consideration in the adoption of ICTs by the public sector include:

- The implementation of ICTs needs to be met with parallel organisational changes in order to fully exploit the benefits of these applications. Also e-government requires a high degree of co-ordination between different government bodies.
- The implementation of new ICTs will give rise to significant costs in the short-run, which should be reflected in improved quality of public services. In the longer-term wider adoption of ICTs should yield significant budgetary savings.
- A high degree of commitment from top management in the public service to the implementation of ICT's is essential, including adequate resourcing of IT.

The recent Action Plan for the Information Society in Ireland[90] contains detailed recommendations designed to promote the development of e-government in Ireland. The Action Plan maps out the following stages for the adoption of ICTs by the public sector. The rapid implementation of these recommendations in tandem with the upgrading of the telecommunications infrastructure, as detailed in Chapter 5, can help Ireland achieve a leadership position in e-government, a prerequisite to success in e-commerce. Some of the recommendations are as follows:

- All Departments and agencies to maintain web-sites that provide up to date information, forms and leaflets. New material will continue to be made available by traditional means.
- Service wide guidelines and practices will be adopted regarding content format and presentation of the web-sites. An Inter-Departmental group will be established to deal with these issues.
- Quality standards for the public service web-sites will be incorporated into the Quality Customer Service component of the SMI, with each department carrying out an audit that will be included in their annual report.
- Databases that present public service information electronically in a client-centred manner will be established. One for citizens and another for business under the control of the Department of Social, Community and Family Affairs and the Department of Enterprise, Trade and Employment respectively. Both databases will be operational by the end of 1999.
- The Department of Finance will prepare proposals for educational and development initiatives with regard to training and development with a view to implementation during 1999.
- All new ICT-based service delivery projects will comply with the principles to be developed under the action plan concerning electronic delivery, electronic payment, electronic exchange methods, where data is communicated between Departments, and the use of digital certificate concepts.
- Several flagship pilot projects aimed at establishing reliable electronic access interfaces will be developed during 1999 by three bodies, the Department of Social, Community and Family Affairs, the Department of Enterprise, Trade and Employment and by the Land Registry. Progress reports will be made quarterly.
- Several other pilot projects common across Departments will be developed including a secure intranet, provision of public procurement information electronically and further development of a virtual private telephone network.
- Electronic payment systems will be developed further within the public service and clients will be encouraged to take up electronic payment options.
- Other Departments are also preparing pilot projects including the Revenue Commissioners, the Department of Health and Children, the Department of Agriculture and Food, the Department of Environment and Local Government and the Central Statistics Office.

7.3 Regulatory Reform

One of the key initiatives to be pursued as part of the SMI was that of regulatory reform. Regulations fall into three categories:

- economic regulations - intervene directly in market decisions such as pricing, competition, market entry or exit
- social regulations - protect public interests such as health, safety, the environment, and social cohesion
- administrative regulations or ‘red tape’

Regulatory reform refers to changes that improve regulatory quality, that is, enhance the performance, cost-effectiveness, or legal quality of regulations and related government formalities. Reform can involve revision of a single regulation, the scrapping and rebuilding of an entire regulatory regime and its institutions, improvement of the process of making regulations and managing reform. Deregulation, a subset of regulatory reform, refers to complete or partial elimination of regulation in a sector to improve economic performance.[91]

The regulatory system can impact considerably on the competitiveness of Irish firms. An inefficient regulatory regime can lead to:

- a misallocation of resources among enterprises (over-investment in capital or excess deployment of labour)
- wages being higher that they would normally be under competitive conditions
- high administrative costs on government, businesses and consumers as they have to comply with various rules
- low productivity and a lack of product innovation

The overriding need to maintain the international competitiveness of the Irish economy by remaining broadly in step with the pace of structural reform in our competitors has pushed the issue of regulatory reform closer to the top of the competitiveness agenda in Ireland. Regulatory reform can minimise distortions to economic behaviour and introduce more vigorous competition. As a result, firms have more incentive to innovate, which in turn leads to greater productivity and lower prices for consumers. Regulatory reform ultimately has the potential to lead to a higher level of GNP and living standards in the economy.

The interaction of increased competition, greater deregulation and improved regulatory quality has the potential to act as a highly effective policy mix for enhancing the dynamism of the economy while protecting public interest. Policy responsiveness and regulatory efficiency are likely to be relatively more important for a small, highly open economy such as Ireland, in respect of which flexibility and adjustment capacity are paramount. Accelerated regulatory reform in Ireland is likely, therefore, to yield significant benefits in terms of overall economic performance.

Effective regulatory reform necessitates action across the three areas of economic, social and administrative regulation. The focus of the reform process should not be exclusively on deregulation, but also on the need for quality social regulation. This suggests the need for more regulation in some areas and less in others. An appropriate rule of thumb would be high quality social regulation and low level economic regulation. Reduced economic intervention often increases the need for increased social protection.

While the emphasis of regulatory reform in Ireland has focused on economic regulation and sector specific deregulation, with a view to improving the conditions in which the enterprise sector competes, countries in more advanced stages of implementing regulatory reform are concentrating more on the social aspect to regulation, with a view to improving conditions for citizens. The US for example, focuses on improving the quality of social regulation as the main objective of regulatory reform. This is rational, since estimates of regulatory costs and benefits suggest that social regulation impose direct costs three to four times higher than costs of economic regulations and that social regulations, if well designed, can deliver greater benefits to society at large.[92]

The OECD have suggested the following guidelines in considering the design of a programme of regulatory reform:[93]

- So-called 'regulation inflation' - rising compliance costs and burdensome administrative formalities that could inhibit market activities, should be discouraged. In particular, care should be taken not to overload SMEs. Streamlining and reducing these burdens can free up scarce human and financial resources for more productive activities. Administrative burdens could be reduced by more efficient use of ICTs.
- State intervention in the regulatory sphere should be limited strictly to situations where there is strong evidence that such intervention is warranted, is likely to be effective and where possible market based alternatives are unlikely to work. The gap between market needs and regulatory rigidities will be widened by excessive intervention. In order to support the development of a more competitive and flexible economy the role of the state should be minimised consistent with effective regulatory practice.
- Regulation should in all cases be clear, transparent and accessible to users. Transparency reforms to improve the openness and accessibility of regulatory decisions and enhance public participation in the regulatory process will, in turn, strengthen accountability and regulation quality.
- Organisational structures, policy and legislative frameworks required to sustain effective regulatory reform should be strengthened. Experience from other countries illustrates a common mistake in the reform process is failing to build new institutions under the new regulatory regime. Flexible institutions are essential that can adapt and evolve as the market develops and hence regulatory requirements change.
- A broader view of regulatory reform, including not only deregulation but also the need both to change the incentives in public sector cultures and move the state away from economic management is essential to adapt regulation to the demands of a modern advanced economy.
- The objectives of regulation should always be clearly defined and spillover effects affecting competitiveness and investment should be monitored closely.
- Administrators often face risks in using relatively untried tools and there are typically strong disincentives for public servants to be innovative. Innovation and policy learning must be supported if alternatives to traditional regulation are to be successfully used.
- The responsiveness of the regulatory system should be improved by continuing to streamline regulatory processes.

7.3.1 Relationship between Regulators and Competition Authority[94]

Important developments in Irish regulation and competition policy are occurring over the next few years with inter-alia, the implementation of full-scale competition in the telecoms market and the introduction of varying degrees of competition in the electricity and gas market. Regulatory reform in other countries has led to a debate concerning the appropriate division of labour between competition agencies and regulators in those sectors being opened up to competition.

Several approaches to this issue have been suggested:

- combine technical and economic regulation[95] in a sector specific regulator and leave competition law enforcement purely in the hands of the competition authorities
- combine technical and economic regulation in a sector specific regulator and give it some or all competition law enforcement functions
- organise technical regulation as a stand-alone function for the sector specific regulator and include economic regulation within the competition agency
- rely solely on competition law enforced by the competition authority

There are many reasons why it might be more appropriate to allocate responsibility to the competition authority rather than to a sector specific regulator, in particular, the avoidance of so-called regulatory capture. Regulatory capture can occur if over time regulators tend to identify with the regulated industry and ultimately defend rather than police its interests leading to excessive regulation and weak competition. Sector specific regulators are clearly more susceptible to regulatory capture than are competition agencies. In New Zealand, there is no sector specific regulation and a total dependence on competition law. In the UK in contrast, a sector specific regulatory approach has been adopted. Empirical work comparing New Zealand to the UK concluded "the absence of both regulatory barriers and concomitant price regulation may have stimulated [in New Zealand] productivity growth over that of a more regulated industry"[96]

Another reason for locating the economic regulation function within the competition authority is that it avoids judicial uncertainty that might occur within the sector specific regulator and ensures that there is greater uniformity in the regulatory environment in the economy. However, under such an approach precedents may be established in competition law in particular industries, that are not universally applicable and may be inappropriate for other sectors. Moreover, the role of price setting tends to run counter to a competition authority's natural tendency to allow prices be determined by market forces and the undertaking of economic regulation by the competition agency may damage its impartial image.

It has been argued that competition law can be slow and unresponsive and as such may impose high costs on society. Competition policy is chiefly ex-post whereas regulation is chiefly ex-ante and continuous. Unlike a regulatory body which would be involved in monitoring firms on an ongoing basis, competition agencies offices usually only begin to investigate possible anti-competitive behaviour after it is alleged to have occurred. The competition agency, focused on addressing breaches of competition law, may be insufficiently pro-active to deal with the longer-term and widespread advantages accruing to incumbents in particular markets.

The competition authorities would, however, appear to have an advantage over regulators when it comes to enforcing prohibitions on anti-competitive behaviour. Such agencies should have exclusive jurisdiction in those domains or at least retain concurrent powers with the regulator. By the same token, technical regulation does not match particularly well with the kind of work competition authorities typically do and is more appropriately designated to a sector-specific regulator. Separating competition law enforcement from regulation means sacrificing certain synergies, but it also ensures that both policies are administered by agencies which thoroughly understand them. However, in sectors expected to evolve relatively quickly to a workable competitive environment, consideration should be given to combining economic regulation with competition law enforcement within the competition authority rather than having a sector specific regulator.

Moreover, economic regulation should be subject to so-called "sun-setting" and should not be renewed unless the competition authority believes that it is justified by continued market power. Sectoral regulation should be formulated in such a way that it is not required beyond the time frame required to establish a robust competitive environment, allowing competition law to deal with market abuses arising over time.

Regulation is not a substitute for, and will not deliver the benefits that can accrue from competition. In fact some forms of regulation may even hinder the development of competition[97] encouraging, or even requiring conduct or conditions that otherwise would represent violations of competition law.

The relationship between sector specific regulators and the competition authority does need to be examined and closer co-operation between the two should be encouraged. In the UK a co-ordinating group has been established to liase with the sector regulators and the competition agencies.

7.4 Public Administration Indicators

In 1998 Ireland ranked 3rd of 15 countries in terms of general government debt (5th in 1997) and 2nd for the general government balance (as a percentage of GDP in both cases) and continues to be ranked first in the EU for both the share of public expenditure and receipts in the economy.

Table S18 **Public Adminstration**

		1	2	3	4	5
	Indicator	**General government consolidated gross debt as a percentage of GDP**	**Net lending (+) borrowing (-) of general government as a percentage of GDP**	**Government spending as a percentage of GDP**	**Share of general government in total employment**	**Tax as a percentage of GDPt**
	Year	1998e	1998e	1998e	1996	1998e
Country	Observations	15	17	17	24	17
Denmark	Value	15.8	1.2	57.6	32.4	58.8
	Rank	7	4	16	23	16
Ireland	Value	52.0	2.0	31.6	17.7	33.7
	Rank	3	2	1	11	2
Japan	Value	0.0	-5.5	38.6	8.3	33.0
	Rank	0	17	0	1	1
Netherlands	Value	68.6	-1.4	48.3	10.8	47.0
	Rank	11	9	10	4	10
New Zealand	Value	0	0	0.00	14.7	0.00
	Rank	0	0	0	6	0
UK	Value	51.5	-0.1	40.6	19.6	40.5
	Rank	2	7	4	16	7
US	Value	0.0	1.4	35.8	15.5	37.3
	Rank	0	3	2	8	3

Public sector employment in Ireland currently represents about 16 per cent of total employment in the economy.

7.5 Conclusions

The quality and efficiency of public administration impacts directly on the environment in which businesses operate and hence on the competitiveness of the economy as a whole. Regulatory reform is central to the process of reshaping the public sector and Ireland's EMU membership greatly increases its importance as a policy tool. The objective of any programme of regulatory reform should include enhanced international competitiveness and flexibility in the economy leading to a stronger adjustment capacity in responding to economic shocks. Regulatory reform has the potential to increase productivity, lower prices, stimulate innovation and ultimately raise GNP. Government must however create the right administrative infrastructure for promoting regulatory reform and new flexible institutions must be

designed, to adjust quickly and flexibly to market developments. The proper balance must be established between high quality social regulation (e.g. quality and safety) and low level economic regulation (e.g. quantity) as well as between the regulatory and ownership role of Government Departments. In the future the interaction between competition, deregulation and regulatory quality will be central to the conduct of policy. The exact nature of the relationship between the Competition Authority and sector specific regulators will be pivotal to the success of regulation and competition policy.

ICTs will also play an important role in the necessary restructuring of the public sector. The faster uptake of ICTs by Government is crucial to enhancing public sector productivity and will act as a catalyst for the adoption of ICTs by business and the general public. The implementation of ICTs should be coupled with new organisational arrangements within the public sector in order to derive maximum benefit for the public from their introduction. There is also a clear need to address the accountability of public servants in association with the development of more flexible and innovative reward systems. Finally, the public sector must continue to re-define itself in terms of its quality of service to the public.

Annex 1

Enterprise Survey on National Competitiveness

1 Introduction

This management summary report presents the findings from a survey of Irish businesses on issues relating to national competitiveness as they impact on enterprise. The survey was conducted on behalf of Forfás (in their capacity as secretariat to the National Competitiveness Council) by Irish Marketing Surveys in November/December 1998.

The objectives of the survey were two-fold:

- To measure opinions and perceptions amongst the Irish business community as to the main issues which they see touching upon their competitiveness in the present trading climate and for the immediate future.
- To establish prevailing opinions amongst Irish enterprises on priorities for expenditure under the next round of structural funds.

The survey was conducted by means of telephone interviewing at senior management level across a representative sample of Irish businesses. The sample comprised seven industry sectors (including services), and was designed to be representative of small, medium and large enterprises.

Details of the survey can be summarised as follows:

Survey Details		
Sample Type	All Senior Directors/Managers	
Sample Size	Unweighted	703
	Weighted	68.575
Fieldwork	3rd November - 3rd December 1998	

A breakdown of the sample is set out below; data was weighted according to universal sector figures, based in turn on the latest CSO figures provided by Bill Moss & Associates.

Breakdown of survey sample Details		
Sectors	**Unweighted Sample**	**Universe Size**
• Construction/mining utilities	98	12,000
• Manufacturing:		
o Food	91	2,750
o Textiles clothing, footwear	86	1,800
o Metal/Engineering/Chemicals	112	6,225
o Other	107	8,300
• Distribution (Retail/Wholesale)	102	31,000

• Other Services	107	6,500
• **Total**	**703**	**68,575**

Interviewing was conducted by interviewers who are fully qualified in the conduct of business to business interviewing. Quality control checks of the highest standard were imposed at all levels of the research.

2 Impact of Government Policy on Business

In order to gain an understanding of how the Irish business community feels government policy and the basic environment in Ireland affects how they conduct their business affairs, respondents were asked to consider a number of broad areas which are affected by government policy, as in the chart listed below.

Specifically, respondents were asked to indicate the extent to which they felt each of these areas impacted on their business, and whether this impact was positive, neutral or negative.

At least two in every five respondents feel that government policies in each of these areas have a high impact on their business operations and growth. An average of one in four feel impact is low.

Impact of government policy on business areas

The effect of government policy on the 'taxation environment' is deemed to have the highest impact on business, mentioned by 47% of respondents. The impact of taxation policy is perceived to be highest in the Services (57%) and Distribution Sector (54%), also for younger companies of 10 years or less (57%) and companies based in Connaught/Ulster (63%). 'Availability of information', 'education/training' and 'telecommunications' follow in turn as other areas of high impact, all mentioned by over two in five respondents. In contrast, 'direct state support' to new business is deemed to have the lowest impact on the business community, mentioned by 28% overall, and by over a third (36%) of 'Textiles' businesses.

Opinion is a little more divided when it comes to assessing whether the impact of government policy is positive or negative. The impact of government policy in the area of 'education and training' is deemed to be most positive, mentioned in this light by over two in five respondents (43%) overall, and increasing to almost half of those in the "Food" (49%) and "Metals/Engineering/Chemical" (48%) sectors. Respondents are also favourably disposed towards the impact of government policy on "labour issues" and "private sector support" both mentioned in a positive light by 37% of respondents. Those in the "Textiles" sector are more likely than average to perceive policy on "labour issues" as having a positive impact (44%) as indeed are those involved in "Exports" (44%).

Effect of government policy on business areas

To counter balance these positive perceptions, a notable minority sector (at least one in every four) of the business community perceive government policies as having a negative impact on their operations. This is particularly so in relation to "environmental regulations", mentioned by a third of all businesses. Those in the Services (36%) and Distribution (34%) sectors are most likely to feel the negative impact of environmental policy.

3 Impact of Policy on Specific Areas

Within each of the broader areas assessed at the outset, the survey focused in turn on the specific aspects likely to be affected by government policy. The same rating scales were used in each case.

3.1 Education & Training

Within the broad area of "education and training", government policy on "in-company training" mentioned by approaching half of respondents (48%) is perceived to have the highest impact on their business.

Effect of government policy on specific areas of education / training

It is also encouraging to see that over half of businesses (53%) view this aspect in a positive light. The perceived impact of policy on education, from primary through to third level, is also positive in the main. Reactions in relation to "apprenticeships" and "government training schemes" are more muted, with government policy in these areas thought to have a generally lower impact, and a more neutral to negative effect on businesses.

3.2 Labour Market

Of greatest concern are people's reactions to the issues of *"availability of labour"* and *"labour costs/wages"*. Seven in ten respondents feel the impact of government policy on *"costs/wages"* is high, while two thirds mention *"availability of labour"* in this context. However, there is a strong tendency to be critical on these issues. Three in five respondents describe the impact of *"availability"* as negative, while half of Irish businesses adopt a similar stance regarding *"labour costs/wages"*.

Effect of government policy on specific areas

The issue of *"childcare facilities"*, although very topical with the media at present, is deemed to be an area of low impact for most businesses (63% of respondents). Commenting on the effect of this on their own business operation over half of respondents feel it is neutral; however, one in three businesses feel it is negative.

3.3 Direct State Support to Business

Relative to other areas under review *"Direct state support"* is deemed to have the lowest level of impact in overall terms. This perception of lower impact is reflected across the specific elements of direct state support, particularly in relation to

"research and development", *"business support from County Enterprise Boards"*, and *"trade support from Enterprise Ireland"* – in each case government policy is perceived as having a low impact by around half of all respondents. Similar proportions in each case describe the effect of these issues on their own business as neutral. The one exception to this trend is the perceived impact of government policy regarding *"tax incentives"*, where impact is rated as high by almost half of all respondents, and there is a generally more optimistic outlook regarding the effect of this impact, with one in three rating it as positive.

Impact of direct state support on specific areas

3.4 Private Sector Support

Businesses are most likely to perceive the effect of government policy in this area as being neutral. Government policy in relation to the *"availability of venture capital"* is most likely to be deemed of low impact (53%). Not surprisingly, policy for *"lending terms and conditions"*, is perceived to have the highest impact, although, in balance, the effect of this policy is seen as neutral.

3.5 Environmental Regulations

Opinion is fairly evenly divided when it comes to rating the impact on their business of *"administration requirements"* and *"cost of compliance"*. Overall, broadly similar proportions of businesses fall into the high, medium and low impact categories in each case. When it comes to rating the effect of these issues, reactions tend to be more neutral, described in these terms by over half of all businesses.

Impact of environmental regulations on specific areas

3.6 Other Government Regulations

When the same areas are considered, i.e. *"administration requirements"* and *"cost of compliance"* in the context of other government regulations such as health and safety or working hours, over a third (37%) feel the impact of policy is high in each case, a similar proportion deem the impact to be medium. The actual effect on their business is seen to be positive by one in every four respondents, while approaching half see it as being more neutral.

3.7 Transport Infrastructure & Services

Within the broad area of infrastructural policy, perceptions of the impact of government intervention are quite diverse. Impact of policy is deemed highest in relation to *"transport costs"* (56%) and the *"quality of existing roads"* (49%); however, in each case over half of respondents feel the effect of this policy is negative. In contrast, areas of lower impact are government policies on availability of *"trained logistics personnel"* (49%), *"availability of ICT infrastructure"* (45%), "air services" (41%) and *"road access to ports"* (45%). The effect of policy in each of these areas is most likely to be seen as neutral.

Effect of transport infrastructure / services on specific areas

3.8 Telecommunications

Naturally, given the huge growth within the telecommunications sector in recent years, Irish businesses are more likely to agree that government policy in this area has a high impact on their current operations. Impact on *"quality of existing networks"* and *"costs"* is seen as high by three in every five respondents. The effect of policy on *"existing networks"* is deemed to be positive by three in five respondents (60%), whereas impact of policy on "costs" is more likely to be perceived as negative (46%).

Effect of telecommunications on specific areas

Respondents are a little undecided with regard to the impact of policy on *"availability of broad band connections"*. Indeed, more than one in ten respondents are unable to make a judgement at all. Only just over a quarter perceive the impact as being high. In terms of the perceived effect, the highest proportion fall into the neutral category.

3.9 Availability of Information

Although over two in every five respondents deem government policy in this overall area to have a high impact on their business, this perception dwindles a little when some of the individual aspects of policy on information availability are considered. In most specific areas the impact of policy is more likely to be seen as medium/low. This is exemplified in the case of policy on *"information on local authority regulations/policies*", where approaching half deem impact to be low (45%), a third deem impact to be medium (33%) with the balance (21%) perceiving it to be high. In line with these opinions of moderate to low impact respondents tend to see the effects of each issue as neutral rather than positive or negative in relation to their own business operations.

Effect of availability of information on specific areas

4 Priority for EU Structural Funds

On a different note, this sample of the Irish business community was asked to consider the most recent round of EU funding and to indicate what areas they feel have benefited mostly from the funds. *"roads/transport"* mentioned by eight in ten (79%) respondents are deemed to have benefited most. This view was consistent across all industry sectors, peaking amongst those in the Construction/Mining sector (85%).

Areas benefited mostly in recent EU funding by Sector

Base: All Respondents

	Overall	Construction / Mining	Food	Textiles	Metal/Eng. / & Chemicals	Other Manuf.	Distribution	Other Services

	%	%	%	%	%	%	%	%
Road/transport	**79**	85	76	80	71	80	79	73
Agriculture	**50**	37	52	44	44	50	56	52
Education/training	**27**	20	18	29	28	23	30	26
Other infrastructure (e.g telecommunications/energy)	**25**	24	24	36	22	24	25	29
Enterprise grants/loans	**16**	14	24	28	13	21	14	20
Research & technological development	**13**	11	14	19	13	10	15	14
Environmental	**12**	11	12	19	12	17	11	12

Agriculture is identified as the other chief beneficiary of recent EU funding mentioned by half of all businesses. Those in the distribution sector are more likely than average to mention agriculture. *"education/training"* and *"other infrastructure"* were mentioned to a somewhat lesser extent, by one in four respondents in each case.

Thinking ahead, respondents were in turn asked to consider the next round of EU structural funds (2000 – 2006 period) and to indicate which area they feel should be the most important focus. Although *"roads/transport"* and *"agriculture"* would have enjoyed an even spread of funds in the last round, the Irish business community feels that greater focus should go to *"roads/transport"* in the next round. Over two in five respondents mention *"roads/transport"* in this regard, whereas only 6% feel that *"agriculture"* warrants the EU funding spotlight.

Priorities for next round of EU funding by Sector

Base: All Respondents

	Overall	Construction / Mining	Food	Textiles	Metal / Eng. / & Chemicals	Other Manuf.	Distribution	Other Services
	%	%	%	%	%	%	%	%
Road/transport	**43**	47	36	33	39	39	45	40
Education/training	**22**	17	20	23	25	21	23	25
Other infrastructure	**8**	7	2	7	8	7	8	13
Enterprise grants/loans	**7**	7	12	13	8	13	4	4
Research & technological development	**6**	4	10	12	10	13	4	6
Agriculture	**6**	5	7	5	2	-	10	1
Environmental	**5**	7	7	7	5	4	5	7

It is interesting to see *"education/training"* receiving a relativity high level of mention (22%), very much in line with the allocation it was awarded in the last round (20%). Across the industry sectors, respondents in the Metal/Engineering/Chemicals and Services sectors are keenest to see funds channelled in this direction (25%) in each case. Those in foreign owned companies also attach a high priority to *"education/training"* (38%).

5 Use of IT Applications

Exposure of the Irish business community to different IT applications is somewhat varied. Whilst very high for E-mail and Internet, exposure is minimal for more specialised applications such as the Extranet.

Three in four businesses currently avail of E-mail. Use of E-mail is universal among foreign owned companies (98%); levels of use are also linked to company size, highest for larger companies (50+ employees) at 89%. A similar pattern is in evidence for Internet usage. Overall, seven in ten companies currently avail of it, this increases to over nine in ten foreign owned companies, and eight in ten large companies.

IT applications current avail of by Sector

Base: All Respondents

		Company Size			Orientation			Ownership		
	Overall	**Small (20/less)**	**Medium (20=49)**	**Large (50+)**	**Domestic Only**	**Domestic % Export**	**Export Only**	**Irish Private**	**Foreign**	**Other (Pic/State)**
	%	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
E-mail	**74**	62	78	89	74	79	85	71	98	87
Internet	**70**	61	72	84	70	75	81	67	96	79
Computer Aided Design (CAD)	**44**	39	43	53	43	47	50	44	51	32
Management/Enterprise Resource Planning (MRP/ERP)	**36**	30	39	41	34	42	44	33	59	47
EDI (Electronic Data Interchange)	**27**	18	30	40	26	30	39	23	53	55
Intranet	**17**	12	17	25	15	17	23	13	40	34
Video Conferencing	**10**	7	8	16	9	16	20	6	44	6
Extranet	**8**	7	6	10	7	8	9	6	12	35
Other	**23**	20	25	26	23	24	20	22	28	22

Other applications enjoying relatively high usage include:

- Computer Aided Design (44%), highest in the metal/engineering/chemical sector (65%).
- MRP/ERP (Management/Enterprise Resource Planning) (36%), also highest in the Metal/Engineering/Chemical sector (43%)
- EDI (Electronic Data Interchange) (27%), highest in the Services sector (41%)

Use of Extranets is somewhat limited at present, currently availed of by only one in ten companies.

Across all these IT applications usage is well above average among foreign owned companies, export orientated companies and larger sized businesses. Interestingly, younger companies (10 years or less in business) enjoy higher levels of use across the range of applications in question. Although these characteristics are not

necessarily interlinked they give a composite picture of the more innovative types of companies currently availing of IT.

6 Company Investment

Respondents were asked to indicate what percentage of their current year's expenditure the following areas accounted for:

- IT equipment
- Research and development and
- Training.

6.1 IT Equipment

Nine in ten businesses report some investment in IT equipment in the current year, with two-thirds (66%) of businesses reporting an investment of 10% or less. The mean average expenditure for this aspect of Irish business is 8.3%. Expenditure in this area is above average for the Service and Distribution sectors, as illustrated below, foreign owned companies (10.0%) and, naturally, for those whose companies avail of IT (9.0%).

Investment expenditure by Sector (% of current years expenditure)

Base: All Respondents

	Overall Average	Construction/ Mining	Food	Textiles	Metal/Eng./ & Chemicals	Other Manuf.	Distribution	Other Services
	%	%	%	%	%	%	%	%
IT Equipment	**8.3**	6.7	4.1	6.4	6.7	5.9	9.4	12.6
Research & Development	**4.5**	4.8	4.6	8.2	7.7	7.6	1.8	8.6
Training	**5.6**	5.1	4.1	7.6	6.1	5.3	5.6	6.8

6.2 Research & Development

Only three in every five companies have invested in research and development in their current year's expenditure, with two in five (44%) spending 10% or less. The mean average for research and development is 4.5% of the current year's expenditure. Expenditure on research and development is highest in the Services and Textiles sectors.

6.3 Training

Reported expenditure on training is widespread, with nine in every ten companies claiming some expenditure in the current year. For three in every four companies this accounts for 10% or less of current expenditure. The mean average of 5.6% peaks in the Textile, Clothing and Footwear sector (7.8%) and amongst smaller companies (7.0%).

Investment expenditure by Sector (continued) **(% of current years expenditure)**

Base: All Respondents

		Company Size			Orientation			Ownership		
	Overall	Small (20/less)	Medium (20=49)	Large (50+)	Domestic Only	Domestic %	Export Only	Irish Private	Foreign	Other (Pic/State)

						Export				
	%	%	%	%	%	%	%	%	%	%
IT Equipment	**8.3**	8.1	6.5	10.7	8.5	8.4	8.8	8.0	10.0	10.2
Research & Development	**4.5**	5.0	4.4	3.8	3.7	6.1	7.8	4.3	4.3	9.5
Training	**5.6**	7.0	4.3	4.7	5.6	5.4	5.7	5.6	6.0	5.8

7 Foreign Alliances

Links between Irish businesses and foreign companies can be somewhat ambiguous. A question asking companies about any links they have with foreign companies gives us a more definitive picture in this regard.

The most common link with foreign companies features among businesses who distribute for foreign companies. Two in five Irish companies currently fall into this category. Naturally, this is highest in the Distribution sector (54%) and those companies based in Dublin (52%) – closest to airports and ports.

The other key link with foreign companies is the presence of foreign shareholders in the local business, approaching one in every five (16%) of companies fall into this category. This is highest in the Food, Metal/Engineering/Chemicals and other Manufacturing sectors, all at 24%, and also for companies involved in exporting beyond the U.K. (31%)

As shown below, other links identified with foreign companies are somewhat more modest.

Alliances with foreign-based companies

Base: All Respondents

	Overall	Construction / Mining	Food	Textiles	Metal / Eng. / & Chemicals	Other Manuf.	Distribution	Other Services
	%	%	%	%	%	%	%	%
Company distributes for a foreign company	**40**	22	25	17	31	30	54	43
There are foreign shareholders in your company	**16**	8	24	13	24	24	16	12
Your company produces under licence/franchise	**10**	7	19	16	13	13	8	13
Your company has a share in a foreign company	**12**	9	9	7	14	9	13	15
Your company is a joint venture with a foreign company	**9**	12	14	7	10	11	5	17
None	**44**	61	55	59	46	47	35	39

Two in every five companies are equipped to do business in some foreign language. This linguistic ability increases to almost three in five of businesses in the Food sector and just half in Textiles, Clothing and Footwear and is obviously highest amongst foreign owned companies (68%). French tops the poll for over one in four respondents, while over one in every five businesses are equipped to do business in German.

Foreign language abilities by Sector

Bases: All Respondents

	Overall	Construction / Mining	Food	Textiles	Metal / Eng. / & Chemicals	Other Manuf.	Distribution	Other Services
	%	%	%	%	%	%	%	%
Any language spoken	**39**	28	58	48	41	50	35	47
None spoken	**61**	72	42	52	59	50	65	53

Q. In which, if any, foreign languages is your compnay equiped to do business

Annex 2

Competitiveness Indicators: Definitions and Sources

Table A1 - Education Levels

1. **Educational participation - age 16 (%)**
   Total participation (net enrolment in all levels of education) for age 16 in public and private institutions (based on head counts).
   Source: OECD, Education at a Glance, 1998
2. **Net enrolment in tertiary education - age 18-21 (%)**
   Net enrolment in public and private tertiary education for persons aged 18-21 years of age (based on head counts).
   Source: OECD, Education at a Glance, 1998
3. **Percentage of population (25-64 years) that has attained 3rd level education**
   Percentage of the population 25 to 64 years of age that has completed third-level education.
   Source: OECD, Education at a Glance, 1998
4. **Percentage of population (25-64 years) that has attained upper secondary level education**
   Percentage of the population 25-64 years of age that has completed at least upper second-level education.
   Source: OECD, Education at a Glance, 1998
5. **School Expectancy for a 5 year-old child**
   Number of years a five year-old entering the education system currently may expect to remain in the educational system.
   Source: OECD, Education at a Glance, 1998
6. **Percentage of people aged 25-34 with higher education qualifications**
   Source: OECD, Education Database, 1998

Table A2 - Education Policy and Performance

1. **Number of teaching hours per year in lower secondary education**
   Number of teaching hours per year in public institutions.
   Source: OECD, Education at a Glance, 1998
2. **Ratio of students to teaching staff - secondary education**
   Ratio of students to teaching staff in public education (calculations based on full-time equivalents).
   Source: OECD, Education at a Glance, 1998
3. **Average achievement in Maths (11-12 years)**
   Overall student achievement in mathematics, eighth grade based on tests administered as part of the Third International Mathematics and Science Study (TIMSS) undertaken by the International Association for the Evaluation of Educational Achievement (IEA).
   Source: OECD, Education at a Glance, 1996
4. **Average achievement in Science (11-12 years)**
   Overall student achievement in science, eighth grade based on tests administered as part of the Third International Mathematics and Science Study (TIMSS) undertaken by the International Association for the Evaluation of Educational Achievement (IEA).
   Source: OECD, Education at a Glance, 1996

5. **Average number of foreign languages per pupil**
   The average number of (modern) foreign languages studied per pupil during the course of general secondary education in 1995. (The Irish language is excluded.)
   Source: Eurostat, UOE, 1997

Table A3 - Labour Costs and Productivity

1. **Compensation per employee (annual average change 1992/1997)**
   Source: European Monetary Institute, Progress Towards Convergence, March 1998
2. **Nominal unit labour costs (annual average change 1992/1997)** Rate at which unit labour costs have been increasing.
   Source: European Monetary Institute, Progress Towards Convergence, March 1998
3. **Unit labour costs in the total economy (percentage increase)**
   Percentage change from the previous period.
   Source: OECD Economic Outlook, December, 64, 1998
4. **Pay for time worked (per hour) for manufacturing workers (Swedish Krona)**
   denotes basic time and piece rates, shift and overtime premium, other work-related premium, incentive pay, and bonuses paid regularly.
   Source: Swedish Employer's Confederation, Wages and Total Labour Costs for Workers, 1998
5. **Total per hour labour costs for manufacturing workers (Swedish Krona)**
   represents pay for time worked, pay for time not worked, other cash payments, employer social security expenditure and labour cost reductions from employment subsidies.
   Source: Swedish Employer's Confederation, Wages and Total Labour Costs for Workers, 1998
6. **Hourly Compensation Costs for Production Workers in Manufacturing (US$)**
   Total compensation costs include pay for time worked; other direct pay; employer expenditures for legally required insurance programmes and contractual and private benefit plans; and, for some countries, other labour taxes.
   Source: US Bureau of Labour Statistics, 1998
7. **Productivity (annual average change 1992/1997)**
   Growth rate in productivity.
   Source: European Monetary Institute, Progress Towards Convergence, March 1998

Table A4 - Work Incentives

1. **Average income tax rate (percentage of average earnings)**
   Married, 100, 0, 2 ch - the average income tax rate as a percentage of average earnings for a married couple, with only one spouse earning 100 per cent of the average production wage and with 2 children.
   Source: OECD, The Tax/Benefit Position of Employees, 1998
2. **Average income tax rate (percentage of average earnings)**
   Single, 100, no ch - the average income tax rate as a percentage of average earnings for a single person, earning 100 per cent of the average production

wage and with no children.
Source: OECD, The Tax/Benefit Position of Employees, 1998

3. **Employer's social security contributions as a percentage of gross labour cost**
   Employers social security contributions (PRSI) as a percentage of gross labour cost. Note this indicator does not account for different contribution ceilings . *Source: OECD, Making Work Pay, 1996*
4. **Income Tax plus Employees Social security contribution rate**
   As a percentage of average earnings - married, 100, 0, 2 ch - income tax plus social security contributions (PRSI) as a percentage of average earnings for a married couple, with only one spouse earning 100 per cent of the average production wage and with 2 children.
   Source: OECD, The Tax/Benefit Position of Employees,1998
5. **Income Tax plus Employees Social security contribution rate**
   As a percentage of average earnings - single, 100, no ch - income tax plus social security contributions (PRSI) as a percentage of average earnings for a single person, earning 100 per cent of the average production wage and with no children
   Source: OECD, The Tax/Benefit Position of Employees, 1998
6. **Marginal (income plus employees social security) tax rate - married, 100, 0, 2 ch**
   The marginal tax rate (incorporating both income tax and employees social security [PRSI]) for a married couple with only one spouse earning 100 per cent of the average production wage and with 2 children
   Source: OECD, The Tax/Benefit Position of Employees, 1998
7. **Marginal (income plus employees social security) tax rate - Single, 100, no ch**
   The marginal tax rate (incorporating both income tax and employees social security [PRSI]) for a single person earning 100 per cent of the average production wage with no children
   Source: OECD, The Tax/Benefit Position of Employees, 1998
8. **Non-wage labour costs - PRSI, Pension, and Holidays (Swede Krona)**
   Includes vacation, public holidays, irregular bonuses, pay-in-kind, employers social security contributions and other labour taxes.
   Source: Swedish Employer's Confederation, Wages and Total Labour Costs for Workers, 1996
9. **Social expenditure and other labour taxes as a percentage of total labour costs**
   Employers social security contributions (PRSI) and other labour taxes as a percentage of total labour costs.
   Source: Swedish Employer's Confederation, Wages and Total Labour Costs for Workers, 1996
10. **Tax wedge**
    The tax wedge (at the average production wage) including income taxes, social security contributions (PRSI) and consumption taxes.
    Source: OECD, Making Work Pay 1996
11. **Top rate of income tax**
    the top rate of income tax liable on personal income. Note this indicator does not take into account the level at which this rate is payable.
    Source: International Tax Summaries, Coopers and Lybrand, 1998

Table A5 - Employment

1. **Days lost to industrial disputes per 1000 civilian employment**
   The data for Ireland are taken from the CSO, Industrial Disputes at least one

day or where more than 10 workdays are lost. The methodology differs among the various entries.
Source: ILO, yearbook of Labour Statistics, 1996 and 1997

2. **Female Activity Ratio**
   Labour force participation of women aged 15-64.
   Source: ILO, Yearbook of Labour Statistics, 1997
3. **Incidence of Part-Time Employment**
   As a percentage of total employment
   Source: OECD Employment Outlook, 1998
4. **Incidence of Temporary Employment**
   Source: OECD Employment Outlook, 1998
5. **Level of youth unemployment (15-24)**
   Level of unemployment for those aged 15-24.
   Source: OECD Employment Outlook, 1998
6. **Long-Term Unemployment**
   Long-term unemployment is defined as unemployment in excess of 12 months, as a percentage of the total labour force.
   Source: OECD Employment Outlook, 1998

Table A6 - Technological Innovation Potential

1. **Science and technology degrees awarded as a percentage of the total number of degrees awarded**
   University-level qualifications by subject category as a percentage of total university-level qualifications.
   Source: OECD, Education at a Glance, 1998
2. **Bachelor degrees in science and engineering as a percentage of 24 year olds in the population**
   Source: NSF Science and Engineering Indicators 1998, CSO data for Ireland
3. **R&D expenditure in higher education and government institutions as a percentage of GDP***
   Source:OECD, MSTI,1,1998
4. **Researchers in higher education or government institutions as a percentage of GDP***
   Source:OECD, MSTI,1,1998
5. **Number of scientific publications per thousand population**
   Source: EU Report on S&T Indicators, 1997

Table A7 - Technological Performance

1. **Business R&D expenditure as a percentage of GDP***
   Source:OECD, MSTI,1,1998
2. **Business R&D researchers per 1000 of the labour force**
   Source:OECD, MSTI,1,1998
3. **Manufacturing R&D as a percentage of sales**
   Source: OECD STAN Database
4. **ISO 9000 Certificates per million capita**
   Total to December 1995 quality indicator
   Source: Mobil Survey, 1996
5. **Inventiveness Coefficient – resident patent applications per 10,000 population**
   Source: OECD, MSTI, 1, 1998
6. **Patents granted in US (per million capita)**
   Source: US Patent and Trademark Offices, Annual Report 1997

7. **Size of Information Technology market (% of GDP*)**
   Source: OECD, Science and Technology Outlook, 1998
8. **Growth in Information Technology Market**
   Compound annual growth rate, 1987-1994
   Source: OECD, Information Technology Outlook, 1997

Table A8 - Trade

1. **Manufacturing export concentration, standard deviation of exports by country**
   This indicator measures the degree to which a country's exports are concentrated in one market or a small number of markets. The more evenly spread the export pattern of a country the lower the standard deviation.
   Source: OECD Bilateral Trade Database
2. **Manufacturing export concentration, standard deviation of exports by industry**
   This indicator measures the degree to which a country's imports originate from one or a small number of countries. The more evenly spread the import pattern of a country the lower the standard deviation.
   Source: OECD Bilateral Trade Database
3. **Manufacturing export concentration, standard deviation of exports by sector**
   This indicator measures the degree to which a country's industrial exports are concentrated in one sector or a small number of sectors. The more evenly spread the export pattern of a country the lower the standard deviation.
   Source: OECD Bilateral Trade Database
4. **Manufacturing import concentration, standard deviation of imports by sector**
   This indicator measures the degree to which a country's industrial imports are concentrated in one sector or a small number of sectors. The more evenly spread the import pattern of a country the lower the standard deviation.
   Source: OECD Bilateral Trade Database
5. **Export Performance for total goods**
   Export performance is the ratio between export volumes and export markets for total goods. The export volume concept employed is the sum of the exports of food, raw materials, energy and manufactures. The calculation of export markets is based on a weighted average of import volumes in each exporting country's market, with weights based on trade flows in 1991
   Source: OECD, Economic Outlook, No.64, December 1998
6. **Producer prices**
   Manufacturing (1990=100) - Data for Ireland refer to the Wholesale price index (output of manufacturing industry)
   Source: OECD, Main Economic Indicators, Feb 1999
7. **Trade openness**
   This indicator measures the sum of total exports and imports (goods and services) as a percentage of GDP.
   Source: OECD, Main Economic Indicators, Feb 1999
8. **Trade openness in services (Exports + Imports) / Services Output**
   This indicator measures the sum of services imports and exports as a percentage of total services not output.
   Source: World Trade Organisation, International Trade and OECD National Accounts

Table A9 - Financial Markets

1. **Government Bond Yields (61)**
   Nominal rates.
   Source: IMF, International Financial Yearbook, 1998
2. **Interest Rate Spread - Absolute**
   This equals the lending rate(601) minus the deposit rate(60p) (Nominal).
   Source: IMF, International Financial Yearbook, 1998
3. **Long-term nominal interest rates**
   The data for Ireland refer to the nominal yield on 15-year government bonds.
   Source: OECD, Economic Outlook, No. 64, December 1998
4. **Money Market Rates - Nominal rates**
   Source: IMF, International Financial Yearbook, 1998
5. **Rate of return on capital in the business sector**
   This indicator is calculated by dividing estimated capital income by the estimated capital stock.
   Source: OECD, Economic Outlook, No. 64, December 1998
6. **Short-term nominal interest rates**
   The data for Ireland refer to the nominal 3-month interbank rate.
   Source: OECD, Economic Outlook, No. 64, December 1998
7. **Cumulative venture capital raised as a percentage of GDP***
   This refers to the value of cumulative venture capital raised as a percentage of GDP.
   Source: European Venture Capital Association Yearbook, 1998 and OECD Main Economic Indicators Feb 1999.

Table A10 - Investment

1. **FDI inflow as a percentage of GDP***
   Based on official national statistics from the balance of payments. This indicator has a broader definition of foreign direct investment (FDI) than just physical investment.
   Source: OECD, Main Economic Indicators, Feb 1999
2. **FDI inflow stock as a percentage of GDP***
   Source: World Investment Report 1998
3. **FDI outflow stock as a percentage of GDP***
   Source: World Investment Report 1998
4. **Non-residential investment as a percentage of GDP***
   Measures the commitment being made to expansion of productive capacity in the economy.
   Source: OECD, National Accounts, Vol II, 1984-96
5. **Ratio of educational expenditures to NRFI**
   The ratio of public and private educational expenditure at all levels to non-residential fixed investment.
   Source: OECD National Accounts and Education at a Glance
6. **Top rate of corporation tax**
   The top rate of corporation tax payable on corporate income. Note this indicator does not take into account issues such as allowances or other differences in tax law.
   Source: International Tax Summaries, Coopers and Lybrand, 1998

Table A11 - Telecommunications

1. **Telephone main lines**
   per 100 inhabitants.
   Source: OECD, Communications Outlook 1999

2. **Internet Hosts per 1000 capita**
   Indicates number of separate internet hosts per 1000 capita in each country. Hosts are identified by their two digit suffix (e.g., Ireland is represented by .ie). This is a slightly imperfect measure of internet penetration as some companies can use .com as a suffix or be routed through their parent company in another country.
   Source: Ripe NCC: European Hostcount, July 1998
3. **Mobile subscriptions per 1000 capita**
   Source: Public Network, February 1999
4. **Per capita expenditure on telecommunications**
   Source: EITO 1998

Table A12 - Telecommunications Costs

1. **2 Mbit/s leased lines national circuits - connection (ECU)**
   2 Mega bit per second leased lines. Connection charges represent the charge for both ends.
   Source: DGIII, Tariff Data, 1996
2. **2 Mbit/s leased lines national circuits - annual rental 50KM ($US)**
   2 Mega bit per second leased lines.
   Source: Eurodata, February 1999
3. **2 Mbit/s leased lines national circuits - annual rental 100KM ($US)**
   2 Mega bit per second leased lines.
   Source: Eurodata, February 1999
4. **2 Mbits leased lines international to USA ($US - Annual Rental)**
   Source: Eurodata, February 1999
5. **Voice grade leased lines national circuits - connection (ECU)**
   Connection charges are for 2-wire circuits and represent the charge for both ends.
   Source: DGIII, Tariff Data, 1996
6. **Analogue leased lines national circuits - annual rental 50KM ($US)**
   Cost of 50 km leased line for dedicated voice transmission
   Source: Eurodata, February 1999
7. **Analogue leased lines national circuits - annual rental 100KM ($US)**
   Cost of 100 km leased line for dedicated voice transmission
   Source: Eurodata, February 1999
8. **Analogue leased lines to USA (US$)**
   Source: Eurodata, February 1999
9. **Cost of peak local call (per minutes) (US$)**
   Source: Eurodata, February 1999
10. **Cost of call to the UK- first minute peak time in $US**
    Source: Eurodata, February 1999
11. **Cost of call to the US – first minute peak time in $US**
    Source: Eurodata, February 1999

Table A13 - Transport and Communications Costs

1. **Insurance and Freight (debit + credit) as % of Total Trade**
   Source: UNCTAD, Handbook of International Trade and Development
2. **Letter costs EU Domestic Tariffs (20 gram letter)**
   Source: An Post
3. **Rail Indicator**
   This is a composite indicator developed using data on the length of the rail network, the percentage electrified and the population density.

Source: European Conference of Ministers of Transport, Statistical Trends in Transport 1965-1994, 1998

4. **Road Indicator**
   This is a composite indicator developed using data on the length of the motorway network, the trunk road network, the secondary roads and the population density.
   Source: European Conference of Ministers of Transport Statistical Trends in Transport 1965-1994, 1998

Table A14 - Energy Costs

1. **Automotive Diesel Oil Prices for Commercial Use (US$ per t.o.e.)**
   t.o.e. denotes tonne of oil equivalent.
   Source: International Energy Agency, Energy prices and taxes, 2nd quarter 1998
2. **Heavy Fuel Oil Prices for Industry (US$ per toe)**
   t.o.e. denotes tonne of oil equivalent.
   Source: International Energy Agency, Energy prices and taxes, 2nd quarter 1998
3. **Industrial Electricity Prices - 24GW hours per annum**
   Large users (ECU) excluding VAT
   Source: Eurostat Energy and Industry, 14, 1998
4. **Industrial Electricity Prices – 10GW hours per annum**
   Medium-sized users (ECU) excluding VAT
   Source: Eurostat Energy and Industry, 14, 1998
5. **Industrial Electricity Prices – 1.25GW hours per annum**
   Small users (ECU) excluding VAT
   Source: Eurostat Energy and Industry, 14, 1998
6. **Gas Prices - Industrial rates excluding VAT (4186 GJ / 200 days) (or 1,163,000 kWh) / 200 days**
   Indicates the volume of usage and load factor by the customer category
   Source: Eurostat Energy and Industry, 15, 1998
7. **Gas Prices - Industrial rates excluding VAT (41860 GJ / 250 days / 4000 hours) - (or 11.63 GWh) / 250 days / 4000 hours**
   Indicates the volume of usage and load factor by the customer category
   Source: Eurostat Energy and Industry, 15, 1998

Table A15 - Property and Construction Cost

1. **Industrial Occupancy Costs**
   Annual rental charge per square metre.
   Source: Hamilton Osborne King, European Property Bulletin 1998
2. **Office Occupancy Costs**
   Annual rental charge per square metre.
   Source: Hamilton Osborne King, European Property Bulletin 1998
3. **Building Costs - Industrial (per m2 - IRP£)**
   The cost is based on a single storey unit of 3,000m/30,000 sq. ft. of steel portal frame and brick construction with an eaves height of at least 6m/18ft. It is finished to a basic shell, with services and heating to the office space but not to the industrial/warehouse space. The cost includes professional fees.
   Source: Hamilton Osborne King, European Property Bulletin 1998
4. **Building Costs - Offices (per m2 - IRP£)**
   The cost is based on a 3,000m/30,000 sq. ft. self-contained, air-conditioned building in the major city in each country. The accommodation is built to a

good finish, including false ceilings, carpets, lighting and power points, but excludes partitioning. The cost includes professional fees.
Source: Hamilton Osborne King, European Property Bulletin 1998

5. **Average of ranks for carpentry, steel reinforcement, concrete and cement material costs**
   This indicator is constructed taking the average of the rank of each country for building input costs such as softwood sections for carpentry, steel reinforcement, concrete and cement. This methodology is used as each of the inputs are measured in different units, and therefore a straightforward average is not possible.
   Source: SPON, European Construction Handbook, 1996
6. **Construction Skilled Labour Costs (per hour - ECU)**
   Source: SPON, European Construction Handbook, 1996
7. **Unweighted Average of Skilled and Unskilled Labour Costs (Q1 1994 - ECU per hour)**
   Source: SPON, European Construction Handbook, 1996

Table A16 - The Environment

1. **CO2 emissions from energy uses (tonnes/capita)**
   Source: OECD Main Economic Indicators, 1997
2. **Per capita NOx emissions from fossil fuels (NOx)**
   Source: OECD, Environmental Data Compendium, 1997
3. **Per capita SOx emissions from fossil fuels (t SOx)**
   Source: OECD, Environmental Data Compendium, 1997
4. **Recycling activity: recovery ratio - Glass (%)**
   Source: Eurostat, Basic Statistics of the European Community, 1996
5. **Recycling activity: recovery ratio - paper/board (per cent)**
   Source: Eurostat, Basic Statistics of the European Community, 1996

Table A17 - SME Performance

1. **Labour Productivity (* 1,000 ECU/PPP) 0-9**
   Productivity in businesses that employ under 10 persons.
   Source: European Observatory for SMEs, Fourth Annual Report, 1996
2. **Labour Productivity (* 1,000 ECU/PPP) 10-49**
   Productivity in businesses that employ between 10 and 50 persons.
   Source: European Observatory for SMEs, Fourth Annual Report, 1996
3. **Labour Productivity (* 1,000 ECU/PPP) 50-249**
   Productivity in businesses that employ between 50 and 249 persons.
   Source: European Observatory for SMEs, Fourth Annual Report, 1996
4. **Turnover limit for concession providing relief from VAT registration (US$)**
   Concessions providing relief from VAT registration. The data for Ireland refer to non-service companies. The limit is 50 per cent lower (IR£20,000 - $28,570) for services companies.
   Source: Consumption Tax Trends, OECD, 1996
5. **Average Debtor days**
   The average number of days an SME must wait before receiving payment of invoices.
   Source: Grant Thornton European Business Survey, 1997
6. **Percentage of SMEs that export**
   Source: Grant Thornton European Business Survey, 1996

Table A18 - Public Administration

1. **General government consolidated debt as a percentage of GDP**
   Source: EC Economic Data Pocket Book 1998 and Department of Finance Stability Programme 1999-2001
2. **Net lending (+) or borrowing (-) of general government as a percentage of GDP**
   Source: EC Economic Data Pocket Book 1998 and Department of Finance Stability Programme 1999-2001
3. **Government spending as a percentage of GDP**
   Source: EC Economic Data Pocket Book 1998
4. **Share of general government in total employment**
   OECD Employment Outlook, July 1997
5. **Tax as a percentage of GDP**
   Source: EC Economic Data Pocket Book 1998

Table A19 - Socioeconomic Performance

1. **Cumulative employment change 1996-1998**
   Cumulative percentage change in civilian employment.
   Source: OECD Employment Outlook, June 1998 and Department of Finance Stability Programme 1999-2001
2. **Consumer prices**
   Annual average rate 1998
   Source: OECD, Main Economic Indicators, Feb 1999
3. **GDP* Growth**
   Source: OECD, Main Economic Indicators, Feb 1999 and Department of Finance Stability Programme
4. **GDP* per capita/EU GDP per capita (PPS)**
   GDP at current market prices per head of population
   Source: European Economy, No. 65, 1998
5. **Standardised unemployment rate - SUR (%)**
   Source: OECD, Main Economic Indicators, Feb 1999

*GNP used for Ireland

Annex 4

Detailed Tables

Table A1 Education Levels

		1	2	3	4	5	6
	Indicator	**Educational participation age 16 (%)**	**Net enrollment in tertiary education - age 18-21**	**Percentage of population (25-64 years) that has attained 3rd education**	**Percentage of population (25-64 years) that has at least upper secondary-level education**	**School expectancy for a 5 year old child (years)**	**Percentage of people age 25-34 with higher education qualifications**
	Year	**1996**	**1996**	**1996**	**1996**	**1996**	**1996**
	Source	OECD, Education at a glance, 1998	OECD, Education at a glance, 1998	OECD, Education Database	OECD, Education at a glance, 1998	OECD, Education at a glance, 1998	OECD, Education Database
Country	Observations	26	24	25	25	24	25
Australia	Value	95.8	31.3	25	57	19.3	25
	Rank	9	7	5	17	1	10
Austria	Value	91.2	16.1	8	71	15.8	9
	Rank	13	17	23	10	17	23
Belgium	Value	100.3	39.6	24	53	18.3	32
	Rank	1	2	7	18	2	3
Canada	Value	90.7	40.5	48	76	17.1	54
	Rank	15	1	1	6	10	1
Czech Republic	Value	99.3	16.9	10	84	14.6	11
	Rank	2	16	22	2	22	21
Denmark	Value	92.8	8.5	22	66	17.1	22
	Rank	12	21	10	12	10	16
EU	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Finland	Value	93.1	18.2	21	67	17.2	24
	Rank	11	15	14	11	8	12
France	Value	96.2	36.0	19	60	16.5	26
	Rank	8	4	15	15	6	9
Germany	Value	97.2	10.8	22	81	16.6	20
	Rank	7	20	10	4	15	17
Greece	Value	81.0	39.4	19	44	14.2	28
	Rank	23	3	15	20	23	7
Hungary	Value	88.4	13.4	13	63	14.8	14
	Rank	17	19	18	13	20	19
Iceland	Value	87.8	7.5	0	0	17.5	0
	Rank	18	23	0	0	4	0
Ireland	Value	88.9	31.4	23	50	15.6	31
	Rank	16	6	8	19	19	4
Italy	Value	0	0	8	38	0	8
	Rank	0	0	23	21	0	24
Japan	Value	97.9	0	0	0	0	0
	Rank	4	0	0	0	0	0
Luxembourg	Value	80.6	0	11	29	0	11
	Rank	24	0	20	23	0	21
Mexico	Value	39.7	6.6	0	0	12.0	0
	Rank	26	24	0	0	24	0
Netherlands	Value	98.4	24.0	23	63	17.5	25
	Rank	3	11	8	13	4	10

New Zealand	Value	97.7	29.4	25*	60	17.2	24
	Rank	5	8	5	15	8	12
Norway	Value	94.4	19.0	27	82	17.1	30
	Rank	10	14	3	3	10	5
OECD	Value	0	23.2	20	60	16.4	0
	Rank	0	0	0	0	0	0
Poland	Value	90.8	21.2	13**	74	14.8	15
	Rank	14	12	18	8	20	18
Portugal	Value	77.4	19.3	11	20	16.9	14
	Rank	25	13	20	24	13	19
Russia	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Spain	Value	82.7	27.3	18	30	17.5	29
	Rank	21	9	17	22	4	6
Sweden	Value	97.3	13.7	27	74	18.0	28
	Rank	6	18	3	8	3	7
Switzerland	Value	86.4	7.6	22	80	15.7	23
	Rank	19	22	10	5	18	15
Turkey	Value	0	0	6*	17	0	7
	Rank	0	0	25	25	0	25
UK	Value	82.3	26.9	20	76	17.3	24
	Rank	22	10	10	6	7	12
US	Value	85.6	34.6	34	86	16.8	35
	Rank	20	5	2	1	14	2

** Data refers to 1997*
***Data refers to 1995*

Table A2 Education Policy and Performance

		1	2	3	4	5
	Indicator	**Number of teaching hours per year in lower secondary education (hours)**	**Ratio of students to teaching staff secondary education**	**Average achievement in maths (age 11 - 12)**	**Average achievement in science (age 11 - 12)**	**Average number of foreign languages per pupil**
	Year	**1996**	**1996**	**1995**	**1995**	**1995**
	Source	OECD, Education at a glance, 1998	OECD, Education at a glance, 1998	OECD, Education at a glance, 1998	OECD, Education at a glance, 1998	Eurostat, UOE
Country	Observations	19	19	23	23	14
Australia	Value	0	0	530	545	0
	Rank	0	0	10	6	0
Austria	Value	658	8.9	539	558	0
	Rank	11	1	6	4	0
Belgium	Value	741	0	546	511	1.65
	Rank	7	0	3	18	8
Canada	Value	0	19.7	527	531	0
	Rank	0	19	11	12	0
Czech Republic	Value	607	12.3	564	574	1.80
	Rank	17	6	2	1	6
Denmark	Value	750	11	502	478	1.85
	Rank	6	4	18	23	4
EU	Value	0	0	509	520	1.30
	Rank	0	0	0	0	0
Finland	Value	0	0	0	0	2.44
	Rank	0	0	0	0	2
France	Value	647	13.3	538	498	1.60
	Rank	12	8	7	19	9
Germany	Value	715	15.0	509	531	1.24

	Rank	10	10	14	12	11
Greece	Value	629	11.3	484	497	0
	Rank	14	5	22	20	0
Hungary	Value	473	10.4	537	554	1.80
	Rank	19	3	8	5	5
Iceland	Value	0	0	487	494	0
	Rank	0	0	20	21	0
Ireland	Value	735	15.8	527	538	1.01
	Rank	9	13	11	7	14
Italy	Value	612	10.2	0	0	1.12
	Rank	15	2	0	0	12
Japan	Value	0	15.9	605	571	0
	Rank	0	14	1	2	0
Luxembourg	Value	0	0	0	0	2.89
	Rank	0	0	0	0	1
Mexico	Value	0	16.2	0	0	0
	Rank	0	17	0	0	0
Netherlands	Value	910	18.6	541	560	2.42
	Rank	2	18	5	3	3
New Zealand	Value	776	16.1	508	526	0
	Rank	5	15	15	15	0
Norway	Value	611	0	503	527	0
	Rank	16	0	16	14	0
OECD	Value	700	14.6	524	523	0
	Rank	0	0	0	0	0
Poland	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Portugal	Value	644	0	454	480	1.29
	Rank	13	0	23	22	10
Russia	Value	0	0	536	538	0
	Rank	0	0	9	7	0
Spain	Value	900	15.1	487	517	1.04
	Rank	3	11	20	17	13
Sweden	Value	576	13.7	519	535	1.67
	Rank	18	9	13	9	7
Switzerland	Value	850	12.3	545	522	0
	Rank	4	6	4	16	0
Turkey	Value	0	0	0	0	0
	Rank	0	0	0	0	0
UK	Value	740	15.6	503	535	0
	Rank	8	12	17	10	0
US	Value	964	16.1	500	534	0
	Rank	1	15	19	11	0

Table A3 Labour Costs and Productivity

	1	2	3	4	5	6	7
Indicator	**Compensation per employee (annual average change %/100)**	**Nominal unit labour costs (annual average change %/100)**	**Unit labour costs in total economy (% change)**	**Pay for time worked (per hour) for manufacturing workers (Swedish krona)**	**Total per hour labour costs for manufacturing production workers (Swedish krona)**	**Hourly compensation costs for production workers in manufacturing (US$)**	**Productivity (annual average change %/100)**
Year	**1992/1997**	**1992/1997**	**1998e**	**1997e**	**1997e**	**1997**	**1992/1997**
Source	European Monetary Institute,	European Monetary Institute,	OECD Economic Outlook,	Swedish Employers Confederation,	Swedish Employers Confederation,	US Bureau of Labour Statistics 1998	European Monetary Institute,

		Convergence Report, March 1998	Convergence Report, March 1998	December, 64 , 1998	Wages and total labour costs for workers, 1998	Wages and total labour costs for workers, 1998		Convergence Report, March 1998
Country	Observations	15	15	24	18	20	22	15
Australia	Value	0	0	2.4	0	0	16.0	0
	Rank	0	0	13	0	0	8	0
Austria	Value	0.033	0.016	0.0	86	169	21.9	0.017
	Rank	4	9	3	6	14	16	10
Belgium	Value	0.036	0.019	0.9	92	174	22.8	0.017
	Rank	7	11	7	10	16	20	9
Canada	Value	0	0	1.0	93	127	16.6	0
	Rank	0	0	9	11	8	9	0
Czech Republic	Value	0	0	9.2	15	24	0	0
	Rank	0	0	22	1	1	0	0
Denmark	Value	0.034	0.012	3.8	136	176	22.0	0.022
	Rank	5	4	19	18	17	17	7
EU	Value	0	0	1.0	0	0	20.2	0
	Rank	0	0	0	0	0	0	0
Finland	Value	0.022	-0.016	0.6	94	163	21.4	0.038
	Rank	1	1	5	12	13	15	2
France	Value	0.030	0.017	0.6	72	146	18.0	0.013
	Rank	3	10	5	4	10	11	14
Germany	Value	0.045	0.016	-0.3	119	216	28.3	0.028
	Rank	11	8	1	15	20	23	4
Greece	Value	0.114	0.110	4.5	41	71	9.6*	0.004
	Rank	15	15	20	2	3	3	15
Hungary	Value	0	0	14.5	0	0	0	0
	Rank	0	0	24	0	0	0	0
Iceland	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Ireland	Value	0.038	-0.005	1.7	78	103	13.6	0.044
	Rank	8	2	10	5	5	6	1
Italy	Value	0.046	0.024	-0.3	65	126	16.7	0.021
	Rank	12	12	1	3	7	10	8
Japan	Value	0	0	2.0	86	148	19.4	0
	Rank	0	0	12	6	11	13	0
Luxembourg	Value	0.035	0.012	0	0	0	22.6	0.023
	Rank	6	5	0	0	0	19	6
Mexico	Value	0	0	0	0	0	1.8	0
	Rank	0	0	0	0	0	1	0
Netherlands	Value	0.023	0.009	2.4	91	157	20.6	0.014
	Rank	2	3	13	9	12	14	13
New Zealand	Value	0.023	0.009	2.4	91	157	20.6	0.014
	Rank	2	3	13	9	12	14	13
Norway	Value	0	0	6.1	128	183	23.7	0
	Rank	0	0	12	17	18	21	0
OECD	Value	0	0	1.6	0	0	0	0
	Rank	0	0	0	0	0	0	0
Poland	Value	0	0	10.9	0	0	0	0
	Rank	0	0	23	0	0	0	0
Portugal	Value	0.070	0.053	2.6	0	39	5.3	0.016
	Rank	14	14	15	0	2	2	11
Russia	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Spain	Value	0.049	0.033	3.2	0	93	12.2	0.016
	Rank	13	13	17	0	4	5	12
Sweden	Value	0.044	0.014	1.9	100	170	22.2	0.029
	Rank	10	6	11	13	15	18	3
Switzerland	Value	0	0	0.3	120	185	24.2	0
	Rank	0	0	4	16	19	22	0
Turkey	Value	0	0	0	0	0	0	0

	Rank	0	0	0	0	0	0	0
UK	Value	0.042	0.014	3.5	89	118	15.5	0.024
	Rank	9	6	18	8	6	7	5
US	Value	0	0	2.7	101	140	18.2	0
	Rank	0	0	16	4	9	12	0

Table A4 Work Incentives

		1	2	3	4	5
	Indicator	**Average income tax rate (% of average earnings) Married, 100, 0, 2 ch**	**Average income tax rate (% of average earnings) Single, 100, no ch**	**Employers social security contributions as a % of gross labour cost**	**Income tax plus employees social security contribution rate as - a % of average earnings - married, 100, 0, 2 ch**	**Income tax plus employees social security contribution rate - as a % of average earnings - single, 100, no ch**
	Year	**1996**	**1996**	**1994**	**1996**	**1996**
	Source	OECD, The tax/benefit position of employees 1998	OECD, The tax/benefit position of employees 1998	OECD, Making Work Pay employees 1998	OECD, The tax/benefit position of employees 1998	OECD, The tax/benefit position of employees 1998
Country	Observations	28	28	20	28	28
Australia	Value	21.5	22.7	0	23.2	24.4
	Rank	24	24	0	18	11
Austria	Value	4.0	9.2	23.6	22.0	27.3
	Rank	7	7	15	17	15
Belgium	Value	16.3	27.4	34.8	30.3	41.3
	Rank	20	25	19	24	26
Canada	Value	12.1	22.2	6.6	17.6	27.6
	Rank	15	21	3	9	16
Czech Republic	Value	5.4	10.0	0	17.9	22.5
	Rank	10	8	0	10	10
Denmark	Value	28.8	36.0	0	37.6	44.8
	Rank	26	28	0	27	28
EU	Value	0	0	19.6	0	0
	Rank	0	0	0	0	0
Finland	Value	29.5	29.5	3.8	37.6	37.6
	Rank	28	27	2	27	24
France	Value	2.7	8.9	0	21.7	27.8
	Rank	5	6	0	15	17
Germany	Value	1.6	21.0	19.4	21.9	41.3
	Rank	2	17	13	16	26
Greece	Value	2.1	1.9	0	18.0	17.8
	Rank	4	1	0	11	3
Hungary	Value	18.1	18.1	0	29.6	29.6
	Rank	22	4	0	23	21
Iceland	Value	5.9	21.5	2.8	6.1	21.7
	Rank	12	18	1	1	7
Ireland	Value	15.4	22.3	12.2	21.5	28.5
	Rank	17	22	10	14	19
Italy	Value	14.4	18.1	46.1	24.3	28.0
	Rank	16	14	20	20	18
Japan	Value	2.0	6.7	7.5	9.0	13.7
	Rank	3	4	5	2	2
Luxembourg	Value	0.0	13.4	15.0	12.5	25.9
	Rank	1	10	12	4	14
Mexico	Value	4.8	4.8	19.4	10.1	10.1

	Rank	9	2	13	3	1
Netherlands	Value	4.4	5.8	7.9	34.9	39.2
	Rank	8	3	7	26	25
New Zealand	Value	18.8	22.3	0	18.8	22.3
	Rank	26	22	0	13	8
Norway	Value	17.1	21.9	12.8	24.9	29.7
	Rank	21	20	11	21	22
OECD	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Poland	Value	15.9	18.0	0	15.9	18.0
	Rank	19	13	0	7	4
Portugal	Value	3.5	7.1	24.5	14.5	18.1
	Rank	6	5	16	6	5
Russia	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Spain	Value	6.6	13.5	31.6	13.0	19.9
	Rank	13	11	18	5	6
Sweden	Value	28.8	28.8	30.1	33.7	33.7
	Rank	26	26	17	25	23
Switzerland	Value	5.6	10.8	10.3	17.1	22.4
	Rank	11	9	9	8	9
Turkey	Value	21.7	21.7	7.1	29.1	29.1
	Rank	25	19	4	22	20
UK	Value	15.7	17.4	10.2	24.1	25.8
	Rank	18	12	8	19	12
US	Value	10.4	18.2	7.7	18.0	25.8
	Rank	14	16	6	11	12

Table A4 Work Incentives continued

		6	7	8	9	10	11
	Indicator	**Marginal (income plus employees social security) tax rate - married 100, 0, 2 ch (%)**	**Marginal (income plus employees social security) tax rate - single 100, no ch (%)**	**Non wage labour costs _ PRSI, pension, pay in kind and holiday (Swedish krona)**	**Social Insurance expenditure and other labour taxes as a % of total labour costs**	**Tax wedge (%)**	**Top rate of income tax**
	Year	**1996**	**1996**	**1996**	**1995**	**1994**	**1997**
	Source	OECD, The tax/benefit position of employees 1998	OECD, The tax/benefit position of employees 1998	Swedish Employers Confederation, 1996	Swedish Employers Confederation, 1996	OECD, Making Work Pay 1996	International Tax Summaries - Coopers and Lybrand, 1998
Country	Observations	28	28	20	16	21	28
Australia	Value	35.7	35.7	0	0	29	47.0
	Rank	14	13	0	0	3	17
Austria	Value	39.7	39.7	83	28	0	50.0
	Rank	16	15	17	13	0	19
Belgium	Value	51.7	55.9	84	27	61	46.6
	Rank	25	27	18	12	20	16
Canada	Value	51.0	46.0	29	17	40	29.0
	Rank	23	20	5	5	7	1
Czech Republic	Value	25.6	25.6	9	0	0	40.0
	Rank	9	6	1	0	0	8
Denmark	Value	47.1	51.7	36	8	63	60.0
	Rank	21	22	7	1	21	27
EU	Value	0	0	0	0	0	0

	Rank	0	0	0	0	0	0
Finland	Value	52.1	52.1	69	25	55	38.0
	Rank	26	24	16	11	13	6
France	Value	21.7	35.7	59	29	41	54.0
	Rank	5	13	11	14	8	23
Germany	Value	47.4	51.9	94	24	59	53.0
	Rank	22	23	20	10	18	22
Greece	Value	28.5	20.1	25	0	0	45.0
	Rank	11	2	3	0	0	14
Hungary	Value	46.5	46.5	0	0	0	42.0
	Rank	20	21	0	0	0	12
Iceland	Value	40.9	40.9	0	0	36	45.9
	Rank	18	17	0	0	5	15
Ireland	Value	34.7	55.7	25	15	55	48.0
	Rank	13	26	3	4	13	18
Italy	Value	40.5	40.5	61	31	57	51.0
	Rank	17	16	12	16	16	21
Japan	Value	16.3	19.4	57	14	26	50.0
	Rank	2	1	10	3	1	19
Luxembourg	Value	12.5	41.2	0	0	52	30.3
	Rank	1	18	0	0	12	2
Mexico	Value	21.4	21.4	0	0	27	35.0
	Rank	4	4	0	0	2	4
Netherlands	Value	43.7	55.0	68	23	55	60.0
	Rank	19	25	14	9	13	27
New Zealand	Value	56.3	26.2	0	0	39	33.0
	Rank	27	8	0	0	6	3
Norway	Value	35.8	45.3	52	18	58	41.7
	Rank	15	19	9	7	17	11
OECD	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Poland	Value	21.0	21.0	0	0	0	44.0
	Rank	3	3	0	0	0	13
Portugal	Value	26.8	26.0	37	0	47	40.0
	Rank	10	7	8	0	10	8
Russia	Value	0	0	0	0	0	35.0
	Rank	0	0	0	0	0	4
Spain	Value	24.1	32.5	88	0	47	56.0
	Rank	6	11	18	0	10	25
Sweden	Value	58.8	58.8	67	30	60	56.0
	Rank	28	28	13	15	19	25
Switzerland	Value	25.5	31.1	68	17	0	0
	Rank	7	10	14	5	0	0
Turkey	Value	25.5	25.5	0	0	0	55.0
	Rank	7	5	0	0	0	24
UK	Value	34.0	34.0	24	13	44	40.0
	Rank	12	12	2	2	9	8
US	Value	51.0	29.9	34	22	35	39.6
	Rank	23	9	6	8	4	7

Table A5 Employment

		1	2	3	4	5	6
Employment	**Indicator**	**Days lost in industrial disputes per 1,000 civilian employment**	**Female activity rate (% female population 15-64)**	**Incidence of part-time employment as a % of total employment**	**Incidence of temporary employment as a % of total employment**	**Youth unemployment as a % of population 15-24**	**Long-term unemployment as a % of the total labour force**

	Year	1996	1996	1997	1994	1997	1997
	Source	ILO, Yearbook of Labour Statistics, 1996 and 1997	ILO, Yearbook of Labour Statistics, 1996 and 1997	OECD Employment Outlook, 1998	OECD Employment Outlook, 1996	OECD Employment Outlook, 1998	OECD Employment Outlook, 1998
Country	Observations	27	28	27	18	28	28
Australia	Value	60.8*	0.643	26.2***	23.5	15.9	2.65
	Rank	20	10	2	2	18	15
Austria	Value	0.0	0.610	10.8	0	7.6	1.78
	Rank	1	14	19	0	4	111
Belgium	Value	0	0	17.4	5.1	21.3	7.68
	Rank	0	0	11	16	22	26
Canada	Value	220.7	0.680	19.0	8.8	16.7	1.15
	Rank	25	8	9	13	21	7
Czech Republic	Value	3.2	0.640	3.4	0	8.4	1.34
	Rank	7	11	26	0	7	9
Denmark	Value	26.8	0.744	17.9	12	8.1	2.07
	Rank	15	3	10	5	6	12
EU	Value	0	0	16.5	11.0	20.4	5.62
	Rank	0	0	0	0	0	0
Finland	Value	7.9	0.704	7.5	13.5	24.8	4.51
	Rank	9	5	24	3	24	21
France	Value	20.0**	0.622	15.5	11.0	28.1	5.11
	Rank	14	12	4	6	25	23
Germany	Value	2.5	0.613	15.0***	10.3	10.0	4.92***
	Rank	6	13	15	9	10	22
Greece	Value	105.9*	0.451*	8.7	10.3	31.0	5.79
	Rank	24	25	21	9	26	24
Hungary	Value	0.6	0.499	3.3	0	15.9	4.46
	Rank	3	21	27	0	18	20
Iceland	Value	1456.4*	0.819	20.0***	0	7.9c	0.62
	Rank	27	1	8	0	5	4
Ireland	Value	76.7	0.488	16.7	9.4	16.1	5.81
	Rank	21	22	12	11	20	25
Italy	Value	84.5	0.434	12.4	7.3	33.6	8.15
	Rank	22	26	18	14	27	27
Japan	Value	1.3**	0.589	21.8***	10.4	6.6	0.74
	Rank	5	18	6	8	2	5
Luxembourg	Value	0	0.460	10.7***	2.9	9.2***	0.91***
	Rank	0	24	20	17	8	6
Mexico	Value	19.2	0.393	15.8	0	6.6	0.09
	Rank	13	27	13	0	2	1
Netherlands	Value	1.0	0.603	29.1	10.9	9.7	2.25
	Rank	4	16	1	7	9	17
New Zealand	Value	30.6*	0.664	22.7	0	15.0	1.13
	Rank	16	9	5	0	16	8
Norway	Value	235.5	0.741	21.2	0	10.9c	0.52
	Rank	26	4	7	0	11	3
OECD	Value	0	0	14.9	0	13.4	2.35
	Rank	0	0	0	0	0	0
Poland	Value	4.4	0.605	0	0	24.7	4.26
	Rank	8	15	0	0	23	19
Portugal	Value	11.0	0.594	7.9	9.4	14.1	3.73
	Rank	10	17	22	11	14	18
Russia	Value	58.7	0.542a	0	0	0	0
	Rank	19	19	0	0	0	0
Spain	Value	99.1	0.470	7.9	33.7	39.0c	11.54
	Rank	23	23	22	1	28	28
Sweden	Value	14.2	0.756	14.2	13.5	15.4c	2.37

	Rank	12	2	16	3	17	13
Switzerland	Value	0.1*	0.690	25.4	0	5.9	1.48
	Rank	2	7	3	0	1	10
Turkey	Value	11.9	0.321	5.8	0	14.4	2.37
	Rank	11	28	25	0	15	14
UK	Value	45.6	0.535b	23.1	6.5	13.5c	2.66
	Rank	18	22	4	15	13	16
US	Value	36.5	0.701	13.2***	2.2	11.3c	0.43
	Rank	17	6	17	18	12	2

* Data refers to 1995
** Data refers to 1994
*** Data refers to 1006
a Data refers to 15-72 year olds
b Data refers to 15+ year olds
c Data refers to 16-24 year olds

Table A6 Technological Innovation Potential

		1	2	3	4	5
	Indicator	**Science and engineering degrees awarded as a % of the total number of degrees awarded**	**Bachelor degrees in science and engineering as a percentage of 24 year olds in population**	**R&D expenditure in higher education and government institutions as a percentage pf GDP¦***	**Researchers in higher education and government institutions per 1,000 labour force**	**Number of scientific publications per 1,000 population**
	Year	**1996**	**1995**	**1996**	**1995**	**1995**
	Source	OECD, Education at a Glance, 1998	NSF Science and Engineering indicators 1998, CSO for Irish data	OECD,MSTI, 1998	OECD,MSTI, 1998	EU Report on S&T indicators 1997
Country	Observations	22	25	28	27	29
Australia	Value	22	0	0.88*	4.6*	0.82
	Rank	19	0	5	2	8
Austria	Value	32	2.7	0.65***	1.5***	0.57
	Rank	4	21	14	23	15
Belgium	Value	29	4.5***	0.49**	2.5	0.70
	Rank	8	13	17	14	13
Canada	Value	20	6.0*	0.61	2.6	0.92
	Rank	18	6	16	11	7
Czech Republic	Value	32	5.1	0.43	1.4	0.25
	Rank	5	10	22	24	21
Denmark	Value	22	6.5***	0.74	3.3	1.12
	Rank	16	4	9	8	3
EU	Value	0	5.0	0.67	2.5	0.56
	Rank	0	0	0	0	0
Finland	Value	39	9.0*	0.88	4.0	0.99
	Rank	1	2	5	4	4
France	Value	0	5.0*	0.86	3.2	0.63
	Rank	0	11	7	9	14
Germany	Value	38	5.8*	0.77	2.6	0.56
	Rank	2	7	8	11	18
Greece	Value	0	2.9***	0.35**	1.9	0.25
	Rank	0	20	25	20	21
Hungary	Value	26	4.7	0.38	1.8	0.25
	Rank	11	12	24	21	21
Iceland	Value	17	0	0.98	4.7	0.78
	Rank	22	0	1	1	11

Ireland	Value	31	5.7	0.47	3.4	0.43
	Rank	7	8	18	6	17
Italy	Value	26	2.5*	0.47	2.1	0.39
	Rank	12	23	18	17	19
Japan	Value	31	6.4	0.91**	4.1	0.42
	Rank	7	5	4	3	18
Luxembourg	Value	0	0	0	0	0.11
	Rank	0	0	0	0	27
Mexico	Value	0	2.5*	0.24**	0.5	0.03
	Rank	0	23	27	27	28
Netherlands	Value	21	4.4***	0.98**	2.7	0.96
	Rank	17	14	1	10	5
New Zealand	Value	20	0	0.71**	2.6	0.82
	Rank	20	0	12	11	8
Norway	Value	24	4.4*	0.74**	3.7	0.81
	Rank	13	14	9	5	10
OECD	Value	0	0	0	1.6	0.49
	Rank	0	0	0	0	0
Poland	Value	0	3.3***	0.45	2.3	0.16
	Rank	0	18	20	15	24
Portugal	Value	20	2.6*	0.37**	1.7	0.14
	Rank	19	22	23	22	26
Russia	Value	0	10.8*	0.23**	0	0.16
	Rank	0	1	28	0	24
Spain	Value	22	3.7***	0.44	2.3	0.36
	Rank	14	17	21	15	20
Sweden	Value	26	3.3*	0.92**	3.4	1.31
	Rank	10	18	3	6	2
Switzerland	Value	33	4.3	0.74	2.1	1.46
	Rank	3	16	9	17	1
Turkey	Value	0	1.8***	0.33	0.6	0.03
	Rank	0	25	26	28	28
UK	Value	29	8.5~	0.66	2.1	0.93
	Rank	9	3	13	17	6
US	Value	19	5.4	0.62	1.4	0.77
	Rank	21	9	15	24	12

~ Data refers to 1996
** Data refers to 1995
* data refers to 1994
*** Data reders to 1993
¦ GNP for Ireland

Table A7 Technological Innovation Performance

	1	2	3	4	5	6	7	8
Indicator	**Business R&D expenditure (% of GDP¦)**	**Business R&D researchers per 1,000 of the labour force**	**Manufacturing R&D as a percentage of sales**	**ISO 9000 Certificates per million capita - total to DEC. 1995**	**Inventiveness coefficient (resident patent applications/10,000 population)**	**Patents granted in US (per million capita)**	**Size of IT market (% of GDP¦)**	**Growth in IT market (compound annual growth rate %)**
Year	**1996**	**1995**	**1994**	**31/12/95**	**1995**	**1997**	**1995**	**1987-94**
Source	OECD, MSTI, 1998	OECD, MSTI, 1998	OECD, STAN, Database	Mobil Survey, 1996	OECD, MSTI, 1998	US Patent and Trademark Office, Annual Report 1997	OECD, Science, Technology and Industry Outlook, 1998	OECD, Information Technology Outlook, 1997

Country	Observations	28	27	15	26	28	28	24	24
Australia	Value	0.87**	1.69	1.1	495	4.8	32.0	2.6	9.5
	Rank	15	17	12	2	2	15	3	12
Austria	Value	0.83***	1.87***	0	141	2.2	48.3	1.4	11.4
	Rank	16	15	0	11	13	12	17	9
Belgium	Value	1.07**	2.74	0	170	0.8	54.3	1.6	8.9
	Rank	12	9	0	9	19	10	9	14
Canada	Value	1.03	2.87	1.2	48	0.8	92.5	2.6	13.5
	Rank	13	7	11	17	19	5	3	5
Czech Republic	Value	0.64	0.93	0	29	0.6	1.3	0	0
	Rank	17	19	0	23	23	23	0	0
Denmark	Value	1.25	2.39	1.6	252	2.4	71.0	1.6	9.8
	Rank	9	12	9	7	11	7	9	11
EU	Value	1.15	2.32	1.8	237	2.3	0	0	0
	Rank	0	0	0	0	0	0	0	0
Finland	Value	1.71	2.65	1.9	152	4.1	94.5	1.5	2.0
	Rank	5	10	6	10	7	4	13	24
France	Value	1.43	2.63	2.6	95	2.2	53.5	1.5	8.3
	Rank	7	11	4	15	13	11	13	17
Germany	Value	1.51	-3.28	2.3	121	4.7	87.3	1.5	13.1
	Rank	6	5	5	13	3	6	13	6
Greece	Value	0.13***	0.31***	0	24	0.4	1.3	0.5	3.6
	Rank	25	24	0	24	25	22	23	23
Hungary	Value	0.29	0.65	0	0	1.1	3.1	1.6	26.2
	Rank	23	22	0	0	18	21	9	1
Iceland	Value	0.47	2.14	0	45	0.7	13.3	0	0
	Rank	20	14	0	18	21	19	0	0
Ireland	Value	1.13	2.33	1.1*	456	2.4	21.4	1.4	9.1
	Rank	10	13	12	4	11	18	17	13
Italy	Value	0.56	1.16	0.9	84	1.4*	24.9	1.1	5.0
	Rank	18	18	14	16	15	17	19	21
Japan	Value	2.01	6.01	2.7	30	26.6	195.5	1.6	11.5
	Rank	2	1	3	22	1	1	9	8
Luxembourg	Value	0	0	0	121	1.4	70.0	0	0
	Rank	0	0	0	14	15	8	0	0
Mexico	Value	0.06**	0.06	0	2	0.0	0.5	0.7	25.3
	Rank	28	27	0	26	27	26	22	2
Netherlands	Value	1.08**	1.79	1.7	344	1.4	56.3	1.9	11.8
	Rank	11	16	8	5	15	9	8	7
New Zealand	Value	0.26**	0.91	0	480	3.6	26.4	2.9	14.4
	Rank	24	20	0	3	8	16	1	4
Norway	Value	0.97**	3.62	1.4	205	2.5	35.5	1.5	8.4
	Rank	14	4	10	8	10	14	13	16
OECD	Value	1.49	3.44	2.4	0	5.8	0	0	9.5
	Rank	0	0	0	0	0	0	0	0
Poland	Value	0.31	0.60	0	0	0.7	0.4	0	0
	Rank	22	23	0	0	21	27	0	0
Portugal	Value	0.12**	0.20	0	39	0.1	0.6	0.9	7.6
	Rank	26	25	0	19	26	25	21	18
Russia	Value	0.51**	0	0	0	0	0.8	0	0
	Rank	119	0	0	0	0	24	0	0
Spain	Value	0.42	0.68	0.6	38	0.5	4.5	1.0	6.5
	Rank	21	21	15	20	24	20	20	20
Sweden	Value	2.67**	4.41	3.5	125	4.5	111.9	2.2	4.7
	Rank	1	3	1	12	5	3	5	22
Switzerland	Value	1.94	3.15	0	295	4.4	165.6	2.1	11.1
	Rank	3	6	0	6	6	2	6	10
Turkey	Value	0.12	0.11	0	7	0.0	0.1	0.3	24.8
	Rank	26	26	0	25	27	28	24	3
UK	Value	1.26	2.80	1.8	901	3.2	47.5	2.1	7.6
	Rank	8	8	7	1	9	13	6	18

US	Value	1.92	5.91	2.9	34	4.7	0	2.9	8.7
	Rank	4	2	2	21	3	0	1	15

** Data refers to 1995
* Data refers to 1994
*** Data refers to 1993
¦ GNP for Ireland

le A8 Trade

		1	2	3	4	5	7	8	
	Indicator	**Manufacturing exports - concentration, standard deviation of exports by country**	**Manufacturing exports - concentration, standard deviation of imports by country**	**Manufacturing exports - concentration, standard deviation of exports by sector**	**Manufacturing imports - concentration, standard deviation of imports by sector**	**Export performance for total goods - % change from last period**	**Producer prices - manufacturing (1990=100)**	**Trade openness - exports + imports (of goods and services)/GDP¦**	**Trade openn in services - (service exp + service imports)/se output**
	Year	**1995**	**1995**	**1995**	**1995**	**1998e**	**1998**	**1997**	**1994**
	Source	OECD Database Bi-lateral trade	OECD Database Bi-lateral trade	OECD Database Bi-lateral trade	OECD Database Bi-lateral trade	OECD Economic Outlook, No. 64, December 1998	OECD Main Economic Indicators, February, 1999	OECD Main Economic Indicators, February, 1999	World Trade Organisation, International Trade and OE National Acco
ry	Observations	23	23	23	23	27	23	28	12
alia	Value	0.0369	0.0445	0.075	0.114	2.5	112.8*	41.7	0
	Rank	5	13	2	21	7	15	25	0
ia	Value	0.0603	0.0793	0.095	0.096	-0.6	101.7	85.0	0
	Rank	22	22	11	13	17	5	7	0
um	Value	0.0479	0.0489	0.083	0.082	0.3	103.2*	141.3	0.9
	Rank	17	17	4	3	14	7	3	1
da	Value	0.1290	0.1086	0.110	0.128	-1.7	118.7	79.7	0.2
	Rank	23	23	17	23	22	16	9	10
n	Value	0	0	0	0	14.2	0	120.6	0
blic	Rank	0	0	0	0	2	0	4	0
nark	Value	0.0405	0.0432	0.086	0.088	-0.7	106.0*	68.6	0.8
	Rank	6	11	5	7	19	8	15	2
	Value	0	0	0	0	0	113.5	0	0
	Rank	0	0	0	0	0	0	0	0
nd	Value	0.0356	0.0380	0.091	0.105	2.9	108.3	70.8	0
	Rank	4	4	9	18	6	10	14	0
ce	Value	0.0407	0.0414	0.098	0.092	-0.1	97.6	49.3	0.5
	Rank	8	7	12	11	16	2	24	4
any	Value	0.0297	0.0586	0.121	0.092	0.5	107.7	52.1	0.6
	Rank	1	19	21	9	11	9	22	3
ce	Value	0.0571	0.0450	0.075	0.080	0.2	206.0*	39.7	0
	Rank	20	14	1	2	15	21	26	0
ary	Value	0	0	0	0	16.2	0	85.8	0
	Rank	0	0	0	0	1	0	6	0
nd	Value	0.0436	0.0336	0.148	0.084	-2.7	0	72.2	0
	Rank	12	1	22	4	25	0	12	0
nd	Value	0.0481	0.0636	0.115	0.112	16.6	112.2	161.4	0.4
	Rank	18	21	19	20	3	14	2	8
	Value	0.0405	0.0429	0.092	0.087	-2.4	126.5*	50.3	0.4
	Rank	7	9	10	5	23	20	23	6
n	Value	0.0463	0.0432	0.154	0.076	-2.4	93.8	21.0	0.1
	Rank	15	12	23	1	23	1	28	12
mbourg	Value	0	0	0	0	0	98.5	171.4	0
	Rank	0	0	0	0	0	4	1	0
co	Value	0	0	0	0	0.5	379.3	60.6	0

	Rank	0	0	0	0	11	22	16	0
erlands	Value	0.0468	0.0454	0.090	0.091	1.6	102.5	104.9	0.5
	Rank	16	15	7	12	9	6	5	5
	Value	0.0447	0.0494	0.100	0.103	-0.7	109.3*	56.9	0
nd	Rank	14	18	13	17	19	11	18	0
ay	Value	0.0353	0.0373	0.082	0.096	-3.3	109.4	75.5	0
	Rank	3	3	3	12	26	12	10	0
	Value	0	0	0	0	0	114.7	0	0
	Rank	0	0	0	0	0	0	0	0
d	Value	0	0	0	0	6.3	0	55.5	0
	Rank	0	0	0	0	4	0	20	0
gal	Value	0.0490	0.0486	0.087	0.092	0.9	0	71.5	0
	Rank	19	16	6	10	10	0	13	0
a	Value	0	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0	0
	Value	0.0444	0.0429	0.105	0.099	2.1	119.2	55.6	0
	Rank	13	10	14	14	8	17	19	0
en	Value	0.0314	0.0413	0.106	0.106	-0.6	119.4	80.6	0.4
	Rank	2	6	15	19	17	18	8	7
erland	Value	0.0420	0.0587	0.114	0.087	0.4	98.2	75.4	0
	Rank	10	20	18	6	13	3	11	0
ey	Value	0.0597	0.0412	0.090	0.100	3.7	8506.0	55.0	0
	Rank	21	5	8	16	5	23	21	0
	Value	0.0413	0.0360	0.107	0.100	-8.3	125.5	57.9	0.3
	Rank	9	2	16	15	27	19	17	9
	Value	0.0434	0.0425	0.121	0.115	-1.6	109.6	25.6	0.1
	Rank	11	8	20	22	21	13	27	11

for Ireland

Table A9 Financial Markets

		1	2	3	4	5	6	7
	Indicator	**Goverment bond yields (%/100)**	**Interest rate spread - absolute (%/100)**	**Long-term interest rates (%/100)**	**Money market rates (%/100)**	**Rate of return on capital in the business sector**	**Short-term interest rates (%/100)**	**Cumulative venture capital raised as a % of GDP¦/100**
	Year	**1997**	**1997**	**1998e**	**1997**	**1998e**	**1998e**	**1997**
	Source	IMF, Financial Yearbook, 1998	IMF, Financial Yearbook, 1998	OECD, Economic Outlook, No. 64, December 1998	IMF, Financial Yearbook, 1998	OECD, Economic Outlook, No. 64, December 1998	OECD, Economic Outlook, No. 64, December 1998	European Venture Capital Association, Yearbook 1998 and OECD Main Economic Indicators February 1999
Country	Observations	21	24	23	22	19	27	17
Australia	Value	0.069	0	0.055	0	0.141	0.049	0
	Rank	18	0	18	0	11	15	0
Austria	Value	0.048	0	0.046	0.0327	0.157	0.036	0.0008
	Rank	3	0	4	7	7	7	16
Belgium	Value	0.056	0.042	0.048	0.0346	0.144	0.036	0.0076
	Rank	10	13	8	8	10	7	7
Canada	Value	0.064	0.014	0.054	0.0434	0.128	0.050	0
	Rank	15	1	16	11	14	16	0
Czech Republic	Value	0	0.055	0	0	0	0.153	0
	Rank	0	18	0	0	0	23	0

Denmark	Value	0.051	0.05	0.050	0.0371	0.089	0.041	0.0038
	Rank	4	17	10	9	18	9	14
EU	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Finland	Value	0	0.033	0.044	0.0323	0.129	0.035	0.0059
	Rank	0	10	3	5	13	3	8
France	Value	0.056	0.028	0.047	0.0324	0.164	0.035	0.0114
	Rank	11	7	6	6	6	3	4
Germany	Value	0.051	0.064	0.046	0.0320	0.153	0.035	0.0048
	Rank	4	21	4	4	8	3	12
Greece	Value	0	0.088	0	0	0.243	0.118	0.0007
	Rank	0	22	0	0	1	22	17
Hungary	Value	0	0	0	0	0	0.178	0
	Rank	0	0	0	0	0	24	0
Iceland	Value	0.055	0.096	0.130	0.0738	0	0.075	0.0103
	Rank	9	23	21	18	0	21	6
Ireland	Value	0.065	0.061	0.050	0.0574*	0.170	0.058	0.0109
	Rank	16	20	10	14	5	18	5
Italy	Value	0.069	0.049	0.049	0.0688	0.146	0.048	0.0056
	Rank	17	16	9	17	9	14	10
Japan	Value	0.017	0.022	0.015	0.0048	0.117	0.007	0
	Rank	1	4	1	1	16	1	0
Luxembourg	Value	0.054	0.020	0	0	0	0	0
	Rank	7	2	0	0	0	0	0
Mexico	Value	0.328*	0	0.250	0.2191	0	0.235	0
	Rank	21	0	23	20	0	26	0
Netherlands	Value	0.058	0.030	0.047	0.0307	0.189	0.035	0.0132
	Rank	12	8	6	3	3	3	3
New Zealand	Value	0.072	0.041	0.063	0	0.191	0.074	0
	Rank	20	12	20	0	2	20	0
Norway	Value	0.051	0.023	0.054	0	0.065	0.057	0.0057
	Rank	6	5	16	0	19	17	9
OECD	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Poland	Value	0	0.061*	0.164	0.2060*	0	0.184	0
	Rank	0	19	22	20	0	25	0
Portugal	Value	0.055	0.046	0.050	0.0578	0	0.045	0.0041
	Rank	8	15	10	15	0	12	13
Russia	Value	0	0.298	0.	0.2360	0	0	0
	Rank	0	3	0	21	0	0	0
Spain	Value	0.058	0.021	0.050	0.549	0.182	0.044	0.0032
	Rank	13	3	10	13	4	11	15
Sweden	Value	0	0.045	0.051	0.0421	0.118	0.043	0.0177
	Rank	0	14	14	10	15	10	2
Switzerland	Value	0.031	0.035	0.029	0.0135	0.135	0.014	0.0051
	Rank	2	11	2	2	12	2	11
Turkey	Value	0	0	0	0.7032	0	0.864	0
	Rank	0	0	0	22	0	27	0
UK	Value	0.071	0.030	0.055	0.0656	0.111	0.073	0.0398
	Rank	19	9	18	16	17	19	1
US	Value	0.064	0.028	0.052	0.0546	0	0.047	0
	Rank	14	6	15	12	0	13	0

* Data refers to 1996
¦ GNP for Ireland

Table A10 Investment

	1	2	3	4	5	6

	Indicator	FDI inflow (% of GDP ¦)	FDI inflow stock (% of GDP ¦)	FDI outflow stock 0(% of GDP ¦)	Non-residential fixed investment GDP ¦ share	Ratio of educational expenditures to non-residential fixed investment	Top rate of corporation tax
	Year	**1997**	**1996**	**1996**	**1996**	**1994**	**1997**
	Source	OECD, Main Economic Indicators, Basic Structural Statistics, Feb 1999	World Investment Report 1998	World Investment Report 1998	OECD, National Accounts, Vol. II, 1984-1996	OECD, National Accounts and Education at a Glance	International Tax Summaries - Coopers and Lybrand 1998
Country	Observations	27	28	28	22	16	29
Australia	Value	2.4	29.7	11.7	0.172*	0.364	0.36
	Rank	7	5	13	7	11	19
Austria	Value	0.8	8.5	5.8	0.198	0.278	0.34
	Rank	22	19	18	3	14	12
Belgium	Value	5.2	45.8	31.4	0.139	0	0.39
	Rank	1	2	3	14	0	24
Canada	Value	1.4	22.0	21.3	0.128	0.440	0.29
	Rank	15	8	6	18	8	6
Czech Republic	Value	2.4	13.6	0.7	0	0	0.39
	Rank	7	14	23	0	0	24
Denmark	Value	0.8**	13.4	12.9	0	0.590	0.34
	Rank	22	15	11	0	2	12
EU	Value	0	13.0	16.8	0	0	0
	Rank	0	0	0	0	0	0
Finland	Value	1.3	7.1	14.3	0.134	0.664	0.28
	Rank	17	22	9	15	1	2
France	Value	1.1	10.1	13.1	0.151	0.404	0.42
	Rank	18	17	10	9	9	26
Germany	Value	0.0	5.9	12.4	0.145	0.476	0.45
	Rank	27	24	12	12	6	29
Greece	Value	0.9*	16.6	0.7	0	0	0.35
	Rank	20	12	23	0	0	15
Hungary	Value	4.7	33.2	1.1	0	0	0.18
	Rank	2	3	22	0	0	1
Iceland	Value	1.7	2.7	3.3	0.130	0.500	0.33
	Rank	13	26	20	17	5	10
Ireland	Value	2.7**	23.9	8.1	0.122	0.574	0.32
	Rank	6	6	16	19	3	8
Italy	Value	0.3	7.4	10.6	0.131	0.383	0.37
	Rank	25	21	14	16	10	21
Japan	Value	0.1	0.7	5.6	0.257	0.204	0.38
	Rank	26	28	19	1	15	22
Luxembourg	Value	0	0	0	0	0	0.32
	Rank	0	0	0	0	0	8
Mexico	Value	3.1	22.3	0.7	0.114	0	0.34
	Rank	4	7	23	21	0	12
Netherlands	Value	2.4	30.4	49.1	0.154	0.350	0.35
	Rank	7	4	2	8	12	15
New Zealand	Value	2.0	51.8	14.6	0.175	0	0.33
	Rank	12	1	8	6	0	10
Norway	Value	2.4	13.0	18.0	0	0	0.28
	Rank	7	16	7	0	0	2
OECD	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Poland	Value	2.3	9.7	0.6	0	0	0.38
	Rank	11	18	26	0	0	23
Portugal	Value	1.7	6.4	3.3	0.218*	0	0.36
	Rank	13	23	20	2	0	19

Russia	Value	0	1.5	0.2	0	0	0.43
	Rank	0	27	27	0	0	27
Spain	Value	1.0	18.1	6.7	0.180	0.303	0.35
	Rank	19	10	17	5	13	15
Sweden	Value	4.2	13.7	28.3	0.146	0.556	0.28
	Rank	3	13	5	10	4	2
Switzerland	Value	0.9**	18.0	49.2	0.117	0	0.29
	Rank	20	11	1	20	0	5
Turkey	Value	0.5	3.4	0.2	0.182*	0.195	0.44
	Rank	24	25	27	4	16	28
UK	Value	2.9	20.5	30.7	0.140	0	0.31
	Rank	5	9	4	13	0	7
US	Value	1.4	8.3	10.4	0.145	0.447	0.35
	Rank	15	20	15	11	7	15

** Data refers to 1996
* Data refers to 1995
¦ GNP for Ireland

Table A11 Telecommunications Infrastructure

		1	2	3	4
	Indicator	**Mainlines per 100 habitants**	**Internet hosts per 1000 capita**	**Mobile subscriptions per 1000 capita**	**Per capita expenditure on telecommunications (ECU)**
	Year	**1997**	**July 1998**	**1/1/99**	**1997**
	Source	OECD Comminications Outlook, 1999	RIPE NCC: European Hostcount	"Public Network" February 1999	European Information Technology Observatory, 1998
Country	Observations	28	29	21	18
Australia	Value	51.2	40.78	0	0
	Rank	15	6	0	0
Austria	Value	45.7	16.32	0	454
	Rank	19	12	0	14
Belgium	Value	48.5	15.07	168.45	515
	Rank	17	14	14	10
Canada	Value	61.6	33.91	0	0
	Rank	7	8	0	0
Czech Republic	Value	32.0	6.38	87.86	0
	Rank	24	20	18	0
Denmark	Value	63.6	35.90	347.84	663
	Rank	5	7	4	3
EU	Value	0	0	0	0
	Rank	0	0	0	0
Finland	Value	55.6	100.69	0	5.4
	Rank	11	1	0	1
France	Value	57.6	7.39	189.88	475
	Rank	8	18	12	12
Germany	Value	55.0	14.06	164.54	518
	Rank	12	15	15	9
Greece	Value	51.6	3.78	197.81	311
	Rank	14	25	11	17
Hungary	Value	31.9	7.25	94.71	0
	Rank	25	19	17	0
Iceland	Value	56.7	68.93	251.00	0
	Rank	9	3	7	0
Ireland	Value	42.1	12.46	218.06	600
	Rank	21	16	9	6
Italy	Value	44.9	5.65	345.90	434

	Rank	20	22	3	15
Japan	Value	47.9	10.84	0	593
	Rank	18	17	0	7
Luxembourg	Value	67.1	15.36	325.02	0
	Rank	2	13	5	0
Mexico	Value	9.8	0.87	0	0
	Rank	28	28	0	0
Netherlands	Value	56.6	32.78	170.16	576
	Rank	10	9	13	8
New Zealand	Value	50.5	49.38	0	0
	Rank	16	4	0	0
Norway	Value	62.6	71.01	390.91	667
	Rank	6	2	1	2
OECD	Value	0	0	0	0
	Rank	0	0	0	0
Poland	Value	19.4	2.56	46.25	0
	Rank	27	26	19	0
Portugal	Value	40.8	4.56	254.46	317
	Rank	22	24	6	16
Russia	Value	0	0.89	1.02	0
	Rank	0	27	21	0
Spain	Value	39.9	6.23	156.67	292
	Rank	23	21	16	18
Sweden	Value	68.0	42.77	362.81	632
	Rank	1	5	2	4
Switzerland	Value	64.5	28.55	225.35	944
	Rank	4	10	8	1
Turkey	Value	0	0.45	46.23	0
	Rank	0	29	20	0
UK	Value	54.0	20.67	198.26	457
	Rank	13	11	10	13
US	Value	66.0	4.86	0	609
	Rank	3	23	0	5

Table A12 Telecommunications Costs

		1	2	3	4	5
	Indicator	**2Mbit/s leased lines national circuits - connection (ECU)**	**2Mbit/s leased lines national circuits - annual rental 50km (ECU)**	**2Mbit/s leased lines national circuits - annual rental 100km (US$)**	**2Mbit/s leased lines to USA (US$) - annual rental**	**Voice grade lessed lines national circuits - connection (ECU)**
	Year	**1/1/96**	**Feb-99**	**Feb-99**	**Feb-99**	**1/1/96**
	Source	DG XIII, Tariff Data, 1996	Eurodata	Eurodata	Eurodata	DG XIII, Tariff Data, 1996
Country	Observations	13	28	28	25	14
Australia	Value	0	42634	53810	633361	0
	Rank	0	17	15	23	0
Austria	Value	1991	52490	64869	384593	242
	Rank	3	22	21	17	4
Belgium	Value	0	48389	58294	248301	1207
	Rank	0	20	18	7	13
Canada	Value	0	38700	54370	151891	0
	Rank	0	12	16	1	0
Czech Republic	Value	0	116474	116474	924813	0
	Rank	0	28	27	25	0
Denmark	Value	5347	25641	41960	199493	754
	Rank	6	7	11	3	11

EU	Value	7359	0	0	0	596
	Rank	0	0	0	0	0
Finland	Value	0	11859	16208	515198	0
	Rank	0	2	1	22	0
France	Value	9308	31371	39681	182407	698
	Rank	11	9	8	2	10
Germany	Value	4246	60648	70438	0	478
	Rank	4	24	22	0	7
Greece	Value	1192	44591	60838	424433	442
	Rank	2	18	20	19	6
Hungary	Value	0	41716	41716	351783	0
	Rank	0	15	10	11	0
Iceland	Value	0	41820	50565	239044	0
	Rank	0	16	13	6	0
Ireland	Value	18328	22216	28756	222062	489
	Rank	13	5	4	5	8
Italy	Value	576	98675	122605	466954	192
	Rank	1	27	28	21	1
Japan	Value	0	84933	102890	744066	0
	Rank	0	25	26	24	0
Luxembourg	Value	6201	25675	56755	439172	259
	Rank	7	8	17	20	5
Mexico	Value	0	95306	95306	268848	0
	Rank	0	26	24	8	0
Netherlands	Value	8889	39577	48853	213904	222
	Rank	10	13	12	4	2
New Zealand	Value	0	41604	41604	0	0
	Rank	0	14	9	0	0
Norway	Value	0	33600	37293	340529	0
	Rank	0	10	7	9	0
OECD	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Poland	Value	0	36084	52574	382674	0
	Rank	0	11	14	16	0
Portugal	Value	5164	48602	101283	374707	233
	Rank	5	21	25	14	3
Russia	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Spain	Value	6899	52796	71809	401332	627
	Rank	8	23	23	18	9
Sweden	Value	8008	16974	19536	357984	995
	Rank	9	3	2	12	12
Switzerland	Value	0	47423	59091	364320	0
	Rank	0	19	19	13	0
Turkey	Value	0	20140	33087	343082	0
	Rank	0	4	5	10	0
UK	Value	10960	25193	36282	376212	1504
	Rank	12	6	6	15	14
US	Value	0	11820	229800	0	0
	Rank	0	1	3	0	0

Table A12 Telecommunications Costs continued

		6	7	8	9	10	11
	Indicator	**Analogue leased lines national circuits - annual rental**	**Analogue leased lines national circuits - annual rental**	**Analogue leased line to USA (US$)**	**Cost of local call (per minute - peak time) US$**	**Cost of call to the UK (1st minute - -peak time) US$**	**Cost of call to the US (1st minute - -peak time) US$**

		50KM (US$)	100KM (US$)				
	Year	**Feb-99**	**Feb-99**	**Feb-99**	**Feb-99**	**Feb-99**	**Feb-99**
	Source	Eurodata	Eurodata	Eurodata	Eurodata	Eurodata	Eurodata
Country	Observations	25	25	23	28	27	27
Australia	Value	4373	4840	0	0.0000	0.572	0.572
	Rank	13	12	0	1	22	18
Austria	Value	6982	8220	30949	0.0718	0.429	0.483
	Rank	21	22	13	28	13	12
Belgium	Value	5729	8060	38512	0.0465	0.422	0.563
	Rank	19	21	19	24	12	17
Canada	Value	4383	6644	0	0.0000	0.444	0.351
	Rank	14	17	0	1	14	7
Czech Republic	Value	4661	4661	51272	0.0247	0.629	1.031
	Rank	16	10	22	14	23	27
Denmark	Value	2543	4175	30773	0.0443	0.366	0.476
	Rank	7	9	12	22	8	11
EU	Value	0	0	o	0	0	0
	Rank	0	0	0	0	0	0
Finland	Value	0	0	24793	0.0143	0.527	0.683
	Rank	0	0	8	5	19	22
France	Value	7190	7814	34902	0.0398	0.302	0.322
	Rank	22	18	16	21	5	3
Germany	Value	7288	7985	36442	0.0465	0.419	0.419
	Rank	23	20	17	25	11	8
Greece	Value	4393	5794	38199	0.0153	0.531	0.594
	Rank	15	16	18	6	21	20
Hungary	Value	1751	1751	24729	0.0328	0.502	0.547
	Rank	4	3	7	19	18	16
Iceland	Value	3960	4788	25423	0.0178	0.377	0.537
	Rank	11	11	9	9	9	15
Ireland	Value	3077	3402	24225	0.0457	0.226	0.346
	Rank	9	6	6	23	3	6
Italy	Value	6482	7826	43918	0.0203	0.670	0.670
	Rank	20	19	20	11	24	21
Japan	Value	0	0	63983	0.0287	1.634	0.688
	Rank	0	0	23	15	27	23
Luxembourg	Value	1689	2703	21621	0.0306	0.335	0.440
	Rank	3	4	2	16	7	9
Mexico	Value	0	0	0	0.0000	1.465	0.817
	Rank	0	0	0	1	26	25
Netherlands	Value	2971	3899	22881	0.0309	0.165	0.222
	Rank	8	7	3	18	1	1
New Zealand	Value	5039	5039	0	0.0245	0.296	0.296
	Rank	17	13	0	13	4	2
Norway	Value	3908	5682	18861	0.0332	0.216	0.324
	Rank	10	15	1	20	2	4
OECD	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Poland	Value	2475	4052	25487	0.0190	0.460	0.942
	Rank	6	8	10	10	15	26
Portugal	Value	5564	11987	33712	0.0160	0.460	0.518
	Rank	18	24	15	7	16	19
Russia	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Spain	Value	14266	16334	28011	0.0309	0.403	0.505
	Rank	25	25	11	17	10	13
Sweden	Value	1184	1491	31146	0.0231	0.307	0.461
	Rank	2	1	14	12	6	10
Switzerland	Value	9300	11034	24223	0.0470	0.528	0.528

	Rank	24	23	5	26	20	14
Turkey	Value	1007	1654	23350	0.0163	0.499	0.749
	Rank	1	2	4	8	17	24
UK	Value	3994	5357	46197	0.0552	0	0.330
	Rank	12	14	21	27	0	5
US	Value	1858	3391	0	0.0130	1.140	0
	Rank	5	5	0	4	25	0

Table A13 Transport and Comminications Costs and Infrastructure

		1	2	3	4
	Indicator	**Insurance and freight (debit + credit) as % of total trade**	**Letter costs - EU domestic tariffs (Irish pence)**	**Rail infrastructure indicator**	**Road infrastructure indicator**
	Year	**1992**	**18/5/98**	**1994**	**1994**
	Source	Handbook of International Trade and Development	An Post	European Conference of Ministers of Transport	European Conference of Ministers of Transport
Country	Observations	26	15	18	19
Australia	Value	3.713	0	0	0
	Rank	13	0	0	0
Austria	Value	3.997	39.5	27673	24074
	Rank	14	13	4	7
Belgium	Value	5.744	32.7	25988	68791
	Rank	21	9	5	4
Canada	Value	0.779	0	0	0
	Rank	2	0	0	0
Czech Republic	Value	8.776	0	30525	26739
	Rank	25	0	3	6
Denmark	Value	6.970	39.1	3878	12545
	Rank	24	12	15	10
EU	Value	4.022	33.0	0	0
	Rank	0	0	0	0
Finland	Value	3.179	36.6	6685	2792
	Rank	9	11	12	17
France	Value	5.568	35.5	14067	6733
	Rank	20	10	8	13
Germany	Value	2.459	43.7	25289	83399
	Rank	7	14	6	3
Greece	Value	4.068	22.9	0	1524
	Rank	16	2	19	18
Hungary	Value	0.757	0	0	0
	Rank	1	0	0	0
Iceland	Value	3.141	0	0	0
	Rank	8	0	0	0
Ireland	Value	2.025	30.0	287	4336
	Rank	5	4	17	15
Italy	Value	5.366	32.2	9402	16626
	Rank	18	8	9	9
Japan	Value	3.563	0	0	0
	Rank	12	0	0	0
Luxembourg	Value	0	30.8	69627	329551
	Rank	0	6	1	1
Mexico	Value	0	0	0	0
	Rank	0	0	0	0
Netherlands	Value	5.493	28.2	8771	22653
	Rank	19	3	10	8

New Zealand	Value	4.004	0	0	0
	Rank	15	0	0	0
Norway	Value	12.414	0	6936	9871
	Rank	26	0	11	12
OECD	Value	0	0	0	0
	Rank	0	0	0	0
Poland	Value	6.406	0	0	0
	Rank	23	0	0	0
Portugal	Value	4.370	31.0	1547	5834
	Rank	17	7	16	14
Russia	Value	5.745	0	0	0
	Rank	22	0	0	0
Spain	Value	3.417	16.4	4412	28932
	Rank	10	1	14	5
Sweden	Value	3.456	45.7	18699	4172
	Rank	11	15	7	16
Switzerland	Value	1.389	0	30640	97260
	Rank	3	0	2	2
Turkey	Value	0	0	240	776
	Rank	0	0	18	19
UK	Value	2.138	30.0	6034	11569
	Rank	6	4	13	11
US	Value	1.942	0	0	0
	Rank	4	0	0	0

Table A14 Energy Costs

		1	2	3	4	5	6	7
	Indicator	**Automotive diesel oil prices for commercial use (US&/toe)**	**Heavy fuel oil prices for industry (US$/toe)**	**Industrial electricity prices - 24GWh per annum - VAT excl(ecu)**	**Industrial electricity prices - 10GWh per annum - VAT excl(ecu)**	**Industrial electricity prices - 1.25GWh per annum - VAT excl(ecu)**	**Gas prices - industrial rate excl. VAT (4186 GJ/200 days)**	**Gas prices - industrial rate excl. VAT (41860 GJ/250 days/4000 hours)**
	Year	**Q1 1998**	**Q1 1998**	**01/01/98**	**01/01/98**	**01/01/98**	**01/01/98**	**01/01/98**
	Source	International Energy Agency, Energy Prices and taxes, 2nd Quarter 1998	International Energy Agency, Energy Prices and taxes, 2nd Quarter 1998	Eurostat Energy and Industry, 1998, 14	Eurostat Energy and Industry, 1998, 14	Eurostat Energy and Industry, 1998, 14	Eurostat Energy and Industry, 1998, 15	Eurostat Energy and Industry, 1998, 15
Country	Observations	25	26	15	16	16	13	11
Australia	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Austria	Value	664.7	107.0	7.00	7.92	10.10	7.4	0
	Rank	15	6	14	13	15	13	0
Belgium	Value	625.8	108.2	5.64	6.85	8.77	4.9	3.5
	Rank	12	7	11	12	12	4	3
Canada	Value	433.4	162.3	0	0	0	0	0
	Rank	4	17	0	0	0	0	0
Czech Republic	Value	522.3	82.5	0	0	0	0	0
	Rank	6	1	0	0	0	0	0
Denmark	Value	683.9	159.9	5.50	5.76	5.93	6.3	4.1
	Rank	17	15	10	6	4	10	7
EU	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Finland	Value	661.1	171.6	3.91	4.39	5.04	4.0	3.8

	Rank	14	19	3	3	3	2	6
France	Value	668.3	127.5	5.15	5.96	6.99	5.5	3.7
	Rank	16	9	7	9	7	6	5
Germany	Value	641.2	118.4	6.57	7.98	9.89	5.9	5.2
	Rank	13	8	13	14	14	8	11
Greece	Value	503.6	171.7	4.94	5.87	6.35	0	0
	Rank	5	20	6	8	5	0	0
Hungary	Value	753.7	102.8	0	0	0	0	0
	Rank	21	5	0	0	0	0	0
Iceland	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Ireland	Value	737.8	184.4	5.31	6.18	8.07	5.7	3.0
	Rank	20	22	8	11	10	7	1
Italy	Value	762.4	145.7	7.07	8.74	10.92	6.4	4.4
	Rank	22	13	15	15	16	11	9
Japan	Value	557.4	184.1	0	0	0	0	0
	Rank	7	21	0	0	0	0	0
Luxembourg	Value	568.2	131.0	4.64	5.63	8.55	5.1	4.8
	Rank	9	11	4	5	11	5	10
Mexico	Value	331.6*	89.2	0	0	0	0	0
	Rank	2	3	0	0	0	0	0
Netherlands	Value	708.6	167.3	4.74	5.56	6.85	6.9	4.2
	Rank	18	18	5	4	6	12	8
New Zealand	Value	274.9	196.8	0	0	0	0	0
	Rank	1	24	0	0	0	0	0
Norway	Value	955.4	329.5	2.55	3.17	4.50	0	0
	Rank	24	26	1	1	1	0	0
OECD	Value	0	160.7	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Poland	Value	408.1	83.7	0	0	0	0	0
	Rank	3	2	0	0	0	0	0
Portugal	Value	597.7	150.5	5.82	8.84	9.79	0	0
	Rank	11	14	12	16	13	0	0
Russia	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Spain	Value	562.7	157.3	5.49	6.10	7.18	4.0	3.5
	Rank	8	16	9	10	8	3	4
Sweden	Value	709.5	197.6	3.29	3.76	4.86	6.2	0
	Rank	19	25	2	2	2	9	0
Switzerland	Value	788.7	130.6	0	0	0	0	0
	Rank	23	10	0	0	0	0	0
Turkey	Value	576.8	188.8	0	0	0	0	0
	Rank	10	23	0	0	0	0	0
UK	Value	1007.8	140.7	0	5.79	7.23	3.9	3.1
	Rank	25	12	0	7	9	1	2
US	Value	0	94.1	0	0	0	0	0
	Rank	0	4	0	0	0	0	0

***** Data refers to 4th Quarter 1997

Table A15 Property and Construction Costs

		1	2	3	4	5	6	7
	Indicator	**Industrial occupancy costs (IRP£ per sq. m.)**	**Office occupancy costs (IRP£ per sq. m.)**	**Building costs industrial (IRP£ per sq. m.)**	**Building costs offices (IRP£ per sq. m.)**	**Average of ranks for carpentry, steel reinforcement, concrete and cement**	**Construction skilled labour costs (per hour ECU)**	**Unweighted average of skilled and unskilled labour costs (Q1 1994 - ECU per**

						material costs		hour)
	Year	**1997**	**1997**	**1997**	**1997**	**Q1 1994**	**Q1 1994**	**Q1 1994**
	Source	Hamilton Osborne King, Property Bulletin, 1998	Hamilton Osborne King, Property Bulletin, 1998	Hamilton Osborne King, Property Bulletin, 1998	Hamilton Osborne King, Property Bulletin, 1998	SPON, European Construction Handbook, 1996	SPON, European Construction Handbook, 1996	SPON, European Construction Handbook, 1996
Country	Observations	20	20	20	20	18	16	15
Australia	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Austria	Value	51.9	149.1	648	1188	10.75	21.99	19.98
	Rank	13	9	20	19	13	12	9
Belgium	Value	36.9	116.8	240	645	5.00	26.95	24.71
	Rank	3	2	4	6	4	15	13
Canada	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Czech Republic	Value	50.3	242.1	293	495	0	0	0
	Rank	10	14	7	3	0	0	0
Denmark	Value	49.9	154.8	474	949	11.75	23.05	23.05
	Rank	9	10	17	16	15	13	11
EU	Value	0	0	0	0	0	17.95	0
	Rank	0	0	0	0	0	0	0
Finland	Value	68.6	184.2	648	1080	4.75	16.19	13.73
	Rank	18	13	19	18	3	6	5
France	Value	40.7	145.9	396	848	12.75	16.24	13.81
	Rank	5	6	13	13	16	7	6
Germany	Value	44.2	179.7	457	914	8.25	29.82	27.80
	Rank	6	11	16	14	7	16	14
Greece	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Hungary	Value	54.8	182.7	247	914	0	0	0
	Rank	14	12	5	14	0	0	0
Iceland	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Ireland	Value	67.3	244.8	430	1076	9.75	12.50	11.22
	Rank	17	16	14	17	10	4	3
Italy	Value	35.4	123.1	200	664	3.25	16.38	15.88
	Rank	1	4	3	7	2	8	7
Japan	Value	0	0	0	0	10.00	0	0
	Rank	0	0	0	0	12	0	0
Luxembourg	Value	49.8	243.4	369	737	0	18.91	0
	Rank	8	15	11	8	0	9	0
Mexico	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Netherlands	Value	36.8	122.7	321	811	13.50	23.65	23.35
	Rank	2	3	9	12	17	14	12
New Zealand	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Norway	Value	0	0	0	0	9.50	21.98	20.43
	Rank	0	0	0	0	9	11	10
OECD	Value	0	0	0	0	0	0	0
	Rank	0	0	0	0	0	0	0
Poland	Value	75.1	351.8	296	626	1.00	0.60	0
	Rank	20	19	8	5	1	1	0
Portugal	Value	49.7	149.0	199	452	9.75	8.47	6.17
	Rank	7	8	2	2	10	2	1
Russia	Value	71.2	426.9	395	791	0	0	0
	Rank	19	20	12	10	0	0	0
Spain	Value	38.1	109.7	270	529	8.0	12.78	11.57
	Rank	4	1	6	4	6	5	4

Sweden	Value	51.8	146.8	432	777	8.50	19.47	18.97
	Rank	12	7	15	9	8	10	8
Switzerland	Value	56.8	249.9	545	1272	15.75	0	0
	Rank	15	17	18	20	18	0	0
Turkey	Value	51.4	134.4	161	336	0	0	0
	Rank	11	5	1	1	0	0	0
UK	Value	60.1	269.1	356	793	6.50	9.16	7.72
	Rank	16	18	10	11	5	3	2
US	Value	0	0	0	0	11.33	37.47	31.84
	Rank	0	0	0	0	14	17	15

Table A16 Environment

		1	2	3	4	5
	Indicator	**CO_2 emissions from energy uses (tonnes/capita)**	**Per capita NO_x emissions from fossil fuels (kg NO_x)**	**Per capita SO_x emissions from fossil fuels (kg SO_x)**	**Recycling activity: recovery ratio - glass (%)**	**Recycling activity: recovery ratio - paper/board (%)**
	Year	**1995**	**1992**	**1992**	**1993**	**1990**
	Source	OECD, Main Economic Indicators, Basic Structural Indicators, Oct. 1997	OECD, Environmental Data Compendium, 1997	OECD, Environmental Data Compendium, 1997	Eurostat, Basic Statistics of the European Community, 1996	Eurostat, Basic Statistics of the European Union
Country	Observations	27	26	25	14	18
Australia	Value	15.8	0	0	0	0
	Rank	24	0	0	0	0
Austria	Value	7.5	23	9	68.0	36.8
	Rank	11	6	4	3	10
Belgium	Value	11.6	35	25	55.0	14.7
	Rank	20	13	9	6	17
Canada	Value	15.9	68	91	0	20.0
	Rank	25	24	24	0	16
Czech Republic	Value	11.7	36	125	0	0
	Rank	23	15	25	0	0
Denmark	Value	11.6	53	30	62.0	35.4
	Rank	20	22	15	4	11
EU	Value	0	32	32	0	0
	Rank	0	0	0	0	0
Finland	Value	10.7	54	22	46.0	40.8
	Rank	18	23	8	8	7
France	Value	6.2	26	17	46.0	45.7
	Rank	6	7	7	8	5
Germany	Value	10.8	27	37	70.0	39.6
	Rank	19	9	16	2	8
Greece	Value	7.3	33	50	20.0	30.0
	Rank	9	12	18	14	13
Hungary	Value	5.6	18	72	0	0
	Rank	4	4	23	0	0
Iceland	Value	8.8	81	29	0	0
	Rank	14	26	13	0	0
Ireland	Value	9.7	37	53	29.0	3.0
	Rank	17	16	19	10	18
Italy	Value	7.4	37	25	52.0	0
	Rank	10	16	9	7	0
Japan	Value	9.2	12	7	0	49.6
	Rank	15	2	2	0	3

Luxembourg	Value	21.8	0	26	0	0
	Rank	27	0	11	0	0
Mexico	Value	3.5	15	0	0	0
	Rank	2	3	0	0	0
Netherlands	Value	11.6	35	9	76.0	50.3
	Rank	20	13	4	1	2
New Zealand	Value	8.2	43	0	0	0
	Rank	13	19	0	0	0
Norway	Value	7.8	51	8	0	26.0
	Rank	12	21	3	0	16
OECD	Value	0	38	38	0	0
	Rank	0	0	0	0	0
Poland	Value	0	29	68	0	0
	Rank	0	10	22	0	0
Portugal	Value	5.1	26	27	29.0	39.1
	Rank	3	7	12	10	9
Russia	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Spain	Value	6.3	31	53	29.0	51.0
	Rank	7	11	19	10	1
Sweden	Value	6.4BR>8	45	11	59.0	42.9
	Rank		20	6	5	6
Switzerland	Value	5.9	19	5	0	49.4
	Rank	5	5	1	0	4
Turkey	Value	2.6	9	29	0	0
	Rank	1	1	13	0	0
UK	Value	9.6	38	47	29.0	31.0
	Rank	16	18	17	10	12
US	Value	19.9	75	63	0	28.6
	Rank	26	25	21	0	14

Table A17 SME Performance

		1	2	3	4	5	6
	Indicator	**Labour productivity (*1,000 ECU/PPP) 0-9**	**Labour productivity (*1,000 ECU/PPP) 10-49**	**Labour productivity (*1,000 ECU/PPP) 50-249**	**Turnover limit for concession providing relief from VAT registration (US$)**	**Average debtor days**	**Percentage of SMEs exporting**
	Year	**1995**	**1995**	**1995**	**01/01/96**	**1997**	**1996**
	Source	European Observatory for SMEs, Fourth Annual Report, 1996	European Observatory for SMEs, Fourth Annual Report, 1996	European Observatory for SMEs, Fourth Annual Report, 1996	OECD/DAFFE/ CFA/CT(96)24	Grant Thornton European Business Survey 1997	Grant Thornton European Business Survey 1996
Country	Observations	18	18	18	17	16	16
Australia	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Austria	Value	11	36	64	28110	43	64
	Rank	17	12	4	5	5	2
Belgium	Value	57	56	59	7200	52	69
	Rank	1	2	6	11	9	1
Canada	Value	0	0	0	22760	0	0
	Rank	0	0	0	6	0	0
Czech Republic	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Denmark	Value	31	38	44	2960	35	52

	Rank	10	9	12	15	2	7
EU	Value	0	0	0	0	61	54
	Rank	0	0	0	0	0	0
Finland	Value	27	33	40	10590	24	51
	Rank	13	16	16	9	1	9
France	Value	33	38	45	1820	64	49
	Rank	6	9	11	17	13	10
Germany	Value	36	43	65	4,340	38	52
	Rank	3	3	3	13	4	7
Greece	Value	16	32	24	7444	77	55
	Rank	16	17	18	10	15	5
Hungary	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Iceland	Value	32	36	48	1920	0	0
	Rank	7	12	9	16	0	0
Ireland	Value	20	34	68	57,140	59	34
	Rank	15	15	2	3	11	16
Italy	Value	35	41	62	0	84	58
	Rank	4	4	5	0	16	4
Japan	Value	0	0	0	269,060	0	0
	Rank	0	0	0	1	0	0
Luxembourg	Value	32	58	72	11040	56	42
	Rank	7	1	1	8	10	13
Mexico	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Netherlands	Value	32	39	41	0	46	55
	Rank	7	5	14	0	6	5
New Zealand	Value	0	0	0	6880	0	0
	Rank	0	0	0	12	0	0
Norway	Value	27	39	46	3990	0	0
	Rank	13	5	10	14	0	0
OECD	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Poland	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Portugal	Value	10	21	27	12790	61	64
	Rank	18	18	17	7	12	2
Russia	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
Spain	Value	34	38	44	0	73	41
	Rank	5	9	12	0	14	15
Sweden	Value	28	39	41	0	37	49
	Rank	12	5	14	0	3	10
Switzerland	Value	44	36	52	50,990	50	38
	Rank	2	12	8	4	7	15
Turkey	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0
UK	Value	31	39	58	71440	50	45
	Rank	10	5	7	2	7	12
US	Value	0	0	0	0	0	0
	Rank	0	0	0	0	0	0

Table A18 Public Administration

		1	2	3	4	5
	Indicator	**General government consolidated gross**	**Net lending (+) or borrowing (-) of general**	**Government spending (% GDP)**	**Share of general government in**	**Tax (% GDP)**

		debt (% GDP)	government (% GDP)		total employment	
	Year	1998e	1998e	1998e	1996	1998e
	Source	EU Economic Data Pocket Book, No. 10-11/and Dept. of Finance, Stability Programme, 1999-2001	EU Economic Data Pocket Book, No. 10-11/and Dept. of Finance, Stability Programme, 1999-2001	EU Economic Data Pocket Book, No. 10-11/1998	OECD Employment Outlook, July 1997	EU Economic Data Pocket Book, No. 10-11/1998
Country	Observations	15	17	17	24	17
Australia	Value	0	0	0	16.3	0
	Rank	0	0	0	10	0
Austria	Value	64.0	-2.2	51.5	20.6	49.3
	Rank	9	11	12	17	12
Belgium	Value	117.2	-1.3	51.0	19.1	49.7
	Rank	14	8	12	15	13
Canada	Value	0	0	0	21.7	0
	Rank	0	0	0	18	0
Czech Republic	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Denmark	Value	58.8	1.2	57.6	32.4	58.8
	Rank	7	4	16	23	16
EU	Value	70.3	-1.8	48.1	0	46.3
	Rank	0	0	0	0	0
Finland	Value	52.9	0.7	52.2	22.5	52.9
	Rank	4	6	14	19	15
France	Value	58.3	-2.9	54.1	24.5	51.3
	Rank	6	16	15	20	14
Germany	Value	61.3	-2.6	47.5	16.2	44.8
	Rank	8	14	9	9	8
Greece	Value	108.7	-2.4	41.5	10.4	39.0
	Rank	13	13	5	3	4
Hungary	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Iceland	Value	0	0	0	18.5	0
	Rank	0	0	0	13	0
Ireland	Value	52.0	2.0	31.6	17.7	33.7
	Rank	3	2	1	11	2
Italy	Value	118.8	-2.6	49.9	18.6	47.2
	Rank	15	14	11	14	11
Japan	Value	0	-5.5	38.6	8.3	33.0
	Rank	0	17	3	1	1
Luxembourg	Value	7.1	2.2	44.5	0	46.8
	Rank	1	1	8	0	9
Mexico	Value	0	0	0	31.7	0
	Rank	0	0	0	22	0
Netherlands	Value	68.6	-1.4	48.3	10.8	47.0
	Rank	11	9	10	4	10
New Zealand	Value	0	0	0	14.7	0
	Rank	0	0	0	6	0
Norway	Value	0	0	0	31.1	0
	Rank	0	0	0	21	0
OECD	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Poland	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Portugal	Value	57.4	-2.3	42.8	18.2	40.4
	Rank	5	12	6	12	6
Russia	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Spain	Value	67.7	-2.1	42.9	15.0	39.0

	Rank	10	10	7	7	4
Sweden	Value	74.0	0.9	61.8	33.1	62.7
	Rank	12	5	17	24	17
Switzerland	Value	0	0	0	11.3	0
	Rank	0	0	0	5	0
Turkey	Value	0	0	0	8.8	0
	Rank	0	0	0	2	0
UK	Value	51.5	-0.1	40.6	19.6	40.5
	Rank	2	7	4	16	7
US	Value	0	1.4	35.8	15.5	37.3
	Rank	0	3	2	8	3

Table A19 Socioeconomic Performance

		1	2	3	4	5
	Indicator	**Cumulative employment growth, (%)**	**Consumer prices, annual average rate (%)**	**GDP¦ growth (%)**	**GDP¦ per capita (EU GDP per capita (PPS) (%)**	**Standardised unemployment rate (%)**
	Year	**1996-98**	**1998**	**1998**	**1998e**	**1998**
	Source	OECD, Employment Outlook, June 1998 and Dept. of Finance Stability Programme 1999 to 2001	OECD Main Economic Indicators, Feb 1999	OOECD Main Economic Indicators, Feb 1999 and Dept. of Finance Stability Programme 1999 to 2001	European Economy No. 65, 1998	OECD Main Economic Indicators, Feb 1999
Country	Observations	28	27	28	17	21
Australia	Value	3.85	0.9	3.6	0	8.2*
	Rank	16	5	12	0	13
Austria	Value	0.10	0.9	3.1	111.8	4.4
	Rank	25	6	14	6	6
Belgium	Value	1.71	0.9	2.9	112.6	8.8
	Rank	19	8	18	5	16
Canada	Value	5.50	1.0	3.0	0	8.4
	Rank	10	10	16	0	15
Czech Republic	Value	-1.40	10.7	-0.7	0	0
	Rank	27	24	27	0	0
Denmark	Value	5.60	1.8	2.4	116.4	5.1
	Rank	9	16	22	3	9
EU	Value	1.81	1.7	2.9	100.0	10.0
	Rank	0	0	0	0	0
Finland	Value	7.37	1.4	5.0	99.8	11.8
	Rank	4	12	5	11	18
France	Value	1.40	0.7	3.1	104.5	11.9
	Rank	21	4	14	9	19
Germany	Value	-2.39	1.0	2.7	109.2	9.7
	Rank	28	9	20	7	17
Greece	Value	3.54	4.8	3.0	68.3	0
	Rank	17	23	16	17	0
Hungary	Value	0.20	13.4	5.1	0	0
	Rank	24	25	4	0	0
Iceland	Value	6.12	1.6	5.6	0	0
	Rank	8	14	3	0	0
Ireland	Value	14.11	2.4	8.5	89.3	7.8
	Rank	2	20	1	14	12
Italy	Value	0.70	1.7	1.5	102.6	12.2*
	Rank	22	15	25	10	20

Japan	Value	1.50	0.6	-2.6	115.1	4.1
	Rank	20	3	28	4	4
Luxembourg	Value	4.05	0.9	4.7	164.1	2.2
	Rank	14	7	6	1	1
Mexico	Value	22.77	15.9	4.6	0	0
	Rank	1	26	8	0	0
Netherlands	Value	6.54	2.0	3.8	105.3	4.1*
	Rank	7	18	10	8	4
New Zealand	Value	4.64	1.2	0.2	0	7.4*
	Rank	12	11	26	0	11
Norway	Value	7.69	2.2	2.3	0	3.3*
	Rank	3	19	23	0	2
OECD	Value	3.74	2.0	2.2	0	6.9
	Rank	0	0	0	0	0
Poland	Value	4.16	0	5.7	0	0
	Rank	13	0	2	0	0
Portugal	Value	4.05	2.7	4.0	68.4	4.9
	Rank	15	21	9	16	8
Russia	Value	0	0	0	0	0
	Rank	0	0	0	0	0
Spain	Value	7.16	1.8	3.8	78.6	18.9
	Rank	5	17	10	15	21
Sweden	Value	-1.30	0.4	2.8	96.9	8.2
	Rank	26	2	19	13	14
Switzerland	Value	0.30	0.0	1.7	0	3.7***
	Rank	23	1	24	0	3
Turkey	Value	7.06	84.6	4.7	0	0
	Rank	6	27	6	0	0
UK	Value	3.33	3.4	2.7	98.7	6.3*
	Rank	18	22	20	12	10
US	Value	5.19	1.5	3.5	144.9	4.5
	Rank	11	13	13	2	7

* Data refers to first three quarters of 1998
*** Data refers to first two quarters of 1998
¦ GNP for Ireland

Council Members

Brian Patterson	Chairman
William Burgess[1]	Partner, Business Insight
Kevin Bonner	Partner, Business Insight
Donal Byrne	Chairman, Cadbury Ireland
Des Geraghty	Vice President, SIPTU
Alan Gray	Managing Director, Indecon Economic Consultants
Jackie Harrison[2]	Director - Enterprise, IBEC
Annette Hughes[3]	Economist, DKM Economic Consultants Limited
Billy McCann	Chairman, ESB
Martha O'Byrne[4]	Managing Director, Blooming Clothing Company
Patricia O'Donovan	Deputy General Secretary, ICTU
Lorraine Sweeney[5]	Chairperson, Small Firms Association
John Travers	CEO, Forfás

1. Council Member from 14 April 1998
2. Council Member from 18 June 1998
3. Council Member from 22 April 1999
4. Council Member from 18 March 1999
5. Council Member from 23 April 1998

ENDNOTES

1. A performance projected to be repeated in 1999.
2. Austria, Belgium, Denmark and the Netherlands.
3. measured using the Purchasing Power Standard (PPS) adjustment that takes account of differences in price levels between countries
4. which adjusts national income (GDP) to take account inter alia of the high level of profit repatriations by foreign multinationals from the Irish economy
5. i.e. Austria, Belgium, Denmark and the Netherlands (Luxembourg excluded)
6. supply capacity or trend output level
7. The percentage change in the ratio of export volume growth to export market growth
8. Harmonised Index of Consumer Prices (HICP)
9. Ireland falls a further place to 17th in the OECD when Internet hosts under generalised Top Level Domains (gTLDs) are included
10. On a whole economy basis
11. OECD Economic Outlook No. 64 December 1998
12. Rising skills and productivity levels in the economy will lead over time to convergence in compensation levels in Ireland with those in other high income advanced economies
13. GNP per capita relative to the EU average level of GNP per capita in PPS terms. Ireland's GNP per capita is now estimated at 88.2 per cent of the EU average level of GNP per capita for 1998 in PPS terms
14. Department of Trade and Industry (1998): Our Competitive Future - building the knowledge driven economy
15. The UK government is committed to add 700,000 extra students a year to further and higher education by 2002
16. The "New Deal" a key part of the UK government's stg£4.9bn, five year, Welfare-to-Work programme focused on the needs of the long-term unemployed (in particular those aged under 25 years) has to date, according to the UK Treasury, benefited over 350,000 people
17. Of the magnitude analysed in the ESRI study The Economic Implications for Ireland of EMU (1996) where sterling is assumed to devalue by 20 per cent from its equilibrium level against the euro
18. Estimated to be in the region 2.50-2.60DM
19. National Competitiveness Council (December 1998) Statement on Skills
20. ESRI (1999) National Investment Priorities for the Period 2000-2006
21. The UK, USA, Benelux, Germany, France, and the Netherlands
22. The UK, USA, Japan, Germany, Singapore and France
23. ODP, organic chemicals, medical and pharmaceutical products and electrical machinery etc.
24. National Competitiveness Council (November 1998) Statement on Telecommunications: A Key Factor in Electronic Commerce and Competitiveness
25. Commissioned from Irish Marketing Surveys and carried out at the end of 1998
26. Economic Implications for Ireland of EMU. ESRI (1996)
27. Excellence in Schools UK Education White Paper (October 1997)
28. The UK government is committed to adding 700,000 extra students a year to further and higher education by 2002
29. The New Deal is a key part of the UK government's £4.9bn five year Welfare-to-Work programme focused on the needs of the long-term unemployed (in particular those aged under 25 years) it has to date, according to the UK Treasury, benefited over 350,000 people
30. Contingency actions that Irish enterprises should consider to provide against a sharp sterling depreciation are set out in Document 9 of the Forfás EMU Business Awareness Campaign "What About Sterling: Sustained Actions for Companies"
31. An End of Term Report, Nicholas Crafts, Centrepiece (June 1998)
32. GKI Economic Research, Budapest, undertook a review of competitiveness in Hungary in 1998 for the National Competitiveness Council. This chapter summarises this report with some supplementary material coming from additional sources including the OECD and IMF
33. US, UK, Germany, Netherlands, Sweden, Denmark, Ireland and New Zealand
34. Germany, Sweden, France, UK, Netherlands, USA and Japan
35. According to the OECD caution is required in comparing school expectancy since neither the length of the school year nor the quality of education is necessarily the same
36. "Should there be a tendency to…. shorten studies during the ensuing years the actual average duration of schooling for the cohort will be… lower" page 138 Education at a Glance OECD (1997)
37. To be evenly distributed between primary and secondary schools
38. Kevin Hannigan, Irish Management Institute, Irish Bankers Review (Autumn 1998)
39. The childcare report has been referred to an Inter-Departmental Group to evaluate, prioritise and cost
40. Expected to report by the Summer
41. Forfás, Expert Group on Future Skills Needs, The First Report of the Expert Group on Future Skills Needs
42. FÁS have now examined in detail skill needs in the construction sector and those of the retail sector and tourism are addressed, in part, in the second report of the Skills Group
43. Trading Qualifications for Jobs, ESRI, 1998
44. TEASTAS, Submission 74 to the Department of Education and Science
45. Kearns A. and Ruane, F. "The Post-Entry Performance of Irish Plants: Does a Plant's Technological Activity Matter?" Irish Economic Association Conference, April 1998
46. Ruane, F. and Kearns A. "To R&D or not to R&D, that is the Question: A Firm Level Study of Employment Growth in the Irish Manufacturing Sector, 1986-1995", Trinity Economic Papers, Sept. 1997
47. National Investment Priorities for the Period 2000-2006, ESRI (1999)
48. Actions that Irish enterprises should consider to provide against a sharpened sterling depreciation have been set out in Document 19 'What about Sterling: Sustained Actions for Companies' of the Forfás EMU Business Awareness Campaign

49. Ireland's Trading Potential With CEECs: A Gravity Study, Brulhart M. and Kelly M. Trinity Economic Paper Series, Technical Paper No. 98/15
50. FDI and Trade The Irish Host-Country Experience. Barry F and J Bradley: Economic Journal (November 1997)
51. Article in The Irish Times Monday, January 4, 1999 "Firms in £9bn worth of mergers"
52. "Outward Direct Investment from Ireland" Treanor, C. (1998). The paper quotes a study of the OECD economies which estimates that each additional dollar of outward investment gives rise to two dollars of exports and a trade surplus of $1.70
53. World Investment Report 1997, Untied Nations
54. "The Business Climate for Multinational Corporations in Ireland" Kevin Hannigan (The Irish Banking Review Autumn 1998)
55. Private Sector Investment in Ireland. NESC (1998)
56. The Business Culture in Germany. Randlesome, C. (1994)
57. Venture capital and the structure of capital markets: banks versus stock markets. Black and Gilson, (1998)
58. According to the Department of Enterprise, Trade and Employment Annual Report 1997 on small business
59. European Information Technology Observatory, 1998
60. It should be noted in the table below that some of the indicators of telecommunications infrastructure refer to the 1996 and 1997 and may not be an up-to-date guide to the current position
61. Taking account of Internet hosts under domain and under generic Top Level Domains (gTLD)
62. This data is more comprehensive than set out in Table S11 for this indicator
63. Amarach Consulting, October 1998
64. Benchmarking Europe's Competitiveness: From Analysis to Action, UNICE, (1998)
65. Communications Outlook 1998, OECD, (1999)
66. Statement on Telecommunications, A Key Factor in Electronic Commerce and Competitiveness, National Competitiveness Council (November 1998)
67. 'Filling the Gap', Fitzpatrick Associates and IBEC, (April 1998)
68. Annual rental of 50km is being used in this report as opposed to 30km in the 1998 report
69. Annual rental of 50km is being used in this report as opposed to 30km in the 1998 report
70. With significant assistance from EU structural and cohesion fund transfers
71. National Investment Priorities for the Period 2000-2006. ESRI (1999)
72. World Economic Forum, Global Competitiveness Yearbook 1998
73. Irish roads beyond the year 2000,Investment benefits and future needs, IBEC Transport Council, (April 1998)
74. Source: Dublin Transport Office
75. "Filling the Gap: The Nature, Scale and Costs of Ireland's Infrastructural Deficit" prepared for IBEC April 1998, Fitzpatrick Associates (1998)
76. National Investment Priorities for the Period 2000-2006, ESRI (1999)
77. "Assessment of Irish Commercial Seaports Capacity, Final Report" by Department of the Marine and Natural Resources
78. IDA Customer Satisfaction Survey
79. Improvement of air services for the business sector at Cork and Shannon Airports, Forfas Air Services Group, Draft Report August 1998
80. This directive states that member states must open the electricity market to competition by 28 per cent by 2000 and 32 per cent by 2003
81. Filling the Gap, The Nature, Scale and Costs of Ireland's Infrastructural Deficit, Fitzpatrick Associates, IBEC (1998)
82. 40 per cent of real GDP growth since 1990 is directly attributable to the so-called leading sectors of manufacturing industry
83. The European Observatory for SMEs, Fifth Annual Report 1997, p.21
84. The European Observatory for SMEs, Fifth Annual Report 1997, p.170-171. The Irish data is based on surveys from 1997 and 1992
85. Small Business, Job Creation and Growth. OECD (1997)
86. Enterprise Survey on National Competitiveness. Forfás/IMS. (December 1998)
87. The European Observatory for SMEs, Fifth Annual Report (1997)
88. The European Observatory for SMEs, Fifth Annual Report (1997)
89. Impact of Changes in Industrial Structure and Integration on SME Clusters in New Trends and Challenges in Industrial Policy, Bianchi, P. UNIDO, (1998)
90. Business Strategies of SMEs and Large Firms in Canada. Micro-Economic Policy Analysis, Industry Canada, McDougall, G. and Swimmer, D. (1997)
91. The European Observatory for SMEs, Fifth Annual Report (1997)
92. Implementing the Information Society in Ireland: An Action Plan (January 1999)
93. The OECD Review of Regulatory Reform in the United States, OECD, (1999)
94. IBID
95. OECD Meeting on Regulatory Reform,22nd/23rd October 1998,Paris and Forfás meeting with Head of Regulatory Reform, OECD, 9th November 1998
96. DAFFE/CLP (98)6 OECD. Relationship between Regulators and Competition Authorities, OECD, (1998)
97. Technical regulation refers to setting and applying standards so as to assure compatibility and addressing privacy, safety and environmental protection concerns. Economic regulation relates to adopting measures to control monopoly pricing and to assure appropriate levels of consumer protection
98. The Economic Efficiency of telecommunications in a Deregulated Market: The Case of New Zealand, Economic Record, Boles de Boer and Evans, (1996)
99. Rhetorical Friends and Deadly Enemies: Competition and Regulation in Public Utilities, Patrick Massey and Tony Shorthall, Dublin Economic Workshop (1998)