WHITE PAPER.

Embracing the Knowledge Society: a Public Sector Challenge

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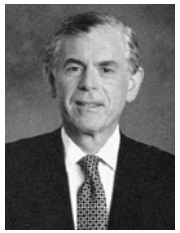
FOREWORD.



Dear colleague,

It is with great pride that I share with you a Unisys White Paper on 'Embracing the Knowledge Society: a Public Sector Challenge'. I hope that as you read it you will be inspired to reflect upon the role of the public sector in helping society make the most of the vast new opportunities afforded by information technology.

Unisys has many decades of experience in working with the public sector in turning public policy objectives into operational successes around the globe. We remain committed to helping policymakers everywhere develop successful, efficient and effective administrations that deliver enhanced services to citizens. Our new Blueprinting model is only the latest example of Unisys commitment to helping public and private organisations obtain the most from the systems they operate.

In this paper Unisys shares some important insights regarding what technology can, and perhaps should, achieve in a knowledge society. While the current focus on the eEurope 2005 Action Plan has brought information technology policy to the forefront of everyone's minds, we hope that our perspective at Unisys will contribute some new ideas to the ongoing debate over the role of IT in modern society.

The ultimate aim of public policy makers is to help businesses and citizens work together to improve the quality and meaning of their daily lives. To this goal we willingly lend our full expertise and support to help public sector actors everywhere create the e-enabled services and systems that Europe needs and desires.

Lawrence A. Weinbach
Chairman and CEO
Unisys Corporation

CONTENTS.

EXECUTIVE SUMMARY.

While millions of people browse the Internet, send e-mail, and while away time in chat rooms, the Internet is still largely a highly complex and often mysterious game room for society as a whole.

The computer-based technology that has made the Internet possible is still mostly in private hands. The challenge is to find a way to unleash the untapped power of that technology to achieve societal goals. At the Lisbon European Council of March 2000 leaders declared information technology a key element in making the European Union 'the most dynamic and most competitive knowledge-based economy in the world.' The eEurope initiative wants its member states to help create 'an information society for all'.

This White Paper seeks to distinguish 'knowledge society' from other terms and to propose a path that can make possible a society that spontaneously shares knowledge, encourages creativity, empowers job-seekers, and improves life quality as a whole.

A knowledge society, then, is one where all stakeholders, not just big business, have equal access to information technology resources and can share in the benefits they bring. It emphasises the social and economic benefits to be derived from making knowledge a central organising principle across all society.

Creating an environment to nurture the knowledge society requires public sector leadership. Government already is the guardian of the legal framework of cities, states, and nations; it oversees public education; it derives resources from the people it serves; and it has the capacity to develop the needed infrastructure. Most important, the work of the public sector focuses not on financial return but on serving the needs of society. Its function is to build for the long-term public interest.

We can get a glimpse of what a knowledge society can produce through two examples: (1) MP3, a file-exchange concept that has spawned both new commercial products and a revolution in the music industry, and (2) an Open Source software environment that competes with the giant Microsoft. Both were devised by individuals and small groups of programmers scattered around the world working cooperatively but without standard organisational support, capitalisation, marketing, a sales force, or endless meetings. Yet, somehow, they have established a worldwide presence, one we believe should be replicated.

In order for citizens to embark on the knowledge society, however, they must be able to access information, be confident that their privacy is protected, accept that the information they provide is secure, and know that the information they retrieve is reliable.

Access cannot rely solely on the PC and the Internet. The PC is too expensive and too complex to achieve universal use. The only current user terminals that even remotely approach 'universal' access status are the telephone and the television. For a knowledge society to function, the entire access infrastructure needs to be overhauled to incorporate these common technologies. They need to accommodate the widely variant skills of the citizenry as well as all kinds of vocal, written, and electronic commands.

Access also involves ensuring that fee-based systems do not take over the technology that searches web-based resources. Today Google is the only search engine that indexes web sites free of charge. All others list only sites that have paid to be indexed. If the only information available is that which forms part of a commercial transaction, huge resources will be lost to the public.

Security in a knowledge society takes on increasing importance. Growing connectivity links more and more systems worldwide, meaning that the shared costs of one individual's failure to enforce robust security standards can be disproportionately high. Only the public sector has the capacity to establish and enforce the level of security needed by a knowledge society. A code of conduct is needed to control our use of the technology highway as much as a highway code is needed to control behaviour on the road.

Trust must be a cornerstone of the knowledge society. To be of value, Internet information must enjoy more than game-room status. It represents a vast resource of information without precedent in human existence, yet it lacks a formal legal status. While we have applied 'Deposit Law' to other media forms – books, periodicals, radio, film, CDs and DVDs – we have yet to apply this principle to the Internet. Such action is essential to building the necessary level of trust.

This developmental role on the part of the public sector inevitably will benefit the private sector. A knowledge society offers lifelong learning; it ensures people's skills are updated to keep them employable; it facilitates re-entry into the workforce; it helps small and medium enterprises to network and build on shared experiences; and it makes easier the task of governments to assess public needs and find ways to address them.

We know this transformation cannot occur overnight. Rather, we propose governments take on small, community-based pilot projects to test technology and strategy. Successful ventures will spawn larger, more complex ones involving multiple communities. We expect growth to be rapid and exciting.

1.0 INTRODUCTION.

Embracing the Knowledge Society: a Public Sector Challenge.

1.1. Context.

Over the past two decades, Information and Communication Technology (ICT) has become a key enabler in the search for increased productivity and economic competitiveness. At the Lisbon European Council of March 2000, the Heads of State and Government declared ICT to be a key component of their strategy to make the European Union 'the most dynamic and most competitive knowledge-based economy in the world'.[1]

Elsewhere, the eEurope initiative[2] was proposing coordinated action among member states to help create 'an information society for all' to 'ensure the European Union fully benefits for generations to come from the changes the information society is bringing'. Still other policy documents referred to a 'knowledge society'[3] or even a 'knowledge-based society'[4] which gave equal importance to 'the social and cultural aspects of life as much as the material and the economic' and where 'knowledge would be used to make informed decisions to improve the quality of all aspects of life.'

These terms are often used interchangeably but actually reveal important differences of scope and vision that no policymaker should ignore. The potential confusion over terms prevents politicians and businesses everywhere from arriving at a clear view of their respective roles in guiding the transformation of society in the digital age – a confusion which may dramatically inhibit the economic and social development of Europe in an increasingly ICT-embedded world.

1.2. Aims.

This White Paper, then, is aimed at a particular public sector audience: those legislators and policymakers whose daily work brings them face-to-face with questions relating to these new information and communication technologies and the place they should have in our society.

1. Lisbon European Council – Presidency conclusions (24/03/00). *http://ue.eu.int/en/Info/eurocouncil/index.htm*
2. eEurope: an information society for all – Commission Communication (1999). *http://www.europa.eu.int/information_society/eeurope/news_library/pdf_files/english.pdf*
3. For example, Building the Information Society for us all – Final report of the high level expert group (1997). *http://europa.eu.int/comm/employment_social/knowledge_society/buildingen.pdf*
4. The term is also to be found in the Lisbon Conclusions

In addressing this group, our aim is twofold. Firstly, we hope that the ideas in the paper will prove educational, and that our technical and commercial perspective will give the public sector reader a better understanding of what technology can, and perhaps should, achieve in a knowledge society. We will explain why the knowledge society is a far more radical concept than its sister, the information society, and why it demands an equally radical change of approach.

Secondly, and more importantly, we hope that the paper will trigger a broader debate regarding the objectives of 'information society' policy at both the EU and the national level. Our recommendations are intended to challenge policymakers to examine their current priorities and to consider how they might adapt current policies to deliver greater added value to society.

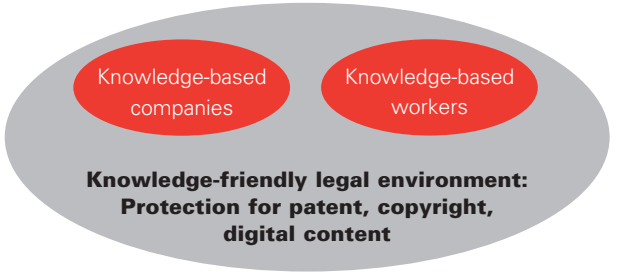
This paper has no pretensions as a scientific document. Rather it is the reflection of several decades' accumulated experience from a company with a distinguished track record of engagement in public sector IT projects around the globe. This experience has led us to conclude that a great deal more can be achieved than is commonly realised or expected, simply through the better use of information techniques. The ideas that follow should show how.

1.3. What is the 'knowledge economy'?

The term 'information society' describes a society that has been radically altered by the advent of digital technology and the PC, and where low-cost information and ICT are in general use. On the other hand, the term 'knowledge economy' denotes a particular kind of legal and economic construct formed by the interplay of big business and government. In the knowledge economy, the private sector leads in the adoption of new information technologies searching for significant productivity gains that will underpin lasting growth and competitiveness. For this to happen, governments are required to create the necessary legal framework (e.g., through patent law, copyright, e-commerce legislation, and liberalisation of the telecoms sector) that will both safeguard competitive forces and mobilise the private capital necessary for growth, innovation and development.

Figure 1.
The knowledge economy

Not surprisingly, given the high priority attached to the idea over the past decade, the knowledge economy is quite close to being completed or achieved. Commercial pressures have turned companies into ICT-embedded organisations that use technology to revolutionise both business processes and the way in which their workers operate in the search for competitive advantage. Indeed, most private organisations of a certain size are now heavily reliant on electronic messaging, shared knowledge bases, distance learning techniques or distributed management, and many have used these technologies to put in place a global infrastructure guaranteeing unprecedented access to internal knowledge resources. This environment has also seen e-commerce emerge as a serious business proposition, with more and more businesses now concerned about developing a web presence and taking advantage of Internet as a major new revenue stream or to reduce overheads.

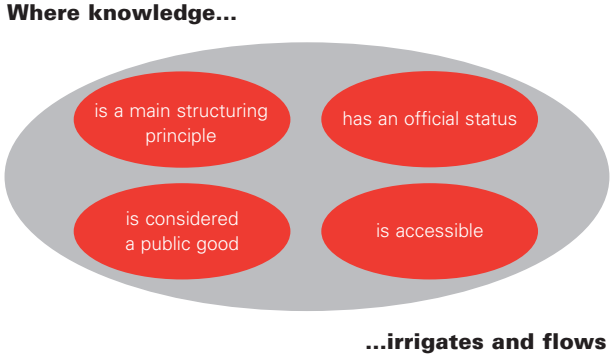


1.4. What do we mean by a 'knowledge society'?

The successful adoption of new technologies in the commercial sphere contrasts with the almost complete absence from the knowledge economy of 'civil society', namely those groups beyond big business that have insufficient funds to make the transformation to the knowledge economy: private individuals, smaller commercial entities, non-profit organisations, charities, consumer associations, trade unions and those organisations making up the public sector. The term 'knowledge (-based) society' therefore denotes a society where all stakeholders, not just

big business, have equal access to information technology resources and can share in the benefits they bring. The 'knowledge society' emphasises the social and economic benefits to be derived from making knowledge a central organising principle across all society. Here the technical infrastructure is used to ensure that the skills and tacit knowledge of the populace can flow and be exchanged, allowing independent entities to pool knowledge resources and overcome institutionalised boundaries of knowledge ownership and data interchange in totally new ways.

Figure 2.
The knowledge society

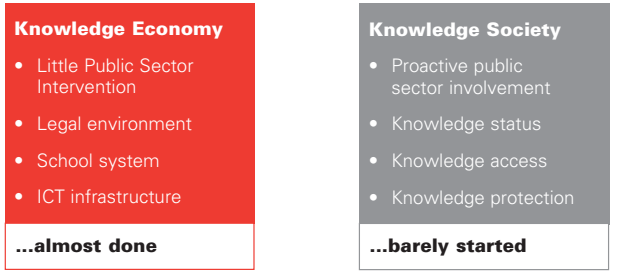


It is our contention that civil society currently lacks the environmental conditions to fully exploit the potential of new digital techniques. It follows that there are potentially enormous benefits to be realised if the digital technologies and techniques so successfully developed within the knowledge economy can be extended to reach 'civil society' and, in so doing, actually touch private individuals and small businesses. By using knowledge-sharing techniques already familiar in the business world, new kinds of knowledge and service can be created from the amalgamation of previously distinct fields of expertise, releasing latent creativity and innovation and overcoming problems caused by information bottlenecks. The examples that follow in this paper suggest some ways in which this could happen.

1.5. Are we ready for the knowledge society?

If Europe is indeed serious about becoming the 'most dynamic' knowledge economy in the world by 2010, it should aim to implement the knowledge society model described above. Left to the interaction of normal technological progress and market forces alone, however, society will not evolve quickly enough to bring about these changes – changes that will allow Europe to become the leader of the most advanced economies in the world. Fig. 3 below shows the main characteristics and relative degree of development of the knowledge economy and knowledge society.

Figure 3.
Knowledge economy and knowledge society compared



1.6. The key role of the public sector.

Certainly, no ordinary economic actor is ever likely to spontaneously develop a public information technology infrastructure for all citizens, or to seek to altruistically extend the benefits of ICT beyond the sphere of its own business interests. For this reason, we believe that the extension of knowledge economy technologies to the citizen can be piloted only by the public sector.

Public authorities are indisputably in the best position for taking action. Supporting this belief are the following observations: they already act as guardians of the legal framework (and can therefore choose to enact legislation encouraging the transfer of knowledge and information); they are already responsible for ensuring that we are taught the right skills (and can adapt educational systems as required to take advantage of new

opportunities); and they already have control over huge investment budgets (and can therefore create an environment which encourages the development of necessary major infrastructure).

Furthermore, there are additional reasons why the public sector could benefit from leading the development of the knowledge society. The widespread adoption of new technologies could, for instance, help revitalise civil society by giving citizens a new means of participating in and influencing society. It can also create exactly the kind of operating environment that small businesses need but could never hope to create on their own, by providing them with an IT infrastructure equivalent to that already put in place by larger companies. And, in a world where an individual government's ability to influence its own economy is continuously being eroded by global economic forces, appropriate use of these techniques can provide the public sector with an additional tool with which to influence the economy.

1.7. How this paper can help.

Governments should therefore consider now how they can best convince society to take advantage of the opportunities presented by ICT and then lead Europe into the knowledge society. This is no easy task. And while this paper does not claim to have all the answers, we hope to describe the most important aspects of the knowledge society insofar as it will affect the ordinary citizen. For while many of the concepts outlined in this paper may seem academic today, the reality is that they will directly affect how governments choose to approach ICT in the near future. As our analysis progresses, we hope to identify some of the fundamental areas where we consider action is needed to bring about a knowledge society. We will conclude by making a number of our own recommendations aimed at bringing this vision a little closer to reality.

2.0 THE UNTAPPED POTENTIAL OF THE KNOWLEDGE SOCIETY.

2.1. A revolution waiting to happen?

Governments have long accepted that they have a role to play in transforming their economies and social structures by taking advantage of the new opportunities afforded by ICT. The EU itself has for nearly a decade played a key role in driving forward the ICT agenda with member states, while at the same time coordinating related policy actions. Online access through government portals is beginning to simplify the citizen's interaction with government and has stimulated internal restructuring and efficiency gains within the public sector along the lines of comparable private industry models. Nonetheless, while e-government projects will transform the public sector, they have yet to revolutionise the lives of their users, namely, the public at large.

By the same token, while citizens may have benefited from the determination of the business world to establish Internet as a global network, e-commerce has, generally speaking, not yet been as successful as expected, even given some outstanding examples of success such as in the airline travel sector. The only truly popular uses of new technology are essentially recreational as exemplified by private emails, web site browsing and multimedia file-sharing. One might expect applications this popular to be quickly taken over and commercialised by the business world, but what all these popular applications have in common is that they are free. From a business perspective, these 'citizens' applications lack any economic justification. Nonetheless, civil society clearly has a growing appetite to adopt knowledge economy technologies and techniques outside a commercial context.

If business remains focused on the financial return of the knowledge economy, the public sector lacks the concepts that make the knowledge society for the citizen easy to implement. Gutenberg's invention of the printing press and movable type dramatically increased the diffusion of knowledge at that time. But nearly three centuries passed before D'Alembert and Diderot invented the encyclopedia concept, which completely reorganised access to knowledge in a book. From that perspective it is likely

that our society has not yet fully conceptualised the possibilities offered by the digital technologies. Looking at the debate about digital ownership rights, or the disappearance of centuries old concepts in the Internet world, like the Deposit Law, it is our belief that the major reason why civil society has not embarked on the knowledge society lies mostly in the lack of understanding of its possibilities.

The impression remains, therefore, of a revolution waiting to happen. In the absence of ready-to-use concepts and business incentives, what is needed are a few visionary leaders from the public sector who are fully committed to implementing the knowledge society.

2.2. Citizens' use of knowledge society techniques: MP3.

The techniques of the knowledge society, as implemented by and for citizens, have nonetheless generated some startling results and suggest new ways in which governments can use ICT for the benefit of society as a whole.

A small group of programmers scattered over the world succeeded in developing a completely new technical environment around the MP3 standard. In only a few years an innovative resource finder was completed with a revolutionary file-exchange concept, and it quickly became what is today considered the single most serious threat the record industry has ever faced. As later evolutions of Napster continue to resist all legal challenges, the music industry is forced to respond and adapt. In recent months this model of data sharing has created a market for a new type of music reading device – the MP3 player, which has had a huge business impact – and has begun to extend its scope to DVD and movie files.

2.3. Citizens' use of knowledge society techniques: the Open Source model.

In an entirely different area, the cooperation model used by the Open Source community produced the only software environment capable of withstanding competition from proprietary software developers. A virtual organisation composed of a few hundred programmers, spread across tens of countries, with no financial support, no chain of command or central organisation, and no sales or marketing team became in a few years the main competitor to Microsoft. In an extraordinary paradox of economic history, these products not only stand alongside those of development giant Microsoft, they have also become an integral part of the business strategy of one of the largest companies in the world, IBM, with its historically huge development budget.

Rather than the products themselves it is the unorthodox organisational model behind Open Source that interests us. Time and again these groups within the Open Source community have demonstrated unprecedented capital and organisational efficiency. In fact, according to the organisational theories currently operative in the business world, such results should not be possible. The efficiency of the Open Source model can be summarised as follows:

Figure 4.
The Open Source development model

These mechanisms provide the first experimental evidence that the knowledge society has the power to help Europe achieve its Lisbon targets. Furthermore, they lead us to ask what else could be achieved if these mechanisms can be harnessed for a different purpose. The sections that follow will begin to sketch out an answer.

3.0 THE PUBLIC SECTOR MISSION.

Clearly the models of collaboration occurring in these two examples are extremely powerful. And, since they are low-cost cooperation models, they lend themselves perfectly well to adoption by civil society. What these models also demonstrate is that civil society has a growing capacity to adopt knowledge economy technologies and techniques outside a commercial context.

The potential scope of such an approach is enormous. In fact, public authorities can apply these collaborative models to set up initiatives for citizens in almost any domain where the key element is cooperation among experts and the exchange of knowledge. As in the commercial world, these new public sector projects should be set up either as a means of achieving greater efficiency or for making initiatives possible that would be cost prohibitive if set up according to normal procedures.

Setting up these projects will not be easy. Most of the underlying concepts are still to be formulated, and knowledge society systems will adhere to a different model from a knowledge economy system. Nonetheless, we can identify a few obvious prerequisites. In order for citizens to embark on the knowledge society, they must be able to access it, be confident that their privacy is protected, accept that the information they provide is secure and know that the information they retrieve is reliable. This can be summarised as follows:

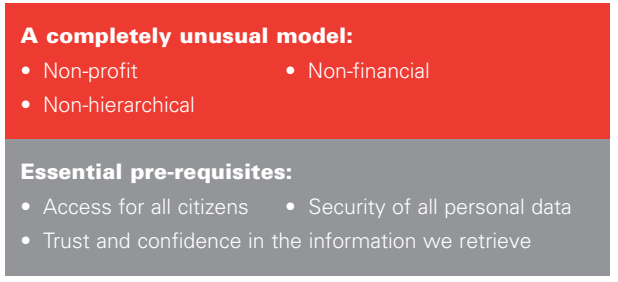


Figure 5.
Prerequisites of the knowledge society

3.1. Accessibility.

Making information available in a knowledge society is not simply a question of placing it in a digital format or even of providing extra PCs. Users must be able to retrieve that information through intuitive and user-friendly mechanisms that encourage easy interaction with technology and digital knowledge resources. In short, we must make it easy to be part of a knowledge society. The question of access, therefore, concerns both a mode (the technology or channel used) and a manner (the technique employed to interact with that technology).

3.1.1. Providing multiple channels of access.

The Internet and the PC alone clearly cannot solve issues relating to both the mode and the manner of access. Apart from being expensive, the PC remains an extremely specialised tool familiar and widely available only to the educated minority of people who are required to use them in the course of their work. Some studies even indicate that access to a PC must be provided within a social context, e.g. the workplace, in order for basic user skills to be passed on. To reach the whole of society, therefore, it is essential to find mechanisms that ensure universal access to information for all, whatever the technology at their disposal and regardless of their level of reading or writing ability.

The only current user terminals that remotely approach 'universal' access status are the telephone and the television. For a knowledge society to function, the entire access infrastructure needs to be overhauled to incorporate these common technologies. The current debate over interoperability of digital television and third generation (3G) mobile telephony only partly addresses this problem. While making it possible to transmit services across a variety of platforms, it is apparent that the target for such initiatives is the consumer. Beyond his or her function as a consumer, however, the citizen requires access to an IT infrastructure that provides learning material and knowledge-sharing mechanisms to enable him to participate in the knowledge society.

Television, in particular, has been widely exploited for commercial ends but has been almost entirely overlooked by civil society. We are all familiar with television channels funded by advertising and special-interest fee-based channels. There are very few channels, on the other hand, that are devoted to the needs of civil society on a non-profit basis. Those that do exist tend to be poorly used. Nonetheless, interactive television would offer an excellent medium for sharing data via a widely-available interface and would provide a further means for working collaboratively across civil society.

The near universal availability of television makes the lack of civil society applications even more surprising. Clearly civil society has more to benefit from adopting commercial mechanisms like television but for non-commercial ends. Greater public sector support for such initiatives is needed to reinforce the development of powerful knowledge-sharing tools on a wider scale.

3.1.2. Flexible, user-friendly technologies.

There is a second aspect to the question of access. Currently there are a limited number of techniques that can be used to interact with technology. Most of these, such as the keyboard and mouse, risk excluding anyone who fails to meet a specific level of literacy and accuracy in handling the technology. We now have technologies that can free users from the limitations of previous generations of technology, including extended semantic applications as well as thesaurus-based and spelling-neutral applications and vocal interfaces that can handle incorrect spelling and actually make allowances for the user's level of knowledge. These kinds of mechanisms can help overcome the barrier to participation in the knowledge society posed by more rigid traditional human/computer interfaces.

3.1.3. What kind of information will citizens of a knowledge society have access to?

New information technologies, particularly since the advent of Internet, have created new 'possibles' not only in the organisation and use of knowledge but also for cooperation among individuals, as the success of the Open Source development model has demonstrated. Nonetheless, if the web offers extraordinary capabilities for collecting and disseminating knowledge, from a public good perspective, it suffers from a major potential defect with regard to access to information.

Indexers, such as Google, are the indispensable aid to research and access to information on Internet. Like the encyclopedia before them, they have developed new concepts for organising knowledge as they search, filter and sort data before returning the most useful information to the searcher. But we should not forget that these indexers are private companies, subject to the laws of the market, and financed by the fee-based services they offer. Most indexers charge website owners a fee to reference their site in a search. Web sites that do not pay will not appear in any search results. In fact there is only one search engine remaining – Google – that chooses to index all web pages free of charge and to make its money through other means (i.e., by patenting its advanced search technologies). This means that if Google decides to change its financial model and to charge for inclusion of a site in a search, the only Internet knowledge available will be that for which someone has paid a fee to ensure its continuing dissemination.

This fee-based system represents a serious retrograde step in providing the masses with access to knowledge – a problem that public libraries appeared to have solved in the 19th and 20th centuries. With digital information potentially privatisable overnight – both in terms of content (through property rights over digital content) and also in terms of access (fee-based indexing of content) – it is essential that public authorities look into the guarantees which can be made to the citizen's ability to access and use information.

If only information that forms part of a commercial transaction is available on the Internet, huge information resources, such as those from academic sources, will be effectively lost to the public. This is important because the huge information resources of the

Internet should form part of the critical infrastructure of a knowledge society. In a reversal of the conventional wisdom, a strong case is growing in favour of government intervention to protect Internet information as a public good.

3.2. Security.

As we progress towards a knowledge society and encourage new collaborative methods of information sharing, it is clear that ICT security takes on an important social dimension. Increased interconnectivity among more and more systems means that the shared costs of one individual's failure to enforce robust security standards can be disproportionately high.

From a public sector perspective, then, we are not primarily concerned with the technical aspects of security. Apart from being in constant evolution, thereby making government-mandated standards unworkable, security is an area where private sector expertise is far advanced over that of the public sector. Therefore, public authorities should concern themselves with managing perceptions regarding the security of the infrastructure underpinning the knowledge society, thus guaranteeing in a visible way the security of data and respect for personal privacy. Statistics show that Belgium, a small country, is the seventh highest source of Internet attacks in the world. This is because the large installed ADSL base is combined with a complete lack of a security culture among the population. Public sector leadership is needed to reduce the impact of such a soft target.

3.2.1. Managing public perceptions of security.

Building trust across civil society as a whole will require an adequate legislative and legal framework, coupled with an appropriate public sector communication strategy, aimed at reassuring the public that the public infrastructure is safe. Only when these positive perceptions are firmly ingrained in the public consciousness will citizens be able to reap the benefits of widespread usage of information society techniques.

The lack of public trust and confidence is still a major inhibitor of the knowledge economy. But initiatives focusing on trust and confidence among e-consumers are addressing only part of the problem. Trust is also a major prerequisite for public acceptance of digital technologies in everyday life in that part of civil society beyond the consumer. Citizens require assurances that their personal data will not be misused. To take one example, a recent attempt in the UK to combine an ID card with a TV licence fee discount for senior citizens was abandoned because the permanent linking of the two elements of information in a card for all to see was felt to be an intrusion of privacy.

The Belgian 'Banque Carrefour' provides one example of how knowledge society information sharing techniques can be used to pool personal data, while still maintaining the privacy of such personal data. The Banque Carrefour allows government-owned private life information to be distributed to different governmental departments across a secure gateway on a need-to-know basis. This means that with the requisite access and security procedures in place, only those employees who need to know a given piece of information at a given time for a given purpose can access it. At the same time this mechanism avoids unnecessary duplication of data on multiple systems and the attendant security risks that would result.

3.2.2. Standards of security behaviour.

The public sector can also instill trust and security in the knowledge society by developing a new approach to the infrastructure on which it is based. So important has the Internet become as an information resource that it is now, in some sense, an essential public infrastructure. On this basis, a code of conduct is needed to control our use of the technology highways as much as a highway code is needed to control behaviour on the road. Regulatory action by the State to enforce ICT security compliance as a social concern should not be ruled out. Indeed, it may soon be required, so as to underline the principle that all ICT users now have a duty of care towards, and personal responsibility for,

the assets of others. Given the importance of the public ICT infrastructure, it is no longer sufficient to leave adherence to security standards to market forces or self-regulation. Negligence in the use or protection of IT systems increasingly constitutes a social risk since it can compromise the personal data security, financial assets, intellectual property or personal identity of others. Appropriate regulation should be considered to promote public standards of ICT behaviour, with security skills eventually forming part of a recognised computer literacy syllabus.

3.2.3. A shared responsibility for security.

Alongside the softer social aspect of security, the public sector still has an important responsibility to ensure that an appropriate legal framework is in place.

Since neither the public nor private sector alone has the resources or expertise to ensure adequate protection of the ICT infrastructure, the public sector will therefore be required to organise collective security partnerships in the common interest. The shared dependency of both sides on this essential infrastructure is demonstrated by the fact that an attack on a few privately owned 'Domain Name' servers can paralyse substantial sections of the Internet to the detriment of all. In a knowledge society the entire ICT infrastructure requires protection as a public good, for the benefit of all, and governments have a responsibility to coordinate a new more robust approach to security across both the public and private sectors.

As well as developing high-level partnerships with key security stakeholders, public authorities can promote better security in a knowledge society by actively educating citizens on good security practice. The greatest risk to the stability of the knowledge society is not sophisticated new cyber criminals but the average user's ignorance of security risks that leave the way open for those with criminal intent. Users at all levels should be educated on their responsibilities and the preventive measures they should take to protect themselves and others.

Governments will also need to ensure an appropriate framework for privacy and data protection. The collaborative environments of the knowledge society that we have seen so far all share an essential characteristic: the bond of trust among collaborators. When seeking to implement similar mechanisms in wider civil society, this component should not be lost. Public authorities will need to find new mechanisms for establishing and protecting the true identity of the people and companies who participate in public exchanges. A practical new form of e-identity to complement, but not replace, existing legal or paper-based identities would provide individuals and businesses with a simple mechanism for achieving this and an additional incentive to take part in these economically efficient systems.

3.3. Trust.

As citizens of a knowledge economy, we already expect to have access to vast resources of information via the Internet. Governments have made first online, and now broadband, access for their citizens a major pillar of their IT strategies. Not surprisingly, the Internet has fast become a major channel for companies old and new to conduct business at reduced cost with a new generation of consumers. An entirely new regulatory framework has sprung up around e-commerce and the need to protect and reassure consumers about their rights in such an environment.

3.3.1. The status of Internet information.

Beyond the commercial environment, however, the status of the Internet is less clear, and the rights and guarantees for citizens indulging in non-commercial activities are much less evolved.

As stated above, browsing the Internet for recreational purposes is one of the very few widespread uses of modern information technologies. The attraction for civil society of having easy and autonomous access to superior information resources is obvious. But in a knowledge society it is also clear that to be of value

Internet information must enjoy more than 'playground' status. The Internet represents a vast resource of information without precedent in human existence, yet it lacks a formal legal status.

We can contrast this with nearly every other previous media format, from the book to radio programmes, films, CDs, and DVDs. Each of these has been given a legal status by means of a 'Deposit Law', whereby an example of each work is deposited in a public archive. Content is thus fixed at a moment in time, rendering it more readily usable by virtue of its recognition by a public authority. The related concept of authorial responsibility means that, in addition, a specific individual can be held liable if any rights are infringed by the work in question.

3.3.2. Moving beyond 'recreational' information.

The Internet is nearly the only media format not covered by this historical precedent. While it is clear that 'recreational' information requires no special status, information intended as 'knowledge' for educational or reference purposes should benefit from the presumption of trustworthiness in order to be accepted by the citizen. This can be achieved only if there is an official framework for Internet publications, such as an obligatory Deposit Law or presence of a 'responsible editor' (if such notion were to be adopted).

Such an initiative is an essential prerequisite for building the trust of civil society, since it is clear that a Deposit Law could help overcome the inherent volatility of the Internet and thus render Internet content more widely 'usable' to civil society, just as it has done for other media formats previously. For the knowledge society to work, a strong case can be made in favour of action by the public authorities to preserve long-established principles of law and to propose an appropriate legal framework that would allow citizens to use Internet knowledge to fullest advantage. Conventional wisdom states that the Internet developed because of a lack of interference by the public sector. Yet now the public sector must consider stepping in to extend and secure the benefits of online information to civil society as a whole.

3.4. Summary thoughts.

The examples highlighted in this section demonstrate that often it is the existence of unchallenged paradigms or laws from the 'knowledge economy' that constitute the greatest barrier to the development of a knowledge society. How, for instance, are we to reconcile the Millennium Copyright Act with new Internet-enabled multimedia file-sharing techniques? In the choices it makes, the public sector can therefore have a direct impact on whether the knowledge society is allowed to develop fully, or whether it remains permanently constrained by the commercial imperatives of the already well-developed knowledge economy.

4.0 CITIZENS' INITIATIVES FOR THE KNOWLEDGE SOCIETY.

The MP3 and Open Source phenomena have demonstrated a real capacity to function as knowledge amplifiers that allow the virtual meeting and sharing of knowledge and know how, whether between ordinary people and experts or between experts specialised in different but related areas.

These models suggest that potential knowledge society projects will need to be based around three key elements:

- Knowledge dissemination from a few experts to a wide community
- Easy access for all to pre-defined digital information resources
- Collaborative and self-regulated organisation

Assuming that all the prerequisites are met, which domains lend themselves most readily to the adoption of these new methods? In the sections below we consider some of the domains that are of particular relevance for the knowledge society. What all these examples have in common is that the end beneficiary of such an initiative will be civil society at large. And, since the solutions require an initial investment in IT infrastructure, with no discernible commercial return on that investment, only the public sector can make them happen.

4.1. Education and training.

One area where these methods might prove particularly effective is in addressing the challenge of education and lifelong learning. Helping citizens to remain employable is of special concern for the public sector, especially in an era where a citizen can rarely expect to enjoy a single job or place of employment throughout a working life.

Apart from transmitting formal knowledge, another important function of education has always been to socialise citizens, that is, to prepare them to live in harmony with each other in a public context, both in their relationships with the State and with other citizens. While most aspects of this process usually proceed without any problem, employment remains an area where society consistently fails to prepare large numbers of citizens to keep up with the demands of the labour market, because at a given moment in their lives they might happen to have insufficient, inappropriate or outdated skills.

4.1.1. Public and private information.

Part of the problem comes from the growing importance of what we might call private information, which has become a fundamental element of employability. By this term we mean information that is not taught at school, but which the individual acquires through life experience or short, practical training sessions. Indeed, be it basic computer literacy or knowledge of word processing tools, for instance, the traditional education channels can no longer ensure that all the relevant skills for a job are effectively mastered when people begin their working lives, when they come back to work after a sabbatical period, or when they change jobs.

4.1.2. Rapidly evolving skills requirements.

Another problem is that the skills and knowledge necessary today to find or keep a job evolve too rapidly for educational programs to follow, and the very nature of that knowledge does not always correspond to what traditional formal education provides. The cooperative models implemented in the business world often require that workers search for, acquire and apply new knowledge to particular tasks as they arise. This means that rather than applying information learnt in advance during formal education, what is now necessary is the rapid exploitation of knowledge acquired on an ongoing basis. Accordingly, potential workers who find themselves outside the labour market are penalised by the rapid evolution of techniques, and by the impossibility of practicing this kind of intellectual exercise, now a common practice in most working environments.

While large companies can afford to offer their employees all the necessary support for ongoing learning and Internet access to information, the obstacles are enormous for those people who, for whatever reason (academic studies, illness or maternity leave,

for instance), find themselves outside the labour market. And yet, even where the training infrastructure does exist, the question of private knowledge remains an unresolved problem, because the vast majority of private knowledge is – by definition – not publicly available.

Many useful and efficient initiatives are trying to compensate for this through classroom programs, often subsidised by the private sector, but the process is costly and slow. Moreover, the limited availability of trainers and training material, may mean they can handle only a few students at a time.

4.1.3. How the knowledge society models can help.

The two models mentioned earlier have demonstrated that a new and very powerful model of inter-individual cooperation has emerged. From a conceptual point of view we can say that:

- MP3 has created a simple and impressively effective way of relating supply and demand between individuals combined with easy modes of transfer of digital files from one point of the planet to another with virtually no effort from the parties involved
- The Open Source Community has proven that a relatively small number of people can create a complex piece of knowledge, even when they are scattered over the world, by using a new organisation model to coach, validate and mentor all contributing parties
- Both models have achieved success without any rigid hierarchy or organisational structure, and in the absence of any particular financial incentive

What made these successes possible is the sharing of different pieces of expert knowledge and the confrontation of informed opinions among people who lead independent lives but who are united around a common interest and who are strongly motivated to cooperate freely. Of course, a few innovative pieces of technology helped this along as well.

There is a need today for the public sector to investigate the translation of these experiences into civil society and to set up the necessary technical environment to support the implementation of such inter-individual cooperation in order to make all this available to the general public for their free and privately motivated usage. Applied to education and lifelong learning, this initiative would call on a limited number of volunteer citizens to share their knowledge of their working environment through discussion forums or through the setup of e-learning programs using Open Source platforms. The open collaborative model would provide a framework for peer review or a coaching forum, based on voluntary contributions from participants. The citizen looking to return to full-time employment would then have access to a virtual organisation where he could locate training material and coaching advisors or mentors using the same peer-to peer technology launched by Napster and further developed by Casa and perhaps even Microsoft.

Through this platform participating citizens will have the opportunity to be socially involved in the knowledge society irrespective of their employment status. Moreover, they will find relevant advice from people involved in their target employment environment, and they will have access to the private knowledge so critical to employment.

4.1.4. Supporting SMEs.

The model applications may go far beyond that. They could be used by small and medium enterprises (SME) who cannot afford to set up their own knowledge network environment, and who are not competitors with each other but who could share experiences and knowledge that would contribute to their evolution. SMEs operating in different countries but selling the same products or services would benefit from the exchange of information on methods and products to develop common approaches, best practices or shared expertise without hampering their local business. The exchange of expertise could perhaps even revive the ancient tradition of exchanging people between peer companies.

4.2. e-Government.

One of the major aspirations of the e-government agenda is to develop efficient computerised systems that let citizens complete multiple transactions with different agencies in one visit, no matter the communication channel or point of contact, seven days a week, and at a lower cost than the traditional way.
A critical success factor here is in maintaining a detailed understanding of how IT systems operate. The Unisys blueprinting technique, for example, which maps different layers of organisation strategy, architecture and process onto IT models, offers public administrators critical insights into how their respective organisations' internal procedures and systems operate, thus enabling them to plan, manage, change and extend their systems with greater confidence than ever before. Blueprints developed successfully in one organisation or administration can then be employed in another, resulting in the spread of best practices across the public sector.

However, the efficient use of IT is only part of the solution. While it is desirable to improve the services offered to the citizen and reduce the overall operating cost for government IT systems everywhere, it is our belief that society could undergo an even more radical transformation once policymakers decide to effectuate a knowledge society and thus allow everyone to benefit from the enormous power of action that only the knowledge economy now holds.

As stated before, the power of the knowledge society derives from the way in which numerous sources of knowledge are made available within a collaborative framework that permits those of differing levels of expertise to interact. Were governments to adopt these knowledge society techniques on a large scale, it would result in a profound transformation of the way public institutions function, both internally and externally, with both their suppliers and the public.

Achieving this wider transformation of society depends on the extent to which governments are willing to embrace the collaborative knowledge structures and information-sharing paradigm we have described. For that reason, rather than recommending yet another project to put existing services online, we advocate developing a set of pilot projects aimed at bringing the knowledge society closer to realisation, while providing an immediate stimulus for users to take up the new services. Extending the demand/resource matching mechanism at the heart of the MP3 file exchange, projects could especially target small community-based jobs or voluntary work for tasks like gardening, child care, private tutoring or even car sharing.

The pilot-project approach presents a number of advantages from both a technical and a strategic perspective. Particularly helpful will be the establishment of a proper strategic view concerning what is feasible and desirable as part of an overall e-government strategy. Pilot schemes are highly effective in identifying technical barriers in system development, and the experience gained can be applied later in full-scale system deployment programmes in many different sectors. And at the same time, they constitute good ways of raising awareness of the need for change and of ensuring that the beneficiaries are prepared to take up the new services.

The concepts underlying the extraordinary efficiency of the appropriation by civil society of the knowledge economy are not yet properly understood. But large scale experiments would certainly allow public sector authorities to better understand them and allow for maximum efficiency in new areas where low cost is a priority. In this context, the creation of a knowledge space furnished with the essential elements that underlie the virtual cooperation model – bulletin boards, discussion forums, et al. – is an experiment that should be high on the public sector's priority list.

5.0 CONCLUSION.

The organisational mechanisms of the virtual cooperation that underlie the MP3 phenomenon and the Open Source community's way of working demonstrated an unexpectedly high return in the areas of knowledge-sharing and individual cooperation. Their efficiency allowed small groups of people to compete on the same terms as the largest industrial groups, something thought to be completely impossible previously.

Although a common working practice in most private companies today, these techniques are still at an embryonic stage in civil society, despite indications that the latter is keen to use these mechanisms for its own ends outside of the commercial environment. Given the lack of any commercial incentive for business to develop a knowledge society for citizens, we believe it is up to the public sector to empower the citizen with the strength of action that is now possible only for the private commercial sector. This, coupled with the fact that no ready template or model for the knowledge society has yet been developed, means that only a few visionary public sector leaders able to define the key underlying concepts will be capable of ushering in the knowledge society.

The potential benefits to society if the public sector rises to this challenge should not be underestimated. Experimental evidence suggests that the knowledge society techniques discussed here could be the key to helping Europe achieve its Lisbon targets. Extending the benefits of the knowledge economy to the citizen and civil society as a whole, especially to small enterprises, could help overcome many long-standing problems relating to the employment market and increase the employability of citizens who find themselves outside the employment market during their working lives. It could also provide a practical framework for the easy exchange of knowledge and expertise across the continent, releasing latent creativity and increasing the ability of governments to influence their respective economies in the face of evolving globalisation.

6. RECOMMENDATIONS.

6.1. Accessibility.

(See Section 3.1, page 15).

The public sector needs to ensure universal access for all to the knowledge society:

- **Technology** – More research is needed to incorporate interactive TV and the telephone into the access infrastructure. Televisions and telephones are the only terminals that approach 'universal' status and, thus, offer the greatest possibility for including all citizens in the knowledge society.
- **Techniques** – More research into human-computer interfaces is required to permit citizens to access information regardless of their respective skill levels in reading or writing, including voice and handwriting recognition technology, dictionaries of synonyms, ways of overcoming spelling mistakes, et al..
- **Content** – Consider public intervention to protect the Internet as a public knowledge resource; also, develop some form of guarantees to ensure access to non-privatised content.

6.2. Security.

(See section 3.2, page 18).

- Consider a 'code of conduct' or formal 'driving licence' for anyone using the public information infrastructure.
- Develop a comprehensive public information campaign to reassure citizens and overcome negative perceptions regarding the knowledge society.
- Organise public-private partnerships to gather collective security expertise and reach a common understanding of the respective responsibilities of public and private stakeholders with regard to securing the public information infrastructure.
- Ensure adequate education for all citizens on security risks and social responsibilities in an increasingly interconnected world to develop a notion of 'IT citizenship'.

6.3. Trust.

(See section 3.3, page 21).

- Ensure the legal status of the Internet via an appropriate Deposit Law for information claiming reference status. This might be a voluntary code but would need the endorsement and support of the international community, e.g. the European Union, United Nations et al..

6.4. Citizens' initiatives for the knowledge society.

(See section 3.3, page 24).

- Devote a proportion of the public research budget to investigating methods for translating knowledge-sharing models from the knowledge economy into civil society at large. The public sector should consider entering into public-private partnerships to develop the necessary technical environment to support the implementation of such inter-individual cooperation.
- Governments should establish pilot citizens' platforms as part of their e-government or research programmes to assess the viability of 'proximity job networks'. Participants could be drawn especially from SMEs, who will benefit from increased access to expertise with minimal investment.
- Develop pilot projects within the EU to establish how these collaborative techniques can transform the delivery of public services. EU funding will ensure ready dissemination of results to all countries. The potential benefits will be far more radical than any existing e-government initiative.

7.0 GLOSSARY OF TERMS.

Information Society – a society which has been radically altered by the advent of digital technology and the PC, and where low-cost information and ICT are in general use. Thus one can already say that in the developed world we live in an information society.

Knowledge Economy – a legal and economic construct formed by the interplay of big business and government. The private sector leads in the adoption of new information technologies to boost productivity, growth and competitiveness while governments put in place a legal framework (e.g., through patent law, copyright, e-commerce legislation, liberalisation of the telecom sector) that safeguard competitive forces and mobilise private investment in innovation and development.

Knowledge Society – a society where all citizens, not just big business, have equal access to information technology resources. Knowledge sharing and remote collaboration techniques are extended beyond the business domain into civil society, making knowledge a central organising principle of society as a whole. A widely available public IT infrastructure is used to ensure that the skills and tacit knowledge of the populace can flow and be exchanged, allowing independent entities to pool knowledge resources and overcome institutionalised barriers to knowledge ownership and data interchange.

Civil Society – the part of society beyond big business, e.g., private individuals, smaller commercial entities, non-profit organisations, charities, consumer associations, and trade unions, which generally lack the funds or human resources to make the transition to the knowledge economy, let alone to the knowledge society.

Public IT infrastructure – the IT infrastructure, whether publicly or privately owned, links disparate sources of information and expertise to form a critical knowledge resource, based around the Internet, for all citizens. Rather than implying a nationalised or publicly owned infrastructure, the term thus seeks to underline the concept of the ICT infrastructure as a 'public good' in a knowledge society. Users of the infrastructure, both public and private, are dependent on one another for maintaining good standards.