Foreword by the Tánaiste and Minister for Enterprise, Trade and Employment

Within 2 to 3 years the Internet will have created a single market of over 300 million computer-based consumers worldwide. Already, e-commerce transactions are estimated to be worth over $100 billion per annum. But by 2003, the value of these transactions is expected to have risen to at least $1.3 trillion per annum.

The use of advanced Information Communications Technologies (ICTs) has become the most significant driver of world economic growth. ICTs are the catalysts through which enterprise, whether traditional or new, can create sustained competitive advantage for its products and services on world markets.

Ireland's enterprise culture is grounded in strong and consistent pro-enterprise policies. These include a stable political and policy environment, prudent management of the public finances, investment in key infrastructures, the provision of a well educated and flexible workforce, a successful system of social partnership, a low business corporation tax regime and the development of an open economy exporting some 81 per cent of GDP.

This Government recognises the need for a broad based, multi disciplinary approach to the new challenges presented by the Information Society. Five priority areas have been identified which must be developed to ensure our global competitiveness in the new digital economy:

1. Telecommunications Infrastructure and Costs
2. Education in the use of ICTs
3. Upskilling the existing business sector
4. Effective Regulation, and
5. Research and Development.

Decisive action has been taken by Government in all of these priority areas.

The telecommunications market has been liberalised a full year earlier than had been planned. Innovative Public Private Partnership arrangements have been put in place which will significantly enhance Ireland's broadband connectivity to the global telecommunications network in the year 2000. Our strategy is to promote strong competition so as to achieve first class services at best OECD prices.

Investment in our infrastructure must be accompanied by investment in our people. The Government has allocated a total of IR£365 million to various educational initiatives designed to develop appropriate skills and to promote innovation. These initiatives include:

- An additional 5,400 new third level college places in high technology courses over the next four years at a cost of IR£75 million
- The Technology Investment Fund, which is making IR£250 million available over a three year period to renew and modernise third level infrastructure
- The Schools IT Initiative, under which the Government is investing IR£40 million to facilitate the integration of ICTs into Ireland's schools, including the provision of hardware and support services in schools and skills development for teachers

In recent months, both FÁS and Enterprise Ireland have each launched initiatives to spread the e-commerce gospel. In 1999, FÁS will provide an additional 730 places in Electronic and Software Courses at a cost of IR£3.2m. Enterprise Ireland will spend some IR£2m per annum to assist indigenous firms to adapt their management and business processes to on-line trading conditions.

High-tech firms have not been slow to assist in the training and skills areas. The Fast Track to IT Initiative was set up with key IT industry participation – Corel, Microsoft, Oracle, Symantec, IBM and CSC. The project will recruit over three years 3,500 long term unemployed persons into areas in the IT industry experiencing skill shortages.

The provision of an appropriate regulatory environment will be a crucial element in establishing Ireland as an e-business hub. The Copyright Bill 1999 is expected to be enacted later this year, and my Department and the Department of Public Enterprise are publishing a consultation paper containing outline proposals for electronic signatures and electronic contracts as a precursor to legislation in these areas.

In Ireland, we have recognised the need for a deeper commitment to research and development by our industry, including much deeper and wider collaboration with Institutions of higher education. Ireland has just completed the first part of a Technology Foresight initiative to identify the technologies that will be important to us in the future. The establishment of centres of excellence in ICTs was one of the main areas identified for prioritisation.

Much work remains to be done in the immediate future if Ireland is to realise its goal as a world class centre for e-business. We have made a good start and no one should doubt our determination to complete the job. Business in Ireland needs a robust but flexible policy framework to rise to the new challenges in the Information Society.

The work of the Steering Group which produced this Policy Statement is an invaluable contribution to the creation of such a framework and helps to chart the way forward. I wish to thank all of those concerned for their time, insights and inputs to this Policy Statement.

Mary Harney T.D.,
Tánaiste and Minister for Enterprise, Trade and Employment

Preface

Electronic commerce is now one of the most significant drivers of both successful business development and national economic development. It is a form of business operation in which the era of truly global markets and global competition has arrived. Throughout the world, leading enterprises in all sectors of economic activity are changing their business strategies to make more effective use of Internet technologies in their operations – including marketing, product development and distribution.

Because e-commerce is a fundamentally new way of conducting business the policy environment within which it can grow and thrive is different to that within which traditional business do so. Throughout the world, at the present time, Governments are putting new policies into place to capture the exceptional opportunities for both economic and social benefit that e-commerce provides. In Ireland, the Government has set the target of making Ireland a global leader in e-commerce, and is actively implementing policies to develop the building blocks for the digital economy.

Because advanced telecommunications is a fundamental requirement for the successful development of e-commerce, Forfás has prepared and published a number of reports on the required investments in this basic infrastructure. These include the proposal and feasibility study for the National Digital Park launched recently by the Taoiseach, the Tánaiste and the Minister for Public Enterprise. They also include Broadband Investment in Ireland (March 1998) and, under the auspices of the National Competitiveness Council, a report on Telecommunications – A key Factor in Competitiveness and Electronic Commerce (November 1998). In this last report particular attention was drawn to the need for all enterprises to plan for the changeover to e-commerce and the need for Government to put in place the required legal and regulatory environment in which e-commerce can prosper. These reports demonstrated that the availability of broadband telecommunication services in all parts of the country, with high capacity international links, is a prerequisite for the development of the digital economy.

This Report on E-commerce – The Policy Requirements complements previous Forfás reports on telecommunications and the skill needs of the electronics and software sectors. The skills issue was considered in the *First Report of the Expert Group on Future Skills Needs*, published by Forfás in Dcember 1998. The telecommunications infrastructure and skills are the two most critical areas in developing the solid foundations on which e-commerce can be built as an intrinsic part of an information society in Ireland. Because the infrastructural requirements of the information society are now widely understood and because substantive action is under way to meet these requirements, the report concentrates instead on how to make best use of that infrastructure. There is, of course, a continuing need to benchmark infrastructural availability and the cost of services on it against best practice in other countries with advanced telecommunications facilities. The report was prepared at the request of the Tánaiste and Minister for Enterprise, Trade and Employment, Mary Harney, T.D. It assesses the development and potential of e-commerce, outlines the policy responses of other countries and analyses the sectoral implications and the requirements for a conducive business environment. In each case, recommendations are made for Government Departments, for the development agencies, and for enterprise. IDA Ireland, Enterprise Ireland, Shannon Development and Údaras na Gaeltachta have formulated strategies for the attraction of e-commerce-related inward investment and for the development of

Irish-owned enterprise in the digital economy, and these strategies are summarised in this report.

E-Commerce provides a major opportunity for the development of profitable business in Ireland providing stable, well paid employment in both existing firms and in new start-up business. For firms that embrace the new technologies and new ways of doing business, these opportunities are immense. For firms that do not, the results could prove fatal.

The recommendations in this report seek to further advance the contribution which e-commerce can make to social and economic development in Ireland.

Michael McKenna
Chairman
Electronic Commerce Policy Steering Group

Executive Summary

1. Background

One of the most significant drivers of enterprise over the next three to five years will be e-commerce and the information and communications technologies that support it. Ireland's success in exploiting the opportunities involved will be a critical determinant of future growth in competitiveness, income and employment.

For the purposes of this report, e-commerce is defined in its broadest sense as including all aspects of business that takes place over networks such as the Internet. It includes goods and services that are delivered over these networks, such as software and music, and goods ordered over the networks but delivered in some other way, such as personal computers. It covers the whole range of business functions required to support these activities from marketing to production to delivery and service and includes the hardware, software, content-generation, telecommunications, and support services that makes all this possible.

E-commerce provides a fundamentally new way of conducting commercial transactions and has far-reaching economic and social implications. It will affect industry structures and competition in home and international markets. It presents major new business opportunities for Irish-based enterprises and for the development of new sectors. It also poses significant threats for enterprises that do not prepare for the fundamental changes that are taking place. At a national level there is a need to ensure that the required legal, regulatory and facilitatory business environment is conducive for the enterprise sector to fully exploit the opportunities and to develop Ireland as a leading location for e-commerce-driven investment. At the level of the development agencies, it requires a new approach to the development of national enterprise policies and new actions.

E-commerce offers a new route to overcoming some of Ireland's strategic challenges, including our peripheral location on the edge of Europe, the high proportion of small and medium sized enterprise (SMEs) within indigenous industry, and regional imbalances in the distribution of industry.

This report was prepared by Forfás at the request of the Tánaiste and Minister for Enterprise, Trade and Employment, Mary Harney, T.D. It provides a framework within which Enterprise Ireland, IDA Ireland, Shannon Development and Údarás na Gaeltachta can formulate the required promotional strategies. It complements previous Forfás work on the telecommunications infrastructure which is one of the two most critical factors in developing our capability to exploit e-commerce, the other being skills. The report does not deal with the telecommunications infrastructure, except to briefly outline what is being done, but concentrates on how to make best use of that infrastructure.

Other Forfás reports have shown that the availability of a broadband telecommunications infrastructure in all parts of the country, with high capacity international links, is a prerequisite for the development of the digital economy. Forfás and the Department of Enterprise, Trade and Employment continue to work with the Department of Public Enterprise, other government departments and the development agencies to ensure that the required telecommunications infrastructure is put in place. This is a major priority for Government and significant progress has been achieved including the following initiatives:

- The liberalisation of the Irish telecommunications market from 1 December 1998, which has spurred a dramatic increase in investment by telecommunications companies
- A major investment to significantly increase international connectivity, by the end of 2000, has been announced
- The sale of Cablelink has been completed subject to an upgrade of the network to provide broadband services
- EU Structural Funds have been allocated to support the deployment of broadband networks to the regions.

The Report of the Expert Group on Future Skill Needs, published by Forfás in December 1998, sets out the third level education requirements for the information technology sectors. It formed the basis for a Government decision to provide IR£75 million (€95.2 million) for an additional 5,400 third level places to increase the supply of skills in Information Technology.

1.1 The Digital Economy

E-commerce and the associated Information Technology (IT) industries are radically changing and growing at breathtaking speed, fundamentally altering production, consumption and communications. The figures are staggering. Business-to-business and business-to-consumer e-commerce are estimated, in a recent study, to have reached $102 billion world-wide in 1998[1]. Forrester Research estimates that business-to-business e-commerce will rise to at least $1.3 trillion by 2003[2]. Online retail sales are forecast to reach $80 billion by 2002 compared with an estimated $15 billion in 1998. While up to 80 per cent of this may be substitution for traditional forms of commerce, it is estimated that the use of Internet technologies is spurring additional commercial growth of up to 20 per cent per annum.

E-commerce is developing strongly in Ireland. Government is fully aware of its importance and potential, both as an instrument of economic and regional development and for the achievement of greater social equity through the distribution of employment opportunities and improved access to Government services. A number of key building blocks are being put in place. These include the international and local telecommunications infrastructure referred to above, increased information technology skills places in third level education and the commitment of resources to developing the research infrastructure.

In the business sector, a number of leading multinational companies are integrating their European operations in Ireland and using Internet technologies to serve markets in Europe and beyond. Irish-owned companies across a range of sectors are rapidly developing e-commerce and achieving significant growth in international markets using the Internet. A number of Irish companies are establishing leadership positions in key e-commerce enabling areas such as security and web tools.

The impact of e-commerce is so pervasive, however, and the pace of change so rapid that companies in all sectors need to develop strategies for the effective integration of the Internet into their businesses. Businesses that respond by seizing the opportunities available will find new products, new processes, new ways of attracting and retaining customers, new ways of delivering their goods and services, new ways of sourcing supplies, and new ways of providing customer care. E-commerce offers major potential for smaller businesses that are attuned and

---

[1] The Internet Economy indicators', Barua, A., Shutter, J., and Whinston, June 1999 (http://www.internetindicators.com)
[2] Forrester Research press release, December 17, 1998 (http://www.forrester.com)

responsive to the developments taking place. Businesses that fail to respond will find – often suddenly and without warning – that their customers disappear, and their products become uncompetitive.

1.2 Methodology

A Steering Group chaired by Mr Michael McKenna, Assistant Secretary, Department of Enterprise, Trade and Employment, guided the preparation of this report. The Steering Group's membership is drawn from Irish and overseas industry the Department of Enterprise, Trade and Employment, the Department of Public Enterprise, academia, and IDA Ireland, Enterprise Ireland, Shannon Development, Údarás na Gaeltachta, and Forfás.

The sectoral implications and the required business environment were discussed with experts both in Ireland and abroad. Workshops were held with over 150 industry participants to assess and test the sector-specific implications of e-commerce. These workshops examined the marketing and operational implications for Irish and overseas firms in a number of sectors in Ireland, specifically electronics hardware, software, food, and small and medium sized enterprises. The workshops also assessed the implications in new and emerging sectors, such as digital support services, education and training, and digital content distribution.

This report is presented in four broad sections:

- The first section assesses the development of e-commerce in Ireland and its potential. It also examines the policy responses of other countries
- The second section assesses the sector-specific implications of e-commerce and the required operational and strategic responses
- The third section sets out the policy actions that are required in the business environment to facilitate the development of e-commerce
- The fourth section sets out the strategies of the development agencies.

Specific recommendations are made for the consideration of government departments, development agencies[1], and business firms.

1. The recommendations throughout this report for Enterprise Ireland apply in general to Shannon Development and Údarás na Gaeltachta.

2. Sectoral Implications

The implications and emerging opportunities presented by e-commerce for a range of key sectors of the Irish economy were analysed. The analyses kept a sharp focus on the marketing and operational impacts. The sectors chosen for analysis was for illustrative purposes. They do not purport to be exhaustive. It can be said, however, from the analyses undertaken that no sector is unaffected by e-commerce developments.

2.1 Software

Software is one of the foundation sectors for the new e-commerce economy. Dramatic growth is expected in the provision of software for the Internet and for telecommunications. A wide range of opportunities are arising to provide software

for specialised applications. Each business sub-sector will require software to meet its individual needs and every business will require standard software to drive its conversion to e-commerce. The software sector is, however, highly knowledge-intensive and skills-intensive with a high degree of locational mobility. The telecommunications infrastructure, skills availability, underlying costs and regulatory framework are key factors influencing the location decisions of firms. Locational competition for the high value-added activities within the sector is intense and will further intensify.

The software industry in Ireland is being fundamentally affected by the Internet in its operations and in its marketing. The biggest impact is the rapid emergence of digital distribution over the telephone lines, wireless and satellite. It is likely that most software in Ireland will be distributed over the telecommunications infrastructure direct to business within three years and to consumers within five years.

E-commerce gives indigenous companies a powerful tool for competing on global markets. However, moving to Internet-based operations requires a significant investment of resources to transform existing products and processes to digital formats. The objective for Irish companies must be to identify, exploit and dominate specific niche product areas, and to establish brands that are recognised and trusted world-wide in key high-growth markets. This may involve consolidation of some small companies, as scale becomes more important to competitiveness.

Research and development of new software products is changing. "Virtual teams" can be co-ordinated with ease across country borders. Overseas owned companies in Ireland can more easily participate in development work carried out by their parent companies. Irish owned companies can use the Internet to gain a foothold in the R & D subsector and to forge relationships with multinational companies located in Ireland, and in particular, with the global headquarters (HQs) of such companies. Some have already done this but many more need to do so.

The localisation activities of software enterprises in Ireland, to meet the individual needs of various EU markets, will increasingly come under competitive threat and will change. The Internet will facilitate language translation in the destination countries will rather than in Ireland. Other localisation activities are also likely to decline. The standardisation of user interfaces and operating platforms will reduce technical localisation work and the more routine coding and testing activities will migrate to lower-cost countries.

In the foreign-owned software sector, much of the activity currently carried out in Ireland is concerned with the physical manufacture and distribution of products. These labour-intensive activities will decline as e-commerce develops. However, the growth in digital distribution will increase the need for technical support, accounts, and digital distribution personnel. As software moves from distribution in physical form to digital distribution, the physical location of the producer will become less relevant.

Marketing activities are likely to reduce in individual country markets with direct digital distribution. The increased demand for software and the new digital delivery systems will result in increased outsourcing by foreign-owned companies in Ireland and throughout the world.

These fundamental changes in the nature of the sector pose threats and provide significant opportunities for promoting both inward investment and the development

of Irish-owned companies. If the infrastructural, regulations, skills and cost environment are competitive the opportunities for Ireland include:

- becoming a major world-centre for the digital distribution of software
- managing the associated intellectual property rights, customisation, credit control, services and support
- the consolidation of software related marketing functions at present located in a number of countries into a single centre based in Ireland
- meeting the increased outsourcing needs of companies based in Ireland and elsewhere for e-commerce-related products and services

To take advantage of these opportunities a number of actions are recommended including:

Agency Actions

Assist Irish-owned firms to move up the value chain from bespoke[3] software to world class niche and other products. (Enterprise Ireland and Shannon Development)

Encourage Irish-owned software firms to supply multinationals globally. (Enterprise Ireland, IDA Ireland and Shannon Development)

Encourage the selective consolidation of Irish owned software companies to create the scale and skills base needed to become significant internationally trading enterprises. (Enterprise Ireland and Shannon Development)

Promote Ireland as the premier EU location for digital distribution of software to business and personal consumers. (IDA Ireland)

Promote strongly, to overseas software companies, the benefits of centralising their European marketing and technical support in Ireland. (IDA Ireland)

Promote suppliers of Internet and telecommunications software to locate in Ireland (IDA Ireland) and develop indigenous software companies in these software sectors. (Enterprise Ireland and Shannon Development)

Promote overseas companies in Ireland to undertake additional development work in Ireland as part of virtual teams with their parent companies. (IDA)

Enterprise Actions (Indigenous)

Reposition bespoke software businesses as product development businesses, using the Internet to identify and develop relationships with new customer groups.

Evolve from contract outsource work to software product developers, supplying the multinational sector and other customers. Move higher up the value chain with a focus on developing specialised products for distribution to international customers using the Internet.

Build relationships with key staff in the headquarters of multinationals in order to identify new outsourcing and collaborative opportunities.

Examine the need and opportunities for alliances and consolidation with other firms in order to provide a more comprehensive product range and knowledge base or to share the costs of product development, market development and expansion and sharing of overheads. **Enterprise Actions (Overseas)**

Expand the range of business functions carried out in Ireland, to include marketing, sales, support, research and development, digital distribution, technical support and management and control of intellectual property.

---

[3] Bespoke software involves the provision of software services to customer specifications rather than product development.

2.2 Digital Content and Intellectual Property Management

The Internet facilitates the transfer over the telephone of products that can be digitised. These include software, education and training products, music and broadcasting. It also includes multimedia products that combine text, music, photographs, maps, drawings or video clips. The ease with which these goods can be transmitted is however a major business issue. Digitised goods can be copied easily and, thereby, misappropriated. This is giving rise to opportunities for the development of technologies for secure digital distribution. It is also giving rise to opportunities for the management of digital distribution for content companies.

To realise the major opportunities arising from these "content" industries businesses will need to develop new ways of managing, controlling, and ensuring payment for intellectual property and other associated payments. Providing such assurances to companies presents a major opportunity for Ireland. Early movers will have the opportunity to become world leaders in the collection, management and settlement of royalty payments, licence fees and tax associated with the use of copyright materials delivered electronically.

To realise these opportunities a number of actions are needed by Government, the development agencies and business firms including:

Government Action
Ensure, as set out in Section 3, that the legislative and regulatory environment for the protection of intellectual property provides a secure environment from which to create and distribute intellectual property and content. (Department of Enterprise, Trade and Employment)
Ensure that the education system provides sufficient numbers of law graduates with expertise in intellectual property law and procedures. (Department of Education)

Agency Actions
Encourage the development of indigenous companies in the provision of digital distribution and intellectual property management support services. (Enterprise Ireland and Shannon Development)
Promote Ireland as the premier EU location from which to digitally distribute content products. (IDA Ireland)
Encourage major music, media, and information publishers to centralise digital distribution in Ireland and to undertake additional value-added activities such as media asset management, and royalty collection and remittance. (IDA Ireland)

Enterprise Actions
Develop businesses that can take advantage of outsourcing opportunities for the wide range of content industries that are moving to distribution over the Internet.
Develop businesses to track the flow of transactions and remittance of royalty payments to copyright holders for digitised content such as film clips, literature, music, photographs, and other content from archives and libraries.

2.3 Electronics Hardware

The electronics sector in Ireland includes most of the key international hardware companies that are driving the development of the Internet. The sector has made a significant contribution to Irish economic growth over recent years. There are two broad categories of electronics firms in Ireland; end-user product manufacturers and sub-suppliers. All business firms in the electronics sector will be significantly affected by e-commerce, but in different ways.

E-commerce allows large hardware companies move towards the use of a smaller number of suppliers that are of the scale to meet their global needs. These companies are increasingly using extranets throughout their supply chains to link with sub-suppliers. Sub-suppliers will need to link into the supply chains of these businesses. They can use the Internet to respond to the changing demands of customers in terms of delivery times and technical specification.

Producers of finished electronics goods are using the Internet to develop new ways of selling direct and managing customer relationships. The Internet also enables the instantaneous comparison of price, delivery times, and service quality levels between alternative sources.

Major electronics corporations are moving towards the establishment of global command and control centres. These centres use digital communications networks to integrate the management of production, and sub-supply arrangements, and offer significant efficiencies in serving global customers. The Internet enables the central administration of orders from customers around the world, the scheduling of production internationally, arranging distribution, tracking delivery and providing on-going technical support. These centres are of strategic importance for high income, knowledge intensive jobs as manufacturing moves increasingly to lower cost locations. They are less vulnerable than production units to competition from low-cost locations in other parts of the world.

To facilitate the location of such centres in Ireland, and to address the other issues outlined above, a number of actions are important including:

Agency Actions
Encourage Irish-owned electronics SMEs to develop e-commerce capabilities in their supply chains using Internet solutions. (Enterprise Ireland and Shannon Development)
Promote Ireland strongly as a location for command and control centre investment. (IDA Ireland)

Enterprise Actions
Build and integrate e-commerce systems to serve customers in Ireland and internationally.
Identify distribution channels that sell and deliver products direct to consumers, and adopt business strategies that build relationships directly with end-users.

2.4 Support Services

E-commerce requires a wide range of support services. This is resulting in opportunities for new inward investment and for new indigenous enterprise. The availability and competitiveness of these services in Ireland will be critical for the development of e-commerce. They include the following:

Localisation services	Marketing and advertising
Graphic artists and design	Electronic data analysis and warehousing
Creative writing	Internet services provision
Specialised Software Developers	Server farms and mirror sites[4]
Fulfilment and digital distribution	Contract shared services provision
Settlement and credit management	

A number of actions are required to encourage the development of a competitive e-commerce support sector in Ireland including:

Agency Actions

Formulate sectoral strategies to exploit opportunities for indigenous development in emerging e-commerce support services. (Enterprise Ireland and Shannon Development)

Promote technology companies providing e-commerce support services, such as Internet transactions processing, digital distribution and design. (Enterprise Ireland and Shannon Development)

Continue to focus on the attraction of leading and emerging e-commerce support service providers to Ireland. (IDA Ireland)

Identify potential international partners for small Irish owned companies with high growth potential in e-commerce support services. (Enterprise Ireland and Shannon Development)

2.5 Food

The food sector is dominated by Irish-owned companies that source most of their raw materials in Ireland. They should continue to develop the ability to link into the supply chains of the major Irish, UK and other European multiples as e-commerce accelerates the move to "just in time" delivery.

Food retailers are using extranets and e-commerce tools to drive efficiency in their supply chains. The Internet can be used to streamline distribution networks, to improve traceability, to enhance quality assurance, and to build customer relationships and loyalty. E-commerce allows retailers to increase global sourcing, as they force relentless price competition. On the other hand, e-commerce creates global market opportunities for firms producing high-quality products at a competitive price.

---

[4] Server Farms and mirror sites are increasingly required by US and other multinationals to process Internet enquiries from the EU. This activity can be outsourced to specialised operators providing the service for a number of companies.

Food producers can command a price premium if they offer full traceability on raw materials. The Internet can be used to track animal health and the use of genetically modified ingredients. The Internet makes this possible by providing a flow of information on the origin and ingredients of products, from farm to retail shelf.

There will be opportunities for some food companies to sell directly to consumers over the Internet. These will be mainly in specialist areas such as non-perishable gourmet foods and chocolates. Products that can be purchased in bulk, such as pet foods, will also be sold directly to consumers.

To take advantage of the opportunities a number of actions are required including:

Agency Actions
> *Encourage* food businesses to use extranets to market and link with retailers world-wide. (An Bord Bia, Enterprise Ireland and Shannon Development)
> *Provide* advice, training and support for food companies developing e-commerce strategies. (An Bord Bia, Enterprise Ireland and Shannon Development)
> *Encourage* the development of Internet based solutions to provide full traceability of raw materials in the food chain in Ireland. (An Bord Bia, Enterprise Ireland and Shannon Development))

Enterprise Actions
> *Build* e-commerce systems and extranets in food supply chains to serve business customers.
> *Identify* new food distribution intermediaries that sell and deliver products direct to consumers.
> *Leverage* traceability for food products throughout the supply chain as a competitive advantage.
> *Explore* aggregation opportunities within and between food categories.

2.6 Education and Training

E-commerce will have a significant impact on the education and training business through the development of new digital-based education and training products, and through the digital conversion of existing textbooks and other material. The Internet enables distance-education courses to be delivered globally. This presents an opportunity and a challenge for the Irish education and training sector. It means that the catchment area for courses is greatly expanded. It also means that Irish students can participate in courses presented from anywhere in the world. To take advantage of these opportunities Irish education and training establishments will need to develop the capability to deliver courses online.

The demand for education software world-wide is experiencing dramatic growth. It offers tremendous potential for specialist software companies and education and training providers. To meet this demand, which is more content expansive and more geographically extensive than the traditional demand for educational and training outputs in Ireland, Irish education and training institutions will need to engage in online education, training provision and distance learning. They will also need to develop strong links with the multimedia industry in Ireland.

To take advantage of the opportunities a number of actions are required including:

Agency Actions

Leverage the strong reputation of Ireland's education system to develop on the Internet. Assist businesses and institutions to target niche markets. (Enterprise Ireland and Shannon Development)

Encourage the leading education and training companies to locate their content-generation, localisation, marketing and distribution and support service activities in Ireland. (IDA Ireland)

Encourage overseas distance-teaching providers to locate their education support and tuition services in Ireland. (IDA Ireland) Attract the in-company training development and provision units of multinationals. (IDA Ireland)

Encourage universities and institutions from other countries to locate their distance learning centres in Ireland. (IDA Ireland)

Enterprise Actions

Convert education and training products and provision to Internet-based platforms for delivering distance-learning products.

Develop in-house corporate training programmes, into specialist products, for marketing and delivering internationally over the Internet to companies with similar training needs.

Develop alliances in multimedia and other sectors to convert content for use on the Internet.

2.7 Tourism

E-commerce brings increased opportunities for all tourism providers to market directly to tourists around the world. It also provides the opportunity to develop communities of interest in Irish tourism products. Electronic information agents on the Internet will increasingly match customers to tourist products.

A number of actions are recommended including:

Joint Agency/Enterprise Actions

Train employees in website management and transaction processing. (CERT) Integrate existing information technology systems to the Internet, and to local and national tourism offices, websites and booking systems. (Bord Fáilte)

2.8 Banking and Finance

Irish financial services have not yet evolved to meet the needs of business-to-consumer e-commerce. However, the changeover to e-commerce in the economy will require that all SMEs have access to some form of secure payment process. In North America, for example, an Address Verification Service provides considerable security for web-based transactions. This is unavailable in Europe. Irish entrepreneurs need information about the e-commerce banking and credit card clearance options available in target markets.

To take advantage of the opportunities a number of actions are required including:

Government
>   *Ensure* that resources and systems are in place to provide for fast regulatory approval of new e-commerce related financial services. (Department of Finance)

Agency and Enterprise Actions
>   *Create* and maintain a website with information and links to sources of e-commerce banking and financial services, such as credit card processing. (Enterprise Ireland)
>   *Assemble and publish* a guide to e-commerce facilitating financial services available to small business. (Chambers of Commerce, Irish Internet Association, Banks)
>   *Strongly promote* the development of a full range of web-based banking, credit card validation, transaction processing, and fulfilment services that can be used by retailers and other businesses moving to e-commerce. (Irish Bankers Federation)

2.9 Logistics and Fulfilment

While the Internet will enable the electronic distribution of many products, most will still require physical delivery. As e-commerce develops, one immediate impact will be an increase in the volume of parcel deliveries. Goods ordered over the Internet will increasingly be delivered directly to the consumer rather than through traditional retail outlets.

These distribution requirements – which must be flexible and world-wide in scope – will encourage suppliers to outsource their logistics requirements. E-commerce, therefore, presents a real opportunity to grow the logistics and postal services in Ireland.

An Post is well placed to exploit this opportunity and provide competitive logistics solutions for Irish SMEs engaging in e-commerce. An Post has both a national door-to-door distribution network and direct access to the distribution networks of postal services across the world. The ability of a range of companies in Ireland to provide competitive logistics and fulfilment services will be important for Irish-owned and for existing and new overseas companies. The latter could include e-retailers that require overnight delivery of e-commerce purchases.

The Logistics Sector itself is highly dependent on specialised telecommunications and information and communication technology (ICT) requirements. As e-commerce expands rapidly, there will be an increasing demand for the upgrading of ICT capacity in the sector.

To take advantage of the opportunities a number of actions are recommended including:

Government Actions

> *Encourage* An Post to develop the capability to guarantee international delivery times, build alliances with international postal services for e-commerce delivery, and provide cash-on-delivery services. (Department of Public Enterprise and An Post)

Agency Actions

> *Determine* the information and communications technology requirements of e-commerce in the logistics sector and the required actions to put them in place. (Enterprise Ireland, Shannon Development & National Institute for Transport and Logistics)
>
> *Examine* the warehousing and distribution needs of SMEs delivering goods sold on the Internet and the need for consolidated warehouses in international markets. (Enterprise Ireland and Shannon Development)
>
> *Promote* the design and production of specialised packaging for e-commerce distribution. (Enterprise Ireland and Shannon Development)
>
> *Promote* global logistics providers to establish their European courier distribution centres in Ireland. (IDA Ireland)

2.10 Small Business

E-commerce is leading to new business opportunities for all SMEs, which account for over 99 percent of enterprises in Ireland. E-commerce provides the means for overcoming disadvantages of scale and geographical position. The global reach of the Internet means that any small business can access global markets. It provides a means for targeting customer groups internationally. It also provides a means for building and managing relationships with customers across the world. On the other hand, small businesses are likely to face increased global competition in home markets.

The efficient delivery of goods and services to the specifications ordered by customers, commonly referred to as the 'fulfilment' of small orders, is a critical capability for which SMEs engaging in e-commerce will need to formulate effective action plans. Customers ordering over the Internet expect fast and efficient delivery of the goods to their specification. SMEs, marketing their products on the Internet, need to ensure that they have the in-house capabilities to fulfil electronic orders promptly. They will also need to work closely with logistics partners that can provide services efficiently.

One of the key SME policy issues is how best to raise SME awareness of the opportunities and threats of e-commerce. Businesses need to ensure that key personnel have had appropriate training on Internet applications. They also need to ensure that company strategies are developed to exploit the technologies associated with e-commerce.

To take full advantage of the opportunities emerging for SMEs a number of actions are required including:

Agency Action
>*Promote* the use of e-commerce and provide training support for SMEs. Efforts to increase the awareness of opportunities and threats should be undertaken on a sector-specific basis. (Enterprise Ireland and Shannon Development)
>
>*Ensure* that e-commerce projects are given priority in the allocation of funds under the R&D incentive programmes of the development agencies. (Enterprise Ireland and Shannon Development)
>
>*Promote* the development capital and capability supports available from County Enterprise Boards for smaller e-commerce projects. (Department of Enterprise, Trade and Employment and County Enterprise Boards)
>
>*Develop* plans by mid 2000 to provide full electronic services to clients. (Enterprise Ireland, Shannon Development & IDA Ireland)

Enterprise Action
>*Build* upon local trade association networks to heighten awareness of the opportunities and threats which e-commerce will bring.
>
>*Lead* in delivering benefits to customers through affiliations of associate companies using web technologies.
>
>*Provide* training at local level through co-operative networks of similar or related companies.

2.11 Trade and International Marketing

E-commerce offers the potential to significantly increase international trade across all sectors of the economy. This potential exists in electronically delivered or electronically ordered products and services. It will bring with it a strong impetus towards harmonisation of international regulatory frameworks in areas such as accreditation, licensing, and restrictions on activity for newly tradable products. The Internet is a major new resource for all business firms engaging in market research and marketing. Marketing information is easily disseminated over the Internet. It is also easy to access the information of competitors.

Portals that provide a gateway through which customers can easily identify and interact with Irish suppliers will be important as businesses increasingly use the Internet to source competitive supplies on a global basis. A portal should be operated at a national level by Enterprise Ireland and should contain general company and product information. Customers who require more detailed product information or who wish to place an order could be switched directly to the Internet site of the supplying companies. Key words should be carefully chosen to ensure "search engines" locate such a site.

The development of a consistent quality standard across all state agency websites that are involved in promoting Ireland would greatly assist international Internet users. A central website containing market information, including information on consumer protection legislation in key export markets, would be valuable for Irish exporters.

A number of actions are required including:

Government Action
> *Agree* bilateral open market principles on e-commerce trade with key, non-EU leading countries in e-commerce, including Japan, Australia, Singapore, and Canada. Such agreements should be similar to that agreed between Ireland the US in September 1998. (Departments of the Taoiseach and Enterprise, Trade and Employment)

Agency Actions
> *Create* and maintain a website providing market information, including consumer protection information on key international markets. (Enterprise Ireland and Shannon Development)
> *Redesign* agency websites to act as portals for promoting the products and services of client companies. (Enterprise Ireland, Shannon Development & IDA)
> *Exploit* the potential of e-commerce as a way to increase the number of services firms exporting for the first time. (Enterprise Ireland/Shannon Development)
> *Develop* a favourable and consistent standard for agency websites that promote Ireland. (Foreign Earnings Committee & Enterprise Ireland and Shannon Development)
> *Design* portal sites in such a way that search engines rapidly locate sites promoting Ireland. (Enterprise Ireland and Shannon Development)

Enterprise Actions
> *Continue* to focus Internet market attention on specific geographic markets. Develop logistics and credit management capabilities for international e-commerce markets.
> L*everage* the Irish image on entering new markets and Internet communities. Create communities of interest on the Internet around groups of complementary Irish suppliers and their international customers, to establish a tight and responsive value chain, and win customer loyalty.

2.12 Government and Public Administration

Government departments and the development agencies must play a leadership role in encouraging e-commerce in the enterprise sector. The Government's Information Society Action Plan set out a coherent framework for the development of e-government. In moving forward, the public sector needs to heighten its focus on the needs of the enterprise sector, and act in such a way that the state e-commerce initiatives generate and foster initiatives in the private sector.

A wide number of actions are already being progressed and the following additional actions are now proposed:

Government Action
> *Develop* a co-ordinated awareness and training programme involving all trade organisations and the social partners. (Information Society Commission)
> *Provide* government and agency forms on the Internet by mid-2000 so they can either be printed for completion or completed electronically. (Department of the Taoiseach)
> *Introduce* electronic funds transfer and payment systems within government departments and state agencies for transactions with the enterprise sector by the end of 2001. (Departments of the Taoiseach and Enterprise, Trade

and Employment)
Develop standards for structuring public information websites in a consistent way.
Develop codes of practice for handling electronic communications between the public sector and the enterprise sector. (Department of Enterprise, Trade and Employment)
Develop links between all websites that provide government services to business firms. (Department of an Taoiseach & ISC)

3. Business Environment

This section summarises a number of the key issues that require action in order to create a business environment in which e-commerce and the digital economy can thrive.

3.1 Regulatory and Legislative Framework

The rapid development of e-commerce is giving rise to fundamentally new forms of business processes, for which the legal framework has yet to be determined. A number of key aspects of the legal framework are being discussed at EU level. Ireland should seize the opportunity to move ahead of other European countries and provide a clear, certain and secure environment for electronic business.

3.1.1 Certification and Trusted Third Parties

Trust is essential to all commercial undertakings, but particularly in e-commerce, where the parties to the transaction may never meet. The buyer wants assurance that the seller (a) exists, and (b) is worth doing business with. The seller likewise wants to know that the buyers are who they say they are, and that the payment is secure.

A system whereby organisations are accredited to certify the existence of individuals and companies in Ireland is required. Such organisations should interact with their counterparts around the world so that the same information, on potential suppliers and customers, can be made available to Irish companies and individuals trading internationally. It is proposed that accreditation should be on a voluntary basis. The provision of assurances that individuals and companies are worth doing business with should be left to the market. Financial and other organisations may decide to provide such information.

The Chambers of Commerce of Ireland and An Post, through PostGem, have introduced certification services.

A draft Consultation Paper has been prepared (Outline Legislative Proposals on Electronic Signatures and Certification Service Provision, Department of Public Enterprise, April 1999). A Bill to implement its proposals is expected in the third quarter of 1999.

A number of actions are required including:

Government Action
> *Bring* forward, as a matter of urgency, the Bill to provide a framework for voluntary certification. (Department of Public Enterprise, Department of Enterprise, Trade and Employment)

Agency Action
> *Develop* and administer a national voluntary scheme for accrediting organisations to certify that individuals and organisations in Ireland exist. The accreditation scheme should be put in place quickly and prior to the enactment of legislation. (National Accreditation Board)

3.1.2 Copyright

Copyright protection is fundamental to e-commerce and digital distribution of content. A Copyright Bill is being brought forward by the Department of Enterprise, Trade and Employment to be passed into legislation by the end of 1999. It accommodates all outstanding EU and World Trade Organisation (WTO) directives, and is intended to provide international protection for copyright material in Ireland. Ideally, the legislation should enable the promotion of Ireland as the most secure place from which to do digital business.

A number of actions are required including:

Government Action
> *Ensure* that the new copyright legislation:
>
> - Makes it an offence to post copyright material on public web sites without the copyright owner's consent, even if not downloadable.
> - Includes protection for technical designs posted on the Internet.
> - Enhances the enforcement powers and penalties for electronic breach of copyright. (Department of Enterprise, Trade and Employment)

3.1.3 Electronic Contracts

A Directive on certain legal aspects of electronic contracts is under discussion at EU level, but it could be 2001 before an agreed directive is implemented. Ireland should move in the interim to provide a framework of legal certainty.

A number of actions are required including:

Government Action
> *Enact* legislation to ensure the legitimacy and enforceability of e-commerce contracts. The legislation should also ensure certainty on the applicable jurisdiction. Pending agreement at EU level this legislation should be based on a contractual model which has been developed by the United Nations.
> *Ensure* contracts made and signed electronically have the same force in law as if they had been made and signed physically.
> *Establish* a resource on the Internet to provide information for businesses on electronic contracts. (Departments of Enterprise, Trade and Employment/Public Enterprise)

Enterprise Action
> *Specify* on websites and in e-commerce transactions the legal jurisdiction that will apply to contracts with clients and, where possible, the key legal provisions or a link to a resource setting out the relevant provisions.

3.1.4 Electronic Evidence and Dispute Resolution

There are a number of issues that should be resolved relating to the circumstances in which electronic evidence may be used in court and the weight assigned to it. Dispute resolution procedures in respect of electronic transactions should be established. There is an opportunity for Ireland to develop as an international centre for arbitration of disputes on electronic transactions.

Unlawful interference with the business resources of Irish e-commerce users (hacking) can be a serious problem for companies where confidential information is involved, and should be deterred by penalties.

A number of actions are required including:

Government Action
> *Update* the Criminal Evidence Act, 1992 to provide for electronic evidence in civil proceedings.
> *Promote* arbitration as a suitable dispute resolution mechanism of e-commerce transactions.
> *Encourage* national courts to develop e-commerce expertise.
> *Consider* the establishment of an online international arbitration mechanism, which companies can use to resolve disputes, regardless of their country of origin.
> *Consider* the establishment of an online Small Claims Court to deal with disputed e-commerce transactions.
> *Ensure* appropriate regulatory provisions and penalties are in place to deter 'hacking' of e-commerce resources. (Departments of Enterprise, Trade and Employment and Public Enterprise)

Agency and Enterprise Action
> *Encourage* the development of a pool of arbitrators to deal with disputes on e-commerce transactions. (Law Society, Bar Council, Enterprise Ireland and IDA Ireland

3.1.5 Liability in Respect of the Sale of Goods and Services

The number, characteristics and liabilities of intermediaries involved in e-commerce transactions, particularly those active in digitally-delivered services, are different from those in traditional commerce. In the context of the Internet, intermediaries include on-line retailers, network operators supplying the telecommunications links, internet service providers or "web hosts" that offer space on their systems for others to use for promotion, sales or other purposes.

The legislation relating to the sale of goods and services should be updated to recognise goods and services offered, sold, or distributed electronically. The new legislation should apportion liability for loss or damage between the provider of the goods or services, distributors and those intermediaries that act as 'mere conduits'. Intermediaries that simply facilitate or provide access between one party and another should not incur liability for the sale of a product or service. Uncertainty on

this issue can deter the establishment of intermediaries in Ireland and they are an important element in developing an e-commerce economy.

A number of actions are required including:

Government Action
> *Update* the body of legislation relating to the sale of goods and services to recognise goods and services offered, sold, or distributed electronically. The legislation should apportion liability for loss or damage between the provider of the goods or services, and any intermediaries or distributors. (Department of Enterprise, Trade and Employment)

Enterprise Action
> *Agree* in advance with intermediaries the terms of business for delivery (electronic and physical quality, expected reliability standards, and liability in event of loss or damage.
> *Review* existing enterprise insurance cover where new modes of delivery, such as courier parcel delivery, are being used to fulfil e-commerce purchases.

3.2 Skills

The emergence of skills shortages is a major issue which could constrain the development of the Irish economy. It is receiving a high priority in other work carried out by Forfás and is not, therefore, dealt with in great detail in this report.

The recommendations of the Expert Group on Future Skill Needs, referred to earlier, in respect of new information technology places in third level education, are being implemented. These skills are critically important for e-commerce but highly specialised IT skills are also needed in some sectors. E-commerce skills are required in key areas of management, marketing and strategic planning. A variety of content management, multimedia and design expertise are required. All disciplines should have modules that provide IT and e-commerce skills to enable graduates to work in an e-commerce environment.

A number of actions are required including:

Government/Agency Action
> *Examine* the multi-disciplinary and e-commerce skills needs of major sectors. (Expert Group on Future Skills)
> *Encourage* the introduction of IT modules in all third level courses. (NCEA, NUI and CHUI)
> *Promote* the establishment of a National College of Multimedia. (Departments of the Taoiseach and Education and Science)

Enterprise Action
> *Examine* the operational and marketing skill sets required to compete in an e-commerce environment and prepare in-company skills development programmes.

3.3 Research and Technological Innovation

The leadership of the US in e-commerce has been fuelled by the innovative and commercial sharing and use of technological research between the research

community and industry. It has also been based on the continuous flow of new developments and applications in telecommunications and information technology arising from research programmes.

A greater awareness by industry in Ireland of the potential impact of telecommunications and IT research is required. This should include an understanding of the benefits of deeper collaboration between third-level colleges and industry. The Irish Council for Science, Technology and Innovation (ICSTI), working with Forfás, has proposed the development of the research base in information and communications technologies to world class standards as part of a "Technology Foresight" exercise.

A number of actions are required including:

Government Action
> *Implement* the recommendations of Technology Foresight in order to make Ireland a centre of world-class research in information and communications technologies.
> *Ensure* that the National Development Plan includes an Information Society sub-programme (within the RTI provisions) with a focus on e-commerce applications and content. (Department of Enterprise, Trade and Employment)

Agency Actions
> *Ensure* that the criteria used to evaluate e-commerce projects for funding are appropriate to the nature and risk inherent in them. (Enterprise Ireland and Shannon Development)
> *Re-emphasise*, among client companies, the e-commerce related research opportunities in the EU Fifth Framework Programme that offers part funding on a competitive basis to successful consortia. (Enterprise Ireland/Shannon Development)

Enterprise Actions
> *Use the results of research and development studies to help develop new, innovative e-commerce related products and services. Use web technologies to improve relationships among research groups and industry.*

3.4 Value Added Tax

Under current rules, the supply of digital services, such as software and music, to business and private customers within the EU is subject to VAT. However, services from non-EU suppliers to EU private customers are not directly subject to VAT in the EU, due to collection and monitoring issues. As the main e-commerce trade is east to west, this VAT 'loss' is a legitimate concern for the EU. As trade shifts from business to end-user, the transaction is more difficult to track, and hence the VAT harder to account for.

At present, companies must register in each member state if supplying goods or services in that State. The EU is however, considering amendments, and aims to have a single place of VAT registration for all electronic traders. Under these proposals the VAT rate applicable in the country of registration would be applied to all business -to-consumer transactions. As Ireland's VAT rate of 21% is higher than some other EU countries, companies will have an incentive to register in and digitally distribute products from the countries with the lower VAT rates, such as Germany with a 16% VAT rate or the UK with a 17.5% VAT rate. Companies will

also consider differences in other costs, such as corporation tax, in their location decisions.

It would be more in keeping with the basic principles of VAT to have the VAT on digitally supplied services to consumers levied at the rate applicable in the country of residence of the consumer and remitted back to that member state. Ireland should push for the adoption of this solution by the EU.

A number of actions are required including:

Government Action
> *Seek* EU approval for services to be taxed at the VAT rate in the country in which they are consumed. (Departments of Enterprise, Trade and Employment, Finance and Revenue Commissioners).

Agency Actions
> *Examine* the issues and options relating to the development of a VAT regime in Ireland that will best facilitate the growth of e-commerce, including the option of reducing the standard rate. (Forfás)

3.5 Performance Indicators

Accurate and timely statistics will be vital for effective policy development in the digital age. The speed of change is such that web technologies themselves must be used for information interchange and dissemination.

Benchmarks must be developed to monitor e-commerce developments at enterprise sub-sector level. The objective of this work is to determine best practices and potential and to set targets for the adoption of e-commerce.

Benchmarking should monitor the comparative take up of e-commerce in the enterprise sector in Ireland with leading countries. This work should build on the benchmarking already underway in the development agencies, in the National Competitiveness Council's Annual Competitiveness Reports, the Information Society Commission and in the Forfás Telecommunications Benchmarking Index.

A number of actions are required including:

Government Actions
> *Assess* Ireland's e-commerce statistical requirements and undertake a review of relevant indicators. (Department of Enterprise, Trade and Employment, the CSO, Revenue Commissioners, Forfás and Enterprise Ireland)

Agency Actions
> *Include* e-commerce indicators in agency surveys where appropriate. (Forfás, Enterprise Ireland, Shannon Development, IDA Ireland)
> *Develop* the Forfás annual Irish Economy Expenditures Survey to track e-commerce trade in the manufacturing and internationally traded services sectors. (Forfás)
> *Co-ordinate* and develop sectoral benchmarking to incorporate appropriate measures on e-commerce. (Forfás, Enterprise Ireland, Shannon Development)

4. Implementation

The policy and other actions set out in this report for government departments, development agencies and enterprises need to be adopted quickly. Steps should be taken to ensure their implementation if the potential of the digital economy is to be realised. Ireland is heavily dependent for income and employment on sectors that will be changed dramatically by e-commerce. The potential of e-commerce for these sectors is significant; so too are the consequences of inaction.

The Government's role is to take the steps required to create the best regulatory and business environment in the EU in order to maximise the development of e-commerce. The development agencies, enterprise associations and enterprises themselves need to build on recent initiatives to foster the rapid take-up of e-commerce. Ireland should aim to develop a leadership position in business-to-business e-commerce, business-to-consumer e-commerce, and e-commerce enabling technologies and services.

This report on e-commerce should be the first step in a process of partnership in developing Ireland's digital economy involving the Department of Enterprise, Trade and Employment, other government departments, the development agencies and the enterprise sector.

The following action is recommended:

Government Action
Establish a group to oversee implementation of the actions set out in this report and to prepare a progress report at the end of the year for the Tánaiste and Minister for Enterprise, Trade and Employment. (Department of Enterprise, Trade and Employment)

1 The Developing Digital Economy

E-commerce will be a major driver of enterprise development into the future, and a major determinant of its success. In its broadest sense, the term e-commerce encompasses all aspects of business that takes place over networks such as the Internet. It includes goods and services that can be delivered over these networks, such as software, music, and investment advice. It includes goods and services that can be ordered over the network, but can be delivered in some other way, such as computers, flowers, and books. It covers the whole range of business activities from marketing to production to delivery and service. And it covers the hardware, software, content-generation, telecommunications, and support services that makes all this possible.

E-commerce offers the opportunity to overcome many of the trade, enterprise and employment challenges with which Ireland has been faced in the past, such as peripherality, small scale, regional differences in enterprise distribution, and on-going transition from agrarian economy.

It also provides the opportunity to build upon many of our strengths, such as craft and cottage industries, tourism, extensive diaspora, music, media, software, customer care, and European operations management.

E-commerce is pervasive throughout the global economy. It presents opportunities and challenges for all sectors of the Irish economy. Enterprise strategies and structures are being transformed. There are implications for all aspects of enterprise activities from operations to marketing. Businesses that are responding quickly to e-commerce are gaining first-mover advantage. A range of sector-specific implications and strategic options are set out in section 2 of this report.

The legal, regulatory and business environments required to support enterprise development and growth in the digital economy are also significantly different from those needed for traditional enterprise. This presents challenges to governments and regulatory authorities, who must adapt national and international policies in a pro-enterprise way. A number of countries are well-advanced in implementing the required changes. Section 3 of this report examines the actions needed to develop Ireland as a leading environment for e-commerce.

In conjunction with EMU, e-commerce represents a tremendous opportunity for Ireland. E-commerce and the euro promote market transparency and require harmonisation of the national rules governing trade, payment systems and consumer protection. These forces of change together present significant new opportunities for enterprise in Ireland and new opportunities to develop new competitive advantages; the challenge is to seize the opportunity for first-mover advantage.

This section examines the development of e-commerce in Ireland and internationally.

1.1 Preparing for E-commerce in Ireland

The Irish Government has moved quickly in a number of key areas to facilitate the development of e-commerce by Irish-based businesses.

Telecommunications and E-commerce
This report does not deal with the telecommunications infrastructure, but concentrates on how to make best use of that infrastructure. This report complements previous Forfás work on the telecommunications infrastructure, which is one of the two most critical factors in developing our capability to exploit e-commerce, the other is skills.

Other Forfás reports have shown that the availability of broadband telecommunications in all parts of the country, with high capacity international links, is a prerequisite for the development of the digital economy. The Forfás report published in March 1998, Broadband Telecommunications Investment in Ireland concluded that investment in broadband infrastructure and services can best be achieved by encouraging competition through a pro-competitive regulatory framework. It also noted that the establishment of a pro-competitive regulatory framework requires that the objectives of the Director of Telecommunications Regulation should be stated explicitly in the telecommunications legislation and should serve as a set of guiding principles for the work of the Director. The report also recommended that:

- Cablelink should be sold to a party that would invest significantly in the network
- The derogation on competition which applied until the year 2000 on voice telephony be ceded
- A telecom marketing expert should be appointed to encourage investment in broadband telecom in Ireland by telecom operators
- A number portability facility to be established by the date of full liberalisation.

Forfás was also a member of the Advisory Committee on Telecommunications established by the Minister for Public Enterprise in 1998. The recommendations of the Committee published in November 1998 included:

- The immediate implementation of the Government decision to have an initial public offering (IPO) of shares in Telecom Eireann and divestiture of Cablelink
- The unbundling of the local loop at tariffs based on long run incremental costs
- Conferring a clear legislative mandate on the Director of Telecommunications Regulation to promote competition in the telecommunications sector with a strengthening of the sanctions available for breaches of the regulatory framework in telecommunications
- Clarification of the co-ordination arrangements between the Director of Telecommunications Regulation and the Competition Authority
- Providing for low-cost Internet access, including the consideration of flat-rate pricing levels
- Providing universal access across regions to broadband and advanced telecommunications services
- Government acting as a catalyst in conjunction with Irish and global telecommunications operators and Internet service companies to provide a new high capacity internet-capable connectivity into Ireland

- the development of Ireland as a leader in electronic commerce as a major objective of national economic policy.

Under the auspices of the National Competitiveness Council, Forfás, in the Council's Statement on Telecommunications: A Key Factor in Electronic Commerce and Competitiveness, set out a number of recommendations were set out as essential for Ireland to take a lead in electronic commerce:

- Establishment of a co-ordinated set of programmes to accelerate investment in broadband and promote the use of broadband services
- Adoption of information and communications technologies by enterprises
- Establishment of a process to monitor Ireland's performance against competing countries
- Development and implementation of a national policy framework for advanced telecommunications deployment
- Establishment of a position amongst the leaders in the world for digital businesses.
- Rapid development of digital TV as a platform for electronic commerce

Digital TV will be a key communications platform and infrastructure from a competitiveness perspective and potentially a significant platform for the mass roll-out of the Internet and e-commerce.

Forfás and the Department of Enterprise, Trade and Employment continue to work with other government departments and the development agencies to ensure that the required national and international telecommunications infrastructures are put in place. This is a major priority for Government and significant progress has been achieved including:

- The liberalisation of the Irish telecommunications market from 1 December 1998 has spurred a dramatic increase in investment by telecommunications companies
- A major investment to significantly increase international connectivity by the end of 2000 has been announced
- The sale of Cablelink has been completed subject to an upgrade of the network to provide broadband services
- EU Structural Funds have been allocated to support the deployment of broadband networks to the regions.

It is critical that the progress to date is maintained. The Government needs to continue to facilitate the roll-out of broadband infrastructures in the regions. Selective incentives should be provided where there is a clear market failure. Legislation to strengthen the regulatory framework to promote investment by a range of private sector telecommunications operators requires to be accelerated.

Skills

Significant measures have been taken in the areas of education and skills. The Government announced in May its decision to commit h95m to create an additional 5,400 IT degree and other places, and significant funds have been committed to ensuring the deployment and effective use of ICTs in education delivery at all levels in the education system.

Other Key Actions

Implementation of the Government's Information Society Action Plan, published in January 1999, is progressing. The comprehensive plan includes measures to develop further Ireland's telecommunications infrastructure and regulatory framework in the wake of liberalisation of the telecommunications market. It sets out measures to develop electronic delivery of public services, including a number of fast-track pilot projects.

The development agencies are targeting growth opportunities in the e-commerce and ICT sectors. IDA Ireland is aggressively targeting and attracting e-commerce businesses that will build up to significant scale in the short- to medium-term.

Enterprise Ireland and Shannon Development are formulating their strategies and putting structures in place to support the development of e-commerce among indigenous internationally-trading companies.

The development agencies have also been involved in a number of awareness seminars and intiatives. In April 1999, Forfás and IBEC jointly published and distributed 15,000 copies of Telecommunications for Business – A User's Guide. This guide explains developments in advanced telecommunications in Ireland and e-commerce from an enterprise perspective.

The Information Society Commission is actively engaged in a number of initiatives aimed at raising public awareness. The Commission also launched an enterprise awareness-raising campaign with IBEC in early 1999.

The Government has also committed resources to Technology Foresight in Ireland, which identified ICT as one of the key technologies of the future.

These related measures together provide the building blocks for the development of e-commerce; the enterprise sector needs to harness the full potential of Ireland's highly-skilled workforce and make effective use of the infrastructures being put in place if it is to improve competitiveness in a fast changing business environment. The potential for e-commerce to substitute for traditional forms of commerce and to drive further growth in the Irish enterprise sector is enormous. The key issue is not just the absolute amount of e-commerce in the economy but the proportion of firms engaging in e-commerce, which is at present small.

Many of the information and communications technology (ICT) companies that are driving and enabling the growth of e-commerce are located in Ireland. The ICT sector has contributed over a third of Ireland's recent economic growth. It has also accounted for the major part of growth in manufacturing and internationally-traded services employment in Ireland over the past 10 years.

The major part of exports of Irish-owned companies are from sectors such as food, engineering and electronics, and chemicals and increasingly internationally traded services and software – sectors that will be significantly affected at an operational and strategic level by e-commerce over the next 2 to 3 years. Similarly, the exports of foreign-owned companies in Ireland are mainly from the hi-tech sectors of electronics, chemicals, pharmaceuticals, and internationally trading/financial services – within two to three years most of these companies will be taking orders online and many will be distributing their products digitally. This underlines both the

potential of e-commerce and the shift required in the enterprise sector to adopt and exploit these technologies.

Most of the growth in e-commerce is initially in the business-to-business sector and most of this is substituting for existing forms of communications, networking and commerce. E-commerce is also giving rise to significant opportunities for additional productivity and sales growth. Enterprises in the sectors that account for the majority of international trade from Ireland, in the high-technology sectors, in food supply to the retail sector, in internationally-traded services, and in tourism marketing are among the first to respond.

Irish companies are already using the Internet across a range of sectors, from speciality food manufacturing and retailing to marketing Irish tourism products. A number of leading companies are also emerging in e-commerce security and related activities.

1.2 Developing E-commerce

The rapid development of the Internet, combined with the proliferation of multimedia, opens up radically new prospects for e-commerce. The universal nature of the Internet, and the fact that it costs so little and is easy to use, favour exponential growth in the number of suppliers and consumers in the new electronic markets.

The growth rate of business on the Internet is difficult to forecast, as it depends both on the progress of technology (especially as regards service quality, usability and security) and on attitudes and profitability. There are currently over 170 million people across the globe with access to the Internet today[5], but this figure could be in excess of 3 million within 2 to 3 years. The development of e-commerce is irreversible, involving the emergence of new economic models and new rules of competition which companies must take into account without delay. The global spread of the Internet is conducive to greater consumer power in markets that have become larger and more transparent. It also allows lower distribution costs, the transformation of traditional intermediary relationships, the use of new forms of competitive differentiation, and a faster pace of change.

Although price will continue to be an essential competitive differentiator, a company's survival and development will increasingly depend on other factors, such as customer loyalty, product innovation, service, and organisation. In this context, efficiency and the intelligent use of information technology have become vital elements of company strategy. This may benefit small and medium-sized companies that take the opportunity of reaching new markets and exploiting the advantages of their size, in terms of flexibility and creativity. It also opens up opportunities for companies operating in new spheres of activity, such as hardware, software, services, and content.

The most urgent task, however, is to seize the exceptional opportunity offered by the Internet to start new companies. By its very nature, the Internet acts as a spur to the imagination and promotes entrepreneurial initiative. Companies will be the main architects in the development of e-commerce.

---

[5] NUA, May 1999 (www.nua.ie/surveys)

Recent Developments

E-commerce developments over the past five years fall into three broad domains: business-to-business, business-to-consumer, and intra-business. The most significant impact to date has been in business-to-business e-commerce, where the benefits include better communications and co-ordination, and control of inter-firm business processes. In turn, these have resulted in improved customer service, faster response and cycle times, and reduced costs ("better, faster, cheaper").

E-commerce and associated Information Technology (IT) industries are radically changing and growing at breathtaking speed, fundamentally altering production, consumption and communications. The figures are staggering. E-commerce (business-to-business and business-to-consumer) is estimated in a recent study to have reached $102 billion world-wide in 1998[6]. Forrester Research estimates that business-to-business e-commerce will rise to at least $1.3 trillion by 2003[7]. Online retail sales are forecast to reach $80 billion by 2002 compared with an estimated $15 million in 1998. While up to 80 per cent of this may be substitution for traditional forms of commerce, it is estimated that the use of Internet technologies is spurring additional commercial growth of up to 20 per cent per annum.

In 1998, non-US users accounted for 56 per cent of Internet traffic, but accounted for only 26 per cent of the total e-commerce revenues. By 2003, it is estimated that 65 per cent of Internet users will be non-US-based, generating over half of all e-commerce transaction revenue by that time. Nua[8] estimates that currently over 170 million people worldwide have Internet access, of which about 102 million are North American and 43 million are European.

It is estimated that between 14 per cent and 16 per cent of Irish adults approximating about 10 per cent of the population currently use the internet, and this figure is rising rapidly. A recent survey by the Irish Internet Association of 2,500 self-selected respondents on their Internet usage showed a 20 per cent increase in the proportion of Internet users who have made online purchases in the past year. Categories of goods and services transacted included software, books, travel services, music, and financial services.

Although e-commerce is a relatively new phenomenon, exemplars are clearly identifiable within each of the three realms of e-commerce – business-to-business, business-to-consumer and intra-business.

Business-to-Business

Cisco has used e-commerce for a number of years, and currently sells over US$25m of products and services over the Internet per day (about 78 per cent of total sales). 75 per cent of all orders are placed electronically, of which 80 per cent are credit checked, scheduled for manufacturing, and released to the factory floor without any human intervention. About 70 per cent of customer support queries are "self-served" over the Web. Cisco now uses the Internet in almost every business function, and estimates that it saves over US$500m per year through e-commerce.

Dell Computers has refined its original direct telesales approach to take advantage of e-commerce technologies and has implemented a highly efficient, flexible, customer-oriented, manufacture to order business model. Internet sales now account for over US$18m per day (30 per cent of revenues in 1999 and expected to

---

[6] The Internet Economy indicators', Barua, A., Shutter, J., and Whinston, June 1999 (http://www.internetindicators.com)

[7] Forrester Research press release, December 17, 1998 (http://www.forrester.com).

[8] http://www.nua.ie

reach 50 per cent by 2000[9]), of which 70 per cent is to business customers. The cost per customer contact has reduced from US$2 to $0.50. In March of this year, Dell launched Gigabuys.com, through which it hopes to leverage its expertise in e-commerce to move into consumer electronics and services.

Intel, a relative newcomer to Internet-based e-commerce, currently averages US$1bn per month in Internet sales, and aims to conduct all its business online within two years.

While technology companies tend to be the leading e-commerce practitioners, many business-to-business exemplars are also to be found in other sectors. In 1994, Federal Express was one of the first companies to offer an interactive business service over the Internet, by allowing its customers to track package deliveries. Competitive responses by UPS, iShip and other competitors over the past four years, have forced FedEx to continue to invest in innovative e-commerce offerings. Other leading players in business-to-business e-commerce include Boeing, General Electric, Marshall Industries, 3Com, Ingram Micro in the US, and RS Components in the UK.

Business-to-Consumer
On the business-to-consumer side, the leading players span the entire range of consumer products and services. They include Amazon.com, Ameritrade, AutoByTel, Buy.com, CDNow, Charles Schwab, eBay, E*Trade, eToys, Expedia, HomeGrocer.com, Intuit, Priceline.com, Travelocity, and Wells Fargo. Revenues at Amazon.com which started as a book retailer have grown from US$15.7m in 1996 to US$836m in 1998. In Europe, First Direct virtual bank had acquired 750,000 customers by 1998, offering them customised services for lower fees than traditional banks.

The Yankee Group identified travel, PC hardware and software, gifts and flowers, entertainment, books, groceries, and clothing as the major categories of online consumer spending during 1998. Internet-based travel transactions in Europe are expected to generate US$1.7bn in sales by 2002, up from US$7.7m in 1997 (online travel in the US was worth $816m in 1997). Internet music sales in 1998 were worth US$143m, of which US$126m was in the US and US$13m was in Europe. (This, however, was only 1% of total music sales).

In the US, 6.6 million households used online banking in 1998; it is expected that this figure will grow to 32 million by 2003. About 16% of all stock trades are now transacted online. The Western European consumer e-commerce market is estimated to be worth US$775m by the end of 1999, increasing to US$8.6bn by 2003, with Germany, Britain, and France identified as the primary e-commerce markets in Europe.

Intra-Business
Intra-business e-commerce applications are facilitating simpler, cheaper, and more comprehensive information sharing and communication within organisations, and more efficient, consistent, and better co-ordinated internal processes. Together, these opportunities are enabling the emergence of "virtual organisations" in which remote employees can maintain tight links with their organisations, and where large organisations with multiple locations and distribution channels can maintain consistent processes. A typical example of the latter is the use of an intranet that enables both "virtual centralised control" of procurement and distributed responsibility (empowerment) for order placement. Such systems have contributed

---

[9] Dell Computer Corporation press release, May 1999, (www.dell.com)

greatly to organisational efficiency, reducing both the costs of materials and administrative overheads.

Among e-commerce technology and services providers, a number of key players are also evident. Lucent Technologies and Cisco are the leading providers of network technologies. MCI Worldcom, British Telecom and other major national telecommunications companies are key network providers. America Online is recognised as being the most successful Internet Service Provider (ISP). Dell, Sun, Compaq, and IBM are particularly strong in the web server market. For IBM, e-commerce services now account for 17 per cent of profits.

Microsoft holds a very strong position in client and server operating system software, and end-user e-commerce applications including browser, email, and desktop videoconferencing software. Open Market and Broadvision are leading providers of e-commerce middleware. Oracle is successfully positioning its products as the database and applications services engines of the Internet. EMC enjoys success in large-scale data storage devices. IBM, EDS, Perot, many telecommunications companies, all the IT consulting companies, and others are moving into a fast developing e-commerce services market, estimated to be worth US$6.1 billion in 2001.

The final category are those known as Internet businesses. Leading international players in this sector include, Inktomi, Lycos, Yahoo, Xoom.

1.3 E-Commerce Policy Responses in Other Countries

A detailed review of other country approaches to the development of the digital economy are set out below.

United States of America

The US currently accounts for about 80 per cent of global e-commerce. Recent figures suggest that 37 per cent of the US population have Internet access at home or at work[10]. 61 per cent of US businesses have Internet access. The proportion of US companies that sell their products over the Internet is forecast to jump from 24 per cent in 1998 to 56 per cent by 2000[11].

A number of measures have been taken to develop electronic government in the US. The *Government Paperwork Elimination Act,* 1998, encourages the prompt implementation of electronic filing and authentication, and removes barriers to electronic interaction with the federal government. In 1998, $1 trillion in business taxes – 80 per cent of all taxes – were deposited using the Electronic Federal Tax Payment System. 20 per cent of individual tax returns for 1998 were submitted electronically. The Internal Revenue Service website is now used by a growing number of taxpayers to download from over 5,000 forms, instructions, and publications. The GSA Advantage Online purchasing service for the Federal Government expects to cover 4 million items within the next 12 months.

The US has signed international e-commerce trade agreements with the EU (December 1997), Japan (May 1998), France (June 1998), and Ireland (September 1998). The US also participates in the Asia-Pacific Economic Co-operation Electronic Commerce Steering Group (APEC). The objectives of APEC are to build trust and confidence, enhance government use, promote technical co-operation and

---

[10] International Data Corporation

[11] FEI/Duke University Corporate Outlook Survey, March 1999 (www.duke.edu)

experience exchange, eliminate barriers to adoption, and develop seamless legal, technical, operating, and trading environments to facilitate growth and development of e-commerce in the Asia-Pacific.

A number of legislative provisions supporting e-commerce have been introduced. The Digital Millennium Copyright Act, 1998, implements the World Intellectual Property Organization (WIPO) guidelines on protection of copyrighted online material, and limits the liability of telecommunications companies and ISPs.

The Next Generation Internet Research Act, 1998, provides research funding to develop the capabilities and capacity of the Internet.

With regard to the financial environment, the *Selected Tax Implications of Global Electronic Commerce Paper, 1996* proposed the principle of equivalence between taxation of traditional and e-commerce.

The *Internet Tax Freedom Act, 1998*, places a three-year moratorium on new and discriminatory taxes on e-commerce transactions and Internet access. The Act established the Advisory Commission on Electronic Commerce, to develop a uniform system for applying existing taxation to remote sales.

The US has also established a Communications and Electronic Commerce Tax Project. This is a forum of government, business, taxpayer groups, and academics, which is considering State and local taxation in the context of new technologies. The Financial Management Service at the Department of the Treasury is conducting a number of pilot programmes to test electronic payments and collection options at military installations and hospitals, including smart cards, electronic cheques, Internet credit card transactions using various security technologies, and Internet sales of savings bonds.

The US Department of Commerce now publishes an annual review of developments in e-commerce. Its second report, The Emerging Digital Economy II, was published in June 1999 (www.ecommerce.gov). An inter-agency Digital Economy Working Group has been set up to co-ordinate economic analysis of the new digital economy. The Department of Commerce and the Small Business Administration are to develop e-commerce strategy initiatives for small business, including:

- Retraining of government employees on the use of e-commerce
- Increasing the incidence of electronic Government
- Developing an outreach plan to inform small business on how to profitably use e-commerce
- Highlighting successful small business use of e-commerce

Singapore
Singapore has a comparatively strong IT-literate and Internet-aware population. 41 per cent of homes in Singapore have PCs and 15 per cent of the population are Internet users. Businesses are highly-computerised, arising from a 17-year history of computerisation within the public and private sectors.

Singapore has introduced a number of e-commerce policy initiatives. *The E-commerce Hotbed Programme* was introduced in 1996 to develop the e-commerce legal and technical infrastructure, and e-commerce services.

In 1998, the Electronic Commerce Co-ordinating Committee[12] and the Trade Development Board published the Electronic Commerce Master Plan. This aims to bring e-commerce to mainstream businesses and the public and to develop Singapore as an international e-commerce hub (building upon its established strengths in international trade, international financial services, telecommunications and IT systems).It also aims to create an e-commerce services sector, and to harmonise cross-border e-commerce laws and policies.

Singapore is also working with its major trading partners to align and harmonise e-commerce laws and frameworks. Discussions have been initiated with Canada, Australia, and Germany.

Basic legal and technical infrastructures to support secure and reliable e-commerce have been in place since 1998. The Singapore ONE initiative provides high-speed, interactive, multimedia broadband services to every home and business. Singapore Telecom's Internet eXchange (STIX) is the Asian Internet Hub. This exchange has 34 Mbps links connecting 15 countries in Asia Pacific with the US and European Internet backbone. It also connects with a number of Electronic Data Interchange (EDI)-based systems, such as TradeNet.

Singapore's objective is to be positioned by 2000 as a centre of e-commerce activities. It aims to do this by building on the existing network infrastructure to provide a critical base of e-commerce services including technical standards, network services, directory services, security services, payment services, legal and regulatory frameworks, incentive schemes, end-to-end trading platforms, trust management, rights management, and logistics services.

The *Electronic Transactions Act, 1998* provides the legal foundation for e-commerce. In particular, it provides that:

- Electronic records can be used as evidence in court
- Electronic contracts and digital signatures are recognised
- Intellectual property rights are consistent with international practice

Singapore's National Computer Board's *Initiative for Electronic Identification (IEI)* provides secure communication, identification, and verification using digital certificates and digital signatures. An efficient international multi-currency settlement system for Internet transactions will be in place by 2000. A variety of secure services for Internet payments has been developed.

Singapore's SMEs, (i.e., those with at least 30 per cent local shareholding) are eligible for the *Local Enterprise Electronic Commerce Programme*. This programme is designed to jump-start the mass adoption of e-commerce by providing up to 50 per cent of the acquisition cost of hardware, software, consulting services, bureau services, and Internet connectivity for e-commerce applications, subject to a maximum of S$20,000 (11,000) per company.

Other incentives are designed to encourage investment in retraining business and technical staff for e-commerce. *The Critical IT Resource Programme (CITREP)*, administered by the National Computer Board, provides training incentives to accelerate the development of emerging, critical, and specialised IT skills. The National Science and Technology Board provides support to companies engaged in e-commerce R&D.

---

[12] Comprising the Attorney General's Chambers, Ministeries of Finance, Law, Trade and Industry, and the New Computer Board

Education and other support programmes have been implemented to help businesses (particularly SMEs) exploit e-commerce for productivity and competitiveness and to create an e-commerce-aware culture. These include:

- Research programmes have been established in e-commerce knowledge creation
- Department of Statistics measures the growth of e-commerce services sector, the volume of e-commerce activity and its contribution to GDP
- E-commerce policy research and market research is encouraged
- National Computer Board maintains a register of e-commerce consultants and solutions providers and provides a referral service for SMEs

Singapore aims to have a critical base of e-commerce services and infrastructure in place by 2000. Key public services will be delivered using the Internet by 2001. The *Electronic Commerce Master Plan* aims to have 50 per cent of businesses using some form of e-commerce, and to position Singapore as an international e-commerce hub transacting S$4 billion (2.3 billion).

Finland

The enterprise sector in Finland is rapidly adopting e-commerce. In October 1998, 60 per cent of Finnish companies had an Internet connection, 28 per cent maintained a website, and 9 per cent offered online ordering.

The Finnish Government follows a strong partnership approach between public administration and industry in its approach to developing the Information Society. The inclusion of the regions and the avoidance of undue concentration on urban centres are particularly important. The rapid deployment and broadest application of sustainable technologies are encouraged, with a clear analysis of the likely physical and societal impacts.

Finland aspires be the first in the world to introduce a new-generation broadband telecommunications network. It also aspires to the development and commercialisation of user-friendly, reliable and safe electronic services and content.

The Finnish Information Society Initiative aims to:

- Improve conditions for entrepreneurship and the quality of working life
- Promote competitiveness
- Improve security
- Ensure data protection and consumer rights are protected
- Develop services and cultural provision
- Increase international interaction
- Boost Finland's attractiveness as a location for innovative enterprises
- Alleviate inequality between regions
- Support the objectives of sustainable development

A number of spearhead projects provide exemplars of the appropriate use of emerging technologies and the fulfilment of national objectives for the information society. These include:

- Electronic transactions and service processes
- Personal navigation
- Electronic learning environments
- Business networking and teleworking
- The local information society

Businesses are encouraged to collaborate both with each other and with research institutions and customers in ICT areas. The exploration of new work methods to support balanced development is also strongly encouraged. The establishment of national and international business networks catering for the needs of SMEs is encouraged.

The Finnish Government believes that the public sector must create the conditions for building the Information Society. Whether in the form of legislation or in the provision of strategic leadership, the public sector in Finland is to promote the development of knowledge, the protection of the individual and balanced regional development. In addition there are commitments to fund research and development, to create an environment conducive to the development of the Information Society, and that the public sector will lead by example in the use of ICTs.

Conclusion

E-commerce provides a major opportunity for the development of profitable business in Ireland providing stable, and for well paid employment in both existing firms and in new start up business. For firms that embrace the new technologies and new ways of doing business involved these opportunities are immense. For firms that do not, the results could prove fatal.

The recommendations in this report, aimed at Government Departments, State agencies, business associations and firms, seek to further advance the contribution which e-commerce can make to social and economic development in Ireland.

2 Sectoral Implications

As outlined in Section 1, e-commerce will have a pervasive influence on all sectors of the economy. It will also accelerate the emergence of new sectors and new forms of economic activity.

This section examines some of the potential implications for key and potential growth sectors of the Irish economy. The sectors were selected following consultations with international experts and industry. It is not intended as an exhaustive examination; rather, by illustrating the opportunities and challenges of e-commerce for these sectors, it serves as a basis for extrapolation to other sectors.

The first part of this section concentrates on key sectors, including electronics hardware, software, the food sector; and tourism. These sectors are important economically to Ireland. They include both high-tech and low-tech areas and both Irish- owned and foreign-owned companies. Furthermore, given the importance of small and medium-sized enterprises (SMFi) in Ireland, the implications of e-commerce for such companies are examined.

The section also examines the implications of e-commerce for traditional areas that are emerging as e-commerce growth sectors, and sectors that are critical to the development of e-commerce. These are examined under the broad headings of digital content industries including education and training, music and entertainment and new digital support services.

The upstream and downstream implications of e-commerce in each sector are assessed under the broad headings of marketing and operational implications, both for Irish enterprises and for overseas enterprises located or considering locating in Ireland.

2.1 Software

The Irish software sector has come a long way in a short period of time. From a handful of companies a decade ago, there are now over 760 software firms in Ireland, employing over 22,000 between them in 1998. It has been the most significant contributor to export growth, with software exports estimated at IR£4,600m in 1998, and rising strongly.

While direct employment in the sector is vital, software is also a key enabler of progress in other sectors. Software and ICT contribute to efficiency improvements in manufacturing industry and enable the growth of services. They are also the means by which whole new business models are made possible. According to the US Department of Commerce, one third of all US economic growth in recent years has been attributed to information and communications technologies that are critically dependent on advances in software. This is underlined by the findings of the first Irish Technology Foresight report, prepared by the Irish Council for Science, Technology and Innovation (ICSTI), working with Forfás. In this exercise expert panels were established for eight sectors and they all allocated a high priority to Information and Communications Technologies applications in their individual fields.

The software sector is one of the foundation sectors for the new e-commerce economy. Dramatic growth is expected in the provision of software for the Internet and for telecommunications. A wide range of opportunities are arising to provide software for specialised applications. Each business sub-sector will require software to meet its individual needs and every business will require standard software to drive its conversion to e-commerce. The software sector is, however, highly knowledge-intensive and skills-intensive with a high degree of locational mobility. The telecommunications infrastructure, skills availability, underlying costs and regulatory framework are key factors influencing the location decisions of firms. Locational competition for the high value-added activities within the sector is intense and will further intensify.

The following strategic areas, within the broader software area, are vital facilitators of e-commerce:

- Relationship management applications – databases and tools, purchase tracking, data mining, customer loyalty systems,
- Software necessary to build server applications for e-commerce – object databases, graphical software, encryption and security products, credit card acquisition and clearance, protocols, groupware,
- Software that enables web applications, linking existing enterprise software with new software products to deliver web benefits,
- Software that facilitate the change to new access methods, for example using GSM telephones or interactive TV for e-commerce.

The most significant impact of e-commerce on the software industry will be the move to digital distribution of software directly to businesses and consumers. It is likely that this sector will deliver its products digitally directly to businesses within three years and directly to consumers within five years.

The fundamental changes in the nature of the sector pose threats and provide significant opportunities for promoting inward investment and for the development of Irish-owned companies. If the infrastructural, regulations, skills and cost environments are competitive, the opportunities for Ireland include:

- Becoming a major world-centre for the digital distribution of software
- Managing the associated intellectual property rights, customisation, credit control, services and support
- The consolidation of software-related marketing functions at present located in a number of countries into a single centre based in Ireland
- Meeting the increased outsourcing needs of companies based in Ireland and elsewhere for e-commerce-related products and services

2.1.1 Overseas

Large software companies, predominantly of US origin, are major employers in Ireland. The key decision factors for investing here are availability of skills and services, low corporate taxation, and access to European markets. Early investments in the sector involved rather low-skill employment such as disk duplication, manual production and packaging operations. Advances have been made in shifting them towards greater value-added activities, such as marketing activities for Europe, the Middle-East and Africa, back office activities such as corporate treasury, accounting and legal activities, as well as the development and localisation of software. Strategic market development is nearly always driven from headquarters.

As the industry moves towards greater use of e-commerce, delivery of software is moving from physical shipment to electronic delivery over networks (referred to as ESD – electronic software distribution). The shift will result in a more direct relationship between producer and end-user, probably reducing the role of distributors.

Alongside the change in distribution, after-sales support is also being delivered over networks. This can extend to automatic upgrades and problem diagnosis (including prevention of potential failures). There are early indications that the industry is moving from a product sale business model to a software services model. In the latter, the software producer contracts to provide users with continuing service (software set-up, upgrades and product support both in fault correction and in effective use) over a defined period in return for a guaranteed income stream.

Unless responded to, the above can be viewed as threats to the sector in Ireland, but there are also whole new areas of opportunity. For example, in-vehicle applications of software are expanding dramatically, empowered by greater processing power in "smart" radios and navigation systems. Mobile systems in general are a huge growth area, with subscribers to wireless phone services forecast to grow from 170 million in 1997, to 600 million in 2001. There is a significant overlap between cellphone users and web users, and it is generally believed that the cellphone will be the vital new connection to web services.

Marketing Implications

Electronic Software Distribution (ESD) will have an increasing impact on the sector. As well as changing the mechanisms employed to distribute software, the networked economy is starting to enable whole new value propositions. Taken together, these will probably lead to more centralised approaches to marketing, supported by local presence in key markets. The centralised marketing will control operations and include risk management services such as a credit card fraud screening service, global rights management to protect the property rights to digital products in the distribution chain, and an export control service to meet government export regulations. Other services will include automatic multi-currency payment processing, territory management, VAT calculation, fulfilment, tracking, warehousing, and secure delivery.

Operational Implications

Localisation has been a major business function in the software sector in Ireland, but the Internet and Internet protocol (IP) standards have reduced the technical localisation and support required. Language localisation will be carried out increasingly in the destination country, which has the advantages of mother tongue and culture, supported by the web technologies.

In the consumer software area, 'shrink wrap' products have dominated. There is a trend toward making a greater range of product offerings available to the consumer, and 'bundling' modules and services in a way that expands the range of options available to the consumer. This will place demands on support services, and commentators speculate on whether this will occur at a centralised level for a region (such as Europe) or will occur at country distributor level.

There is concern that the design, development and testing functions associated with foreign investment is less represented here than might be expected on the basis of turnover. These activities are changing with e-commerce. "Virtual teams" can now be co-ordinated with ease across country borders. Overseas-owned companies in Ireland can use this technology to more easily participate in development work carried out by their parent companies.

In software production, the role of actual coding is diminishing. The routine function of coding has reduced in relative importance (but not in total numbers employed) ; increasing emphasis is being put on command and control centres: locations in which the strategic development and evolution, project management, testing, and support are directed and controlled.

In the foreign-owned sector, much of the activity carried out in Ireland is concerned with the physical manufacture and distribution of products. These labour-intensive activities will decline as e-commerce develops. However, a corollary requirement of e-commerce is increased technical support, accounts and digital distribution personnel. The IDA must encourage client companies to develop e-commerce, and in particular, to be in a position to deliver products digitally to business within three years, and to consumers within five years.

As software moves from distribution on physical media to electronic distribution, the physical location of the producer will be irrelevant. Ireland could become a world centre for distributing software, and managing the associated intellectual property rights, credit control, customisation, and service and support.

2.1.2 Indigenous

The indigenous software sector employs over 10,000 people in 560 companies. While average company size has been growing, the typical firm is still small by international standards. Exports in 1998 were over £450m or 60 per cent of total revenue in the sector. The major challenge for the sector is to achieve sustainable scale by growing in new markets. This can be done both by natural growth and product development, and by acquisitions and mergers.

Marketing Implications

There is a clear need to develop the export sales of software. About 46 per cent of indigenous firms earn less than 30 per cent of their revenue from exports.

Bespoke development and general business applications account for 34 per cent of software income. These are threatened due to the increasing reliance on generic software products. Niche software, such as specialist applications and tools for the food sector, already dominates the strategic focus of the sector, and there is great potential to exploit the web to enlarge the customer base. Sectors such as telecommunications, router and switch producers should also be targets for relationship development.

Products and brands are just as important an issue in e-commerce as in any other marketplace. Building product and brand awareness for the general market demands funds that are beyond the capacity of most Irish companies. They must therefore focus on the specific needs of smaller customer groups, a process greatly facilitated by the relationship-building capabilities of web marketing techniques.

A possible entry opportunity for Irish firms into exports is though relationships with larger companies in the target market. The headquarters staff (predominantly US-based) of multinationals with investments in Ireland are a group of high potential targets.

Support services for web companies, such as systems integration and management, are an area of high potential. The production of web content and features for Europe is an opportunity that should be addressed.

Research and development of new software products will gain an impetus from the adoption of e-commerce. Irish companies can use the Internet to gain a foothold in the Research and Development subsector by forging relationships with US companies, and in particular, with the headquarters of such companies. IDA Ireland has a role to play in facilitating such strategic partnerships.

Operational Implications

The continuous pressure for higher value-added activities implies that only those organisations that focus on the unique value proposition to the customer can prosper. The acquisition, interpretation and realisation of customer preferences are key high-value activities. Coding will be less important, and can easily be outsourced to other locations.

Some observers have commented on the speed, flexibility and competitiveness of small teams in the software sector, as though small size was an advantage in itself. As the industry matures, the same dynamic will apply as in any other sector: there is a minimum scale to attract all the resources necessary to maintain sustainable competitive advantage. However, increasing standards and formal methods make it very difficult for lone players to prosper in the long term. The agencies must encourage consolidation of companies where the scale is an important factor in competitiveness. The industry itself must examine this need and the existing opportunities for consolidation. Successful companies grow by acquisitions and mergers, attracting the resources to themselves for dynamic growth and development.

Major new growth areas are often first developed at the interface between disciplines, such as between software and medicine, and between software specialists and financial services. Recognition of this must lead to increased co-operation across sectors to ensure that Irish companies make the best returns for their stakeholders.

2.1.3 Actions

The following actions are recommended:

Agency Actions

- *Assist* Irish-owned firms to move up the value chain from bespoke software to world class niche and other products. (Enterprise Ireland and Shannon Development)
- *Encourage* Irish-owned software firms to supply multinationals globally. (Enterprise Ireland and Shannon Development)

- *Encourage* the selective consolidation of Irish-owned software companies to create the scale and skills needed to become significant internationally trading enterprises. (Enterprise Ireland and Shannon Development)
- *Promote* Ireland as the premier EU location for digital distribution of software direct to business and personal consumers. (IDA Ireland)
- *Promote* strongly, to overseas software companies, the benefits of centralising their European marketing and technical support in Ireland. (IDA Ireland)
- *Promote* suppliers of Internet and telecommunications software to locate in Ireland (IDA Ireland) and develop indigenous companies in these software sectors. (Enterprise Ireland and Shannon Development)
- *Promote* overseas companies in Ireland to undertake additional development work in Ireland as part of virtual teams with their parent companies. (IDA Ireland)

Enterprise Actions (Indigenous)

- *Reposition* bespoke software businesses as product development businesses, using Internet platforms to identify and develop relationships with new customer groups.
- *Evolve* from contract outsource work to software product developers, supplying the multinational sector and other customers.
- *Move* higher up the value chain with a focus on developing specialised products for distribution to international customers using the Internet.
- *Build* relationships with key staff in the headquarters of multinationals in order to identify new outsourcing and collaborative opportunities.
- *Examine* the need and opportunity for alliances and consolidation with other firms in order to provide a more comprehensive product range and knowledge base or to share the costs of product development, market development and expansion and sharing of overheads.

Enterprise Actions (Overseas)

- *Expand* the range of business functions carried out in Ireland, to include marketing, sales, support, research and development, distribution, and management and control of intellectual property. (IDA Ireland)

2.2 Digital Content and Intellectual Property Management

The Internet facilitates the transfer over the telephone lines of products that can be digitised. The ease with which these goods can be transmitted is however a major business issue. Digitised goods can be copied easily and, thereby, misappropriated. This is giving rise to opportunities for the development of technologies for secure digital distribution.

The development, management and control of intellectual property will be the key value creation activity in content industries in the future. The internet and the convergence between media, entertainment, content, and software sectors is giving rise to significant new opportunities for digital content distribution in a range of sectors that previously required physical distribution media. The most significant growth sectors include education and training services, music distribution, entertainment, and Internet broadcasting services that can now be delivered

directly to the desktop computer. The Internet is also giving rise to new content production and distribution methods and new ways of providing support services.

This section assesses new opportunities for Ireland in a number of key content sectors.

2.2.1 Media Asset Management

Ireland can develop as a centre for media asset management for a range of content industries that are moving to distribution over the Internet. These include entertainment products, educational training, music, library archives, and audio-visual broadcasting. Media asset management involves tracking the flow of transactions and remittance of royalty payments to copyright holders. The necessary technologies and tools are now available to allow owners and distributors of copyright material to determine the cost and price applicable to content or segments thereof, and collect royalties electronically.

Companies are undertaking media asset management in-house, as well as outsourcing these activities. IDA Ireland should encourage the major entertainment, music and video publishers to centralise these activities in Ireland, including royalty collection and remittance. There is significant scope for the development of indigenous companies either individually or collaboratively to provide these services.

Success will require the development of legal expertise in cross-border copyright management and data protection, as has been developed in the areas of tax and cross-border accounting. US companies, in particular, will need access to experts in EU and domestic copyright and piracy protection laws. Expertise in data protection legislation in European countries will be required to facilitate effective customer relationship management and marketing by the media asset management companies.

Other support services required include settlement and credit management services. Ireland needs to develop a strong competence in this area and the banks should take a lead. Inventory and data warehousing services will also be required. Ireland has a number of companies that could support the development of media asset management activities here. The sector will require to be underpinned by dedicated security tools, which is also a burgeoning sector in Ireland.

2.2.2 Music

The Internet is set to have a major impact on the music distribution and recording industry. E-commerce in music is growing in the US and internationally. Of the US companies currently selling music over the Internet, over 25% of their sales are outside the US. World-wide online sales of music are forecast to reach $1.6bn by 2003. This will include both downloading music from music sites and ordering CDs that are then physically distributed.

The pace of development of e-commerce in the music industry will depend somewhat on the pace of adoption by the big five, BMG, EMI, Polygram, Sony, and Warner, which control about 75% of music distribution. However, new competitors are entering this business through the Internet, such as Microsoft, CDNOW and Amazon.

While Ireland has a strong base of songwriters, artists and musicians, it does not have a well-developed music recording and distribution sector. E-commerce could, however, provide an opportunity to attract some of the back-office functions that will be required for digital distribution to locate in Ireland. Ireland's success in this will depend on the adequacy and enforceability of our copyright laws.

E-commerce offers the potential for the large international music distributors to establish centralised marketing, distribution and back office activities, that can be accessed from specific markets or from around the world. This would also give rise to the need for the localisation of marketing content on websites.

Decentralised recording, editing and production will be possible over the Internet and some of these functions could be located or out-sourced in Ireland. There will be opportunities for Ireland to become the European base for new companies entering the music distribution business.

The Internet provides opportunities for the promotion of Irish music and artists. It presents opportunities for developing communities of interest in Irish music across the world. Irish artists, recording companies and distributors will be able to target these communities. E-commerce will also present opportunities for marketing direct to independent distributors and retailers in new markets that may not otherwise have been accessible.

The Internet is likely to increase the opportunities for recording, editing and producing music remotely by Irish enterprises. These opportunities will arise in the music industry itself, the audio-visual and film industry, and in other content and software sectors that need music for their products or websites, such as education and training packages.

2.2.3 Entertainment and Internet Broadcasting

Ireland could attract Internet entertainment companies to locate their European digital distribution and shared services operations in Ireland.

Internet broadcasting is likely to be a large growth sectors with audio-visual programming edited and customised to individual requirements. There may be opportunities to attract the major broadcasting companies to locate operations associated with Internet broadcasting. These could include back office transaction processing and distribution.

2.2.4 Actions

The following actions are recommended:

Government Action

- *Ensure*, as set out in Section 3, that the legislative and regulatory environment for the protection of intellectual property provides a secure environment from which to create and distribute intellectual property and content. (Department of Enterprise, Trade and Employment)
- *Ensure* that the education system provides sufficient numbers of law graduates with expertise in intellectual property law and procedures.

(Department of Education)

Agency Actions

- *Encourage* the development of indigenous companies in the provision of digital distribution and intellectual property management support services. (Enterprise Ireland and Shannon Development)
- *Promote* Ireland as the premier EU location from which to digitally distribute content products. (IDA Ireland)
- *Encourage* major music, media, and information publishers to centralise digital distribution in Ireland and to undertake additional value-added activities such as media asset management, and royalty collection and remittance. (IDA Ireland)

Enterprise Actions

- *Develop* businesses that can take advantage of outsourcing opportunities for the wide range of content industries that are moving to distribution over the Internet.
- *Develop* businesses to track the flow of transactions and remittance of royalty payments to copyright holders for digitised content such as film clips, literature, music, photographs, and other content from archives and libraries.

2.3 Electronics Hardware

Ireland has developed a strong electronics hardware, manufacturing sector, with employment of over 62,000 in 1998 and exports of over £10bn. The sector has been a key driver of economic development in the 1990s, as Ireland benefited from the location here of key players in the PC revolution, such as Intel, Dell, 3Com, and Hewlett Packard, as well as the strategic development of established companies such as Nortel, Ericsson and IBM. In addition, a significant indigenous sector has developed both to meet the sub-supply requirements of the overseas companies and as a supplier of proprietary products.

It is useful to distinguish two categories of firm: those that produce finished end-user products, and those that act as sub-suppliers to other enterprises. E-commerce will impact differently on each category.

Producers of finished products must build relationships with end-users, even if there are intermediaries in the value chain. It is only through this direct relationship that customer value can be provided in a competitive time-scale.

Sub-suppliers must work almost as an extension of the 'marketers' fulfilment system. They must employ the technologies to become part of the extended enterprise. Increasingly manufacturers require integration of systems. Up to now, EDI was the way of achieving this integration, with required significant expenditure needed on systems. Now, however, the Internet provides access for smaller suppliers to larger electronics hardware firms. While this places demands on their production systems, it also offers the opportunity of extending their market reach, to others in similar industries as well as to other geographical locations.

Since the mid 1980s, the electronics hardware sector has been dominated by the PC revolution, which in the past five years has been amplified by the speed of the Internet. This is leading to the much-heralded merging of datacoms and telecoms that will provide the basis for the e-commerce revolution. However, the industry itself will also be profoundly affected by the e-commerce revolution, in terms of both marketing and operations.

Marketing Implications
In terms of marketing, companies like Dell are leaders in applying the Internet to an already sophisticated direct selling operation. The impact extends right down to their sub-suppliers, with machines being built to customer order in very short production cycles.

This type of marketing model will increasingly apply to both business-to-business and business-to-consumer selling. This in turn will create greater demand for marketing, technical support and control activities. Ireland must focus on capturing this growing part of the sectoral value chain, as well as new hardware support companies.

There are also opportunities for companies developing and manufacturing Internet access for specialist purposes.

Operational Implications
There will also be significant operational issues for hardware manufacturers. The opportunities presented by e-commerce to improve supply chain management will inevitably lead to the relocation of lower value-added manufacturing jobs to lower cost locations, while the elements of customisation will present opportunities. Therefore the manufacturing activities that will remain viable in Ireland will have some or all of the following characteristics

- Be very specialised with a need to be close to its final customers
- Need to co-locate with higher value-added activities, such as software and services
- Relatively low labour costs as a percentage of final output, and/or the bulk of the labour require high skill levels

The improved efficiency of the supply chain will also present threats and opportunities for Irish suppliers to MNC operations in Ireland. On the one hand, process re-engineering will produce greater pressure for lower costs and efficient delivery, while on the other hand, it will create global market opportunities for firms producing high quality products at a competitive price. Such companies should be helped to extend their marketing range to the global market.

Outsourcing will become increasingly common on a European/global level; with more associate companies coming within the extended enterprise to deliver value to the customer.

Overall, the ratio of low-skills employment in the sector in Ireland will shrink. Software is allowing new benefits to be built into the hardware package, and the key driver for the industry is the software features and benefits. This has implications for the service and support of the product once it moves into the field. The relentless shift towards up-skilling and knowledge intensity that is evident elsewhere is merely emphasised here.

Internet sales and technical support will provide opportunities for development. The challenge for the agencies is to ensure that the command and control centres

replace the lower value-added components of the enterprise in Ireland. These centres will have the crucial role in responding to customer preference by integrating order entry, production planning, logistics and technical support.

The following actions are recommended:

Agency Action

- *Encourage* Irish-owned electronics SMEs to develop e-commerce capabilities in their supply chains using Internet solutions. (Enterprise Ireland and Shannon Development)
- *Promote* Ireland strongly as a location for command and control centre investment (IDA Ireland).
- *Promote* companies manufacturing electronics hardware products for the internet and telecommunications sector. (IDA Ireland and Enterprise Ireland)

Enterprise Actions

- *Build* and integrate e-commerce systems to serve customers in Ireland and internationally.
- *Identify* distribution channels that sell and deliver products direct to consumers, and adopt business strategies that build relationships directly with end-users.

2.4 Support Services

E-commerce in Ireland will succeed only if there is a base of world-class, competitive digital support services. The development and supply of these services is a major opportunity for inward investment and for entrepreneurship among Irish-owned companies. Data mining and relationship marketing, enabling services and digital distribution services are considered below:

2.4.1 Data Mining and Relationship Marketing

Online data services such as those described below are important because many companies will want to outsource these activities, or to operate them as separate cost-or profit-centres.

- Data warehousing and mining involves the storage and analysis of a company's trading data to reveal patterns of market and customer behaviour. Companies that deliver or could get involved in data warehousing services include large IT consultancies, market research companies and smaller, specialised market-focused data management firms
- Data management, logistics, accounting, finance and customer service functions
- Traditional database and news systems which can be delivered across the Internet
- New niche data services, such as online commodity price trends and weather forecasting

As the number of e-commerce users rises, so does the capacity of business to gather, store and, most importantly, to access transaction data that links consumers to products. These databases are essential e-commerce tools. Businesses use the information gained in this way to use product suggestions and personalised interfaces as marketing tools. According to Dataquest, the worldwide data warehousing and mining industry grew by 34% in 1997, with revenues reaching over $1.88bn in 1998. Most enterprises engaging in e-commerce will initially need to outsource these activities due to lack of in-house expertise. There are opportunities to establish Irish owned projects and to attract international players to locate in Ireland.

Mobile investment opportunities are likely to arise as e-commerce provides the option for companies to move out of the main financial and news centres, to locations that offer good telecommunications links and the availability of skilled staff. Initially, the inward investment opportunities in this area are likely to be modest, with the information created in other locations. Over time, skills in content development and adaptation could lead to more of the high-value added activity being undertaken in Ireland.

Electronic publishing and online distribution is growing rapidly across a range of media sectors, including newspapers, magazines, periodicals and books. It is increasingly being outsourced to specialist companies. There is an opportunity to attract such companies here.

2.4.2 Enabling Services

E-commerce enabling services include any activity that promotes or supports trading and selling online, such as:

- Electronic payment, banking and cash systems
- Fulfilment and logistics services
- Online booking and reservation systems
- Services supporting e-commerce, such as certification services
- Credit card transactions based on the secure electronic transaction (SET) or similar protocol
- Electronic wallets, for smaller transaction
- Electronic cheques, for the online payment of bills

The online booking and reservation market is set to expand dramatically as the Internet becomes the preferred medium for dealing directly with customers. The largest systems are currently in the airline industry serving the booking needs of travel intermediaries, such as travel agents, rather than being available direct to customers. The major players are Sabre, Galileo and Amadeus.

There is already significant growth in companies developing e-cash products. These include companies that are supporting transaction centres, and server centres of banks offering online services for businesses and personal customers together with companies developing and distributing certification and encryption services, and integrated Internet-based customer service centres. <

2.4.3 Digital Distribution Services

As companies involved in software and content industries move to digital distribution, they are likely to increasingly outsource distribution and transactions

processing activities to specialist companies. There is an opportunity to attract these specialist companies to locate their European or worldwide operations in Ireland. There is also an opportunity to develop indigenous enterprises in this sector that can undertake the specialist distribution and transactions processing activities for large corporations.

The development of and technical support for mirror sites and data centres will be a key part of the infrastructure for developing an e-commerce presence on a number of continents. Mirror sites are sites that duplicate the information on a website to facilitate access and relieve traffic pressure. They include:

- Server sites for Internet Service Providers (ISPs) to provide localised, and faster access to Internet users
- Server sites established by large companies to provide backup to their computer networks
- Server farms, where content from a number of sources is held and combined to provide a highly tailored service to users

While the direct employment associated with mirror sites is generally low, there can be associated spin-offs to companies providing technical support and content adaptation services.

The support services associated with these various infrastructure elements include the content generation and packaging stages of the value chain, such as:

- Computer animation and graphics – from the creation of film or video animation for commercials, to full-length films and games including animation effects created through art work, modelling or computer-generated images
- Computer modelling and simulation – the provision of 3-D simulation services and virtual reality software and equipment
- Development of software tools and systems for the digital industry
- Post-production of film and video
- Localisation services to modify software and other content to address the language, cultural, legal and technical needs of local markets

Animation and graphics activities that currently serve the film, video and multimedia sectors will increasingly be required for the development of Internet content. Computer modelling and simulation services, used in the development of training and education material, will be required to support a range of content industries. At present, these are mainly supplied by large US companies, which are likely to need a base in Europe for localisation activities. The development agencies should identify potential partners for small companies wishing to form strategic, co-operative relationships. Enterprise Ireland should promote technology companies providing support services.

2.4.4. Actions

The following actions are recommended: <

Agency Action

- Formulate sectoral strategies to exploit opportunities for indigenous development in emerging e-commerce support services. (Enterprise Ireland

and Shannon Development)
- Promote technology companies providing e-commerce support services, such as Internet transactions processing, digital distribution and design. (Enterprise Ireland and Shannon Development)
- Continue to focus on the attraction of leading and emerging e-commerce support service providers to Ireland. (IDA Ireland)
- Identify potential international partners for small Irish owned companies with high growth potential in e-commerce support services. (Enterprise Ireland and Shannon Development).

2.5 Food and Agribusiness

The food-processing sector contributes significantly to the Irish economy, through direct and indirect employment, output and exports, and through its linkages with primary sectors of the economy. Over 50,000 people are directly employed predominantly in Irish-owned companies and 50% of output is exported, with 40% destined for the UK.

Overall, e-commerce is likely to impact most significantly on business-to-business relationships in the sector, primarily as a result of the development of extranets by the large retail and wholesale chains in Ireland and the UK. Retailers are using e-commerce to drive efficiency in their supply chains, to streamline distribution networks, to improve traceability and quality assurance, and to build customer relationships and loyalty. E-commerce is also allowing retailers increase global sourcing, driven by relentless price competition.

E-commerce will impact on this sector mainly by changing the traditional supply chain relationships. In some cases, it will enable producers to forge new direct relationships with customers; in others, it will raise the technological barrier to market entry, for example, by increased use of extranets. How Irish companies in the sector respond to these threats and opportunities will have a significant impact upon their ability to survive and prosper.

The following sections analyse some of the marketing and operational implications for Irish food companies.

Marketing Implications
The potential implications of e-commerce for marketing are different for business-to-consumer and business-to-business relationships.

Business-to-Consumer Marketing
E-commerce could have a positive impact on the sales of Irish food companies, though, in proportion to total sales, electronic sales may remain small. It will give food companies access to new markets, in particular for producers of non-perishable specialist products and products that could economically be purchased in bulk, for example, Irish chocolates, smoked foods, gourmet sauces, pet foods and drink.

The Internet will provide a new medium for Irish food companies to promote products and brands, market directly to target communities and consumer groups, gather feedback, and develop loyalty with customers around the world. These promotional opportunities will be available through dedicated international food

portal sites, and through the websites of the national food promotion agencies such as An Bord Bia, An Bord Glás, An Bord Iascaigh Mhara, and the Irish Dairy Board.

E-commerce offers Irish food SMEs the potential to build awareness of their own products and brands. It will also provide the opportunity for these food companies to collaborate with more established companies in marketing complementary food products on the Internet. These aggregation opportunities are likely to be both within food categories, such as Irish cheeses and sauces, and between food categories, such as chocolates, drinks and smoked foods.

Business-to-Business Marketing
The internet enables continental multiples to search for competitive sources internationally, and provides an opportunity for Irish food companies to market directly to retail multiples on the continent. Irish suppliers could have advantages within the euro-zone.

The US has witnessed the rapid growth of virtual exchanges for physical commodities (spot markets) and of agricultural futures and options on the Internet. E-commerce allows both suppliers and buyers of commodity products to find new markets for bulk supply as spot markets develop, and will provide particular opportunities for ingredients and meat processors seeking new export markets.

While retailers are likely to increase their dominance of food channels to consumers as they develop Internet retailing, new food distribution intermediaries are also emerging to sell and deliver food and groceries directly to consumers. Irish food companies will have the opportunity to market directly to these new food distribution intermediaries as they emerge in key markets such as the US.

Food companies are focusing increased marketing efforts on national and international food service providers, such as restaurants, catering companies and franchisees, to boost international sales. This is as a result of the trend towards increased eating out in developed economies and consolidation in the retail sector. The Internet offers the potential for food companies to market directly to the food service industry internationally. It will provide a medium for food companies to promote the range and quality of Irish food products. Suppliers will also have the opportunity to engage in mutual marketing with food service companies using Irish food inputs.

Operational Implications
The most significant operational implication for food companies and their sub-suppliers is likely to be the ability to link with and use the extranets that are being developed by the large retail chains. Extranets connect and manage the flow of products throughout the supply chain, from farm to consumer. They increase supply chain efficiency and reliability, and enhance cost and performance transparency.

While e-commerce will significantly improve the efficiency of logistics operations, it will also require changes to the distribution networks of Irish food companies. With e-commerce and extranets, both retailers and customers will increasingly purchase in smaller batch sizes and in individual units.

The number of customers served through the distribution networks of food companies is likely to increase as a consequence of the growth of e-commerce. To distribute directly and competitively to consumers in international markets, food companies may have to establish distribution centres in international markets, or to develop alliances with fulfilment companies in these markets.

Full traceability of food products throughout the production and supply chain is facilitated by e-commerce. Providing online traceability, back to farm level, could be a major competitive advantage for Irish food companies. Traceability will increasingly be required for European consumer markets, to identify whether or not genetically modified ingredients have been used in food preparations. It will also be possible to trace meat products back to farm level, enabling producers to provide assurances to consumers and retailers on breeding and disease status.

E-commerce will significantly increase the amount and quality of data and information available to retailers and suppliers on production processes, costs, and consumer buying habits. Food companies will need access to the data gathered by retailers as well as the ability to analyse it. The sharing of information over the Internet could provide an opportunity for Irish food companies to analyse consumer trends, performance and efficiency. Food companies can use the information strategically in structuring their own production processes and plans, and as part of their market research on consumer buying patterns and preferences.

The following actions are recommended:

Agency Action

- *Encourage* Encourage food businesses to use extranets to market and link with retailers world-wide. (An Bord Bia, Enterprise Ireland and Shannon Development)
- *Provide Advice* training and support for food companies developing e-commerce strategies. (An Bord Bia, Enterprise Ireland and Shannon Development) .
- *Encourage* the development of Internet based solutions to provide full traceability of raw materials in the food chain in Ireland. (An Bord Bia, Enterprise Ireland and Shannon Development).

Enterprise Actions

- *Build* on e-commerce systems and extranets in food supply chains to serve business customers.
- *Identify* new food distribution intermediaries that sell and deliver products direct to consumers.
- *Leverage* traceability for food products throughout the supply chain as a competitive advantage.
- *Explore* aggregation opportunities within and between food categories.

2.6 Education and Training

E-commerce is likely to have a significant impact on the education and training sector, through the development of new education and training products and the conversion of existing textbooks and material. Online material can be a more effective learning medium than traditional methods, and offers great potential to improve the efficiency of in-company training.

Although distance learning has existed for some time, the Internet makes possible a dramatic expansion in coverage and better delivery of instruction. Such technical improvements coincide with a general demand for retraining and upskilling by those

who, due to work and family demands, cannot attend traditional courses. Distance learning over the Internet is likely to complement existing schools for children and university students, but it could have more of a substitution effect for vocational training and continuing education programmes. For some degree programmes, high-prestige institutions could use their reputation to attract online students who would otherwise attend a local faculty.

The education software market is already experiencing dramatic growth. According to OECD estimates, the US is the largest market, accounting for 69% of the world education software, followed by Germany at 12%, the UK at 7% and France at 5%. The professional and corporate market accounts for 48% of total sales, the home and consumer market for 32%, and institutions for 20%. The industry is currently growing at 45% per annum and is forecast to maintain this growth into the future. Five US firms account for about 60% of the market, namely Computer Curriculum, Jostens Learning, CUC Software, Educational Management, and McGraw Hill.

Overseas

There is an opportunity to attract the leading education and training companies to locate their marketing, distribution and support service activities in Ireland. Ireland has a strong skill base in education and training content development for the Internet. The conversion and localisation of textbook content for European markets requires significant input from educationalists, software developers, and multimedia specialists.

E-commerce creates opportunities for overseas distance teaching providers to locate their education support and tuition services in Ireland. As education and training establishments internationalise to provide courses in Europe, there will be opportunities to attract these establishments to locate their European bases in Ireland. E-commerce also provides opportunities to attract the in-company education and training development centres of large corporations for the development of products to meet their own needs and for other customers.

Indigenous

The Internet provides a medium for both public and private education and training providers in Ireland to move to distance learning. It also provides a new medium for promoting online services and for marketing to students who are prepared to travel for courses, such as for foreign language study.

Irish education and training providers will have opportunities to market to individuals and corporate customers around the world using electronic means. Universities, institutes and specialist colleges can develop online courses, and leverage the strong reputation of Ireland's education system to develop their brands on the Internet and target niche markets.

The Internet could provide an opportunity for Irish universities and colleges to recruit students in Asia, the Middle East and Africa who are considering studying overseas. The US currently captures the majority of these students, and a number of UK and continental European universities are actively targeting them.

There are entrepreneurial opportunities for the development and provision of specialist training courses for different industries and professions. Companies that have well-developed and specialised in-house training programmes and materials will have opportunities to market these products to companies with similar needs.

The Irish software and multimedia sector is well positioned to seek out opportunities for the conversion of training and education material for delivery over the Internet

for in-company training programmes, for leading education publishers, and for Irish universities and colleges. E-commerce will facilitate collaboration between these educationalists and Irish software development companies, distributors and service providers.

Actions
The following actions are recommended:

Agency Action

- *Leverage* the strong reputation of Ireland's education system to develop on the Internet. Assist businesses and institutions to target niche markets. (Enterprise Ireland and Shannon Development))
- *Encourage* the leading education and training companies to locate their content-generation, localisation, marketing and distribution and support service activities in Ireland. (IDA Ireland)
- *Encourage* overseas distance-teaching providers to locate their education support and tuition services in Ireland. (IDA Ireland)
- *Attract* the in-company training development and provision units of multinationals. (IDA)
- *Encourage* universities and institutions from other countries to locate their distance learning centres in Ireland. (IDA Ireland)

Enterprise Actions

- *Convert* education and training provision to Internet-based platforms for delivering distance-learning products.
- *Develop* in-house corporate training programmes into specialist products marketed internationally and delivered over the Internet to companies with similar training needs
- *Develop* alliances in multimedia and other sectors to convert content for use on the Internet.

2.7 Tourism and Other Sectors

E-commerce will be pervasive across all sectors of the economy, and the detailed implications examined in previous sections are intended to provide a basis for extrapolation into other sectors of the economy. The implications for all sectors should be examined in future work, with a particular focus on the economic implications of e-commerce for some of the sectors below.

2.7.1 Tourism
E-commerce will have far-reaching implications for tourism promotion and tourism policies. It will profoundly affect each part of the tourism distribution chain including suppliers such as hotels and golf courses, intermediaries such as tour operators and travel agents, sectoral, regional and national marketing organisations, and finally, the perceptions, behaviour and purchasing patterns of consumers. It will also have implications for the industry workforce and in particular the SMEs that make up the bulk of the Irish tourism industry and contribute so much of its character.

There will be increased opportunities for direct marketing to potential tourists and for developing communities of interest in Irish tourism products. Electronic

information agents will increasingly match customers to tourism products. Tourism areas and regions will have an opportunity to increase visibility to potential tourists, and to complement national marketing material and campaigns, both online and conventional. The Internet will, over time, increase the cost-effectiveness of marketing by reducing production and distribution costs.

The challenge for Irish tourism is to maximise the benefits of e-commerce while building on the existing strength of the destination as a brand. In the world of global online travel shops with increasingly homogenous product, there is a need to manage the presentation of Ireland's image as a destination. The content of the electronic shop window must be rich, comprehensive, and up to date. The quality of the national product and its accessibility must be optimised by the tourist board and branded as such with an 'approved' indicator. Destinations with a coherent and inclusive e-commerce strategy, which includes all potential distribution channels, will be at a competitive advantage in the growing online community.

Tourism providers and their employees will need advice, training and support to avail of the opportunities presented by e-commerce, including website construction and management, online marketing, transaction processing and communications.

Irish tourism providers will need to integrate existing information technology systems and the Internet into local and national tourism offices, overseas market offices, websites and booking systems, to create a comprehensive electronic infrastructure linking all sectors of the industry.

The following actions are recommended:

Joint Agency/Enterprise Actions

- *Train* employees in website management and transaction processing. (CERT)
- *Integrate* existing information technology systems to the Internet, and to local and national tourism offices, websites and booking systems. (Bord Failte)

2.7.2 Retailing

E-commerce is having a major impact on the retail sector. Retailing is increasingly disintermediated: suppliers can sell direct to consumers anywhere in the world. In 1997, 12 per cent of US retailers sold products on the Internet. In just one year, this number trebled to 39%. According to a 1997 survey, 52% of European retailers think that e-customers will cease using traditional outlets.

Retailers will need to adapt quickly to marketing on the Internet and to fulfilling e-commerce orders. They will need to maintain a presence in both physical and cyber channels. There will also be opportunities for new entrepreneurial entities in retailing small niche operators that can deliver high value goods directly to consumers.

2.7.3 Health Services

Telemedicine is set to be a major growth area. At least three different services can be provided: teleradiology (transmission and diagnosis of X-rays, ultrasound images, or magnetic resonance images), telepathology (real-time transmission and

diagnosis of information to a pathology laboratory during an operation), and virtual reality (the use of computer simulation techniques to train and instruct).

The increased demand for health services as populations age, budgetary pressures to contain health costs, and regulatory reform will help to promote future e-commerce activity in health services.

2.7.4 Professional Services
Professionals whose occupations largely involve the exchange of ideas or advice, such as architects, engineers, accountants, lawyers, and consultants are likely to increasingly rely on e-commerce, especially to acquire and serve clients. While clients are unlikely to engage such services without direct personal contact, e-commerce is likely to expand the market for them and increase the level of client interaction, for example, in the review of draft legal agreements.

The rapid take-up of e-commerce among the professions will be an important determinant of take-up in the economy in general, as they interact with all types of businesses, in particular with SMEs.

2.8 Banking and Finance

Financial services, including banking, stock trading, insurance, and provision of financial information, are likely to be significantly affected by e-commerce. As for other products, the displacement of existing activities will be offset by overall increases in the market for these services, as prices decline and people make more frequent use of them. For example, there is more frequent stock trading now that commissions are low. E-commerce can make a major contribution to improved efficiency in the banking sector. Preliminary results from a Canadian Survey of Innovation (1996) reveal that 82% of the banks are using the Internet, and that 19% use it to sell goods and services.

Irish banks are evolving to support the emergence of a vibrant small business sector on the Web, particularly in relation to business-to-consumer transactions. In this form of transaction, the merchant provides a facility to customers whereby credit cards can be accepted over the web interface. At the Business-to-Business level, electronic movement of value is not a particular problem. The biggest volume of electronic transfer of funds in the world is by the Clearing House Interbank Payments System in New York. CHIPS handles a trillion dollars a day clearing Eurodollars[13]. It has been doing this successfully for a long time, with no breaches in security.

All major Irish banks will be in a position to facilitate Business-to-Business and Business-to-Government transactions with new service offerings that are currently undergoing testing. These have the ability to effect domestic and international third party payments, and combined with certification services becoming available, will have a facilitating role to play in domestic and cross-border trade.

No shop, online or offline, can accept credit-card payments without getting merchant status from a commercial bank. It is relatively easy for a brick-and-

---

[13] The Euro market was created at a time when American banks were prohibited from paying interest on checking accounts and much US money began moving overseas. It became stateless money. The Euromarkets are now the greatest mobile pool of capital in the world. "Money goes where it is wanted and stays where it is well treated." This is instructive in terms of taxation and other policies in a world were the importance of borders has been greatly diminished.

mortar business to get the required hardware and services – usually just a trip to a commercial bank. Things are different in the online world. Telephone and online retailers cannot get their customers' signatures at the point of sale. So, in theory, the risk of forged identities and stolen credit-card numbers is greater. There is a real risk to the on-line merchant as well as to the credit-card agency and precautions are necessary.

The larger Irish banks have initiatives at final stages of development that will allow them to offer a service to online retailers. This will provide retailers, that achieve a satisfactory risk profile with an effective service. The criteria are likely to include minimum trading period, liquidity and reserves.

Since credit cards are the most common means of doing Business-to-Consumer e-commerce, intermediaries take on the risk for smaller retailers for a significant fee. Examples of these include NetBanx and the US InternetSecure (http://www.internetsecure.com).

There is a rapidly developing international market in these types of services. Information on the range and scope of these should be included in any awareness and training campaigns.

There is an opportunity to build upon the success and reputation of the International Financial Services Centre to position Ireland as a centre for international e-commerce financial services. The leading US Internet-based financial services organisations could beneficially use the IFSC as the base for launching their services into Europe.

The following actions are recommended:

Government Action

- *Ensure* that resources and systems are in place to provide for fast regulatory approval of new e-commerce related financial services. (Department of Finance and Director of Consumer Affairs)

Agency and Enterprise Actions

- *Assemble and publish* a guide to electronic and e-commerce facilitating financial services available to small business. (Chambers of Commerce, Irish Internet Association, Banks)
- *Strongly Promote* the development of a full range of web-based banking, credit card validation transaction processing, and fulfilment services that can be used by retailers and other businesses moving to e-commerce. (Irish Bankers Federation).
- *Create and Maintain* a website with information and links to sources of e-commerce banking and financial services, such as credit card processing. (Enterprise)

2.9 Logistics and Fulfilment

E-commerce presents a real opportunity to grow the logistics and postal services in Ireland. While the Internet will enable the electronic distribution of many products, such as software and music, most products will still require physical delivery. Increased parcel delivery of goods that are ordered over the Internet is likely to be one of the most immediate impacts of e-commerce.

For some businesses, this will require increased flexibility in logistics. For others, it will mean a complete re-engineering of their logistics processes. Businesses targeting consumer markets will need the ability to produce, package, and deliver customised orders, within a specified time period, to a guaranteed level of quality. For Ireland-based enterprises targeting business markets, it will require the management of integrated extranets on which customers can order and schedule delivery to their batch sizes, and track and trace their order through the production and distribution processes.

Logistics can be a mix of in-house and out-sourced functions in the e-commerce space, including parallel delivery, customer support and, in some cases, collection of taxes. Due to the flexibility and distribution networks required by e-commerce, over 25% of current e-commerce-related logistics is outsourced in the US. Federal Express estimates that 68% of their orders originate online. This is giving rise to an initial dominance of global courier companies. Presence in local markets is a key advantage for these companies, although more economic alternatives will be required if e-commerce is to realise its full potential.

An Post is well placed in Ireland to serve the needs of Irish companies engaged in e-commerce, as it has both a national door-to-door distribution network and direct access to the distribution networks of postal services in most countries across the world. It is also a comparatively cost-effective solution for low volume distribution. For Irish enterprises to be competitive in the e-commerce environment, An Post must rapidly develop the capability to guarantee delivery times and quality of delivery. It will need to develop alliances and extranets with international postal services in order to provide such guarantees. Cash-on-delivery services to Irish businesses need to be developed. Businesses will also need access to online tracking and tracing services for parcels being delivered to customers across the world.

Global logistics providers should be encouraged to establish their European distribution centres in Ireland, both to provide competitive services to enterprises in Ireland engaged in e-commerce, and to build up the base of subsupply services required to attract e-commerce companies. The latter could include retailers that require overnight delivery of orders. IDA Ireland and Enterprise Ireland should target the major fulfilment and logistics providers to locate in Ireland, and to develop Irish logistics companies into e-commerce fulfilment companies. These service providers take orders for clients, break bulk and fulfil the orders from stock in warehouses, dispatch and track delivery.

For many Irish SMEs engaging in e-commerce, the cost and time associated with dispatch from Ireland will impact on the competitiveness of their products. To serve export markets such as the US, there may be a need to ship product in bulk to the destination market and break bulk locally as orders are received. This activity could be undertaken by establishing a distribution centre in these markets, by outsourcing to a fulfilment company in that market or through alliances with other Irish exporters to achieve economies of scale in distribution. An Enterprise Ireland initiative, similar to the Pleroma consumer foods distribution centre established in the UK for breaking bulk, may be required for the US and other markets.

Delivery of product through the postal service or by courier will require new forms of packaging. A high level of innovation will be required in packaging design to maintains the quality of product shipped while reducing the bulk. Irish packaging companies can develop a first mover advantage in designing and producing specialised packaging for e-commerce distribution. The agencies need to assess the capability and opportunities for the packaging industry to meet the new requirements of e-commerce logistics.

The following actions are recommended:

Government Action

- *Encourage* An Post to develop the capability to guarantee international delivery times, build alliances with international postal services for e-commerce delivery, and provide cash-on-delivery services. (Department of Public Enterprise and An Post)

Agency Actions

- *Determine* the information and communications technology and specialised telecommunications implications of e-commerce in the logistics sector and the required actions to put this in place. (Enterprise Ireland, Shannon Development & National Institute for Transport and Logistics).
- *Examine* the warehousing and distribution needs of SMEs delivering goods sold on the Internet and the need for consolidated warehouses in international markets. (Enterprise Ireland and Shannon Development).
- *Promote* the design and production of specialised packaging for e-commerce distribution. (Enterprise Ireland and Shannon Development
- *Promote* global logistics providers to establish their European courier distribution centres in Ireland. (IDA Ireland)

2.10 Small Businesses

E-commerce is likely to have its most fundamental impact on SMEs. In Ireland. 99.4% of enterprises are SMEs (fewer than 250 employees), accounting for just under half of total enterprise employment and 50% of SMEs employ fewer than ten people. In view of the importance of SMEs to the economy, and the threats and opportunities offered by e-commerce, there is a need to focus on enhancing their growth and participation in the knowledge-based economy and global marketplace.

E-commerce increases the business opportunities of SMEs, providing the means for overcoming disadvantages of business scale and geographical position. However, compared to large corporations, SMEs do not have sufficient business resources (either human or capital) to invest in the construction and operation of systems.

The key marketing and operational implications of e-commerce for SMEs are set out below.

Marketing Implications

E-commerce will provide SMEs, including previously non-exporting firms, with immediate access to international markets. There will be increased opportunities for

a wide range of SMEs to open up new markets, not only in the speciality food and software areas, but also in areas such as giftware, crafts and fashion. It will enable SMEs access the more sophisticated markets in the US, such as the highend of the mail-order business.

Currently only 3% of service businesses in Ireland are actively exporting. E-commerce will increase the transportability of services and offers the greatest potential for enabling services SMEs to start exporting.

Competition in all the main domestic and international markets of Irish SMEs will increase as a result of e-commerce, as barriers to entry for foreign companies are significantly reduced. Irish SMEs will need to concentrate initially on the management of existing customer relationships and on selling direct in existing supply/distribution channels.

E-commerce will enable Irish SMEs develop and build marketing and distribution alliances with American SMEs trading over the Internet that need a 'local' partner in Europe. The Internet will provide increased access to information for SMEs for market research and intelligence, for market segmentation, and for targeting and building communities of interest. It will also provide promotion opportunities both for trading over the Internet and for using the Internet to build brand and market awareness. Multi-lingual content will be important in this regard, as well as skills in web marketing.

The strategic implications for business-to-business marketing will include increased opportunities to market direct to multinationals based in Ireland, and to their corporate headquarters. However, it will also result in increased transparency of competitiveness in terms of costs and performance, in particular relative to other SMEs in the euro-zone, and will require SMEs to market other strengths, such as quality and reliability of service.

The Internet will present new opportunities for specialist craft companies and artists in Ireland to reach new customers, in new ways, across the world. The Internet will make it possible to target and build communities of interest in crafts and goods that are uniquely Irish. The Irish diaspora of more than 80 million people will become more accessible. Irish artists and crafts companies will need the services of aggregators or national portals for promotion, for the management of customer relations, and to encourage those involved in crafting uniquely Irish goods to engage in e-commerce.

Operational Implications

The development of extranets connecting business production and operational systems is more likely to impact on logistics than on any other significant operational area. The impact will be greatest on sub-suppliers to MNCs. They will have to adapt quickly to the systems and standards of larger companies. MNCs will be able to compare the offerings of alternative suppliers from around the world. E-commerce will facilitate logistics and procurement pooling among SMEs, as both exports and imports can be scheduled and tracked electronically by SMEs.

SMEs may have separate extranets with more than one large customer, and systems integration between existing IT systems and Internet systems will be a significant challenge for such companies. SMEs will need to plan the development of their Internet strategies, and ensure that their systems are based on international standards that can accommodate MNC-specific extranets.

E-commerce offers major potential for SMEs to improve the efficiency of their procurement processes, as the Internet will allow them to buy directly from suppliers, by-passing intermediaries and wholesalers.

SMEs will be able to capture a great deal of significant business information, in relation to costs and performance of their supply chains, and customer trends and purchasing patterns. The ability to analyse and interpret the data generated will be critical for efficiency improvement and competitive advantage.

Awareness and Training

The implications of e-commerce for all aspects of enterprise development and competitiveness must be understood at company level. Specifically, there is a real need to develop awareness and training in e-commerce for SMEs.

While most businesses have some general awareness about e-commerce and the Internet, there is a general lack of understanding about the opportunities and implications of e-commerce for specific sectors. The levels of e-commerce deployment by enterprise, and individual Internet access, are significantly below international leaders.

Current levels of e-commerce adoption are seriously at odds with the international perceptions of Ireland as the "Celtic Tiger". In April 1999, Forfás and IBEC jointly published and distributed to enterprises 15,000 copies of Telecommunications for Business – A User's Guide explaining developments in advanced telecommunications and e-commerce from an enterprise perspective. The Information Society Commission is actively engaged in a number of initiatives aimed at raising public awareness, and launched an enterprise awareness-raising campaign with IBEC in early 1999. Enterprise Ireland are developing a programme of awareness for their clients. This will be followed with training support targeted at the needs of the specific sectors. Enterprise will be encouraged and supported in getting connected to the internet. Support will also be provided to develop e-commerce strategies appropriate to their needs.

A co-ordinated national awareness campaign, involving all trade and business representative organisations and the social partners, should be established. The Information Society Commission should take a lead in the provision of well researched and easy-to-understand information and guides, targeted at specific sectors. Organisations and the social partners must then act as information multipliers and providers of training support for their members across the country.

Initiatives are also to equip Government departments and agencies to deal with SMEs through e-commerce. This are considered in section 2.12 Government and Public Administration.

Actions

The following actions are recommended:

Government Action

- *Establish* a coordinated national awareness campaign involving all trade and business representative associations

Agency Actions

- *Promote* the use of e-commerce and provide training for SMEs. Efforts to

increase the awareness of opportunities and threats should be undertaken on a sector specific basis. (Enterprise Ireland and Shannon Development).
- *Ensure* that e-commerce projects are given full access to funds under the R&D incentive programmes of the development agencies. (Enterprise Ireland and Shannon Development).
- *Focus* on providing management development support in developing and implementing business plans to exploit e-commerce. (Enterprise Ireland and Shannon Development)
- *Increase* in-company training, up-skilling and multi-skilling of the workforce with appropriate e-commerce skills particularly in sectors that are likely to be fundamentally impacted by the Internet. (Enterprise Ireland, FAS and Shannon Development)
- *Promote* the development capital and capability supports available from County Enterprise Boards for smaller e-commerce projects (Department of Enterprise, Trade and Employment and County Enterprise Boards)
- *Develop* plans by mid 2000 to provide full electronic services to clients. (Enterprise Ireland, Shannon Development and IDA Ireland)

Enterprise Actions

- *Build* upon local trade association networks to heighten awareness of the opportunities and threats which-commerce will bring.
- *Lead* in delivering benefits to customers through affiliations of asociate companies using web technologies.
- *Provide* training at local level through co-operative networks of similar or related companies.

2.11 Tourism and International Marketing

The Government's Trade Policy Statement, published in January 1998, noted that Government activity must continue to focus on measures to enhance the competitive environment, and to ensure coherence between trade policy and policy objectives in related areas.

E-commerce will increase international trade in services as well as manufactured products. Many services have not yet been exposed to significant international trade, but have operated on a global level only for large corporate clients. This change may come as a shock to sectors that have been sheltered by logistical or regulatory barriers. In addition, it will generate pressures to reduce differences in regulatory standards.

In the same way as Ireland agreed a bilateral communiqué on e-commerce with the US in September 1998, Ireland should agree similar bilateral open market principals on e-commerce trade with key non-EU leaders in e-commerce, including Japan, Australia and Canada. The US has signed similar bilateral agreements with a range of countries, including Japan and France. At a wider level Ireland should consider participating in an e-commerce agreement between US ("representing" NAFTA), Ireland ("representing" the EU), and Singapore ("representing" the Asia Pacific region) to facilitate the development of a pervasive, consistent and secure global technical and regulatory environment for e-commerce.

Ireland should develop a special relationship with an Asian partner to complement that with the US. Singapore is advanced in developing IT and e-commerce and would provide significant opportunities to leverage its learning and expertise.

E-commerce offers the potential for a significant increase in the number of first-time exporters and this should be a particular focus of agency resources. Enterprise Ireland should take appropriate measures to provide businesses with better access to relevant market information in respect of e-commerce, including the establishment of a website for information on all EU regulations and consumer protection information on key international markets.

Portals

A key issue for Irish enterprise is how to ensure that consumers and businesses around the world find the Irish sites, before the sites of their competitors. The rapidly-increasing volumes of information and companies on the Internet pose a challenge to businesses to entice customers to their sites. Global "search engines" and portals are emerging, for example, Yahoo and Alta Vista which are used by Internet users, regardless of nationality.

The development agencies should undertake a review of the use and development of portals to determine how Irish enterprises can most effectively use the Internet to get access to global markets. The Review should address the marketing and promotion needs of the main sectors. Enterprise Ireland should take the lead in developing a favourable image for Ireland, which companies could use, on the Internet. Consistency in delivering such an image is important, aided by an on-going programme of market research to identify weaknesses in the Irish image on the Internet. Irish companies could take advantage of a well-developed Irish Internet image to differentiate their products and services.

The development agencies should provide business with advice and guides on web marketing. This should include developing national codes of practice and guidelines in the use of the Internet for business. Attention should be paid to the design and functionality of websites, and to the effective use of websites for market intelligence. The development of a consistent quality standard across all state agency websites that are involved in promoting Ireland would greatly assist international Internet users. A central website containing market information, including information on consumer protection legislation in key export markets would be valuable for Irish exporters.

A portal should be operated at a national level by Enterprise Ireland and should contain general company and product information. Customers who require more detailed product information or who wish to place an order could be switched directly to the Internet site of the supplying companies. Key words should be carefully chosen and web marketing undertaken to ensure search engines locate such a site.

Access to the Irish internet address, ".ie", is administered by the Computer Science Department of UCD. Access is expensive relative to other countries. It is available only to registered companies and trademark holders. The address should now be made widely available and promoted to assist in the development of an Irish image on the internet.

Actions

The following actions are recommended:

Government Action

- *Agree* bilateral open market principles on e-commerce trade with key non-EU leading countries in e-commerce, including Japan, Australia, Singapore, and Canada. Such agreements should be similar to that agreed between Ireland and US in September 1998. (Departments of the Taoiseach and Enterprise, Trade and Employment).

Agency Actions

- *Create* and maintain a website providing market information, including consumer protection information on key international markets. (Enterprise Ireland and Shannon Development).
- *Redesign* agency websites to act as portals for promoting the products of client companies. (Enterprise Ireland, Shannon Development and IDA).
- *Exploit* the high potential of e-commerce as a way to increase the number of services firms exporting for the first time. (Enterprise Ireland and Shannon Development)
- *Develop* a favourable and consistent standard for agency websites that promote Ireland. (Foreign Earnings Committee & Enterprise Ireland and Shannon Development)
- *Target* key words to trigger search engines to locate sites promoting Ireland. (Enterprise Ireland and Shannon Development).

Enterprise Actions

- *Continue* to focus Internet market attention on specific geographical markets
- *Develop* logistics and credit management capabilities for international e-commerce markets.
- *Leverage* the Irish image on entering new markets and Internet communities.
- *Create* communities of interest on the Internet around groups of complementary Irish suppliers and their international customers, to establish a tight and responsive value chain, and win customer loyalty.
- *Promote* the Irish internet address, .ie, and make it available to Irish companies and individuals at a competitive price.

2.12 Government and Public Administration Government
departments have a key leadership role to play in encouraging e-commerce in the enterprise sector. The Assistant Secretaries Information Society Action Plan published in January 1999 sets out a three-stage approach for the development of e-government over the next three years. This plan is important in encouraging the take-up of e-commerce in the country.

There are a number of pilot projects set out in the plan that will be of direct benefit to the enterprise sector and are particularly welcome. These include initiatives being introduced by the Revenue Commissioners for the electronic submission of tax returns and the development of online registration and returns to the Companies Office.

The Department of Enterprise, Trade and Employment, relevant government departments and development agencies need to help SMEs overcome barriers to the use of the Internet and e-commerce. An initiative is needed to :

- Examine the need for training in the public sector for those who have contact with SMEs on the use of the Internet and e-commerce
- Identify commonly-used government services and forms that should be moved to the Internet, to enable SMEs to use the Internet to interact electronically

Systems should be introduced to allow electronic funds transfer and payment systems within all government departments and state agencies and should start to become available to enterprise clients by the end of 2000.

Codes of practices for handling electronic communications should be developed for the public sector. Contact details and email addresses of relevant sections and staff should be clearly identifiable on departmental websites.

There is a need to develop standards for the consistent structuring of public information and websites. The relevant government departments need to co-operatively develop an online resource, detailing the legal and regulatory framework pertaining to e-commerce. This needs to include the Departments of Enterprise, Trade and Employment, Justice and Law Reform, Public Enterprise, and agencies, such as the Competition Authority.

Ireland should maintain a close watching brief on emerging global e-commerce regulatory and legislative environments. The rapid move to e-commerce has implications for all aspects of public policy formulation, public administration and competitiveness. It is important that the public administration system actively monitors developments internationally, understands the implications for administration and public policy in Ireland and ensures that necessary action is taken.

Government Actions

- *Develop* a co-ordinated awareness and training programme involving all trade organisations and the social partners (Information Society Commission).
- *Provide* government and agency forms on the Internet by mid-2000 so they can either be printed for completion or completed electronically. (Department of the Taoiseach).
- *Introduce* electronic funds transfer and payment systems within all government departments and state agencies for transactions with the enterprise sector by the end of 2001 (Departments of the Taoiseach and Enterprise, Trade and Employment).
- *Develop* standards for structuring public information websites in a consistent way. (Department of Finance)
- *Develop* codes of practices for handling electronic communications between the public sector and the enterprise sector. (Department of Enterprise, Trade and Employment).
- *Develop* links between all websites that provide government services to business firms. (Department of an Taoiseach & ISC).
- *Examine* the need for training in the public sector for those who have contact with SMEs on the Internet.

Summary of Key Actions

Government Actions

- *Ensure* as set out in Section 3, that the legislative and regulatory environment for the protection of intellectual property provides a secure environment from which to create and distribute intellectual property and content. (Department of Enterprise, Trade and Employment)
- *Ensure* that the education system provides sufficient numbers of law graduates with expertise in intellectual property law and procedures. (Department of Education)
- *Ensure* that resources and systems are in place to provide for fast regulatory approval of new e-commerce related financial services. (Department of Finance and Director of Consumer Affairs)
- *Encourage* An Post to develop the capability to guarantee international delivery times, build alliances with international postal services for e-commerce delivery, and provide cash-on-delivery services. (Department of Public Enterprise and An Post)
- *Establish* a coordinated national awareness campaign involving all trade and business representative associations
- *Agree* bilateral open market principles on e-commerce trade with key non-EU leading countries in e-commerce, including Japan, Australia, Singapore, and Canada. Such agreements should be similar to that agreed between Ireland and US in September 1998. (Departments of the Taoiseach and Enterprise, Trade and Employment).
- *Develop* a co-ordinated awareness and training programme involving all trade organisations and the social partners (Information Society Commission).
- *Provide* government and agency forms on the Internet by mid-2000 so they can either be printed for completion or completed electronically. (Department of the Taoiseach).
- *Introduce* electronic funds transfer and payment systems within all government departments and state agencies for transactions with the enterprise sector by the end of 2001 (Departments of the Taoiseach and Enterprise, Trade and Employment).
- *Develop* standards for structuring public information websites in a consistent way. (Department of Finance)
- *Develop* codes of practices for handling electronic communications between the public sector and the enterprise sector. (Department of Enterprise, Trade and Employment).
- *Develop* links between all websites that provide government services to business firms. (Department of an Taoiseach & ISC).
- *Examine* the need for training in the public sector for contact with SMEs on the Internet

Agency Actions

- Assist Irish-owned firms to move up the value chain from bespoke software to world class niche and other products. (Enterprise Ireland and Shannon Development)
- Encourage Irish-owned software firms to supply multinationals globally. (Enterprise Ireland and Shannon Development)
- Encourage the selective consolidation of Irish-owned software companies to create the scale and skills needed to become significant internationally

trading enterprises. (Enterprise Ireland and Shannon Development)
- Promote Ireland as the premier EU location for digital distribution of software direct to business and personal consumers. (IDA Ireland)
- Promote strongly, to overseas software companies, the benefits of centralising their European marketing and technical support in Ireland. (IDA Ireland)
- Promote suppliers of Internet and telecommunications software to locate in Ireland (IDA Ireland) and develop indigenous companies in these software sectors. (Enterprise Ireland and Shannon Development)
- Promote overseas companies in Ireland to undertake additional development work in Ireland as part of virtual teams with their parent companies. (IDA Ireland)
- Encourage the development of indigenous companies in the provision of digital distribution and intellectual property management support services. (Enterprise Ireland and Shannon Development)
- Promote Ireland as the premier EU location from which to digitally distribute content products. (IDA Ireland)
- Encourage major music, media, and information publishers to centralise digital distribution in Ireland and to undertake additional value-added activities such as media asset management, and royalty collection and remittance. (IDA Ireland)
- Encourage Irish-owned electronics SMEs to develop e-commerce capabilities in their supply chains using Internet solutions. (Enterprise Ireland and Shannon Development)
- Promote Ireland strongly as a location for command and control centre investment (IDA Ireland).
- Promote companies manufacturing electronics hardware products for the internet and telecommunications sector. (IDA Ireland and Enterprise Ireland)
- Formulate sectoral strategies to exploit opportunities for indigenous development in emerging e-commerce support services. (Enterprise Ireland and Shannon Development)
- Promote technology companies providing e-commerce support services, such as Internet transactions processing, digital distribution and design. (Enterprise Ireland and Shannon Development)
- Continue to focus on the attraction of leading and emerging e-commerce support service providers to Ireland. (IDA Ireland)
- Identify potential international partners for small Irish owned companies with high growth potential in e-commerce support services. (Enterprise Ireland and Shannon Development).
- Encourage food businesses to use extranets to market and link with retailers world-wide. (An Bord Bia, Enterprise Ireland and Shannon Development)
- Provide advice, training and support for food companies developing e-commerce strategies. (An Bord Bia, Enterprise Ireland and Shannon Development)
- Encourage the development of Internet based solutions to provide full traceability of raw materials in the food chain in Ireland. (An Bord Bia, Enterprise Ireland and Shannon Development).
- Leverage the strong reputation of Ireland's education system to develop on the Internet. Assist businesses and institutions to target niche markets. (Enterprise Ireland and Shannon Development)
- Encourage the leading education and training companies to locate their content-generation, localisation, marketing and distribution and support service activities in Ireland. (IDA Ireland)
- Encourage overseas distance-teaching providers to locate their education support and tuition services in Ireland. (IDA Ireland)
- Attract the in-company training development and provision units of multinationals. (IDA)

- Encourage universities and institutions from other countries to locate their distance learning centres in Ireland. (IDA Ireland)
- Train employees in website management and transaction processing. (CERT)
- Integrate existing information technology systems to the Internet, and to local and national tourism offices, websites and booking systems. (Bord Failte)
- Assemble and publish a guide to electronic and e-commerce facilitating financial services available to small business. (Chambers of Commerce, Irish Internet Association, Banks)
- Strongly promote the development of a full range of web-based banking, credit card validation transaction processing, and fulfilment services that can be used by retailers and other businesses moving to e-commerce. (Irish Bankers Federation).
- Create and maintain a website with information and links to sources of e-commerce banking and financial services, such as credit card processing. (Enterprise)
- Determine the information and communications technology and specialised telecommunications implications of e-commerce in the logistics sector and the required actions to put this in place. (Enterprise Ireland, Shannon Development & National Institute for Transport and Logistics).
- Examine the warehousing and distribution needs of SMEs delivering goods sold on the Internet and the need for consolidated warehouses in international markets. (Enterprise Ireland and Shannon Development).
- Promote the design and production of specialised packaging for e-commerce distribution. (Enterprise Ireland and Shannon Development)
- Promote global logistics providers to establish their European courier distribution centres in Ireland. (IDA Ireland)
- Promote the use of e-commerce and provide training for SMEs. Efforts to increase the awareness of opportunities and threats should be undertaken on a sector specific basis. (Enterprise Ireland and Shannon Development).
- Ensure that e-commerce projects are given priority full access to funds under the R&D incentive programmes of the development agencies. (Enterprise Ireland and Shannon Development).
- Focus on providing management development support in developing and implementing business plans to exploit e-commerce. (Enterprise Ireland and Shannon Development)
- Increase in-company training, up-skilling and multi-skilling of the workforce with appropriate e-commerce skills particularly in sectors that are likely to be fundamentally impacted by the Internet. (Enterprise Ireland, FAS and Shannon Development)
- Promote the development capital and capability supports available from County Enterprise Boards for smaller e-commerce projects (Department of Enterprise, Trade and Employment and County Enterprise Boards)
- Develop plans by mid 2000 to provide full electronic services to clients. (Enterprise Ireland, Shannon Development and IDA Ireland)
- Create and maintain a website providing market information, including consumer protection information on key international markets. (Enterprise Ireland and Shannon Development).
- Redesign agency websites to act as portals for promoting the products of client companies. (Enterprise Ireland, Shannon Development and IDA).
- Exploit the high potential of e-commerce as a way to increase the number of services firms exporting for the first time. (Enterprise Ireland and Shannon Development)
- Develop a favourable and consistent standard for agency websites that promote Ireland. (Foreign Earnings Committee & Enterprise Ireland and Shannon Development)
- Target key words to trigger search engines to locate sites promoting Ireland.

(Enterprise Ireland and Shannon Development).

Enterprise Actions

- Reposition bespoke software businesses as product development businesses, using Internet platforms to identify and develop relationships with new customer groups.
- Evolve from contract outsource work to software product developers, supplying the multinational sector and other customers.
- Move higher up the value chain with a focus on developing specialised products for distribution to international customers using the Internet.
- Build relationships with key staff in the headquarters of multinationals in order to identify new outsourcing and collaborative opportunities.
- Examine the need and opportunity for alliances and consolidation with other firms in order to provide a more comprehensive product range and knowledge base or to share the costs of product development, market development and expansion and sharing of overheads.
- Expand the range of business functions carried out in Ireland, to include marketing, sales, support, research and development, distribution, and management and control of intellectual property. (IDA Ireland)
- Develop businesses that can take advantage of outsourcing opportunities for the wide range of content industries that are moving to distribution over the Internet.
- Develop businesses to track the flow of transactions and remittance of royalty payments to copyright holders for digitised content such as film clips, literature, music, photographs, and other content from archives and libraries.
- Build and integrate e-commerce systems to serve customers in Ireland and internationally.
- Identify distribution channels that sell and deliver products direct to consumers, and adopt business strategies that build relationships directly with end-users.
- Build on e-commerce systems and extranets in food supply chains to serve business customers.
- Identify new food distribution intermediaries that sell and deliver products direct to consumers.
- Leverage traceability for food products throughout the supply chain as a competitive advantage.
- Explore aggregation opportunities within and between food categories.
- Convert education and training provision to Internet-based platforms for delivering distance-learning products.
- Develop in-house corporate training programmes into specialist products marketed internationally and delivered over the Internet to companies with similar training needs.
- Develop alliances in multimedia and other sectors to convert content for use on the Internet.
- Build upon local trade association networks to heighten awareness of the opportunities and threats which-commerce will bring.
- Lead in delivering benefits to customers through affiliations of asociate companies using web technologies.
- Provide training at local level through co-operative networks of similar or related companies.
- Continue to focus Internet market attention on specific geographical markets
- Develop logistics and credit management capabilities for international e-commerce markets.
- Leverage the Irish image on entering new markets and Internet

communities.
- Create communities of interest on the Internet around groups of complementary Irish suppliers and their international customers, to establish a tight and responsive value chain, and win customer loyalty.
- Promote the Irish internet address, .ie, and make it available to Irish companies and individuals at a competitive price.

3 Business Environment

E-commerce is a business issue. It will affect all businesses in Ireland, and in particular those engaged in international trade. It will also affect businesses previously sheltered from international competition in home markets. It can make a significant contribution to the achievement of national social and economic objectives. It also offers significant new enterprise and inward investment opportunities. A supportive and adaptive business environment is essential to realise this potential.

The changes being brought about by e-commerce at enterprise level require new frameworks for conducting business: government policies relating to commerce need to be re-examined, as most were formed with a very different image of commerce in mind. Reform is needed in legal and regulatory areas, such as trusted third parties, contract law and tax collection. However, action is also required in other policy areas that influence enterprise competitiveness including logistics, skills, awareness, training, and international marketing.

This section sets out the key actions required on the part of government, the development agencies, and the enterprise sector. A partnership approach is required to speedily implement the required changes.

3.1. Legal and Regulatory Framework

The development of a secure and conducive legal environment for e-commerce could establish a first mover advantage for Ireland as an e-commerce business jurisdiction. The legal framework for traditional forms of commerce has developed over the centuries, but e-commerce is giving rise to fundamentally new forms of commerce, for which the legal framework remains to be determined. A number of the key aspects of the legal framework are being discussed at EU level, but Ireland must also introduce domestic measures to provide a clear, certain and secure environment for e-commerce transactions.

3.1.1 Certification and Trusted Third Parties

Trust is essential to all commercial undertakings. In e-commerce, trust is particularly important as the parties to the transaction may never meet – the identity of partners is therefore a serious issue. The buyer wants assurance that the seller (a) exists, and (b) is worth doing business with. The seller likewise wants to know that the buyers are who they say they are, and that the payment is secure.

A system whereby organisations are accredited to certify the existence of individuals and companies in Ireland is required. Such organisations should interact with their counterparts around the world so that the same identification information, on potential suppliers and customers, can be made available to Irish companies and individuals trading internationally. It is proposed that accreditation should be on a voluntary basis.

The provision of assurances that individuals and companies are worth doing business with should be left to the market. Financial and other organisations may decide to provide such information.

An Post, through its subsidiary PostGem, and the Chambers of Commerce of Ireland have both launched certification services for enterprises in the first half of 1999, which are welcomed.

A draft consultation paper[14] has been prepared on a proposed future approach. It is expected to form the basis for a Bill, to be published in the final quarter of 1999. The consultation paper proposes mechanisms to ensure legal recognition of secure electronic transactions and will also include outline legislative provisions on electronic contracts, electronic signatures, electronic writing as well as certification service providers and related matters. It advocates providing:

- Legislative recognition of electronic signatures
- A legal basis for accrediting certification service providers
- Recognition of advanced electronic signatures, with defined characteristics
- Recognition for "certificates" linking signature verification data to a person and confirming the identity of that person, and "qualified certificates", which meet the requirements of the accreditation authority and are provided by a certification service provide (Trusted Third Party).

The Accreditation Scheme[15] envisaged is already at an advanced stage of development in other European countries. However, the accreditation criteria against which certification service providers might be assessed are still being developed. A first mover advantage could accrue to Ireland by providing such an accreditation service in advance of international developments. The characteristics of the scheme to be applied in Ireland are becoming clear:

- Provision of certification services will not be subject to prior authorisation by a Minister
- Accreditation of these certification services will be voluntary in nature
- "Evidential weight" will be given to both electronic signatures and advanced electronic signatures, but by implication, chain of evidence requirements will be more rigorous for signatures associated with non-accredited certification service providers

The following actions are required:

Government Action

- *Bring* forward, as a matter of urgency, the Bill to provide a framework for voluntary certification. (Department of Public Enterprise and Department of Enterprise, Trade and Employment

Agency Actions

- *Develop* and administer a national voluntary scheme for accrediting organisations to certify that individuals and organisations in Ireland exist. The accreditation scheme should be put in place quickly and prior to the enactment of legislation. (National Accreditation Board)

Enterprise Actions

---

[14] Outline Legislative Proposals on Electronic Signatures and Certification Service Provision, Department of Public Enterprise, April 1999.
[15] The essential concept of Accreditation is an independent and authoritative assessment of the competence of the Certification Service Provider to carry out its work.

- *Encourage* trade and other organisations to establish self-regulating standards of approval for use by companies engaging in e-commerce.

3.1.2 Copyright

Copyright protection is fundamental to e-commerce and digital distribution of content. A Copyright Bill is being brought forward by the Department of Enterprise, Trade and Employment to be passed into legislation by the end of 1999. It accommodates all outstanding EU and World Trade Organisation (WTO) Directives, and is intended to provide international protection for copyright material in Ireland. Ideally, the legislation should enable the promotion of Ireland as the most secure place from which to do digital business.

A number of actions are required including:

Government Action

Ensure that the new copyright legislation:

- *Makes* it an offence to post copyright material on public web sites without the copyright owner's consent, even if not downloadable
- *Includes* protection for technical designs posted on the Internet
- *Enhances* the enforcement powers and penalties for electronic breach of copyright

(Department of Enterprise, Trade and Employment)

3.1.3 Electronic Contracts

A Directive on certain legal aspects of electronic contracts is under discussion at EU level, but it could be 2001 before an agreed directive is implemented. Ireland should move in the interim to provide a framework of legal certainty. Ireland should set out a legislative framework for e-commerce contracts, specifically addressing the point of creation and conclusion of contracts.

Businesses must ensure that in making offers for the sale of goods or supply of services on their websites, they notify to customers the "contract agenda" of relevant jurisdiction and applicable laws.

The following actions are required:

Government Action

- *Enact* legislation to ensure the legitimacy and enforceability of e-commerce contracts. The legislation should also ensure certainty on the applicable jurisdiction. Pending agreement at EU level this legislation should be based on a contractual model which has been development the United Nations.
- *Ensure* contracts made and signed electronically have the same force in law as if they had been made and signed physically.
- *Establish* a resource on the Internet to provide information for businesses on

electronic contracts. (Departments of Enterprise, Trade and Employment and Public Enterprise)

Enterprise Action

- *Specify* on websites and in e-commerce transactions the legal jurisdiction that will apply to contracts with clients and, where possible, the key legal provisions or a link to a resource setting out the relevant provisions.

3.1.4 Electronic Evidence and Dispute Resolution

There are two key issues relating to the use of electronic evidence. The first is its admissibility, and the second is the weight assigned to it and the parameters for its use. Legislation is required to provide for electronic evidence in civil proceedings and to set out the parameters for its use. This can be done through an amendment to the Criminal Evidence Act, 1992.

Once these issues have been addressed, guidelines will be required as to what procedures are necessary (in respect of storage of data etc.) in order that computer records are considered sufficient in evidential terms.

There is an opportunity for Ireland to develop as an international centre for the arbitration of disputes on electronic transactions. Countries such as the Netherlands and the UK have previously developed as leading international centres for the settlement of copyright disputes. Training of arbitrators should cover the domestic, European and international legal framework pertaining to e-commerce, and in particular, the proposed legislative changes. A pool of arbitrators, who are internationally recognised experts, is essential to the promotion of Ireland as a centre for dispute resolution.

There is also an opportunity to develop as a leading international location for the settlement of small claims. In the medium-to-long term, an electronic fast track/ small claims court could be developed.

The following actions are required:

Government Action

- Update the Criminal Evidence Act, 1992 to provide for electronic evidence in civil proceedings.
- Promote arbitration as a suitable dispute resolution mechanism for e-commerce transactions.
- Encourage national courts to develop e-commerce expertise.
- Consider the establishment of an online international arbitration mechanism, which companies can use to resolve disputes, regardless of their country of origin.
- Publish guidelines as to the procedures necessary (in respect of storage of data etc.) in order that computer records are considered sufficient in evidential terms.
- Consider the establishment of an online Small Claims Court to deal with disputed e-commerce transactions.

(Department of Justice and Law Reform, Department of Enterprise, Trade and Employment and the Department of Public Enterprise)

Agency/Enterprise Action

- *Encourage* Encourage the development of a pool of arbitrators to deal with disputes on e-commerce transactions. (Law Society/Bar Council/Enterprise Ireland/IDA Ireland)

3.1.5 Liability in Respect of the Sale of Goods and Services

The number and characteristics of intermediaries involved in e-commerce transactions differ from those in traditional commerce, in particular for digitally delivered services. The liability of intermediaries must be clarified, specifically, the application of the 'mere conduit' rule.

Legislation dealing with the sale of goods and services needs to be amended to cater for goods and services offered, sold or distributed electronically. The liability of intermediaries requires to be clarified. The new legislation should apportion liability for loss or damage between the provider of the goods or services, distributors and those intermediaries that act as 'mere conduits'. Intermediaries that simply facilitate or provide access between one party and another should not incur liability for the sale of a product or service.

Uncertainty on this issue can deter the establishment of intermediaries in Ireland and they are an important element in developing an e-commerce economy. The product liability regime for unsafe products also requires examination.

Enterprises engaging in e-commerce should agree with intermediaries the terms of business in advance including delivery, quality, reliability, standards expected, and liability in event of loss or damage. Existing enterprise insurance cover in respect of physical delivery should also be assessed where new modes of delivery are being used.

The following actions are required:

Government Action

- Update the body of legislation relating to the sale of goods and services to recognise goods and services offered, sold, or distributed electronically. The legislation should apportion liability for loss or damage between the provider of the goods or services, and any intermediaries or distributors.
- Clarify that intermediaries operating as 'mere conduits' or simply as access providers should not incur liability.

Joint Government/Agency Action

- *Develop* Develop a guide for businesses on relevant consumer protection legislation in key US, European and other markets. (Department of Enterprise, Trade and Employment, Enterprise Ireland and Shannon Development)

Enterprise Actions

- *Agree* in advance with intermediaries the terms of business for delivery (electronic and physical), quality, expected reliability standards, and liability in event of loss or damage.
- *Review* existing enterprise insurance cover where new modes of delivery, such as courier parcel delivery, are being used to fulfil e-commerce purchases.

3.1.6 Defamation

In theory, defamation cases on foot of defamatory material posted on the Internet can be taken in any country in which it can be viewed. From Ireland's perspective, the liability of companies hosting such material on mirror sites or acting as mere conduits for such material, requires clarification. This is particularly important in attracting the major information and news services to locate here. The regulations should set out the parameters for determining negligence in respect of such material.

3.1.7 Unsolicited Commercial E-mail

Spamming is the practice of sending unsolicited commercial material, such as mass mail shots, to communities or individuals across the Internet. This abuse of Internet capabilities is causing problems for Internet Service Providers (ISPs) and others and disrupts the provision of efficient services to business. National codes of practice need to be developed, differentiating between direct marketing activities and spamming to encourage customer relationship marketing activities from Ireland and to encourage global ISPs to locate here.

Government Action

- *Encourage* Encourage the development of codes of practice in respect of unsolicited commercial communications via e-mail. (Department of Enterprise, Trade and Employment)

3.1.8 Encryption

One obstacle facing companies involved in e-commerce is controls on the export of encryption products. Encryption essentially scrambles information in a way that can only be undone by users with proper authorisation. The level of security afforded by encryption is related to the size of the authorisation key. This is measured in bits.

Ireland along with most industrialised countries is subject to the Wassenaar Arrangement treaty and relevant EU legislation that regulates the export of products with encryption software built in. The US government exempts the export of products that contain weak encryption of up to a maximum of 56 bits but controls the export of higher-bit products. The affect for e-commerce is that whereas US companies may be permitted to use standard commercial systems with 128-bit encryption within the US, those outside using the same software for e-commerce may be restricted to using products at weaker levels.

Ireland needs to ensure that any regulations of encryption do not create unnecessary barriers to growth of e-commerce and should seek to achieve a relaxation of export controls on encrypted products. One method of achieving this would be to permit the export of products that met set criteria under an open licence after a one-time review.

The following actions are required:

Government Action

- *Discuss* with the US authorities the options for easing restrictions on trade of high-bit encryption software
- *Introduce* fast track procedures for licensing encryption products for export or the introduction of an Open General Export Licence. (Department of Enterprise, Trade and Employment)

3.1.9 Hacking

Unlawful interference with the business resources of Irish e-commerce users (hacking) can be a serious problem for companies, particularly where confidential information is involved. Hacking should be deterred by penalties, with a strong enforcement regime.

The following actions are required:

Government Action

- *Ensure* appropriate regulatory provisions and penalties are in place to deter 'hacking' of e-commerce resources. (Department of Enterprise, Trade and Employment)
- *Ensure* that skilled resources are made available for investigation of hacking and enforcement. (Department of Justice and Law Reform)

3.1.10 Consumer Protection

There is a need for a clear legal framework relating to consumer protection, both to encourage the take-up of e-commerce among consumers and to provide certainty for enterprises. Enterprises engaging in e-commerce with European and North American consumers should understand in advance their obligations under country-specific consumer protection regulations.

Irish consumer protection law includes EU directives and domestic legislation, and provides substantial certainty and protection for consumers. However, consumer protection regulations are not yet fully harmonised in the EU. A Distance Selling Directive, applicable to e-commerce contracts, is being developed at EU level. This Directive will give consumers the right to prior information on the identity of suppliers, on the characteristics of goods and services being offered, on price and delivery costs, the duration of offers, and the right to withdraw within seven days, (possibly 30 days for financial services contracts and mortgages).

From an enterprise perspective, developing business-to-consumer e-commerce within the existing and proposed framework of consumer protection legislation will require careful management by business firms. Businesses will need to be aware of the consumer protection requirements in markets in which they are trading over the Internet. Specifically, unlike business-to-business contracts, there are limitations to businesses imposing choice of law and jurisdiction clauses on consumers. Under Common Law the jurisdiction where the consumer habitually resides generally prevails. This could have implications for the remote digital delivery of goods and services, such as software and music as referred to in section 2.11 above.

Enterprise Actions

- *Clarify* the rights and protection afforded to consumers in different countries when engaging in business-to-consumer e-commerce.

3.2 Skills

The emergence of skills shortages is a major issue that could constrain the development of the Irish economy. It is receiving a high priority in other work carried out by Forfás and is not, therefore, dealt with in great detail in this report. Success in tackling skills and the telecommunications infrastructure will, more than any other issues, determine the rate of progress in e-commerce.

The Expert Group on Future Skills published its recommendations in respect of the needs of the IT sector in late 1998. In April 1999, the Government committed h95million to the full implementation of the Expert Group's report. This includes an additional 5,400 places over the next four years in technical, vocational and degree level courses. These places will go a long way towards addressing the high skill needs of the information technology sector into the future.

However, all sectors of the economy will increasingly require multidisciplinary staff and graduates with information and communication technology (ICT) skills combined with other business-related skills if they are to compete in the e-commerce business environment.

Multi-Disciplinary Skills
E-commerce requires ICT expertise, coupled with strong business applications. There will also be a requirement for specialists in e-commerce operations, production management, logistics, graphic design, and multimedia disciplines.

The Expert Group on Future Skills should build on its work for the IT sectors and examine the e-commerce skills needs of the other major sectors of the economy.

A high proportion of the future skills needs could be addressed through the introduction of ICT modules in existing courses, in particular in business, legal and international marketing disciplines. The third level sector will need to integrate ICT/e-commerce modules into all courses, to ensure graduates are capable of working in an e-commerce environment.

Multimedia/IT
There is a need for a significant expansion of the national third-level multimedia infrastructure, in particular of the facilities in the Dublin Institute of Technology,

Trinity College Dublin, the Senior College Ballyfermot and FÁS. An important part of the third-level infrastructure will be the establishment of a dedicated national college for multimedia. Multimedia education should allow students to work closely with companies, both through research project and through work placement assignments.

Consideration requires to be given to the introduction of conversion courses to allow students from other sectors to pursue a career in multimedia. Strong links between multimedia and other educational institutions should be encouraged.

In summary, the creative and technical skill base needs to be developed in the following ways:

- The expansion of existing multimedia activities, particularly in the Dublin Institute of Technology, Trinity College Dublin, Senior College Ballyfermot and FÁS
- The introduction of conversion courses to allow students from other disciplines to pursue a career in digital business
- The development of courses that include modules where students would learn the business benefits of advanced applications
- The establishment of a higher-level dedicated National College of Multimedia

Distance Learning
The NUI, NCEA and other professional bodies need to establish systems for the accreditation of courses delivered online to students. The distance learning university Oscoil and other education and training institutes need to enhance their distance learning provision.

Migration
The inward migration of skills is now a key part of the development plans of a range of companies. While high proportions of inward migrants are returning emigrants and EU nationals, the import of skills for the technology sectors from non-EU countries is increasing. There were an estimated 44,000 inward migrants in 1998, 23,200 of which were returning Irish emigrants, 14,100 were EU nationals and 6,700 were non-EU that would need work permits. To support the development of high-technology companies, relevant government departments need to ensure that applications for work permits are dealt with in an expedient manner and that increasing resources are allocated to processing these applications as the numbers increase over the coming years.

The following actions are required:

Government Action

- *Examine* the multi-disciplinary and e-commerce skills needs of major sectors. (Expert Group on Future Skills) Encourage the introduction of ICT/e-commerce modules in all third level courses. (NCEA, NUI and CHUI)
- *Promote* the establishment of a National College of Multimedia (Departments of the Taoiseach and Education and Science)
- *Develop* the creative and technical skills base through expanding existing multimedia activities and through the introduction of conversion courses

Enterprise Actions

- *Examine* the operational and marketing skill sets required to compete in an

e-commerce environment and prepare in-company skills development programmes.
- *Encourage* networks of enterprises to develop and undertake e-commerce training programmes at local level.

3.3 Research and Technological Innovation

There needs to be a deeper commitment to research and technological/innovation (RTI) by industry in Ireland, including much deeper and wider collaboration with institutions of higher education. The innovative and commercial sharing and use of technological research among the research community and industry have fuelled the leadership of the US in e-commerce. It has also been based on the continuous flow of new developments and applications in telecommunications and information technology arising from research programmes.

A greater awareness by industry in Ireland of the potential impact of telecommunications and IT research is required. This should include an understanding of the benefits of deeper collaboration between third-level colleges and industry. The Irish Council for Science, Technology and Innovation (ICSTI), under the auspices of Forfás, has proposed, as part of a "Technology Foresight" exercise, the development of the research base in information and communications technologies to world class standards. It is vitally important that progress is made to implement core foresight actions by the end of 1999.

The National Development Plan, 2000-2006 should give priority to a new Research, Technology and Innovation Sub-Programme with a focus on advanced communication research and supporting e-commerce applications.

One of the core recommendations arising from Foresight is the need to develop a Centre for Advanced Informatics. It is envisaged that this would play the leading role in encouraging research teams to address technological opportunities seen to be vital to the national interest. It would provide the natural link to global excellence in key ICT areas, attracting top level professionals from other locations worldwide. It will act both as a resource and an exemplar to all Ireland-based enterprises.

The criteria for approval of R&D support require to be assessed to ensure that they are accessible for research on e-commerce developments and applications. Criteria that concentrate on supporting capital expenditure as part of the proposal rather than on action and qualitative research on the strategic, economic, social and organisational impacts of e-commerce are barriers to development and must be changed. The Department of Enterprise, Trade and Employment and the agencies need to develop a national mechanism that would support companies and third level institutes in the commercialisation of research. Web techniques can contribute substantially to this effort.

The origins of the Internet and its early development lie in research networks. The future of the Internet will also be closely related to the work carried out in third level institutions and advanced research laboratories. Ireland needs to monitor and be involved in the development of Internet II and Next Generation Internet (NGI), and examine the options for participation.

The UCAID project (University Cooperation for Advanced Internet Development) should be used as the stimulus for Irish researchers to contribute to both international and enterprise-based Internet research projects.

The level of research on the development and implications of e-commerce for Ireland and the enterprise sector in particular requires to be rapidly increased. To ensure a strategic orientation this research needs to be jointly funded by industry, the third-level sector and government. This research is essential to the policy/strategy making process at both national and enterprise level. Specifically, research is required in the following broad areas:

- Facilitators and barriers to e-commerce diffusion within Ireland
- Strategic and operational implications of e-commerce for Irish industry
- Management of e-commerce within SMEs
- Economic and social implications of e-commerce for Ireland

The EU Fifth Framework programme has actions targeted specifically at e-commerce related actions. Irish enterprise must be actively encouraged to avail of the opportunity to participate in partnerships where it will contribute to their strategic goals.

The following actions are required:

Government Action

- *Implement* the recommendations of Technology Foresight in order to make Ireland a centre of world-class research in information and communications technologies.
- *Ensure* that the National Development Plan includes an Information Society sub-programme (within the RTI provisions) with a focus on e-commerce applications and content.
- *Ensure* Ireland is appropriately involved internationally in initiatives to develop Internet. (Department of Enterprise, Trade and Employment)

Agency Actions

- *Ensure* that the criteria used to evaluate e-commerce projects for funding are appropriate to the nature and risk inherent in them. (Enterprise Ireland and Shannon Development).
- *Re-emphasize,* among client companies, the e-commerce related research opportunities in the EU Fifth Framework Programme that offers part funding on a competitive basis to successful consortia. (Enterprise Ireland/Shannon Development)

Enterprise Actions

- *Use* the results of research and development studies to help develop new, innovative e-commerce related products and services.
- *Use* web technologies to improve relationships among research groups and industry.

3.4 Tax

The taxation regime has a major impact on all forms of commerce. How it is adapted to e-commerce, and how well it facilitates rather than hinders such commerce, will be to central to development. The general principle that the tax system should not distort trade between electronic and traditional means should prevail.

3.4.1 Value Added Tax

Under current rules, the supply of digital services such as software and music, to business and private customers within the EU is subject to Value Added Tax (VAT). However, services from non-EU suppliers to EU consumers are not directly subject to VAT in the EU, due to collection and monitoring issues. As the main e-commerce trade is west to east, this VAT 'loss' is a legitimate concern for the EU. As trade shifts from business to end-user, the transaction is more difficult to track, and hence the VAT harder to account for.

At present, companies must register in each member state if supplying goods or services in that State. The EU is, however, considering amendments and aims to have a single place of VAT registration for all electronic traders. Under these proposals the VAT rate applicable in the country of registration would be applied to all business-to-consumer transactions. As Ireland's VAT rate of 21% is higher than some other EU countries, companies will have an incentive to register in and digitally distribute products from the countries with the lower VAT rates, such as Germany with a 16% VAT rate or the UK with a 17.5% VAT rate. Companies will also consider differences in other costs, such as corporation tax.

It would be more in keeping with the basic principles of VAT to have the VAT on digitally supplied services to consumers levied at the rate applicable in the country of residence of the consumer and remitted back to that member state. Ireland should push for the adoption of this solution by the EU.

A number of actions are required:

Government Action

- *Seek* EU approval for services to be taxed at the VAT rate in the country in which they are consumed. (Department of Enterprise, Trade and Employment, Finance and Revenue Commisioners)

Agency Actions

- *Examine* the issues and options relating to the development of a VAT regime in Ireland that will best facilitate the growth of e-commerce, including the option of reducing the standard rate. (Forfás)

3.4.2 Withholding Tax

The European Patent Office is proposing that European rules on software patenting be altered to conform to agreements negotiated through the WTO. This could lead

to a dramatic increase in the patenting of software in Europe. In these circumstances, software developed in Ireland could benefit from the patent royalty exemptions, and Ireland could become the European centre for patenting software for non-EU companies supplying software in the EU.

Up to now, the software industry has not opted to take out patents on software, given the short product life cycles, and the ability to register and protect copyright on intellectual property. However, this may be about to change, as companies in the US are increasingly patenting e-commerce-related software and processes. The EU is likely to follow this lead.

Through Ireland's series of negotiated tax treaties, the remittance of royalties on patents from Ireland are subject to zero or reduced withholding tax. Reduced rates of 10 per cent apply to treaty countries such as Australia, Japan, New Zealand and Israel, all of which have strong ICT sectors. The rate of withholding tax for non-treaty countries is 24 per cent and the implications of this for attracting investment from non-treaty countries requires to be kept under review as the new patenting regime emerges.

3.4.3 Business Development Capital

While the availability in Ireland of seed and venture capital for high technology start-ups has significantly increased over the past three to four years, there is an increasing need among e-commerce start-ups and entrepreneurs for early stage capital of between £50,000-£100,000. The expansion of existing funds to support technology start-ups related to e-commerce and increased competition between the funds in the technology area should be encouraged by Enterprise Ireland. The following action is recommended:

Agency Actions

- *Encourage* the expansion of seed and venture funds to support e-commerce related start-ups. (Enterprise Ireland)

3.4.4 Benefit in Kind

The Benefit-in-Kind tax regime must be kept under review to ensure that teleworking is facilitated and encouraged, as it evolves. This should include exemptions from BIK for personal computer equipment and peripherals, and for advanced communications infrastructures, such as ISDN telephone lines.

3.4.5 Profit Sharing and Share Options

Emerging skill shortages and increasing competition on wage levels in parts of the information and communications technology labour market are making it difficult for new and emerging companies to retain high-skilled staff. Encouraging profit sharing and employee share option schemes through the tax system could significantly increase the incentives for entrepreneurship, improve the survival rates of new IT start-ups through retention of staff, and restrain high-skill wage inflation.

The following action is required:

Government Action

- *Consider* the options and bring forward proposals to encourage alternative forms of remuneration to encourage enterprise in the ICT sector, including the possibility of a reduced income tax rate for income from profit sharing schemes. (Department of Enterprise, Trade and Employment, Department of Finance, Forfás and Enterprise Ireland)

3.5 Performance Indicators

Accurate and timely statistics will be vital for effective policy development in the digital age. The speed of change is such that web technologies themselves must be used for information interchange and dissemination.

There is also a need to continuously benchmark against international best practice the development of electronic commerce in key enterprise sectors of the Irish economy. This work is already underway within the development agencies through Forfás telecommunications benchmarking.

The Department of Enterprise, Trade and Employment, Forfás and Enterprise Ireland have also been involved in a number of benchmarking initiatives at EU level. These included a pilot benchmarking project for the EU Industry Council during 1998 on Information and Communications Technology and Organisation for which Forfás provided the research on Ireland. The industry benchmarking work ongoing in Enterprise Ireland requires to specifically address the development of e-commerce at a sectoral level.

Other countries are moving ahead on addressing this need. The five Nordic countries have developed an initiative to measure ICT usage across 18 indicators. The US is to create a new industry code recognising electronic shopping establishments and trade that will be in place by 2002.

For Ireland, there is a need for data across a range of indicators including:

- The number and classification of e-commerce companies/operations in the country
- Turnover and volumes of online transactions
- International e-commerce trade
- Investment in ICTs in the economy
- Employment and occupation trends in e-commerce industries
- E-commerce sub supply, consumer purchases and so on

The following actions are required:

Government Action

- *Assess* Ireland's e-commerce statistical requirements and undertake a review of relevant indicators. (Department of Enterprise, Trade and Employment, the CSO, Revenue Commissioners, Forfás and Enterprise Ireland)

Agency Actions

- *Include* e-commerce indicators in agency surveys where appropriate. (Forfás, Enterprise Ireland, Shannon Development, IDA Ireland)
- *Develop* the Forfás annual Irish Economy Expenditures Survey to track e-commerce trade in the manufacturing and internationally traded service sectors. (Forfás)
- *Co-ordinate* and develop sectoral benchmarking to incorporate appropriate measures on e-commerce (Forfás, Enterprise Ireland, Shannon Development)

3.6 Competition Policy

Competition policy will have to address new types of anti-competitive behaviour. Many e-commerce products benefit from non-rivalry (one person's consumption does not limit or reduce the value of the product to other consumers), network externalities (each additional user of a product increases its value to other users), and increasing returns to scale (unit costs decrease as sales increase).

These factors create an environment where producers may seek to engage in practices that permit them to establish themselves as the, or part of the, de facto standard. Similarly leading companies in related sectors are developing their e-commerce capabilities through acquisitions in converging markets. Such developments can hinder innovation and competition.

As the Competition Authority's enforcement of competition law is typically reactive the issue of introducing proactive regulatory guidelines to prevent this development becomes an issue of concern. The EU has issued the following principles regarding an e-commerce regulatory framework:

- No regulation for regulations sake
- Any regulation must be based on all Single Market freedoms
- Any regulation must take account of business realities
- Any regulation must meet general interest objectives effectively and efficiently

Thus legislation in this complex industry will have to be designed not only to prevent anti-competitive behaviour, but also to take into account the need for globally harmonised policies.

The Competition Authority will need to continue to develop its understanding and expertise in technology markets, monitor changes in ICT industry structures as they emerge, and take appropriate action to ensure that innovation and competitive markets are encouraged as e-commerce develops.

3.7 North South

There is a long tradition of successful industrial development in Northern Ireland, with many key technology-intensive firms located there. As a later- developing region, the South has perhaps made more recent progress in the ICT field. In recent years, the cross-border flow of graduates with ICT and software skills and spill-

overs of research and knowledge have been mutually beneficial to the development of knowledge sectors both North and South.

A recent survey[16] identified a number of difficulties in developing North-South trade. For Northern firms these included currency issues, political/cultural factors and networking. For Southern companies the main difficulties included payments, the need for sales representatives and local councils. The Internet could make a major contribution to eliminating these difficulties, with associated economic and social benefits to all involved.

E-commerce and information sharing could be encouraged as a means of increasing networking through the development of extranets linking the key development and marketing agencies, industry groups and community development actions in the North and South. These should provide links to encourage subsupply opportunities and should also act as forums for market intelligence, case studies and demonstration projects. Public procurement projects could also be featured on these extranets.

Several smaller co-operation efforts with the universities/institutes/RTD base in North are now underway. These include for example the Nortel research centre, the Belfast software R&D infrastructure and the Northern Ireland Nerve Centre. The Technology Foresight report noted the benefits that a Radian style initiative could have for the building of teams around US based opportunities.

The Internet also requires to be used to increase the infrastructural linkages between North and South and ensure optimal use of the installed infrastructure. Airports, ports and logistics centres in the northern half of the island have major contributions to make to cross-border trade and should be facilitated by using Internet technologies to promote the services provided and enable enterprises plan their route and access strategies in a more efficient way.

Co-operation in leisure, tourism and cultural fields already underway should be reflected by portal-style web presence for both marketing and development agencies.

The following action is recommended:

Summary of Key Business Environment Actions
Government Action
Bring forward, as a matter of urgency, the Bill to provide a framework for voluntary certification. (Department of Public Enterprise and Department of Enterprise, Trade and Employment)   *Ensure* that the new copyright legislation: *Makes* it an offence to post copyright material on public web sites without the copyright owner's consent, even if not downloadable.   *Includes* protection for technical designs posted on the Internet.   *Enhances* the enforcement powers and penalties for electronic breach of copyright. (Department of Enterprise, Trade and Employment)   *Enact* legislation to ensure the legitimacy and enforceability of e-commerce contracts. The legislation should also ensure certainty on the applicable

---

[16] Border barriers to Trade, Technology Ireland, UCD, 1999.

jurisdiction. Pending agreement at EU level this legislation should be based on a contractual model which has been developed by the United Nations.

- *Ensure* contracts made and signed electronically have the same force in law as if they had been made and signed physically.
- *Establish* a resource on the Internet to provide information for businesses on electronic contracts.
- *Update* the Criminal Evidence Act, 1992 to provide for electronic evidence in civil proceedings.
- *Promote* arbitration as a suitable dispute resolution mechanism for e-commerce transactions.
- *Encourage* national courts to develop e-commerce expertise.
- *Consider* the establishment of an online international arbitration mechanism, which companies can use to resolve disputes, regardless of their country of origin.
- *Publish* guidelines as to the procedures necessary (in respect of storage of data etc.) in order that computer records are considered sufficient in evidential terms.
- *Consider* the establishment of an online Small Claims Court to deal with disputed e-commerce transactions.
- *Update* the body of legislation relating to the sale of goods and services to recognise goods and services offered, sold, or distributed electronically. The legislation should apportion liability for loss or damage between the provider of the goods or services, and any intermediaries or distributors. (Department of Justice and Law Reform, Departments of Enterprise, Trade and Employment and the Department of Public Enterprise)
- *Clarify* that intermediaries operating as 'mere conduits' or simply as access providers should not incur liability. (Department of Enterprise, Trade and Employment)
- *Encourage* the development of codes of practice in respect of unsolicited commercial communications (spam) via e-mail. (Department of Enterprise, Trade and Employment)
- *Discuss* with the US authorities the options for easing restrictions on trade in high-bit encryption products. (Department of Enterprise, Trade and Employment)
- *Introduce* fast track procedures for licensing encryption products for export or the introduction of an open general export licence. (Department of Enterprise, Trade and Employment)
- *Ensure* appropriate regulatory provisions and penalties are in place to deter 'hacking' of e-commerce resources. (Department of Enterprise, Trade and Employment)
- *Ensure* that skilled resources are made available for investigation of hacking and e-enforcement. (Department of Justice and Law Reform)
- *Examine* the multi-disciplinary and e-commerce skills needs of major sectors. (Expert Group on Future Skills)
- Encourage the introduction of IT modules in all third level courses. (NCEA, NUI and CHUI)
- *Promote* the establishment of a National College of Multimedia. (Departments of the Taoiseach and Education and Science)
- *Develop* the creative and technical skills base through expanding existing multimedia activities and through the introduction of conversion courses. (Department of Education and Science)
- *Implement* the recommendations of Technology Foresight in order to make Ireland a centre of world-class research in information and communications technologies.
- *Ensure* that the National Development Plan includes an Information Society sub-programme (within the RTI provisions) with a focus on e-commerce applications and content. (Department of Enterprise, Trade and

Employment)

- *Ensure* Ireland is appropriately involved internationally in initiatives to develop the Internet. (Department of Enterprise, Trade and Employment)
- *Seek* EU approval for services to be taxed at the VAT rate in the country in which they are consumed. (Departments of Enterprise, Trade and Employment, Finance and Revenue Commissioners)
- *Consider* the options and bring forward proposals to encourage alternative forms of remuneration to encourage enterprise in the ICT sector, including the possibility of a reduced income tax rate for income from profit sharing schemes. (Department of Enterprise, Trade and Employment, Department of Finance, Forfás and Enterprise Ireland)
- *Assess* Ireland's e-commerce statistical requirements and undertake a review of relevant indicators. (Department of Enterprise, Trade and Employment, the CSO, Revenue Commissioners, Forfás and Enterprise Ireland)

Agency Actions

- *Develop* and administer a national voluntary scheme for accrediting organisations to certify that individuals and organisations in Ireland exist. The accreditation scheme should be put in place quickly and prior to the enactment of legislation. (National Accreditation Board)
- *Encourage* the development of a pool of arbitrators to deal with disputes on e-commerce transactions. (Law Society/Bar Council/Enterprise Ireland/IDA Ireland)
- *Develop* a guide for businesses on relevant consumer protection legislation in key US, European and other markets. (Department of Enterprise, Trade and Employment, Enterprise Ireland and Shannon Development)
- *Encourage* networks of enterprises to develop and undertake e-commerce training programmes at local level. (Enterprise Ireland, Shannon development, Údarás)
- *Ensure* that the criteria used to evaluate e-commerce projects for funding are appropriate to the nature and risk inherent in them. (Enterprise Ireland and Shannon Development)
- *Re-emphasise* among client companies, the e-commerce related research opportunities in the EU Fifth Framework Programme that offers part funding on a competitive basis to successful consortia. (Enterprise Ireland/Shannon Development)
- *Examine* the issues and options relating to the development of a VAT regime in Ireland that will best facilitate the growth of e-commerce including the option of reducing the standard rate. (Forfás)
- *Encourage* the expansion of seed and venture funds to support e-commerce related start-ups. (Enterprise Ireland)
- *Include* e-commerce indicators in agency surveys where appropriate. (Forfás, Enterprise Ireland, Shannon Development, IDA Ireland).
- *Develop* the Forfás annual Irish Economy Expenditures Survey to track e-commerce trade in the manufacturing and internationally traded service sectors. (Forfás)
- *Co-ordinate* and develop sectoral benchmarking to incorporate appropriate measures on e-commerce. (Forfás, Enterprise Ireland, Shannon Development)
- *Promote* the Belfast-Dublin and Armagh-Monaghan digital corridors as effective channels for trade and information sharing. (Enterprise Ireland and IDA Ireland)

Enterprise Actions

- *Encourage* trade and other organisations to establish self-regulating standards of approval for use by companies engaging in e-commerce.
- *Specify* on websites and in e-commerce transactions the legal jurisdiction that will apply to contracts with clients and, where possible, the key legal provisions or a link to a resource setting out the relevant provisions.
- *Agree* in advance with intermediaries the terms of business for delivery (electronic and physical), quality, expected reliability standards, and liability in event of loss or damage.
- *Review* existing enterprise insurance cover where new modes of delivery, such as courier parcel delivery, are being used to fulfil e-commerce purchases.
- *Clarify* and understand the rights and protection afforded to consumers in different countries when engaging in business-to-consumer e-commerce.
- *Examine* the operational and marketing skill sets required to compete in an
- e-commerce environment and prepare in-company skills development programmes.
- *Encourage* networks of enterprises to develop and undertake e-commerce traing programmes at local level.
- *Use* the results of research and development studies to help develop new, innovative e-commerce related products and services.
- *Use* web technologies to improve relationships among research groups and industry.

4 Development Agency Strategies

Sections 2 and 3 of this report set out key actions for the industrial development agencies. The agencies have also been developing their own operational plans in respect of e-commerce and these are summarised below. These Strategies take on board the broad thrust of this report and set out the frameworks that will guide agency actions in respect of e-commerce over the coming years.

4.1 IDA Ireland

IDA Ireland has been highly successful in sustaining the momentum of growth in the information and communications technology sector. It has established Ireland as the leading location in Europe for mobile investment in a number of key sectors including electronics, software, call centres and shared services/back office operations, leading to high skill, high income and high value added employment.

IDA's stated objectives for the future include contributing to regional development and achieving a sustained increase in the quality of jobs in client companies. E-commerce has the potential to contribute strongly to the achievement of these objectives.

IDA Ireland will target opportunities in both new and emerging sectors and new e-commerce expansion opportunities within existing clients.

Emerging Sectors
A value chain of activities has been identified that will form the basis of IDA Ireland's marketing programme launched earlier this year. Examples of the areas being targeted include:

- Applications devices and telecommunications hardware
- Internet Service Providers (ISPs)/Web hosting companies that provide Internet access or web hosting services to third parties
- Web/Media Shop companies involved in web design and consultancy where gaps exist in the availability of services in Ireland
- E-Commerce services that provide support services for e-commerce
- E-commerce Utility Services that provide the full range of e-commerce services
- Portals/Communities that provide access to the World Wide Web or provide services to distinctive groups of users
- Retail companies that are involved in direct marketing using e-commerce
- Financial services companies
- Elements of the Infotainment sector that provide entertainment and information services
- Business-to-business activities, which mainly involves selling or buying products on-line but also includes promoting awareness, product research, comparison selection, transactions processing, fulfilment and post-sales support

The majority of the additional jobs created by the Internet will arise in Shared Services and in the provision of content/information. Business-to-business use of e-commerce is likely to result in increased efficiencies, etc., for all businesses.

IDA Ireland Existing Clients

The base of existing overseas companies will continue to be strongly encouraged and supported where necessary in moving quickly to e-commerce-driven operations and in up-skilling employees in e-commerce management and work practices.

The existing base of companies is likely to be an important source of new projects. IDA has been very successful in the past in attracting add-on functions to companies once they are established here. About half of all IDA project and job approvals now come from expansions. With the development of e-commerce, there is potential to attract in command and control centres, shared services, fulfilment functions, and marketing departments of existing companies. There is also the potential to attract key sub-supply companies from the US, for example, in the area of software and digital content distribution.

The development of a cluster of support services in content development, fulfilment and information management and control would be a key marketing advantage for the IDA. In order to ensure that Ireland develops a competitive and conducive e-commerce support environment, Enterprise Ireland will need to work with IDA and its clients to identify the e-commerce support services required. This work should determine whether gaps or structural weaknesses could best be met through encouraging indigenous enterprise or through attracting in overseas companies.

IDA will continue to focus on establishing Ireland as a centre for e-commerce including digital content distribution. This will focus, in the first instance, on ensuring that Ireland becomes the leading European location for digital software distribution. Opportunities in areas where Ireland has not been successful in the past in attracting inward investment such as music, film and audio-visual, entertainment and education and training, focusing, initially on the leading players will also be targeted as they develop.

IDA Ireland will continue its work with Forfás, government departments, and others on key e-commerce business environment issues including:

- Implementation of the international connectivity project and the development of telehouse facilities
- Completion of the two initial Digital Parks at Citywest and East Point
- Consultations on the legal, regulatory and fiscal environment to support e-commerce

4.2 Enterprise Ireland - "Building Profitable Relationships Electronically"

The Emergence of E-commerce

For the purpose of EI's e-commerce strategy, e-commerce is defined as "...the use of computers and telecommunications networks to develop and conduct business transactions between buyers, sellers and other trading partners".

Of Enterprise Ireland's client base, it is estimated that two thirds have not yet established websites and one third are not yet users of email.

EI is to take a strongly proactive role in promoting the use of e-communications/ e-commerce with all clients to reap the benefits of the enormous opportunities emerging for all sectors. New opportunity areas are also emerging in web hosting,

e-commerce services and utilities, retail, financial services and infotainment. There are also opportunities for some EI clients to develop the technologies and products required for e-commerce.

Enterprise Ireland's Strategy

Enterprise Ireland's Strategy EI's overall goal is to ensure that the full capability of the newer information and communications technologies driving e-commerce is harnessed to help Irish business – and EI clients in particular – build their competitive advantage and grow their profitable sales, exports and employment.

In this context, EI's objectives are to:

- Help a wide range of EI client companies to develop and upgrade their e-commerce capability, and in particular to have all EI clients using email for business and two thirds at least of EI clients having a business website by 2001
- Accelerate the development of key players in the provision of software, services and hardware for e-commerce over the next three years

To achieve these objectives, EI needs to:

- Increase the awareness of EI clients of the opportunities and competitiveness requirements of e-commerce, and demonstrate the value to them of e-commerce
- Develop tools that SMEs can avail of to build their e-commerce capability
- Encourage and support through Development Advisors and the mainstream financial facilities, the widespread development by EI clients of e-commerce capabilities
- Facilitate the development of companies and sectors that can supply the software, services and hardware needed for e-commerce
- Maximise the opportunities inherent in informational communications technologies and e-commerce for balanced spatial development and press for the infrastructural improvements that particularly address the needs of EI clients
- Establish an internal e-commerce specialist unit and an e-commerce co-ordination group to promote and support e-commerce both within EI and EI's clients

Particular initiatives to progress these tasks are summarised below.

Increase Awareness/Develop Tools

Increase Awareness/Develop Tools Enterprise Ireland has been heavily involved over the past two years in building awareness among its clients about the threats and opportunities of e-commerce.

At a group level, seminar/workshop activities have been undertaken in most major commercial centres in Ireland. These have often been in partnership with industry representative groups (for example, the Small Firms Association, Chambers of Commerce, Institute of Chartered Accountants), service providers (for example, Indigo, Esat, Bank of Ireland, AIB, Irish Management Institute, The Irish Times) and technology/content suppliers (for example Microsoft, Intel, Compaq, Dialog Corp).

Also, Enterprise Ireland is currently proposing that a pilot project be funded under the Small Business Operational Programme (SBOP) to develop e-commerce tools for SMEs. Specifically, the project's objectives are:

- To assist up to 1,000 Irish SMEs to take specific action in relation to their own companies and to provide them with practical knowledge of e-commerce use and applications
- To provide companies with the definitive Irish-based e-commerce resource set
- To build a community of interest around the e-commerce theme and to successfully leverage this community to rapidly move Irish companies towards adopting successful e-commerce strategies

The project is intended to run for 18 months and is comprised of a combination of practical components aimed at building awareness, increasing adoption and fuelling more effective SME use of ICTs. These include:

- The development of an EI e-commerce web-based Knowledge Bank. This involves the development of a web-based resource set that would become the key web resource for SMEs entering the e-commerce world
- Production of a Practical Guide to e-commerce (hardcopy and online versions)

EI will also examine the proposal for an e-commerce trade logo proposed by the Advisory Committee on Telecommunications (1998).

In addition, EI has already developed a number of e-commerce Training Modules using the EU Adapt and Netlink programmes, which can also be used for SMEs.

Upgrade Companies' Capabilities (Mainstream IT/E-commerce Initiative)
Once companies are aware of and motivated to use e-commerce, SMEs typically will need specialist advice and help, staff training and some financial support to achieve the changes required.

This mainstream IT/e-commerce initiative operating through EI Development Advisors working with client companies and using mainstream financial incentives will provide financial support for areas such as:

- Management/marketing consultancy for e-commerce strategy and practice
- IT Specialist recruitment
- Training of:

- Managers in e-commerce strategy
- In-house specialists
- Operatives in general IT skills
- Operatives in basic IT and related skills of teamworking, literacy, etc.

A variety of options that companies can pick and choose from will be available. In the training area, some generic modules could be pre-designed.

The Development of E-Commerce Technology Companies
Financial assistance in the form of equity investment and grants, allied to advice, consultancy and expertise will be available to help Irish technology companies become established and grow, by the strengthening of business development capabilities, competitiveness and profitability. Already a number of companies have been established with EI support. A range of companies has been supported during

1999 either with feasibility, expansion/ capacity or management development and mentor grant-aid.

Marketing initiatives undertaken in support of e-commerce technology companies include taking groups of companies to the Boston March 1999 Internet Commerce Expo, and to the Internet World show in LA in April 1999. E-commerce events are planned for New York (October 1999) and Japan (November 1999). The Online Networking Forum of software companies in the USA has also been launched.

The Online Networking Forum comprises a bulletin board site, and a biweekly email newsletter. The goal of the online forum is to prompt discussion and the building of community among Irish high technology companies doing business in the USA.

EI will be extensively involved in the EU 5th Framework for Research, Technological Development and Demonstration. EI will seek to ensure that EI client companies can avail of this developmental funding in the area of "New Methods of Work and Electronic Commerce".

Conclusion

E-commerce is critical to the development of indigenous companies, both in improving the capability of the broad mass of EI client companies, and in providing market opportunities for a number of EI technology companies. The strategy outlined above aims to maximise these opportunities for EI clients. Other aspects, such as the regional and spatial dimensions and the specific infrastructural need of indigenous SMEs, need to be examined further.

To deliver the strategy, the following has been established:

- An e-commerce specialist unit, within the Development Directorate to promote and support e-commerce as a capability both within EI and with EI's clients
- An EI cross-divisional e-commerce co-ordination group, which prepared this strategy and will progress it further

4.3 Shannon Development

In the Shannon Region, Shannon Development will follow the same strategic approach as Enterprise Ireland, in promoting and supporting the adoption of e-commerce by its client companies. Client companies of Shannon Development in the Shannon Region will have access to the same e-commerce advisory and support services as their EI counterparts elsewhere in the country.

In addition, a number of specific regional initiatives aimed at stimulating the development of e-commerce were set out in the ShIPP (Shannon Region Information Society Partnership Programme) Strategy and Action Plan which was published in December 1998. The ShIPP Action Plan proposes that a Shannon Region E-Commerce Initiative should be implemented in order to position the Region as a leader in e-commerce and to implement the recommendations proposed in the report of the Advisory Committee on Telecommunications.

The key elements of the Shannon Region E-Commerce Initiative include:

- A Shannon Region E-Commerce Hub, which would be established as a strongly branded and promoted platform to allow Shannon Region

companies and their global customers to make commercial transactions on-line in both business-to-business and business-to-consumer markets. As well as global market recognition, this Shannon E-Commerce brand will indicate dependability, security and trustworthy e-commerce processing worldwide. In business-to-business applications, the aim will be to facilitate Shannon Region SMEs to join together through a transaction-capable extranet to create virtual enterprises, for more efficient buying and selling between manufacturers, suppliers and distributors

- A branded Shannon E-Commerce platform and network will provide regional businesses with sophisticated, pre-packaged e-commerce facilities to assist them in creating, designing, and implementing complete online facilities and in running their online businesses. This will be built on the secure, reliable and high-performance Internet connectivity that the Region will have. It will provide reduced costs, a strong branded image and site on the Web, up-to-date and well-maintained systems, faster time to market, assured high security and high performance. It is proposed that the Shannon E-Commerce Hub be established as a public-private partnership with commercial funding and public sector support.
- An E-Commerce Support Centre and Team will:
- Provide awareness, training and independent support to the Region's companies to adopt e-commerce into their businesses, particularly for their business-to-business transactions
- Support entrepreneurs to set-up new IT-based companies in the Region
- Attract established information technology based companies to the region
- Encourage new types of companies and ways of working, such as dynamic networked and virtual organisations, digital communities, distributed call centres and teleworking
- Undertake further research and development on new ways of working in the Information Society
- Sustain and expand the Region's E-Commerce Initiative

- Advanced Teleservices Infrastructure based on the Shannon EuroCall Centre in the Shannon Free Zone. This provides modern call-centre infrastructural facilities including 38,000 square feet of open plan and office space, 140 agent workstations, state-of-the-art telephony equipment. It features trunk fibre optic bandwidth capacity and office support services, such as conference rooms and security. Companies use the facilities to deal directly with customers, thus avoiding the need to fully outsource, while cutting down on the capital expenditure required to operate an in-house service. Access to the workstations in terms of the number required and the duration for which they will be used is fully flexible and can be tailored to meet the needs of individual clients.

Using the Shannon EuroCall model, similar centres will be developed over time throughout the Shannon Region. These centres will include custom-designed buildings, with the facilities and services that a call centre requires and with a telecommunications infrastructure, including access to fibre optic bandwidth capacity, multimedia capability for handling voice, web, fax and email, and full PABX and ACD functionality. This will also involve access to a pool of skilled labour with the required information and communications technologies and language skills. Shannon Development will proactively promote the development of these centres and continue to work on the implementation of this initiative.

A key objective of Shannon Development is to disperse the benefits of commerce and of new IT and communication technologies throughout the Shannon Region. The spatial distribution of e-commerce activities is a core issue for regional economic development, as the new IT-based activities have considerable potential for stimulating growth outside of the main urban centres. Shannon Development will implement a structured programme of developing the infrastructure required to support new IT enterprises throughout the Region, working closely with the private sector and with educational institutions such as the Institute of Technology Tralee and the TRBDI.

As well as promoting the E-Commerce Initiative, Shannon Development will implement a number of other innovative enterprise support programmes aimed at promoting the use of information and communications technologies among SMEs throughout the Region and creating a positive environment for e-commerce to develop. These support programmes include the Technology Web project which will involve the establishment of a network of Technology Management Centres (TMCs), to provide a focal point for the delivery of pro-active technology and innovation management services to SMEs in the Shannon Region.

Current plans call for the development of regional nodes or TMCs in Birr, Tralee, Ennis, and Thurles initially, with the Innovation Centre in Limerick acting as the primary node. Additional nodes can be added as the Technology Web develops. This project will attempt to address many of the geographical and infrastructure issues identified by the ShIPP industry workgroup.

A further programme that addresses the information and communication technologies needs of start-up enterprises outside of the main urban centres is the DigiTech Business Development Programme. This commenced at the Innovation Centre in late 1998. It was delivered to prospective entrepreneurs in the Region in the software, multimedia, electronics and telecommunications sectors using videoconferencing technology. The success of this programme illustrates how Shannon Development can support new enterprise development and stimulate the growth of e-commerce throughout the Shannon Region, regardless of location.

4.4 Údarás na Gaeltachta

Údarás na Gaeltachta faces a constant challenge in seeking to achieve its job-creation objectives in the face of a inadequate physical infrastructure throughout the Gaeltacht regions and under the disadvantage of the perceived remoteness of its region. The emergence of an increasing level of ICT-based business opportunities offers the Gaeltacht at least one business sector where these disadvantages are less relevant.

However, it is worth noting the increasing trend among young graduates who want to spend at least their early working years in larger urban centres. This factor accentuates the tendency for service industries, particularly those requiring a significant graduate-level workforce, to locate in these larger urban centres. The Gaeltacht areas are significantly lacking any large or even medium-sized urban centres and this factor militates against the development of a vibrant services sector.

Údarás na Gaeltachta is anxious to ensure that its existing industrial base in the Gaeltacht is adequately equipped to deal with the threats and opportunities created by the emergence of e-commerce. It is also concerned to ensure that the Gaeltacht

areas gain their fair share of the new enterprises that will emerge in Ireland to exploit this new business milieu.

The specific measures that will be undertaken by Údarás towards achieving these objectives will include:

- A campaign aimed at increasing the awareness of client companies of the development of e-commerce and encouraging them to evaluate the threats and opportunities which e-commerce brings to their particular businesses
- Encouraging selected companies in the Gaeltacht to develop relevant e-commerce strategies and providing training and management development support where appropriate in order to assist them towards this end
- Where necessary, assisting companies seeking to exploit e-commerce opportunities in identifying relevant funding sources, for example, grant-aid, venture capital funds, RTI, 5th Framework, etc
- Training for Údarás' own staff to improve the agency's capacity to exploit and promote the possibilities of e-commerce
- Increasing use of ICT to communicate and transact business with client companies
- Harnessing the sectoral intelligence of IDA and EI in order to be able to more effectively progress the adoption and development of e-commerce strategies in the Gaeltacht
- Evaluate the need to assign special responsibility within the organisation in relation to the promotion of e-commerce Seek to establish demonstration projects within each of the major Gaeltacht regions
- Ensure that the Gaeltacht areas have adequate access to broadband services to ensure that the region is not disadvantaged in the development of e-commerce
- Evaluate on an ongoing basis the possibilities of using ICT in the promotion of the Irish language and encourage client companies to make appropriate use of the Irish language in implementing their e-commerce strategies

Implementation

The policy and other actions set out in this report for government departments, development agencies and enterprises need to be adopted quickly. Steps should be taken to ensure their implementation if the potential of the digital economy is to be realised. Ireland is heavily dependent for income and employment on sectors that will be changed dramatically by e-commerce. The potential of e-commerce for these sectors are significant; so too are the consequences of inaction.

The Government's role is to take the steps required to create the best regulatory and business environment in the EU in order to maximise the development of e-commerce. The development agencies, business associations and firms themselves need to build on recent initiatives to foster the rapid take-up of e-commerce and harness its full potential for social and economic development in Ireland. Ireland should aim to develop a leadership position in business- to-business e-commerce, business-to-consumer e-commerce and e-commerce enabling technologies and services.

This report on e-commerce is the first step in a process of partnership in developing Ireland's digital economy involving the Department of Enterprise, Trade and Employment, other government departments, the development agencies and the enterprise sector.

The following action is recommended:

Government Action

- *Establish* a group to oversee implementation of the actions set out in this report and to prepare a progress report at the end of the year for the Tánaiste and Minister for Enterprise, Trade and Employment. (Department of Enterprise, Trade and Employment)

MEMBERSHIP OF FORFÁS ELECTRONIC COMMERCE POLICY STEERING GROUP

Michael McKenna **Chairman**	Assistant Secretary General	Department of Enterprise, Trade and Employment
Cormac Callanan	Chairman	Internet Service Providers
Noel Hiney	Head of Internet Business	Bank of Ireland
Paddy Holihan	Vice President Marketing	Baltimore Technologies
John Leech	Software and e-Business Manager	IBM Ireland
Gerry McGovern	Managing Director	NUA
John Mooney	Associate Dean	Graduate School of Business, UCD
Deirdre Hunt	Professor,Management and Marketing,	Management and Marketing, UCC
John Nagle	Managing Director	Fexco
David Priestly	Executive	Microsoft Ireland
Terry Ralph	Managing Director	Informix Ireland
Geoff Shakespeare	Executive	Ericsson
John P. Kelly	Principal Officer Department of Enterprise,	Department of Enterprise, Trade and Employment
Niall O Donnchu	Principal Officer	Department of Public Enterprise
Patricia McLister	Manager,International Services	Enterprise Ireland
Niall O'Donnellan	Head, Policy and Planning Department	Enterprise Ireland
John Doherty	Manager, New Business	IDA Ireland
David Hogan	Project Executive	Shannon Development
Ken Stockil	Project Executive	Shannon Development
Rory Hynes	Project Executive	Údarás na Gaeltachta
Colm Regan	Executive Director	Forfás
John O'Brien	Manager,Enterprise and Trade Policy	Forfás

Secretariat:

Declan Hughes	Enterprise and Trade Policy Division	Forfás
Martin Hynes	Science and Technological Innovation Division	Forfás

Glossary

Address Verification Service (AVS): Address Verification Service is used as a means of reducing fraud for credit card transactions in the U.S. It uses the US Zip code as a means of validating the authenticity of the customer.

Bespoke software: Software developed for use by a specific enterprise client, as contrasted with generic business applications that have been customised, or niche products for vertical markets and a range of clients.

Caching: Web caching is a technique to reduce World-Wide Web network traffic and improve response time for end users. Access delays are minimized by keeping popular data close to the entity which needs it.

Content: As computer-mediated communication has evolved from its roots in science and academia, the interesting material available publicly has become known as "content".

Digital cash: Issued by a bank, this electronic currency or "e-cash" is numerical reference numbers, similar to serial numbers on real currency, that let buyers pay for a product or service electronically. It could be stored in a computer based "wallet" or smart card.

E-mail: Messages sent in digital form via the Internet or a private network.

Electronic commerce: The application of e-mail, EDI, electronic funds transfer, and other information-sharing technologies to conduct business online.

Electronic data interchange (EDI): Transferring business information from one computer application to another in a standard electronic format. EDI messages usually travel over a private, value-added network but could go over the Internet. Software at either end of the transmission translates the data into a format useful to users.

Encryption: Using computer hardware, software, or both to transform data from its original form into a cipher (not readable) form for the purpose of security or privacy.

Extranet: A private network that uses Internet-based technology to link companies with suppliers, customers, and other partners.

ICT: Information and Communications Technologies are an intertwined set of technologies and services that mutually reinforce expanded benefits and efficiencies.

Internet Protocol (IP): a technology to empower decentralised networks as opposed to centrally switched circuit switched technologies.

Intranet: Based on Internet technologies, an internal network that operates much like the World Wide Web, accessible only to employees and other authorized users and protected by a firewall.

Internet: A global network connecting other networks and computers.

Multimedia: (frequently interactive multimedia) the combination of sound, music, text and graphics in a way that encourages interactivity and a dynamic use of web based content.

SET : (secure electronic transmission): An industry standard to enable secure credit card transactions on the Internet. (www.setco.org)

Web browser: Software applications that make it easy to access and navigate the World Wide Web.

Web page: A document on the World Wide Web.

Web server: A computer that hosts Web sites and pages, can also refer to the specific software "serving" web pages from that computer: e.g, Apache, Microsoft or Netscape web servers.

Web site: A location on the World Wide Web containing subject, or company specific documents and files.

World Wide Web: A system of Internet servers that support documents formatted in HTML, which allows electronic links to other documents and files.