



**Information  
Society Commission**

# Learning to Innovate

Reperceiving the global information society

January 2005



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## Chairman's Foreword

In the global knowledge-based economy, our future competitiveness and cohesion is critically dependent on all sections of society becoming more innovative. We cannot face tomorrow's challenges equipped only with yesterday's solutions. Accelerated social, economic and technological change demands a stronger commitment to learning new ways of doing things – and to unlearning what is no longer useful.

Change and learning can be seen as two sides of the same coin, and a faster pace of change requires us to learn more quickly. The key to prosperity in a more competitive world is therefore to unlock the talents of each and every citizen. We must innovate in boosting our capacity to create wealth; in realising the full potential of our human resources; and in strengthening the position of those most vulnerable to change.

The experience from our work programme over the past three years suggests that we should also be increasingly circumspect about the effectiveness of centrally defined solutions. The role of expert knowledge and intelligence has never been greater. However, the development of this expertise must be aligned with a new emphasis on intensified communication and cooperation between all stakeholders in society. In an environment of exponentially growing flows of information, the finite resource is our capacity to think, to collaborate, and to agree what is important. The level of ambition that we set for ourselves in envisioning new possibilities will be crucial.

I would like to take this opportunity to thank all the members of the Commission for their commitment over the past three years, and to acknowledge in particular the dedication of those involved in chairing our advisory groups. A special word of appreciation is due to all who contributed to our work programme through their participation in these groups, including the cooperation of NESF, Forfás and the HEA in progressing the Knowledge Society Foresight initiative. Finally I would like to express the Commission's gratitude to the Secretariat for all their help and support.

The significance of the key messages that we have set out in this report is far-reaching. We commend them to Government with confidence.



**Dr Daniel O'Hare**

# Executive Summary



## Executive Summary

### **Innovation is key to unlocking the value of ICT.**

1. The digital era is more about new ways of doing things than about technology itself. We should think in terms of one part technology, nine parts innovation. The value of ICT is unlocked only when supported by substantial complementary investments in new work practices, new skills, and new organisational structures. The transformation potential of broadband-enabled ICT challenges our prevailing conception of business models, value chains, skills needs, community development, and public sector organisation. The digital era therefore raises deep issues of strategic reorientation for firms, for regions, and for national economies. It is an innovation agenda.

### **Our engagement with ICT continues to grow...**

2. Levels of engagement with ICT in Ireland have grown significantly in recent years. Over four-fifths of household PCs were connected to the Internet in 2004, up from only one-quarter in 1998. We now have 46 PCs and 38 Internet connections per hundred households. ICT engagement is broadly consistent with EU averages, with the exception of broadband connectivity. Our 6 broadband connections per hundred households is one-fifth the average level in competitor countries.

### **...but the challenges that lie ahead are now clearer.**

3. There has been slippage against many of the key objectives set out in the *New Connections* action plan. This includes our well-documented broadband deficit. The delays in bringing into effect the widely praised Public Services Broker model for integrated and multi-channel service delivery have also attracted criticism. However, there is now a clearer understanding of the deep issues of organisational change and unlearning involved in making this vision a reality. We should note too the many positive developments. These include the Revenue Online Service (ROS), the Inter Agency Messaging Service (IAMS) developed by Reach for secure exchange of life event information, the Motor Tax Online Service, the Land Registry's Electronic Access Service, and the innovative MoBhaile project.

**The ISC work programme has been extensive, and is reflected in key policy developments.**

4. We have produced 13 wide-ranging reports since our appointment in December 2001, in addition to our role in supporting the ‘Netd@ys’, ‘eWeek’ and ‘make IT secure’ initiatives. Our influence on policy development continues to unfold, but is particularly evident in the following areas:
  - Since our *Building the Knowledge Society* report in December 2002, a deeper engagement with the idea of the knowledge or knowledge-based society is evident in policy discourse. This is reflected most significantly in the commitment in the *Sustaining Progress* social partnership agreement that “a Knowledge Society Foresight exercise will be progressed under the aegis of the Information Society Commission with appropriate participation by the social partners”.
  - Significant broadband policy developments are evident since we produced our report, *Ireland’s Broadband Future*, in December 2003. These include the commitment to extending open access MAN (Metropolitan Area Network) infrastructure to all population centres of greater than 1,500 people, the Group Broadband Scheme to promote rollout to smaller towns and rural areas, and the appointment of e-Net as the Managed Services Entity (MSE) to manage the open access MAN infrastructure on behalf of government.
  - Our *eGovernment* report, produced in October 2003, pointed out that there is more to e-government than simply putting services online. We argued that ICT is essentially a tool for better government – better public services, better information management, better collaboration across agencies. This thinking is now widely endorsed, including government’s acceptance of our advice to step back from the commitment of putting all services online by 2005 as an end in itself, and to prioritise those services that will have greatest impact.
  - We initiated the innovative MoBhaile project, a concept that has now been acted upon and is being piloted in selected local authorities.
  - We played the anchor role in the ‘make IT secure’ initiative that took place in November 2003, taking the idea to government and facilitating a new model of collaborative engagement between public and private stakeholders.



**We face a global environment of accelerated change in which knowledge is the key resource...**

5. Digital technologies are best understood as tools for thought. There is no important domain of human or economic activity unaffected by them. Their key significance lies in amplifying brainpower in much the same way that the energy technologies of the industrial revolution amplified muscle power. Sources of value in the digital era therefore lie principally in the generation of new knowledge. This is reflected in the unprecedented worldwide productivity explosion since the mid-1990s, an associated reorganisation of global production, and a greatly intensified pace of scientific and technological development generally. The digital era is shaping a global environment that is increasingly complex, heterogeneous and unpredictable.

**...and in which greater Foresight capacity is a necessary policy response.**

6. It is in this context that the past decade has seen rapid developments in the design and practice of national Foresight exercises. It is increasingly recognised that a new emphasis on collaborative, future-oriented thinking is a necessary policy response to the digital era's environment of accelerated social and technological change. Foresight exercises are therefore designed to support knowledge intensive networking processes through which stakeholders can together deepen their understanding of changing challenges and opportunities, developing shared commitment to longer-term objectives. They are an institutional innovation that enhances the capacity to manage dependencies, to prioritise and make the right choices, and to make those choices more quickly. The EU Presidency conference that we supported in June 2004, *Foresight for Innovation – thinking and debating the future; shaping and aligning policies*, was designed to address the role of Foresight activity in supporting enhanced governance and improved alignment of policies at local, regional, national and EU levels.

**New models of organisation are emerging...**

7. New models of organisation are fundamental to the underlying potential of digital technologies. These are reflected globally in the emergence of Cross National Production Networks (CNPNS) – flexible, adaptable and modular production systems that disaggregate the value chain into constituent parts that can be contracted out to independent producers, across national boundaries. The digital era is being defined by innovation organised through both local and global networks, and the diminishing effectiveness of centralised, hierarchical models of organisation. The emergence of networked organisational forms, enabled by digital technologies, is supporting more decentralised ways of working, and new approaches to creating value through distributed collaboration. The Internet and World Wide Web are both products of and tools for this new way of doing things, demonstrating the feasibility of achieving significant goals outside of the confines of traditional hierarchical organisation. Innovative activity is becoming more open, more interactive, more interdisciplinary, and more networked.

**...while the role of government becomes more networked and knowledge intensive.**

8. The role of government is therefore changing, as its traditional model of mobilising resources around goals that are centrally defined and hierarchically executed loses relevance. Better government and innovation in delivering quality public services will depend on greater stakeholder involvement in more networked and knowledge intensive institutional arrangements. A knowledge-based society will be characterised by the emergence of knowledge intensive networks as key agents of progressive development in all significant domains of activity. A central public policy concern is therefore to lead and support the emergence of these networks, and to link them effectively with policy-making processes.

**We form 2 key conclusions.**

9. It is in the light of this changing role of government that we form our two key conclusions.

**It is necessary to renew and reorient our e-strategy priorities...**

10. The first of these conclusions is the need for a renewal and re-orientation of our e-strategy priorities, with a particular emphasis on technology-enabled innovation in government itself **(Recommendations 1 to 7 below)**. The European Commission estimates that half of the productivity gains in the economy come from ICT. These technologies are a key source of innovation in the production of high value goods and services, while also providing a powerful means to support the public sector renewal necessary to meet the challenges of the digital era. The transformation potential of ICT acquires a new significance as we begin the delayed rollout of broadband services.

**...while deepening commitment to the Knowledge Society Foresight initiative.**

11. The second of our conclusions is the need for the development of an appropriate approach to taking forward the Knowledge Society Foresight initiative in line with the commitment in the *Sustaining Progress* social partnership agreement **(Recommendation 8 below)**. This is a commitment that we have progressed collaboratively with the National Economic and Social Council (NESCC), Forfás, and the Higher Education Authority (HEA), by way of engaging key stakeholders in a series of exploratory workshops held during 2003 and 2004. The focus of this activity has been on the key challenges facing Ireland in advancing to the innovation-driven stage of socio-economic development. As reflected in the Sixth Progress Report (October 2004) on the *Sustaining Progress* agreement, there is now:

- Broad-based agreement around the need to deepen shared understanding of Ireland's innovation challenge
- A high level of enthusiasm for the role of the Knowledge Society Foresight initiative in meeting this challenge

- Clear recognition of the synergies that can be developed between this initiative and the strengths of the social partnership process.

**We need to agree a vision for Ireland in the 21st century.**

12. We face strategic choices that will be crucial to our long-term development and prosperity. These choices raise fundamental issues about what sort of society we want to build. A commitment to Knowledge Society Foresight can be understood as the development of a greater capacity to support collaborative learning through new knowledge intensive networks, while ensuring that these networks are appropriately aligned with the setting of priorities and the mobilisation of resources. It is clear to us that a more holistic and long-term style of thinking is necessary if we are to deal successfully with the momentous changes that are taking place around us. We need to agree a vision for Ireland in the 21st century.

**Recommendation 1: Broadband Delivery Group**

A new Broadband Delivery Group should be established to communicate the vision for the next generation of broadband services in Ireland, and to align the energies and actions of all key stakeholders. These include local, regional and central government policy-makers; the health, education and research communities; service providers (both current and potential); market and technology experts; and of course business and residential user groups. This group would serve as a knowledge-intensive community of broadband interests that would have the independence and standing necessary to engage key stakeholders, to identify barriers to adoption of broadband services (including emerging issues of trust and security), and to ensure ongoing policy responsiveness to accelerated international market and technology developments.

**Recommendation 2: Renewal of eGovernment Strategy**

A new e-government strategy should be produced in early 2005. This new strategy should embrace the use of ICT to support better management of public sector information, better collaboration between agencies, and innovation in the delivery of quality public services. Particular attention is needed to the role of broadband-enabled ICT in transforming the crucial health and education sectors. The strategy should also include commitment to an early public consultation on privacy and data protection issues in order to build confidence in the Public Services Broker model for integrated and multi-channel service delivery.

**Recommendation 3: Renewal of eBusiness Strategy**

We support the new e-business strategy produced in December 2004, and its emphasis on strengthening SME engagement with the role of ICT in boosting enterprise productivity. Alignment of e-business policy supports with our growing broadband vision will be of key importance. A particular goal should be to improve the level of broadband take-up in the SME sector, currently standing at around 30 per cent. Non-technological barriers to the economy-wide innovation made possible by ICT should also become an increasingly important policy focus, with particular attention to legal and regulatory arrangements that undermine competition-led market development.

**Recommendation 4: Community-based ICT Programmes**

A much stronger resource commitment is needed to developing structured and sustainable programmes to support engagement with ICT among disadvantaged groups and individuals. New community-based programmes should build on existing local development structures, be aligned closely with wider social inclusion objectives, and draw on the higher education sector for appropriate logistical and technical support. In the light of the *Sustaining Progress* special initiative around 'Including Everybody in the Information Society', particular attention should be given to the potential to support new community-based ICT programmes along these lines through the Dormant Accounts Fund.

**Recommendation 5: eAccessibility**

Careful attention should be given to the influence of the Excellence Through Accessibility awards being developed by the NDA (National Disability Authority) in bringing about greater understanding of and compliance with their IT Accessibility Guidelines. The need for further measures in this area should be kept under ongoing review, appropriately informed by levels of engagement with the new accreditation process.

**Recommendation 6: ICT Security**

The model of collaborative engagement with key stakeholders that we developed to support the *make IT secure* initiative in November 2004 should be sustained and strengthened in 2005, appropriately informed by the findings of the research survey being carried out to assess the impact of the initiative on levels of engagement with ICT security issues.

**Recommendation 7: Monitoring Engagement with ICT**

The development of a comprehensive approach to monitoring levels of household and business engagement with ICT should be mainstreamed through the work of the Central Statistics Office within the Eurostat framework for harmonisation of EU data collection. Government should ensure that special purpose surveys carried out by other bodies on specific ICT-related themes or sectors are consistent with this framework in terms of concepts, definitions and general methodology.

**Recommendation 8: Knowledge Society Foresight**

Government should develop an appropriate, collaborative approach to taking forward the commitment in the *Sustaining Progress* social partnership agreement to progress a Knowledge Society Foresight initiative. A high-level project group with the standing necessary to shape and oversee a successful initiative should be put in place in early 2005, appropriately supported by an expert international advisory panel.

# 1

## Understanding the Digital Era



# 1\ Understanding the Digital Era

The great transition from the agricultural to the industrial age was of course based upon natural resources and physical labor power, and ultimately gave rise to giant factory complexes in places like Detroit and Pittsburgh. The transformation now in progress is potentially bigger and more powerful. For the previous shift substituted one set of physical inputs (land and human labor) for another (raw materials and physical labor) while the current one is based fundamentally on human intelligence, knowledge and creativity.

*Richard Florida<sup>1</sup>*

## 1.1\ Innovation

Research shows us that the value of ICT (information and communication technologies) is unlocked only when supported by substantial complementary investments in the form of new work practices, new skills, and new organisational structures<sup>2</sup>. Our thinking can be guided by the idea that successful formulas will be one part technology, nine parts innovation. The digital era therefore raises deep issues of strategic reorientation for all actors – for firms, for public sector organisations, for communities, for regions, and for national economies. It is an innovation agenda.

<sup>1</sup> Richard Florida, “Rise of the Creative Class” (2004)  
<http://www.creativeclass.org/>

<sup>2</sup> Eric Brynjolfsson’s, “The IT Productivity Gap” (June 2003).  
<http://www.optimizemag.com/showArticle.jhtml?articleID=17700941>  
 MIT eBusiness brief, “The Digital Organisation: Seven Practices of Highly Productive Firms” (May 2003).  
<http://ebusiness.mit.edu/research/OrgCapital.pdf>

One way of understanding the globalisation process is in terms of a removal of key barriers to interacting and doing business over distance. As Ignazio Visco has identified: “The truly new achievement of recent decades has been the dramatic fall in communication costs. This, and the technological breakthroughs behind it, has led to a diffusion of ideas, technological know-how and general spread of information at a pace that is quite unprecedented in the history of humankind”<sup>3</sup>.

This globalisation story can alternatively be conceived as one of national innovations being played out on a global stage. The digital era is therefore being defined by an acceleration in the pace of unexpected competitive challenges: new competitors, new and often unexpected sources of innovation, bringing new products, new processes and new business models to the global marketplace<sup>4</sup>.

### Box 1: Communications and Globalisation

The driving force of the new globalisation is the communications revolution. And if you want to put a technological fix on it, the turning point would be the late 1960s and early 1970s, the first time when there was an effective communications satellite sent up above the earth that made possible instantaneous communication from one part of the world to another. To me, that changed more or less the whole of late 20th century history.

Take the example of the decline of the Soviet Union. This was very much related to the fact that the Soviet Union couldn't compete in the new kind of society and the new kind of economy which a hooked-up global electronic world creates. The Soviet Union was pretty competitive in the old industrial economy, but wasn't able to compete in the new globalised weightless economy, nor were its politics appropriate to it, because in an era of high communications soft power tends to replace hard power. The kind of authoritarian top-down power, which the Soviet Union represented par excellence, becomes largely dysfunctional for effective management or effective politics. You are talking about big packages of changes here in which key things are continuing the transformation of communication.

*Anthony Giddens*<sup>5</sup>

<sup>3</sup> “Forward Thinking”, OECD Observer January 2003. Ignazio Visco served as OECD chief economist from 1997 to 2002. [http://www.oecdobserver.org/news/fullstory.php/aid/883/Forward\\_thinking.html](http://www.oecdobserver.org/news/fullstory.php/aid/883/Forward_thinking.html)

<sup>4</sup> John Zysman, “Finland in a digital era: How do wealthy nations stay wealthy?” (2004) <http://www.valtioneuvoisto.fi/tiedostot/pdf/fi/89837.pdf>

<sup>5</sup> Edge interview with Anthony Giddens, “The Second Globalisation Debate” (2001) [http://www.edge.org/3rd\\_culture/giddens/giddens\\_index.html](http://www.edge.org/3rd_culture/giddens/giddens_index.html)

## 1.2\ Networks

Fundamental to the innovation that is taking place around the underlying potential of digital technologies is the evolution of new models of organisation. These are symbolised in the emergence of Cross National Production Networks (CNPNS) – flexible, adaptable and modular production systems that disaggregate the value chain into constituent parts that can be contracted out to independent producers, across national boundaries. These independent producers will in turn be located wherever local conditions provide a comparative advantage<sup>6</sup>. “Thus only under the conditions of the recent wave of information and communication technologies could networks (an old form of social organisation) address their fundamental shortcoming: their inability to manage coordination functions beyond a certain threshold of size, complexity and velocity. Only under the electronics-based technological paradigm can networks reconfigure themselves in real time, on a global–local scale, and permeate all domains of social life”<sup>7</sup>.

The digital era is therefore about much more than the simply the permeation of ICT. It is being defined by innovation organised through local and global networks, and the diminishing effectiveness of centralised, hierarchical models of organisation. Pekka Himanen captures the point well in his report earlier this year to the Finnish Parliament’s Committee for the Future: “In short, the idea of the information society can be defined as a creative society that is based on interaction. What is most important to the information society is not new technology but a new way of doing things. From a theoretical perspective, the key concepts include *network forms of organisation and growth that is based on innovations*”<sup>8</sup>.

### Box 2: Eclipse of Command-and-Control

If you think about it, it cannot be an accident that it is the same 15-year period when communism fell, when command-and-control corporations like General Motors and IBM had to be drastically restructured, when planning ministries throughout the developing world were closed down, and when the Japanese model of industrial policy proved to be a complete failure. There is something about this epoch in history that really puts a premium on incentives, on decentralisation, on allowing small economic energy to bubble up rather than a more top-down, more directed approach, that may have been a more fruitful approach in earlier years.

...It’s not altogether clear. My guess is it’s just a greater availability of information, which encourages the empowerment of people lower and lower in the decision-making chain and makes the losses from trying to centralise the information and decision-making authority much greater than they once were.

*Laurence Summers*<sup>9</sup>

6 Stephen S. Cohen, John Zysman, and Bradford J. DeLong, “Tools for Thought: What is New and Important about the “E-conomy?”” (2000)  
<http://repositories.cdlib.org/brie/BRIEWP138/>

7 Manuel Castells, “Why Networks Matter”, in McCarthy et al (2004)  
<http://www.demos.co.uk/catalogue/networks/>

8 Pekka Himanen, “Challenges of the Global Information Society” (2004)  
[http://www.eduskunta.fi/efakta/vk/tuv/challenges\\_of\\_the\\_globalinformationsociety.pdf](http://www.eduskunta.fi/efakta/vk/tuv/challenges_of_the_globalinformationsociety.pdf)

9 Commanding Heights interview with Laurence Summers (2001)  
[http://www.pbs.org/wgbh/commandingheights/shared/miniextlo/int\\_laurencesummers.html](http://www.pbs.org/wgbh/commandingheights/shared/miniextlo/int_laurencesummers.html)

### 1.3\ Tools for Thought

The technologies of the digital era (ICT) are best understood as *Tools for Thought*. “In the industrial model of development, the main source of productivity lies in the introduction of new energy sources... In the informational model of development, the source of productivity lies in the technology of knowledge generation, information processing and symbolic communication”<sup>10</sup>.

Gordon Moore’s prediction – or Moore’s law – that the power of computer chips would double every eighteen months has held since the beginnings of integrated circuits in 1959, and looks set to continue until at least 2015. There have been parallel doublings of capacity in digital storage and communications bandwidth too. Brad DeLong and Laurence Summers have captured the dramatic scale of progress in information processing in the following terms<sup>11</sup>:

Compare our use of information technology today with our predecessors' use of information technology half a century ago. The decade of the 1950s saw electronic computers largely replace mechanical and electromechanical calculators and sorters as the world's automated calculating devices. By the end of the 1950s there were roughly 2000 installed computers in the world: machines like Remington Rand UNIVACs, IBM 702s, or DEC PDP-1s. The processing power of these machines averaged perhaps 10,000 machine instructions per second.

Today, talking rough orders of magnitude only, there are perhaps 300 million active computers in the world with processing power averaging several hundred million instructions per second. Two thousand computers times ten thousand instructions per second is twenty million. Three hundred million computers times, say, three hundred million instructions/second is ninety quadrillion – a four billion-fold increase in the world's raw automated computational power in forty years, an average annual rate of growth of 56 per cent per year.

These technologies provide us with powerful tools to manipulate, organise, transmit and store information in digital form. Their key significance lies in amplifying brainpower in much the same way that the energy technologies of the industrial revolution amplified muscle power. There is no significant domain of human or economic activity unaffected by them. “Information technology builds the most all-purpose tools ever, tools for thought. The capabilities created to process and distribute digital data multiply the scale and speed with which thought and information can be applied. And thought and information can be applied to almost everything, almost everywhere”<sup>12</sup>.

The finite resource is not the capacity of digital technologies. It is our capacity to think, to collaborate, and to make informed choices.

<sup>10</sup> Manuel Castells, “The Rise of the Network Society” (1996)

<sup>11</sup> Bradford J. DeLong and Laurence H. Summers, “The ‘New Economy’: Background, Historical Perspective, Questions, and Speculations” (2001)  
[http://www.j-bradford-delong.net/Econ\\_Articles/Summers\\_New\\_Economy\\_2001.html](http://www.j-bradford-delong.net/Econ_Articles/Summers_New_Economy_2001.html)

<sup>12</sup> Stephen S. Cohen, John Zysman, and Bradford J. DeLong, “Tools for Thought: What is New and Important about the “E-economy?”” (2000)  
<http://repositories.cdlib.org/brie/BRIEWP138/>

## 1.4\ The Experimentally Organised Economy

Gunnar Eliasson argues that the digital era is making the world increasingly complex, heterogeneous and unpredictable. “Information technology has increased our capacity to gather, process and analyse information, but at the same time also diminished our possibilities of being informed about the whole by increasing the total of circumstances that we can be informed about at a faster rate than we have learned about the previous state of affairs”<sup>13</sup>. Eliasson develops his theory of the Experimentally Organised Economy (EOE) based on three information paradoxes<sup>14</sup>.

### Box 3: Eliasson’s Three Information Paradoxes

#### *Information Paradox 1*

**Are we growing relatively less informed because the stock of knowledge we can know about is growing faster than we can learn?**

Predictability is not a feature of this environment. Our circumstances are unavoidably characterised by ignorance.

#### *Information Paradox 2*

**Are we becoming less and less informed about what is becoming more and more important?**

The digital era is increasingly defined by innovation-based competition. Issues of quality are what differentiate key inputs and outputs. There are no known limits to quality, but we don’t know how to measure it.

#### *Information Paradox 3*

**Are we moving from a knowledge based information economy towards a misinformation society?**

Simplified models must guide choices. But these models are always incomplete, and will necessarily be characterised by variation in understanding and insight.

Because the range of opportunities open to firms is vast to the point of being beyond comprehension, traditional analytic approaches to business strategy have limited value. Mistakes are not avoidable. The key skill is learning to select and fail intelligently. He argues that companies will have to look at their initiatives as experiments, as attempts to find their way through a maze of uncertainty – while developing the tacit knowledge necessary to evaluate these experiments, and to interpret the experiments of others<sup>15</sup>. Thus the economy becomes *experimentally organised*.

<sup>13</sup> Gunnar Eliasson, “The Nature of Economic Change and Management in the Information Based Knowledge Economy” (1998) <http://www.druid.dk/conferences/summer1998/conf-papers/eliasson.pdf>

<sup>14</sup> Gunnar Eliasson, “Ignorant Actors in the Resource Rich World of the Knowledge Based Economy” (2004) <http://ideas.repec.org/p/hhs/ratio/0047.html>

<sup>15</sup> Ibid.

### 1.5\ Information vs. Knowledge

The digital era can be seen as bringing about a revolution in the instruments of knowledge through its deep influence on the production and dissemination of information. This influence is clearly reflected in the intensified pace of scientific and technological developments generally. However, this is not to confuse knowledge with information. Knowledge is fundamentally a matter of cognitive capability. It is best understood as empowering its possessors with a capacity for intellectual or physical action. Information can serve only as a stimulus, a means to evoke a human response. Information acquires meaning only through human interpretation, and is in fact open to different interpretations<sup>16</sup>.

The importance of this distinction becomes clear when we consider relative reproduction costs. The cost of reproducing information is no more than the cost of making copies, now next to nothing because of digital technologies. However the reproduction of knowledge is much more complex, as many cognitive capabilities are not transferred readily to others, or easily made explicit. Knowledge reproduction therefore relies heavily on human relationships. These have traditionally taken the form of master-apprentice systems, and interpersonal transactions among members of the same profession or community of practice. As the technologies of the digital era support an explosion in the volumes and flows of information, the relative scarcity of socially embedded tacit knowledge (*know-why, know-how, know-who*) becomes an increasingly important focus.

### 1.6\ Supporting Knowledge Intensive Networks

Knowledge intensive networks, characterised by teamwork and collaborative learning, underpin the creation and widespread adoption of innovative practices. These networks tend to span the boundaries of conventional organisations and can be understood in terms of three main features: a significant number of their members interact in concerted efforts to co-produce new knowledge; they create a public space for exchange and interaction; and ICT is used intensively to codify and transmit new knowledge<sup>17</sup>. Scientific communities are the most obvious example of horizontal networks of this kind. This model is one that we also see deployed in open source software projects.

<sup>16</sup> Frank Webster, "I=0 (Information has no intrinsic meaning)" (2001)  
<http://www.fernstar.com.au/publications/papers/i=o.htm>

<sup>17</sup> OECD, "Innovation in the Knowledge Economy: Implications for Education and Learning" (2004)  
[http://www.oecd.org/LongAbstract/0,2546,en\\_2649\\_34539\\_31658285\\_119699\\_1\\_1\\_1,00.html](http://www.oecd.org/LongAbstract/0,2546,en_2649_34539_31658285_119699_1_1_1,00.html)

One of the most striking features of our increasingly knowledge-based economy is the uneven development of knowledge from one sector to the next. “One can observe a strongly unbalanced and uneven development of knowledge across sectors and fields. Advances in human know-how have been spectacular in some sectors such as ICTs, remarkable in dealing with some kinds of human illness but very limited in other areas, for example education, managerial know-how, avoiding wars, developing cities”<sup>18</sup>. Development is often least evident in areas of public sector activity. It has on the other been most rapid in sectors with the closest relationship to science and technology. “These are the sectors capable of carrying out controlled experiments and thoroughly testing results, while maintaining constant liaison and feedback between the various stages of experimentation and application”<sup>19</sup>.

A knowledge based-society will be characterised by the emergence of knowledge intensive networks as key agents of progressive development in all significant domains of activity. “Only when increasing numbers of communities displaying those very characteristics are formed across a wide variety of cognitive fields, when professional experts, ordinary users of information, and uninitiated students are brought together by their shared interest in a given subject, will the knowledge society become a reality rather than a vision of a possible future”<sup>20</sup>. A central public policy concern is therefore to support the emergence of such networks, and to link them effectively with policy-making processes.

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**18** Dominique Foray and David Hargreaves, “The development of knowledge of different sectors: a model and some hypotheses” (2002)  
<http://www.oecd.org/dataoecd/47/39/2074366.pdf>

**19** OECD, “Innovation in the Knowledge Economy: Implications for Education and Learning” (2004)  
[http://www.oecd.org/LongAbstract/0,2546,en\\_2649\\_34539\\_31658285\\_119699\\_1\\_1\\_1,00.html](http://www.oecd.org/LongAbstract/0,2546,en_2649_34539_31658285_119699_1_1_1,00.html)

**20** Ibid.

# 2

## eStrategy Review



## 2\ eStrategy Review

The first wave of productivity gains from information technology were exploited in manufacturing. Only belatedly did private services experience major gains. Now public sectors stand to gain even more than the private sector because so much of what they do involves the collection, processing and dissemination of information and knowledge; these lie at the very heart of government. Yet the realisation of these gains depends on radical reform of processes, structures and rules.

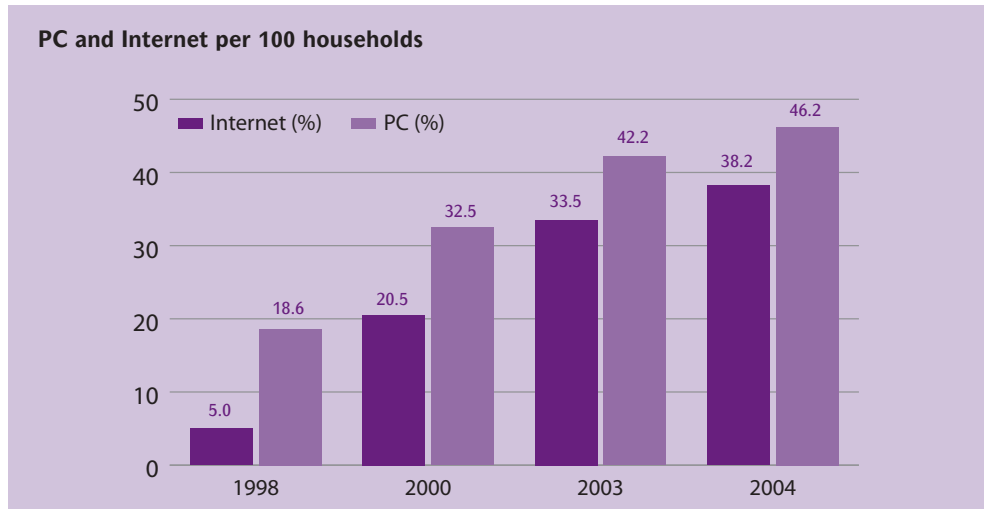
*Geoff Mulgan<sup>21</sup>*

### 2.1\ Engagement with ICT

There have been significant increases in levels of engagement with ICT in recent years. CSO data<sup>22</sup> suggest that PC penetration reached 46 per hundred households in mid-2004, over twice as many as in 1998. Household Internet connections grew more than seven-fold during the same period, reaching 38 per hundred households in 2004. While only one-quarter of household PCs were connected to the Internet in 1998, this has risen to over four-fifths in 2004.

<sup>21</sup> Geoff Mulgan, "Connexity Revisited" in McCarthy et al (2004)  
<http://www.demos.co.uk/catalogue/networks/>

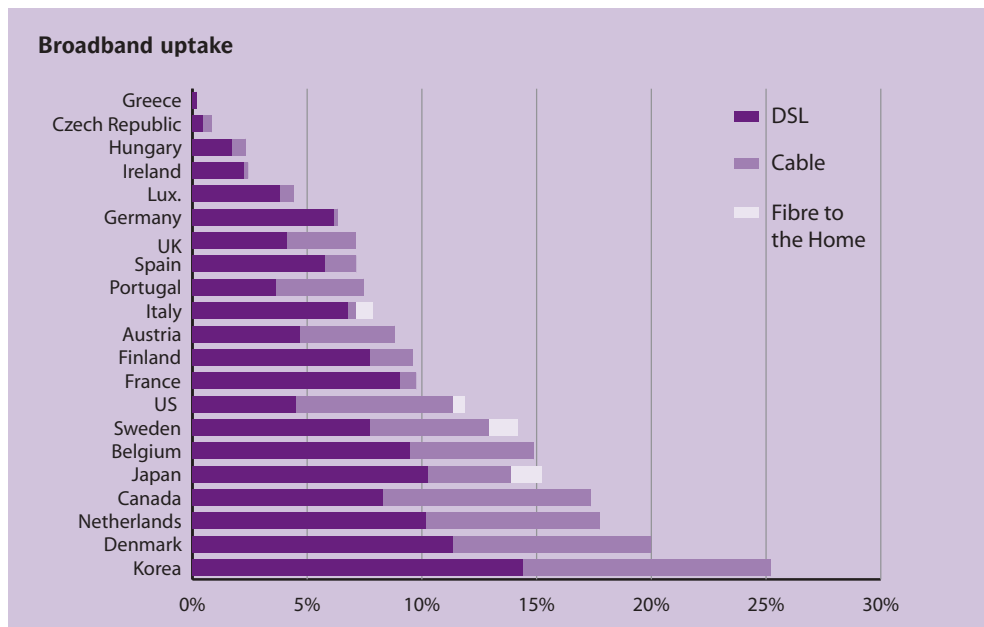
<sup>22</sup> CSO, "Information Society Statistics – Ireland" (2004)  
<http://www.cso.ie/publications/ict/ictireland2004.pdf>



Source: CSO

Our 38 Internet connections per hundred households in 2004 is relative to an EU-15 average of 45, and an EU-21 average of 41. Our 46 PCs per hundred households in 2004 is relative to a 2003 EU-15 average of 56<sup>23</sup>.

Our deficit in the area of broadband connections is more striking. The most recent benchmarking data available from Forfás<sup>24</sup> suggest that we now have around 2.5 entry-level broadband connections per hundred inhabitants<sup>25</sup>. This places us 18th in the comparator group of 21 countries, which has an average of 11 connections per hundred inhabitants. Based on established growth patterns, the Forfás analysis suggests that we would need a seven-fold increase on our current base of 100,000 broadband connections to have parity with the comparator group by 2007.



Source: Forfás

<sup>23</sup> Eurostat Information Society Statistics Database  
[http://europa.eu.int/comm/eurostat/newcronos/reference/display.do?screen=welcomeref&open=/&product=EU\\_MAS TER\\_information\\_society&depth=2&language=en](http://europa.eu.int/comm/eurostat/newcronos/reference/display.do?screen=welcomeref&open=/&product=EU_MAS TER_information_society&depth=2&language=en)

<sup>24</sup> Forfás, "Broadband Telecommunications, Benchmarking Study" (November 2004)  
<http://www.forfas.ie/publications/broadbandbenchmarking041126/index.html>

<sup>25</sup> Another way of representing this figure is as 6 broadband connections per 100 households.

Research carried out by the NCTE shows that the number of computers in our schools grew steadily from 36,000 in 1998 to over 84,000 in 2002. This approximates to 1 computer for every 10.3 students, slightly below the EU-15 average of 1 per 9.3 students. Our ratio of PCs to students ranked us 10th in the EU-15<sup>26</sup>.

In the area of mobile phone usage, ComReg data<sup>27</sup> indicates that we had 91 lines per 100 inhabitants in 2004. This compares with an EU-15 average of 96.

On the whole, a review of key indicators suggests that levels of ICT engagement in Ireland approach EU-15 averages. The exception is the area of broadband connections, where the gap to the EU-15 average is a significant one. Our broadband community is around one-fifth the average level in competitor countries.

Levels of engagement with ICT provide us with an important indicator of progress, and must remain an important focus. The radical innovation it enables makes advanced ICT infrastructure a *sine qua non*. However, we should also be clear that our successful development as a knowledge-based society raises a much deeper and wider set of issues than can be embraced by the proxy of ICT engagement alone. Indeed the complexities of the digital era, including the increasing importance of intangible assets, are likely to require new frameworks of assessment, and renewed attention to societal agreement on key progress indicators. "It would be too simple to say that all sectors of society must be involved in the development of key indicators systems or in any other initiative aimed to identify fact-based agreed upon common knowledge. But if knowledge is to be used, it must be 'common knowledge' or knowledge that society will recognise as addressing its concerns. Ultimately society must choose what to include as measures of progress"<sup>28</sup>.

## 2.2 Policy Developments

Government's ICT policies are reflected in the ambitious *New Connections* action plan that it produced in March 2002. There have been two official progress reports since then, in February 2003 and April 2004. The picture that emerges from a review of this material is a mixed one. The conclusion that there has been slippage against many key objectives is unavoidable. This includes our well-documented broadband deficit, and the high profile delays in bringing into effect the widely praised flagship e-government initiative, the Public Services Broker model for integrated and multi-channel service delivery.

However, we should be careful to ensure that there is sufficient acknowledgement of those areas where real progress has been made. "As with any policy, failure is easier to notice and discuss than quiet success"<sup>29</sup>. Key policy developments reflecting a more positive ICT experience include the following:

- **Revenue Online Service (ROS):** Launched in 2000, ROS is now handling over half of all income tax returns online. Its services have a footprint in around three quarters of all businesses (either directly or through their agent).

<sup>26</sup> NCTE, "Schools for the Digital Age, Progress Report 1998-2002" (2004)  
<http://www.ncte.ie/documents/ICTProgressReport1998-2002.pdf>

<sup>27</sup> ComReg, "Irish Communications Market: Key Quarterly Data" December 2004  
[http://www.comreg.ie/\\_fileupload/publications/ComReg04121b.pdf](http://www.comreg.ie/_fileupload/publications/ComReg04121b.pdf)

<sup>28</sup> Donald J. Johnston, Secretary General of the OECD, "Statistics, Knowledge and Policy" (November 2004)  
<http://www.oecd.org/dataoecd/14/61/33915491.doc>

<sup>29</sup> Work Foundation, "SmartGov: Renewing Electronic Government for Improved Service Delivery" (2003)  
[http://www.theworkfoundation.com/research/isociety/smartgov\\_main.jsp](http://www.theworkfoundation.com/research/isociety/smartgov_main.jsp)

- **Inter Agency Messaging Service (IAMS):** This facility developed by REACH now allows for secure electronic transmission and exchange of life event information (births, deaths and marriages) between the General Register Office, the Department of Social and Family Affairs, the Central Statistics Office and other subscribing agencies. One early example of its impact is the automatic updating of Child Benefit entitlement when a new birth is registered.
- **Motor Tax:** This is renewable online and since March 2004. The service is operating successfully and supported around 370,000 transactions in its first six months.
- **Land Registry:** The Electronic Access Service is being used by an estimated 80 per cent of its customers to access property records such as folios, filed map plans and names index records.
- **Priority Services:** Government agreed in November 2003 to prioritise an additional 80 services for online delivery based on the tangible benefit they will provide.
- **CAIT:** The CAIT (Community Application of Information Technology) initiative deployed a significant resource commitment of €5m to support ICT engagement by late adopters through 120 community-led projects that ran during 2001 and 2002.
- **MoBhaile:** The innovative MoBhaile project is now being piloted by the LGCSB (Local Government Computer Services Board) in seven local authorities, pioneering a user-centred approach to local information and service availability, while also supporting the ICT needs of community and voluntary sector groups.
- **Connecting Schools:** There is now a commitment that all schools will have broadband connections by September 2005.
- **ICT Statistics:** In November 2003 the Central Statistics Office produced its first official statistics on household and enterprise ICT usage.

Our assessment should also be qualified by the clear understanding that the value of ICT is unlocked only when supported by substantial complementary investments in the form of new work practices, new skills and new organisational structures. These issues reflect complicated interactions between people and technology. The issues are complex precisely because they are socio-technological rather than merely technological in nature. We should be careful to acknowledge that ICT-centric perspectives may not necessarily be the most appropriate ones.

## 2.3\ ISC Influence

A full overview of the range of reports produced and activities undertaken by the Commission since our appointment in December 2001 is included at Appendix 1. We highlight here particular areas where our influence on policy developments is evident:

- **Knowledge Society:** Our first report to Government in December 2002 introduced the idea of *Building the Knowledge Society*. *The Knowledge Society Foresight* exercise was subsequently included as a commitment in the *Sustaining Progress* social partnership agreement in February 2003 – an area to which we return in Section 4. It is now evident that we increasingly look beyond technology to talk of a knowledge or knowledge-based society, recognising human creativity as the ultimate resource.
- **Broadband:** Significant broadband policy developments are evident since we produced our report, *Ireland's Broadband Future*, in December 2003. These include the commitment to extending open access MAN (Metropolitan Area Network) infrastructure to all population centres of greater than 1,500 people, the Group Broadband Scheme to promote rollout to smaller towns and rural areas, and the recent appointment of e-Net as the Managed Services Entity (MSE) to manage the open access MAN infrastructure on behalf of Government.
- **eGovernment:** Our *eGovernment* report produced in October 2003 indicated that there is more to e-government than simply putting services online. We argued that ICT is essentially a tool for better government – better public services, better information management, better collaboration across agencies. This thinking is now widely accepted. Government has also accepted our idea to step back from the commitment of putting all services online by 2005 as an end in itself, and to prioritise those services that will have greatest impact.
- **ePayments:** Our report on *Delivering a World Class Payments Environment* was produced in June 2003, pointing to significant efficiency gains from the development of a robust and ubiquitous e-enabled payments infrastructure. We are expecting a 'changeover date' to be announced shortly by which all government payments and receipts will be capable of being supported electronically. The recent Competition Authority study of the banking sector is also broadly consistent with our support for greater collaboration on payments infrastructure, and greater competition in the market for payments services.
- **eInclusion:** We welcome the focus on 'Including Everybody in the Information Society' as one of the special initiatives in the *Sustaining Progress* social partnership agreement. The mainstreaming of e-inclusion issues is further reflected in their incorporation in the National Anti-Poverty Strategy (NAPS). We also initiated the innovative Mo Bhaile project during 2002 through our eInclusion Working Group. As indicated above, this concept has been acted upon and is now being piloted by the LGCSB in seven local authorities.
- **Public Procurement:** In our report, *Modernising Public Procurement*, we pointed to potential savings in the region of €1b through using ICT to support better public procurement. However, we argued that government would need to modernise its traditional procurement processes, rather than simply e-enable them. This emphasis on process modernisation – including new training and skills needs – is now appropriately reflected in government's strategy.

- **‘make IT secure’ initiative:** We chaired the steering group overseeing the consortium behind the recent ‘make IT secure’ initiative that took place in November 2003. Our key role was to take the idea to government, and to facilitate the innovative, collaborative engagement between public and private stakeholders.

## 2.4\ eStrategy Renewal

As the European Commission has indicated recently: “The exploitation of the potential offered by ICT will require the implementation of ICT specific policies for many more years. We are still at an early phase in the deployment of these technologies. Promoting wider take up depends on our capacity to address many issues to which the use of these technologies gives rise. In general, ICT accelerate the pace of technological progress, modernisation and structural adjustment of our economies”<sup>30</sup>.

A key issue is to deepen our understanding of the role of ICT in supporting improved productivity. “Substantial investments in training, in reorganisation, and in strategic reorientation are required. The critical question is what to do with those underlying digital capacities and how to use their potential”<sup>31</sup>.

The ICT agenda is an innovation agenda, and its transformation potential acquires a new significance as we begin the rollout of broadband services. The quality of public policy engagement with the potential of ICT has in many ways been paralysed by our broadband deficit. Broadband-enabled ICT will challenge deeply our prevailing conception of business models, value chains, skills needs, and public sector organisation. The extent of this transformation is constrained only by the limits to our imagination, by how effectively we can collectively conceive of new ways of doing things. It is the level of ambition we set for ourselves that will be crucial.

## 2.5\ ICT Priorities

In conceiving Ireland’s longer-term development as a knowledge-based society, we can envisage the broadband-enabled ICT infrastructure now taking shape forming ten percent of a much bigger picture. A growing challenge is therefore to deepen our understanding of the interplay of this infrastructure with the complex demand-side issues that will over time form the other ninety percent: how we unlock the value of the infrastructure in the years ahead; how we engage our collective creativity in envisioning the new possibilities that it presents; and how we develop the new institutional capacities that will allow us to act on this potential.

These key issues are ones to which we return in the following sections. We highlight here specific issues of ICT policy to which ongoing attention is necessary.

<sup>30</sup> European Commission, “Challenges for the European Information Society beyond 2005” (November 2004) [http://europa.eu.int/information\\_society/eeurope/2005/doc/all\\_about/new\\_chall\\_en\\_adopted.pdf](http://europa.eu.int/information_society/eeurope/2005/doc/all_about/new_chall_en_adopted.pdf)

<sup>31</sup> John Zysman, “Finland in a digital era: How do wealthy nations stay wealthy?” (2004) <http://www.valtioneuvoisto.fi/tiedostot/pdf/fi/89837.pdf>

## Broadband

As we identified in our recent statement on broadband, *21st Century Infrastructure*, government's aspiration to be within the top decile of OECD countries for broadband connectivity by early 2005 will not be realised. This policy objective should be re-established without equivocation against an ambitious timeline, and supported by the identification of key broadband milestones that will enable us to assess the quantitative and qualitative dimensions of our performance relative to competitor countries. We must recognise too that relative broadband performance is a constantly moving target. For example in Japan at the moment there are 100,000 new residential customers signing up monthly to 100 mbit/s services that are available in the same general price range as Irish entry-level services

A spatial divide based on the quality and cost of advanced telecommunications services has become evident and could prove to have far-reaching socio-economic consequences. Stronger measures are needed to support the objectives of the Group Broadband Scheme in ensuring availability of broadband services to sparsely concentrated centres of populations. Key immediate issues include the development of distance-independent pricing arrangements for leased lines and backhaul services, and the development of a clear strategy (based on the deployment of appropriate, alternative technologies) to ensure availability of broadband services to population centres of less than 1,500 people.

**We also identified in that statement the need for a new policy instrument in the form of an appropriately constituted Broadband Delivery Group that would communicate the vision for the next generation of broadband services in Ireland, while aligning the energies and actions of all key stakeholders.** These include local, regional and central government policy-makers; the health, education and research communities; service providers (both current and potential); market and technology experts; and of course business and residential user groups. The Broadband Delivery Group group would also identify barriers to adoption of broadband services (including emerging issues of trust and security), and ensure ongoing policy responsiveness to accelerated international market and technology developments.

## eGovernment

In the area of e-government, the vision of the Public Services Broker model – agreed by Government in May 2000 – remains a compelling one. However we now have a clearer understanding of the deep issues of organisational change and managerial innovation involved in making this vision a reality. Unlocking the value of ICT in delivering quality public services – as elsewhere – is not about supporting business as usual. It is about changing the way business is done. As the OECD has identified: “The impact of e-government at the broadest level is simply better government – *e-government is more about government than about 'e'*. It enables better policy outcomes, higher quality services and greater engagement with citizens... eGovernment initiatives refocus attention on a number of issues: how to collaborate more effectively across agencies to address complex, shared problems; how to enhance customer focus; and how to build relationships with private sector partners. Public administrations must address these issues if they are to remain responsive”<sup>32</sup>.

<sup>32</sup> OECD, “The e-government imperative: main findings” (March 2003)  
<http://www.oecd.org/dataoecd/60/60/2502539.pdf>

### Box 4: Australian Government Information Management Office (AGIMO)<sup>33</sup>

AGIMO acts as a catalyst for change in government to improve the delivery of public services and achieve long-term efficiencies by using the enabling capabilities of information and communication technology (ICT). The application of new technology, combined with changes to existing processes and practices, enables government policies, programs and services to be connected in ways that better support both the increasing incidence of multi-agency and whole-of-government actions and the needs of customers.

It works across Australian jurisdictions to maintain and develop Australia's position as a world leader in the use of ICT for the operation of government. AGIMO provides leadership in defining and driving government-wide ICT strategy, standards, and technical architecture, and embraces security and resilience issues.

A new e-government strategy is now needed that will more explicitly embrace the use of ICT to support better management of public sector information, and better collaboration between agencies, while retaining the focus on deploying these enhanced capacities to deliver better quality public services – including addressing issues of privacy, trust and confidence. This strategy should be appropriately aligned with our growing broadband vision, and should extend beyond the limitations of that subset of services capable of actual online delivery. Particular attention is needed to the potential of broadband-enabled ICT in transforming the crucial health and education sectors.

#### eBusiness

A new national e-business strategy was produced in December 2004 with an emphasis on SME engagement with the role of ICT in boosting enterprise productivity and performance. This policy re-orientation is one that has our full support. An increasingly important issue will be the alignment of e-business policy supports with our broadband ambitions. A particular goal should be to improve the level of broadband engagement in the SME sector, currently standing at around 30 per cent<sup>34</sup>.

eBusiness strategy must also be more closely aligned with wider innovation policy issues. ICT applications have their greatest impact when tailored to sector-specific business processes; deployed in a sequence that builds capabilities over time; and co-evolved with the business innovation that actually drives productivity gains<sup>35</sup>. Their key value is as an enabler of economy-wide innovation. Research by the McKinsey Global Institute on productivity at the sector level has identified the following as the leading inhibitors of business innovation across Europe: insufficient competition; poor regulation of complex sectors; the presence of obstacles to new business development; the constraints and distortions caused by zoning and development regulations; and weak corporate governance<sup>36</sup>. These and other non-technological barriers to the diffusion of ICT-enabled innovation should become an increasingly important policy focus.

<sup>33</sup> The AGIMO was established in April 2004.  
<http://www.agimo.gov.au/>

<sup>34</sup> Forfás, "Broadband Telecommunications, Benchmarking Study" (November 2004)  
<http://www.forfas.ie/publications/broadbandbenchmarking041126/index.html>

<sup>35</sup> McKinsey & Company, "How IT Enables Productivity Growth" (2002)  
<http://www.mckinsey.com/knowledge/mgi/IT/>

<sup>36</sup> McKinsey & Company, "Improving European Competitiveness: MGI Perspective" (2003)  
[http://www.mckinsey.com/knowledge/mgi/european\\_competitiveness/](http://www.mckinsey.com/knowledge/mgi/european_competitiveness/)

### Community-based ICT Programmes

Digital divides by and large mirror underlying social divides. The issues involved are therefore complex and multi-dimensional. However, a priority clear to us is the need for a much stronger resource commitment to developing structured and sustainable community-led programmes to promote greater engagement with ICT among disadvantaged groups and individuals.

Without effective public policy intervention, the uptake of ICT is likely to have the effect of exacerbating existing social divisions. Research carried out for the Dublin Employment Pact in 2003 provides us with important insight into the nature of the digital divide. “The key individual-level variables that influence computer awareness, confidence and competence are having a third-level education, belonging to a younger age cohort, being in a low or high social class category, household income and the number of friends and neighbours who are able to provide help and advice in relation to computers and internet”<sup>37</sup>.

While complementary with our own work in this area, the report provides us with new understanding in highlighting the importance of neighbourhood effects and support networks as informal channels for the transmission of new skills. “From a policy-making perspective this is an important finding, as it suggests that a programme of public interventions that boosts computer competence in these areas can have a particularly strong, indirect effect on neighbourhood differentials by injecting additional skills into existing social networks... The study concludes that equality in access to new information technologies and the targeted provision of computer centres and training programmes in disadvantaged areas represent the most promising measures for minimising the threat of a growing digital divide”<sup>38</sup>. We take the opportunity to endorse this suggested approach in the strongest terms.

### eAccessibility

Ongoing policy attention is necessary to ensure that the benefits of ICT are made available to the widest possible range of citizens, including an emphasis on their accessibility to older people and people with disabilities. “Information and communication technologies can be powerful tools for bringing people together, improving their health and welfare, and making their jobs and social lives richer and more rewarding. But over 90 million EU citizens either cannot reap these benefits in full, or are effectively cut off from them because of age or disabilities. Making ICT products and services more accessible is thus a social, ethical and political imperative”<sup>39</sup>.

<sup>37</sup> Trutz Haase and Jonathan Pratschke, “Digital Divide: Analysis of the Uptake of Information Technology in the Dublin Region” (2003)  
<http://www.dublinpact.ie/publications011.htm>

<sup>38</sup> Ibid.

<sup>39</sup> Viviane Reding, EU Information Society and Media Commissioner (January 2004)  
<http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/05/14&format=HTML&aged=0&language=EN&guiLanguage=en>

The IT Accessibility Guidelines produced by the NDA (National Disability Authority) in 2002 provide clear direction on best practice in designing usable interfaces for service and information delivery. However research on public sector websites carried out by Ennis Information Age Services during 2004 suggests that there is some way to go in terms of compliance with these guidelines, including issues of general awareness and understanding<sup>40</sup>. The Excellence Through Accessibility awards now being developed by the NDA embrace an important focus on services delivered via ICT by public bodies, and provide a very welcome opportunity to bring about a much stronger engagement with these key issues by way of a formal accreditation process for compliance with recognised guidelines and standards.

### **ICT Security**

As household and business ICT usage intensifies, the integrity and security of information networks will continue to assume a greater importance. Gartner Research is predicting that cyber-attacks against software flaws will double in speed by 2006<sup>41</sup>. These and other growing threats to confidence in ICT cannot be allowed to develop unchecked. The model of collaborative engagement between public and private sector stakeholders that we facilitated to support the *make IT secure* initiative in November 2004 provides a solid basis for deeper engagement with issues of ICT security, and the development of effective awareness strategies appropriate to the needs of household, education and business users.

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<sup>40</sup> Ennis Information Age Services, "Accessibility of 30 Irish Central Government State Organisation Websites" (2004) <http://www.eias.ie/>

<sup>41</sup> Gartner Research, "Our Top Predictions for 2005, and Beyond" (November 2004) [http://www.gartner.com/resources/124800/124887/our\\_top\\_predict.pdf](http://www.gartner.com/resources/124800/124887/our_top_predict.pdf)



# 3

## Rethinking Organisation



## 3\ Rethinking Organisation

The transition from the type of company and employment relationship we have now to the type suggested by the logic of a free information world is going to be at least as radical – and as slow – as the shift from Victorian entrepreneurialism to 1950s corporatism. And yet the logic is there. With the average company life now down to under 20 years, any business that can trace its roots back to the nineteenth century and which hopes to survive through the twenty-first century should start struggling with it now.

*Diane Coyle*<sup>42</sup>

### 3.1\ The Network Society

The digital era is being defined by innovation organised through local and global networks. It is in this sense more about new ways of doing things – new ways of organising – than it is about technology itself. Manuel Castells argues persuasively that networked organisational forms are central to the digital era's key processes of transformation. He sees the network society as the specific form of social structure that characterises the age in which we are living<sup>43</sup>.

Networks are old forms of social organisation, distinguished by flexibility and adaptability. However, their effectiveness has traditionally been compromised by their limitations in coordinating functions, managing complexity, and mobilising resources. Another way of seeing these limitations is in terms of inefficiencies in the domain of communications. For most of human history, networks have therefore been outperformed by organisations capable of mobilising resources around goals that are centrally defined and hierarchically executed.

<sup>42</sup> Diane Coyle, "Organising for Success" in McCarthy et al (2004)  
<http://www.demos.co.uk/catalogue/networks/>

<sup>43</sup> Manuel Castells, "Material for an exploratory theory of the network society" (2000)  
[http://sociology.berkeley.edu/public\\_sociology/public\\_sociology\\_pdf/Castells.pdf](http://sociology.berkeley.edu/public_sociology/public_sociology_pdf/Castells.pdf)

Castells' key contention is that digital technologies have now shifted this balance. "For the first time, the introduction of new information/communication technologies allows networks to keep their flexibility and adaptability, thus asserting their evolutionary nature. While, at the same time, these technologies allow for coordination, and management of complexity, in an interactive system which features feedback effects, and communication patterns from anywhere to everywhere in the networks. It follows an unprecedented combination of flexibility and task implementation, of coordinated decision-making, and decentralised execution, which provide a superior social morphology for all human action"<sup>44</sup>.

Thomas Malone of MIT sees the emergence of networked organisational forms supported by digital technologies as representing a deep fundamental shift in the way many of us think about work, business and management. "In other words, almost none of us understand how many business problems could be solved in much more decentralised ways than they currently are. And I think that that realisation and that understanding has a potential to create organisations that look and feel different from those of today, and that are – here I'm bringing in the other point – not only more economically efficient and flexible, but also potentially more desirable from the point of view of other human values"<sup>45</sup>.

### 3.2\ Digital Organisation

Erik Brynjolfsson, Malone's MIT colleague, has drawn conclusions about the organisational characteristics associated with the most effective deployments of ICT, based on researching over 1000 large US-based firms<sup>46</sup>. While suggesting a generally positive relationship between ICT capital and performance, Brynjolfsson argues that there is a distinct set of organisational practices and corporate culture common to the most effective performers<sup>47</sup> – defining what he calls the *Digital Organisation*. These are as follows:

- **Converting traditional analogue processes to digital processes:** Employees are able to operate with less direct supervision when standard working procedures are embedded in shared software, while creating transparency for customers too.
- **Distributing decision rights and empowering line workers:** Effective deployment of ICT is associated with decentralised decision-making.
- **Adopting a policy of free information access and communication:** This includes encouraging open information access to internal and external documents throughout the organisation, while using ICT to enhance both lateral and vertical communication flows.
- **Performance-linked incentives:** In Brynjolfsson's research of large US-based firms, these include performance-based remuneration and use of stock options.
- **Sharp corporate focus and communicating strategic goals:** There is an emphasis on creating a strong corporate culture around core strategic goals, while weeding out non-core activities.

<sup>44</sup> Ibid.

<sup>45</sup> Dialog on Leadership interview with Thomas Malone, "The Power of Decentralization: Discovering the New Physics of Organising" (2001)  
<http://www.dialogonleadership.org/interviewMalone.html>

<sup>46</sup> MIT Research Brief, "The Digital Organisation: Seven practices of highly productive firms" (May 2003)  
<http://ebusiness.mit.edu/research/OrgCapital.pdf>

<sup>47</sup> Multi Factor Productivity is used as the key performance metric.

- **Recruiting top-quality employees and committing necessary resources:** Employees are more likely to be screened for interpersonal skills and for fit with the corporate culture, with senior executives more directly involved in the recruitment process.
- **Strong emphasis on ongoing investment in human capital:** They recruit highly educated employees, and give priority to supporting ongoing learning.

Brynjolfsson's key conclusion is that ICT can make little contribution to overall performance unless it's combined with complementary investments in work practices, human capital, and organisational restructuring. "We do find evidence of a substantial relationship between computers and productivity growth, but closer examination reveals that the biggest benefits accrue to companies that adopt an identifiable cluster of business practices we call the digital organisation. Relatively few of these practices are directly related to the implementation of the technology itself. Most involve changes in the organisation of information work, including decision-making rights, incentive systems, hiring, and training"<sup>48</sup>.

### 3.3 \ Managing Invisible Assets

David Hargreaves contends that organisations are effective to the extent that they can mobilise the range of resources at their disposal in effective and efficient ways. He identifies these resources as four forms of capital: material, intellectual, social and organisational<sup>49</sup>:

- **Material capital** is the most familiar form, reflected in financial capital and physical capital such as buildings and equipment. Because these assets are the visible ones, and fairly easily measured, they are what tend to command attention. It is not often that a demand for more resources looks beyond levels of material capital.
- **Intellectual capital** is the first of an organisation's invisible assets. It embraces the knowledge, skills, talents, expertise, and creativity of its people. It is an asset that is easily overlooked, rarely audited, and often neglected.
- **Social capital** is the second invisible asset. It reflects levels of internal trust, the quality of internal and external relationships, and the depth of engagement with stakeholders. Social capital is embodied in networks of interpersonal relations, and can be strengthened by a deeper understanding of these networks.
- **Organisational capital** is the third of an organisation's invisible assets. It reflects the know-how and skill that is available to make effective use of its intellectual and social capital. High levels of organisational capital will in fact be deployed to strengthen the other invisible assets. This capital is essentially a function of available leadership qualities.

<sup>48</sup> Eric Brynjolfsson, "The IT Productivity Gap" (June 2003).  
<http://www.optimizemag.com/showArticle.jhtml?articleID=17700941>

<sup>49</sup> David Hargreaves, "Creating an Education Epidemic in Schools", in Bentley and Wilson (2004)  
[http://www.demos.co.uk/catalogue/theadaptivestate\\_page333.aspx](http://www.demos.co.uk/catalogue/theadaptivestate_page333.aspx)

A key conclusion is that the mere existence of these assets – visible or invisible – does not mean that they are being mobilised effectively. “That an organisation is rich in material, intellectual and social capital does not automatically mean that these resources will be used properly or fully: the resources have to be actively mobilised and organisational capital is the know-how that is needed to do so. In recent years we have begun to realise that in many organisations, including schools, intellectual and social capital are underestimated and underused, and this is in part because managers and leaders lack the insights and skills that comprise organisational capital”<sup>50</sup>.

Hargreaves shows us that there is no route to innovation in organisations other than investment in these four forms of capital. It is an insight that also points to significant opportunity costs flowing from our relative neglect of intangibles.

### Box 5: From Sausage Factories to Jazz Ensembles

#### Industrial Organisation

*Key metaphor: machine*

hierarchy  
centralised  
control  
instruction  
manager  
chain-of-command  
self-contained  
energy  
product  
stable  
expanding

#### Knowledge-based Organisation

*Key metaphor: eco-system*

network  
distributed  
influence  
collaboration  
broker  
peer-to-peer  
interactive  
creativity  
solution  
dynamic  
learning

### 3.4 Collaborative Climate

Pioneering organisation theorist, Karl-Erik Sveiby, specialises in the area of how intangible assets are managed in organisations that produce only knowledge. His starting point is that to be knowledge-focused is to be concerned with “the art of creating value from intangible assets”<sup>51</sup>.

While two-thirds of GNP in most developed countries is now made up of services, our management concepts remain predominantly industrial era ones designed to support efficiency in producing tangible goods. The assumption that knowledge is a tangible object will lead us to conclude that technology can manage this object more effectively. If we accept that knowledge is in fact an intangible process embodied in human relationships, our attention shifts to exploring networks of human interaction as the key source of new value.

<sup>50</sup> Ibid.

<sup>51</sup> Karl-Erik Sveiby, “What is Knowledge Management?” (2001)  
<http://www.sveiby.com/articles/KnowledgeManagement.html>

Hardware and software are easily purchased. The intangible quality of human relationships is characterised by a different dimension of complexity. “Investment in human infrastructure is not understood by accounting systems still firmly rooted in the early 1900s. How do your accountants for instance treat the costs for your trip to meet and build relationships with the new staff in a recently acquired subsidiary? As a cost! How do the same accountants treat the extension of your firm’s fibre optics cable network to the new office? As an investment!”<sup>52</sup>.

While tangible goods tend to depreciate in value when used, knowledge behaves inversely. It grows when used and depreciates when not used. Knowledge shared is effectively knowledge doubled. Indeed we should imagine the sharing of knowledge conforming to Metcalfe’s law that the value of a network increases exponentially with the number of new users<sup>53</sup>.

Improving flows of knowledge is therefore key to creating value in knowledge-based organisations, and the dividend is one that grows exponentially. To assist our understanding of these knowledge flows, Sveiby identifies an organisation’s intangible assets as a family of three<sup>54</sup>:

- **Individual competence** reflects people’s capacity to act in the situations they’re presented with. It includes skill, education, experience, values and social skills. Indeed all assets and structures, whether tangible products or intangible relations, are the result of human action and ultimately depend on people’s individual competence.
- **Internal structure** embraces administrative and computer systems, as well as patents, concepts and models created by employees and generally belonging to the organisation. Informal qualities such as internal networks and organisational culture are also included here. Internal structure and people constitute what is generally regarded as the *organisation*.
- **External structure** consists of relationships with customers and suppliers, as well as brand names, reputation or image. The value of these assets is influenced primarily by how well the company solves its customers’ problems. Reputations and relationships can therefore be good or bad, and can change over time.

The human interactions within and between these three families of intangible assets provide us with nine ways in which the effectiveness of knowledge-based organisations can be enhanced<sup>55</sup>. Value is created by strengthening the relationships necessary to support improved flows of knowledge in the following nine areas:

- Between individuals
- From individuals to the external structure
- From the external structure to individuals
- From individuals to the internal structure
- From the internal structure to individuals
- Within the external structure
- From the external to the internal structure
- From the internal structure to the external structure
- Within the internal structure.

<sup>52</sup> Ibid.

<sup>53</sup> Netherlands Government, “Contract with the future: a vision on the electronic relationship between government and citizen” (2001)  
[http://www.minbzk.nl/uk/different\\_government/publications/contract\\_with\\_the](http://www.minbzk.nl/uk/different_government/publications/contract_with_the)

<sup>54</sup> Karl-Erik Sveiby, “The Invisible Balance Sheet” (2001)  
<http://www.sveiby.com/articles/InvisibleBalance.html>

<sup>55</sup> Karl-Erik Sveiby, “Organising for Effective Knowledge Work” (2003)  
<http://www.sveiby.com/articles/Kworkerdevelopment.htm>

There is then an overall issue of maximising the creation of value by ensuring these complementary interactions form a coherent whole. This knowledge-based perspective of the organisation therefore challenges our traditional conception of its boundaries. Value created by generating new knowledge through external relationships is no less significant than value generated internally.

Sveiby's work also points us to the striking – and not yet widely acknowledged – conclusion that the effectiveness of a knowledge-based organisation is a function of its collaborative climate. The collaborative climate should be seen as the human equivalent of ICT infrastructure. “A poor collaborative climate reduces the bandwidth of communication so sharing and creativity are strangled. Likewise a good collaborative climate increases and leverages an individual's knowledge”<sup>56</sup>. Emerging research suggests that as much as one third of the performance of a knowledge-intensive organisation relates to this collaborative climate within which knowledge is shared<sup>57</sup>.

### 3.5\ Open Innovation Networks

Further insight into evolving models of organisation is provided by the open source software movement. The Internet and World Wide Web are both products of and tools for this new way of doing things, demonstrating the feasibility of achieving significant goals through distributed collaboration outside of the confines of traditional hierarchical organisation<sup>58</sup>.

Most Internet servers run on open source Apache software, while perhaps the most prominent open source product is the Linux operating system. However it is the underlying open source process itself – rather than any of its contemporary manifestations – that is of particular interest. “What make a significant difference in human life are the ideas, theories, and institutions that are themselves a product of experimentation and imagination, of a different sort. The steam engine was the metal behind the first industrial revolution, but the revolution was a set of ideas about organising factories, limited liability corporations, trade unions, and daily newspapers. The second industrial revolution was a story about the publicly traded corporation, the commercial bank, business schools, the professionalisation of women, etc. None of these are technologies, and neither is the open source process. They are each ideas, ideas that create institutions and ways of organising that were nearly unimaginable beforehand and nearly unrecognisable when they first emerged”<sup>59</sup>.

Digital networks provide us with powerful new tools to support cooperative working and collaborative learning. Indeed the original conception of the Internet in the late 1960s was as a peer-to-peer network designed to share computing resources between cooperating US academic centres, each acting as both server and client. In similar fashion, Tim Berners-Lee designed the origins of what became the Web while working at CERN as a way for physicists to share research data<sup>60</sup>.

<sup>56</sup> Ibid.

<sup>57</sup> Karl-Erik Sveiby and Roland Simons, “Collaborative Climate and Performance – an Empirical Study” (2004) <http://www.sveiby.com/articles/ccsuk.doc>

<sup>58</sup> Jerome A. Feldman, Pekka Himanen, Olli Leppanen and Steven Weber, “Open Innovation Networks” (2004) <http://www.sitra.fi/Julkaisut/raportti35.pdf>

<sup>59</sup> Steven Weber, “The Success of Open Source” (2004) <http://www.gbn.com/ArticleDisplayServlet.srv?aid=26621>

<sup>60</sup> Tim Berners-Lee, “Weaving the Web” (1999)

Innovative activity in the digital era has therefore become more open and more networked. A team generating new knowledge may consist of people of very different backgrounds working together as a project-based unit to solve a particular problem. At the same time the boundaries between the production and application of new knowledge have become increasingly blurred. Knowledge evolves within the context of its application, rather than being the preserve of abstract theory or analysis. “We now understand better than ever that innovation is very often a social, interactive process rather than one of individual creativity, and that networks play a vital role in the creation and the transfer of new knowledge and innovation”<sup>61</sup>.

The issues arising for current models of public sector organisation are of particular significance. As solutions that are centrally defined and hierarchically executed become increasingly ineffective, we should be alert to the potential of open innovation networks in addressing complex issues of public sector adaptation to accelerated change – including in the key education, health, and social services sectors. “Some significant subset of social problems that communities confront can be structured as knowledge creation and/or problem solving domains similar to the ‘problems’ that the open source software community has found new ways to ‘solve’. It follows that the tools and governance principles of the open source software community, in some modified form, could yield new approaches to community organisation and problem solving that build on but go beyond what is currently known about traditional institutions of formal government as well as more informal notions of ‘civil society’ and ‘communities of practice’”<sup>62</sup>. A deeper understanding of open innovation networks can support more effective engagement with the new models of public sector organisation that are a necessary adaptive response to the complexities of the digital era.

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<sup>61</sup> David Hargreaves, “Networks, Knowledge and Innovation” in McCarthy et al (2004)  
<http://www.demos.co.uk/catalogue/networks/>

<sup>62</sup> Jerome A. Feldman, Pekka Himanen, Olli Leppanen and Steven Weber, “Open Innovation Networks” (2004)  
<http://www.sitra.fi/Julkaisut/raportti35.pdf>

# 4

## Innovation in Shaping Priorities



## 4\ Innovation in Shaping Priorities

Over the last few decades, I've become very interested in the notion that we can make a difference not just as individuals, but collectively: as groups, as teams, as communities. I'm absolutely fascinated with trying to understand how you can help large groups make a difference. And making a difference, for me, is about helping people identify problems and helping them come to terms with those problems faster than they otherwise would.

One of the most important things we can do is to define problems clearly. I'm always interested in the context in which different groups have to make decisions... If you know it well, you are much better positioned to make intelligent decisions. Change the context, and you'll change the decisions people make. Change the understanding of the context, and you'll change the decisions.

*Ged Davis*

*Centre for Strategic Insight, World Economic Forum<sup>63</sup>*

### 4.1\ Accelerated Change

The world is undergoing an unprecedented productivity explosion based on innovation around the application of the new tools for thought. World manufacturing production increased by 30 percent between 1995 and 2002, while manufacturing employment shrunk by 11 percent in the same period – with 31 million manufacturing jobs eliminated in the twenty largest economies<sup>64</sup>. Steel production in the US surged from 75 to 102 million tons in the past decade, while the number of workers in the US steel industry actually fell from 289,000 to 74,000<sup>65</sup>. It is not just a matter of manufacturing jobs moving from one part of the world to the other. Manufacturing has simply become more efficient, leading to ongoing decline in the net overall number of manufacturing jobs. Between 1995 and 2002, China too lost more than 15 million factory jobs, or 15 percent of its total manufacturing workforce<sup>66</sup>. “Productivity gains are further boosted by the globalisation of business, and especially direct investments... Jobs will be lost, and companies’ activities will move abroad. And the trend has just begun. The same paradigm now affects the service industry”<sup>67</sup>. Digital technologies are supporting new levels of innovation in the services sector, while also increasing the volume of services that can be produced a distance from where they are actually used.

<sup>63</sup> A GBN Conversation with Ged Davis, “Scenarios Come to Davos” (2004)  
[http://www.weforum.org/pdf/CSI/GBN\\_Davis\\_interview.pdf](http://www.weforum.org/pdf/CSI/GBN_Davis_interview.pdf)

<sup>64</sup> IMD, “World Competitiveness Yearbook” (2004)  
<http://www01.imd.ch/wcc/yearbook/>

<sup>65</sup> Jeremy Rifkin, “Return of a Conundrum” (March 2004)  
<http://www.commondreams.org/views04/0302-07.htm>

<sup>66</sup> Ibid.

<sup>67</sup> IMD, “World Competitiveness Yearbook” (2004)  
<http://www01.imd.ch/wcc/yearbook/>

The globalisation dynamic of the digital era is therefore bringing about a worldwide reorganisation of production. Major shifts in the geographical distribution of global production have taken place since the mid-1990s. “After the Second World War, Europe produced almost one third of the world’s entire industrial output; today, the figure is only slightly over one tenth. By comparison, the share accounted for by eastern Asia (China, Japan, India) has risen from one tenth to more than one third”<sup>68</sup>.

It is in this context that we increasingly recognise human creativity as the ultimate resource, and the only sustainable source of comparative advantage. “The ability to come up with new ideas and better ways of doing things is ultimately what raises productivity and thus living standards”<sup>69</sup>. The digital era is therefore shifting the focus of competitiveness from tangible to intangible assets. “Probably, the most difficult hurdle is to overcome is a classical approach to economic affairs, which traditionally emphasises exports, tangible goods, and basic infrastructure. Competitiveness also highlights the importance of education, knowledge, intangible goods and technological infrastructure”<sup>70</sup>.

This changing context also prompts new priorities in the area of inward investment. “Soliciting investments is not just about increasing production capacity and thereby improving employment; what is also important is that investments boost the level of technology. In other words, investments not only increase production but improve productivity”<sup>71</sup>.

Setting of policy priorities must also acknowledge the pattern of wider scientific developments towards converging technologies. “Information and communication technology helped produce the profound transformation of daily life in the twentieth century. Biotechnology is transforming agriculture, medical diagnosis and treatment, human and animal reproduction. Most recently, the transformative potential of nanotechnology has captured the imagination. Add to this that cognitive and neuroscience are challenging how we think of ourselves, or that the rise of the social sciences parallels that of bureaucracies and modern forms of governance. The convergence of these profoundly transformative technologies and technology-enabling sciences is the first major research initiative of the twenty-first century”<sup>72</sup>.

## 4.2\ Understanding the Role of Foresight

It is in this context that the past decade has seen rapid developments in the design and practice of national Foresight exercises. It is increasingly recognised that a new emphasis on collaborative, future-oriented thinking is a necessary policy response to the environment of accelerated social and technological change that characterises the digital era. Foresight exercises are therefore designed to support networking processes through which stakeholders can together deepen their understanding of changing challenges and opportunities, developing shared commitment to longer-term objectives.

<sup>68</sup> Finland Prime Minister’s Office, “Finland’s competence, openness and renewability: Summary of the final report of the ‘Finland in the Global Economy’ project” (December 2004)  
<http://www.vnk.fi/tiedostot/pdf/fi/90444.pdf>

<sup>69</sup> Richard Florida, “Rise of the Creative Class” (2004)  
<http://www.creativeclass.org/>

<sup>70</sup> Stephen Garelli, “Competitiveness of Nations: The Fundamentals” (2004)  
<http://www01.imd.ch/wcc/fundamentals/>

<sup>71</sup> Finland Prime Minister’s Office, “Finland’s competence, openness and renewability: Summary of the final report of the ‘Finland in the Global Economy’ project” (December 2004)  
<http://www.vnk.fi/tiedostot/pdf/fi/90444.pdf>

<sup>72</sup> DG Research, “Converging Technologies – Shaping the Future of European Societies” (2004)  
[http://europa.eu.int/comm/research/conferences/2004/ntw/index\\_en.html](http://europa.eu.int/comm/research/conferences/2004/ntw/index_en.html)

## Box 6: Why Foresight?

Due to accelerated social and technological change, a new culture of future oriented thinking in society is needed. Decision-makers need to acquire new skills in the face of the declining role of traditional value systems and the erosion of traditional interest groups combined with calls for more accountability and accelerated technological change. This new culture should focus on producing a strategic framework for better-informed policies, based upon transparent, participatory and flexible decision-making in the face of complex challenges.

As science and technology are amongst the main drivers of change, foresight activities are an important vehicle in prompting broad social debates based upon expert inputs and mobilising broad sections of all stakeholders to give collective thought on priorities and actions. Bringing together experts with people from different disciplinary and sectoral backgrounds, makes it possible that next to possible impacts on policy-making of the products of Foresight activities, the processes that lead to that output also change the perceptions and beliefs of the participants.

*European Commission*<sup>73</sup>

A parallel development is the increased attention to the role of social capital, and to the management of intangible assets generally – the domain of networks of interpersonal relationships. Another way of conceiving this dynamic is in terms of a deeper engagement with the issues that determine how society can appropriately absorb, use and act upon exponentially growing and increasingly complex information flows. “Decision makers are searching for effective innovation policy instruments which make a lasting impact on future welfare. Hence they seek also to learn about future challenges, needs and alternatives in science, technology, society and the economy as a guiding cognitive framework for the design and strategic orientation of innovation policies”<sup>74</sup>. Foresight is about enhancing our capacity to manage dependencies, our capacity to prioritise and make the right choices, and our capacity to make those choices more quickly.

### 4.3\ Foresight for Innovation

The increasing profile of Foresight activity is reflected in the series of EU Presidency conferences that have been supported by the European Commission in recent years, including the one organised under the aegis of the Irish Presidency in June 2004, *Foresight for Innovation – thinking and debating the future; shaping and aligning policies*. The Information Society Commission acted as co-sponsors of this event in partnership with the European Commission (DG Research), Forfás, and the European Foundation for the Improvement of Living and Working Conditions. The 2004 conference, organised as part of the Irish Presidency, captured an important shift in focus from means to ends. It was themed to move beyond awareness-raising, and to support a deeper engagement with Foresight outcomes – the role of Foresight activity in supporting enhanced governance and improved alignment of policies at local, regional, national and EU levels.

<sup>73</sup> DG Research, “Thinking, debating and shaping the future: Foresight for Europe” (2002) <http://www.cordis.lu/foresight//main.htm>

<sup>74</sup> Ruud Smits and Stefan Kuhlmann, Foreword to *International Journal of Foresight and Innovation Policy*: Volume 1, Nos. 1-2 (2004)

## Box 7: The First Futurists

Ten thousand years is the size of civilisation thus far. In that time a number of civilisations and dozens of empires have risen and receded, but the overall advance and convergence of civilisation on the planet has been steady... Those original farmers ten millennia ago were the first systemic futurists. They mastered the six-month lag between sowing and reaping, and they remembered enough crop experience and matched it with enough astronomy to be able to use the sky as an accurate signal of when to plant. *Such tricks confer advantage*. Agriculture-based civilisations replaced hunter-gatherers and in time were able to prevail over even the fiercest marauders.

*Stuart Brand,  
The Clock of the Long Now*

### 4.4\ Ethics and Values

Richard Riley, former US Secretary of Education, suggests that integrity is in fact the core value at the heart of innovation. “Innovators, in their pursuit of the new and what they see as important, are guided and sustained by a deep, abiding sense of integrity. Artists stay true to their art. Writers hold to their vision. And scientists across the world define their work by upholding the high values of the scientific credo. Integrity is a value that sustains innovation. In the last decade both here in Ireland and the United States, we have witnessed a steady stream of scandals. It has been a sorry business. In many cases, these scandals were driven by the short-term worldview – cooking the books and fudging the numbers for the next quarterly report. So it seems to me very important that we change our time horizons to think long term and place integrity at the core of what we do”<sup>75</sup>.

Societal adaptation to accelerated change necessarily raises deep issues of ethics and values. “Thus, adaptive work in cultures involves the clarification of values and the assessment of realities that challenge the realisation of those values”<sup>76</sup>. What sort of society do we want to become? What do we mean by better? *Ethics and Values in a Digital Age* was the theme of a conference to explore these issues that we organised in October 2004, the proceedings of which we have produced separately.

The keynote paper delivered by William Desmond provides us with important insight: “The recent explosion of developments in cybernetics has entailed remarkable transformations of daily life around the globe. But the computer age is itself the result of an immense preparation of an indirect sort. I mean the long-developing achievements in science and technology that undergird a surface that itself fosters the shortening of our perspective of time, itself inseparable from our being sometimes taken over by a demand for immediate solutions to problems and by an instrumental orientation to things. There is a paradox here: the longer patience that leads to these amazing cybernetic instruments itself can risk undermining the disciplined patience that serves all human achievement, in the long run”<sup>77</sup>.

<sup>75</sup> Richard Riley, speaking at Forfás National Innovation Conference (November 2003)  
[http://www.forfas.ie/news.asp?page\\_id=287](http://www.forfas.ie/news.asp?page_id=287)

<sup>76</sup> Ronald A. Heifetz, “Adaptive work” in Bentley and Wilsdon (2004)  
[http://www.demos.co.uk/catalogue/theadaptivestate\\_page333.aspx](http://www.demos.co.uk/catalogue/theadaptivestate_page333.aspx)

<sup>77</sup> Information Society Commission, “Ethics and Values in a Digital Age” (2004)  
<http://www.isc.ie/>

#### 4.5\ Developments under Sustaining Progress

The current social partnership agreement, *Sustaining Progress*, contains a commitment to progress a Knowledge Society Foresight (KSF) exercise, under the aegis of the Information Society Commission, with appropriate participation by the social partners. This is a commitment that we have progressed collaboratively with the National Economic and Social Council (NESC), Forfás and the Higher Education Authority (HEA) by way of engaging key stakeholders in a series of exploratory workshops held during 2003 and 2004. The EU Foresight conference organised under the aegis of the Irish Presidency in June 2004 was also positioned to be complementary with this momentum.

The focus of this activity has been on the key challenges facing Ireland in advancing to the innovation-driven stage of socio-economic development. Significant themes emerging from the exercise are captured at Appendix 2. A framework document prepared in the light of these themes and welcomed by key stakeholders is included at Appendix 3<sup>78</sup>. This points to an intensification of transformation pressures, placing new demands on our capacity to innovate and adapt to change, and presenting new challenges in distributing the costs and benefits of change. It includes a particular focus on new challenges in bringing about a strategic alignment of inter-dependent public policies, and the need for a systemic understanding of these challenges. It is a synthesis that points to the cultivation of our human resources as the crucial issue.

The key outcomes from this engagement of key stakeholders are as reflected in the Sixth Progress Report (October 2004) on the *Sustaining Progress* agreement. There is now:

- Broad-based agreement around the need to deepen shared understanding of Ireland's innovation challenge
- A high level of enthusiasm for the role of a Knowledge Society Foresight initiative in responding to this challenge
- Clear recognition of the synergies that can be developed between this exercise and the strengths of the social partnership process.

#### 4.6\ Knowledge Society Foresight (KSF): Next Steps

A key issue for Government is now the development of an appropriate, collaborative approach to taking forward the *Sustaining Progress* commitment into 2005 and beyond. International experience allows us to assert that factors decisive to securing a successful process outcome will be:

- HIGH level commitment
- WIDE participation
- DEEP interaction
- LONG term view of benefits.

<sup>78</sup> Information Society Commission, "A Framework for Responding to the Innovation Challenge: Towards a Systemic Understanding" (April, 2004)

The issue of process design is a critical one. A successful Knowledge Society Foresight initiative will be shaped to address strategic priorities, and dovetailed with the institutional arrangements of governance. This is likely to mean a close alignment with the remit of the new National Economic and Social Development Office (NESDO) in the area of collaborative policy development initiatives.

Our consultation with domestic and international expertise suggests that a successful national Foresight exercise should now be conceptualised in the following terms:

Step	Purpose	Indicative Timeline
Step -2	<b>Building momentum:</b> Mobilise engagement of key stakeholders.	Complete
Step -1	<b>Political commitment:</b> Ensure a mandate that is anchored in governance structures (ie action-oriented) and supported by an appropriate resource commitment.	Early 2005
Step 0	<b>Process design:</b> A high-level project group is formed with the standing necessary to define and shape a successful exercise: setting clearly defined goals; agreeing key processes; appropriately supported by an expert, international advisory panel.	Early 2005 (c. 8 weeks)
Step 1	<b>Intelligence gathering:</b> Best available global expertise is leveraged to establish the knowledge-base necessary to support collaborative engagement with the objectives and processes identified by the project group.	Early 2005 (c. 8-12 weeks)
Step 2	<b>Collaborative learning networks:</b> The core processes get underway, typically in the form of appropriately constituted expert panels.	2005/6 (c. 12-18 months)
Step 3	<b>Synthesis and conclusion:</b> The key learning from the exercise is synthesised and appropriately disseminated.	Before end 2006 (c. 8-12 weeks)

Building from the momentum now underway, a creatively designed process along these lines can be positioned to play a pivotal developmental role in three key respects:

- Strengthening agreement around the key strategic conditions necessary to support and sustain innovation-driven wealth creation and growth
- Deepening understanding of the dislocation that is necessarily associated with the innovation process<sup>79</sup>

<sup>79</sup> Dislocation can be understood as older ideas, technologies, skills, jobs, firms, and sectors being replaced by newer ones.

- Securing the consensus necessary to bring about a distribution of the costs and benefits flowing from this growth and dislocation in a manner that is equitable and sustainable over the longer term.

#### 4.7\ Joint Learning Through Networks

Sources of value and productivity in the digital era lie in the generation of new knowledge, and a knowledge-based society will be characterised by the emergence of knowledge intensive networks as key agents of development in all significant domains of activity. However as knowledge becomes more important, it also becomes obsolete more quickly. Another way of imagining Knowledge Society Foresight is therefore in terms of an embedded institutional capacity to generate new knowledge through networks. The establishment of these networks will allow us to explore the assumptions that we currently hold about the future; to recognise where these assumptions about the future may be misplaced; and to guide better choices by equipping us to act more effectively in the present.

#### Box 8: Mental Maps

We like to think of maps as objective sources of information, but recent work on the history of cartography has challenged this view, establishing how maps both codify a particular perspective on reality, and, in turn, influence our view of the landscapes they represent.

Sometimes a mapmaker deliberately concentrates on one aspect of a territory; but maps are also shaped by more subtle intentions. Medieval mappae mundi represent not so much the physical dimensions of the world as the spiritual arena of Christianity as it was at the time. They usually show the interior of the Classical or Medieval world, centred on Jerusalem and circumscribed by an ocean beyond which nothing was deemed to exist. European maps of the exploration of America represented and renamed the land as it appeared to the colonists. By excluding the place names of the Native Americans, these maps denied the legitimacy of their claims to their territory.

We can compare the process of physical map-making to the way in which we view the future. Just like graphic maps, our mental maps are constructions based on, and shaped by, our culture, background and life experiences. As with graphic maps, it is all too easy to accept our mental map as the true representation of reality.

*Scenarios: An Explorer's Guide*<sup>80</sup>

<sup>80</sup> Shell International, "Scenarios: An Explorers Guide" (2003)  
[http://www-static.shell.com/static/royal-en/downloads/scenarios\\_explorersguide.pdf](http://www-static.shell.com/static/royal-en/downloads/scenarios_explorersguide.pdf)

All of our decisions concern the future. Thinking more effectively about the future therefore enhances our decision-making capacity. The idea of futures literacy can be understood as the capacity to suspend the view that the present is forever, and to think in greater depth about change over time. “If you get your facts wrong, your map will be wrong. If you get the map wrong, you’re likely to do the wrong thing”<sup>81</sup>.

Knowledge Society Foresight is a commitment to a common knowledge space, and the development of a shared narrative through joint learning. This is a narrative about the cohesive and sustainable development of a small island in an increasingly networked global economy; about how we can learn more effectively from the many changes that are taking place around us; and about the ethics and values that will guide our response to accelerated change.

What are the most important of these new networks? Who should they involve? How should they be supported and appropriately linked with our institutions of governance? The need to address these questions has never been greater. It is clear to us that Knowledge Society Foresight has a key role to play. The important issue now is one of Government deepening its engagement with the idea. We are confident that the collaborative progress established through the *Sustaining Progress* social partnership agreement provides a solid foundation on which to build this deeper engagement.

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<sup>81</sup> Peter Schwartz, “The Art of the Long View” (1996)



# 5

## Conclusions and Recommendations



## 5\ Conclusions and Recommendations

The real difficulty lies, not in developing new ideas, but in escaping from the old ones.

*John Maynard Keynes*

### 5.1\ Changing Role of Government

It is clear that the digital era raises deep issues of strategic reorientation for firms, for regions, and for national economies. As its traditional model of mobilising resources around goals that are centrally defined and hierarchically executed becomes less relevant, the role of the public sector in adapting to this new environment is a critical one.

The digital era is being defined by innovation organised through knowledge-intensive networks. Better government and innovation in the delivery of public services will therefore depend on greater stakeholder involvement in more flexible and responsive institutional arrangements. “The government’s ability to deliver public policy goals will increasingly depend on pulling together resources and people from many different organisations: public and private, mutual and voluntary, large and small, staff and consumers. The role of the civil service and politicians should be to orchestrate these alliances for change. Politicians should provide leadership: the goals to mobilise around”<sup>82</sup>.

<sup>82</sup> Charles Leadbeater, “Innovate from Within” (2002)  
<http://www.demos.co.uk/catalogue/innovatewithin/>

This changing role of government demands commitment to a deeper understanding of networked models of organisation, a much stronger emphasis on managing intangible assets, and a new dimension of performance in mobilising the intellectual, social and organisational capital necessary to address increasingly complex and interdependent public policy issues.

Successful adaptation to the challenges and opportunities of the digital era cannot be premised on an outdated view of the power, autonomy and effectiveness of central government. Rory O'Donnell has presciently pointed towards a new model of partnership and public governance that would appropriately reflect changing roles<sup>83</sup>. It is an insight consistent with the three main messages emerging from the work of the OECD on twenty-first century governance. "First, old forms of governance in both the public and private sectors are becoming increasingly ineffective. Second, the new forms of governance that are likely to be needed over the next few decades will involve a much broader range of active players. Third, and perhaps most importantly, two of the primary attributes of today's governance systems – the usually fixed and permanent allocations of power that are engraved in the structures and constitutions of many organisations; and the tendency to vest initiative exclusively in the hands of those in senior positions in the hierarchy – look set to undergo fundamental changes"<sup>84</sup>.

It is in the light of this changing role of government that we form our two key conclusions.

## 5.2\ eStrategy Priorities

Our first conclusion is the need for a renewal and re-orientation of e-strategy priorities into 2005 and beyond to support deeper engagement with the transformation potential of broadband-enabled ICT. It is estimated that half of the productivity gains in the economy come from ICT<sup>85</sup>. These technologies are a key source of innovation in the production of high value goods and services, while also providing a powerful means to support the public sector renewal necessary to meet the challenges of the digital era. "ICT is an essential tool in boosting the efficiency and quality of public and government services, providing the means to address the growing challenges in areas such as health, learning, inclusion, security and environment, all essential for Europe's economic and overall competitiveness"<sup>86</sup>.

### Box 9: The Potential of eGovernment

At some stage, somewhere in the world a country will get e-government right. They will exploit the full potential of ICT to improve the quality of their public services while also driving down the cost of delivery. This will enable them to either plough the savings back into the public sector to deliver even better outcomes in terms of health, education etc, or to reduce the tax base to increase the competitiveness of their economies... There are many examples of private sector companies transforming their competitiveness through the full exploitation of ICT. There is no fundamental reason why government cannot do the same.

*Broadband Stakeholder Group*<sup>87</sup>

<sup>83</sup> Rory O'Donnell, "The Future of Social Partnership in Ireland" (2001)  
<http://www.forfas.ie/ncc/reports.html>

<sup>84</sup> OECD, "Governance in the 21st Century" (2001)  
[http://www.oecd.org/document/54/0,2340,en\\_2649\\_34209\\_17243894\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/54/0,2340,en_2649_34209_17243894_1_1_1_1,00.html)

<sup>85</sup> DG Enterprise, "Stakeholder Consultation on the Framework Programme for Competitiveness and Innovation" (December 2004)  
[http://europa.eu.int/comm/enterprise/enterprise\\_policy/cip/docs/consultation\\_doc.pdf](http://europa.eu.int/comm/enterprise/enterprise_policy/cip/docs/consultation_doc.pdf)

<sup>86</sup> Ibid.

<sup>87</sup> BSG Briefing Paper, "The Broadband Impact" (September 2004)  
<http://www.broadbanduk.org/>

**Recommendation 1: Broadband Delivery Group**

A new Broadband Delivery Group should be established to communicate the vision for the next generation of broadband services in Ireland, and to align the energies and actions of all key stakeholders. These include local, regional and central government policy-makers; the health, education and research communities; service providers (both current and potential); market and technology experts; and of course business and residential user groups. This group would serve as a knowledge-intensive community of broadband interests that would have the *independence* and *standing* necessary to engage key stakeholders, to identify barriers to adoption of broadband services (including emerging issues of trust and security), and to ensure ongoing policy responsiveness to accelerated international market and technology developments.

**Recommendation 2: Renewal of eGovernment Strategy**

A new e-government strategy should be produced in early 2005. This new strategy should embrace the use of ICT to support better management of public sector information, better collaboration between agencies, and innovation in the delivery of quality public services. Particular attention is needed to the role of broadband-enabled ICT in transforming the crucial health and education sectors. The strategy should also include commitment to an early public consultation on privacy and data protection issues in order to build confidence in the Public Services Broker model for integrated and multi-channel service delivery.

**Recommendation 3: Renewal of eBusiness Strategy**

We support the new e-business strategy produced in December 2004, and its emphasis on strengthening SME engagement with the role of ICT in boosting enterprise productivity. Alignment of e-business policy supports with our growing broadband vision will be of key importance. A particular goal should be to improve the level of broadband take-up in the SME sector, currently standing at around 30 per cent. Non-technological barriers to the economy-wide innovation made possible by ICT should also become an increasingly important policy focus, with particular attention to legal and regulatory arrangements that undermine competition-led market development.

**Recommendation 4: Community-based ICT Programmes**

A much stronger resource commitment is needed to developing structured and sustainable programmes to support engagement with ICT among disadvantaged groups and individuals. New community-based programmes should build on existing local development structures, be aligned closely with wider social inclusion objectives, and draw on the higher education sector for appropriate logistical and technical support. In the light of the *Sustaining Progress* special initiative around 'Including Everybody in the Information Society', particular attention should be given to the potential to support new community-based ICT programmes along these lines through the Dormant Accounts Fund.

**Recommendation 5: eAccessibility**

Careful attention should be given to the influence of the Excellence Through Accessibility awards being developed by the NDA (National Disability Authority) in bringing about greater understanding of and compliance with their IT Accessibility Guidelines. The need for further measures in this area should be kept under ongoing review, appropriately informed by levels of engagement with the new accreditation process.

**Recommendation 6: ICT Security**

The model of collaborative engagement with key stakeholders that we developed to support the *make IT secure* initiative in November 2004 should be sustained and strengthened in 2005, appropriately informed by the findings of the research survey being carried out to assess the impact of the initiative on levels of engagement with ICT security issues.

**Recommendation 7: Monitoring Engagement with ICT**

The development of a comprehensive approach to monitoring levels of household and business engagement with ICT should be mainstreamed through the work of the Central Statistics Office within the Eurostat framework for harmonisation of EU data collection. Government should ensure that special purpose surveys carried out by other bodies on specific ICT-related themes or sectors are consistent with this framework in terms of concepts, definitions and general methodology.

**5.3\ Knowledge Society Foresight (KSF)**

Our second conclusion is the need for an appropriate approach to taking forward the commitment in the *Sustaining Progress* social partnership agreement to progress a Knowledge Society Foresight initiative. This approach should build from the momentum that we have established collaboratively with NESC (National Economic and Social Council), Forfás and the HEA (Higher Education Authority), and be appropriately aligned with the remit of the new National Economic and Social Development Office in the area of collaborative policy development initiatives.

The digital era is shaping a global environment that is increasingly complex, heterogeneous and unpredictable. The momentous changes taking place around us are making it urgent for a small country like Ireland to view its role in a holistic way, and to take the longer-term perspective necessary to mobilise and concentrate resources effectively around a sustainable path of development. Ulrich Beck introduced the notion of the risk society just over a decade ago. According to Beck, people and organisations in the twenty-first century will increasingly require the capacity and confidence to navigate an environment characterised by ambiguity, uncertainty, unpredictability and unreliability<sup>88</sup>. “This is a world in which individuals, communities and whole societies must be able to engage with change, not as its mere victims, but as its active and informed authors... Engaging successfully with this startling and unprecedented combination of changes, as facilitator and respondent, constitutes the single biggest challenge to public leadership in our time”<sup>89</sup>.

<sup>88</sup> Ulrich Beck, “Risk Society: towards a new modernity” (1992)

<sup>89</sup> Bob Fryer, “Leadership, reform and learning in public services” in Bentley and Wilson (2004) [http://www.demos.co.uk/catalogue/theadaptivestate\\_page333.aspx](http://www.demos.co.uk/catalogue/theadaptivestate_page333.aspx)

## Box 10: Vision for Sweden in the 21st Century

If we are to deal successfully with these major changes in our surroundings, we must adopt a more long-term style of thinking. We must dare to discuss fundamental issues concerning what society we want to build. We need to develop mechanisms and forums to discuss the future in a tangible way and in broad groups, especially technological development and its possibilities and problems. These forums must involve the most important players and create opportunities to influence tangible decision-making processes. We need a vision for Sweden in the 21st century.

*Swedish Technology Foresight*<sup>90</sup>

Many of the more complex issues presented by the digital era can be understood as adaptive challenges – problem situations for which solutions lie largely outside current ways of operating<sup>91</sup>. Adaptive challenges therefore demand learning: the development of new know-how, and new models of organisation. The concept of adaptation arises in turn from scientific efforts to understand biological evolution. Thriving in a changing environment demands experimentation, learning what is effective, and dispensing with the expendable. The adaptive difficulty with which organisations – public sector organisations in particular – often struggle most is identifying and discarding the DNA that is no longer useful. “Thus, an adaptive challenge generates a situation that forces us to make tough trade-offs. The source of resistance that people have to change is not resistance to change per se; it is resistance to loss. People love change when they know it is beneficial. Nobody gives the lottery ticket back when they win. Leadership must contend, then, with the various forms of feared and real losses that accompany adaptive work”<sup>92</sup>.

Developing the full potential of our human resources is the crucial issue. The challenge of bringing about comprehensive availability of personalised (or user-centred) lifelong learning opportunities is one that will clearly require new ways of thinking and operating, system-wide innovation, and a wider acceptance of responsibility by all stakeholders. “Government and citizens are increasingly operating in a network society in which they are becoming more and more equal and in which the strength of government is determined by the delivery of quality and by the joint creation and sharing of policy. Indeed policy can be said to be a co-production”<sup>93</sup>. A commitment to Knowledge Society Foresight can therefore be understood as the development of an institutional capacity to deepen stakeholder engagement with this and other adaptive challenges of the digital era. It is an institutional capacity that will support joint learning through new knowledge intensive networks, and that will link these networks effectively with policy-making processes.

**90** Swedish Technology Foresight, “Choosing Strategies for Sweden: A synthesis report from Swedish Technology Foresight” (2004)  
<http://www.tekniskframsyn.nu/>

**91** Ronald A. Heifetz, “Adaptive work” in Bentley and Wilsdon (2004)  
[http://www.demos.co.uk/catalogue/theadaptivestate\\_page333.aspx](http://www.demos.co.uk/catalogue/theadaptivestate_page333.aspx)

**92** Ibid.

**93** Netherlands Government, “Contract with the future: a vision on the electronic relationship between government and citizen” (2001)  
[http://www.minbzk.nl/uk/different\\_government/publications/contract\\_with\\_the](http://www.minbzk.nl/uk/different_government/publications/contract_with_the)

Building from the momentum established under the *Sustaining Progress* social partnership agreement, a creatively designed Knowledge Society Foresight initiative along the lines that we have set out in Section 4 should now be positioned to play a pivotal developmental role in the following three key respects:

- Strengthening agreement around the key strategic conditions necessary to support and sustain innovation-driven wealth creation and growth
- Deepening understanding of the dislocation that is necessarily associated with the innovation process
- Securing the consensus necessary to bring about a distribution of the costs and benefits flowing from this growth and dislocation in a manner that is equitable and sustainable over the longer term.

**Recommendation 8: Commitment to Knowledge Society Foresight**

**Government should develop an appropriate, collaborative approach to taking forward the commitment in the *Sustaining Progress* social partnership agreement to progress a Knowledge Society Foresight initiative. A high-level project group with the standing necessary to shape and oversee a successful initiative should be put in place in early 2005, appropriately supported by an expert international advisory panel.**



# Appendices



## Appendix 1

# Overview of ISC Reports and Activities

Building the Knowledge Society

December 2002

The Commission's first report to Government argued that the emergence of the knowledge society, building on the pervasive influence of modern information and communications technologies, is bringing about a fundamental reshaping of the global economy. With up to 80 per cent of economic growth now said to be due to new and better knowledge, sources of competitive advantage increasingly depend on knowledge-based innovation.

The report examines Ireland's performance in addressing the challenges of the emerging knowledge society. Ireland's relative strengths include its small size, which allows it to respond quickly to new developments, the high-level political backing given to Information Society issues, its success in attracting Foreign Direct Investment, the establishment of Science Foundation Ireland to administer the Technology Foresight Fund in supporting world-class research and Ireland's reputation for having a well-educated, highly-skilled workforce that is responsive to the skills needs of the high-tech sector. Ireland's relative weaknesses include the low levels of broadband connectivity, weak societal engagement with Internet technologies, traditionally low levels of investment in R&D, relatively low levels of patenting, poor rates of participation in adult education by international standards, and the low application of technology to the education sector.

The report identifies challenges facing Government in three key areas:

- **Innovation** – In the globalised knowledge society, sources of sustainable competitive advantage increasingly depend on knowledge-based innovation. Continuous market-driven innovation is the key to competitiveness and to economic growth. The key role of ICTs in this context will be as facilitators of innovation, including innovation in the public sector.
- **Broadband** – In the 21st century, broadband is the enabling infrastructure through which information and knowledge will be accessed, used and shared. Government broadband investment must therefore be guided by a clear sense of its importance as a key determinant of future socio-economic development, both nationally and regionally.
- **Skills** – The emergence of the knowledge society means an ever-increasing demand for a well-educated and skilled workforce across the whole economy. The countries that succeed in the 21st century will be those that are creative, adaptive and skilled. Therefore lifelong learning must become a key public policy objective. The knowledge society in turn can deliver better jobs, higher standards of living and enhanced social inclusion.

**Building Trust Through the Legal Framework****December 2002**

Trust is essential in giving people confidence to participate in the Information Society. People will not use a system they distrust. Government, citizens, business and voluntary bodies must have absolute confidence that electronic contracts, transactions and communications enjoy the same level of legal protection as conventional paper ones. This report notes the importance of a proper regulatory framework in inspiring confidence and so encouraging people at all levels to engage with the Information Society. The report recognises that it is important to guarantee to users of ICT that the necessary laws are in place and understood, that enforcement resources are adequate and accessible, and that appropriate redress is available.

The report highlights a number of challenges to creating trust, not only in relation to criminal activity assisted by or based on new technologies, but also with regard to the pace of technological change, which makes it difficult for those devising legislation to ensure that it is effective and cannot be circumvented. It sets out a number of important legislative measures that have had a significant impact to date and suggests how the legal framework can be adapted to address issues of public concern.

The actions recommended in the report include:

- More extensive consultation with various interests when legislation at national and European level is being proposed and drafted
- An appropriate balance to be struck between personal privacy and data protection while maintaining the flexibility necessary to sustain business and investment
- Support for citizens and SMEs to help them understand, and function in, the Information Society legal environment
- Protection of information networks and tackling of cyber-crime
- Use of ICTs to make court processes more accessible to citizens and business
- Courts and law enforcement systems to develop expertise in dealing with cyber-crime
- The need for focused and coherent international co-operation.

**Netd@ys Essay Competition: A vision for Ireland in 2012****March 2003**

Netd@ys Europe is an initiative of the European Commission that promotes the use of new media, particularly the Internet, as a resource to create quality educational and cultural initiatives on various themes. As a contribution to Netd@ys 2002, the Information Society Commission organised a National Essay Competition for post-primary students in conjunction with Léargas, the promoters of Netd@ys in Ireland.

The proliferation of information and communications technologies in recent years has meant that young people in particular are seeing fast and wide-ranging changes in their lives unimagined by their parents. The ISC felt it appropriate to try to engage young people on how such technologies could be made to work for a better world.

In conjunction with Leargas, the ISC wrote to all secondary schools inviting entries for a National Essay Competition. Students were asked to put forward their views of how they might be using technology in 10 years time. Submissions were received from all around the country. The four winning essays dealt with a wide range of themes, including global access to real time information on traffic, crime and news; the use of technology to transform the learning environment in school; the radical changes in the home and in leisure pursuits; and the enhanced functionality of current technologies such as PDAs, personal music players, and television. The successful students received their prizes at a special ceremony in Government Buildings. Ms Mary Hanafin T.D., Minister with responsibility for the Information Society, presented the prizes, which were kindly sponsored by Hewlett Packard.

### Delivering a World Class Payments Environment

June 2003

This report highlights how a more coordinated approach to payments infrastructure could deliver annual cost savings to the economy of up to €420m per annum, approximating to 0.3 per cent of GNP. It points to a strong economic rationale for a cohesive Government strategy to coordinate the delivery of a world-class payments environment in Ireland. Noting that Ireland has the highest levels of cheque payments and cash usage in the EU, the report argues that the development of a co-ordinated strategy could, with the minimum of investment, generate significant shared cost savings across the banking, corporate, SME and Government sectors.

The report calls on Government to:

- View delivery of a world-class payments environment as source of innovation-led competitive advantage
- Establish a point of ownership within Government to progress this agenda
- Engage quickly with the key stakeholders in the public and private sectors
- Migrate Government payments and receipts away from paper-based processes
- Develop a standardised payment infrastructure
- Resolve the 'unbanked' issue
- Develop a key infrastructure component to underpin e-enablement of the economy

**Modernising Public Procurement****September 2003**

This report examines the rate of progress in the modernisation of the public sector procurement process. Following a study of international best practice models, the ISC takes the view in the report that the Government could potentially save up to €1 billion annually on public procurement, and should explore the potential of self-funding delivery models such as Public Private Partnerships (PPP). The public service as a purchaser spends approximately €9 billion per annum and it is essential to get the best value for taxpayers through use of the most modern procurement methods available.

While recognising the particular difficulties that SMEs can experience in engaging with the e-procurement process, the report sees the public procurement sector as a strong mechanism in ensuring a healthy adoption of e-business in the Irish economy.

The key messages from the report are the need for Government to:

- Resource the National eProcurement Strategy adequately
- Enhance the functionality of the e-tenders website
- Examine alternative delivery models – including PPP
- Support SME adjustment in line with procurement reform.

**eInclusion – Expanding the Information Society in Ireland****October 2003**

An inclusive Information Society is one where all citizens have the opportunity to use ICT, particularly the Internet, to improve the quality of their lives and their communities, to contribute to a knowledge-based economy and society, to engage with Government services and participate in democratic processes. This report examines these issues and notes that while there has been considerable engagement with modern technology in Irish society, a significant minority do not see its value or relevance. It notes that this segment of the population is disproportionately concentrated among more marginalised groupings.

The report argues that a wider societal engagement with the potential of ICTs is needed to support a sustainable path of cohesive socio-economic development and prevent the emergence of new risks of exclusion. It is the Commission's view that there are essentially two sets of issues that need to be addressed: there is a need to build the capacity to use these technologies on the one hand, while seeking to create the conditions that make their use more relevant to people's lives on the other.

The Commission's key messages for Government are:

- Mainstream ICT literacy
- Build community-based programmes
- Create local partnerships

- Leverage the potential of eGovernment
- Get local content online
- Ensure accessibility for people with disabilities

### eGovernment – More than an automation of Government Services October 2003

This report argues that Government must look beyond putting services online to a more critical engagement with how ICT can improve overall public sector performance. The impact of eGovernment at its broadest level is about better government – better policy outcomes, higher quality services and stronger engagement with citizens.

eGovernment has powerful potential to deliver better quality public services, reduce waiting times, improve cost-effectiveness, raise productivity, and improve transparency and accountability. However, this requires a willingness on the part of Government to re-think established ways of working. It also requires a citizen-centric approach to enhancing service provision to both individual and corporate citizens through a variety of easily accessible channels, including 'one stop shops' at local public offices, internet linked devices, mobile phones, public kiosks and digital television, as well as the more "traditional" methods of telephone and post.

The report acknowledges that while eGovernment will be expensive to implement, the financial benefits and opportunities for democratic engagement are too great to ignore. eGovernment is affected by complex interactions between people, strategy, structure, processes, information and technologies. Government will need to align all these elements into defining the processes that will ensure that Government departments can provide significant service and value to the Irish Citizen.

Key recommendations from the report include the need to:

- Recognise the far-reaching potential of eGovernment
- Re-visit the objective of putting all services online by 2005
- Focus on streamlining and consolidating internal Government processes
- Implement funding arrangements that support high-impact cross-cutting projects.

### Ireland's Broadband Future

December 2003

This report calls for targeted Government intervention to provide broadband infrastructure and stimulate demand. Noting clear evidence of market failure, the report recommends the establishment of a National Broadband Infrastructure Programme with clear delivery targets and timelines, and adequate resources to ensure its implementation.

The Commission affirms that widespread availability of affordable broadband services is crucial for Ireland's competitiveness. It recognises that broadband can deliver tangible benefits in terms of jobs, GNP growth and welfare. However, it is concerned at the strong digital divide in Ireland and urges Government to accelerate the rollout of broadband to towns (the MANs programme) to foster real competition and stimulate demand.

The report's main recommendations are:

- Government should put in place a comprehensive and detailed Broadband Action Plan
- Government and regulatory policy should shift the focus of incentives and support measures towards a platform-led (rather than access-led) approach
- ComReg should review the pricing structure for leased lines so that the retail price to consumers can be reduced
- The Management Services Entity (MSE) should be established without delay
- Broadband infrastructure assets of state bodies should be managed by the MSE
- Further incentives should be used to stimulate the introduction of 'last mile' solutions at reasonable price
- Government should stimulate demand for broadband services.

#### Netd@ys Essay Competition: How can technology be used to embrace dialogue between cultures?

March 2004

For Netd@ys 2004, the ISC, again in conjunction with Léargas, wrote to all secondary schools inviting entries for a second National Essay Competition. This time the title was "How can technology be used to embrace dialogue between cultures". Again, submissions were received from all parts of the country. Key themes included the use of ICT as a tool to educate and break down barriers, promote the intercultural exchange of ideas, create a true 'global village' and fight disease, in particular HIV.

The prize-giving ceremony took place in Government Buildings with Ms Mary Hanafin T.D., Minister with responsibility for the Information Society, presenting the prizes, which were again kindly sponsored by Hewlett Packard.

The two essay competitions served as a stimulus in encouraging the decision makers of tomorrow to articulate their vision of the opportunities and challenges posed by technological change. By engaging students on their thoughts and ideas, policies can be prepared and implemented to create the kind of future society in which they will want to live and work.

## Current Perspectives on the Information Society

April 2004

This report provides a summary view of current thinking on the Information Society by those who have contributed significantly to its analysis. The thinkers whose work is summarised in this report were selected through discussion with researchers and policy advisors active in this area, and through immersion in publications and published debates gathered from a wide range of popular and academic sources, both in print and online. All of the 18 writers featured here are prominent in debate about the impact of ICTs and they come from a range of backgrounds – industry, higher education, research and consultancy.

Despite their different backgrounds and approaches, the report has identified several themes of shared concern or interest including:

- Critical reflection on the concept of an Information Society
- Implications of the Information Society for social inclusion
- Relationship between communications technologies and economic change
- The expanded role of knowledge
- The effect of intellectual property rights in restricting knowledge-sharing
- New forms of connectivity
- Issues surrounding personal identity.

## eWeek

April 2004

eWeek, which ran from 26-30 April, asserted Ireland's identity as a leader in new communications technologies. It promoted the idea that technology is about connections: it connects business; it connects communities; and it can connect the new Europe. eWeek demonstrated how new technologies can strengthen those connections to everybody's advantage, developing new communications and new networks. eWeek was an initiative by the Dublin Chamber of Commerce supported by industry partners and the ISC. The ISC took lead responsibility in organising and facilitating five roundtable discussions. These were informed by expert panels, oriented towards public policy implications, and structured to support completion of the Commission's work programme:

- **ICT Productivity Paradox**  
This roundtable examined the relationship between ICT and improved workplace productivity. It explored the organisational practices and characteristics that are associated with the most effective uses of ICT.
- **Health Leverage**  
This roundtable explored the role of ICT in supporting better health services and improved health outcomes in the context of ever increasing demands arising from demographic changes and higher quality-of-life expectations.

- **eAccessibility**

This discussion explored the use of ICT in the further promotion of independence, inclusion and employment opportunities for people with disabilities.

- **eGovernment**

This roundtable explored the role of ICT as a tool to achieve better government, and the need for a deeper understanding of the value proposition associated with the e-government process.

- **Integrated ICT Security**

This roundtable explored the new security challenges associated with ICT innovation, and how best to ensure that security practices keep pace with these developments.

### “make IT secure”

November 2004

The Commission facilitated the collaborative engagement between public and private stakeholders leading to the “make IT secure” day that took place on 17 November 2004. The primary objectives of the campaign were to raise awareness of security issues and to inform consumers and businesses of the steps required to make their PCs and networks secure. The innovative public/private consortium included the Department of Communications, Marine and Natural Resources, Microsoft, Eircom, HP, Dell, Symantec, Esat BT and RTE.

The initiative drew on extensive national print advertising, radio promotions, and the distribution of 500,000 booklets through national newspapers. This activity was also reinforced by the “make IT secure” website ([www.makeitsecure.ie](http://www.makeitsecure.ie)), which continues to support the initiative’s key messages.

### 21st Century Infrastructure

November 2004

This report advocates a deeper and wider public policy engagement with the transformation potential of broadband technologies. While welcoming recent signs of progress in the availability and uptake of broadband services, the report warns that there is no room for Government complacency, particularly given Ireland’s poor international ranking in regard to broadband penetration. It also notes that Government’s target to be within the top decile of OECD countries for broadband services by mid-2005 will not be reached.

The report highlights five priority areas where the quality of this engagement should be strengthened and recommends that Government should:

- Set ambitious targets based on a coherent strategy
- Eliminate a growing spatial divide, particularly by rolling out broadband to smaller towns and rural areas

- Aggregate public sector demand and align it with our broadband vision
- Ensure policy development is based on ongoing benchmarking of our relative broadband performance
- Establish a Broadband Delivery Group to communicate the vision for the next generation of broadband services in Ireland, and to align the energies and actions of all key stakeholders.

## An eHealthy State?

December 2004

eHealth can be defined as “health services and information delivered through the internet and related technologies”. It can include everything from health information websites to decision support systems designed to assist clinical assessment. It also includes remote access technologies connecting patients to health professionals, as well as connecting health professionals to specialists at distant locations.

This report set out to:

- Provide a clear analysis of Ireland’s progress against various e-Health targets
- Identify the benefits associated with implementation
- Provide a baseline for monitoring progress on an ongoing basis.

Noting that eHealth is a tool with enormous potential to empower all stakeholders in the health sector, Dr. Chris Coughlan, Chair of the eHealth Steering Group, stated “the report positions the implementation of eHealth as a key element in the health reform programme. It recommends that the patient should be the focus of future technological developments in the health sector, so that systems for GPs can integrate with hospital and community systems, resulting in maximum patient benefit”. The report cites a number of successful examples of eHealth implementation in Ireland, despite the relatively low spend in this area. It also notes various international studies that indicate that many eHealth systems are self-financing due to the resulting efficiencies.

The report’s recommendations support four major strategic imperatives. These are that the Irish health service should:

- Significantly increase its investment in e-Health technology and applications
- Use technology as an enabler for the health reform programme
- Target a leading position in the adoption of eHealth in Europe
- Capitalise on European funding and research opportunities.

**Survey Assessments of the Information Society in Ireland****December 2004**

The ISC engaged the ESRI to compile a report based on its review of the 1996-2002 survey data gathered on behalf of the current ISC and its predecessor. The exercise was designed to (a) identify key trends, (b) assess the adequacy of the available data, and (c) shape an appropriate approach to future data collection.

The report concentrates mainly on MRBI surveys of the general population and business community conducted for the Commission in November 2002. In addition, the report includes some comparative discussion of two more recent surveys conducted by the Central Statistics Office, namely the Quarterly National Household Survey of June 2003 and the ICT Enterprise Survey, also carried out in 2003. The report suggests that a comprehensive approach to monitoring levels of household and business engagement with ICT should be mainstreamed through the Central Statistics Office, and that any supplementary studies carried out by other public bodies should be consistent with this framework in terms of concepts, definitions and general methodology.

**Ethics and Values in a Digital Age: Conference Proceedings****December 2004**

This is a report of an ISC conference entitled 'Ethics and Values in a Digital Age' held on 15 October 2004. The conference brought together a diverse group of thought leaders from a variety of sectors, but particularly from education and industry, to examine the implications for values and ethics arising from the increasing role of modern technology in Irish society. The conference had a three-fold purpose:

- To address the question of how we can speak of values and ethics in the Information Society
- To identify the specific ethical challenges presented by the increasing dominance of technologies
- To identify tasks, responsibilities and strategies appropriate to Government in terms of providing leadership with regard to values and ethics in the Information Society.

The keynote speakers were Dr Diarmuid Martin, Catholic Archbishop of Dublin, Professor William Desmond, Katholieke Universiteit, Belgium, Mr Martin Curley, Intel, and Dr Gary McDarby, Media Lab Europe. They led a thought-provoking and challenging debate on the pervasive influence of technology in people's lives and how it can be harnessed to shape society in a constructive fashion. The papers from the main speakers are contained in the report, together with a summary and analysis of the proceedings. In addition, the report contains a foreword from Rev Dr Eamonn Conway, Chair of the ISC Ethics Advisory Group, and also the remarks of the Minister with responsibility for the Information Society, Mr Tom Kitt, T.D., who opened the conference.

**Learning in the 21st Century: Towards Strategic Priorities****December 2004**

This is a report of an ISC policy workshop held on 4 November 2004 on the theme of “Learning in the 21st Century: Towards Strategic Priorities”. There is a widespread recognition that Ireland must reposition its education system to cope with the challenges of the knowledge society. This process is already underway and an unprecedented level of reappraisal, analysis, consultation and policy formulation has been undertaken. This has served to place education, both for children and adults, within the new policy paradigm of lifelong learning.

Education is central to Irish society’s social, economic and cultural development and new emphases are being sought in the teaching and learning process. Two key thought leaders in this area, Professor David Hargreaves and Dr. Riel Miller, made presentations at the workshop with responses from a panel of key leaders and innovators in Irish education. It was structured towards extending mental horizons by envisioning possible new frameworks and processes for learning in the future. The report contains details of the two main presentations, as well as short perspectives from the panellists. Professor John Coolahan, who chaired the event, provides an introduction and conclusion. The foreword is provided by the Minister for Education, Mary Hanafin T.D.

## Appendix 2

### Key Themes from KSF initiative

The *Sustaining Progress* social partnership agreement contains a commitment to progress a Knowledge Society Foresight (KSF) exercise under the aegis of the Information Society Commission, with appropriate participation by the social partners. The following were the significant themes emerging from the initial exploratory workshop held in June 2003:

- Recognition of the more intense competitive environment presented by an increasingly networked global economy where production and application of knowledge has become the critical success factor, an associated acceleration in the rate of innovation and change, and a new international mobility of industrial and service activities
- A sense of imperative about the need for more structured engagement with supporting the improved productivity necessary to underpin the development of a successful and prosperous society in this environment of intensified competitiveness
- The increasing dependence of high-value economic activity on quality of life issues and creating attractive conditions for high-skilled knowledge workers, pointing to new complexities and inter-dependencies in public policy development
- Recognition of the wide range of activities underway across the public policy process consistent with supporting enhanced innovation capacity, qualified by a sense that they might be more coherently aligned and underpinned by a deeper understanding of their contribution to national objectives in the context of overall priority setting and resource mobilisation
- Concern at the pace of moving from policy to implementation across a range of key areas including broadband infrastructure, levels of investment in R&D, commercialisation of publicly funded research, education sector reform, lifelong learning, and public sector modernisation
- The broad societal foundations that underpin the national system of innovation, with the capacity to learn (and unlearn) increasingly being the key determinant of the relative success of individuals, firms, regions and national economies
- The dependence of innovation capacity on the institutional arrangements in place to optimise participation in appropriate forms of education and training to support adjustment to accelerated change, including pedagogy and curriculum reform issues at primary and secondary levels
- The consequent need to widen social ownership of the challenges associated with shaping the national system of innovation, informed by an overarching focus on the development and distribution of appropriate learning capabilities

- The evidence that there is no international convergence to a single model of development that should be replicated here, but rather that Ireland's future course will have its own unique trajectory shaped by the formulation of policy responses that are appropriate to domestic circumstances
- The role of competition as a primary driving force behind technological and managerial innovation delivering improved productivity and organisational performance
- The need for attention to creating appropriate behavioural incentives for both individuals and firms, including having regard to unintended consequences of existing fiscal, regulatory and other policy frameworks
- The disruptive nature of innovation and change, and the need for policy responses that appropriately address the displacement associated with shifts to higher-value economic activity, and manage a transparent and equitable distribution of attendant costs and benefits
- An enthusiasm for the potential of foresight activity to enhance engagement with these new policy complexities, building on a complementarity with the strengths of the social partnership process in creating shared visions and mobilising collective strategic actions.

## Appendix 3

### Framework prepared for KSF initiative

#### A Framework for Responding to the Innovation Challenge: Towards a Systemic Understanding<sup>94</sup>

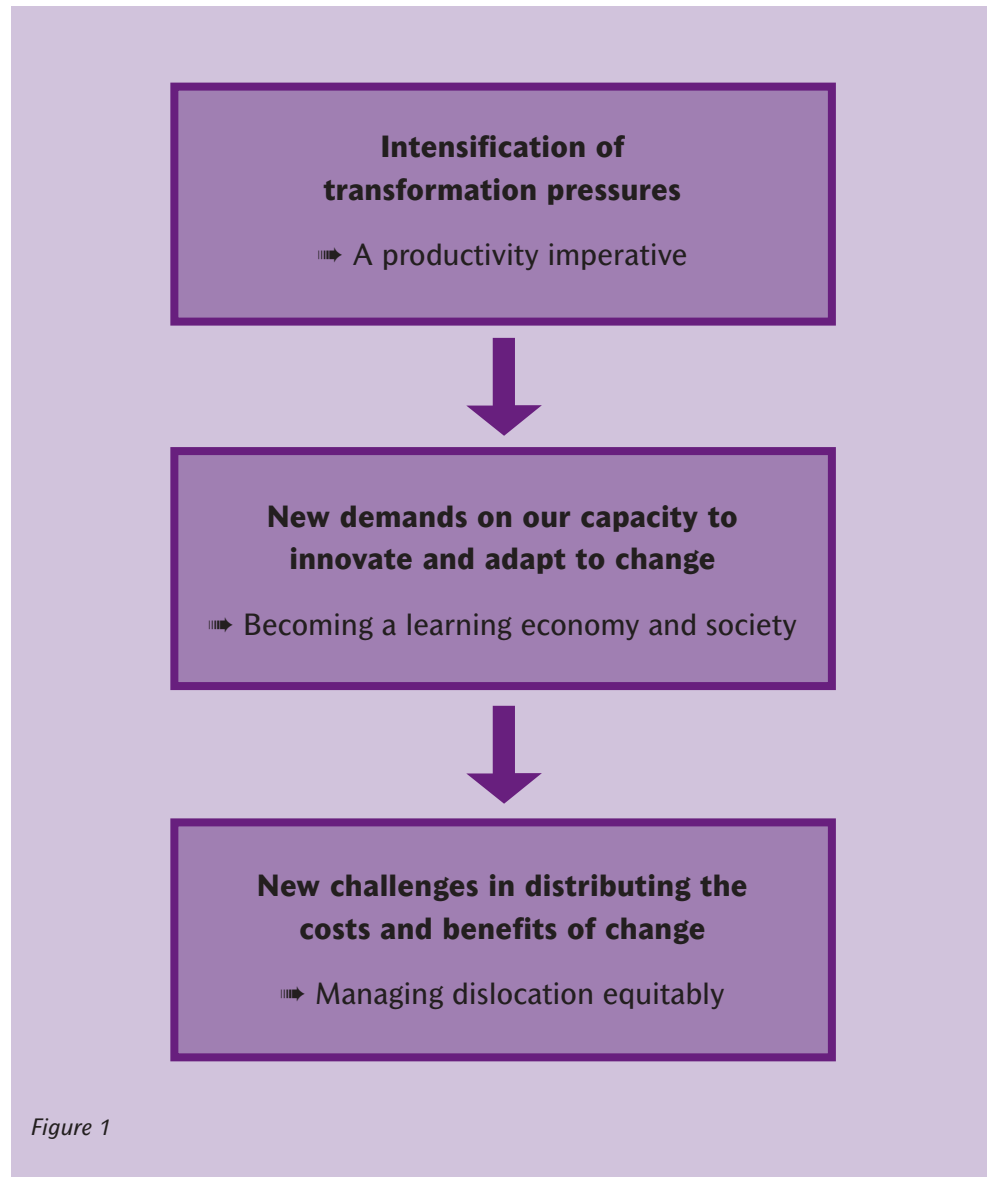


Figure 1

<sup>94</sup> This short paper was designed to capture the key challenges facing Ireland in advancing to the innovation-driven stage of socio-economic development. Building from the conclusions of an exploratory workshop involving an ad hoc group of social partners convened in June 2003, it develops a particular focus on the potential to bring about a stronger alignment of complementary public policies. While it does not purport to be a definitive analysis, an earlier version of the paper was welcomed by a cross section of senior personnel in government departments and public agencies at a workshop held in January 2004. This version adds an emphasis on governance issues in the light of those latter discussions. The framework was prepared by the ISC Secretariat (Mr Aedan Hall) in collaboration with Ms Helena Acheson (Forfás), Mr Fergal Costello (HEA), and Dr John Sweeney (NESC).

## 1. Intensification of transformation pressures

- a. An increasingly networked global economy is creating greater rewards for companies who participate effectively in it and penalties for those who do not.
- b. Competition from companies with operations in lower cost regions, particularly India and China, is forcing a reshaping of corporate strategies in manufacturing and services.
- c. EU enlargement alters the context for Ireland's inward investment policy, immigration flows and for its exporters.
- d. Uncertainties continue to attend the international outlook and increase the importance to a small country of its internal cohesion and speed of collective response to exogenous shocks.
- e. The implementation of the Lisbon Strategy, the EU's template for adapting to globalisation, is not proving easy or automatic at the EU or national level.
- f. Science is increasingly affecting every sphere of economic, social and personal life, making a higher level of scientific literacy essential if people are collectively to understand and respond to new opportunities and threats.
- g. Changing demography means we can no longer assume a 'young Ireland'.
- h. Higher living standards mean Ireland is no longer a low cost location.
- i. National economic development policy is essentially about facilitating 'globally rational' structural shifts in the economy rather than resisting them.
- j. The productivity of the entire economy matters for improved living standards – not just the productivity of the high-tech and internationally traded sectors.
- k. Ireland has lost the basis for one economic development model (low cost, pool of young educated workers, hidden reserves of labour) without yet having completed the construction of another (R&D infrastructure, childcare, adult learning, etc.).

## 2. New demands on our capacity to innovate and adapt to change

- a. An accelerated rate of economic, social and technological change means that specialised knowledge and skills are being exposed to a more rapid depreciation than previously experienced.
- b. Learning (and unlearning) has become crucial to the socio-economic success of individuals, firms, regions and the national economy.
- c. A new emphasis is needed on building and distributing appropriate learning capabilities to support a successful transition to higher value economic activities.
- d. Greater recognition is needed of the importance of the science base everywhere in the economy (indigenous and 'high tech' industries) and to society's pursuit of a better quality of life (health, environment, heritage, leisure, etc.).
- e. Recruitment practices, management skills and flexible work organisation have become key parameters affecting the competitiveness of enterprises.
- f. The capacity to innovate draws on broad societal and cultural foundations.
- g. Innovation is not just technological but social and institutional as well.

- h. An appropriate balance is needed within Ireland between:
  - i. Generating new knowledge at the global frontier and leveraging the existing stock of global knowledge (creative application);
  - ii. Supporting R&D and supporting the changes in organisational and working arrangements that are necessary to realise the productivity improvements made possible by technological advances;
  - iii. Pursuing innovation through formal R&D and pursuing it through increased user-producer interactions and learning-by-doing.
- i. A focus is needed on long-term competence building in firms, public sector institutions, and society as a whole.
- j. The complex nature and roots of innovation mean that government and all the other actors must find new ways to guarantee the prerequisites for innovation, create innovating environments, welcome innovation where it occurs and ensure that social and societal development is in step with technological and economic development.

### 3. New challenges in distributing the costs and benefits of change

- a. Developing the economy is disruptive – “creative destruction” (Schumpeter) is inherent to the process.
- b. The incidence of adjustment is distributed unevenly across existing occupations, sectors and regions.
- c. Inequalities in pre-tax market earnings are likely to grow rather than diminish.
- d. Advanced knowledge-based economies can and do develop alongside quite different national education systems and welfare states (e.g., USA vs. Finland).
- e. How social protection is designed and delivered can help to block change or to facilitate it.
- f. A significant section of Irish society is still weakened by the high unemployment and low investment of the past (low educational attainment, low skills, welfare dependency, intergenerational transmission of disadvantage, area disadvantage).
- g. Unless consensus is built around the strategies and instruments effective in managing the dislocation generated by rapid social and economic change, new and serious inequities will emerge (e.g., current unmet housing needs, the weak social position of many immigrants), and the efforts to effect change may themselves be less effective.

### 4. A new framework to support strategic policy alignment

- a. Innovation-driven development requires a new perspective on a broad set of policy interdependencies – including enterprise policy, labour market policy, education and training policy, science and technology policy, competition and regulation policy, regional policy, taxation policy, welfare policy, and public sector modernisation.

- b. **A new conceptual and operational framework is needed for the strategic alignment of these inter-dependent public policies.**
- c. This would facilitate the horizontal integration across areas (enterprise, education, welfare, etc.) and vertical integration of levels of engagement (departmental, agency, local, etc.) without which policy alignment will not occur.
- d. The functioning of the national system for competence building and innovation can be considered in terms of three sub-systems that must be appropriately aligned to support successful and sustainable development:
- i. Commercial innovation sub-system
  - ii. Human resource development sub-system
  - iii. National solidarity sub-system.
- e. Important synergies between public policies occur as positive spill-overs across these three sub-systems.

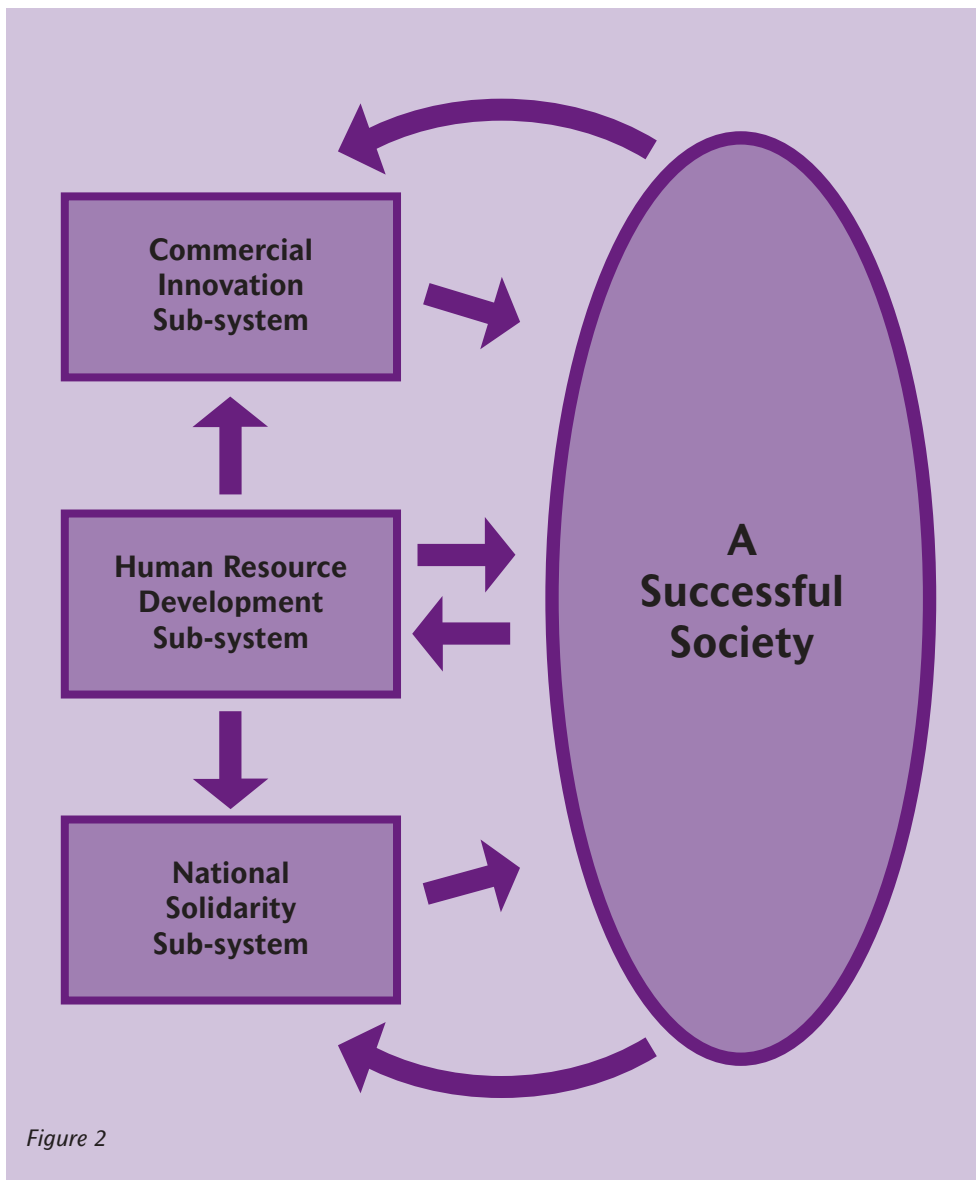


Figure 2

## 5. Commercial Innovation sub-system

**The purpose of the commercial innovation sub-system is to create the conditions for rapid and sustainable economy-wide productivity growth. It builds from macro-economic stability, and the availability of the infrastructures necessary to support internal and international logistical efficiencies in movements of information, people, goods, and services (including transport, energy and communications networks).**

### a. Policy principles:

- i. The skills and competencies of people are the primary resource underpinning successful commercial innovation.
- ii. The promotion of competition to bring about efficient functioning of markets is a key driver of commercial innovation.
- iii. Domestic R&D is essential both to generate new knowledge and build the capability to access, assess and apply existing knowledge.
- iv. The regulatory environment must be innovation-friendly and responsive to unintended bottlenecks created by existing frameworks.
- v. It is necessary that taxation policies incentivise entrepreneurship.
- vi. Public policy must address market failures in leveraging commercial application of globally available scientific and technological knowledge.

### b. Key challenges:

- i. Ensure an enhanced focus on the quality of the micro-economic business environment – supporting the sophistication with which both domestic companies and MNC (multi-national corporation) subsidiaries can compete.
- ii. Develop a high and sustained R&D effort in the private and public sectors.
- iii. Design publicly funded research programmes to encourage appropriate collaboration (among firms, between firms and centres of research)
- iv. Create niches of excellence capable of being at the frontier of global scientific and technological knowledge.
- v. Link knowledge to the marketplace, i.e.:
  - 1) Strengthen the absorptive capacity of firms
  - 2) Foster increased business expenditure on research and development (BERD)
  - 3) Strengthen collaboration and linkages between the higher education and enterprise sectors
  - 4) Foster intermediate organisations – particularly private – whose expertise is to bridge research and the needs of SMEs.
  - 5) Foster the commercialisation of publicly funded research, including an appropriate IPR (intellectual property rights) regime
  - 6) Ensure a supply of science, technology, & engineering graduates (3rd and 4th level), including through appropriate immigration policies, to meet skills needs of the high-tech, knowledge-intensive sector, and the problem-solving needs of other sectors.

- vi. Embed technology foresight in policy development.
- vii. Keep a policy focus on the scientific needs of indigenous, low-tech economic activities.
- viii. Promote a culture which values creativity, entrepreneurship, and risk-taking.
- ix. Support the development of high-performance workplaces.
- x. Maintain a predictable and competitive corporation tax regime, while ensuring incentives for R&D investment.
- xi. Develop a particular focus on services sector innovation.
- xii. Support the development of broadband infrastructure.
- xiii. Ensure Ireland's quality-of-life supports its international attractiveness as a location for high-value economic activity (affordable housing, quality public services, clean environment, family-friendly amenities, etc.).
- xiv. Develop appropriate, adaptable and anticipatory institutional arrangements.

## 6. Human Resource Development sub-system

**The purpose of the human resource development sub-system is to support learning in order to allow every member of Irish society to achieve her or his full potential, and to contribute to national social, economic and cultural development.**

### a. Policy principles:

- i. 'Learning to learn' is a key individual and organisational attainment in an environment of accelerated change, building capability, agency and social responsibility.
- ii. A continuum of lifelong opportunities is necessary to develop personal skills and competencies – from early childhood, through formal education, and during working life.
- iii. Learning is for employability and for life. People's competencies and skills are the foundation of an innovative economy *and* of a participatory, internationalised and attractive society.
- iv. The curriculum, pedagogies and assessment at every level of the formal education system need to develop the skills and attitudes necessary for an innovation culture to flourish: e.g., mathematics, analytical reasoning, scientific and IT literacy, and languages; creativity, confidence, curiosity, team-working, and entrepreneurship.
- v. Early-childhood welfare is the key foundation of individual development (cognitive, social and emotional), and of future social cohesion and workforce productivity.

### b. Key challenges:

- i. Support formal educational institutions in becoming learning organisations that respond in an ongoing manner to the changing environment and communities in which they operate, e.g.
  - 1) Increased diversity of pupils (racial, cultural etc).
  - 2) New staff training and development needs, particularly to meet challenges in attracting, developing and retaining effective teachers.

- 3) New forms of disadvantage among students.
  - 4) New expectations of students with disabilities.
  - 5) Need for increased engagement with STE.
  - 6) Changes in the world of work.
- ii. Find transparent and fair ways to compare and develop curricula, pedagogies, teaching effectiveness, assessment procedures, institutional leadership and culture across educational institutions so as to support and promote excellence.
  - iii. Develop integrated measures to support early-childhood welfare.
  - iv. Provide alternative development paths for early school-leavers.
  - v. Ensure that young people completing secondary education and not choosing third level have the foundations, qualifications and on-going supports to continue learning at work and as adults.
  - vi. Continue to increase participation in higher education, particularly on the part of mature students and young people from working-class backgrounds.
  - vii. Provide higher education institutions, within a legislative framework that sets out a clear mission, with a funding framework that provides stability, allows for institutional innovation and autonomy, and ensures accountability.
  - viii. Support universities and other 3rd level institutions in making the utilisation of new and existing knowledge a characteristic mission.
  - ix. Increase funding to third level institutions in a way that reflects the scale of private benefits gained by learners and enterprises and the benefits reaped by society.
  - x. Embed and sustain a strong research capability that fosters the creation and dissemination of new knowledge, particularly by supporting post-graduate researchers and PhDs.
  - xi. Increase adult participation in education and training generally, through comprehensive adult guidance provision and a better alignment of policy measures to support “second chance” adult learners.
  - xii. Recognise the firm’s role in education and training, particularly in lifelong learning. Support workplace learning, including new education/training leave arrangements.
  - xiii. Develop structured accreditation arrangements in a way that facilitates easy transition between full- or part-time learning and the workplace.
  - xiv. Develop flexible and responsive institutional arrangements – shifting from institution-led to learner-oriented provision; and embracing new delivery channels.

## 7. National Solidarity sub-system

**The purpose of the national solidarity sub-system is to ensure that all members of Irish society benefit from the emphases in national policy on knowledge-based innovation. It does this by managing the dislocation associated with technological and economic developments, and by promoting an equitable distribution of the costs and benefits of continuing change.**

**a. Policy principles:**

- i. High employment rates provide the best framework for supporting individual and societal well-being.
- ii. A cohesive and attractive society makes it easier to address the challenges of commercial innovation and human resource development.
- iii. Social cohesion is best safeguarded by investing proactively in strengthening the skills and competencies of individuals, communities and regions most exposed to transformation pressures.
- iv. Adequate and appropriately designed safety nets are necessary to give people vulnerable to dislocation the necessary security and incentives to accept change.
- v. There will always be a need to compensate those unable to attain or maintain the threshold of skills and competencies necessary to hold employment.
- vi. Innovation is crucial to finding new ways of addressing the marginalisation of people who have difficulty keeping up with the learning economy and society.

**b. Key challenges:**

- i. Ensure ruthless priority to combating poverty and social disadvantage in childhood and among young people.
- ii. Overcome class-based and other boundaries to what people ambition for themselves, and what others expect of them, and address issues of access and resources that impede the development of individual potential.
- iii. Ensure equality of opportunity is constantly recreated across the life cycle.
- iv. Ensure that labour market institutions and policies support skill enhancement and entrepreneurship while containing extreme earnings inequality.
- v. Shift the emphases in social welfare for people of working age from passive income transfers to services and sequenced preparation for economic and social participation.
- vi. Develop services that give people with domestic caring responsibilities the freedom to hold employment and pursue careers.
- vii. Ensure that work pays at entry-level jobs and that progression is always possible out of the lowest-paying jobs.
- viii. Ensure participation in quality training and education pays for adults with skills no longer experiencing strong market demand.
- ix. Support full participation by immigrants and their families in Irish society.
- x. Develop appropriate compensation and redeployment packages for displaced workers, and suitable employments for older workers.
- xi. Review and restructure in an equitable and transparent way the social contract between young and old generations.
- xii. Seek as wide a spatial distribution of socio-economic development as is consistent with the advantages of clustering and the benefits of modern cities.
- xiii. Harness the full potential of ICTs (information and communication technologies) to support social inclusion and balanced spatial development.

- xiv. Develop flexible, decentralised and responsive institutional arrangements for tackling social exclusion.

## 8. Governance for Innovation

**The development and alignment of the three sub-systems – and, thus, of Ireland’s national system for competence building and innovation – cannot be centrally planned and directed.**

- a. Creativity and innovation are not “produced”, but the conditions that increase their likelihood can be better understood and more effectively provided.
- b. Just as the creativity and innovativeness of a firm’s staff do not flourish in hierarchical, Taylorist-style work cultures, neither will the creativity and innovativeness of private, public and not-for-profit organisations flourish nationally if policy is premised on an outdated view of the power, autonomy and effectiveness of central government.
- c. As the contributions of government, firms, higher education institutes, other research bodies, public agencies and civil society to achieving an innovative economy and society are complex and interwoven, it is of key importance to develop habits, patterns and structures in using power (political, corporate, professional, institutional etc.) that are suited to the governance of innovation.
- d. Governance has been defined as “rules, processes and behaviour that affect the way in which powers are exercised...particularly as regards openness, participation, accountability, effectiveness and coherence”.<sup>96</sup> It comprises the often complex mechanisms and institutions through which citizens and groups articulate their interests, mediate their differences and exercise their rights and obligations.
- e. Accelerated social and technological change demands a new emphasis on future-oriented thinking in society. A clear focus is needed on establishing processes through which actors together can deepen their understanding of changing challenges and opportunities, and develop a shared commitment to longer-term objectives.
- f. Some of the key requirements for the multiple actors involved to support and influence each other include:
  - i. Shared understanding of what is needed in broad outline and why
  - ii. Recognition of actors’ diverse but synergistic roles
  - iii. Coherence of networks, structures and opportunities for effective communication and interaction.
- g. A key role for government is as facilitator, supporting innovation-conducive environments.
- h. The leadership and functional contributions appropriate to government include:
  - i. Facilitating interaction between all relevant actors.
  - ii. Maintaining a consensus and commitment at the highest level in support of knowledge-based innovation.

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<sup>96</sup> European Governance – A White Paper. European Commission, 2001.

- iii. Coherence of policy design and policy implementation – greater horizontal and vertical integration across departments and agencies is key to improving the delivery of quality public services and the implementation of national strategies.
- iv. Government departments developing their capacity to use research effectively in formulating and evaluating policy.
- v. Improving publicly-delivered services of every sort through innovation.
- vi. Fostering innovation through public procurement policies.
- vii. Being pro-active in fostering social innovations.
- viii. Developing its capacity to continuously identify key challenges, update policies accordingly and transform policy into action.

## 9. Key questions

- a. Does this framework adequately capture the key features of Ireland's innovation challenge?
- b. How successfully are current arrangements helping all relevant actors to interact usefully and develop synergistic responses to the innovation challenge?

## Appendix 4

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Dee Carri, Torque Management

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Claire Cunningham, Aura Internet Services Ltd

Joe Horan, South Dublin County Council

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Robert Johnston, JLS Technology Ltd.

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Dr. Patricia O'Hara, Western Development Commission

Marion O'Neill, Kilkenny Information Age Town

Kathryn Raleigh, IBEC

Colm Reilly, PA Consulting

Peter Ryan, Department of the Taoiseach

Jerry Shanahan, ICTU/Amicus

Charles Stanley-Smith, R495.com

Christopher Took, Web Developer (resigned September 2002)

Donal Toolan, Forum of People with Disabilities

## Appendix 5

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