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The Next Leap: Competitive Ireland in the Digital Era

The Next Leap

COMPETITIVE IRELAND IN THE DIGITAL ERA

A STRATEGIC REPORT ON THE TRENDS OF CHANGE IN THE DIGITAL SECTOR AND GOVERNMENT OPPORTUNITIES FOR ACTION, BASED ON THE IIEA DIGITAL SECTOR STAKEHOLDERS' CONSULTATION BY JOHNNY RYAN

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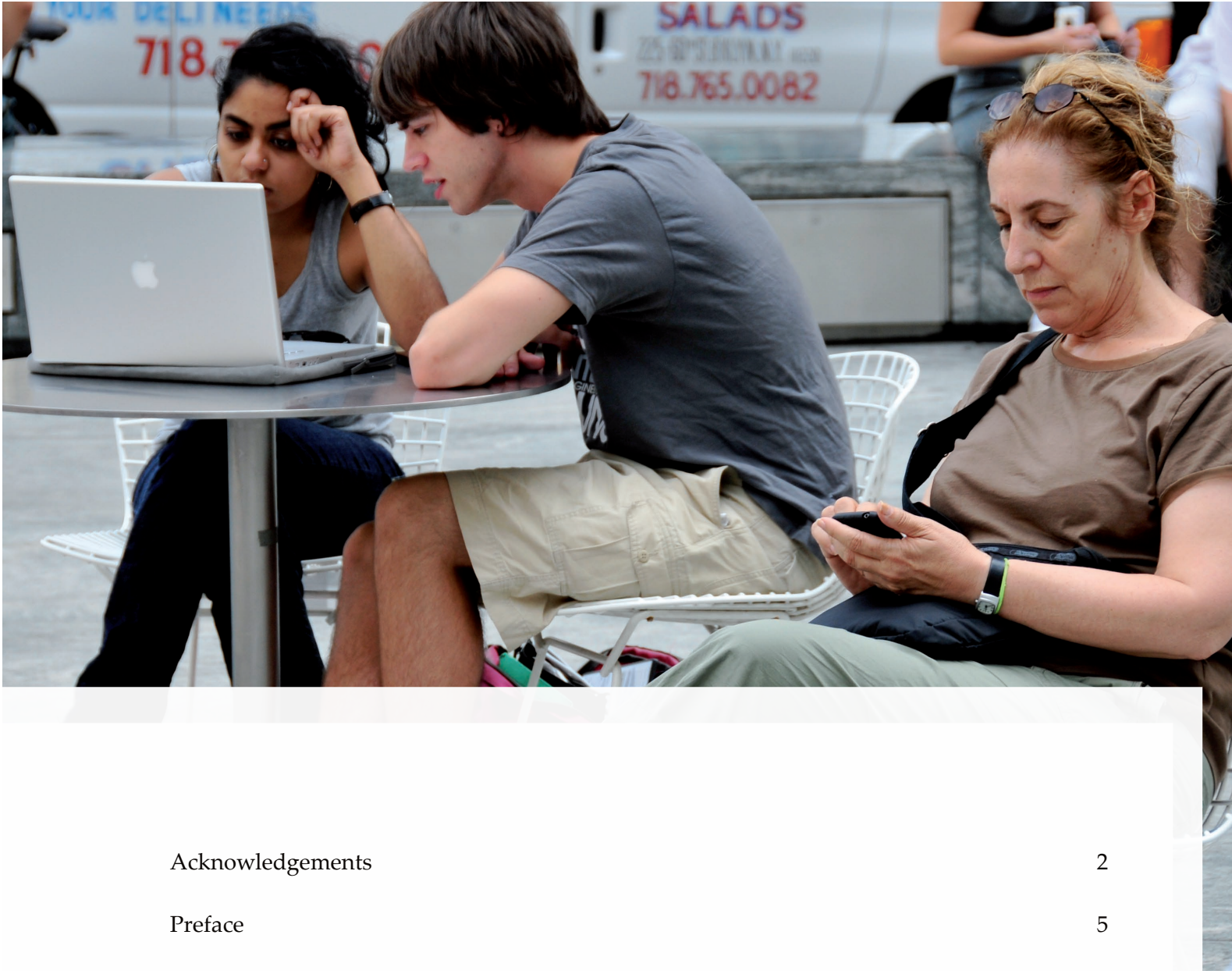


{image: New Yorkers connected on laptop and smart phone. Photo by Ed Yourdon July 2008}

Ireland must leap upstream in the post-Celtic tiger era

Preface

In 2008, the Institute of International and European Affairs (IIEA) identified Ireland's competitiveness in the digital sector as a priority area for research. The trigger for this research was the warning by the Irish Technology Leadership Group in Silicon Valley that Ireland was no longer mentioned among the top five countries in the digital sector. The challenge was to identify the key factors inhibiting Ireland's competitiveness and to reflect on how to rebrand Ireland as a digital leader.

This report represents one strand of a process that was initiated in the Institute in October 2007. It was compiled on the basis of the recent IIEA Digital Sector Stakeholders' Consultation. The Institute will continue its work on the trends identified in these pages in the coming months.

The second strand of the Digital Futures work programme consists of a series of keynote addresses by digital thought leaders on issues as diverse as cyberwar, net neutrality, spectrum management, regulation, e-readiness, new media content and IP rights. Attendees at the IIEA Digital Future Group's regular events have the opportunity to network with national and international policy makers, key stakeholders from industry, start-ups and representatives from research and financial circles.

I would like to take this opportunity to thank the speakers at the Digital Future Group over the last twelve months who included Larry Sanger, co-founder of Wikipedia; H.E. Toomas Henrik Ilves, President of Estonia; Fabio Colasanti, Director General, DG Information Society & Media at the European Commission; Professor Jonathan Zittrain, Founding member of the Harvard Law School Berkman Centre for Internet & Society; US Congressman Rick Boucher, founder of the House Internet Caucus; Linnar Viik, Estonian E-guru; Susanne Dirks, Leader of the IBM Institute for Business Value; Triona Campbell, Producer of *Sophia's Diary*; Martin Murphy, Managing Director of Hewlett Packard Ireland; and Peter Fleischer, Google's Global Chief Privacy Counsel.

I would also like to thank all the participants in the stakeholder consultation process for their generosity in sharing their insights with us. I am particularly grateful to Paul Rellis, Managing Director of Microsoft Ireland, and to Professor Joyce O'Connor, Chair of the Digital Hub Development Agency, for acting as chair and vice-chair of the Group and for their tremendous support for the project. Our peer reviewers, the Irish Technology Leadership Group, deserve warmest thanks for their invaluable inputs. I would especially like to thank Johnny Ryan, author of this report.

I hope that *The Next Leap* will prompt a wider debate on the Digital Future, and that it will stimulate its readers' interest in exploring these issues in person at the IIEA's Digital Future Group.

Jill Donoghue
Director General, IIEA

{image: Internet cafe in Dublin, eszter (Flickr user), June 2007}

Foreword

Ireland has travelled a successful journey since the foundation of the State. I believe that the defining moment in our development as a knowledge economy occurred under the stewardship of Sean Lemass, who was a pivotal figure in the transition of Ireland to a more open and progressive society. The decision on 10 December 1966 by his Minister for Education, Donogh O'Malley, to increase access to education by introducing free secondary education, set in motion the creation of an economy and society based on knowledge. His vision was of a confident Irish people doing jobs that had yet to be invented, using technologies that had yet to be developed. This decision and others by Lemass and Whitaker eventually led to enmeshing Ireland in the fabric of the global economy. Forty-two years later, in 2008, this message resonates once more with the Irish public.

However, the pace of change is dramatically more rapid today than at any other time in our history. The speed of innovation and the ubiquity of competition suggests that Ireland's sources of competitive advantage need to be continually re-defined. Although it seems as if we have a choice to make as to whether or not we embrace the knowledge economy and exploit the advantages it presents, I do not believe that we have a choice.

Ireland already has the cost-base, living standards and expectations of a leading knowledge economy. We now have the opportunity to engage everyone in our community, in adapting our education system to the digital age, starting at primary and secondary levels, to transform our public services, by mobilising our business sector and by creating the technical infrastructure to support the knowledge economy. To date, the approach has been piecemeal and tentative and this has made Ireland a follower not a leader. While we contemplate this new and uncertain future, other countries are moving rapidly and comprehensively to seize the opportunities that are presenting.

Ireland already enjoys many of the ingredients required to become a leading knowledge economy: it has the technical know-how, the literary, artistic and musical skill, and the cultural agility to successfully interact with people across the globe. While these ingredients are necessary, they are not sufficient to guarantee future success.

Now is the time to create the vision of a new economic reality where the digital world can connect Irish people in a society where access is open to all, regardless of health, wealth or geographical location. If Ireland fosters innovation and enterprise in the digital space, it can create social and economic benefits. However, to do so requires bold and brave investment. In forty years' time, historians will look back at the actions we took in 2008 to address the challenges and opportunities presented to us. I believe they will commend our foresight on the basis of the actions we take now.

Paul Rellis
Managing Director, Microsoft Ireland

Keith Bohanna is an entrepreneur and one half of a new **two-person business** called dbTwang. **Though based in Kilkenny, he is using the Internet to target a global niche market.** dbTwang is a social & trading network for guitar collectors around the world.

Triona Ryan is CEO of CampbellRyan Productions in Dún Laoghaire. Their product, *Sophia's Diary* is an interactive TV show that uses **multiple, converged platforms** (internet, TV, radio, mobile, print) to connect to a teen audience. Within two weeks of launching on Bebo.com, the UK-based show gained five million hits.

image: Triona Campbell speaking at the IIEA Digital Future Group in 2008

Introduction: A Moment of Opportunity

Ireland is at a moment of opportunity. A digital revolution is transforming the global environment in which Ireland operates. Failure to embrace the transition to this new world will leave Ireland marooned as conventional industries migrate to cheaper locations, and traditional industries are transformed using new digital technologies with which our people are not conversant and for which we lack the infrastructure. On the other hand, the digital revolution presents huge opportunities for Ireland. If we successfully manage it, Ireland can offset its long-standing geographical disadvantage, leverage the creativity of its citizens at all levels of society, and engage with a global market of unprecedented scale.

November 2008 will mark the fiftieth anniversary of the publication of the *First Programme for Economic Expansion* as a White Paper. Intrepid Government leadership in the late 1950s and throughout the 1960s guided Ireland in its first steps from its agrarian past to embrace manufacturing and trade. T.K. Whitaker, the youngest ever Secretary General of the Department of Finance, proposed bold initiatives in his study *Economic Development* that met the challenge of transition. Ireland now requires a similarly bold statement of intent to transition to the digital era.

There was a sense among the stakeholders consulted during the preparation of this report that Ireland will make the necessary leap and an acknowledgement that, underwriting all else, it will be Government leadership that will guide Ireland into its digital future. The recent decision to update and reinvigorate the "information society" agenda is a positive sign of the Cabinet's will to take action.

The Next Leap: Competitive Ireland in the Digital Era is intended to be a useful point of reference as Government considers a new national strategy to maximise Ireland's competitive advantage in the digital era. It is an exercise in digital foresight that describes:

1. Emerging trends that will characterise the digital environment in coming years; and
2. Government actions that could capitalise on these trends

This report is not a performance assessment, nor is it intended to supplant studies conducted by the government bodies active in the field. It does, however, attempt to present something new: a cross-cutting draft plan of action derived from the diverging inputs of stakeholders across the digital sector. The Digital Sector, which this report defines broadly, includes communications regulators, actors in the ICT industry from multinational EMEA HQs in Ireland to indigenous start-ups, sub-sectors of the financial services, digital media content providers, game development, ICT R&D, web research, education, medical research, the media & culture sector, finance & capital providers, foreign development initiatives. This document does not represent a consensus, but rather the best and boldest concepts drawn from the input of leaders in the field of research, entrepreneurs, media producers, multinational companies and early stage startups, software vendors, educators, and public sector bodies and organisations, who were consulted for this purpose during the IIEA's Digital Sector Stakeholders' Competitiveness Consultation.

This consultation was the first step in the three-step process that resulted in this report. The second step was analysis and consolidation to ensure that the diverse inputs received from stakeholders were presented in a coherent and policy relevant manner. The third step was to submit the report for peer review to the Irish Technology Leadership Group (ITLG) in Silicon Valley. The ITLG is composed of the most senior Irish business people in the global digital sector. Finally, the report was submitted by the IIEA to Government.

The primary recommendation around which this report focuses is the adoption of a strategic approach to the digital sector in which the following primary action points are nested:

1. Transformation of education

-Transform system as a national priority with the swift roll-out of a digital curriculum at primary and secondary level

-Integrate business context into secondary level curriculum to emphasise the viability of a career in the digital sector

-Introduce weighted marks at Leaving Certificate level for ICT relevant subjects

2. Kickstart of the digital economy with a "Digital IFSC"

-Re-task RTE as an incubator & developer of media content irrespective of platform

-Investigate new approaches to create a national pool of venture capital

-Use private sector leaders with proven successes to assess start-up applications for state funding

3. Brand Ireland as a Software and Services Hub

(Note that further recommendations are included at the end of this report.)

This report takes the roll-out of next generation broadband as its prerequisite starting point. The single area of consensus among all stakeholders was the need for free or affordable high speed cheap broadband. This was viewed as the *sine qua non* of an internationally competitive digital sector.

Since DCENR is currently examining the responses to the NGB consultation paper, this report takes the roll-out of next generation broadband as the prerequisite starting point, and bypasses the current infrastructural dialogue in favour of a longer term assessment of the key emerging trends that will impact on Ireland's digital competitiveness.

TREND 1: A Globally Competitive Generation with "Digital Instincts"

The inputs of the IIEA's consultative process showed that education was the key priority after infrastructure for virtually every stakeholder consulted across all strata of the digital sector. Different stakeholders placed emphasis on primary and secondary education or on tertiary and fourth level training and research. The creation of Irish digital consumers and producers would have benefits for business and the consumer alike. As the former Minister for Education noted in her foreword to *Investing Effectively in ICT in Schools: 2008-2013*, "the prevalence of ICT requires us to ensure that all citizens are capable of full participation in this digital world". Stakeholders viewed education as the key to Ireland's digital competitiveness in four respects:

First, it offers an opportunity to negate the advantage of far larger competitor nations by allowing us, through far-sighted educational reform, to produce a generation capable of competing with their global peers. The term "digital instincts" is coined here to reflect an underlying assumption of many stakeholders that it is necessary to instil a foundation of basic digital skills in young children if they are to be able to easily adapt to new technologies as they emerge.

Second, educational reform is imperative in the medium-term because multinational and indigenous businesses in Ireland require a sustainable supply of employees and find it increasingly difficult to source the necessary human capital from among the Irish population.

Third, educational reform is an opportunity to avert a "digital divide" among privileged

{image: School children in Mongolia at work. Photo by Carla Gomez Monroy of One Laptop per Child}

and disadvantaged schools. Interest in technology should not be dependent on the level of interest in a child's home.

Fourth, "world class" universities and advanced research are recognised prerequisites for a knowledge economy.

Stakeholders identified a number of negative factors that harm the prospect of a globally competitive generation in Ireland. There is no national approach in practice to digital education of primary students. The Department of Education Inspectorate's 2008 report on ICT in Schools found that almost a third of primary school students in classes surveyed were computer illiterate to the extent that they were incapable of connecting to the Internet or of printing a document. Perhaps this is due, as the OSCE noted in 2005, to the particularly infrequent use by Irish students of computers in school. Nor are Irish schools suitably equipped. Another important negative factor is the ongoing decline in the number of students pursuing relevant subjects at secondary level, thereby throttling advanced research and training at tertiary and fourth level. Despite the ambitious goals of the *2006-2013 Strategy for Science, Technology and Innovation* and the €8.2 bn allocated in the National Development Plan in support of the Government's Strategy for Science, Technology and Innovation, some stakeholders were concerned about the performance of the universities.

These negatives should not be seen as a significant impediment to the speedy reform of our education system, and valuable work has already been done by many actors in this area, which can now be built upon.

Options for action by Government:

As a first step, **a drive to transform Ireland's education system could be endorsed at Cabinet level as a national priority**. This drive would contain three elements: i) Cabinet endorsement and leadership, ii) speedy curricular roll-out, and iii) a strategic and cost-saving approach to equipment and connectivity, possibly in partnership with the private sector.

The Department of Education could work with the proposed digital strategy department (proposed in the conclusion, below) **on the speedy roll-out of a curriculum capable of inculcating "digital instincts" during primary education**. Already the National Council for Curriculum & Assessment (NCCA) has developed a framework for the use of ICT in schools as a tool for learning that has been favourably benchmarked when appraised by international standards.

Urgent action is required to correct the balance of students studying maths, applied maths, and sciences at secondary level, in order to improve the flow of students into sciences and engineering at third level. This is key to a "knowledge economy". A number of stakeholders repeated the suggestion of awarding **weighted marks at Leaving Certificate level for higher level sciences, and higher and applied mathematics**, and of considering new approaches to recruiting and compensating high quality teachers in these areas. An additional step towards increasing interest in subjects related to ICT is to introduce a commercial context into computer syllabi to **emphasise the viability of a career in the digital sector**. For example, introduce a course that mixes simple programming with commercial opportunity, such as an introduction to popular software development kits (SDKs) for platforms such as Facebook, or mobile phone platforms, with which teams of students could learn to design simple services that would generate revenue.

It will be necessary to commit to disbursement of **the funding required to provide sufficient connectivity and equipment to bring Irish schools up to the OECD average**. This is a strategic investment that will pay long-term dividends. Adopting a national and strategic approach and centrally purchasing computers (plus maintenance, refresh, and technical support contracts) would generate economies of scale and guarantee national constancy. In addition, Government could also consider **exempting all school ICT equipment from VAT**, availing of the fact that education is outside EU competence.

Stakeholders concerned with the tertiary and fourth level believed that recent developments in cross-disciplinary studies and R&D commercialisation were important steps. Relevant measures are outlined in trend 2, below.

Convening stakeholder think-ins involving policy makers, industry, educators, curriculum developers, and the research community, will facilitate joined up thinking on Ireland's education reform. In technology, especially during these pivotal years in which countries are adapting to the new opportunities of the digital age, Ireland can ill afford to stand still.

TREND 2: "Total Commerce"

A number of stakeholders emphasised the opportunity for Ireland to transition to a new phase of economic competitiveness. This national commercial renaissance - in which every citizen can be engaged through a laptop - is referred to in this report as "Total Commerce". This is intentionally evocative of the "total war" era in the last century when industrial states harnessed their entire citizenry in the war effort. Underlying the stakeholders' inputs was an understanding of the fundamental changes currently being brought about by the Internet, which might usefully be explained here. Change is manifesting in three cardinal areas:

First, information is being democratised. The overwhelming majority of the globe's top 50 most popular Internet websites is reliant on user-generated content, and Wikipedia is the world's most widely consulted encyclopaedia.

Second, the Internet is undercutting established distribution channels, and negating Ireland's geographic disadvantage. The Web gives any individual at any location direct access to remote niche markets. By connecting prospective providers and customers directly, it neutralises the advantage of large companies who have built expensive distribution channels.

Third, despite gaining popularity as recently as the mid-1990s, the impact of the Internet is now so profound that it is beginning to revolutionise not only commerce, but politics too. The shift in candidate financing in US politics (tested in the Dean campaign of 2004, and matured in the Obama campaign of 2008) illustrates the new importance of the many but small contributors at the expense of established networks of the few but large donors.

This revolution in information and distribution represents a significant opportunity for Ireland. Perhaps most profound is that the smallest unit of commercially viable creativity with global reach has been dramatically reduced. As a number of stakeholders noted, this could herald a new era of entrepreneurial activity across Ireland, enabling tiny creative operations to produce innovations and sell services and products to remote niche markets. While Dublin is Ireland's major cluster for these activities, the extension of broadband connectivity outside of urban centres in Ireland has enabled hundreds of new micro-businesses to begin to provide services over the Internet.

Recent developments on the Internet have also lowered the bar for entry to the software and creative industries by providing existing platforms with remote data centre capacity that reduce the expense of starting from scratch. An example is the popular social network site Facebook, on which users can now create and sell simple services. Provided the educational and infrastructural requirements are in place, more and more micro-entrepreneurs, relying on fewer resources, and acting at a younger age, will introduce commercially viable innovations and content from Ireland to the global market. Moreover, a digitally conversant public, capable of engaging in a global market of niche demands, could help keep the local market buoyant during periods of downturn.

At the same time, stakeholders active in large software and research organisations observed new opportunities to grow indigenous firms to a global scale. At both micro and

{image: Photo by the author, August 2008}

macro levels, there was a consistent view among stakeholders that Ireland must find an optimal means of harnessing the creativity of the public across the nation.

Options for Government Action:

A common theme in stakeholders' responses was the opportunity to establish a "digital IFSC" and provide the conditions for the emergence of an Irish Silicon Valley. In light of the momentum generated at the Digital Hub, this digital IFSC proposal might be considered a phase 2 to the Digital Hub. As a first step, Government could appoint **a panel of Irish business leaders, including some of the individuals involved in the establishment of the IFSC, to consider how the Digital Hub could be built upon to create a "digital ISFC".** At present, the Digital Hub provides rented office space, internet connectivity, and some opportunities for CEOs to network. Additional and more strategic services, such as mentoring and legal advisory services, are required if the Digital Hub is to become a "digital IFSC" that supports and attracts growing businesses competing in global markets. Closely related are the proposals for a **digital legal hub** and **Global Rights Clearance Centre** in trends 4 and 6, below. An additional step is to **investigate what tax incentives might be feasible to promote digital development**, particularly in areas of EU derogations such as audio visual services, while at the same time respecting EU rules on state aid.

Raising capital for initial ventures and expansion was a concern among many stakeholders. This concern is particularly relevant to the new sub-sector of tiny 1-2 people firms. The Digital Hub reports that 79% of its resident companies are either in start-up or early growth phases, and that 33% see their funding coming from business angels, VCs and the BES scheme. Government could establish a working group to **develop new, innovative ways of generating a national pool of venture capital**. One way of consolidating and efficiently disbursing capital might be to replicate the success of "Y-combinator", a seed capital initiative in the US, and "seedcamp", the recently established EU emulator of Y-combinator, style venture capital competitions. A key aspect of these two examples is that established industry leaders, rather then civil servants, judge the viability of proposals. A number of stakeholders noted that while Enterprise Ireland rightly assigns civil service experts to judge the due diligence and legal aspects of a proposal, it is important to leverage the knowledge of the private sector when judging cutting edge technology and market aspects of proposals.

Many stakeholders in industry and research saw the nexus of research and commerce as an area of concern and opportunity. There were diverging perspectives on the question of whether intellectual property should be retained or shared by academic/research or commercial partners. On the other hand, there was a common consensus among many stakeholders that cross-disciplinary endeavours were generally positive, and that an environment for positive cooperation between industry and academia must be created. To pursue this aim Government, or Enterprise Ireland, could support the establishment of **"niche exploration" groups to investigate possible areas of national expertise and excellence**. Building on Enterprise Ireland's initiative of National Competence Centres, Government could consider supporting neutral organisations or venues to host small stakeholder meetings in areas where consortia could eventually develop. Ireland is home to many indigenous and international businesses and researchers with expertise in promising niche areas. These areas are as diverse as gambling, financial services software, security software, biometrics, wireless R&D, life sciences, food science, gaming. Interested parties of any background could request to use this facility to meet peers in industry, research, investment, customer base, and the development agencies.

A number of stakeholders emphasised the need **to harness the creativity of the public**. RTE could play a leading role in this endeavour, as discussed in trend 4, below. Government could consider the practical roll-out of digital media literacy programmes in the form of a digital entrepreneurial roadshow. This could be a regional initiative focused on areas outside the Greater Dublin Area, which would build on the experience of organisations such as the Digital Hub in its e-inclusion programme in the Liberties and the Dublin Community ICT Programme, and leverage the training expertise currently being developed at the Digital Media Forum. Increasingly, as broadband is rolled out across the country, new micro-entrepreneurs are developing new services and delivering them via the Internet from their homes. These individuals could be engaged in local roadshows, informing citizens how to use their connections on the Internet to make money. This could include awareness raising on how to use eBay to sell to distant markets, how to start and generate advertising revenue from a blog, or how to learn to create small programmes on popular platforms like Facebook that can generate revenue. Further development and the roll-out of this initiative could be outsourced to a third party (such as the Digital Media Forum or life long learning programmes), which might then be required to raise a target percentage of funds from private sector partners.

TREND 3: Pervasive Internet

The Internet only began to have a significant commercial impact in the mid- to late-1990s. Yet only a decade later its impact is extending to many aspects of daily life. This trend can be expected to accelerate in the coming years, driven by two factors:

First, new consumer technology such as affordable and small laptops, wireless networking, and Internet connected mobile phones have expanded the market for mobile Internet connectivity. The ongoing development of new mobile platforms means that the mobile internet device will soon be universal in Ireland, and can be expected to expand very rapidly across the globe.

{image: Wireless connectivity in action on a Harvard University lawn. Photo by the author, July 2008}

Second, many governments are reconsidering their regulation and policies governing the allocation of wireless spectrum, not least because of the so-called "digital dividend" of unallocated spectrum freed for new uses once analog television signals are switched to more efficient digital ones. The Government's new Spectrum Strategy is a welcome reflection of this priority. Judging by the number of mobile handsets, as opposed to PCs, sold globally, the convergence of Internet connectivity with mobile telephony will produce a truly massive market for digital media content and advertising (discussed as a trend in itself in trend 4, below). Juniper Research anticipates that expenditure on mobile advertising will rise from $1.3bn in 2008 to more than $7.6bn in 2013. In addition, mobile Internet take up will create a global demand for better wireless technologies capable of delivering more content to more users more reliably at lower cost.

Options for Government Action:

While mobile connectivity will soon be pervasive, the technology is in its infancy. Maturing technologies such as WiMax and emerging technologies such as cognitive and software defined radio are expected to revolutionise connectivity, but still require testing and development. Stakeholders active in this area were agreed that **Ireland can brand itself as an attractive venue for spectrum research and development.** Conditions in Ireland are particularly favourable: Ireland has a highly developed wireless sector to build upon, and its range of spectrum is unusually wide since there is no extensive military communications allocation, nor is the country bordered by neighbours with conflicting spectrum needs. Key to this is the development of a favourable and flexible spectrum licensing regime that will attract companies to test and develop their technologies in Ireland. To achieve this**, a task force comprising ComReg, Enterprise Ireland, the IDA, and leaders in industry and research, could be assembled to further develop a liberal radio spectrum experimentation policy on the basis of ComReg's Test & Trial Licensing Scheme**, established in 2006.

While Ireland has had successes in transitioning to eGovernment, the need to renew and accelerate the pace of transition was a key theme in many stakeholders' inputs. **A renewed eGovernment campaign would elevate Ireland's global profile and rebrand it as an innovation leader.** Lack of digital literacy at government and official level was identified by stakeholders as a significant stumbling block. Moreover, by changing their own practices Government departments can kick start the adoption of e-payments and invoicing systems by tenderers and suppliers in the wider economy. This could, for example, be an important support to Ireland's e-payments industry. Internet delivered government services are also key to reducing the cost-to-income ratio for businesses. Moreover, by providing services over the Internet, Government can stimulate the demand for wired and wireless connectivity, making Ireland a more attractive test bed for spectrum R&D.

A number of stakeholders viewed the security sector in general as a promising niche for Irish software developers. In addition, the need for critical infrastructure protection, highlighted by one stakeholder, is a point emphasised here. The need to guarantee resilient connectivity and Internet services will increase as the Internet assumes an increasingly important role in daily political, social, and economic life, particularly if Ireland is to place a priority on data centre hosting and the provision of digital content. By **establishing a Computer Emergency Response Team (CERT)** within the Department, DCENR would provide a means of protecting the connectivity of Irish citizens and businesses against a hostile attack by hackers and racketeers on the Internet, and of providing support services such as anti-virus and intrusion detection. The need for this unit is such that a small, independent CERT called the "Irish reporting information security service" (IRIS) will begin functioning on a small budget in November 2008. The establishment of a national, government supported CERT would not only provide assurance to companies operating in Ireland, but could be regarded in the wake of the Estonia DDOS (distributed denial of service) attacks in 2007, and the Georgia cyber attacks this year, as something of a priority.

TREND 4: A Global Digital Media Boom

Despite the very rapid pace of change, stakeholders engaged in creative and media activities were optimistic about the future of their sector. Three trends signal the emergence of a global digital media boom:

First, convergence across media and platforms is becoming a reality. This is evident in the fact that while until very recently mobile phones were limited to making and receiving phone calls, now a cheap mobile phone can handle E-mail, display satellite maps, play music, and create and display video.

Second, the global population of Internet users is growing, as is the bandwidth to deliver converged content to them. The global explosion of high bandwidth connections will create a truly global and massive market for digital media content. Digital media content is a very broad area, and offers a wide range of opportunities. Gaming, for example, offers the opportunity of a brand new sub-sector, generating high-skilled employment in graphics, physics, networking, game engine technology, interactive audio, and marketing, sales, PR, and distribution. Content will soon be among the key commodities on the Internet, particularly where it can be delivered in a personalised manner directly to individuals' mobile handsets.

Third, the trend towards providing free services paid for by advertising suggests significant opportunities for any countries that gain leadership in global advertising in new digital formats.

These trends represent a significant opportunity for Ireland to develop as a global media and advertising hub. Witness, for example, Irish-based software developer CryptoLogic's announcement in August 2008 of its agreement of a deal to provide an online version of the traditional boardgame "Mahong" to 50% of China's internet cafes. However, the boom in digital media content is also a threat to conventional TV. The schedule-based programming of conventional television channels is threatened with obsolescence by the radical change in the viewing habits of a new audience that prefers to choose how and when it watches video content online. This post-broadcasting world, however, may represent a rich opportunity for RTE to diversify its offerings and become an incubator and developer of new Irish content.

{image: Child watches cartoons on Youtube.com. Photo by alexmuse, flickr.com member, July 2006}

Options for Government Action:

Stakeholders active in this area observed that a holistic approach that reflected the convergence of media was lacking among the various state entities with which they liaised. The convergence of technologies and media platforms that is currently underway presents Government with an opportunity to rationalise Ireland's framework of institutions active in various media and arts. **As technologies and media converge, so too might relevant State entities.** This would consolidate State resources, and at the same time would reflect the realities of media convergence and provide a one-stop-shop with which content producers could work. A temporary stakeholders group could be established to consider **the convergence of existing cultural and media bodies into a single unified Irish Creative Media Board**. The Creative Media Board could be drawn from an expanded Irish Film Board, fused with other bodies such as the Arts Council. It would provide a one stop shop to creators of all media, irrespective of platform and format. The Irish Creative Media Board would work under the lead unit mentioned above to enable Ireland to leverage its artistic heritage globally, in creative and lucrative niches.

The temporary stakeholders group could also consider **the establishment of a lead unit to drive a strategic approach to Irish Digital Media**. The lead unit could be established within the strategic digital department (proposed in the conclusion, below) and would be responsible for the digital media strand of the national digital strategy. This unit would cooperate with and lead relevant parts of other State agencies and bodies to provide a whole of government approach. This unit could, for example, undertake some functions currently within the remit of the Department of Arts, Heritage, Gaeltacht and the Islands, and would play an important role in driving Ireland's global profile and success in digital media content across all platforms.

Government, in consultation with relevant stakeholders, could consider what functions RTE might fulfil as the relevance of conventional TV declines. One **opportunity is for RTE to embrace a new role as public service broadcaster responsible for pushing radical new services and content, with an emphasis on supporting and developing Irish creative content across all platforms, from script writing to gaming**. Specifically, it could provide capital and expertise to support content producers across Ireland, including local community developed content. There could be useful synergies with the proposals on regional enterprise in trend 2, above. Channel 4's new "4IP" investment fund, which that broadcaster views as its entry to the post-broadcasting world, is a useful model to build and expand upon. By embracing change in advance, as Channel 4 is doing, RTE can be an important force for social inclusion in the regions and an incubator of Irish cultural activity, while at the same time assisting in the propagation of digital media literacy. RTE has already taken a step in this direction by buying "Aisling's Diary", the Irish version of the Bebo.com internet show "Sophia's Diary". In addition, RTE could now re-calibrate its relationship with independent producers and consider whether to allow them to retain copyright of their ideas as a means to encourage a vibrant content market.

Finally, it will be important to consider **incentives to promote the development of digital media content** in Ireland. The artists' tax exemption has been a valuable tool to incentivise Irish cultural output. At present the exemption applies to writing, theatre, musical composition, painting or other like pictures and sculpture. Ireland could capitalise on the convergence of creative content by extending or duplicating this exemption to new media content. A taskforce could consider a definition to govern the extent of this exemption, and determine the extent to which it might enable Ireland to become a global leader in this promising new area. Relevant for further examination is the derogation in the EU treaties for cultural and audio visual services, exceptions to the European Commission's usual prohibitions against state aids in the economic development of deprived areas, and in aid to promote culture and heritage conservation, and additional exemptions relevant to training aid. This relates to the "digital ISFC" proposal, in trend 2, above.

TREND 5: Cloud Computing

In the past few years, the trend of cloud computing has gathered pace, and is regarded by many digital sector stakeholders as a dominant emerging trend. Initially focused on E-mail accounts and photo collections stored online (remote from any specific computer), cloud computing now includes office, project management, and even some early video editing applications. These applications are either delivered as "software as a service" (SaaS), where the application is delivered remotely from a data centre to the user's computer, or as "software plus services" (S+S), where the application operates locally on the user's computer, and also uses services delivered remotely from a data centre. Both approaches are referred to here as "SaaS/S+S".

In parallel with noticing the trend towards cloud computing, the stakeholders were concerned about the continuing trend of outsourcing some services to locations away from Ireland. This is less pronounced when considering services that are of a sensitive legal character,

{image: Collage of logos of softwares delivered as services. Image by Ludwig Gatzke, February 2006}

and could not be conducted in other jurisdictions that might have lower legal standards or protections. While these two trends threaten the traditional software manufacturing and distribution industry, which may become entirely obsolete, it also significantly increases demand in three areas where Ireland could emerge as a leading provider: green data centres, legal environment and services, and localisation.

SaaS/S+S, and associated services such as cloud computing (the use of computing power supplied to users from a global pool of networked processing capacity) rely on data centres to provide the necessary processing power and storage from massive physical premises to remote users of their services around the world. This, as described in trend 6, below, suggests an opportunity for green data centres.

SaaS/S+S, delivered through data centres in jurisdictions across the globe and delivered internationally to remote clients, may open new opportunities for a global legal services hub wherein expertise relevant to rights clearance, payments, escrow and other relevant legal areas could be concentrated. Moreover, the boom in digital media content, described in trend 4, above, and the resulting trade in rights and protection of intellectual property, will expand the global market for supporting legal services.

SaaS/S+S may also create a boom in localisation as new services and other digital products delivered to a wide variety of customers at different locations across the globe require localisation. This can range from translation of language to adaptation of the entire product to fit better with the particular culture or technical context in which it is being marketed.

Options for Government Action:

As part of the national strategy, Government could consider the importance of **branding Ireland as a Green Data Centre Location** in the European, Middle East, Africa area (EMEA). This was a point of consensus among many of the consulted stakeholders, and is elaborated upon below under trend 6, below.

Thanks to the foresight of Government initiatives in the early 2000s, Ireland was ranked joint first in Western Europe in the legal environment category of the 2008 IBM E-Readiness Ranking. This reputation may allow Ireland to maintain firms here that require a solid legal framework and reputation for confidentiality, such as Enterprise Resource Planning (ERP), financial services, and gambling, that might not be available in competing outsourcing locations. A number of stakeholders suggested that there may be an opportunity to **brand Ireland as a Digital Legal Hub**. This measure would work in synergy with the "digital IFSC" proposal in trend 2, above. As a part of the legal hub, a taskforce could be drawn together to **consider the feasibility of a global rights clearance hub**. A number of stakeholders emphasised this opportunity, and, while attractive in the light of the digital media boom and emergence of SaaS/S+S, further study would be required to assess whether the proposal is feasible. The Taxation Commission could investigate whether innovative tax deductions could be introduced to make Ireland an attractive location in which to vest intellectual property, and whether new tax treaties are necessary to minimise double taxation on foreign withholding tax. In addition, new measures to enhance Ireland's conformity with US intellectual property and trade compliance law could be considered. One stakeholder proposed that Ireland lobby to join the US Patent Prosecution Highway (PPH), thereby allowing parties filing patents of first instance to do so in Ireland, with the added assurance that they could pursue infringers in the US for damages.

A temporary policy and industry taskforce could discuss an optimal national strategy to **promote Ireland as a location for localisation services**. Already, Ireland is home to large localisation operations, and has a base of localisation research at the University of Limerick. While Ireland may be prohibitively expensive as a location for services such as low level technical support, localisation is higher up the value chain. By creating an international hub of localisation services within Ireland when the Cloud Computing trend is in its infancy, Ireland's capacity to deliver these services will be well developed when the SaaS/S+S market matures.

TREND 6: A Green Dividend

Energy crises (rising fuel prices, strategic fuel supply concerns across Europe and the United States), and an increasing popular awareness of climate change, is placing a premium on renewable energy.

This is evident in practical steps taken by businesses that rely on data centre capacity to reduce their carbon footprints and energy use. The image above shows a new Microsoft data centre currently under construction at Castle Grange in West Dublin. The 51,000 sq metre facility will use ambient air conditioning to reduce energy consumption while cooling tens of thousands of servers. Microsoft is a member of the Green Grid, a global consortium of 92 information technology companies including Dell, IBM, Hewlett Packard, and Intel. In April 2008, the Green Grid consortium signed a memorandum of understanding with the US Environmental Protection Agency committing to work toward reducing data centre energy use and carbon emissions. Other examples of the digital sector's increasing concern about digital issues include BT Group's announcement of a target of 80% reduction in CO_2 emissions by 2020, and Google becoming the biggest investor in the United States in research into geothermal energy.

The move toward renewable energies and the growing importance of these energies to multinational companies active in the digital sector, is an opportunity for Ireland. The Government has a strong record of commitment in this area. The 2007 Energy White paper commits Ireland to generating 33% of electricity from renewable sources. ESB's Strategic Framework to 2020, announced in March 2008, will see major investment in renewable energy, and puts the organisation on the path to achieving "carbon net-zero" by 2035. Over €10bn will be invested in renewables (€4bn directly invested in renewable energy projects, €6.5bn spent facilitating renewables including smart metering and smart networks in the period to 2020). This emerging strength in renewables can be an integral part of Ireland's global brand, and indeed to some extent already is: Ireland was recently placed number ten in the world in the Ernst & Young renewables index.

{image: Architect's rendering of the Microsoft data centre due to be opened at Castle Grange in 2009. Image courtesy of Microsoft Ireland}

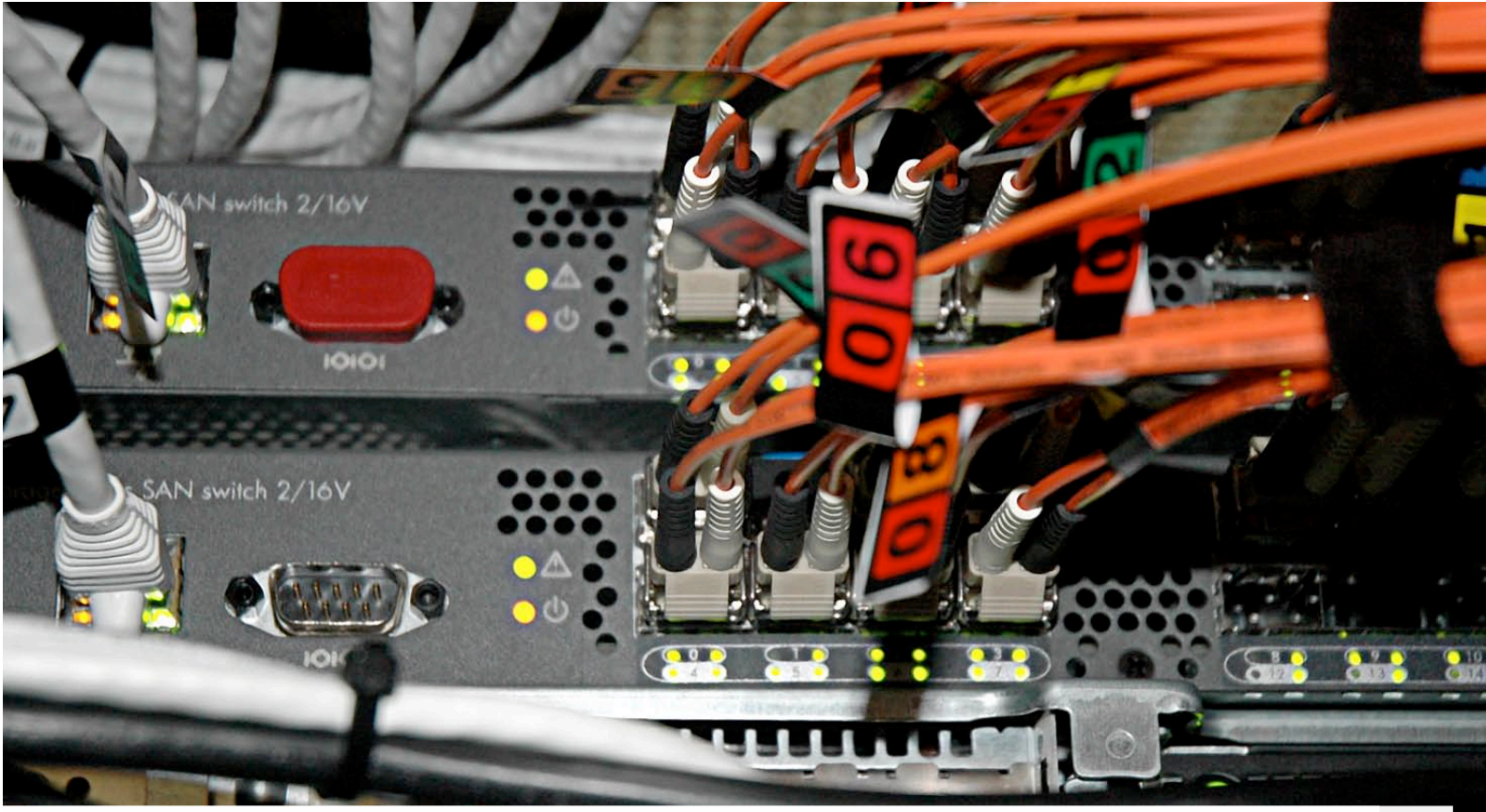
Options for Government Action:

Though Government is already doing much in this area, two additional measures are suggested: A first proposal, drawing upon trend 5 "Cloud Computing", above, might be to **establish Ireland as the leading EMEA (European, Middle East, Africa Region) Green Data Centre Location**. Despite the high cost of energy in Ireland at present, the country has a natural advantage as a data centre location: our temperate climate means that significantly less energy is required to cool equipment in Ireland than might be required elsewhere. Air-conditioning costs are among the highest concerns for data centre operators. Successfully meeting the 33% renewable energy supply target by 2020 will also enhance Ireland's security of supply and our branding as a green energy destination.

Second, establish a multi-disciplinary group convened by SEI and SFI to consider whether **research into "silicon offsetting"** would be a useful niche around which a national research focus could be generated. Silicon offsetting is the use of ICT to prevent generating unnecessary carbon, such as using video conferencing to avoid flights to face-to-face meetings. By promoting research on renewable energies, and identifying technologies through which "silicon offsetting" could be achieved, including behavioural, infrastructural, transport, and manufacturing change, Ireland can refresh its identity as a revitalised, green innovation society. Traffic flow problems in urban areas, and lingering infrastructural challenges outside the capital make Ireland a logical location for testing new technologies for working from home. This is a potentially rich area for commercialisation by indigenous technology firms.

In 1999, Irish physicist William Dick established the company "Wavebob" to develop a wave energy converter that can produce energy in harsh, deep water environments. Today Wavebob works with leading organisations including Chevron, Vattenfall, and the Georgia Tech Research Institute.

{image: "Wavebob" off the coast of Galway. Photo courtesy of Wavebob Ltd., 2008}



CONCLUSION: Converged Leadership

The Digital Sector encompasses a broad array of actors, many of whom would not necessarily have categorised themselves as being primarily associated with information communications technology (ICT). The diversity of this sector draws from the fact that, on the one hand, technologies and media that had previously been separate, such as TV and telephony, are now part of the great technological convergence of formats, and platforms. At the same time, businesses that would not previously have considered themselves to be operating in the technology sector have embraced these converging technologies to produce and deliver their products. For example, consider ESB's work on smart grids and the pivotal role of digital technologies in making this a reality.

The parties active in the digital sector, diverse though they are, have similar requirements from Government. Chief among these, and a common thrust of all stakeholders' inputs to the IIEA's consultation, is the need for leadership and vision, and the successful development of an imaginative national digital strategy for Ireland. This common vision would engage the key stakeholders (including industry stakeholders, broadcasters, government departments, regulators, agencies, bodies, educators, entrepreneurs, researchers), and enable a whole of government approach that avoids duplication, consolidates State resources, and guarantees benefit to all regions of the country as Ireland strives to compete in the new digital era.

Options for Government Action:

First, the time has come to create a **national mission statement** that reflects Ireland's intention to transition to an economy and society that can prosper in the digital era. If ambitiously drafted, this mission statement would reflect not only on the Ireland of 2010 but also the Ireland of 2020 and of 2040. By taking a direct interest in drafting this statement, and by consulting relevant stakeholders on its content, the Taoiseach could send an international signal of Ireland's intention to re-emerge as a key player in the international digital sector. A first step in this respect could be to host a gala of international digital gurus who would be invited to advise on the national mission statement.

Second, to provide leadership and coordination in support of Ireland's mission to create and pursue a national digital strategy, the following two options could be considered:

1. Establish a **dedicated department**, similar to the UK Ministry of Culture, Media [and Sport], which would, in effect, **provide digital town planning**. A first step could be to commission an assessment of whether the proposed department might represent a cost-effective consolidation of the existing array of State entities active in the area. This department would have two pivotal roles in driving Ireland's digital future. First, it would be tasked with ensuring a whole of government approach, and the tighter coordination of relevant departments, bodies and agencies (including the Department of Education, the Department of Communications, Energy and Natural Resources, the Department of Enterprise, Trade and Employment, Science Foundation Ireland, the National Digital Research Council, the Industrial Development Agency, Enterprise Ireland, FÁS, and the Irish Creative Media Board (proposed in trend 4, above). Second, it would provide leadership in driving and reframing the national strategy on Ireland's digital future, and in elevating Ireland's international profile as a committed and innovative information society.

2. Alternatively, a **dedicated "national digital strategy unit" could be established in DCENR to aggressively pursue the whole of government approach**. This unit, with Cabinet consent, could source and resolve impediments to the successful delivery of a national digital strategy wherever they arise. The unit could avail of seconded senior personnel from other government departments and agencies, and would be equipped to convene high-level stakeholder meetings of industry, policy makers and researchers, and to investigate evolving strategy in specific areas of the national digital strategy with the benefit of private sector participation.

CONCLUSION: Key Action Points

The vision presented in this report has emerged from the inputs of stakeholders across the digital sector. How and when to pursue their implementation are questions for Government. The most dramatic elements of this vision are a national strategy, a transformed education system, a new government department, a converged Irish Creative Media Board, and a new role for RTE. A full list of the main action points are listed below.

- **Draft a national mission statement that expresses Ireland's intention to re-assert itself in the digital sector**
- **Establish a government department**, or specialised cross-cutting unit within an existing department, that can propel the national digital strategy and guarantee a whole of government approach
- **Launch a Cabinet endorsed drive to transform the education system as a national priority**
- Speedy roll-out of a digital curriculum to provide "digital instincts" at primary and secondary level
- Integrate business context into secondary level curriculum to emphasise the viability of a career in the digital sector
- Introduce weighted marks at Leaving Certificate level for ICT relevant subjects
- Commit the funding required to provide sufficient connectivity and equipment to bring Irish schools up to the OECD average, and exempt all school ICT equipment from VAT
- Launch initiatives to harness the creativity of the public (example: roadshow on commercial opportunities)
- Support "niche exploration" groups to investigate possible areas of national expertise
- **Convene a panel of Irish business leaders, including some of the individuals involved in the establishment of the IFSC, to consider how the Digital Hub could be strategically developed**
- **Assess the feasibility of legal hub and Global Rights Clearance Centre within Digital Hub**
- Consider what tax incentives might be feasible to promote digital development
- Investigate new approaches to create a national pool of venture capital
- Use private sector leaders with proven successes to assess start-up applications for state funding
- The creation of a task force comprising ComReg, Enterprise Ireland, the IDA, industry leaders, and research leaders to design a liberal radio spectrum experimentation policy
- Renewal of the e-Government campaign, and improved digital literacy within the Civil Service
- Establish a Computer Emergency Response Team (CERT) within DCENR
- Establish a lead unit within the proposed digital department to lead a strategic approach to Digital Media
- **Establish a single Irish Creative Media Board into which the existing cultural and media bodies could be converged**
- Re-task RTE as an incubator & developer of media content irrespective of platform
- Investigate the feasibility of a tax exemption on digital media content producers that avails of EU derogations
- Brand Ireland as a Green Data Centre location
- Convene a taskforce to discuss an optimal national strategy to promote Ireland as a location for localisation services
- Global Rights Clearance Hub: i) tax deductions could make Ireland an attractive location in which to vest intellectual property; ii) new tax treaties to minimise double taxation on foreign withholding tax; iii) lobbying to join the US Patent Prosecution Highway (PPH)
- Establish a multi-disciplinary group convened by SEI and SFI to determine whether Ireland could be a hub of "silicon offsetting" research


EXIT

Peer Review

This report identifies several key areas that, in the opinion of the ITLG*, are paramount for Ireland to be able to compete in the digital era over the next 20-30 years, namely:

-increased investment and focus on 2nd level science, technology, engineering and mathematics (STEM) education,

-significantly increased public investment in, and private focus on, technology education and university research & development at 3rd and 4th level

-development of public and private institutions to incubate startup companies

-growth of a healthy and vibrant venture capital ecosystem, attracting both public investment and private equity

John Hartnett
Chairman of the Irish Technology Group in Silicon Valley
Senior Vice President, Palm Inc.

* Note: The Irish Technology Leadership Group in Silicon Valley is a group of Irish and Irish American senior executives based in Silicon Valley, active in the global technology industry, committed to ensuring that Ireland remains a strategic area of investment and opportunity for US technology companies, and who are keen to support the growth and development of Irish-based technology companies.

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