

Technology and Growth: Ireland's Recent Experience

Desmond O'Malley

Introduction

The subject of my address is the central role that the Irish experience of technology and growth has played in transforming the Irish economy in recent years. In the context of today's Forum, I hope it will provide some backdrop for the debates on national growth strategies and technology and on how, by investing in the tools and skills needed to compete in the digital economy, we can improve economic performance and the welfare of our people.

As the globalisation of knowledge, production, trade and the boundaries to technology and computing power continues to astound us, you will forgive me if I draw attention to linking this process with an Irish literary episode. Reading a recent article in the *New York Times* entitled "Software's Next Leap Out of the Box", I am reminded of the writings of one of Ireland's great comic writers, Flan O'Brien, also known as Myles na gCopaleen. He had a bizarre theory about molecular transfer, which he used to explain his bond with his bicycle! This is not unlike the German philosopher, Martin Heidegger, who wrote that a blind man is not conscious of the cane he has as a separate entity, but regards it as an extension of his hand. For contemporary scientists this vision is held up as a powerful guide for future software designers.

Recalling Flan O'Brien's comic genius in describing his relationship with his bicycle, it is perhaps not entirely coincidental that Ireland, a country with a population of only 3.7 million people, is, in absolute terms, the largest exporter of software products in the world — ahead even of the United States. The story of how we got to this stage is not simple, however.

Ireland: Some Basic Facts

First, to set the context, it may be useful to recall some basic statistical facts about the Republic of Ireland:

Population: 3.75 m (2000)

Labour Force: 1.78 m (2000)

Unemployment Rate (2001): 3.6 per cent (2001)

Annual Average Change in GDP 1993–99: 9.0 per cent

Annual Average Change in GNP 1993–99: 8.0 per cent

GDP (1999): IR£69 100 million (\$80 200 million)

GNP (1999): IR£59 100 million (\$68 600 million)

GNP per head (1999): IR£15 700 (\$18 200)

1993–2000: A Period of Exceptional Economic Growth

The process of economic adjustment initiated in the mid–1980s, together with other factors relating to demography and policy initiatives introduced in earlier decades, which bore fruit in the 1990s, led to a period of exceptional economic growth in Ireland in the 1990s:

- The average annual rate of increase in GDP was 9 per cent, and in GNP 8 per cent, over the seven–year period 1993–99 (inclusive);
- The average annual rate of inflation (CPI) was 1.9 per cent from 1993 through 1999. In 2000, however, it increased significantly, under the impact of oil price increases, increased mortgage interest rates, increases in indirect taxation on tobacco introduced in late 1999 for health–promotion reasons, a fall in the value of the euro and a tightening labour market that gave rise to a degree of wage inflation in particular sectors of the economy.
- The debt/GNP ratio fell to below 45 per cent by the end of 2000;
- The population has increased by 240 000 (7 per cent) to 3.75 million since 1990, with net migration into Ireland accounting for over a quarter (64 000) of this increase — a reversal of an age–old trend in which Ireland had been a source of labour supply for countries all over the world;
- The number of people employed has increased by over 60 per cent (over 540 000) since 1993, to some 1.78 million in 2000;
- The unemployment rate has fallen from 15.7 per cent in 1993 to 3.6 per cent this year; and

- GDP per head in Ireland rose to over 111 per cent of the average for the European Union (EU-15) in 1999 — a considerable improvement on the situation when Ireland first joined the EEC in 1973, when GDP per head was about 60 per cent of the EU-15 average. This gain over the past 30 years has been driven by two principal factors:
- i) Strong productivity growth (output per head), particularly in an increasingly high-tech industrial sector; and
 - ii) A falling economic dependency ratio (i.e. the ratio of total population to the number of people employed) as employment and labour participation rates increased and unemployment and the proportion of the population outside the 15-64 year age groups fell.

Ireland's economy has further evolved strongly during the 1990s to reinforce the long-term trend from a natural-resource/agriculture-based, inward-looking, narrowly export-based economy into a high-tech, knowledge-based, export-driven economy. It is one of the most open trading economies in the world. The value of exports and imports combined amounted to over 160 per cent of GDP and over 190 per cent of GNP in 1999.

An Export-Driven Region of A Global Economy

A useful way of looking at Ireland's economy is to view it as a regional economy within the wider European, US and global markets in which it trades. As such, the strength and competitiveness of its export base primarily determine the growth capacity of the economy.

Competitiveness: The Foundation of Ireland's Economic Transformation

Clearly, the fairly remarkable development of the export performance of the Irish economy rests on the competitiveness of its export base. While, ultimately, competitiveness depends on the performance of individual enterprises in specific markets, the national or locational base from which enterprises operate also helps or hinders their competitiveness. Underlying locational determinants of competitiveness include the regulatory environment, the cost, availability and quality of labour, the cost and quality of infrastructure, the comparative burden of taxation, societal attitudes to business and so on. In helping to understand the growth of the Irish economy it is useful to refer to three measures of competitiveness, viz:

- i) Country rankings as set out in the *World Competitiveness Yearbook* of the International Institute of Management Development (IMD) in Switzerland;
- ii) Indices of changes in unit wage costs in manufacturing industry; and
- iii) Productivity trends.

World Competitiveness Scoreboard: The IMD *World Competitiveness Scoreboard 2001* ranks Ireland seventh in the world in terms of overall competitiveness for business. Ireland's attractiveness rating is ranked sixth in the world for venture capital and fourth for availability of credit from banks. The country ranks second in GDP growth (9.9 per cent in 2000).

Relative Unit Wage Costs: The competitiveness of the Irish economy, as indicated by relative wage costs in manufacturing industry, has also improved sharply over the past decade and more.

Productivity: One of the most significant features of the growth of Ireland's economy in recent years is the contribution that productivity — defined as GDP per capita — has made. The remarkable increase in productivity has been driven, in turn, by the development of the *high-tech* sectors of the economy and, in particular, the chemicals/pharmaceuticals, electronics, electrical engineering and computer-software sectors. These sectors now account for over 25 per cent of GDP and are the sectors on which the equally remarkable Irish export growth has been based. Today, high-tech exports account for some two-thirds of total exports from Ireland compared with some 40 per cent at the beginning of the 1990s.

Public Policy Agenda Driven by the Needs of the Market–Trading Sector

The trade-dependence of Ireland's economy drives the public policy agenda to a considerable extent. Ireland is highly supportive of an open international framework that promotes, encourages and facilitates trade between countries. For that reason Government policies operate a non-restrictive regulatory framework in respect of capital flows; support an extensive range of trade-facilitating and investment-supporting double-taxation agreements with other countries; and promote a well-developed and competitive financial services industry that is also trade-supporting. Public policy also accords a high priority to the development of an internationally competitive logistics sector — encompassing infrastructure, a high level of services to firms engaged in international trade and the incorporation of service-enhancing and productivity-increasing information technology innovations within the sector.

Foreign Direct Investment (FDI): Key Component of Ireland's Economic Growth

The promotion of export-oriented FDI projects has been at the centre of Irish economic development policies for some 40 years and remains so today. The underlying rationale has been to fast track the development process in a relatively late-industrialising country through the transfer of knowledge (technological, marketing, project financing, managerial) to the private and public sectors in Ireland from globally competitive firms in selected high-growth sectors. The wider public policy agenda has been shaped, to a considerable extent, by the need to meet these objectives.

The reasons for this are clear. A fundamental basis for FDI by any firm relates to the return on investment that it makes in particular locations. The return on FDI for firms that locate in Ireland is, perhaps, the highest in the world. The United States is by far the largest source of FDI in the world and also accounts for the largest share of FDI in Ireland. US Department of Commerce data show consistently that US firms achieve a higher return on investment in Ireland than in any other European country.

A proven high rate of return on investment is a key factor that helps to explain Ireland's success in attracting FDI. It is a function of a complex of interrelated elements. They include a geographically strategic location in Europe at its closest point to the United States, a pro-business regulatory and government policy regime, a flexible and well-educated labour-force and the agglomeration economies associated with a well-established, globally trading, high-tech industry sector. These agglomeration economies include a shared knowledge base, infrastructure, supply linkages, relevant educational curricula and a labour market which has expanded and deepened considerably in the skills in demand to support high-tech industry.

As a location for FDI in the high-tech projects that drive high-income, sustainable economic development, Ireland competes mainly with other European locations rather than with countries in the Far East or other significant destinations for global FDI. Ireland accounts for less than one per cent of the population of Europe, but the share of European-based FDI it attracts is a multiple of its population share. Commissioned research indicates that for FDI projects in software, call/customer-contact centres and shared services Ireland has the highest market share in Europe.

E-Business Investment: A Further Evolution of the Development Process to Serve Global Markets

The development of Ireland as a significant world e-business centre is a further evolution of its development process. For more than 25 years Ireland has been an international centre for investment in the electronics and related industries.

- Today over 300 major electronics companies develop, market and manufacture a wide range of leading-edge products in Ireland. They generate over one-third of total exports and employ over 60 000 people.
- Ireland is the major centre in Europe for software localisation and production. Five of the world's top ten independent software companies have major operations in Ireland. Today Ireland is the largest exporter of software products in the world. Over 40 per cent of all PC package software and 60 per cent of business application software sold in Europe is produced in Ireland.
- Ireland is also the leading European country in attracting call and shared-services centres.

Building on the significant base of activity related to e-business already in place, Ireland is today developing as a major international e-business centre. Already, a range of important investments have taken place in data-hosting projects, e-service provision projects, the manufacture of e-business technology platforms, e-business security services, e-business content projects, e-business trading and procurement projects and e-business system integration projects. These projects have been developed both by the existing base of business projects in Ireland in the fields of electronics, software, call centres and shared-services centres and by new FDI projects from internationally trading firms coming to Ireland for the first time.

Ireland as A World E-Business Centre: The Six Pillars of Success

The attraction of Ireland as a base for e-business projects rests on six main factors:

- An existing base of significant investments in e-business related activities;
- A proven high return on investment for globally-traded businesses, including those engaged in projects related to e-business;
- The availability of people with the high skills and qualifications needed for e-business;
- A high-quality telecommunications infrastructure with competitive prices;
- A highly supportive government and legislative framework for e-business; and
- High-specification R&D programmes supporting e-business.

I would like to expand further on two of these factors: people and infrastructure.

A Young, Educated Workforce. The availability of a plentiful supply of well-educated and skilled young people entering the labour force, both at present and in future years, places Ireland in a strong position for future e-business and technology projects. The proportion of the population less than 25 years of age in Ireland is higher than in any other EU country. The quality of the labour force reflects the high value widely attached to education and to the acquisition of skills and qualifications within Irish society. It reflects also a long-run emphasis in public-sector policies on providing universal (free) access to educational opportunities beyond the primary school level — first at the second level in the mid-1960s and subsequently (in the early 1990s) at the third level. In addition, the significant increase in the educational attainment of the work force over the past 20 years has helped contribute greatly to an increase in average skill levels and productivity.

A High Quality, Competitive Telecommunications Sector. Good telecommunications infrastructure is the basic foundation on which e-business and future industries are built. The first fully digitalised telecommunications system in Europe was installed in Ireland in 1980 through the then State-owned incumbent

telecommunications company. In recent years the challenge and opportunities posed by e-business gave rise to new government thinking on the development of the telecom sector and a strategy based on four fundamental and inter-related pillars:

- Increasing and upgrading international broadband connectivity at reduced prices to customers;
- Country-wide rollout of broadband infrastructure and services;
- Increasing the level of competition and deregulation of the telecom sector; and
- Putting in place the legislative framework necessary to facilitate e-business activity.

Countrywide Roll-Out of Broadband Infrastructure Services.

To complement the upgrading of international broadband connectivity now in place, the Government is working with telecom companies and infrastructure suppliers active in the Irish market to achieve widespread broadband connectivity to all parts of the country with the aid of a IR£150 million (US\$180 million) incentive programme. Every industrial estate in the country will have direct access to top-class broadband infrastructure with the roll-out of 20 000 km. of fibre-optic cable around the country. In addition, satellite-based broadband services are being targeted at remote areas, including offshore islands.

Increasing Competition and Deregulation of the Telecom Sector.

A pro-active approach to the deregulation of the telecom sector has been a central feature of the Government's e-business development strategy in recent years. Competition already has ensured that over 15 per cent of the fixed market has transferred from the existing incumbent telecom company to new entrants. Prices have fallen and quality has improved significantly. The mobile market is growing at the third-fastest rate in Europe with a 70 per cent increase in penetration in the year to June 2000. Mobile market penetration is now up to 50 per cent. Mobile phones have already surpassed fixed PSTN lines as the most common means for voice communication. The significant increase in international connectivity being put in place in Ireland is already beginning to impact positively to reduce the cost of international voice and data transfer from Ireland.

Conclusion

The evolution in information and communications technologies is, *inter alia*, transforming the way business is conducted. The process of transformation is beginning to accelerate as people and business enterprises begin to understand and recognise the way in which a "new economy" is emerging. This "new economy" is characterised by a number of features, of which the following are among the most important:

- The “new economy” rests firmly on the advances and innovations that have taken place in *information and communications technologies* and that can be encompassed in traditional social and economic activities. These activities can, simply, be undertaken more effectively with the support of the new technologies, or they can be transformed into completely new activities in the process.
- The *price of computer processing power* has been falling at an estimated annual average rate of one-third over the past three decades — a multiple of the rate of fall in the price of previous generic technologies such as steam, electricity and internal combustion engines. This has helped to bring about a situation in which the *pace* at which information and communications technologies is being absorbed into social and economic activities is far higher than was the case with previous economy-transforming technologies.
- The applications of the new technologies are *pervasive* — encompassing most sectors of the economy including manufacturing, agriculture, transportation and the services sector. They hold immense potential to boost *productivity* in the services sector (e.g. in retailing, health services, education services, government services, financial services and so on). Because the services sector accounts for the greater part of economic activity in all developed countries the potential impact on overall productivity is profound.
- The new technologies facilitate greater *transparency, competition and information availability*, and thereby, greater *efficiency* in markets.
- The new technologies accelerate the process of *globalisation* of production, capital markets, knowledge and entertainment through reductions in the cost and increases in the speed of communication between organisations and people.
- The new technologies accelerate and enhance the process of *innovation* by facilitating, for example, the manipulation and analysis of large banks of information.

These developments pose a particular challenge for governments and call for new methodological approaches to policy formulation — in areas as diverse as education, training, deregulation and competition policy, investment in infrastructure, R&D, taxation and international co-operation. The government in Ireland is acutely aware of these issues. It has gone some distance towards addressing them and I have attempted to sketch briefly the approach adopted in a number of areas. As indicated, some degree of success has attached to the approach adopted, including in the area of e-business promotion and development. Complacency is, however, the ultimate potential enemy of success in the “new economy”. Accordingly, Ireland as yet makes no claim to success. It acknowledges only that a journey has begun.