Forfás

eBusiness Monitor Report

THE NATIONAL POLICY AND ADVISORY BOARD FOR ENTERPRISE, TRADE, SCIENCE, TECHNOLOGY AND INNOVATION

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1 Executive Summary

1.1 Introduction

The importance of eBusiness in developed economies is reflected in the fact that some €77 billion worth of business is currently transacted on-line within the E.U. and that this figure is forecast to grow to €2.2 trillion by the end of 2006, equivalent to 22% of all E.U. industrial trade[1]. Despite the general economic and technology slowdown over the period 2000 to date, eBusiness continues to grow in many cases exceeding the hype of the Internet boom, for example[2]:

- *US business to business eCommerce[3] for 2003 is estimated to be valued at $2.4 trillion by Forrester Research, almost 100% higher than predicted in 1999 ($1.3 trillion);*
- *US business to consumer eCommerce for 2003 is estimated to be valued at $95 billion by Forrester, marginally lower than predicted in 1999 ($108 billion);*
- *The Brooking Institute has revised its estimates of the productivity gains for business from eBusiness upwards to $450 billion per year by 2005 (from $250 billion per year).*

The eBusiness performance of the Irish enterprise sector over the next five to ten years will be a key determinant of Ireland's economic success in the emerging global Knowledge Society. Government action in a range of areas such as telecommunications, enterprise supports, legislation and eGovernment etc, will have a direct influence on the scale and timing of the development of eBusiness in Ireland.

1.2 Overview of the Knowledge Society in Ireland

When compared to the eight other case study countries, the Knowledge Society in Ireland requires further development. In an EU15 context, Ireland's performance (8th) is better than France and the Southern European member states, but behind that of the Nordics, the UK, the Netherlands and Germany.

In terms of **eGovernment**, Ireland counts as a relatively strong performer in terms of eGovernment services to enterprise. eEurope benchmarking reports rank Ireland first of the case study countries in terms of on-line availability of basic services, and second in terms of the percentage of businesses that use ICT to collect Government information.

In terms of **Information Society or general public adoption**, the levels of Internet adoption in Ireland are behind those of the leading case study countries. Of the eight case study countries, Ireland was ranked joint eighth with Germany. It is estimated that 38% of Irish adults had access to the Internet in 2002, a 5% increase on 2001. Ireland continues to lag the USA (amongst others) where Internet access in 2003 is greater than 60%.

1.3 Ireland's eBusiness Performance

Ireland lags the case study countries in terms of the **adoption** of eBusiness by existing enterprise, but is more advanced than most in terms of the **sophistication** of eBusiness application. Currently Ireland is ranked joint seventh of the case study countries falling behind in terms of Internet and broadband connections, while performing better in terms of selling, accepting orders and purchasing on-line (in terms of those who are on-line).

1 *Forrester Forecast, source www.forrester.com*
2 *Source: Business Week, 12 May, 2003.*
3 *The term eCommerce encompasses transactions that take place over electronic networks such as the Internet.*

With regard to eBusiness **innovation**, indicators suggest that Ireland is a weak performer relative to the eight case study countries. By contrast, Ireland's "high tech" enterprise **creation** performance is the strongest of the case study countries reviewed. Notable findings in this regard are:

- *Ireland was the best represented in per capita terms, of the European case study countries in the Deloitte and Touche Technology Fast 500 in 2002;*
- *Ireland has more NASDAQ listings per head of population than any of the case study countries (except the US); and,*
- *Ireland is the best represented of the European case study countries in the Tornado 100 listing of Europe's top high tech companies.*

In terms of attracting **eBusiness FDI**, Ireland is a strong performer (in relative terms i.e., per 1m population). Ireland attracted over 9 eBusiness FDI projects[4] in 2001 (per 1m population). The only country to record a stronger performance in that period was Singapore (10 per 1m population). The performance of all the remaining case study countries was at least half that of Ireland's. However, worldwide flows of FDI remain substantially lower in 2003, with Central and Eastern Europe gaining market share.

1.4 Ireland's eBusiness Environment

The **strengths** of the Irish eBusiness environment include:

- *the availability of IT supports/skills within the economy;*
- *the general pro-business nature of the fiscal environment;*
- *eGovernment, driven by the on-line integration of Government services to enterprise, and plans for the rollout of eProcurement in the Irish public service; and,*
- *the availability of supports for the adoption of eBusiness by existing enterprise.*

Against these strengths stand a series of **weaknesses**, the most apparent of which are:

- *the limited availability and high price of DSL[5] and the absence of widespread cable modem broadband services;*
- *relatively low levels of usage of PCs in primary and secondary schools (with implications for future IT literacy levels/societal adoption of Internet technologies); and,*
- *the relatively low levels of eBusiness adoption by existing business.*

At an overall level, Ireland's Knowledge Society requires further development relative to other case study countries. In an E.U. 15 context, Ireland's performance (8th/9th) is broadly consistent with that of Belgium – higher than that recorded in France and all of the Southern Member States, but behind that of the Nordics, UK, the Netherlands, Germany and Austria.

1.5 Key Findings and Recommendations

Benchmarking, international case study research and national consultations indicate that a number of issues must be addressed if Ireland is to retain and develop its current global eBusiness standing in terms of promoting eBusiness adoption and a positive environment to support eBusiness development.

4 *Global Investment Location Database, PwC Belgium, 2002*

5 *Digital subscriber line (DSL) technologies allow high speed broadband communications over existing copper wires.*

Recommendations aimed at addressing these issues have been identified based on the research and analysis undertaken, and also on the review and prioritisation of all eBusiness related policy recommendations made in reports published subsequent to the completion of the initial eBusiness Monitor study in October 2002. Discussions with representatives from the Information Society Commission, the eCities working group, cross industry workshops, eBusiness experts, Government Departments, and development agencies, have resulted in a number of important key recommendations being identified. Four key recommendations[6] have been prioritised as fundamental to driving enterprise eBusiness adoption, eBusiness innovation and eBusiness foreign direct investment. These prioritised recommendations are presented below.

1. **Review of eBusiness Policies and Supports**: a review of eBusiness support policies and initiatives in Ireland should be initiated taking account of the European Councils' conclusions on the European Commission's Communication of March 2003 "Adapting eBusiness Policies in a Changing Environment" (Actors: Department of Enterprise, Trade and Employment, development agencies, business organisations). In light of this proposed review, it is recommended that:
    - Consideration be given to the development of more sector oriented eBusiness programmes for SMEs, and that sectors be targeted where business processes are likely to be significantly enhanced by the application of eBusiness technologies. (Actors: Department of Enterprise Trade and Employment, Enterprise Ireland, business organisations)
    - Programme(s) should be put in place to support and encourage SMEs to prepare for the adoption of eProcurement, especially in the context of the move (albeit phased) to eProcurement by the Public Sector. (Actors: Department of Enterprise Trade and Employment, development agencies, business organisations)
2. **The rollout of eProcurement in the Public Service**: eProcurement projects should be progressed as a matter of priority, supporting on-line catalogues/tender management/electronic ordering and payment. In addition, the Government should explore the potential for Public Private Partnerships (PPP) should Exchequer funding be an issue in implementing eProcurement, as is being done in Denmark and Singapore. (Actor: Department of Finance)
3. **The widespread availability of broadband access** at competitive prices will be critical to the development of eBusiness in Ireland. It is recommended that:
    - Broadband Infrastructure: a co-ordinated plan for national eInfrastructure should be developed to ensure that Ireland can achieve the key targets set out in the Government's Broadband strategy, namely the provision of 5 Mbits+ access to the Internet for businesses. Its formulation should be coordinated directly with the National Development Plan and the National Spatial Strategy. (Actors: Department of Communications, Marine and Natural Resources)
    - Broadband Services: Government should continue to encourage the rapid extension of broadband services to regional centres and the development of a more competitive national pricing structure. (Actor: Department of Communications, Marine and Natural Resources, ComReg)
4. **Articulation of Ireland as a Knowledge Society**: the Government's implementation plan for the emerging Knowledge Society (New Connections), while detailed and comprehensive, needs to be supported by an underpinning vision and roadmap outlining what all of its constituent elements are to achieve. Following this, New Connections should be re-articulated on the basis of this vision and roadmap, prioritising the implementation agenda as required. The effectiveness of the procedures used for implementing the eAgenda in Ireland, in terms of promoting cohesion and complementarity between various eBusiness/Information Society/eGovernment strands, should be

6 Chapter six provides an outline of all the recommendations in the report.

continuously reviewed. Building on the vision of Ireland as a Knowledge Society, the Government should outline clear timetables and targets that allow the achievement of the eAgenda to be monitored and assessed. (Actor: Department of An Taoiseach)

1.6 Conclusions

The Irish policy response to eBusiness is similar in many respects to the most successful case study countries. From a review of the policies underpinning the eBusiness adoption successes of the case study countries, some key conclusions emerge:

- *there is no "one size fits all" policy solution to the promotion of eBusiness within an economy – rather the most appropriate solution will depend on the enterprise culture that prevails and related societal values;*
- *similarly, there is no one "killer initiative" with universal application;*
- *successful countries are characterised by a strong Government role in the provision of basic Internet access services and a willingness to intervene when competition is failing to deliver required access levels and/or prices;*
- *delivery of eGovernment services for enterprise feature prominently in the policy approach to the promotion of eBusiness adoption in all of the case study countries reviewed, with significant progress expected in the coming months and years;*
- *direct supports (e.g. fiscal, financial, advisory) to enterprise are available in all of the case study countries reviewed – targeted for the most part at SMEs or enterprises based in regionally disadvantaged locations;*
- *most successful countries have developed schemes to promote the uptake of the Information Society (Internet technologies by citizens). This three pronged approach (i.e., eGovernment, eBusiness and Information Society) greatly enhances the sustainability of eBusiness enterprise support programmes and contributes to the eBusiness momentum within an economy;*
- *the banking sector has played a major role in the promotion of societal and enterprise adoption of Internet technologies in the Nordic countries; and finally,*
- *complacency with respect to the promotion of eBusiness does not exist among the leading eBusiness economies.*

The eBusiness performance of the Irish enterprise sector over the next five to ten years will be a key determinant of Ireland's economic success in the emerging global Knowledge Society. To date, Ireland has performed well in terms of developing eBusiness related enterprises and through the attraction of eBusiness related FDI. However, widespread adoption of eBusiness lags that in the case study countries.

The conduciveness of the business environment in Ireland compare well with leading countries on many aspects (e.g. eGovernment, supports to enterprise, etc). To improve on Ireland's current rankings requires further development of the business environment in Ireland relative to other case study countries. Government action in a range of areas such as telecommunications, promotion of widespread adoption of ICT amongst the general public, eProcurement, etc. will have a direct influence on the scale and timing of the development of eBusiness in Ireland.

2 Introduction

2.1 Introduction

The importance of eBusiness in developed economies is reflected in the fact that some €77 billion worth of business is currently transacted on-line within the E.U. and that this figure is forecast to grow to €2.2 trillion by the end of 2006, equivalent to 22% of all E.U. industrial trade[7].

The collapse of a number of high profile dot.com companies over the period 2000-2002, compounded by the downturn in the technology sector has to an extent engendered a degree of scepticism about the importance of eBusiness as a driver of enterprise competitiveness. However, such scepticism is misplaced as enterprises continue to harness the potential for competitiveness through the adoption and use of Information and Communications Technology (ICT). Despite the general economic and technology slowdown eBusiness continues to grow in many cases exceeding the hype of the Internet boom, for example[8]:

- *US business to business eCommerce[9] for 2003 is estimated to be valued at $2.4 trillion by Forrester Researchers, almost 100% higher than predicted in 1999 ($1.3 trillion);*
- *US business to consumer eCommerce for 2003 is estimated to be valued at $95 billion by Forrester, marginally lower than predicted in 1999 ($108 billion);*
- *The Brooking Institute has revised its estimates of the productivity gains for business from eBusiness upwards to $450 billion per year by 2005 (from $250 billion per year); and,*
- *40% of the 200 publicly quoted Internet companies in the US reported a profit in the fourth quarter of 2002.*

The eBusiness performance of the Irish enterprise sector over the next five to ten years will be a key determinant of Ireland's economic fortunes in the emerging global Knowledge Society. Government action in a range of areas such as telecommunications, enterprise supports, legislation and eGovernment etc., will have a direct influence on the scale and timing of the development of eBusiness in Ireland.

2.2 Study Objectives

Forfás in conjunction with the Department of Enterprise, Trade and Employment commissioned PricewaterhouseCoopers (PwC) to benchmark Ireland's eBusiness performance against that of leading eBusiness economies worldwide. A core part of this comparison required the assessment of eBusiness public policy in the leading countries.

The core objectives of this study were to:

- *compare Ireland's stage of eBusiness development (using an agreed set of variables) with the stage of development pertaining in eight leading countries;*
- *assess and interpret the factors underpinning Ireland's performance and that of other countries;*
- *identify the actions required by firms, Government and the development agencies to increase adoption of eBusiness, and to make Ireland a more attractive location for mobile investment in eBusiness related activities.*

7 *Forrester Forecast, source www.forrester.com*
8 *Source: Business Week, 12 May, 2003.*
9 *The term eCommerce encompasses financial transactions that take place over networks such as the Internet.*

2.3 Methodology

In Phase 1, extensive quantitative research was undertaken to develop a database of eBusiness measurements (comprising more than 80 indicators) that form the statistical basis for assessment of Ireland's eBusiness performance. In addition, in depth qualitative research was undertaken, including a series of national and international consultations with eBusiness experts and policymakers, along with a review of the policy factors underpinning the success of leading eBusiness economies.

Eight leading eBusiness economies were selected for the purpose of comparing Ireland's eBusiness performance, namely:

- Australia
- Denmark
- Germany
- Netherlands
- Singapore
- Sweden
- United Kingdom
- United States

Phase 2 focused on developments in Ireland's eBusiness performance. A key element of Phase 2 included a review and prioritisation of all eBusiness related policy recommendations made in key reports published subsequent to the completion of the phase I (The Information Society Commission's *"Building the Knowledge Society"*, and the eCities Working Group's "*Recommendations for Dublin as a World Class eCity, and Ireland as a World Class eNation*"). Prioritisation of these recommendations was achieved following:

1. Discussions with representatives from both the Information Society Commission and the eCities Working Group;
2. An industry workshop bringing together industry, Government and educational representatives;
3. Consultations with eBusiness experts and Government Departments and Agencies.

This prioritisation identifies the recommendations considered fundamental to creating the business environment and conditions necessary for eBusiness to flourish going forward.

2.4 Study Scope

This report focuses on two aspects namely:

1. The monitoring of Ireland's eBusiness performance, for the purpose of the study, is defined as "the application and adoption of Internet technologies by enterprise". The study examines Ireland's "performance" under three distinct components, namely the:
   - adoption of Internet technologies by existing enterprises;
   - eBusiness innovation and the creation of new eBusiness enterprises;
   - attraction of eBusiness related foreign direct investment (FDI).
2. The monitoring of Ireland's eBusiness environment for enterprise. For the purposes of the study, this includes factors in the environment that may promote or inhibit eBusiness within the economy. The following environmental factors are addressed:
   - policy making structures;
   - the fiscal environment;
   - support services from Government and the private sector;

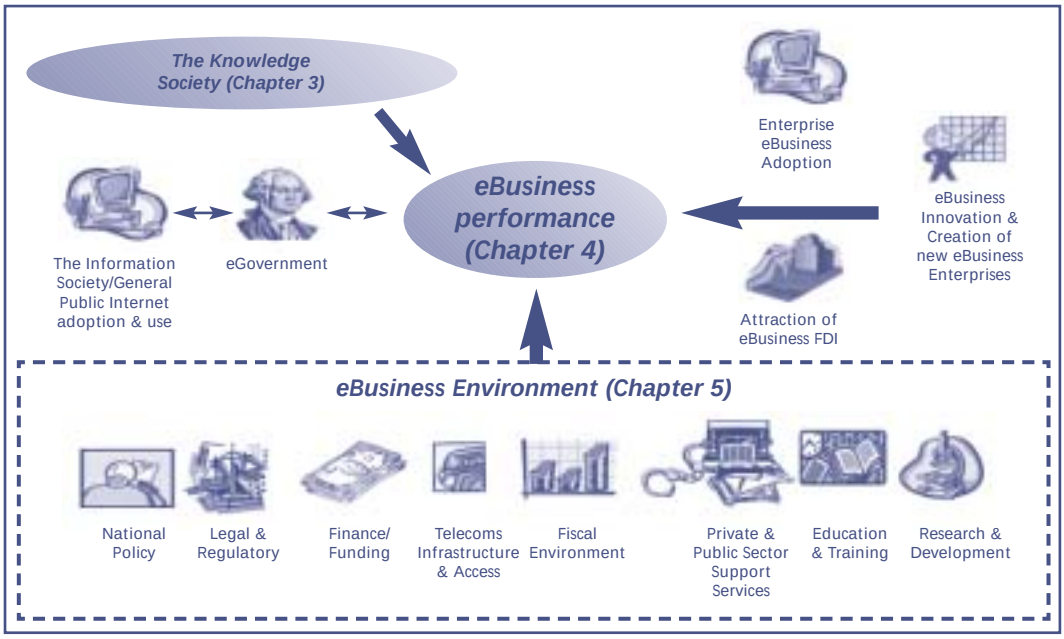
- education and training;
- research and development investment;
- the legal and regulatory environment;
- telecommunications infrastructure, access and cost;
- the financial environment.

The study does not focus in detail on the wider "Knowledge Society", which refers to the adoption and application of Internet technologies throughout all society, i.e., the Government and public service and the general public, in addition to the enterprise sector. However, there is a high degree of interdependence between the three components of the Knowledge Society as follows:

- *the quality and extensiveness of eGovernment services for enterprise have an impact on the rate of eBusiness adoption in an economy;*
- *research has highlighted that there is strong correlation between societal levels of Internet usage and rates of eBusiness adoption.*

This interdependence between the three components is reflected in their mutually reinforcing nature and their shared underlying drivers (as presented in Figure 2.1). As such, the development of Ireland's Knowledge Society is profiled briefly in Chapter 3 with the remainder of the report focusing solely on eBusiness and the eBusiness environment in Ireland.

Figure 2.1: *The Mutually Reinforcing Nature of the Knowledge Society*



3 The Knowledge Society in Ireland

3.1 Overview of the Knowledge Society in Ireland

As noted earlier, the Knowledge Society refers to the adoption and application of Internet technologies throughout all society, i.e., Government and public service (eGovernment), the Information Society/general public, and the enterprise sector, with a high degree of interdependence between the three. This chapter focuses on the first two components with the remaining chapters of the report focusing on eBusiness (i.e. the enterprise sector).

At an overall level, when compared to the eight case study countries, the Knowledge Society in Ireland requires further development. Table 3.1 compares Ireland against Knowledge Society rankings for the eight case study countries[10].

Table 3.1 *Knowledge Society Rankings 2001/2002*

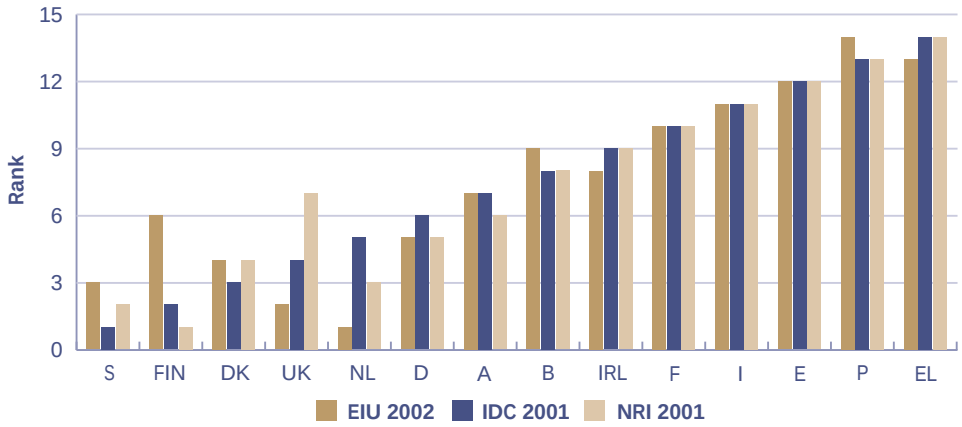
	Australia	Singapore	US	Sweden	Denmark	Germany	Netherlands	UK	Ireland
EIU 2002 *(60 countries)*	6	11	1	4	7	8	2	3	**15**
IDC 2001 *(55 countries)*	8	9	4	1	5	13	10	6	**20**
NRI 2001 *(75 countries)*	14	8	1	4	7	17	6	10	**19**

Source: EIU eReadiness Index, IDC/World Times Information Society Index, Harvard Networked Readiness Index (NRI)

In an **E.U. 15** context, Ireland's performance (8th) is better than France and the Southern Member States, but behind that of the Nordics, the UK, the Netherlands, Germany and Austria, as shown in Figure 3.1 over.

10 *These indices have regard to a combination of factors. These include eGovernment, use of Internet technologies by general public, value of eCommerce in the economy, eBusiness, quality of Information Society infrastructure.*

Figure 3.1 *Ireland's Knowledge Society Performance in EU14[11] Perspective*



Source: EIU eReadiness Index, IDC/World Times Information Society Index, Harvard Networked Readiness Index (NRI)

3.2 eGovernment

The quality and extensiveness of eGovernment services for enterprise is a key driver of the rate of eBusiness adoption within an economy. eGovernment comprises two components: the application of Internet technologies to the workings of Government to realise cost/resource efficiencies in service delivery; and, facilitating on-line access by the general public and enterprise to Government services.

3.2.1 eGovernment in Ireland

There is no explicit national strategy for eGovernment in Ireland. Elements are incorporated into the strategy for the modernisation of the public service and the Information Society action plan 'New Connections'[12]. The current target for eGovernment in Ireland for enterprise, as set out in New Connections, is the on-line delivery of all suitable services through a single point of contact by 2005. The "integration" element of this objective makes it much more ambitious than those of other case study countries. Major Irish eGovernment developments to date include:

- *launch of the integrated portal for business access to Government services (**BASIS.ie**) in May 2001. Users can access all relevant content related to Government services with the site having an average of 12,000 to 15,000 users per month. Currently, users are referred to other sites for transactions;*
- *139 of the 149 Governmental services have some form of Internet presence (from contact details to financial/legal interactivity). Of the 24 on-line services promised by mid 2003, some 12 are operational;*
- *launch (December 2001) of the non-interactive **eTenders** website which publishes all public tender opportunities, introduced as a forerunner to the full scale implementation of eProcurement in the public service;*
- *Revenue On-line Service (**ROS**) which allows for the on-line tax filing/payment.*
- *agreement on the framework for the delivery of integrated public services to citizens through the **Public Services Broker** (PSB). The objective of the PSB is to facilitate eGovernment by providing the central services required for Government transactions, e.g., forms, signature and payment facilities. Phase I is focusing on ePayments, identification and authentication (user name and password). However, it will be 2004 before delivery on the PSB begins.*

11 *Table does not include Luxembourg.*

12 *http://www.taoiseach.gov.ie/upload/publications/1153.pdf*

The New Connections progress report[13], released in February 2003, states that "*the slow delivery of the PSB is the biggest issue in the development of eGovernment (from the perspective of developing services for citizens), and its continued delay will adversely impact on the development of on-line service delivery in agencies awaiting the shared components that comprise the Broker (registration, authorisation, personal data vaults, process flow etc.)*".

However, the rollout of eProcurement into the public service is potentially the most significant pending eGovernment initiative from the perspective of enterprise in Ireland. The strategy for its introduction was launched in April 2002[14].

3.2.2 Irish eGovernment Performance Internationally

Ireland is one of only four countries to have an **integrated business portal** amongst the case study countries from which enterprises can access the entire range of eGovernment services targeted at business. However, as noted, few services are interactive with the site referring users through to other Government websites for transaction purposes.

Similarly, Ireland is one of five case study countries to have published a strategy for the introduction of **eProcurement**, with Ireland currently developing portals for specific product areas. Full rollout of eProcurement has not, however, occurred on a national level in any of the case study countries reviewed. The Swedish Government has proposed that Government departments source 20% of procurement needs from SMEs, and it is expected that this requirement will drive SMEs in Sweden towards eProcurement, as a greater number of Government departments embrace this. The support of indigenous companies is also illustrated in the US, where the Federal Government must purchase 23% of its prime contracts from SMEs. Of the case study countries, Denmark is the closest to a full rollout of eProcurement, having developed systems and procedures for the electronic procurement of a range of low involvement, relatively standard goods and services, such as telecommunications, PCs etc.

The Danish Government's eProcurement portal (DOIP) was established in 2002 through a public private partnership (PPP) with gatetrade.net. They will operate, maintain and develop the DOIP further. The Singaporean Government has also embarked on PPP initiatives to electronically enable Business to Government transactions.

A clear forerunner of eProcurement in the Irish public service is the on-line availability of public tenders. Ireland's eTenders website is currently 'publish' only, but there are more sophisticated interactive tenders websites available in Singapore, Denmark, and Germany. However, further developments are currently being implemented.

As outlined in Table 3.2, Ireland is a relatively strong performer in terms of eGovernment services to enterprise, e.g. eEurope benchmark reports rank Ireland first of the case study countries in terms of on-line availability of basic services, and second in terms of the percentage of businesses that use ICT to collect Government information. All of the case study countries are moving fast in this regard and Ireland will need to follow through on its current commitments to eGovernment to retain and improve on its moderate to high ranking within the case study group. The relatively centralised system of public administration in Ireland is expected to provide advantage in this regard.

13 *http://www.taoiseach.gov.ie/upload/publications/2124.pdf*
14 *http://www.finance.gov.ie/publications/otherpubs/Strategy%20Report.pdf*

Table 3.2 *Assessment of eGovernment for Enterprise, Case Study Countries 2003*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
Overall Government Assessment									
Accenture, eGovernment Ranking 2003	4	6	3	**7**	8	n.a.	1	5	2
NRI, Assessment of State of Development of eGovernment, 2003	8	9	6	**5**	7	4	1	3	2
eEurope % On-line Availability of Basic Services, 2003	n.a.	5	3	**1**	6	2	n.a.	4	n.a.
DTI % of Businesses that use ICTs to collect Government information 2003	2	6	n.a.	**2**	n.a.	1	n.a.	5	4
DTI % of Businesses that use ICTs to make tax or other payments to Government	2	6	n.a.	**4**	n.a.	1	n.a.	5	3
eGovernment Policy									
Distinct eGovernment Strategy 2002	yes	yes	yes	**no**	yes	no	yes	yes	yes
Executive Agency dedicated to eGovernment 2002	no	no	no	**yes**	no	no	no	no	yes
Enterprise Supports/Services									
Published eProcurement Strategy	yes	yes	yes	**yes**	no	no	no	no	yes
eProcurement Rollout	no	no	no	**no**	no	local	no	no	no
Tenders Published Centrally On-line	yes	yes	yes	**yes**	no	yes	yes	no	yes
Interactive eTenders Site	no	yes	no	**no**	no	no	yes	no	no
Electronic Filing of Tax Returns	yes	yes	yes	**yes**	yes	yes	yes	yes	yes
Integrated Portal for Enterprise Services	yes	no	no	**yes**	no	no	yes	no	yes

Source: Accenture, Network Readiness Index (NRI), eEurope, Department of Trade and Industry (UK)/PwC Derived (2002 and 2003)

3.3 The Information Society/General Public Adoption

Research by Forfás has highlighted that there is a strong correlation between societal levels of Internet usage and rates of eBusiness adoption. Table 3.3 highlights that the levels of Internet adoption in Ireland are behind those of the leading case study countries. Of the eight case study countries benchmarked, Ireland was ranked eighth. It is estimated that 38% of Irish adults had access to the Internet in 2002, a 5% increase on 2001. Ireland continues to lag the USA (amongst others) where Internet access is greater than 60%.

Table 3.3 *General Public Usage of Internet, Case Study Countries 2003*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
WCY No. of Internet Users per 1,000 Population, 2001	4	9	2	**8**	5	1	6	7	3
WCY No. of Computers per 1,000 Population, 2001	4	9	3	**8**	5	2	6	7	1
eEurope % of Households with Internet Access, June 2002	n.a.	6	2	**4**	1	3	n.a.	5	n.a.
eEurope % of Interviewees that use the Net from Home, June 2002	n.a.	6	1	**5**	3	2	n.a.	4	n.a.
eEurope % of Interviewees that use the Internet, June 2002	n.a.	6	2	**4**	3	1	n.a.	5	n.a.
eEurope % of Interviewees that occasionally use the Net to purchase products or services, June 2002	n.a.	2	6	**5**	4	3	n.a.	1	n.a.
eEurope % of Interviewees that use the Internet for on-line banking operations, June 2002	n.a.	4	2	**6**	3	1	n.a.	5	n.a.

Source: World Competitiveness Yearbook, eEurope/PwC Derived

4 Ireland's eBusiness Performance

For the purpose of the study, **eBusiness performance** is defined as "*the application and adoption of Internet technologies by enterprise*". The monitoring of Ireland's eBusiness performance is examined under its three distinct components:

4.1 The **adoption** of Internet technologies by existing enterprises;

4.2 eBusiness **innovation** and the **creation** of new eBusiness enterprises;

4.3 The attraction of eBusiness related **foreign direct investment** (FDI).

4.1 The Adoption of Internet Technologies by Existing Enterprises

The adoption and effective application of Internet technologies by incumbent enterprises is a crucial determinant of a country's ability to prosper in the Knowledge Economy. Benefits to enterprise stem from the potential offered by Internet technologies to improve on customer relations management, expand product and service markets and realise efficiencies in a range of back office functions, including procurement etc. The rapid adoption and sophisticated application of Internet technologies by incumbent enterprises, particularly in traded sectors, will be a crucial determinant of Ireland's economic well being into the 21st century.

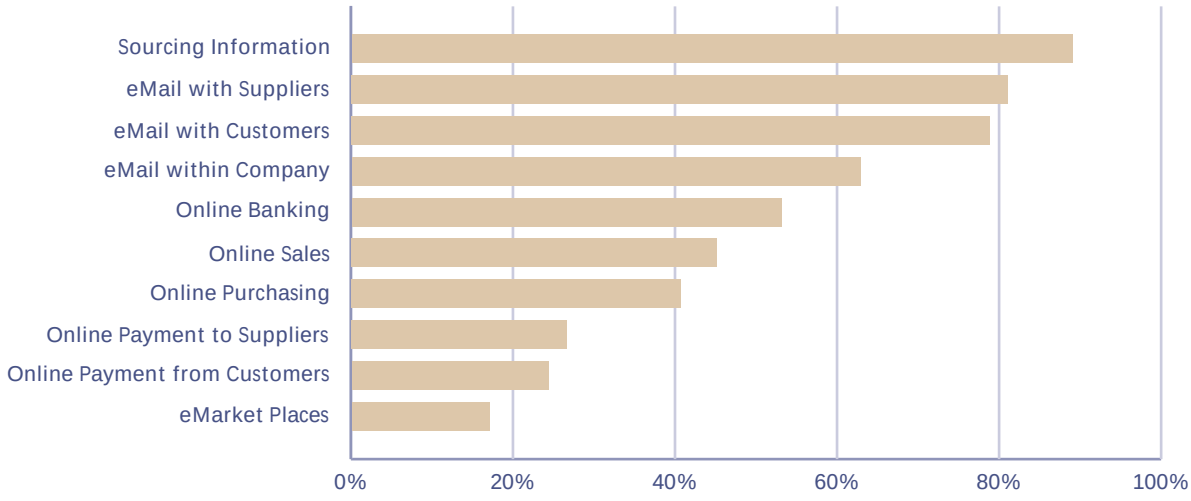
Ireland's eBusiness Adoption can be evaluated under two aspects: firstly, through assessing Irish performance in terms of progress on a national basis; and secondly, through assessing progress on an international basis – against the case study countries.

4.1.1 Ireland's Performance Nationally

There are a number of sources of data on rates of eBusiness adoption by enterprises based in Ireland. The most recent are: Chambers of Commerce of Ireland (CCoI): SME eBusiness Survey, 2002; and Forfás/Enterprise Ireland (EI): Annual Business Survey, 2002.

CCoI launched its third annual SME[15] eBusiness survey in September 2002. Figure 4.1 and Table 4.1 present summary findings.

Figure 4.1 *eBusiness Adoption/Sophistication by "Existing" Irish Enterprise, 2002*



Source: Chambers of Commerce of Ireland, 2002

15 *SMEs are defined as enterprises with less than 250 employees.*

Table 4.1 *eBusiness Adoption, Selected Statistics 2000, 2001 and 2002*

	2000	2001	2002
All Respondents/All Respondents with > 1 PC	**% of Enterprise**	**% of Enterprise**	**% of Enterprise**
Networked PCs	69%	72%	74%
Internet Access	69%	81%	84%
Own Website	34%	45%	55%
All Respondents with Internet Access			
Narrowband Connection	69%	53%	40%
ISDN Connection	21%	38%	47%
Dedicated Leased Line	8%	6%	9%
Cable	0%	1%	1%

Source: Chambers of Commerce of Ireland, 2000, 2001, 2002

In 2002, information sourcing and external email are the most common activities of the 84% of CCoI members with Internet access, followed by internal email, on-line banking, on-line sales and on-line purchasing. On-line payments are less developed with 25% of CCoI members indicating they used the Internet to make an on-line payment to suppliers. 2002 data represents a modest improvement on 2001 – the share of CCoI members having Internet access growing by 3% and the share of those with websites growing to 55% from 45%. Internet access is now dominated by ISDN connections and to a lesser extent, narrowband services, with just 10% of CCoI members having a broadband connection in 2002.

The sample for the Forfás/EI annual survey of agency clients was drawn from the entire Enterprise Ireland client base. Key findings are shown in Table 4.2.

Table 4.2 *eBusiness Sophistication of Enterprise Ireland Clients, June 2002*

Sector	Website	% of Sales Achieved Over Internet
Healthcare/Pharmaceuticals	68%	2.3%
Engineering	55%	0.2%
Electronics	76%	0.3%
Consumer Food	44%	0.3%
Dairy/Drink	57%	0.0%
Beef/Lamb and Pig	35%	0.2%
Timber and Furniture	56%	0.3%
Consumer Products	61%	0.2%
InfoComms	94%	1.5%
Finance/Healthcare/Software	95%	5.6%
Digital Media/eCommerce/Training	89%	0.4%
Total	67%	0.7%

Source: Annual Business Survey 2002 (Preliminary Findings)

Table 4.2 shows that close to 70% of EI clients had a website at June 2002 – this share being considerably higher in high technology enterprises, including electronics and pharmaceuticals. Lagging performers were the traditional food and agri-business, and timber and furniture sectors. Notwithstanding a high share of enterprises with websites, very small volumes of total sales were being effected on-line – the share for all enterprises in 2002 standing at less than 1%. Software (5.6%), pharmaceutical (2.3%) and Infocomms (1.5%) firms were the strongest performers in this regard, although their share was also small.

4.1.2 Ireland in an International Perspective

Currently, Ireland is ranked joint seventh of the nine case study countries in terms of eBusiness adoption and sophistication by enterprises. A number of metrics[16] are used to identify Ireland's position as presented in Table 4.3, with "best practice" in this area including: high rates of Internet penetration; widespread investment in ICTs by businesses; and, use of high speed (broadband) Internet connections. Ireland's overall rank has not altered over the past nine months.

Table 4.3 *eBusiness Adoption/Sophistication, Case Study Country Rankings*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
Adoption									
IDC "Internet Infrastructure" 2001	3	7	5	**9**	8	1	2	4	6
DTI % of Businesses with Access to the Internet, 2003	6	2	n.a.	**5**	n.a.	1	n.a.	3	3
DTI % of Businesses with Broadband Connection to the Internet, 2003	5	3	n.a.	**5**	n.a.	1	n.a.	3	2
EC % of Enterprises with an Internet Connection, December 2001	n.a.	3	2	**4**	5	1	n.a.	6	n.a.
Sophistication (% of Enterprises with Internet Access)									
DTI % of Businesses with a Website, 2003	6	1	n.a.	**5**	n.a.	2	n.a.	3	4
DTI % of Businesses trading on-line, 2003	2	3	n.a.	**5**	n.a.	1	n.a.	5	4
DTI % of Businesses selling on eMarketplaces, 2001	6	1	n.a.	**4**	n.a.	5	n.a.	2	3
DTI % of Businesses using on-line banking or investment services, 2001	3	2	n.a.	**5**	n.a.	1	n.a.	4	6
E.U. % of Enterprise with a Website, December 2001	n.a.	1	3	**6**	4	2	n.a.	5	n.a.
E.U. % of Enterprises that Accept Orders Received Via Website, December 2001	n.a.	1	4	**2**	6	3	n.a.	5	n.a.
E.U. % of Enterprises that sell on eMarketplaces, December 2001	n.a.	1	6	**4**	5	3	n.a.	2	n.a.
E.U. % of Enterprises that purchase some or all Supplies on-line via the Internet, December 2001	n.a.	4	1	**2**	3	5	n.a.	6	n.a.

Source: International Data Corporation (IDC), Department of Trade and Industry (DTI/UK), European Union (E.U.)

16 *Metrics are from different years due to sources being updated more frequently than others. Where possible, metrics are for 2003.*

4.2 eBusiness Innovation and the Creation of New eBusiness Enterprises

National eBusiness economic benefits also stem from the formation of eBusiness enterprise and the commercialisation of indigenously developed eBusiness technologies/innovations. This section describes Ireland's eBusiness innovation and the creation of new eBusiness enterprise in both a national and an international context.

4.2.1 Ireland's Performance Nationally

National historical performance in the formation and development of ICT/eBusiness enterprises was assessed using Enterprise Ireland client data[17]. The precise measures employed are the following: EI ICT project **feasibility grants** (as a measure of national levels of interest in ICT entrepreneurship); EI seed and **venture capital** investment (as a measure of the number of ICT/eBusiness enterprises in start up and developments phases); and **sales/exports** of EI clients in ICT/eBusiness (as a measure of the "stock" of indigenously created eBusiness firms in Ireland). On the whole, national performance in the creation and development of eBusiness related enterprises in Ireland has been strong historically, with no major deterioration recorded despite the slowdown in the technology sector.

4.2.2 Ireland in an International Perspective

Ireland ranks seventh of the nine case study countries in terms of eBusiness innovation, and first out of seven in terms of enterprise creation. In the area of eBusiness innovation, Ireland continues to perform poorly in relation to the case study countries. In relation to firms that develop and provide eBusiness technologies and services, PwC concludes that Ireland has been very successful in developing ICT and eBusiness related enterprises. Despite the worldwide technology slowdown, Ireland's relative performance (i.e. per 1m population) in terms of enterprise creation is stronger than any of the case study countries. Table 4.4 presents key findings from the benchmarking process, with notable findings:

- *Ireland was the best represented of the European case study countries in the Deloitte and Touche Technology Fast 500 in 2002, with 7.6 listings per 1m population (i.e. 29) compared with 2.4 for the second ranked, the UK;*
- *Ireland was the best represented of the European case study countries in the 2002 Tornado 100 listing of Europe and Israel's top high tech companies, with 1.3 listings per 1m population compared with 0.89 listings for the 2nd ranked Sweden;*
- *Ireland has more NASDAQ listings (2002) per head of population than any of the case study countries (excluding US), and more actual listings than Germany, Singapore or Denmark.*

17 *This is a reasonably valid approach when one considers that EI is by far the largest of the enterprise development agencies in Ireland and that a very high share of indigenous ICT/eBusiness enterprises will seek state supports in the start-up and development phases.*

Table 4.4 *Ireland's Relative Performance in ICT Innovation and Enterprise Creation*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
Innovation									
WCY Total No. of Patents granted to Residents per 1 million Population, 1999	6	3	7	**7**	4	2	9	5	1
WCY Total No. of Patents in Force per 100,000 Population, 1999	6	8	4	**3**	2	1	5	n.a.	7
European Commission, EPO patent applications in high tech classes per 1,000 population, 1999	n.a.	3	5	**7**	1	4	n.a.	6	2
Eurostat/USPTO, USPTO Patent Applications in High tech Classes per 1 million Population, 1998	n.a.	5	4	**7**	3	2	n.a.	6	1
UNDP Receipts of Royalties and Licence Fees (US$ per 1,000 People), 1999	8	6	n.a.	**5**	2	1	7	3	4
Enterprise Creation and Growth									
D&T Technology Fast 500 in Europe/ No. of Indigenous Enterprises, 2002	n.a.	2	6	**3**	5	4	n.a.	1	n.a.
D&T Technology Fast 500/No. of Indigenous Enterprises per 1m population, 2002	n.a.	6	5	**1**	4	3	n.a.	2	n.a.
Tornado 100/No. of Indigenous Enterprises, 2003	n.a.	2	6	**4**	5	3	n.a.	1	n.a.
Tornado 100/No. of Indigenous Enterprises per 1m Population, 2003	n.a.	6	4	**1**	5	2	n.a.	3	n.a.
Funds raised by Domestic VCs and invested Domestically in High tech Enterprise/€'000s, 2001	n.a.	1	4	**5**	6	3	n.a.	2	n.a.
Funds raised by Domestic VCs & invested in High tech Firms Domestically/€'000s per M pop, 2001	n.a.	5	3	**1**	6	2	n.a.	4	n.a.
No. of Companies Listed on the NASDAQ international, April 2003	3	7	8	**3**	2	3	6	1	n.a.
No. of Companies Listed on the NASDAQ international per 1m population, April 2003	6	8	7	**1**	4	3	2	5	n.a.

Source: European Union, Eurostat, United Nations Development Programme, Deloitte and Touche, Tornado, European Venture Capital Association, NASDAQ

4.3 The Attraction of eBusiness related Foreign Direct Investment (FDI)

The final source of eBusiness economic benefit is the attraction of Internet and eBusiness related FDI. A challenge inherent in an assessment of Ireland's performance in this regard is the blurred distinction between ICT enterprises (the vast majority of which incorporate an eBusiness/Internet component) and enterprises that are eBusiness dominated.

4.3.1 Ireland's Performance Internationally

In relative terms (i.e. per 1m population) Ireland currently ranks second out of the case study countries in terms of attracting eBusiness FDI.

In the 2002 eBusiness monitor baseline report, Ireland was ranked as one of the outstanding FDI performers in terms of attracting foreign eBusiness firms. In per capita terms, Ireland and Singapore attracted more eBusiness in 2001 than any of the remaining case study countries. In absolute terms (i.e. total number) the baseline report noted that Ireland attracted 7% of all eBusiness FDI projects into Europe, with the UK attracting 42% and Germany 16%.

In 2003, due to the worldwide economic and technology slowdown, global flows of FDI have slowed dramatically in all countries. Ernst and Young *European Investment Monitor*[18] has however noted that market share of Central and Eastern Europe continues to grow, with (general) FDI in that region rising from 20% in 2000 to 32% in 2002. This monitor also shows that over the past two years, there has been a 55% fall in the number of new investment projects in Ireland. However, despite the slowdown and greater competition (particularly from Central and Eastern Europe, an evaluation of which is beyond the scope of this study) two of the leading Internet search engine companies (Google and Overture) have announced the development of significant operations in Ireland.

Table 4.5 *Ireland's Performance in the Attraction of ICT/eBusiness FDI in International Perspective, 2001*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK
All FDI								
% of New Projects	3	2	8	**5**	6	6	4	1
Total Projects/Population	5	8	6	**1**	7	4	2	3
All ICT FDI								
% of New Projects	7	2	8	**5**	3	5	4	1
Total Projects/Population	7	8	5	**2**	6	4	1	3
All eBusiness FDI								
% of New Projects	3	2	8	**6**	6	3	3	1
Total Projects/Population	7	8	5	**2**	6	3	1	4
All ICT R&D								
% of New Projects	4	6	5	**2**	8	3	7	1
Total Projects/Population	6	8	2	**1**	7	3	4	5

Source: PwC Belgium, Global Investment Location Database, 2002.

18 *Ernst and Young European Investment Monitor June 2003*

4.4 Summary of Ireland's eBusiness Performance

A summary of Ireland's eBusiness performance, benchmarked against the eight other case study countries, is presented in Table 4.6 below. Overall, of the countries reviewed, the Nordics (i.e. Denmark and Sweden), the US and Germany were the strongest performers, although certain indicators showed all countries to be operating in a very tight band.

Currently, Ireland is ranked joint seventh of the nine case study countries in terms of eBusiness adoption and sophistication by enterprises, seventh in terms of eBusiness innovation, and first out of seven in terms of enterprise creation. Finally, in relative terms (i.e. per 1m population) Ireland ranked second out of the case study countries in terms of eBusiness FDI. Ireland's rankings in all three areas have broadly remained constant over the past nine months.

Table 4.6 *Summary of Ireland's eBusiness Performance compared with Case Study Countries*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
eBusiness Adoption[19]	◑	●	●	◑	◑	●	◕	◕	●
eBusiness Innovation (per capita)[20]	○	◕	◕	◑	●	●	n.a.	◕	●
eBusiness Enterprise Creation (per capita)[21]	○	○	○	◑	○	◔	n.a.	◔	n.a.
Foreign Direct Investment: Attraction of all ICT FDI (per capita)	○	○	○	◑	○	○	◕	○	n.a.
Attraction of eBusiness FDI (per capita)	○	○	○	◑	○	○	◕	○	n.a.
Attraction of ICT R&D FDI (per capita)	○	○	◔	◑	○	◔	○	○	n.a.
Attraction of all ICT FDI (absolute)	◑	◕	○	◑	◑	◑	◑	●	n.a.
Attraction of eBusiness FDI (absolute)	◑	◕	○	◑	◑	◑	◑	●	n.a.
Attraction of ICT R&D FDI (absolute)	◔	○	○	◑	○	◑	○	●	n.a.

○ << Ireland ◔ < Ireland ◑ = Ireland ◕ > Ireland ● >> Ireland

Source: PwC

19 *eBusiness adoption was assessed based on various measures, including: businesses with access to the Internet; businesses with a website; businesses trading on-line; enterprises that sell on eMarketplaces etc.*

20 *eBusiness innovation (per capita) was assessed based on various measures, including: number of patents granted; number of patents in force; number of patent applications etc.*

21 *eBusiness Enterprise Creation (per capita) was assessed based on various measures, including: number of companies in D&T Fast 500; domestic VC funds invested in domestic hi-tech companies etc.*

5 Ireland's eBusiness Environment

This chapter assesses the competitiveness of Ireland's eBusiness environment relative to the eight case study countries. For the purpose of the study, this includes factors in the environment that may promote or inhibit eBusiness within the economy, such as:

- *5.1 Policy making structures.*
- *5.2 The fiscal environment.*
- *5.3 Support services from Government and the private sector.*
- *5.4 Education and training.*
- *5.5 Research and development investment.*
- *5.6 The legal and regulatory environment.*
- *5.7 Telecommunications infrastructure, access and cost.*
- *5.8 The financial environment.*

Table 5.1 below, summarises the overall quality of the eBusiness environment in Ireland relative to the eight case study countries, based on a combination of internationally comparable data and case study qualitative information[22]. Major **strengths** of the Irish eBusiness environment are:

- *eGovernment, driven by the on-line integration of Government services to enterprise and plans for the rollout of eProcurement in the Irish public service;*
- *the general pro-business nature of the fiscal environment; the availability of IT supports/skills within the economy; and,*
- *the current availability of supports for the adoption of eBusiness by existing enterprise.*

Against these strengths stand a series of **weaknesses**, the most apparent of which are:

- *the limited availability and high price of DSL[23] and the absence of cable modem broadband services;*
- *relatively low levels of usage of PC's in primary and secondary schools (with implications for future IT literacy levels/societal adoption of Internet technologies); and,*
- *the relatively high rates of VAT (which has implications for digital products).*

22 *The case studies were prepared by PwC based on a combination of quantitative research, and primary & secondary qualitative research including face-to-face and telephone interviews and desk-based research etc.*

23 *Digital subscriber line (DSL) technologies allow high speed broadband communications over existing copper wires.*

Table 5.1 *Summary of the Quality of Ireland's eBusiness Environment relative to Case Study Countries*[24]

	Australia	Germany	Denmark	Ireland	Netherlands	Singapore	Sweden	UK	US
Government Supports[25]	◔	◔	◔	◑	◔	◑	◔	◕	n.a.
Private Sector IT Supports	◕	◑	◑	◑	◑	n.a.	◕	◑	●
Education & Training	n.a.	●	◑	◑	◑	●	●	◕	n.a.
Research and Development	◑	●	●	◑	◕	◕	●	◕	●
Telecoms	◕	●	●	◑	◕	◕	●	◕	●
Venture Capital	n.a.	◑	◔	◑	○	n.a.	◑	◕	n.a.

○<< Ireland ◔ < Ireland ◑ = Ireland ◕ > Ireland ● >> Ireland

Source: PwC Assessment, 2003.

5.1 Policy Making Structures

Ireland's policy making structure was put in place in June 2001 to ensure a higher level of political involvement and policy co-ordination in the formulation of policy for the Knowledge Society than existed previously. Policy formulation is underpinned by the second national strategy for the Knowledge Society (New Connections, launched in mid-2002). Table 5.2 below compares the institutional arrangements for the Knowledge Society in Ireland with those in place in the eight case study countries (see Appendix 1 for further information).

Table 5.2 *Key Features of Policy Making Structures, Case Study Countries*

	Australia	Germany	Denmark	Ireland	Netherlands	Singapore	Sweden	UK	US
IS/eBusiness National Strategy	yes	yes	yes	**yes**	yes	yes	yes	yes	yes
Level of Political Involvement	high	medium	medium	**medium**	medium	high	medium	high	high
Dedicated IS/ eBusiness Department	yes	no	no	**no**	no	yes	no	no	no
Dedicated IS/eBusiness Agency	yes	no	no	**no**	no	yes	no	yes	no
Private Sector Involvement in Policy Formulation	yes	yes	no	**yes**	yes	no	yes	yes	yes

Source: PwC Assessment

All case study countries have a published strategy for promoting the Knowledge Society/eBusiness. Ireland's strategy is the most operational of those reviewed, the remaining countries being for the most part aspirational, with some (e.g. Singapore) having no defined timeframe for promoting the knowledge society.

Some countries have dedicated Knowledge Society/eBusiness Government Departments or agencies namely, Australia (Department for Communications, IT and the Arts), Singapore (Ministry of Information, Communications and the Arts) and the UK (eEnvoy). The level of political involvement

24 *It should be noted that certain environmental factors described in the main body of the report did not lend themselves to this type of assessment. These are: "legal and regulatory" and "policy-making structures". For this reason, they are not included in Table 5.1 but are included in the qualitative analysis that follows.*

25 *Includes the fiscal environment and financial incentives.*

in eBusiness policy in these countries, along with the USA, is higher than in the remaining countries. Ireland's knowledge Society policy making structures are more advanced compared to the remaining case study countries in terms of level of political involvement in policy formulation. A distinction that exists between Ireland and the remaining case study countries is the profile of the Government Department with primary responsibility for Information Society policy formulation. In Ireland, the Department of the Taoiseach with its eGovernment portfolio represents a natural fit with its public sector modernisation function.

5.1.1 Role of the European Union

There are four E.U. Commission Directorate Generals (DG) responsible for E.U. eBusiness policy with policy and implementation spearheaded by the Information Society Directorate General (DG). It plays a key role in implementing the "vision" (from an Information Society perspective) set for Europe in Lisbon (2000): "*to make Europe the world's most competitive and dynamic economy, characterised by sustainable growth, more and better jobs and greater social cohesion, by 2010*".

The first E.U. action plan for the Information Society was the *eEurope Action Plan* in 2000. The overall objective of the *eEurope Action Plan (2000)* was to promote Internet connectivity, by focusing on three key areas:

1. cheaper, faster and secure Internet;

2. investing in people and skills; and,

3. stimulating use of the Internet.

The E.U. established a process to ensure that progress towards implementation was periodically reviewed. A final progress report on the first eEurope action plan was published in February 2003[26].

In May 2002, the Commission adopted a second Action Plan entitled "*eEurope 2005*". It outlines that by 2005, Europe should have:

1. modern on-line public services

    a. eGovernment

    b. eLearning services

    c. eHealth services

2. a dynamic eBusiness environment

and, as an enabler for these:

3. widespread availability of broadband access at competitive prices

4. a secure information infrastructure

"*eBusiness W@tch*", launched in January 2002 and updated in 2003, is the primary eBusiness benchmarking exercise undertaken by the Commission. This has sought to provide policy makers and stakeholders in industry with statistical data and analysis on 15 key sectors, to help them better identify the challenges to be addressed in support of eBusiness, and to gain a better understanding of the impact of eBusiness on enterprise competitiveness and productivity.

The "*Go Digital*" initiative was launched as part of the Commission's efforts to assist SME's embrace Internet technologies. Initial programme efforts focused on raising eBusiness opportunity awareness in SMEs. The programme has also launched a grant scheme under the Multi Annual Program 2001. The scheme, with the support of multiple organisations, aims to identify and disseminate best practices for SMEs to use eBusiness, and has sought to make SMEs aware of its particular benefits,

26 This report can be found at http://europa.eu.int/eur-lex/en/com/cnc/2003/com2003_0066en01.pdf

identifying and discussing the practical obstacles that SMEs and the target sectors face in eBusiness. As a follow up to the Go Digital initiative, the Commission adopted the Communication "*Adapting eBusiness policies in a changing environment*" on 27 March 2003. This Communication alerts Member States to the need to move to an eBusiness approach of efficient integration and productive use of ICT in internal and external business processes. Moreover, this Communication calls upon Member States and regions to review their eBusiness strategies in support of SMEs and to adopt (voluntarily) policy targets to accelerate this transition.

To support this, the eBSN has been established – *"European eBusiness Support Network for SMEs"*. The objectives are:

- *to bring decision makers to share information and discuss strategic policy orientation;*
- *to validate existing eBusiness policies and exchange views about targets for future policies; and*
- *to provide a "one-stop-shop" for information about regional/national/E.U. initiatives and funding for SMEs. The importance of eBSN membership has been highlighted by the E.U., for all Member States.*

5.2 The Fiscal Environment

In all case study countries, fiscal incentives feature strongly in the range of policy initiatives that have been introduced to stimulate eBusiness.

The Irish Government has not been as proactive as a number of the other case study countries in levering fiscal policy to specifically promote eBusiness or indeed the Information Society in general (see table 5.3). This most likely reflects the view of Government that the fiscal environment in Ireland is more favourable to its enterprise base than any of the other case study countries, with corporate and direct taxation levels in Ireland counting among the lowest internationally.

Table 5.3 *Fiscal Policy and eBusiness, Selected Indicators*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
General Fiscal									
Rate of Corporate Tax (1 = Most Favourable)	4	9	5	**1**	7	3	2	6	8
Rate of Direct Tax (1 = Most Favourable)	6	5	8	**2**	1	7	n.a.	3	4
Rate of Indirect Tax (1 = Most Favourable)	n.a.	2	7	**5**	4	6	1	3	n.a.
Household/Personal									
Computer Ownership	no	no	yes [1]	**no**	no	yes	no	no	n.a.
Internet Connection	no	no	no	**no**	no	yes	no	no	n.a.
Enterprise Sector									
Hardware/Software Purchase	no	no	no	**no**	no	no	no	yes	n.a.
Internet Connection	no	no	yes [1]	**no**	no	yes	no	no	n.a.
ICT/eBusiness Training/ Consultancy Expenditures	no	no	no	**no**	no	no	no	no	n.a.
Recruitment of ICT/ eBusiness Specialists	no	no	no	**no**	no	no	no	no	n.a.
ICT R&D Investments	yes	no	marginal	**no**	yes	no	yes	yes	n.a.
eBusiness enabled Exports/ Overseas Sales	no	no	no	**no**	no	no	yes	no	n.a.
Business/Angel Venture Capital Investments	no	no	no	**yes**	no	no	no	yes	no
ICT/eBusiness Specialists									
Attraction of ICT/eBusiness Specialists from Overseas	no	no	yes	**no**	no	yes	no	yes	n.a.

Source: Respective Government websites/PwC Derived ([1] applicable to employees only and with intention of promoting teleworking)

Ireland offers just one out of a selection of possible fiscal incentives to the promotion of eBusiness, namely the provision of fiscal incentives to promote private sector investment in start up enterprises (i.e. Business Expansion Scheme [BES]/Seed Capital Scheme). **Sweden**, by contrast, offers four distinct tax incentives, namely: PC Reform – tax write offs for purchase of Home PCs; tax write off for household connection to broadband networks; tax write off for enterprise connection to broadband networks; and the application of tax to only 75% of the income of ICT researchers.

The tax incentives provided by **Denmark** are broadly similar, although the personal home computer scheme is only open to employees that have the opportunity of teleworking. **Singapore's** "Accredited Cyber Trader" initiative is unique among the case study countries and provides for full tax exemption on all profits made from Internet generated sales in overseas markets, as long as some core functions associated with the eBusiness activity (e.g., hosting) are located in Singapore. The country also

provides tax holidays for certain categories of eBusiness FDI, and does not charge VAT on any overseas Internet generated sales. This constitutes a considerable advantage over a number of European countries where full local VAT rates are payable on all overseas sales. However, Singapore's advantage in this regard will be diminished with the new E.U. VAT Directive.

The E.U. VAT directive will require suppliers of digital products from outside the E.U. to register for VAT in one of the member states if that non E.U. supplier wants to supply into the E.U. market. Once the non E.U. supplier has registered in an E.U. member state, the non E.U. supplier will be obliged to charge VAT on its European digital sales at the rate applicable to the E.U. country of residence of the private purchaser of its digital products. Thus if a Singaporean supplier for example wants to access the Irish market, they must firstly register in the E.U., and charge their Irish customers of digital products the Irish VAT rate of 21%.

The introduction of this E.U. VAT Directive (July 2003) has already seen multinational corporations who sell digital services throughout the E.U. 15 member states re-structure to reduce exposure to high and varying E.U. VAT rates at the point of consumption. AOL recently announced (July 2003) that it would be moving its supply base from the UK to Luxembourg. This move will allow AOL to take advantage of the low level of VAT applied to digital services in Luxembourg (presently at 15%). Locating in Luxembourg (rather than just registering) will allow AOL charge its customers across the E.U. the Luxembourg VAT rate of 15%. This will give AOL significant competitive advantage over its competitors who operate from higher VAT jurisdictions within the E.U.

With regard to Ireland the standard rate of VAT relative to most E.U. countries is likely to prove a significant barrier to businesses that sell on-line to consumers (i.e. Business to Consumer [B2C]). However, E.U. tax legislation does not permit the Government to introduce a lower VAT rate specifically for on-line transactions - it is only possible to reduce VAT on on-line sales to the E.U. minimum of 15% if the standard VAT rate is also reduced to 15%. The latter would not be economically viable for Ireland as total VAT receipts for on-line transactions in 2001 amounted to a mere 0.5% of all VAT receipts and only 0.15% of the total tax take (€42m). It should also be noted that in the majority of cases VAT does not impact on Business-to-Business [B2B] transactions (the most significant component of on-line transactions).

The **UK**, like Singapore, is somewhat unique, being the only country of those reviewed to provide fiscal incentives for the procurement of hardware/software by SMEs. The **German** situation with regard to taxation and the Internet was noteworthy to the extent that Government has considered the introduction of an "Internet Licence" to be charged on every computer connected to the Internet to meet the costs of public broadcasting content (i.e. equivalent to a television licence).

Ireland's non-interventionist performance in the formulation of eBusiness fiscal policy should be considered in the context of Ireland being one of the few countries to have provided a wide range of financial incentives to both indigenous and multinational enterprise, as discussed in section 5.3.

5.3 Support Services from Government and the Private Sector

5.3.1 Government Supports for eBusiness Development

eBusiness support services facilitate and promote the adoption of Internet technologies by enterprise. Governments frequently adopt policy initiatives with the explicit intention of promoting eBusiness adoption among existing enterprises. These can take the form of financial incentives (e.g., direct grant aid or guaranteeing bank loans for eBusiness activities), fiscal incentives (e.g., capital allowances on investment in hardware) or direct supports (e.g., provision of state funded advisory services). Currently, of the case study countries, Ireland is ranked second behind Singapore. (see table 5.4)

The major programmes of **Government support** to enterprise in Ireland at present are:

- ***EI Accelerator Fund**: the €12.7m fund was established in May 2000 to fast track eBusiness projects in EI, IDA, Shannon Development and Údarás na Gaeltachta client firms, 102 companies were approved for funding for demonstration projects which included: the development of web based sales; electronic customer databases; IT interfaces with suppliers; order tracking and fulfilment systems; production management systems, and document management systems. While many companies have only recently completed the projects funded under this initiative, they have already reported receiving a wide range of benefits including: increased sales/market share; development of new markets; improved customer satisfaction; increased internal efficiency; and cost reduction.*
- ***Empower Initiative**: this €3m initiative provided eBusiness supports to the client base of Ireland's 35 County Enterprise Boards. Like the Accelerator Fund, programme funding was sourced through the Information Society Fund.*
- ***CCoI**: the most recent initiative was the rollout of the Department of Enterprise, Trade and Employment funded consultations between CCoI engaged eBusiness executives and some 2000 CCoI members, with a view to developing "eBusiness Action Plans" and identifying eBusiness training needs. The CCoI has also published fourteen case studies of companies that have successfully integrated Internet technologies into their business activities.*

Since 2002, there have been a number of changes and new developments in Government support for eBusiness including the launch of Enterprise Ireland's "eBit" programme in June 2003 which comprised funding of €905k. This recently launched initiative has been established to help companies compete and grow in international markets by:

- *Making better/more cost effective use of existing eBusiness and IT facilities;*
- *Dealing with potential IT risks (security, back up etc.); and/or*
- *Investing in new eBusiness and IT facilities, skills etc.*

Under the eBIT initiative companies can apply for one day free in company eBusiness/IT advice from a consultant retained by EI, and/or a 50% grant towards the cost of a more comprehensive consultancy assignment. Ireland is not alone in the provision of financial supports to promote eBusiness activities among targeted enterprises. As shown in Table 5.4 below, programmes of direct financial support also exist in Sweden, Singapore, Australia and the UK.

Table 5.4 *Availability of Direct Financial eBusiness Supports to Enterprise*

	Ireland	Sweden	Singapore	Australia	UK	Denmark	Germany	Netherlands
IT Training	yes	yes	yes	yes	yes	no	no	no
IT Consultancy	yes	yes	yes	yes	yes	no	no	no
Hardware	yes	no	yes	no	no	no	no	no
Software	yes	no	yes	yes	no	no	no	no
Internet Access	no	no	no	no	no	no	no	no
Broadband Access	no	no	yes	no	no	no	no	no

Source: PwC Research

The most generous programme of direct eBusiness financial support to enterprise was in the UK, namely, the DTI's Small Business Service SMART programme, which had a budget of €145m to the three years ending 2002. Another eBusiness adoption initiative launched in the UK is the "Opportunity Wales" SME Support Network Initiative. Singapore's main vehicle for supporting eBusiness activities is the eBIDS (eBusiness Industry Development Scheme) programme which has a targeted spend of €18m over a two year period, although the allocation of a large share of this funding is tied into the performance of supported companies in generating eCommerce sales. Australia recently introduced a package of direct supports to encourage eBusiness activity among SMEs ("small business assistance package"), but its budget is relatively small at €3.6m for a two year period. Sweden's REG-IT programme is scheduled to run for two years and has a €5m budget (with supports targeted at SMEs in relatively underdeveloped regions). Denmark, Germany and the Netherlands do not provide direct financial incentives to enterprise to promote eBusiness activity.

State sponsored eBusiness advisor networks comprising a multi-disciplinary advisory approach have been successful in the promotion of eBusiness adoption in the UK and Germany. In Ireland, the issue of a lack of multi-disciplinary consultants has been identified as an issue to be addressed in terms of support programmes provided to SMEs. In addition, support programmes must ensure provision of specific advice and development support for the integration of eBusiness into individual companies and sectors, in addition to general eBusiness advice. The launch of "eBit" by Enterprise Ireland is welcome in this regard.

5.3.2 Private Sector Supports

A review of international metrics on the quality of private eBusiness support services in Ireland relative to the case study countries showed Ireland to be a moderate performer within the group of nine countries. Ireland is ranked joint fourth with Germany, Denmark, the Netherlands and the UK.

A significant slowdown of eBusiness activity forecasts created by the dot.com crash and the downturn in the global technology sector would seem to have abated the major issues that once existed with regard to the lack of availability of eBusiness support services (e.g. web designers). However, CCoI research findings (Annual eBusiness Survey) suggest that the cost of ICT specialists remained a barrier to eBusiness adoption in Ireland, with some 46% of CCoI members reporting the "cost of eBusiness skills" to have constituted a major barrier to its adoption in 2002. Industry feedback would also suggest that an issue in relation to eBusiness skills is not the availability of eBusiness skills per se, but rather the quality of eBusiness advice received and, related to this, the impartiality of the source, i.e., eBusiness consultants frequently have a product or service interest. Similarly, a high level of specialisation means that enterprises engaging an "eBusiness" consultant find themselves subsequently requiring the services of a range of additional consultants, with often significant cost implications.

Little has changed since 2002. However the introduction in 2003 of the Enterprise Ireland eBIT programme may address the lack of impartial and multi-disciplinary advice provided by consultants.

Other eBusiness support services which fall into both Government and the Private Sector, are those of ePayments and Security. **ePayment** infrastructure refers to the entire framework of agreements and systems that underpin all forms of electronic payment, from ATMs to mobile commerce. The vast bulk of ePayments in Ireland take the form of Electronic Fund Transfer (EFT), and the business portals of Ireland's main banks (i.e. AIB and BoI) facilitate national and international EFT payments.

Singapore and Denmark were the only countries identified where B2C transactions had evolved beyond credit cards, with Danes making widespread use of debit cards ("Dankort") and Singaporeans having an evolved smart card payment system for on-line and offline transactions.

A recent report commissioned by the Department of the Taoiseach ("Ireland's National ePayments Strategy", April 2003) points to the strong economic rationale for the development of a cohesive national ePayments strategy, and argues that the development of a robust, ubiquitous ePayment infrastructure would strengthen the quality of the micro-economic business environment and deliver a significant contribution to national competitiveness objectives.

With regard to **eSecurity** in Ireland, there are three categories of provider of digital certificates at the present time in the Irish market namely: An Post (Post.Trust), Revenue On-line Services (ROS) and the national banks with on-line offerings. Government security for the PSB is anticipated to be based on a user name and password, with digital certificates not being implemented at this stage.

Digital certificates are currently in use in the public service of five of the seven case studies countries reviewed, namely Denmark, Ireland, Australia, UK, Singapore and Germany. In the UK and Singapore, a central access point to Government services for enterprise requires a Digital Certificate for certain Government services. Certificate service providers are approved by Government in the case of both countries. The Australian Government also has a system of accreditation ("Gatekeeper") for certificate service providers. Sweden is a laggard in terms of the development of Digital Certificates (none in use at the present time in the Swedish public service) with its Government in discussion with the banks regarding their role as "Trusted Third Party" which may result in a solution for the public service.

5.4 Education and Training

If Ireland is to pursue the objective of being counted among Europe's leading eBusiness innovators, investment levels will have to increase considerably in order to address the relatively low levels of usage of PC's in Irish primary and secondary education. Policy initiatives in education and training have implications for future IT literacy levels and societal adoption of Internet technologies.

As shown in Table 5.5 below, Ireland is ranked fourth in terms of schools connected to the Internet at both primary and secondary level, being ranked below the leading case study countries of the UK, Denmark and Sweden.

Table 5.5 *ICT and Education, Selected Indicators*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
General Education									
eEurope Computers connected to the Internet per 100 students at primary level, 2001	n.a	6	1	**4**	5	2	n.a.	3	n.a.
eEurope Computers connected to the Internet per 100 students at secondary level, 2001	n.a	6	1	**4**	5	2	n.a.	3	n.a.
eEurope % of Schools with ADSL or Cable Modem Connection to the Internet, 2001	n.a	5	1	**6**	2	3	n.a.	4	n.a.

Source: eEurope

The *Schools IT 2000* project, launched in November '97, was the first major national initiative aimed at upgrading levels of access to ICTs in Irish primary and secondary schools. A total investment of €50m was made to end 2000, for integrating ICT into teaching. The successor programme to Schools IT 2000 is the "Blueprint for the Future of ICT in Irish Education – Three Year Strategic Action Plan 2001-2003", which has a targeted central Government expenditure of €109m, €78.7m of which is earmarked for capital investment, and the remainder for teacher training.

Since 2002, there have been positive advances in this area. In particular pupil to computer ratios have fallen from 17.7:1 and 12:1 to 11:1 and 9:1 for primary and secondary schools respectively[27]. This progress has been somewhat overshadowed by the cut in funding in the December 2002 budget. The Government is considering the introduction of a levy on telecoms companies to fund broadband access for schools as a mechanism for bringing Ireland up to best practice internationally. While promoting broadband in schools is to be welcomed, other countries, in particular Singapore, continue to be ahead of Ireland in terms of the deployment of ICT in the classroom.

Singapore, in its *IT Master plan for Education* programme provides €1.2bn for capital investment for ICT in schools, supplemented by €354m annually for the maintenance of ICT infrastructure and Internet related services. The ambitious nature of the plan is reflected in the target that, by 2005, 30% of curriculum time in Singapore's schools will entail hands on use of PCs.

Another important measure of Ireland's eBusiness environment in terms of education and training is the number of Science and Technology (S&T) graduates in Ireland. A selection of key indicators to measure Ireland's performance against the eight case study countries is presented in Table 5.6. Since 2002, the number has been falling with students reacting to the downturn in ICT by choosing other courses. If this continues, the ability of the Irish economy to create or attract high value enterprise may be seriously diminished.

27 Source: NCTE, 2003.

Table 5.6 *S&T and Education, Selected Indicators*

IT Education	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
OECD % of Population aged 25-64 with Tertiary Education, 1999	n.a.	2	3	**6**	5	1	n.a.	4	n.a.
ESDIS Total Graduates in S&T as a % Total Graduates (20 - 24 year olds only), 1997	n.a.	3	5	**2**	6	4	n.a.	1	n.a.
OECD, HR in S&T as a % of Labour Force, 1999	n.a.	4	3	**6**	1	2	n.a.	5	n.a.
ESDIS, ICT-related Training Places at 3rd Level per 1,000 Inhabitants, 2001	n.a.	4	2	**1**	n.a.	5	n.a.	3	n.a.
WCY Level of Agreement by Senior/Middle Management with Statement "Information Technology Skills are readily available in your country's labour force", 2002	3	9	6	**5**	7	2	4	8	1
IT Advanced Education WCY, No. of Scientific Articles per 1 million Population, 1997	5	7	2	**9**	4	1	8	3	6
European Commission (Benchmarking R&D Policies 2001), Total New S&T PhDs per '000 Population aged 25-34Years, 2000	n.a.	2	5	**4**	7	1	n.a.	3	6

Source: OECD, ESDIS, World Competitiveness Yearbook

With regard to specialist IT education, the Irish Government has invested close to €100m over the past decade in expanding the number of specialist ICT training/education places in Ireland by 5,400 to 8,300 today. Notwithstanding this large increase, the *Expert Group on Future Skills Needs* report of July 2001[28] found that this level of output would not be sufficient for the medium to longer term needs of the economy, and recommended the allocation of an additional €165m over five years to encourage the further development of IT conversion courses, among others. In May 2002, the Minister for Education and Science announced the creation of a dedicated fund to meet this recommendation. The original allocation for 2002/2003 was €15m but this has since been revised downwards to €12m. A report has recently been commissioned by Forfás, in conjunction with the Expert Group on Future Skills Needs, to review the Irish ICT sector as a whole. This report will include a review of the number of Engineering and Computing graduates required from Irish 3rd level institutions going forward.

28 The Expert Group on Future Skills Needs published an updated report on the future skills needs of the Irish ICT sector in October 2003.

5.5 Research & Development (R&D) Investment

Levels of investment in R&D are the primary driver of a country's performance in the generation of "innovation", the subsequent commercialisation of which can have a favourable impact on enterprise creation levels within the national economy. While R&D does not necessarily have a direct impact on eBusiness, it has implications for the economy's international perception of being a "Knowledge Society" and consequently, the attraction of ICT/eBusiness FDI.

Levels of investment in R&D in Ireland grew strongly in the period to end 1999, with industry investment growth (+128%) leading that of third level institutes (+112%) and Government (+24%). The National Development Plan 2000-2006 provides for a total Government allocation of €2.48bn to Research and Technology and Development Initiatives (RTDI), equivalent to €357m per year, the mainstay of which is to be allocated to industry supports (€1.5bn). The major programmes of R&D support for industry and academia in Ireland are:

- ***Programme for Research in Third level Institutions (PRTLI)****: established in 1999, this is the major funding programme for basic research in third level institutions in Ireland. By September 2002, more than €600m had been invested under the programme, however the December 2002 budget has seen cuts in capital investments under this scheme;*
- ***Science Foundation Ireland (SFI)****: established initially as a sub-board of Forfás, SFI was established in 2000 to administer the €711m Technology Foresight Fund, a ring fenced and additional R&D fund to develop world class research capability in biotechnology and ICTs. Recent grants awarded under SFI include the €42m investment in three new Centres for Science, Engineering and Technology (CSETs), announced in May 2003;*
- ***Programmes in Advanced Technology (PATs)****: six EI programmes aimed at promoting research in priority areas, one of which is Informatics. The Informatics Research Initiative is currently supporting 31 research projects in the areas of digital media, eBusiness, and mobile and wireless communications in six third level institutes;*
- ***R&D Capability Initiatives (Enterprise Ireland/IDA Ireland)****: EI/IDA provides financial supports to companies to further develop R&D capability activities.*
- ***Embark Initiative (Department of Education and Science):*** *the Basic Research Grants Scheme which is jointly funded by EI and the Irish Research Council's "Embark Initiative" is aimed at predominantly early stage researchers. Focusing on the commercialisation of R&D, this €95m (2000–06) scheme also operates a €10m postgraduate research scholarship and a €3.2m post-doctoral fellowship scheme. SFI will assume responsibility of the initiative later in 2003;*

Measured against the case study countries in the eBusiness baseline report (see Table 5.7), Ireland was found to be a relatively poor performer in R&D investment, only surpassing Australia in terms of total expenditure and total business per capita expenditure on R&D. In the intervening nine month period, Ireland's ranking has not improved.

While Ireland is one of the few case study countries not to offer fiscal incentives for business spend on R&D, it does offer direct financial support to industry to develop its research capability. Case study countries where such support is available include Australia, Denmark, and Singapore. A recent initiative introduced by Singapore at the end of 2002 has seen the Government subsidising the R&D related wage costs of local SMEs. The *Technology for Enterprise Capability Upgrading (TEC-UP) scheme* has been introduced to help SMEs undertake R&D activities. SMEs with 30% local shareholding can engage the services of a pool of over 100 research scientists and engineers (RSEs). RSEs are seconded full time for up to two years to the SMEs to help identify and implement suitable projects. The SMEs need only pay 30% of salary with the remaining 70% funded under the scheme.

Table 5.7 *R&D in Ireland in International Perspective, Selected Indicators*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
WCY Total Expenditure (US$) on R&D per Capita, 2000	8	4	3	**9**	5	1	7	6	2
WCY Business Expenditure (US$) on R&D per Capita, 2000	9	4	3	**8**	7	1	6	5	2
WCY Total R&D Personnel Nationwide (FTE) per Capita, 2000	5	3	2	**7**	4	1	6	8	n.a.
WCY Total R&D Personnel in Business (FTE) per Capita, 2000	8	3	2	**7**	4	1	6	5	n.a.
EC Share of Government Budget Allocated to R&D, 1999	n.a.	3	6	**7**	2	5	n.a.	4	1
EC Total New S&T PhDs per '000 Population aged 25-34 Years, 1999	n.a.	2	5	**4**	7	1	n.a.	3	6

Source: World Competitiveness Yearbook, European Commission

Two recent developments in relation to Ireland's R&D funding are noted: the fact that Government did not introduce fiscal incentives for R&D in the December 2002 budget (as was sought); and, the reduction of funding for research at third level institutions (PRTLI), which has further diminished Ireland's ability to catch up with the case study countries.

5.6 The Legal and Regulatory Environment

Legal and regulatory provisions for eBusiness can take many forms, ranging from legislation introduced to ensure that electronic transactions enjoy the same legal standing as paper based transactions, to the clarification of tax rules regarding cyber trade.

The fact that all E.U. countries are moving in tandem (guided by the various eBusiness related Directives of the E.U.) means that the Legal and Regulatory environment has little potential to enhance international competitiveness with Europe. There is a risk of putting legislative impediments to eBusiness in place through unilateral national legislative change – which must be avoided.

In an Irish context, considerable progress has been made in the introduction of legislative change in support of eBusiness. Key developments include the: Electronic Commerce Act, 2000; Copyright and Related Rights Act, 2000; Broadcasting Act, 2001; and Criminal Justice Act, 2002. Moreover, the Department of the Taoiseach has established an Inter-Departmental Working Group to ensure coordination across Government Departments in addressing legal and regulatory issues relevant to the Knowledge Society.

While it is not possible to benchmark the quality of the eBusiness legal and regulatory environment in each of the case study countries with any degree of accuracy, the overall perception, nationally and internationally, is that Ireland's legal environment is highly conducive to eBusiness in all of its forms. The ICT/eBusiness legal and regulatory environment is examined in the Forfás report *Legislating for Competitive Advantage in eBusiness and ICTs*[29] (published October 2002).

5.7 Telecommunications Infrastructure, Access and Cost

The quality of telecoms infrastructure, combined with choice and the cost of all forms of Internet access have important implications for rates of eBusiness adoption within an economy.

Total revenues for the Irish fixed, mobile and broadcasting markets currently stand at approximately €3.44bn per annum with the telecoms sector accounting for approximately 3% of Irish GDP in 2001. Domestic minutes represent the highest proportion of total retail traffic (44%), followed by Internet minutes (37%). As at December 2002 there were a total of 1.6m PSTN (public switched telephone network) lines in Ireland, and approximately 375k ISDN access channels, an increase of 30% since 2001. Approximately 3,300 DSL lines had been ordered by the end of 2002, and approximately 2,300 cable modems were supplied. There were also approximately 5,000 residential and business subscribers of fixed wireless access services in 2002.

Broadband access and cost in Ireland has improved over the past six months with the rollout of lower cost broadband options, most notably DSL and cable modem. Both Eircom and ESAT BT launched DSL services in May 2002, and since then, DSL coverage has increased to approximately 41%. Eircom has rolled out broadband to over 70 exchanges, as part of its five year €125m investment programme and the company expects that number to rise to 110 exchanges (which will have the capacity to service approximately 1m customers) by end '03.

While DSL coverage rates are expected to reach 65% by the end of 2004, it should be noted that leading countries have already reached coverage rates of over 90%. Ireland's position, as a laggard in relation to broadband infrastructure, is highlighted by recent forecasts by Jupiter Research (May 2003), which predict that while approximately 28% of European homes will have broadband access by 2008, only 14% of Irish homes will have it.

The Irish Government allocated €230m for telecommunications in the NDP and has developed a National Broadband Strategy, Phase 1 of which entails investment in fibre optic networks in 19 towns and cities in Ireland. The construction of these *Metropolitan Area Networks (MANs)* is estimated at a cost of €65m.

Compared to the case study countries, Ireland was found to be a relatively weak player in terms availability of Internet telecoms services, choice and cost, as shown in Tables 5.8 and 5.9 below. Ireland's competitive performance in terms of the relatively high cost of narrowband access for business, and the limited availability and high price of DSL was found to be weak. In terms of access cost, recent OECD findings have illustrated that Irish DSL prices are far higher than the majority of other E.U. nations, with DSL prices for small businesses five to six times higher than in the two lowest priced markets. Such high pricing will curtail the uptake of broadband services by Irish businesses and consumers alike.

Since the completion of the eBusiness baseline report in September 2002, a number of developments have taken place. Ireland has seen the introduction of flat rate Internet narrowband access and lower cost broadband (DSL) services. The Government has also commissioned pilot projects to assess the possibilities from alternative broadband technologies such as wireless LANs[30]. IDA Ireland is continuing its negotiations to attract leading international ISPs to Ireland to improve the country's Internet peering facilities.

29 *www.forfas.ie*
30 *Local Area Networks*

Table 5.8 *Telecom Infrastructure and Costs/Ireland and Case Study Countries Compared*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
NRI: Assessment of Quality of "Information Society" Infrastructure, 2001	4	3	5	**9**	8	2	6	7	1
WCY Level of Top/Middle Management Agreement that Communications Infrastructure (availability, reliability, cost) is Adequate, 2001	6	5	3	**9**	4	7	2	8	1
WCY No. of Mobile Phone Subscribers per 1,000 Population, 2001	8	7	4	**3**	6	1	5	2	9
OECD Broadband Penetration (DSL or Cable Modem) per 100 Population, 2001	6	5	2	**8**	4	1	n.a.	7	3
OECD Cost of SME Entry Level DSL Services (0.25-0.5 Mbit/s), 2002	n.a.	1	3	**7**	5	6	n.a.	4	2
OECD Cost of Basic DSL Services for SMEs (0.5 Mbit/s), 2002	n.a.	7	1	**6**	3	2	n.a.	5	4
OECD, Internet Dial-up Access Costs Residential User 20 Hours Off-Peak, 2001	n.a.	3	n.a.	**6**	5	4	n.a.	2	1
OECD, Internet Dial-up Access Costs Business User: 40 Hours at Peak Time, 2001	n.a.	3	4	**6**	7	5	n.a.	2	1

Source: Networked Readiness Index/Harvard, World Competitiveness Yearbook, OECD

Table 5.9 *Assessment of Ireland's Telecom Infrastructure/Costs*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
General Telecoms Infrastructure	◕	●	●	◑	●	●	●	◕	●
Broadband Penetration/Access	●	●	●	◑	●	●	●	●	●
Broadband Affordability (SMEs)	n.a.	◕	●	◑	●	●	n.a.	◑	●
Narrowband Affordability	n.a.	●	●	◑	◑	◕	n.a.	●	●
Mobile Phone Penetration	○	○	◔	◑	◔	●	○	◑	○

○ << Ireland ◔ < Ireland ◑ = Ireland ◕ > Ireland ● >> Ireland

Source: PwC Assessment

With regard to telecom policy initiatives, the Irish Government and regulator (ComReg) are not unique in intervening in the market. The Swedish Government for example, is investing heavily in the upgrading and improvement of the broadband network throughout the country, through direct investment and provision of fiscal incentives to local Government to invest on a discretionary basis. Similarly, the development of Singapore's national broadband network was the result of a Government PPP. An initiative by OFTEL, the UK regulator, required BT to offer wholesale flat rate access to competitors in a bid to stimulate the supply of flat rate always on access and this is reported to have had favourable impacts on eBusiness levels.

5.8 The Financial Environment

This section looks at the extent to which venture capital (VC) funding is available for ICT/eBusiness start ups and expansionary enterprises. Investment funds may come from Government, Government-incentivised private sector schemes (e.g. BES) or from non-incentivised private sector sources.

Table 5.10 shows levels of investment by Irish venture capitalists in 1999, 2000, 2001, and 2002. In 2002, Irish based venture capitalists made €105m worth of investments, down from €145m in 2001 and substantially lower than 2000 (€223m). The investment trends in Ireland over the past two years have mirrored global investment trends - less funds being raised and invested in the volatile funding market, with the majority of investments allocated to follow-on funding.

Table 5.10 *Venture Capital Investments in Ireland, 1999, 2000, 2001 and 2002*

	1999		2000		2001		2002	
	€'000s	No. of Companies	€'000s	No. of Companies	€'000s	No. of Companies	€'000s	No. of Companies
Investments								
Initial Investment	59,731	75	117,068	67	64,717	52	31,717	48
Follow on Investment	45,244	80	106,299	84	79,827	65	73,420	108
Total Investment in Year €	**104,976**	**155**	**223,368**	**151**	**144,545**	**117**	**105,137**	**156**
Stage Distribution of Investments in Year								
Seed	2,843	9	1,495	3	1,101	5	1,808	7
Start up	37,671	69	110,130	77	36,540	52	25,623	55
Expansion	38,049	60	100,321	64	86,419	53	75,875	87
Replacement Capital	564	3	5,488	5	3,217	4	1,831	7
Buyout	25,849	14	5,934	2	17,268	3	0	0
Total Investment	**104,976**	**155**	**223,368**	**151**	**144,545**	**117**	**105,137**	**156**
ICT&T/eBusiness Investments	64,665	82	153,771	91	120,410	90	69,632	100
ICT&T/eBusiness as a % of Total	62%	53%	69%	60%	83%	77%	66%	64%

Source: PricewaterhouseCoopers/European Venture Capital Association

Table 5.11 presents a selection of statistics that indicate the availability of high tech venture capital in Ireland relative to the eight other case study countries.

The statistics suggest that there are no major issues with regard to the availability of venture capital funding for high tech enterprises in Ireland – the country being ranked second out of six countries in the per capita availability of high tech funding for start ups, and fourth in terms of the per capita availability of VC funding for established high tech companies. Despite Ireland's positive ranking for availability of venture capital, consultations suggest that further funding is required at the development phase.

Table 5.11 *Availability of Venture Capital for High Tech Enterprise, 2001*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
VC (€) raised by domestic VCs for high tech start ups ('000s), 2001	n.a.	2	5	**4**	6	3	n.a.	1	n.a.
VC (€ million) raised by domestic VCs for high tech start ups per million population, 2001	n.a.	5	4	**2**	6	3	n.a.	1	n.a
VC (€) raised by domestic VCs for high tech expansion ('000s), 2001	n.a.	2	4	**6**	5	3	n.a.	1	n.a
VC (€ million) raised by domestic VCs for high tech expansion per million population, 2001	n.a.	5	2	**4**	6	3	n.a.	1	n.a
WCY Management Agreement with statement "venture capital is easily available for business development", 2002	6	9	8	**4**	2	7	3	5	1

Source: European Venture Capital Association, World Competitiveness Yearbook

6 Key Findings and Recommendations

This chapter summarises the foregoing analysis from the benchmarking of eBusiness performance (chapter 4) and the eBusiness environment (chapter 5) in Ireland vis-à-vis the eight case study countries, to identify:

6.1 Key Lessons for Ireland

From the review of eBusiness policy initiatives and actions in successful case study countries, the following key findings were identified:

- *certain countries enjoy natural advantages over others in terms of the promotion of eBusiness adoption including: the presence of visionary enterprises; a high concentration of enterprise in technology enabled enterprise, and/or the early rollout of eBusiness precursor technologies, e.g. Electronic Data Interchange;*
- *there is a strong correlation between a country's success in the promotion of societal adoption of Internet technologies and rates of eBusiness adoption by existing enterprise. Countries with relatively low societal adoption have to invest more heavily in enterprise support activities (e.g. direct financial supports);*
- *related to the above, the importance of the interdependence of the three aspects of the Knowledge Society (***i.e. eGovernment, Information Society or public adoption, and eBusiness***), with each "prong" contributing to eBusiness momentum within the economy;*
- *"simple" policy initiatives have proven to be most effective in stimulating (directly or indirectly) eBusiness activity, ranging from the provision of tax incentives for home ownership of PCs and Internet access in Sweden to the intensive promotion of IT education for all in Singapore;*
- *the need for direct and indirect eBusiness supports (e.g. fiscal, financial, advisory) to enterprise, primarily targeted at SMEs and enterprises based in regionally disadvantaged locations;*
- *there has been a need for a strong Government role in the provision of basic Internet infrastructure at competitive prices, and a willingness to intervene in order to stimulate eBusiness activity;*
- *a major focus on the implementation of eGovernment services for enterprise;*
- *an absence of eBusiness complacency.*

In terms of the Knowledge Society overall, Ireland has by and large, adopted an Knowledge Society promotion model that broadly resembles that of the UK, i.e., strong emphasis on enterprise and eGovernment with few policy initiatives targeted directly at society wide take up of Internet technologies. While a relatively heavy push on enterprise is justified by the fact that Irish business lags the performance of the leading countries, this relatively limited concentration means that Ireland's eBusiness progress is not enjoying the full support of the other interrelated and critical aspects of the Knowledge Society. Failure to address this policy deficit in the short term will mean that Government will have to shoulder the responsibility of demonstrating the benefits of Internet technologies (including broadband) to enterprise, with often limited effects, as opposed to letting this be a natural progression from usage in the home.

6.2 Key Issues and Recommendations

International case study research and national consultations indicate that a number of issues must be addressed if Ireland is to retain and develop its current global eBusiness standing in terms of promoting eBusiness adoption and a positive environment to support eBusiness development.

As noted in Chapter 1, the recommendations to address these issues have been identified based on the research and analysis undertaken above, but also on the review and prioritisation of all eBusiness related policy recommendations made in key reports published subsequent to the completion of the initial eBusiness Monitor study in October 2002. The reports reviewed were the Information Society Commission's "*Building the Knowledge Society*", and the eCities Working Group's "*Recommendations for Dublin as a World Class eCity, and Ireland as a World Class eNation*".

The recommendations outlined in 6.2.1 were identified as fundamental to driving enterprise eBusiness adoption, eBusiness innovation and eBusiness FDI competitiveness in Ireland.

6.2.1 Review of eBusiness Policies and Supports

On 27 March 2003, the European Commission adopted a Communication entitled "*Adapting eBusiness policies in a changing environment: the lessons of the Go Digital Initiative and the challenges ahead*". The Communication highlights the need for Member States to regularly review their eBusiness support policies for SMEs in order to help them adapt to the continuously changing eBusiness environment.

It is recommended that:

A review of eBusiness support policies and initiatives in Ireland should be initiated taking account of the European Councils' conclusions on the European Commission's Communication of March 2003 "Adapting eBusiness Policies in a Changing Environment". (Actors: Department of Enterprise, Trade and Employment, development agencies, business organisations)

This review should specifically address the issues of promoting SME eBusiness usage and preparing SMEs for eProcurement.

(a) Promoting SME eBusiness Usage

State sponsored eBusiness advisor networks comprising a multi-disciplinary advisory approach have been successful in the promotion of eBusiness adoption in the UK and Germany. In Ireland, SMEs that cannot afford high calibre internal IT departments (but whose competitiveness depends on appropriate IT/eBusiness usage) need to be encouraged and possibly assisted to have their IT/eBusiness needs identified by independent advisors who have a strong understanding of both business and IT/eBusiness issues in an SME context. They should also be encouraged to use such help before selecting any business critical IT products.

It is recommended that:

In light of this proposed review, consideration should be given to the development of more sector oriented eBusiness programmes for SMEs, and that sectors be targeted where business processes are likely to be significantly enhanced by the application of eBusiness technologies. (Actors: Department of Enterprise Trade and Employment, Enterprise Ireland, business organisations)

(b) Preparing SMEs for eProcurement

eBusiness potentially poses a series of threats to a significant cohort of the SME enterprise sector in Ireland. These stem in greatest part from the introduction of eProcurement from client firms, including Government, and related developments (e.g. aggregation of demand/requirement for

supplier managed inventories), and also from more intense international competition that had previously been afforded some degree of protection by "knowledge" barriers to entry. Depending on the sector within which an SME operates, the implications may be significant. Therefore, the Government's approach to the introduction of eProcurement into the Irish public service will be an important determinant of the rate of eBusiness adoption by SMEs in Ireland, as well as of the viability of significant numbers heavily dependent on the public service as a source of demand. Care must be exercised to ensure that the manner in which eProcurement is introduced does not have more negative than positive effects on SMEs. ICT Ireland recommended in a recent report *Creating a World Class Environment for ICT Entrepreneurs* that the Government should mandate that at least 20% of their technology purchases be from SMEs. This recommendation is supported by the fact that the US Federal Government must purchase 23% of its prime ICT contracts from small and medium sized companies, and that Swedish Government is required to purchase 20% of its procurement needs from SMEs.

There is a need for measures to be identified and implemented to prepare SMEs for, and drive them towards, eProcurement. General programmes should include communications, advice, and guidance for SMEs.

It is recommended that:

Programme(s) should be put in place to support and drive SMEs to prepare for the adoption of eProcurement, especially in the context of the move (albeit phased) to eProcurement by the Public Sector. (Actors: Department of Enterprise Trade and Employment, development agencies, business organisations)

6.2.2 The rollout of eProcurement in the Public Service

The Government's eProcurement strategy represents an initiative to help drive eBusiness adoption in Ireland, and is potentially the most significant pending eGovernment initiative from the perspective of enterprise development. While recognising the need to take a measured and sector based approach to its implementation, delivery of the Government's published eProcurement strategy has been slow to date.

It is recommended that:

eProcurement projects should be progressed as a matter of priority, supporting on-line catalogues/ tender management/electronic ordering and payment. In addition, the Government should explore the potential for Public Private Partnerships (PPP) should Exchequer funding be an issue in implementing eProcurement, as is being done in Denmark and Singapore. (Actors: Department of Finance)

6.2.3 Broadband

The quality of telecoms infrastructure, combined with choice and the cost of all forms of Internet access have important implications for rates of eBusiness adoption within an economy.

(a) Broadband Infrastructure

A feature of many of the case study countries was a willingness by Government to intervene where market forces were not delivering the quality of telecoms service required at competitive prices. The high costs and lower availability of Internet access was identified as a major constraint to the development of eBusiness in Ireland.

It is recommended that:

A co-ordinated plan for national eInfrastructure should be developed to ensure that Ireland can achieve the key targets set out in the Government's Broadband strategy, namely the provision of 5 Mbits+ access to the Internet for businesses. Its formulation should be coordinated directly with the National Development Plan and the National Spatial Strategy. (Actors: Department of Communications, Marine and Natural Resources)

(b) Broadband Services

The importance of broadband access for eBusiness adoption, the competitiveness of advanced broadband services for the attraction of eBusiness FDI, and the promotion of eBusiness enterprise creation and innovation have been highlighted. The rollout of flat rate access in June 2003 and the introduction of DSL broadband services in May 2002 enhance the choice and quality of services available to small businesses and citizens. However costs to businesses and citizens of broadband are amongst the highest in the OECD and levels of access amongst the lowest.

It is recommended that:

Government should continue to encourage the rapid extension of broadband services to regional centres and the development of a more competitive national pricing structure. (Actor: Department of Communications, Marine and Natural Resources, ComReg)

6.2.4 Articulation of Ireland as an Knowledge Society and its Implementation

The level of eBusiness momentum built up over the last number of years within the Irish economy is still considerably less than in the world's leading eBusiness economies, with these nations continuing to invest intensely in the improvement of their eBusiness infrastructure and enterprise supports. Ireland's position vis-à-vis leading eBusiness economies means that it will have to continue to push much harder than the world leaders to retain and develop its current standing. The Government's implementation plan for the emerging Knowledge Society (New Connections), while detailed and comprehensive, needs to be supported by an underpinning vision and roadmap for what all of its constituent elements are to achieve.

It is recommended that:

A vision and roadmap for the emerging Knowledge Society in Ireland be formulated by the Government. Following this, New Connections should be re-articulated on the basis of this vision, prioritising the implementation agenda as required. (Actor: Department of An Taoiseach).

While the policy making structures put in place in Ireland for the Knowledge Society are consistent with those of leading eBusiness economies, the effectiveness of the procedures used for implementing the eAgenda in Ireland, in terms of promoting cohesion and complementarity between various eBusiness/Information Society/eGovernment strands should be continuously reviewed.

It is recommended that:

The Government should outline clear timetables and targets that allow the achievement of the eAgenda to be monitored and assessed. (Actor: Department of An Taoiseach)

6.2.5 Pilot Projects to Stimulate Adoption of Internet Technologies

There is a need for further initiatives aimed at promoting faster uptake of Internet and eBusiness technologies in Ireland. "Partnership" programmes in countries such as the UK have been successful in driving broadband and Internet technologies adoption, e.g. a partnership between a telecoms company, community and business groups has proven very successful in increasing the level of broadband adoption in Cornwall.

It is recommended that:

Pilot projects to promote the faster uptake of Internet and eBusiness technologies in enterprises and the community in general, should be rolled out on a phased basis in order to stimulate adoption of broadband services. The policy initiatives of case study countries such as Sweden, Singapore and Denmark should be reviewed in determining potential pilot initiatives[31], as indeed should the experiences garnered from the Ennis Information Age Town pilot and CAIT[32]. (Actors: Department of Communications, Marine and Natural Resources, Private Telecom Operators)

6.2.6 Internet Peering

Given continued growth in Internet traffic and the need for peering[33], the Internet exchange facilities which provide backbone services are becoming a vital element of Internet infrastructure. To increase the capacity to handle large volumes of Internet traffic to and from companies based in Ireland, there is a need to attract additional leading Internet Service Providers to connect to an Irish Internet Exchange (IX). Currently there are only 10 ISPs connected to the Irish IX, compared to 130 connected to the London IX, and 157 connected to the Amsterdam IX. While large corporates in key centres tend to be relatively well catered for in terms of their broadband needs, Ireland's international peering arrangements for ISPs need to be improved.

It is recommended that:

IDA Ireland and telecommunications operators should continue to actively encourage the attraction of Tier 1 (leading) ISPs to Ireland and put in place a world class Internet exchange. (Actors: The Department of Communications, Marine and Natural Resources, IDA Ireland, telecom operators)

6.2.7 Stability in promotion of the eAgenda

While €44.3m in Knowledge Society funding was put in place for 2003, low levels of societal usage of the Internet, compounded by relatively low levels of eBusiness adoption mean that continued funding of this nature is necessary going forward. The majority of the €44.3m funding for 2003 has been allocated to ongoing projects (e.g. BASIS and the PSB), with a central fund of approximately €9m retained for allocation to "innovative" eBusiness and Knowledge Society initiatives. Ongoing funding is needed in order progress the Government eAgenda going forward in addition to a multiyear budget to enable forward planning of eBusiness initiatives. Continuity is also required in Government policy if further private sector investment is to be raised to assist in the funding of future eInfrastructure and eGovernment initiatives.

It is recommended that:

The Information Society Fund is retained to fund the development of Ireland's eAgenda in the future. In addition, a multiyear budget should be considered to enable forward planning of eBusiness initiatives. (Actors: Department of An Taoiseach, Department of Finance)

6.2.8 eBusiness and Education

While significant investment has been made to date through the Schools IT 2000 initiative and subsequently, through the "Blueprint for the Future of ICT in Irish Education – Three Year Strategic Action Plan 2001-2003", Ireland's position does not compare as favourably with most of the eight case study countries, particularly Singapore. In addition, there was a cut in the funding for ICT in schools in the December 2002 budget.

31 See appendix III

32 Community Application of Information Technologies

33 Where telecommunications operators and Internet Service Providers can exchange data traffic at Internet exchanges.

It is recommended that:

The integration of ICT into education is prioritised as a critical element of the Government's national eAgenda. (Actor: Department of Education and Science).

6.2.9 eBusiness R&D

The recent reduced levels of investment in pre-competitive R&D may have a negative impact by constraining levels of eBusiness innovation in Ireland. In particular, stakeholders expressed concern at the cuts in PRTLI funding, emphasising the importance of sustaining the levels of funds allocated to this programme to promote ICT R&D in third level institutions. If Ireland is to pursue the objective of being a leading eBusiness innovator, investment levels must be sustained for pre-competitive R&D and the commercialisation of R&D.

It is recommended that:

The Government should increase funding for pre-competitive and the commercialisation of R&D projects to support eBusiness innovation. (Actors: Department of Education and Science, Enterprise Ireland, IDA Ireland and Science Foundation Ireland)

6.2.10 eGovernment (Public Service Broker)

Although current plans for eGovernment in Ireland are relatively progressive in international terms, any further slippage in the rollout of eGovernment services, as evident over the past 12 months will have serious implications for Ireland's Knowledge Society. The delivery of the Public Sector Broker is estimated to be a year and a half behind initial development timeframes. It is now expected that it will be the first or second quarter of 2004 before anything will be in place.

It is recommended that:

To expedite the delivery of on-line services, REACH should publish a detailed delivery programme for the PSB with milestone dates for deliverables. The delivery programme should set out information for consultation on the principles, standards and protocols relating to the PSB functionality and inter-operability between the PSB and Department/Agency systems. (Actor: Reach).

6.3 Conclusions

The Irish policy response to eBusiness is similar in many respects to the most successful case study countries. However, rates of eBusiness adoption remain behind those of most of the case study countries. From a review of the policies underpinning the eBusiness adoption successes of the case study countries, some key conclusions emerge:

- *there is no "**one size fits all**" policy solution to the promotion of eBusiness within an economy – rather the most appropriate solution will depend on the enterprise culture that prevails and related societal values;*
- *similarly, there is no one "**killer initiative**" with universal application;*
- *successful countries are characterised by a strong Government role in the provision of basic Internet access services and a willingness **to intervene** when competition is failing to deliver required access levels/prices;*
- *most successful countries have developed schemes to promote the uptake of the Information Society (Internet technologies by **citizens**). This three pronged approach (i.e., eGovernment, eBusiness and Information Society) greatly enhances the sustainability of eBusiness affects realised through enterprise support programmes and contributes to the eBusiness momentum within an economy;*

- *Delivery of **eGovernment** services for enterprise feature prominently in the policy approach to the promotion of eBusiness adoption in all of the case study countries reviewed, with significant progress expected in the coming months and years;*
- *direct **supports** (e.g. fiscal, financial, advisory) to enterprise are available in all of the case study countries reviewed – targeted for the most part at SMEs or enterprises based in regionally disadvantaged locations;*
- *the **banking** sector has played a major role in the promotion of societal and enterprise adoption of Internet technologies in the Nordic countries; and finally,*
- ***Complacency** with respect to the promotion of eBusiness does not exist among the leading eBusiness economies.*

The eBusiness performance of the Irish enterprise sector over the next five to ten years will be a key determinant of Ireland's economic success in the emerging global Knowledge Society. To date, Ireland has performed well in terms of developing eBusiness related enterprises and through the attraction of eBusiness related FDI. However, widespread adoption of eBusiness lags that in the case study countries.

The conduciveness of the business environment in Ireland compare well with leading countries on many aspects (e.g. eGovernment, supports to enterprise, etc). To improve on Ireland's current rankings requires further development of the business environment in Ireland relative to other case study countries. Government action in a range of areas such as telecommunications, enterprise supports, eProcurement, etc. will have a direct influence on the scale and timing of the development of eBusiness in Ireland.

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Appendix I: Glossary of Terms and Abbreviations

BASIS	Business Access to State Information and Services
B2B	Business to Business On-line Transactions
B2C	Business to Consumer On-line Transactions
CAIT	Community Application of Information Technologies
CCoI	Chambers of Commerce of Ireland
CSO	Central Statistics Office
CSP	Certificate Service Provider
D&T	Deloitte and Touche
DETE	Department of Enterprise, Trade and Employment
DTI	Department of Trade and Industry/UK
eBusiness	The process of doing business with trading partners electronically. This includes processing business transactions electronically; integrating business processes electronically, transferring payments electronically; and delivering services electronically
EC	European Commission
eCommerce	EC encompasses transactions that take place over networks such as the Internet
EDI	Electronic Data Interchange
eEurope	European Commission/Benchmarking
EI	Enterprise Ireland
EIU	Economist Intelligence Unit
ESDIS	Employment and Social Dimension of the Information Society/European Commission
EVCA	European Venture Capital Association
FDI	Foreign Direct Investment
HEA	Higher Education Authority
IBEC	Irish Business Employers Confederation
ICT	Information and Communication Technologies
IDC	International Data Corporation
IS	Information Society
ISP	Internet Service Provider
MNC	Multinational Corporation
NRI	Networked Readiness Index/Harvard
OECD	Organisation for Economic Co-operation and Development
PwC	PricewaterhouseCoopers
R&D	Research and Development
RTDI	Research Technology and Development Initiatives
S&T	Science and Technology
SFI	Science Foundation Ireland
SME	Small and Medium-sized Enterprise
VC	Venture Capital
WCY	World Competitiveness Yearbook

Appendix II: An Overview of Ireland's Information Society Policy-making Structures and the E.U. Policy Environment

E.U. eBusiness Policy-making Structures and Initiatives that Influence Irish eBusiness Policy

As a member of the European Union, Ireland's eBusiness policies are guided by the policy decisions made at E.U. level. The Government has recently established an Oireachtas Committee to co-ordinate Irish legislation with that at E.U. Commission level.

There are four E.U. Commission Directorate Generals (DG) responsible for E.U. eBusiness policy. These are the Information Society DG, Enterprise DG, Health and Consumer Protection DG and Internal Market DG. E.U. eBusiness policy is spearheaded by the Information Society DG which plays a key role in implementing the "vision" set by Europe's heads of state in Lisbon, 2000: "*to make Europe the world's most competitive and dynamic economy, characterised by sustainable growth, more and better jobs and greater social cohesion, by 2010*". The Information Society DG is supported by the Enterprise DG which "*refocuses enterprise policy on entrepreneurship, creating an environment that is supportive to innovation. Its ambition is to supply the policy ideas that will foster the competitiveness of enterprises and revitalise Europe's economy, with the goal of creating a knowledge-based economy in Europe*".

The Health and Consumer Protection DG seeks to propose legislative and other initiatives for the benefit of consumers, and to contribute to enforcement of these initiatives across the E.U. The DG is charged with ensuring that the interests of consumers are given due consideration in the development of eBusiness related E.U. policies; and is responsible for enhancing the capacity of consumers to make informed choices through more effective information and education initiatives. The Internal Market DG is responsible for making the Single Market work, and is tasked with developing the Single Market in certain specific sectors, one of which is electronic commerce. It is also responsible for proposing and implementing a European legal framework for company law, public procurement, intellectual property, industrial property (for example patents, trademarks and designs), and the protection of personal data.

E.U. eBusiness related policy is driven through implementation of the "*eEurope Action Plan*", which was adopted in 2000 and updated in 2002. The overall objective of this plan is to bring Europe on-line as fast as possible, and the Action Plan is built upon a methodology which consists of accelerating legal measures; re-focusing existing financial support programmes; and benchmarking. In pursuing these objectives the Action Plan for the E.U. as a whole targets three areas:

1. Cheaper, faster and secure Internet;

2. Investing in people and skills; and

3. Stimulating the use of the Internet.

The eEurope targets are monitored regularly to ensure that they stay on track.
Recent updates include:

- *November 2000 – Update to heads of State*
- *December 2000 – National Progress Reports*
- *March 2001 – Report to the Stockholm Spring Council*
- *December 2001 – Update on all actions 2000/2001/2002*
- *February 2002 – Benchmarking Report*

In May 2002, the Commission adopted a follow-up Action Plan to eEurope 2002, entitled, "*eEurope 2005*" which will run from 2003 to 2005. *eEurope 2002* has been regarded as a successful format, and it is intended that the new action plan will build on these successes and maintain "*eEurope*" as the symbol of E.U. policy to develop the information society.

eEurope 2005 seeks to "*provide a favourable environment for private investment and for the creation of new jobs, to boost productivity, to modernise public services, and to give everyone the opportunity to participate in the global information society. It therefore aims to stimulate secure services, applications and content based on a widely available broadband infrastructure*".

Key priorities of the initiative have been to modernise the rules governing Internet access and, to create a single market for telecommunications services. The Commission has recommended that: "*Member States should ensure effective competition in local telecommunication networks (the 'local loop') in order to speed up the development of the European broadband network*". It is expected that competition will drive investment, generate innovation and lower prices, and the Commission has stated that public policy should focus on issues where competition is not effective. The new regulatory framework, which will be applied in all Member States from July 2003, takes full account of the convergent nature of broadband, and encourages the efficient investment in infrastructure, and the promotion of innovation, as explicit objectives for regulators, stipulating that: "*this means taking account of the need for investors to obtain an adequate return on their investment, in the light of the risks taken. This also means that regulatory uncertainty for investors must be reduced as much as possible*".

"*e-Business W@tch*", launched in January 2002 and updated in 2003, is the primary eBusiness benchmarking exercise undertaken by the Commission. This has sought to provide policy-makers and stakeholders in industry with statistical data and analysis on 15 key sectors, to help them better identify the challenges to be addressed in support of eBusiness. "*e-Business W@tch*" has helped policy-makers and stakeholders obtain a better understanding of the impact of eBusiness on enterprise competitiveness and productivity. The 15 sectors included in this benchmarking exercise are: food and beverages, tobacco, media and printing, chemical industries, metal products, machinery and equipment, electronics, transport equipment, retail, tourism, banking and leasing, insurance and pension funding, real estate activities, business services, ICT services, health and social services.

The "*Go Digital*" initiative was launched as part of the Commissions efforts to assist SME's to embrace internet technologies. The initial efforts of this programme focused on raising the awareness of SME's on the opportunities of eBusiness. The programme has also seen the Commission launch a grant scheme under the Multi Annual Program 2001, in May 2001. The objective of this scheme has been to support eBusiness related events organised at the European, national, regional, local or sectoral level. The scheme, with the support of multiple organisations, has aimed at identifying and disseminating best practices for SMEs to use eBusiness, and has sought to make SMEs aware of the particular benefits of eBusiness, identifying and discussing the practical obstacles that SMEs in general and the target sectors in particular face in the eBusiness environment. (Refer to Annex 3 for further information on SME eBusiness initiatives in the E.U.)

The Commission's Enterprise Directorate General, responsible for the "*Go Digital*" initiative, has also been responsible for a number of eBusiness surveys and sectoral reports, and in March 2003 published "*Adapting e-business policies in a changing environment: The lessons of the Go Digital initiative and the challenges ahead*". For a full listing of the Enterprise Directorate General's publications see www.europa.eu.int/comm/enterprise/ict/index.htm.

The key E.U. Directive that impacts eBusiness related activity is the **E-Commerce Directive**, approved in May 2000.The Lisbon Summit identified this Directive as a top priority in preparing Europe's transition to a knowledge-based economy and boosting competitiveness. The Directive will ensure that Information Society services benefit from the Internal Market principles of free movement of services and freedom of establishment and can be provided throughout the European Union if they comply with the law in their home Member State. It establishes specific harmonised rules only where strictly necessary to ensure that businesses and citizens can supply and receive Information Society services throughout the E.U., irrespective of frontiers.

Other key E.U. directives include:

- ***The Electronic Signatures Directive*** *– In November 1999 the European Commission welcomed the adoption of a new legal framework guaranteeing E.U.-wide recognition of electronic signatures. The Electronic Signature Directive has been seen as the first example of the Commission's flexible and integrated approach towards developing a European framework for the development of electronic commerce. In the past only hand-written signatures have been legally valid but this legislation extended that recognition to electronic signatures and applied the Internal Market principles of free movement of services and home country control to E-commerce.*
- ***The Directive on a transparency mechanism for Information Society*** *– Adopted in 1998, this Directive requires draft national rules that concern Information Society services to be notified to the Commission. After notification of each new draft national rule there will be an initial 'standstill' period of 3 months to allow the Commission, Member States and interested parties to comment on the draft rules and if necessary propose amendments. The Directive's key aim is to ensure that the Single Market is not fragmented and that no new regulatory barriers appear.*

E.U. Policy and SMEs

In 2000, the E.U. set itself the target of becoming the most competitive knowledge based society in the world by 2010. SMEs are considered vital to the achievement of this goal. It has been confirmed in the *e-Europe 2005* Action Plan that SMEs and eBusiness remain at the heart of Europe's political agenda.

It should be noted that SMEs are defined in the E.U. as:

- *Having fewer than 250 employees;*
- *Having an annual turnover not exceeding €40m or an annual balance sheet total not exceeding €27m; and,*
- *Being independent - not 25% or more owned by one or more organisations which are not an SME (except public investment corporations, VCs and funds and institutional investors).*

The Commission's objective, as part of the new FP6 E.U. programme, is to allocate at least 15% of the seven thematic priorities budget (€1.7bn) to SMEs. In addition, the objective is to introduce special measures to encourage SME participation in new eBusiness/ICT projects.

Specific measures to encourage SME participation include:

- *Participation of SME groupings for management, research, technology transfer, training and dissemination of results, which will lead to stronger impact and higher efficiency.*
- *Evaluation criteria related to SME for integrated projects and specific targeted research projects. The criteria include quality of the consortium and potential impact.*
- *Targeting of calls in areas relevant for SMEs. In some thematic priorities, subjects are described as particularly relevant for SMEs depending on characteristics such as: maturity of the field of research; number of SMEs already involved in the subject; the possibility of creating start-ups; the number of high-tech SMEs; the need to transform traditional industries; and, the need or presence of SMEs with the ability to transfer knowledge.*
- *Pre-allocated budgets for take-up measures. There is a need to create ideal platforms for presenting SMEs with the results of the research undertaken. SME partners are to be identified and involved at the proposal stage and SMEs are to be identified after contract signature.*
- *Opportunities to extend FP6 contracts to include new SMEs. The rules of participation in FP6 contracts state "**the Commission may increase its financial contribution to an indirect action already underway in order to expand its scope to cover new activities which may involve new participants**". This provides the opportunity for SMEs to enter projects already running. This would be done by way of calls for proposals launched by the Commission and subsequent evaluation according to the normal procedures.*

In its Communication "*Helping SMEs to Go Digital*", the E.U. has identified benchmarking as a major step to further promote the use of ICT and the Internet by SMEs. As part of the Go Digital initiative, an extensive benchmarking study was undertaken, with the following objective: "*to describe and benchmark national and regional policies and instruments for the promotion of eBusiness for SMEs. This will help Member States and regions to assess their policies and identify best practice on the basis of national experience. It should also help to identify how European funds and other E.U. initiatives can complement regional and national strategies*".

The study encompassed 5 steps:

1. *Obtain a clear picture of the adoption of ICT and eBusiness by SMEs;*
2. *Benchmark existing policy initiatives in favour of helping SMEs go digital against pre-defined criteria and to identify examples of good practice;*
3. *Present results to a broader audience of policy makers, which was done in Brussels in June 2002;*
4. *Identify a number of quantitative targets to be achieved through a combination of national and/or European policies;*
5. *Monitor the implementation of the policy targets.*

Lessons learned from the benchmarking study:

1. *Sound policy intervention should be underpinned by solid data and research.*
2. *Continuous and broad consultation with the business community is needed and must result in flexible and adaptable eBusiness policies.*
3. *Various policy instruments are available but they should be used in a co-ordinated and consistent manner.*
4. *eBusiness policies and initiatives should meet the needs of different regions and sectors.*
5. *Public private partnerships (PPPs) are crucial to promote eBusiness.*
6. *SMEs need independent advice and value it highly.*

7. SMEs can benefit from sharing good business practice.

8. Policies benefit from effective use of multipliers, intermediaries and existing mechanisms.

9. Clear targets are essential for successful eBusiness policies.

10. eBusiness policies must be sufficiently supported by resources to be effective.

11. The effectiveness of the policy instruments should be monitored and evaluated.

12. The importance of communicating policy matters.

13. Specific eBusiness policies should not be perpetuated forever.

14. The benefits of eBusiness policy initiatives should be sustainable.

15. Watch for opportunities to learn from other policy initiatives.

10 Commandments for Government Policies in Support of eBusiness For SMEs:

- *1. Establish an informed basis for policies (insight based on a clear understanding of problems/challenges for SMEs).*
- *2. Set measurable targets – establish relevant evaluation criteria.*
- *3. Develop/acquire adoption tools – must be based on and representing perceived benefits, organisational readiness and external pressures on SMEs. Tools have to be easy to use.*
- *4. Use partnerships – agents, service partners, trade organisations, trade associations, business newspapers, vendors with a clear set of service level agreements and clear definition of responsibilities.*
- *5. Recognise the diversity of SMEs.*
- *6. Make advantages explicit and specific.*
- *7. Roll out national awareness programmes.*
- *8. Make interventions two-way.*
- *9. Company focused, on-site, customer oriented.*
- *10. eLearning assisted training programmes. eLearning can seldom stand alone, but it can be valuable in modular forms for specific topics.*

In terms of individual country examples, of policies to assist SMEs with eBusiness/ICT adoption, the UK offers a numbers of initiatives one of which is the "**Opportunity Wales**" SME Support Network Initiative, discussed in Section 3.4.1.

The eBSN - European eBusiness support network for SMEs

As a follow-up of the Go Digital initiative, the Commission adopted the Communication "Adapting e-business policies in a changing environment" on 27 March 2003. This Communication is an important step to accelerate progress towards the Lisbon target of making Europe the world's most competitive and dynamic knowledge-based economy. It is alerting Member States to the need of shifting the gear from e-commerce to eBusiness, i.e. to a holistic approach which includes not only buying and selling over the Internet but most important, the efficient integration and productive use of ICT in internal and external business processes. Moreover, this Communication calls upon Member States and regions to review their eBusiness strategies in support of SMEs and to adopt, on a voluntary basis, policy targets to accelerate the shift from e-commerce to eBusiness.

The eBusiness policies addressed at SMEs should take into account their diversity (based on size, sector of activity, geographic location, etc.), the particular characteristics of SMEs (e.g. techno-phobia, lack of managerial understanding, lack of e-skills, etc.), as well as the changing nature of eBusiness. Therefore eBusiness policies should be designed to be flexible and adaptable to the changing eBusiness environment, during their entire lifetime. A characteristic feature of new policy initiatives has been the shift of emphasis from promoting Internet connections and Web presence of SMEs towards policies to enhance the eBusiness implementation and intensity of use by SMEs.

The objectives and structure of the eBSN are:

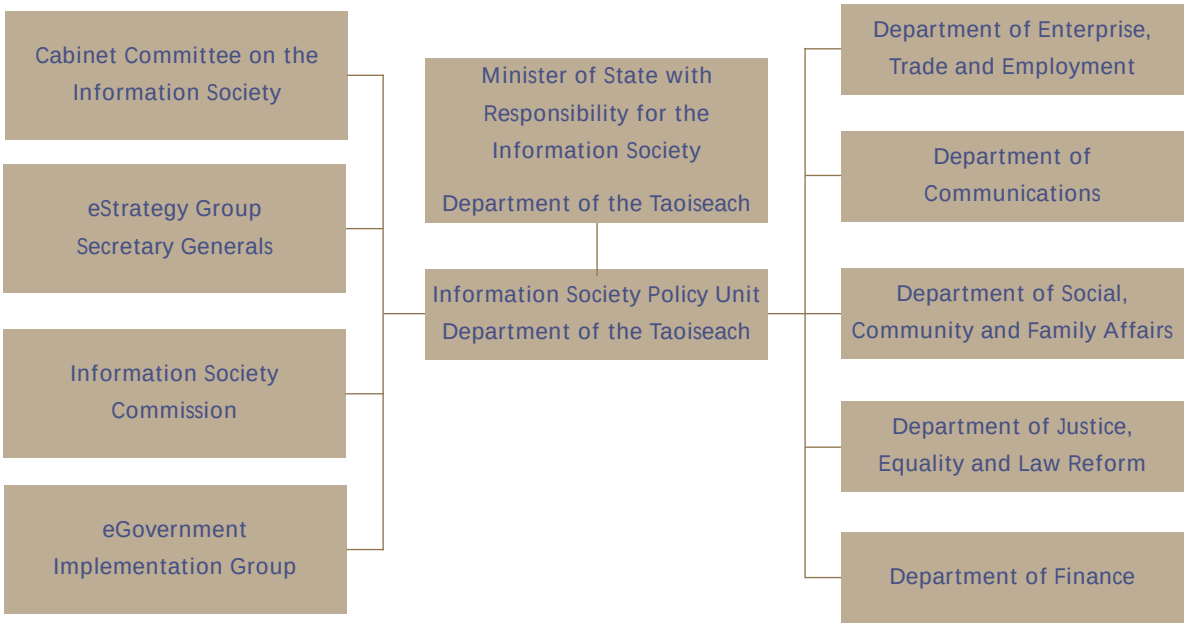
- *To bring together real decision makers in the field of eBusiness, to share information, and to discuss strategic policy orientation;*
- *To validate existing eBusiness policies and to exchange views about targets for future eBusiness policies;*
- *To provide a "one-stop-shop" for information about regional, national and European initiatives and funding possibilities for SMEs.*

eBusiness Policy-making Structures

Irish eBusiness Policy-making Structures

Policy-making structures for Ireland's Information Society are shown in the Figure below.

Figure 3.1 *Information Society Policy-making Structures*



This policy-making structure was put in place in June 2001 to ensure a higher level of political involvement and policy co-ordination in the formulation of policy for the Information Society than existed previously. Policy formulation is underpinned by the second national strategy for the Information Society – "New Connections" – which was launched in mid-2002, with a progress report published in February 2003. Ireland's first strategy, Information Society Ireland – A Strategy for Action, was published by Forfás in 1997. Table 3.1 compares the institutional arrangements for the Information Society in Ireland with those in place in the eight case study countries.

Table 3.1 *Key Features of Policy-making Structures, Case Study Countries*

	Australia	Germany	Denmark	Ireland	Netherlands	Sweden	Singapore	UK	US
IS/eBusiness National Strategy	yes	yes	yes	**yes**	yes	yes	yes	yes	yes
Level of Political Involvement	high	medium	medium	**medium**	medium	medium	high	high	high
Dedicated IS/ eBusiness Department	yes	no	no	**no**	no	no	yes	no	no
Dedicated IS/ eBusiness Agency	yes	no	no	**no**	no	no	yes	yes	no
Private Sector Involvement in Policy Formulation	yes	yes	no	**yes**	yes	yes	no	yes	yes

Source: PwC

All of the case study countries have a published strategy for promoting the Information Society/eBusiness. Ireland's strategy is the most operational of those reviewed, the remainder being, for the most part aspirational in nature and some having no defined timeframe (e.g., Singapore).

Some countries have dedicated Information Society/eBusiness Government Departments and Agencies, such as Australia (Department for Communications, IT and the Arts) and Singapore (Ministry of Information, Communications and the Arts). Together with the UK (eEnvoy), these are the only countries with dedicated eBusiness Government Departments or agencies. The level of political involvement in eBusiness policy in these four countries is higher than in the remaining countries.

Excluding the UK, Singapore, the US and Australia, Ireland's Information Society policy-making structures are the most advanced of the remaining case studies in terms of level of political involvement in policy formulation. A distinction that exists between Ireland and the remaining case study countries, however, is the profile of the Government Department with primary responsibility for IS policy formulation. In Ireland, it is the Department of the Taoiseach – eGovernment representing a natural fit with the public sector modernisation function of the Department.

Appendix III: Case Study Countries – a Summary

This appendix supplements the analysis in the main body of the report by providing a more detailed look at the factors that have driven performance in eBusiness adoption in the four top performing case study countries, namely the United Kingdom, Singapore, Denmark, and Sweden.

THE UK

Factors underpinning the **UK's** success in eBusiness adoption terms are the following:

- *The creation of a network of UK On-line for Business eBusiness* **advisors** *for SMEs, and the roll out of the UK On-line for Business eBusiness information portal. These advisors tend to be business focused rather than technology focused, analysing the business case/problem and suggesting technology solutions to suit;*
- *existence of a very good* ***telecommunications*** *infrastructure. The market demand for cheaper broadband services has led to British Telecom reducing the cost of its wholesale DSL prices, which saw a subsequent 45% increase in the number DSL and Cable lines to over half a million lines between February and May 2002, and as at May 2003 this had risen to approximately 1 million lines. However, the roll-out and uptake of broadband services continues to be focused on urban areas;*
- *introduction of* ***fiscal*** *incentives to promote the purchase of ICT equipment by SMEs, and fiscal incentives to promote R&D;*
- *a host of government support schemes and* ***funding initiatives*** *for SMEs;*
- *a well* ***educated*** *population, with a high number of computers in secondary schools connected to the Internet and a very high percentage of Science and Technology graduates. However there have been recent concerns regarding the reduction of Science and Technology graduates, due largely to external factors such as the introduction of 3rd level fees.*

The UK eBusiness policy has been centred on creating awareness and providing the environmental conditions whereby enterprise will be able to avail of the benefits of Internet technologies. Less emphasis has been placed on social inclusion than in countries such as Sweden and Denmark, and as a result societal usage of the Internet is not as high as in these countries.

Success in the adoption of eBusiness has stemmed from focused Government policy, driven by the Department of Trade and Industry and the Office of the E-Envoy. The UK Government has placed great emphasis on the provision of information services to enterprise on various aspects of eBusiness, primarily through the development of the UK On-line for Business portal. The initiative that has underpinned the success of both eBusiness adoption as a whole, and UK On-line for Business, is the establishment of free access for SMEs to regional UK On-line for Business advisors.

The UK Government continues to put services on-line, but there is a growing realisation that the usage of these services has not been as high as expected. The Government is currently reviewing the aspirational target of having all government services on-line by 2005, and placing greater emphasis on getting the most "relevant" services on-line. In addition, the Government is focusing on promoting the usage of specific on-line services, rather than promoting general "awareness". In this regard, the Office of the e-Envoy recently hosted a summit emphasising the need to get people to use technology in a more innovative way. As with the other case study countries, emphasis is now being placed on mainstreaming technology as part of business.

SINGAPORE

Singapore represents an interesting contrast to Denmark and Sweden where there is a strong emphasis on general societal adoption of Internet technologies, the Singapore Information Technology policy emphasis having evolved from one which was primarily focused on the workings of Government in 1980 to one which incorporates a significant "social inclusion" element in 2002. Factors and policy initiatives that have promoted eBusiness adoption in Singapore are the following:

- *Singapore was an **early mover** in terms of the formulation of a formal strategy for the development of IT capability – the country's first Information Technology strategy was launched in 1980, with the primary purpose of introducing computers into the country's public service. IT objectives have evolved considerably since then, the current programme (Infocomm 21) representing a balance of social inclusion and enterprise objectives;*
- *in common with Sweden and Denmark, the Singaporean Government took early and decisive action to ensure the widespread availability **of broadband** services in Singapore – committing to the development of such an infrastructure in 1992. This commitment became reality with the launch of the PPP-funded Singapore One in December 1998, making Singapore the only country in the world with a nationwide broadband service;*
- *an early focus on the potential of IT to modernise Government has helped place Singapore ahead globally in the development of **eGovernment services**. Indeed, the Singaporean Government did not await the arrival of eBusiness for the provision of interactive services – the EDI-based tradenet allowing importers and exporters to apply for trade documentation electronically from the mid-1990s. Singapore is the most evolved country in eGovernment (enterprise) terms of all of the case study countries and the wide range of interactive/transaction services now available on-line have played an important role in the promotion of eBusiness adoption;*
- *in contrast to Sweden and Denmark, Singapore has long-established **programmes of support** for encouraging the adoption of ICTs and Internet technologies by enterprise. These are undergoing significant change at the present time, but distinct supports will continue to be offered to enterprises with and without eBusiness capabilities. Companies with no eBusiness capabilities qualify for 70% grant-aid towards the cost of eCommerce consultancy services and feasibility studies. Those with eBusiness capabilities can qualify for up to €292,000 in funding, with all Government payments being subject to performance in the generation of eCommerce sales. The total cost of these programmes is relatively modest, i.e., €18 million for two years;*
- *the interventionist nature of the government of Singapore is illustrated in the recently introduced (December 2002) **Technology for Enterprise Capability Upgrading (TEC-UP) scheme to help SMEs undertake R&D activities**. SMEs with 30% local shareholding can engage over 100 research scientists and engineers (RSEs). The RSEs will be seconded full-time for up to two years to the SMEs to help identify suitable projects for upgrading operations and implement them. The SMEs need only pay 30% of their salary while the remaining 70% will be taken care of under the scheme. On completion of secondment, the SMEs may hire the RSEs permanently;*
- ***PC a Dollar a Day** – a social inclusion measure of the current ICT strategy, this scheme is aimed at promoting PC ownership in Singapore's poorest households. For a fee of €0.59 per day over three years, households on combined incomes of less than €1,180 per month can receive the following: a new multi-media PC; a cash card reader; free 56k Internet dial up access; and participation in a national IT literacy programme.*
- *Singapore's IT Masterplan for **Education** launched in 1997 has put in place one of the most extensive computer/internet infrastructures of any education system in the world. The programme has a*

targeted spend of €1.2 billion and annual operational costs of €354 million. The ambition of the plan can be gauged by the medium-term objective of requiring that 30% of curriculum time involve hands-on use of computers;

- *finally, Singapore has put in place an extensive system of IT education for all members of society, including a **national IT literacy programme** which aims to provide training to 10% of the country's population by end 2004. Additional training programmes aimed at improving the basic IT skills of the labour force and keeping highly-skilled IT specialists up to speed in their area of expertise have been put in place. All of these education programmes are state-funded, with some incorporating provisions for state payment of salaries during training periods.*

Thus, Singapore has now engaged in an aggressive programme of support for the promotion of Internet technologies/capabilities throughout society and particularly in the enterprise sector. Unlike Sweden and Denmark, Singapore's performance has almost single-handedly been driven by Government interventions with the banking sector/local visionary enterprises playing a much more muted role.

DENMARK

Factors underpinning **Denmark's** success in eBusiness adoption terms are the following:

- *high levels of investment by the Danish Government in the 1980s and early 1990s in the roll-out of high-**bandwidth** fibre-optic cable, with the result that 95% of Danish households can now access broadband services;*
- *early **deregulation** of the telecoms sector (August 1998), with favourable impacts on the cost of broadband and narrowband services;*
- *widespread and early adoption of Internet technologies by the Danish **banking sector**, which counts among the most evolved in eBusiness terms in the world. A very high proportion of Danish banks and consumers now bank on-line, a development that has a favourable impact on consumer and enterprise confidence in the Internet;*
- *widespread and very early (>15 years) adoption of pre-Internet technologies (i.e., **EDI**) throughout the retail and transport sectors in Denmark, meaning that large tracts of enterprise were already engaged in "eBusiness" per se before the advent of the Internet;*
- *highly **educated** population and widespread use of computers and the Internet in the Danish education system, as a result of a series of Government investment programmes ongoing to the present time;*
- *introduction of **fiscal incentives** to promote teleworking in Denmark, whereby the employee can write 75% of the cost of the computer off against tax and not be liable for benefit-in-kind on employer's payment of monthly Internet connection fees. This scheme, however, is said not to have been particularly successful in promoting PC home ownership which is already high;*
- *strong exemplar role being played by **Government** in the roll-out of services for enterprise and citizens, in particular the establishment of an eProcurement portal for government services. The Danish public procurement portal, "The Public Purchase Portal (DOIP)", was developed in 2002 by a PPP – gatetrade.net. gatetrade.net is incorporated as a company limited by shares, and is jointly owned by Post Danmark, Danske Bank, Maersk Data and TDC (formerly Tele Danmark). Gatetrade will operate, maintain and develop the DOIP, and the development of DOIP took place in close cooperation with the Danish Ministry of IT and Research, the Ministry of Finance and SKI A/S (National Procurement Company of Denmark);*

With the exception of relatively small-scale eBusiness initiatives within the regions (e.g., establishment of IT skills centres in Jutland), the major thrust of Danish eBusiness policy has been towards creating the environmental conditions whereby enterprise will be able to enjoy, in full, the benefits of Internet technologies – together with the promotion of Internet adoption by the general public. In common with other countries, however, the Danish Government does provide information services to enterprise and citizens on various aspects of eBusiness – one website (forbrugersikkerhed.dk) being dedicated to the education of consumers on on-line security issues. A pending initiative that may place Denmark to the forefront in eBusiness security terms is the planned distribution of digital certificates to all citizens, to enable everyone to interact/transact with Government at all security levels.

SWEDEN

Initiatives underpinning **Sweden's** success in promoting eBusiness adoption by existing enterprises have much in common with those of Denmark, albeit with a small number of notable additions. These are:

- *influential role of the indigenous telecom giants **Ericsson** and **Telia** on national policy in Sweden in the 1980s and early 1990s, with the result that Sweden was one of the first countries in Europe to formulate a formal policy for the development of ICTs/Information Society and to appoint an advisory Information Society Commission (1996);*
- *related to the foregoing, a tradition of high levels of state investment in ensuring world-class telecom infrastructure. This "**interventionist**" approach has persisted since the sector was deregulated, and particularly where a "market failure" is likely to place the Swedish Government in contravention of its "universal service obligation" of facilitating access to broadband services by all of its citizens. The Swedish Government is planning to invest some €520 million in upgrading/expanding the broadband network to end 2004;*
- *the **banking** sector is widely recognised in Sweden as having made a significant contribution to enterprise and individual take-up of Internet technologies, being the first in Europe to offer on-line account information and transaction services to customers. Three of Sweden's banks feature in the IBM/Interbrand top 10 Internet banks in the world. The result is very widespread use of Internet banking and on-line financial services (e.g., stock trading), leading to high levels of confidence in the Internet for relatively high-risk and confidential transactions;*
- *relatively modest **fiscal incentives** are available to households and businesses wishing to connect for the first time to high bandwidth networks;*
- *the **PC Reform Programme** entails the provision of tax breaks to Swedish employees wishing to buy a PC, with the full cost of the hardware deductible against income tax. This programme has had a major impact on levels of home PC ownership in Sweden, which now counts among the highest in the European Union. The programme is considerably less restrictive in its provisions that the equivalent programme in Denmark, i.e., "teleworking" requirement does not exist;*
- *recent introduction of two programmes aimed at accelerating the adoption of Internet technologies by **SMEs**. Although these have not had any impact on Sweden's performance to date, they are interesting to the extent that they represent Sweden's first foray into the provision of direct "eBusiness" supports to enterprise. The first programme (IT.SME) has a €3.2 million budget for a two-year period to end 2002, and provides funding for the provision of IT competence programmes to SMEs. The second programme (REG.IT) is open to companies in underdeveloped regions only and provides primarily "soft" supports, but may also provide some funding for hardware. The Swedish Government has proposed that Government departments source 20% of their procurement needs from SMEs, and it is expected that this requirement will drive SMEs in Sweden towards eProcurement, as a greater number of Government departments embrace eProcurement;*

- *a highly **educated** population and a very ambitious ongoing programme of investment (ITiS) in the IT infrastructure and resources of Sweden's primary and secondary schools.*

In common with Denmark, Swedish IT policy has traditionally aimed to facilitate eBusiness by putting in place an appropriate policy framework, while simultaneously pursuing very ambitious social inclusion objectives. The result has been a high level of societal usage of the Internet which has had favourable impacts on levels of eBusiness take-up by enterprise. Recent months have seen Swedish IT policy become slightly more interventionist in terms of the direct promotion of eBusiness, but supports are still "soft" relative to the types of support available elsewhere.

Appendix IV: Statistics Underpinning Rankings in eBusiness Monitor

eBusiness Adoption/Sophistication

										Ireland's Ranking	
										Baseline	Update
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
IDC "Internet Infrastructure" 2001	2302	1902	2170	**1452**	1898	2622	2504	2224	2004	9	9
NRI Preponderance of eCommerce in the Economy, 2001	4.17	4.86	4.33	**4.02**	4.52	4.74	4.27	4.56	4.91	9	9
DTI % of Businesses with Access to the Internet, 2001	88%	97%	n.a.	**90%**	n.a.	98%	n.a.	94%	94%	5	5
2003	84%	97%	n.a.	**88%**	n.a.	98%	n.a.	91%	91%		
DTI % of Businesses with Broadband Connection t the Internet, 2001	20%	30%	n.a.	**31%**	n.a.	61%	n.a.	39%	56%	4	5
2003	34%	50%	n.a.	**34%**	n.a.	68%	n.a.	50%	59%		
EC % of Enterprises with an Internet Connection, December 2001	n.a.	96%	96%	**95%**	91%	99%	n.a.	84%	n.a.	4	4
DTI % of Businesses with a Website, 2001	44%	67%	n.a.	**48%**	n.a.	70%	n.a.	70%	65%	5	5
2003	47%	76%	n.a.	**52%**	n.a.	73%	n.a.	69%	66%		
DTI % of Businesses trading on-line, 2001	18%	20%	n.a.	**16%**	n.a.	16%	n.a.	21%	17%	5	5
2003	29%	27%	n.a.	**22%**	n.a.	32%	n.a.	22%	23%		
DTI % of Businesses selling on eMarketplaces, 2001	4%	9%	n.a.	**5%**	n.a.	4%	n.a.	7%	6%	4	4
DTI % of Businesses using on-line banking or investment services, 2001	44%	47%	n.a.	**38%**	n.a.	67%	n.a.	41%	30%	5	5
EC % of Enterprise with a Website, December 2001 - Flash EB No 116	n.a.	77%	72%	**62%**	70%	75%	n.a.	65%	n.a.	6	6
EC % of Enterprises that Accept Orders Received Via Website, December 2001	n.a.	46%	35%	**38%**	24%	37%	n.a.	31%	n.a.	2	2
EC % of Enterprises that sell on eMarketplaces, December 2001	n.a.	17%	12%	**15%**	12%	16%	n.a.	17%	n.a.	4	4
EC % of Enterprises that purchase some or all Supplies on-line via the Internet, December 2001	n.a.	30%	42%	**34%**	31%	30%	n.a.	28%	n.a.	2	2

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
WCY Total No. of Patents granted to Residents per 1 m Population, 1999	64	229	67	65	186	284	34	75	295	7	7
2000	**68**	**224**	**59**	**59**	**183**	**262**	**15**	**75**	**289**		
WCY Total No. of Patents in Force per 100,000 Population, 1999	466	453	555	619	764	1106	458	n.a.	456	3	3
2000	**487**	**459**	**555**	**619**	**756**	**1097**	**549**	**n.a.**	**471**		
European Commission, EPO patent applications in high-tech classes per 1,000 population, 1999	n.a.	29.3	21.5	13.3	38.5	22.9	n.a.	18.9	29.5	7	n.a.
Eurostat/USPTO, USPTO Patent Applications in High-tech Classes per 1 mn Population, 1998	n.a.	15	18	3.5	20	29	n.a.	14	85	7	n.a.
UNDP Receipts of Royalties andLicense Fees (US$ per 1,000 People), 1999	18.2	36.8	n.a.	110.3	151.2	156.6	25.5	134	130	5	5
D&T Technology Fast 500 in Europe/ No. of Indigenous Enterprises, 2001	n.a.	50	6	38	33	20	n.a.	149	n.a.	3	3
2002	**n.a.**	**53**	**4**	**29**	**19**	**20**	**n.a.**	**142**	**n.a.**		
D&T Technology Fast 500/No. of Indigenous Enterprises per 1m population, 2001	n.a.	0.6	1.1	10	2.1	2.2	n.a.	2.5	n.a.	1	1
2002	**n.a.**	**0.6**	**0.8**	**7.6**	**1.2**	**2.2**	**n.a.**	**2.4**	**n.a.**		
Tornado 100/No. of Indigenous Enterprises, 2001	n.a.	11	1	5	4	9	n.a.	31	n.a.	4	4
2003	**n.a.**	**15**	**2**	**5**	**3**	**8**	**n.a.**	**29**	**n.a.**		
Tornado 100/No. of Indigenous Enterprises per 1m Population, 2001	n.a.	0.134	0.189	1.316	0.252	1.011	n.a.	0.521	n.a.	1	1
2003	**n.a.**	**0.183**	**0.377**	**1.316**	**0.189**	**0.899**	**n.a.**	**0.487**	**n.a.**		
Funds raised by Domestic VCs and invested Domestically in High-tech Enterprise/€'000s	n.a.	1180	116	106	96	195	n.a.	1039	n.a.	5	5
Funds raised by Domestic VCs and invested in High-tech Firms Domestically/€'000s per mn population	n.a.	14.4	21.8	27.8	6	21.9	n.a.	17.5	n.a.	1	1
No. of ICT Companies in Forbes International 500, 2002	1	3	1	0	1	2	0	5	n.a.	7	7
No. of Companies Listed on the NASDAQ International , August 2002	5	6	8	3	2	3	7	1	n.a.	3	3
Apr-03	**3**	**7**	**8**	**3**	**2**	**3**	**6**	**1**	**n.a.**		
No. of Companies Listed on the NASDAQ International per 1m population, August 2002	0.57	0.11	0.189	3.42	1.51	1.46	1.46	0.42	n.a.	1	1
Apr-03	**0.52**	**0.06**	**0.38**	**2.63**	**0.88**	**1.12**	**1.71**	**0.61**	**n.a.**		

Ireland's Performance in the Attraction of ICT/eBusiness FDI in International Perspective, 2001

Actual Scores		A	D	DK	IRL	NL	S	Sing	UK
All FDI	% of new projects	11%	3%	16%	7%	6%	8%	6%	43%
	total projects/population	11.1	10.2	3.8	38.9	7.9	37.3	14.5	14.6
rank	% of new projects	3	8	2	5	6	4	6	1
rank	total projects/population	5	6	8	1	7	2	4	3
All ICT	% of new projects	7%	3%	16%	6%	9%	8%	6%	44%
	total projects/population	4	5.7	2	17.1	5.6	19.5	7.4	7.7
rank	% of new projects	7	8	2	5	3	4	5	1
rank	total projects/population	7	5	8	2	6	1	4	3
All eBusiness	% of new projects	8%	3%	16%	7.00%	7.00%	8%	8%	42%
	total projects/population	2.1	2.5	1	9.2	2.3	10	4.3	3.5
rank	% of new projects	3	8	2	6	6	3	3	1
rank	total projects/population	7	5	8	2	6	1	3	4
All ICT R&D	% of new projects	10%	8%	6%	15%	3%	4%	13%	40%
	total projects/population	0.7	2.1	0.1	5.3	0.3	1.5	2	0.9
rank	% of new projects	4	5	6	2	8	7	3	1
rank	total projects/population	6	2	8	1	7	4	3	5

										Ireland's Ranking	
										2002 Rank	Rank 2003
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
Accenture, eGovernment Ranking 2002	4	9	5	10	11	n.a.	2	6	3	7	7
2003	**5**	**10**	**4**	**11**	**13**	**n.a.**	**2**	**8**	**3**		
NRI, Assessment of State of Development of eGovernment, 2001	4.58	4.28	4.88	4.58	4.65	5.1	5.43	4.83	4.88	8	5
2003	**4.74**	**4.61**	**5.04**	**5.24**	**4.81**	**5.27**	**7**	**5.36**	**5.41**		
eEurope % On-line Availability of Basic Services, 2001	n.a.	40%	59%	68%	37%	61%	n.a.	50%	n.a.	1	1
2003	**n.a.**	**46%**	**69%**	**85%**	**42%**	**81%**	**n.a.**	**63%**	**n.a.**		
DTI % of Businesses that use ICTs to collect Government information	57%	43%	n.a.	61%	n.a.	61%	n.a.	60%	58%	1	2
2003	**61%**	**33%**	**n.a.**	**61%**	**n.a.**	**73%**	**n.a.**	**50%**	**52%**		
DTI % of Businesses that use ICTs to make tax or other payments to Government	27%	8%	n.a.	12%	n.a.	37%	n.a.	11%	19%	4	4

General Public Usage of Internet, Case Study Countries 2002

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
WCY No. of Internet Users per 1,000 Population	465	309	541	289	449	554	469	402	522	9	8
2002	**530**	**369**	**593**	**376**	**512**	**603**	**511**	**456**	**556**		
WCY No. of Computers per 1,000 Population	585	436	609	461	510	626	580	492	639	8	8
2002	**630**	**480**	**658**	**516**	**605**	**687**	**596**	**526**	**739**		
WCY No. of Credit Cards per capita	0.64	1.26	0.38	0.72	1.31	0.68	0.61	1.90	1.75	5	5
2001	**0.64**	**1.30**	**0.34**	**0.82**	**1.29**	**0.74**	**0.68**	**2.13**	**1.75**		
eEurope % of Households with Internet Access, June 2001	n.a.	38%	59%	46%	59%	64%	n.a.	47%	n.a.	5	4
Jun-02	**n.a.**	**44%**	**65%**	**48%**	**66%**	**64%**	**n.a.**	**45%**	**n.a.**		
eEurope % of Interviewees that personally use the Net, June 2001	n.a.	52%	68%	57%	64%	69%	n.a.	55%	n.a.	4	5
Jun-02	**n.a.**	**56%**	**73%**	**57%**	**68%**	**70%**	**n.a.**	**61%**	**n.a.**		
eEurope % of Interviewees that use the Net at home (all respondents), June 2001	n.a.	35%	51%	39%	52%	55%	n.a.	41%	n.a.	5	6
Jun-02	**n.a.**	**40%**	**61%**	**39%**	**60%**	**58%**	**n.a.**	**45%**	**n.a.**		
eEurope % of Interviewees that occasionally use the Net to purchase products or services (Internet Users Only), 2001	n.a.	15%	13%	16%	14%	15%	n.a.	25%	n.a.	2	5
Jun-02	**n.a.**	**20%**	**14%**	**15%**	**17%**	**18%**	**n.a.**	**27%**	**n.a.**		
eEurope % of Interviewees that use the Internet for on-line banking operations (Internet Users Only), 2001	n.a.	29%	41%	22%	35%	48%	n.a.	29%	n.a.	6	6
Jun-02	**n.a.**	**33%**	**50%**	**24%**	**48%**	**53%**	**n.a.**	**30%**	**n.a.**		

ICT and Education, Selected Indicators

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**	**2002**	**2003**
General Education											
eEurope Computers connected to the Internet per 100 students at primary level, 2001	n.a	1.6	16.7	3.3	2.3	7.3	n.a.	4.3	n.a.	4	4
eEurope Computers connected to the Internet per 100 students at secondary level, 2001	n.a	4.4	49.8	8	6.5	19.9	n.a.	11.2	n.a.	4	4
eEurope % of Schools with ADSL or Cable Modem Connection to the Internet, 2001	n.a	6	63	0	26	25	n.a.	11	n.a.	6	6
IT General Education											
OECD % of Population aged 25-64 with Tertiary Education, 1999	n.a.	28%	27%	21%	22%	29%	n.a.	25%	n.a.	6	6
ESDIS Total Graduates in S&T as a % Total Graduates (20 - 24 year olds only), 1997	n.a.	3%	3%	4%	2%	3%	n.a.	5%	n.a.	2	2
OECD, HR in S&T as a % of Labour Force, 1999	n.a.	30%	30%	19%	34%	33%	n.a.	23%	n.a.	6	6
WCY Level of Agreement by Senior/Middle Management with Statement "Information Technology Skills are readily available in your country's labour force", 2002	8.27	6.47	7.77	7.93	7.69	8.77	8.26	6.97	8.77	5	5
IT Advanced Education											
WCY, No. of Scientific Articles per 1 mn Population, 1997	702	549	1025	387	863	1182	330	760	618	9	9
1999	**646**	**455**	**779**	**326**	**657**	**936**	**403**	**667**	**568**		
European Commission (Benchmarking R&D Policies 2001), Total New S&T PhDs per '000 Population aged 25-34 Years, 1999	n.a.	0.75	0.56	0.61	0.35	1.17	n.a.	0.63	0.47	4	4
2000	**n.a.**	**0.81**	**0.49**	**0.50**	**0.34**	**1.24**	**n.a.**	**0.68**	**0.41**		

R&D in Ireland in International Perspective, Selected Indicators

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
WCY Total Expenditure (US$) on R&D per Capita, 2000	299.9	559.9	680.5	302.2	509.8	1035.7	434.6	453.2	936.8	8	9
2001	**309.9**	**571.7**	**680.2**	**306.0**	**458.6**	**1035.7**	**436.5**	**444.8**	**991.2**		
WCY Business Expenditure (US$) on R&D per Capita, 2000	137.6	394.6	431.5	220.9	287.4	778.0	269.4	293.3	705.6	8	8
2001	**145.9**	**406.0**	**431.3**	**222.9**	**264.2**	**778.1**	**276.4**	**291.8**	**737.2**		
WCY Total R&D Personnel Nationwide (FTE) per Capita, 2000	4.9	5.9	6.7	3.3	5.5	7.5	4.8	1.6	n.a.	7	7
2001	**5.0**	**5.9**	**6.7**	**3.3**	**5.7**	**7.5**	**4.7**	**1.6**	**n.a.**		
WCY Total R&D Personnel in Business (FTE) per Capita, 2000	1.38	3.74	3.94	2.23	2.86	4.99	2.55	2.44	n.a.	7	7
2001	**1.45**	**3.80**	**3.94**	**2.22**	**3.08**	**4.99**	**2.40**	**2.43**	**n.a.**		
European Commission (Benchmarking R&D Policies 2001), Share of Government Budget Allocated to R&D, 1999	n.a.	1.9	1.37	0.77	3.25	1.4	n.a.	1.87	4.2	7	7
European Commission (Benchmarking R&D Policies 2001), Total New S&T PhDs per '000 Population aged 25-34 Years, 1999	n.a.	0.75	0.56	0.61	0.35	1.17	n.a.	0.63	0.47	4	4

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
Overall Assessment NRI: Assessment of Quality of "Information Society" Infrastructure, 2001	5.9	6.21	6.46	5.48	6.32	6.62	6.1	6.22	6.45	9	9
2002	**5.15**	**5.22**	**5.13**	**4.31**	**4.80**	**5.23**	**4.89**	**4.87**	**5.75**		
WCY Level of Top/Middle Management Agreement that Communications Infrastructure (availability, reliability, cost) is Adequate	8.09	8.4	9.03	6.48	8.63	8.31	8.81	7.69	8.73	9	9
2003	**8.43**	**8.57**	**8.74**	**6.48**	**8.68**	**8.38**	**8.92**	**7.35**	**8.97**		
WCY Mobile Telephone Subscribers per 1,000 Inhabitants, 2001	610.3	651.7	719.5	753.5	730.8	792	687.9	754.8	435	3	3
2002	**656.8**	**666.5**	**790.4**	**798.9**	**717.5**	**900.3**	**761.1**	**823.7**	**496.9**		
Broadband Penetration and Price OECD Broadband Penetration (DSL or Cable Modem) per 100 Population, June 2001	0.59	1.03	2.33	0.01	2.74	4.52	n.a.	0.28	3.24	8	8
Jun-02	**1.4**	**3.2**	**6.7**	**0.05**	**3.9**	**6.8**	**n.a.**	**1.3**	**5.8**		
OECD/Monthly Tariffs for DSL (0.25 - 0.5 Mbits/s)/ SME Entry Level, 1st Quarter 2002 (€)	n.a.	49	68	119	70	54	n.a.	50	54	7	7
2003	**n.a**	**49**	**53**	**141**	**62**	**69**	**n.a.**	**62**	**49**		
OECD/Monthly Tariffs for DSL (0.5 Mbits/s)/ Small Firms, 1st Quarter 2002 (€)	n.a.	145	63	175	70	54	n.a.	173	79	7	6
2003	**n.a**	**334**	**63**	**175**	**86**	**69**	**n.a.**	**149**	**89**		
OECD, Internet Dial-up Access Costs Residential User: 20 Hours Off-Peak, 2001	n.a.	25.4	n.a.	30.37	29.13	28.19	n.a.	24.23	20.89	6	6
Broadband Service Options OECD, Internet Dial-up Access Costs Business User: 40 Hours at Peak Time, 2001	n.a.	37.67	42.89	71.97	72.1	68.53	n.a.	34.21	23.22	6	6

Availability of Venture Capital for High-tech Enterprise, 2001

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
VC (€) raised by domestic VCs for high-tech start ups ('000s), 2001	n.a.	897,550	82,935	120,927	44,298	158,310	n.a.	2,261,906	n.a.	4	4
VC (€m) raised by domestic VCs for high-tech start ups per million population, 2001	n.a.	10.95	15.65	31.82	2.79	17.79	n.a.	38.02	n.a	2	2
VC (€) raised by domestic VCs for high-tech expansion ('000s), 2001	n.a.	847,720	110,181	47,987	60,542	161,131	n.a.	1,514,293	n.a	6	6
VC (€m) raised by domestic VCs for high-tech expansion per million population, 2001 n.a.	10.34	20.79	12.63	3.81	18.1	n.a.	25.45	n.a		4	4
WCY Management Agreement with statement "venture capital is easily available for business development", 2002	5.64	5.88	6.13	6.67	7.38	6.67	6.43	6.58	8.21	3	4
2003	**5.75**	**4.31**	**5.59**	**6.07**	**6.42**	**5.63**	**6.38**	**5.83**	**7.35**		

										Ireland's Ranking	
										2002 Rank	2003 Rank
Actual Scores	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
General IT Supports											
NRI - Assessment of Availability, Quality and Cost Competitiveness of Hardware, Software and Support Services, 2002	5.72	5.88	5.83	5.53	5.63	6.16	5.40	5.94	6.76	8	8
WCY Level of Agreement by Senior/Middle Management with Statement "Information Technology Skills are readily available in your country's labour force", 2002	8.27	6.47	7.77	7.93	7.69	8.77	8.26	6.97	8.77	5	6
2003	**8.57**	**7.94**	**8.19**	**8.11**	**7.80**	**8.76**	**8.53**	**7.13**	**8.75**		
DTI % of Businesses rating quality of IT advice received as "good" or "very good", 2001	55%	44%	n.a.	49%	n.a.	41%	n.a.	50%	52%	4	4
ISPs											
No. of ISPs on Major Internet Exchange, 2002, per 1 m population	2.2	1.2	6	2.9	8.9	5.2	1.5	2.1	n.a.	4	4
2003	**n.a.**	**1.4**	**5.7**	**2.6**	**9.9**	**4.3**	**2.2**	**2.2**	**n.a.**		
WCY Annual ISP Cost for 20 Hours of Monthly Use (US$ PPP adjusted), 2000	35.9	37.4	34.5	50.5	53	39.9	n.a.	44.5	21.4	7	8
2001	**28.8**	**33.1**	**36.3**	**48.07**	**45**	**39.9**	**n.a.**	**44.0**	**21.4**		
Banking Services											
No. of Banks included in IBM/Interbrand Top 10 World Internet Banks, 1999	0	1	0	0	0	3	0	1	3	5	5
WCY Level of Agreement by Senior/Middle Managers with Statement that "banking services are widely developed in your country", 2002	9.09	8.33	8.87	8.07	8.75	8.77	8.43	8.67	9.41	9	9
2003	**9.04**	**8.41**	**8.63**	**8.26**	**8.65**	**8.78**	**8.28**	**8.58**	**9.10**		
DTI % of Businesses using on-line banking or investment services, 2001	60%	55%	n.a.	51%	n.a.	77%	n.a.	47%	36%	4	4
Security Infrastructure											
WCY No. of Secure Servers per 1,000 Inhabitants	147.6	45.85	54.12	64.64	34.11	91.43	n.a.	74.02	231.49	5	5
2000	**147.6**	**45.77**	**54.12**	**64.64**	**34.03**	**91.43**	**n.a.**	**73.69**	**238.19**		

										Ireland's Ranking	
										2002 Rank	2003 Rank
Entrepreneurship	**A**	**D**	**DK**	**IRL**	**NL**	**S**	**Sing**	**UK**	**US**		
European Commission % of new enterprises as a % of all enterprises (average 1995 to 2000)	n.a.	16%	7%	14%	9.8%	8%	n.a.	10.2%	n.a.	2	2
WCY Levels of Senior/Middle Management Agreement with Statement "Entrepreneurship is common in your economy", 2002	6.9	5.16	5.56	6.77	7.44	6.13	5.83	6.47	9.11	4	3
	6.5	**5.18**	**5.75**	**6.29**	**6.06**	**5.58**	**5.34**	**4.94**	**7.28**		
Innovation/Adoption WCY Level of Senior/Middle Management Agreement with the Statement "national culture is open to foreign ideas", 2002	8.36	7.02	6.44	7.65	8.63	7.8	7.87	6.64	8.04	6	4
	8.17	**6.59**	**6.54**	**7.59**	**8**	**7.28**	**7.72**	**6.45**	**7.47**		
UNDP Rate of Adoption of Telephones (mainline and cellular per 1,000 people), 1999	862	874	n.a.	924	1042	1247	901	1037	993	5	5
Tradition of Innovation/Nobel Prizes per Capita since 1950 (WCY)	0.155	0.341	0.749	0.261	0.377	1.239	0	0.84	0.713	7	7
	0.152	**0.34**	**0.747**	**0.258**	**0.372**	**1.242**	**0**	**0.866**	**0.724**		

Forfás Reports 2003

World Trade Organisation Negotiating Objectives for Irish Enterprise Policy	February 2003
National Survey of Vacancies in the Private Non-Agricultural Sector **National Survey of Vacancies in the Public Sector** Expert Group on Future Skills Needs	March 2003
Utilising Intellectual Property for Competitive Advantage Irish Council for Science, Technology & Innovation (ICSTI)	April 2003
Design & Development Irish Council for Science, Technology & Innovation (ICSTI)	April 2003
Baseline Assessment of the Public Research System in Ireland in the areas of Biotechnology and Information and Communication Technologies	April 2003
The Demand and Supply of Skills in the Food Processing Sector Expert Group on Future Skills Needs	April 2003
State Expenditure on Science and Technology, 2001 Volume One: The Total Science & Technology Budget Volume Two: The Research & Development Element of the Science & Technology Budget	May 2003
Statement on Inflation National Competitiveness Council	May 2003
Consumer Pricing Report 2003	May 2003
Embedding the PharmaChem Industry in Ireland Irish Council for Science, Technology & Innovation	May 2003
International Trade & Investment Report, 2003	June 2003
The Demand and Supply of Engineers and Engineering Technicians Expert Group on Future Skills Needs	July 2003
State Expenditure Priorities for 2004 Statement of the Irish Council for Science, Technology & Innovation (ICSTI)	July 2003
Forfás Annual Report 2002	July 2003
A Comparison of Starting Salaries for Science and Engineering Graduates Statement of the Irish Council for Science, Technology & Innovation (ICSTI)	August 2003
The Supply and Demand for Skills in the Biotechnology Sector Expert Group on Future Skills Needs	September 2003
Annual Employment Survey 2002	September 2003
Business Expenditure on Research and Development (BERD), 2001	September 2003
The Fourth Report of the Expert Group on Future Skills Needs	October 2003
Survey of Research & Development in the Higher Education Sector, 2000	November 2003
Annual Competitiveness Report 2003 National Competitiveness Council	December 2003
Competitiveness Challenge 2003 National Competitiveness Council	December 2003

Functions of Forfás

Is é Forfás an bord náisiúnta um polasaí agus comhairle le haghaidh fiontraíochta, trádála, eolaíochta, teicneolaíochta agus nuála. Is é an comhlacht é a bhfuil comhactaí dlíthiúla an stáit maidir le cur-chun-cinn tionscail agus forbairt teicneolaíochta dílsithe ann. Is é an comhlacht é freisin trína dciomnaítear cumhachtaí ar Fhiontraíocht Éireann le tionscail dúchais a chur chus cinn agus ar ghníomhaireacht Forbartha Tionscail na hÉireann (GFT Éireann) le hinfheistíocht isteach sa tir a chur chun tosaight. Is iad feidhmeanna Fhorfáis:

- comhairle a chur ar an Aire ó thaobh cúrsaí a bhaineann le forbairt tionscail sa Stát
- comhairle maidir le forbairt agus comhordú polasaithe a chur ar fáil d'Fhiontraíocht Éireann, d'GFT Éireann agus d'aon fhoras eile dá leithéid (a bunaíodh go reachtúil) a d'fhéadfadh an tAire a ainmniú trí ordú
- forbairt na tionsclaíochta, na teicneolaíochta, na margaíochta agus acmhainní daonna a spreagadh sa Stát
- bunú agus forbairt gnóthas tionsclaíoch ón iasacht a spreagadh sa Stát, agus
- Fiontraíocht Éireann agus GFT Éireann a chomhairliú agus a chomhordú ó thaobh a gcuid feidhmeanna.

Forfás is the national policy and advisory board for enterprise, trade, science, technology and innovation. It is the body in which the State's legal powers for industrial promotion and technology development have been vested. It is also the body through which powers are delegated to Enterprise Ireland for the promotion of indigenous industry and to IDA Ireland for the promotion of inward investment. The broad functions of Forfás are to:

- advise the Minister on matters relating to the development of industry in the State
- advise on the development and co-ordination of policy for Enterprise Ireland, IDA Ireland and such other bodies (established by or under statute) as the Minister may by order designate
- encourage the development of industry, technology, marketing and human resources in the State
- encourage the establishment and development in the State of industrial undertakings from outside the State, and
- advise and co-ordinate Enterprise Ireland and IDA Ireland in relation to their functions.

Board Members

Peter Cassells
Chairman

Martin Cronin
Chief Executive, Forfás

Sean Dorgan
Chief Executive, IDA Ireland

Dan Flinter
Chief Executive, Enterprise Ireland

Paul Haran
Secretary General, Department of Enterprise, Trade & Employment

Dr. William C. Harris
Director General, Science Foundation Ireland

Professor Michael Hillery
Chair of Manufacturing Engineering, University of Limerick

Rody Molloy
Director General, FÁS

William Murphy
Partner, Tynan Dillon and Company

Feargal O'Rourke
Partner, Taxation, PricewaterhouseCoopers

Toni Wall
Managing Director, Wall-2-Wall Ltd

Jane Williams
Managing Director, The Sia Group Ltd

eBusiness Monitor Report

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