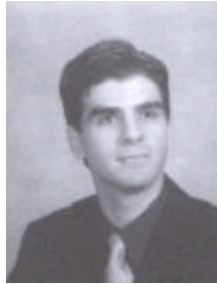


e-Ireland: Europe's New Internet Hub

Hrvoje Benko



In a few years' time, there will be no Internet companies – there will just be companies – and all companies that will operate in the future, will be Internet companies.

- Dr. Andrew Grove, Chairman, Intel Corporation

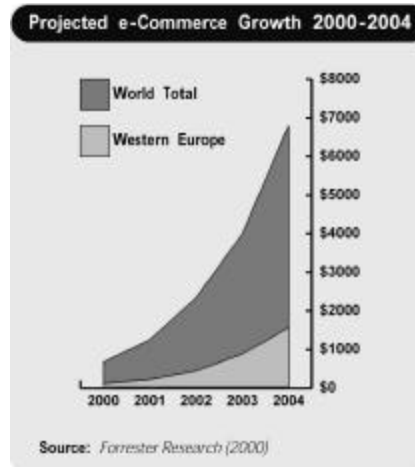
Introduction

By the end of 2001, the Internet will have created a single market of about 300 million computers worldwide. According to Forrester Research, in 2000 global e-commerce transactions equaled about \$657 billion. Most analysts predict that this number will increase more than tenfold by the year 2004. Even though North America will account for most of those profits in 2004, contributing close to \$3.5 trillion, the region's dominance will fade as Western Europe and Asian-Pacific countries experience intensive growth in 2002. (Forrester) The amazing thing is that these astounding numbers are only conservative estimates.

Today, Ireland stands far removed from centuries of large-scale emigration and a suffering economy. GDP growth is currently averaging about nine percent per year, compared to three percent in the U.K. and five percent in the U.S. The economy is prosperous, labor demand is at its all-time high, and for the first time in history there is net immigration into the country. However, many scholars suggest that the foreign direct investment that has poured in during the last two decades may have reached its plateau

and that high GDP growth rate cannot be sustained for long. It appears that Ireland is just coming out of the “catching up” phase with the rest of Europe and that therefore this growth will soon have to slow. Also, pressures coming from the rest of the European

Figure 1



Union have already resulted in a small but significant corporate tax increase from 10 percent to 12.5 percent, an increase which directly affects Irish industry.

Government and businesses in Ireland are now turning to e-commerce and the prospects of the new digital economy to take growth and prosperity in the republic to the next level. Becoming the e-commerce capital for Europe and ultimately one of the premier e-commerce centers of the world is Ireland’s top national priority. In this paper I will evaluate the level of readiness for e-commerce activities in Ireland, focusing on the technical, economic and social conditions that play key roles in ensuring their development.

E-Commerce Explained

Electronic commerce (e-commerce) can be defined as any and all business communication and transactions over data networks and through computers. In the most restrictive form, e-commerce entails exchanging goods, services and funds through digital communication channels like the Internet. Beyond changing the way companies and individuals buy or sell, e-commerce is challenging the way the companies think, the way they market and distribute their products, and the way they adapt and react to continuously changing global markets. Even though some authors make distinctions between the terms e-commerce and e-business, throughout this paper both of these terms will be used interchangeably.

E-commerce has introduced several fundamental changes to the traditional business environment. Foremost is the change in the perception of the global marketplace. No longer must a company be physically present in a certain market to conduct business there. With digital communication, any company with effective strategy and marketing can develop a presence anywhere on the globe where there is a substantial digital culture. A second key change concerns infrastructure. Advanced telecommunications is the fundamental requirement for successful development of e-commerce. Broadband access to the world's data networks is a must for any e-commerce venture. A third fundamental change introduced by e-commerce is in the nature of business leadership. The different character of the competition, the speed of reaction required of market leaders, and the new ideas and practices that they have to promote make these new managers a different breed of business leaders. A final change brought about by e-commerce is the increasing dependence on highly skilled computer professionals to create, maintain and upgrade information systems.

These developments do not mean the disappearance of traditional “brick and mortar” businesses. On the contrary, some of the most important players in the e-commerce world are traditional companies, like Barnes and Nobles, Staples and Fidelity Investments, all with well-established brands and products and all of whom have incorporated the digital environment into their business models and have created their presence online.

Ireland’s Advantages

In discussing the e-commerce advantages that Ireland has compared to its competitors in the European Union and the world, I will use the following framework:

1. Advanced broadband infrastructure;
2. Provision of a skilled workforce;
3. Supportive business environment;
4. Investment in research and development.

These components are vital to e-commerce development. Using this framework, one can assess the initiatives and actions of the Irish government in creating an e-commerce-friendly environment and also what still needs to be done to firmly establish Ireland as a European e-commerce center.

Advanced Broadband Infrastructure

With ever-increasing demand for higher quality data, including images and streaming audio and video, a universally accessible broadband telecommunications network is the top priority of any e-business. By a definition, broadband connectivity is essentially a high-speed and high-throughput telecommunications link. Capacity is described by data transmission rates through the network, measured in bits per second

(bit/s)¹. The minimum capacity for a broadband connection is 2 Mbit/s; however, today many businesses are demanding bandwidth of 155 Mbit/s and higher. To put these

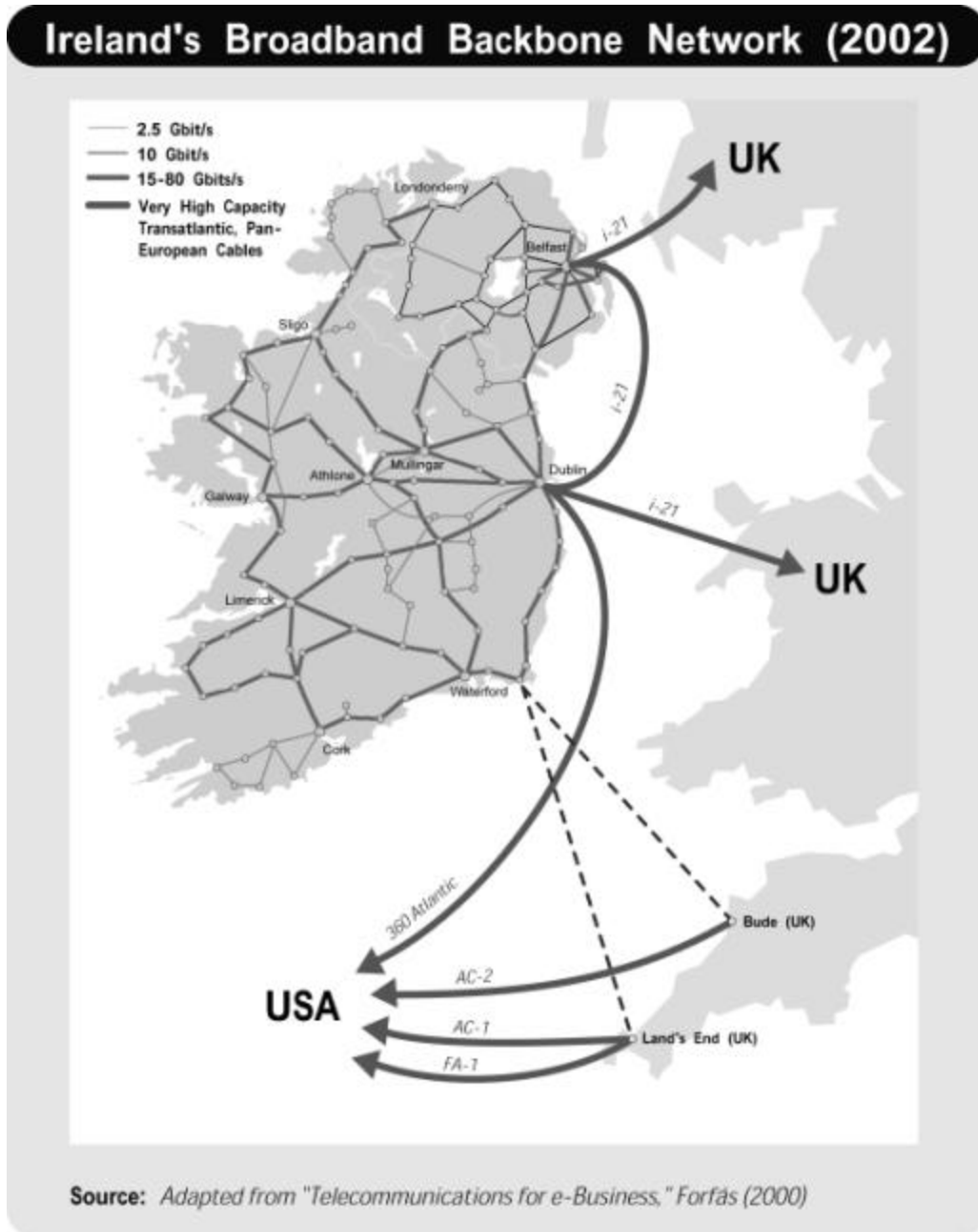
¹ 1 Kbit/s = 1,000 bit/s, 1 Mbit/s = 1,000 Kbit/s, 1 Gbit/s = 1,000 Mbit/s

numbers into perspective, standard modems that individual home users use to connect to the Internet have a maximum speed of 56 Kbit/s, which is roughly 35 times less than the slowest broadband connection.

Ireland has long recognized the fundamental importance of advanced telecommunications to e-commerce development. The initial push for the advanced communications infrastructure came with the liberalization of Ireland's telecommunications market in 1998, which was executed a full year ahead of schedule. Liberalization introduced competition, new technologies and reduced Internet access prices. Government agencies such as Forfás (The National Policy and Advisory Board for Enterprise, Trade, Science, Technology and Innovation), Enterprise Ireland, and the Industrial Development Agency (IDA Ireland) have since prepared and published a number of critical reports on the necessary investments in the basic infrastructure. These reports set some groundwork for further investments in fiber optic infrastructure. By the beginning of 2001, over 200,000 kilometers of fiber optic cables have been laid throughout Ireland (see Figure 2). According to Forfás' plans there will be a 700 percent increase in available business locations with broadband access by 2002.

(“Telecommunications for e-Business,” p. v) The development of the National Digital Park as a premiere industry development area just outside of Dublin, with broadband capacity, appealing infrastructure and a pro-business environment, has already attracted a number of interested companies and research agencies and will further increase the Irish presence in the e-commerce arena.

Figure 2



Probably the biggest push for Ireland's communications infrastructure happened when the government decided to make an important deal with Global Crossing Holdings, Ltd. Global Crossing is one of the leading providers of global broadband communication services in the world. The Irish government seeded the market for broadband

development by bringing the country directly onto Global Crossing's AC-1 cable. AC-1 is the company's first transatlantic cable, laid in mid 1998. The AC-1 cable connects the United States with the United Kingdom, Germany and Holland. In 2000 the Irish government bought about half of the available capacity on an AC-1, which translates to 160 155Mbit/s lines. (Lillington) In order to facilitate digital economy growth, the government sold a majority of those lines at just above cost to companies in Ireland with strong strategies of network and e-commerce use. The availability of cheap broadband access should create a major competitive advantage for Irish e-commerce businesses.

In order to ensure the leadership position in broadband capacity, Ireland also bought parts of Global Crossing's new AC-2 cable, as well as yet a third transoceanic cable, named 360Atlantic, laid by the Canadian company 360 Networks Inc. Note that one of only four landing points of the 360Atlantic cable is in Dublin, giving the National Digital Park a direct link to the Internet (see Figure 2). With such a sizeable increase in broadband supply, the cost of bandwidth has plummeted. Whereas a 25-year lease on a 155-Mbits/s line between London and Paris will cost \$4.47 million, the same deal between Dublin and Paris or any other of 35 European cities will cost only \$0.5 million. (Cass, p. 38) As a result of these substantial investments, Ireland now commands one quarter of all Europe's broadband data capacity to the United States, and the costs of broadband connections are among the lowest in the world.

Provision of a Skilled Workforce

Almost every developed country in this age of the digital economy is faced with a major skills shortage, especially among IT and computer professionals. Two areas are relevant to analysis of e-commerce workforce needs: the provision of the new skilled

workforce and expanding the skills and knowledge base of existing managers and business leaders.

One of Ireland's strengths through the last two decades has been an expanding and well-educated young population. Ireland is the youngest nation in Europe, with about 40 percent of its population under the age of 25. This workforce advantage is projected to remain in Ireland's favor even in the year 2010 when about 35 percent of the population will be under 25 years of age, compared to the U.K.'s 31 percent or Germany's 24 percent. (United Nations) Additionally, the Irish Government has created strong incentives over the past 15 years to develop an educational system that produces well-educated professionals in software and technical fields. The net result is a significant skill-set in computing, software and information technology among the predominantly young population. According to IDA Ireland, the most important factor attracting Intel to locate in Ireland was the quality and numbers of highly qualified young people coming out of the Irish educational system. ("Achieve European...", November 1999) This mix of young and highly trained professionals has already proven to be an important incentive in attracting other high-tech businesses to Ireland, and should continue to have an important role as industry shifts towards e-business.

In addition to ensuring the flow of new workers to e-commerce enterprises, Ireland has taken steps to educate existing managers and leaders in e-commerce strategies. The rising importance of e-commerce to businesses in Ireland has presented a need to incorporate e-commerce topics into the advanced managerial curricula in Irish higher education. University College Dublin and Trinity College in particular are now offering major courses in Information Technology, while in institutes of technology

around the country e-commerce serves as an important segment of every business course. (McCall) The re-education of the existing managerial force is well underway with programs like the Masters in Business Administration (MBA) and the Masters in Business Studies (MBS) in e-Commerce, which are now available in universities across the country.

Supportive Business Environment

Ireland's major selling point in the effort to attract foreign direct investment has been its pro-business environment: a democratic and stable government, the only English-speaking nation under the European Monetary Union, supportive corporate legislation, an excellent educational system and a low corporate tax. However, e-businesses will also require additional incentives in order to fully develop. The physical environment suitable for e-commerce mostly relies on the telecommunications infrastructure as was discussed above. However, incentives are also needed in legal and regulatory areas, such as the establishment of trusted third parties, supportive contract law and favorable taxation. Ireland's Electronic Commerce Act 2000 made electronic signatures legally binding as handwritten signatures, and began a series of legislative initiatives to foster Irish e-commerce. This act ensures that electronic agreements are undertaken in an environment of trust and certainty and have full validity and protection under Irish law. Together with similar acts in the U.S., U.K., Canada and Singapore, this act serves as the model for many other countries establishing their own e-commerce legislation. ("Electronic Commerce...")

In order to create a pro-e-business legal environment, Ireland should also establish a system for accrediting the existence and reputation of e-business companies. This

trusted third party should be an independent and reputable source of information and certification that helps develop trust between online parties. The Chamber of Commerce Ireland (CCI) has shown interest in becoming such a certification authority; however, no definite decisions have yet been made public. The government has passed several other bills besides the Electronic Commerce Act to push forward this initiative and create e-commerce-friendly legislation. The two most important bills are the Copyright Bill, which deals with copyright issues of online documents, and the amendments to the Criminal Evidence Act 1992, which allow for certain online documents to be valid evidence in court. (“Report on...,” p. 89) Having this legislation in place provides Ireland with an advantage over those nations without any legal support for electronic transactions.

Research and Development

Before 2000, Ireland did not participate significantly in high-tech research and development. Universities across Ireland did not have the funds, resources or access to networks of researchers developing high-tech devices or software. Instead, Irish higher education focused mainly on providing a highly skilled workforce. A significant change came on December 12, 2000, when Taoiseach Bertie Ahern announced that Ireland was getting a direct link to, and membership in, the cutting edge Next Generation Internet (NGI) and Internet 2 (I2) research networks in the United States. “Broadband links are set to increase over 20 times between Irish and U.S. research institutions,” said Ahern. (Lillington) Ireland’s premiere research institutions, which have so far been lagging significantly behind those in Europe and the United States, will thus not only have access to cutting edge research networks but will also participate in the development of future

Internet standards. In order to facilitate this connection, the Irish Government is using a segment of the fiber-optic cable AC-1 that it acquired from Global Crossing. This broadband capacity link, labeled as a national resource, will directly link U.S. and Irish research centers.

In addition to this broadband link, the Irish government had previously announced plans to expand and support high-tech research institutions across Ireland. In 2001 the government will complete the launching of Science Foundation Ireland with the IR £560 million Technology Foresight Fund for advancement of biotechnology and IT and communication technologies. This is probably Ireland's biggest research push ever in the high-tech arena. This initiative urges companies and Irish universities to develop research centers, bringing Ireland to the technological forefront. One of the first responses came during the summer of 2000 from the top research institution in the world, the Massachusetts Institute of Technology, which opened MIT Media Lab Europe near the center of Dublin. This Media Lab is one of the pioneers of the National Digital Park and has already started several ambitious research projects.

Potential Problems

Despite all efforts of the government to provide the most supportive environment for development of e-commerce, there are several emerging problems that might be hard to overcome and should definitely not be overlooked when analyzing the Irish digital future. These include:

1. Skills shortage;
2. Overdependence on foreign investments;
3. Value added taxation;

4. Inactive domestic market;
5. Slow “m-commerce” initiatives.

I will discuss each of these problems in the sections that follow.

Skills Shortage

The worldwide shortage of skilled IT professionals affects Ireland as well. Therefore, the Irish government is taking steps to increase the output of its educational system. In April 1999 the government approved an additional allocation of IR £75 million to the Department of Education and Science for the provision of 5,400 IT-related places in third-level educational institutions. In January 1999 the programs in the institutes of technology were expanded to include information technology, and thus 1,100 additional IT-related openings were created. In June 1999 the government made available an additional IR £6 million towards the continuing annual provision of 1,500 IT-related postgraduate places in third-level colleges. (“Expert Group...,” p. 21) These expensive boosts notwithstanding, Irish IT and software industries still face labor shortage problems. According to the Computer Staff Recruitment's annual Technology Salary and Skills Survey 1999, 95.3 percent of Irish software development companies were experiencing difficulties in recruitment in 1999. Ten percent even outsourced their development work overseas. (“Technology Salary...”) Enterprise Ireland has reported that Irish IT companies alone will have to fill nearly 3,000 software development positions by 2003. Enterprise Ireland predicts that a significant number of these and other IT-related positions will have to be filled with the workers from outside of Ireland. (Gallen)

The idea of having to rely on foreign workers to bolster economic growth is a new and fairly difficult one for the Irish, who for the last couple of centuries only had to deal with large emigration and a struggling economy. Even though labor flows freely within the boundaries of the European Union, skilled labor at competitive prices often has to be found outside of the EU borders. Most overseas nationals currently employed in the Irish IT industry come from Eastern Europe and Russia. Moreover, slow and bureaucratic immigration procedures for non-EU nationals frustrate recruiters in need of new skilled workers. In order to ensure a sufficient labor supply for the IT industry, the Irish government should expedite its immigration procedures to make overseas recruiting easier and less costly.

Overdependence on Foreign Investments

Most of the credit for the booming economic growth in Ireland throughout the 1990s is due to two factors. First, Ireland attracted U.S. multinational firms such as Microsoft, Intel, Dell, Merck and Pfizer, offered them substantial benefits to locate and export from Ireland, and depended greatly on them to develop its economy. Second, at the same time Ireland used the EU Structural Funds to develop its roads, telecommunications and other infrastructure, which served as further selling points to attract multinationals. Once one of the least-developed countries in Europe with no high-tech industry, Ireland has quickly become one of the fastest growing economies in the world.

However, for several reasons Ireland should further promote its indigenous industry, especially in the e-business area, thus relying less on foreign funds and foreign plans. First of all, the 2001 slowdown in the U.S. economy, especially its technology

sector, could negatively impact the Irish economy. In Ireland, where 76 percent of GDP comes from exports, the fortunes of its top three exporters (Intel, Dell and Microsoft) significantly drive the overall economy. With these and numerous other high-tech and IT companies struggling, Ireland's growth could be severely impacted. Second, recent pressures from the European Union to increase Irish corporate taxes combined with pressures connected with the Value Added Tax (to be discussed below) are reducing the benefits to locate and export from Ireland. Therefore, multinational corporations might relocate or reduce their output as taxation incentives fall. A third reason for promoting indigenous industry comes with Ireland's transformation from a net beneficiary of the EU Structural Funds to a net contributor in the year 2001. This change presents an important budget redistribution challenge for the Irish government. For all these reasons, a strong domestic industry would help ensure continued economic growth while reducing dependence on foreign investments.

Some very successful indigenous IT companies have been started up in Ireland during the 1990s. IONA Technologies, for example, was started by Trinity College students in 1991. IONA eventually patented its research on distributed computing, and its technology is now used in almost every Global 2000 company. However, in e-commerce venture capital is the primary catalyst for startups. Only recently have venture funds become available throughout Ireland. The major initiative came with Enterprise Ireland's IR £10 million e-Business Accelerator Fund to assist 120 start-up companies. However, most of those funds have now been exhausted. (Gallen) It remains to be seen whether these scarce initiatives will aid in support for Irish indigenous e-commerce and IT industry.

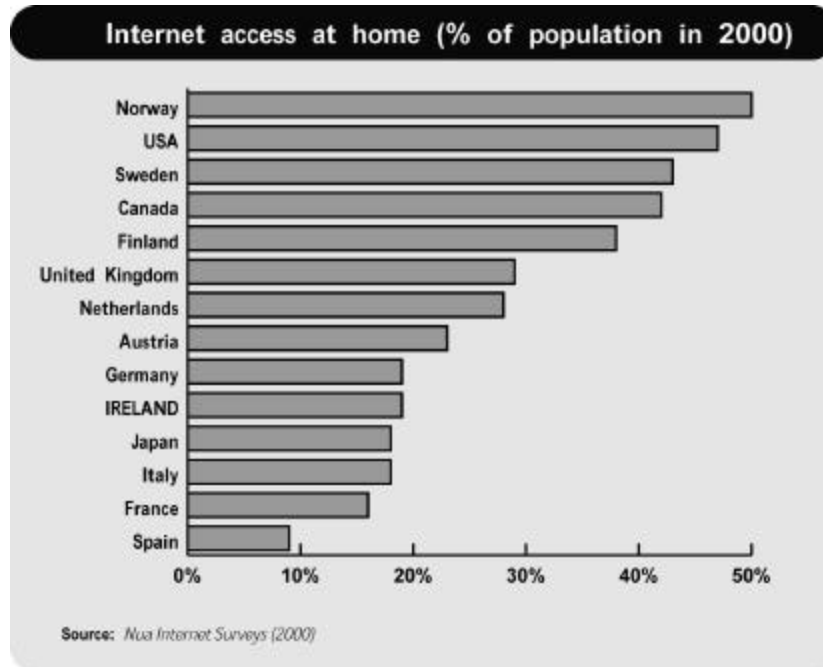
Value Added Tax in Europe

While a low corporate tax is helpful in attracting corporations to settle in Ireland, Ireland's Value Added Tax (VAT) is a significant disadvantage to e-commerce companies. The 21 percent Irish VAT is much higher than the VAT in Germany (16 percent) or in the U.K. (17.5 percent). ("Report on...", p. 99) There are proposals in the EU to apply the VAT to online transactions in the country of registration, which would put companies located in Ireland at a serious disadvantage. If these proposals become law, Ireland will need to either lower its VAT to the level of its competitors have or add some other benefits in order to attract new e-businesses.

Inactive Domestic Market

For a country with dreams of becoming the European e-commerce center, Ireland currently lags well behind many other less tech-ambitious countries in overall e-commerce activity. Figure 3 shows how Ireland compares to some of the most developed countries in terms of Internet access at home. Clearly, for a country that boasts a large broadband network and relatively cheap connection costs, the 20 percent Internet access statistic is surprisingly low.

Amárach Consulting, an Irish firm specializing in Internet statistics, points out another troubling fact. According to Amárach, only 10 percent of Irish Internet users made an online purchase in 1999, which also means that only about 2 percent of the total population actually participated in e-commerce activities in Ireland. ("Eir-Commerce...", p. 2) Comparing Irish activity with that of the U.K., Canada and the U.S. shows that Internet users in the U.K. are twice as likely to have made an online purchase

Figure 3

while those in the U.S. are nearly three times as likely. Amárach analysts also claim that the low number of Irish Internet customers is primarily due to the small number of local e-commerce web sites and to low credit card usage among Irish web users. Only about one third of Irish Internet users have credit cards, which hinders their ability to participate in e-commerce. Additionally, high local phone charges and no flat-rate connections in Ireland reduce the amount of time Irish spend online.

Slow m-Commerce Initiatives

It is surprising that with all the attention that Irish government is giving to plans and programs for development of e-commerce, there is very little mention of m-commerce. Even though m-commerce as a worldwide term is not yet generally well known, it can be taken to mean mobile and wireless commerce via WAP-enabled² mobile

² WAP – Wireless Application Protocol.

phones. In Europe, where DSL³ and cable connection technologies are not as available as in the U.S., many consumers access the Internet through slow modems, which are not very conducive to expanding e-commerce. The biggest opportunity in Europe now seems to lie with mobile telecommunications. GSM⁴ standardized the mobile phone market across Europe, with about 25 percent penetration⁵ in the EU. With this large market base, analysts forecast skyrocketing m-commerce activity in the near future.

Despite strong Irish plans for e-commerce, the mobile phone boom seems to have caught Ireland by surprise. Only recent initiatives hint that m-commerce might someday be part of the Irish e-commerce strategy. Looking at the penetration statistics in 2000, Ireland is above the European average with 49 percent, and the number of mobile lines now exceeds the number of fixed lines. (“World Analogue...,” p. 109) Nevertheless, a troubling statistic comes from the Office of the Director of Telecommunications Regulation (ODTR) in Dublin: Ireland tops the EU list for most costly monthly mobile calls, both personal and business. (“Statement on Telecommunications...,” p. 8) A major step was taken in May 2000 when a third mobile carrier, Meteor, was introduced to the Irish market to increase competition and lower prices. Some other initiatives to help Irish m-commerce include awarding third-generation broadband wireless access licenses such as UMTS⁶ licenses to allow high-speed data access over wireless networks. Even though recent activities show promise, they remain too limited while access prices are still the highest in the EU. Ireland has to come up with a national strategy, much like that for e-

³ DSL – Digital Subscriber Line.

⁴ GSM – Global System for Mobile Communications.

⁵ Penetration is defined as the number of mobile phone users per capita.

⁶ UMTS – Universal Mobile Telecommunications System. This system allows 2Mbit/s speeds over mobile phones.

commerce, on how to establish its presence in this quickly growing and highly lucrative market.

Conclusion

Ireland has been successful in revitalizing its industry potential and has now reached a relatively mature stage of economic growth. Based on the extensive research that the Irish government has done, headed by a proactive and future-looking Minister of Enterprise, Trade and Employment, Mary Harney, Ireland is well on its way to becoming Europe's e-commerce hub. The government has laid the groundwork and created a competitive e-business environment. Now it is time for firms, both Irish and international, to embrace the new technology and the new digital economy and to start doing e-business in Ireland. Even though opportunities for companies doing so are promising, success will ultimately depend on how well they manage to compete with the rest of the world and how responsive they are to their customers' needs. In the e-commerce world, alternatives are just a mouse click away. The fight for customers is every bit as competitive as in traditional markets and perhaps even more so. The companies that succeed will ensure the future Irish position in the international e-commerce arena.

References

- “2000 Review and 2001 Outlook Statement.” Forfás. Dublin, January 31, 2001. Online.
<http://www.forfas.ie>.
- 360Networks Inc. Online. <http://www.360networks.com>.
- “Achieve European Competitive Advantage in Electronics.” IDA Ireland. Dublin,
November 1999. Online. <http://www.ida.ie>.
- “Achieve European Competitive Advantage in Software.” IDA Ireland. Dublin, March
1999. Online. <http://www.ida.ie>.
- Brady, Mick. “Ireland’s High-Tech Jig.” *E-Commerce Times*. September 5, 2000. Online.
<http://www.ecommercetimes.com/news/articles2000/000905-1.shtml>.
- Cass, Stephen. “Putting Ireland on the Network Map.” *IEEE Spectrum*. Vol. 38, No. 3,
March 2001. pg. 36-38.
- “Eir-Commerce 2000.” Amárach Consulting. Dublin, 2000. Online. <http://www.amarach.com>.
- “eIreland: Connecting the Dots?” Andersen Consulting. Dublin, 2000.
- “Electronic Commerce Act, 2000.” Dublin, November 27, 2000. Online.
<http://www.ecommercegov.ie>.
- “Enterprise 2010.” Forfás. Dublin, January 27, 2000. Online. <http://www.forfas.ie>.
- “Expert Group on Future Skills Needs - e-Business.” Forfás. Dublin, August 2000.
Online. <http://www.forfas.ie>.
- Forrester Research. Press Release. April 19, 2000. Online. <http://www.forrester.com>.
- Gallen, Seamus. National Software Directorate, Enterprise Ireland. Remarks to
Martindale Center Students. Dublin, May 25, 2000.

Global Crossing Holdings Ltd. Online. <http://www.globalcrossing.com>.

Grove, Andrew. Chairman. Intel Corporation. September 20, 1999. Online.

<http://www.intel.ie/pressroom/archive/speeches/cn092099.htm>.

Halpin, Brendan. Media and Public Relations Manager, IDA Ireland. Remarks to

Martindale Center Students. Dublin, May 29, 2000.

IONA Technologies. Online. <http://www.iona.ie>.

Internet Economy Indicators. Report. June 6, 2000. Online. <http://www.internet>

[indicators.com](http://www.internetindicators.com).

Kalakota, Ravi and Robinson, Marcia. *e-Business 2.0: Roadmap for Success*. Reading,

MA: Addison Wesley Longman Inc., December 2000.

Lillington, Karlin. "Ireland Links to Net's Future." *Wired News*. December 12, 2000.

Online. <http://www.wired.com/news/technology/0,1282,40638,00.html>.

McCall, Barry. "Back to School for e-Commerce." *ElectricNews*. September 15, 2000.

Online. <http://www.electricnews.net/sh334x2850.html>.

Nua Internet Surveys. Report. 2000. Online. <http://www.nua.ie>.

"Report on e-Commerce - The Policy Requirements." Forfás. Dublin, July 29, 1999.

Online. <http://www.forfas.ie>.

"Statement on Telecommunications, e-Business and the Information Society." National

Competitiveness Council, Forfás. Dublin, July 2000. Online.

<http://www.forfas.ie>.

"Taking Your Business On-line." Enterprise Ireland. Dublin. Online. <http://www>.

[openup.ie](http://www.openup.ie).

Tapscott, Dan. *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*. New York, NY: McGraw-Hill, 1995.

“Technology Salary and Skills Survey, 1999.” Computer Staff Recruitment. Dublin, 1999. Online. <http://www.csr.ie>.

“Telecommunications for e-Business: A Users Guide.” Report published jointly by Forfás, CBI, IRTU, IBEC, and Department of Public Enterprise. Dublin, 2000. Online. <http://www.t4eb.com>.

United Nations. Statistical Data Report. 2000. Online. <http://www.un.org>.

“Vital Statistics.” IDA Ireland. Dublin, February 2001. Online. <http://www.ida.ie>.

“World Analogue & Digital Cellular Subscriber Update.” *Mobile Communications International*. Issue 79, March 2001. pg 89-116.

Abstract

With the beginning of the new millennium, Ireland is turning to e-commerce and the new digital economy to take growth and prosperity in the republic to the next level. This paper evaluates the level of readiness for e-commerce activities in Ireland, focusing on the technical, economic and social conditions that play key roles in ensuring their development.

Biography

HRVOJE BENKO graduated with highest honors from Lehigh University in June 2001 with a Bachelor of Science in Computer Engineering. He served as the president of the Lehigh University Philharmonic Orchestra, Head Gryphon of Trembley Park, and the president of Future Global Entrepreneurs Club. For his achievements he was presented the Gabuzda Memorial Award for the Best Student in EECS Department, as well as the Phi Beta Delta Student of the Year and the Student Life Leadership Award. He was inducted into Phi Beta Kappa, Tau Beta Pi and Phi Beta Delta honor societies. A native of Croatia, Hrvoje is currently pursuing a Ph.D. in Computer Science at Columbia University in New York City.