Cisco 20/20

Changing the way Europe works, lives, plays and learns

A contribution to the European Commission consultation on the future EU 2020 Strategy

Cisco is the worldwide leader in networking for the Internet. Networks are an essential part of business, education, government and home communications, and Cisco Internet Protocol-based (IP) networking solutions are the foundation of these networks.

Since the company invented the first multi-protocol router in 1984, Cisco has been one of the leaders in the development of IP-based networking technologies. Today, this tradition of innovation continues with industry-leading products and solutions in the company's core development areas of routing and switching, as well as in advanced technologies such as Application Networking, Data Center, Digital Media, IPICS, Mobility, Security, Storage Networking, TelePresence, Unified Communications, Video and Ethernet FTTH access solutions.

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1. Introduction: time for a new approach

> "Growth, sustainable public finances, tackling climate change, social inclusion, a strengthened industrial base and a vibrant services sector are not alternatives. They reinforce each other. Europe reduced unemployment from 12% to 7% in the decade to 2008. We now need new sources of growth to replace the jobs lost in the crisis."
> President José Barroso

Cisco welcomes the opportunity to comment on the future EU 2020 strategy consultation, the successor to the Lisbon Strategy, Europe's reform strategy for the last decade. In focusing on prioritising knowledge based growth; developing skills in inclusive societies; and achieving a connected, competitive and greener economy, it emphasises the core principles for Europe's future success. As recognised in the consultation, and as detailed below, the network is at the centre of reaching these goals.

Europe is at a crossroads. As Member States focus on promoting an agenda for sustainable growth they grapple with a set of apparently competing outcomes. These involve either fuelling economic growth, investment, economic competitiveness and jobs, or improving the quality and reach of public services, lifting social inclusion and economic participation, or protecting significant industries, or lowering carbon intensive energy consumption and improving environmental quality.

At the same time, we face a number of apparently intractable problems that appear to give rise to deeply unpalatable trade-offs. Policymakers at every level from global to national to municipal are being forced to decide between mutually exclusive objectives. The question is: can they break out of the 'either/or' dilemma and develop an approach that emphasises the 'and' so that one policy goal is compatible with, rather than inimical to, another.

The Lisbon Strategy was instrumental in creating momentum on the role of innovation to stimulate economic growth and create jobs. It worked as a blueprint to prepare Europe for the 21st Century and it is fair to recognise it had a very significant impact across Europe. It combined an agenda for competitiveness, technology and knowledge industries, with a shared commitment to welfare reform. But these two strands of the Lisbon agenda were seen as largely separate, if not competing with each other. It is now time to combine the innovation and technology agenda to address the main societal challenges we face. EU 2020 is an opportunity to break the mould and create a new paradigm. A call for Europe to align the best of our social model with a rapidly transforming economy is a daunting challenge we all must embrace.

What we increasingly need, therefore, is a cross-disciplinary and cross-sectoral approach that more accurately reflects and addresses the more complex, interconnected, dynamic and frankly messy systemic reality in which we live.

1.1 Crisis as an opportunity

Crises are always moments when change accelerates, and when new possibilities arise.

Every major recession of the past has been followed by radical changes to the industrial structure, with the surging growth of new industries often supported by new infrastructures.

Just as the roads and railway of the past created the conditions for social change and improvement, the development of their 21st Century equivalents in high-speed digital networks will allow innovation to drive similar social change. But this does not mean that widespread broadband per se will deliver the required changes. It is the collaboration, activities and information flows it facilitates that are the drivers of progress and change.

Europe should also aim to be the first region of the world to implement an EU-wide smart grid roll out, through deployment of an end-to-end, secure, intelligent, communications infrastructure for electrical systems that will deliver benefits for utilities, businesses and consumers as well as mitigate environmental impact.

Cisco's ability to use the crisis as an opportunity to cut expenses, invest in innovation and prepare new growing markets, has helped us weather economic downturn — even the catastrophic one of 2009 – and emerge stronger. Cisco has a recognised ability to time market transitions, change directions quickly and capitalise on downturns. In each of the market downturns — 1993, 1997, 2001, 2003 and 2008-09 —Cisco gained market share, moved into new markets and came out stronger than its peers. The right positioning enabled Cisco to move through the current economic crisis. Cisco's 'save to invest' strategy enabled the company to commit the necessary resources and reduce its expenses by 10 percent. Employee salaries were not cut, and through restructuring, employee layoffs were held to 2 percent to 3 percent, or between 1,500 and 2,000, of its 67,000 workforce. Savings were achieved by utilisation of ICT tools. Deployment of collaboration tools like TelePresence and WebEx has enabled us to cut travel expenditure by 40% (FY06 baseline) while improving productivity of our employees. Cisco has also implemented a collaborative Council and Board governance structure that enables us to quickly bring together the functional teams to develop a solution, such as next generation healthcare solutions like HealthPresence or go after a market, such as emerging countries. Cisco bought seven companies in 2009 and the company is now planning to hire a significant number of employees in 2010.

2. The Network as the Platform – Resolving Europe's Challenges through ICT

Over the next ten years, Europe will encounter a set of key economic, social and political challenges. In the sections below we examine the nature of these challenges, how and why ICT lies at the root of turning them into opportunities and measures which governments can undertake to help achieve this outcome.

2.1 Economic Growth

2.1.1 Challenges

With real GDP thought to have contracted by 4% in 2009, the sharpest contraction in the history of the EU, the European economy is considered to be either in the middle or tentatively emerging from the worst recession in decades. Whether or not we are emerging, there is little doubt that the recovery is fragile and easily upset.

The European Commission believes that unless policies are implemented to meet the challenges we face, GDP in the EU could fall to a lower trajectory on a permanent basis.[1] The reasons are threefold. Innovation may be tempered by a fall in investment in R&D by the private sector; skills may be lost through long-term unemployment; and investment in infrastructure may decrease, undermining productivity. The recovery packages adopted and currently being implemented across Europe have to a certain extent addressed the immediate demand-side issue but supply-side management is the key to our future competitiveness and success. While we address innovation and unemployment/skills in sections 2.2 and 2.3 respectively, it is clear that the crisis represents a unique opportunity to build the infrastructure of the future.

2.1.2 Solutions

It is widely recognised that Next Generation Broadband is linked to a number of economic benefits.[2] Companies adopting broadband-based processes improve their employees' labour productivity on average by 5% in the manufacturing sector and by 10% in the services sector. Cloud computing may also achieve critical mass, giving greater architectural flexibility and cost savings to businesses.

The crisis offers new opportunities to shape the future of our economies and provides an opportunity to accelerate innovation in relation to the major long-term challenges that will dominate governments' concerns when the recession is over. Europe needs to do more to unlock the potential of the new digital infrastructure, encouraging the creativity and innovation of consumers and entrepreneurs to create new social and business models

[1] 'Economic Crisis in Europe: Causes, Consequences and Responses' (2009), DG Economic and Financial Affairs

[2] The study 'The Impact of Broadband on Growth and Productivity' (MICUS, 2008) indicated that an adoption rate of broadband at the speed of the most advanced countries in Europe would be worth an extra 2.1 million jobs from 2006 – 2015, whereas adopting it at the rate of the slowest countries, while still beneficial, would create just 345,000 jobs.

and new consumption patterns. Broadband is not simply a new communication line but a major social infrastructure. As recognised by the EU Future Innovation Business Panel, high speed broadband is not just for faster content transmission, it will enable next generation internet, radical new services and business models. It will transform how people work and live by increasing both location independence (allowing people to see work as an activity rather than a place) and the importance of specific places for face-to-face interaction. It will unlock the growth potential of all businesses, large and small, provide a platform for improved school systems and enable a huge range of environmentally sustainable ways to work and learn. *Widespread access to next generation broadband connections is an essential component of our economic future.*

Cisco has recently sponsored its second annual study about the quality of broadband connections experienced by consumers in 66 countries[3]. The study shows that in most countries the Broadband Quality Index today is adequate for web browsing, email and basic video downloading and streaming. Only a handful of countries have the quality of broadband to enjoy the applications of tomorrow, allowing them access to high speed symmetrical services such as high definition IPTV or consumer telepresence.

Alongside deployment of upgraded cable networks, bringing fibre closer and closer to the subscriber, eventually reaching them directly, is an essential element in reaching the necessary bitrates. Today, outside the Scandinavian countries, large scale fibre deployments have not been widely adopted in Europe raising the question of whether Europe's global competitiveness is threatened now or will be in the near future.

At the same time, in order to build complementary wireless networks at the requisite speed for the applications of tomorrow, spectrum with a global footprint needs to be made available for wireless broadband on a technology and service neutral basis. The digital dividend at 800MHz is an important element, alongside licensed and unlicensed spectrum in other bands. The technologies are ready (WiMAX), or set to be so (LTE), but we need to maximise spectrum for broadband use because the wider the channels, the greater the capability of the system.

Building the high speed networks for the future has been identified by the Commission as a key priority for the next Digital Agenda, and rightly so, the EU 2020 consultation document highlights the fact that "*It is crucial that Europe invests in sustainable high speed networks. Europe needs 100% broadband coverage as soon as possible, and needs to achieve the roll-out of high speed internet though a massive programme of investment fibre networks and wireless broadband".*

2.1.3 Policy recommendations

[3] http://www.sbs.ox.ac.uk/Pages/Search.aspx/Results.aspx?k=Oxford%2FCisco%20Broadband%20Quality%20study

- The Commission needs to continue its primary focus on getting next generation access networks (fibre, upgraded cable and wireless) built as quickly and as widely as possible whilst simultaneously facilitating demand enablers.
- The appropriate regulatory framework should be set for next generation access that provides certainty and predictability and promotes sufficient investment in new fibre networks.
- At the passive layer, this means facilitating access to ducts and other initiatives designed to lower barriers of entry.
- At the active layer, regulation should have the flexibility to prioritise remedies to balance the goals of promoting efficient investment and sustainable competition.
- Policies should be encouraged that will enhance the creation and adoption of next generation services both by the public and the private sector.
- The role of the public sector will be increasingly important to close the digital gap, leveraging both the EU stimulus package and other EU and national and regional funds.
- The EU should continue to encourage appropriate public sector led investment at the Member State level, public-private partnerships and tax incentive schemes for the roll-out of broadband.
- Spectrum with a global footprint should be made available to wireless broadband on a technology and service neutral basis and introduce greater flexibility in the management of spectrum. The 800MHz Decision on the digital dividend is an important first step.

2.2 Innovation

2.2.1 Challenges

Innovation is often thought of as primarily an activity that takes place in the closed world of laboratories, think tanks and science parks. Such innovation has been and remains essential to the development of technological and scientific progress and the wider benefits that they bestow on all of us. However, by adhering to that traditional view of innovation, we risk losing sight of the far wider benefits and social progress that a much broader understanding of what innovation is and where it takes place can produce. We need to ensure that innovation is at the heart of how we go about tackling the many challenges that all members of the European Union must address to ensure the future prosperity and security of generations to come.

2.2.2 Solutions

We need a broader concept of innovation; one that breaks free from the confines of the lab and includes public sector and social innovation. It should see innovation as a participatory and collaborative process connecting many different actors across business, academia, government and wider society. In most advanced economies, the biggest sectors today are healthcare and education and these areas represent significant potential markets for private suppliers to provide innovative solutions. The 'corporate social innovation' opportunity is recognised by the 'New Nature of Innovation' report: "The future of companies' participation in solving public services lies in the hands of governments. There is an enormous potential for the government to take advantage of companies' innovative capabilities when it comes to delivering public services. The real growth markets will be in innovative solutions – or at least helpful responses – to the longer-term challenges faced by public services."[4]

To illustrate this concept of innovation, one can consider mobility, which plays a central role in a long term vision for Europe. Erasmus has been one of the most successful European programmes, with a major social impact. With pervasive next generation broadband, Europe should create opportunities by embedding mobility in the ethos of universities, education and training institutions, companies, professional associations and local authorities, as suggested in the EU report on learning mobility. A majority of citizens are connected, networked and equipped with several wireless and intelligent devices to obtain and process information. Therefore, virtual mobility is wider, quicker and cheaper. Better connected, they develop personal connections beyond countries, cultures and expertise. Developing the synergies between virtual and physical mobility is a central art of a new way of life. Telepresence solutions, which create live face-to-face experiences over the network, should become mainstream. This will enable students to enjoy collaboration in such a realistic way, that virtualisation becomes the norm. Lectures with star professors could take place via hologram, permitting simultaneous events in all affiliated universities and institutions. These exchanges will nurture more creativity,

[4] 'New Nature of Innovation', FORA (2009) http://www.newnatureofinnovation.org/full_report.pdf

innovation and dynamism than ever before and systematic recorded video content will capture the debate.

Advocating Social Innovation

This priority is emerging as a major concern in the preparation for the EU 2020 Strategy:

- The Lund Declaration, called for greater collaboration between the public and private sector in the identification of and response to social and environmental challenges.
- The EU Future Innovation Business Panel report, 'Reinvent Europe through Innovation' argues that within innovation policy, the "priority has been investing in knowledge rather than utilising it rapidly and powerfully for societal benefit and development".
- The report 'Strengthening the Role of European Technology Platforms in Addressing Europe's Grand Challenges', proposes that "ETP clusters will have to broaden participation to include not only researchers, but also funding institutions, policy makers at both EU and Member State levels, business communities, and organisations representing the interests of the citizen."
- The European Research Area Board states that by 2030, "mobility of researchers between the public and private sector [will be] high, and industrial funding of academic research [will account] for 1/3 of the overall research budget. Mobility [will triple], with up to 20% of EU doctoral candidates working outside their home country."

2.2.3 Policy recommendations

- The European Commission should review European legislation to identify where legislation may, unintentionally, be a 'social innovation killer', and engage in dialogue with Member States about where legislation might be transformed into an innovation driver.
- Innovation should be core to EU financial institutions. The European Investment Bank could focus its activity on innovation where a market failure is visible. Next generation infrastructures and services, public sector innovation (e.g. preparing for an ageing society), industrial renewal, global networks of innovation, SMEs.
- The EIB's venture capital arm, the European Investment Fund should i) work on setting up pan-European funds, ii) team up with corporate investors in thematic funds; iii) support tech transfer; iv) encourage new public/private partnerships
- European funding mechanisms must assure additional capacity to innovate. European programs seem more risk adverse than ever. The structural funds rules need to be revised to enable a more flexible approach.
- The new financial perspectives should prioritise sectors based on growth and jobs.
- Public procurement directives should support innovation, including the setting aside a part of public tenders specifically for innovation.

- Each of the Member States should commit to invest a significant part of their Public Departments budget (e.g. health) in open innovation funds.

2.3 Social Cohesion and Fighting Unemployment

2.3.1 Challenges

Europe has long prided itself on its social values and cohesive society. But while we may be 'united in diversity', there are those who continue to be left behind. 78 million Europeans, approximately one in six, are suffering poverty and social exclusion. In the current economic climate, unemployment is rising and is a particular problem with the young; 12 Member States of the EU27 face youth unemployment over 20%.[5]

Within families, people want more family time and are spending more time engaging with their children (an average 99 minutes per day versus 25 minutes in the 1970s)[6] Meanwhile, more families have both parents in the work force and commuting times to the office are rising, putting more pressure on family time.

There is a persisting inequality in terms of service availability and wealth between urban and rural areas. While the gap is less in wealthier countries, urban dwellers earn approximately €100 more than their rural counterparts each month.[7] As ICT becomes increasingly important to both work and social life, it is important that a digital gap does not arise between those living in towns versus the countryside.

2.3.2 Solutions

43% of the unemployed and 71% of those who are not economically active do not have computer skills[8], but ICT is at the heart of the solution to helping marginalised groups to be employed and included. Access to ICT improves life chances for employment and training. Within five years, 90% of businesses in Europe across all sectors will require ICT skills – putting them at the foundation of the modern workplace[9]. Cisco's Networking Academy reaches 215,000 students in 3100 academies across Europe and is a good example of applying a 21st Century educational approach. It is a public-private education 'eco-system' that not only prepares students for Cisco technical certifications, but also delivers a range of technical and business skills that can support students in the future as they further their educations, prepare for work outside the ICT industry, or start their own businesses. Our students range from secondary school pupils to university students, to those later in life looking for a second chance. We adopt a technology rich approach through instructor-led, web-based course content, sophisticated online skills assessments, hands-on labs, and cutting-edge simulations. Instructors themselves can benefit from remote training via collaboration technologies, should they find it difficult to travel to regional training centres, and students are involved in curricula related activities

[5] Eurostat, Q1 2009
[6] Future Foundation (2006), referenced in 'Realising Britain's Potential' (2008)
[7] Income per household adjusted using the OECD scale 2 to account for household size and purchasing power. First European Quality of Life Survey: Urban-Rural Differences (2006)
[8] Eurostat
[9] 'Post Crisis: e-Skills are Needed to Drive Europe's Innovation Society', IDC (2009)

outside of the classroom, for example, through online virtual skills competitions and games that engage students on a global scale available at Academy NetSpace.

Technology is becoming increasingly important to address the work-life balance. As the commutes lengthen, teleworking is becoming, and will continue to be, an important element. In order to make remote working easier and facilitate family life, it will be important to have universally available high-speed internet. This will enable a true suite of communication and collaboration technologies such as consumer telepresence, video conferencing, online meeting, and webconferencing for effective substitution of the work environment. Smart Work Centers are a complementary solution to enable remote working. Located next to residential areas and thus reducing travel, they provide space to workers in individual or in a group work setting. Through the use of IT technologies, all work processes are fully supported and enhanced. Amsterdam has piloted such centres.

To address the urban-rural digital gap, it will be important that high-speed internet is available in remote areas. This will enable citizens to engage in the information society regardless of their location.

Prison Academies case study: reintegrating prisoners into society

• Fully functional Cisco Networking Academy training centres in prisons
• First Prison Academy established in 2001
• Initiative in UK is known as Prisons ICT Academy (PICTA)
• 23 PICTA academies in the UK
• Since 2001 more than 1,000 prison inmates in the UK have passed through PICTA
• Five further prison academies in Italy, France, Hungary and Germany
• Set to expand to Portugal and elsewhere
• Besides networking certification, students can acquire the European Computer Driving Licence, as well as 'soft'skills necessary for working life; such as the ability to work in a team, putting together a CV and interview techniques.

Data from 2007

2.3.3 Policy Recommendations

- Promote transformative education via public-private partnerships that experiment with learning methods
- Use technology for remote teaching and training, sophisticated assessment, participatory methods and engagement of students outside the classroom.
- Ensure ICT is a core competence in teacher training.
- Ensure sufficient spectrum is available in large enough blocks for next generation wireless technologies to cover all geographies and close the digital divide.

2.4 Ageing Well

2.4.1 Challenges

Europe is getting old. United Nations predictions indicate that by 2030 roughly one third of the population of Europe will be aged over 60 and almost one quarter will be over the traditional retirement age of 65. By 2030 the average *dependency ratio* across the EU will be 2:1 - only two working aged people (16 to 64) to every citizen of traditional retirement age.[10]

While it is true that the incidence of ill-health, in particular multiple chronic diseases, increases sharply with age, it is in fact only a minority of older people who experience major health problems. The 2007 HSBC report *The Future of Retirement*[11], for which 21,000 people between the ages of 40 and 79 from 21 countries were interviewed, found that life for over 80% of people in their 60s and 70s was characterised by good health, independence, high levels of control and a generally good quality of life. The report showed that far from being dependant the 60-80 age groups are able and willing to be significant contributors to the economy.

But current models of work and service consumption are based on outdated ideas. We still predominantly see work as a place we go to between the ages of 16 and 64, rather than as a series of activities in our lives. We still provide most health and care services in way which expect consumers to go to fixed locations (hospitals and doctors' offices) with little respect for their time and their personal needs.

The greatest challenges in accommodating demographic change do not lie in serving a dependant population, but rather in adapting our current models of work and service provision in order to accommodate new ways of working, new concepts of social interaction and new ways of providing and receiving care. We need to adopt models that *extend the participation* of older people in continued economic and social contribution and in developing *new ways of providing health and care services.*

2.4.2 Solutions

Today's phenomenal array of communication possibilities already provides the tools to overcome many of these outdated constraints. They offer many new opportunities to meet the need for *greater location independence* in service delivery and *greater personal control* in service consumption, which will allow our societies to meet the new challenges of an ageing population.

- Unified communications, mobile telephony and video-enabled communications create the platform for new age-friendly models of work and volunteering practices, allowing people to work in a flexible way from home, local centres or on the move.

[10] UN Population Prospects, 2008 at http://esa.un.org/unpp/
[11] The report can be downloaded at http://www.hsbc.com/1/PA_1_1_S5/content/assets/retirement/

- Remote monitoring and consultation, implantable and wearable biosensors, and on-line networks for peer support provide new care delivery models which allow stretched human and financial resources to scale to provide care and support for older people in their own homes and more closely tailored to their particular needs.
- User-friendly one-button video communications bring physically dispersed families closer together for continued emotional and social support and provide new models of interaction for disparate groups with common interests to meet and interact.

The most significant challenge ahead does not lie in supporting a huge growth in dependency, but in building the political and economic will to *adopt innovative service models that extend participation and improve health and care to allow our communities to age well.* Cisco's programme Ageing Well in a Connected World, addresses this macro issue in collaboration with a wide range of public and private sector players.

2.4.3 Policy Recommendations

- Enable global standardisation and interoperability for technical, security and semantic aspects. As standardisation largely takes place on an informal standardisation basis in the health space, it is important to ensure that industry groups working in health IT standardisation are able to make proper contribution to the European formal standardisation processes.
- Standardise ID management/ access control to enable better use of safe and secure personalisation of services.
- Ensure that funding and reimbursement systems allow for remote service provision.
- Update regulatory procedures to recognise different types of work flow management enabled by technological advances, e.g. allowing diagnostics to be physically carried out in the community or at home.

"The new future of old age is about *staying in society, staying in the workplace and staying very connected.* And technology is going to be a very big part of that, because the *new reality is, increasingly, a virtual reality*. It provides a way to make *new connections, new friends and new senses of purpose*." (James Coughlin, MIT AgeLab)

2.5 Public sector transformation and democratic renewal

2.5.1 Challenges

In previous decades, the public sector has offered relatively standardised services. In the last few years, however, there has been greater demand from the public for more personalised services and focus on the citizen. At the same time, almost all EU countries face huge public deficits, with the aggregate budget deficit for the eurozone expected to hit 6.4% in 2009 and 6.9% in 2010, compared with 2.0% in 2008. The public sector is facing a scenario where it must work out how to do more with less.

In the democratic arena, traditional institutions and measures of political engagement have been in decline. Political party membership has fallen across Europe and voter turnout has decreased in European elections and in elections at the national level[12]. In a study of 16 West European countries, 13 had seen declines in party membership as a proportion of the electorate from the 1960s to the 1990s, many drastically.[13] There is evidence, however, that citizens remain interested in politics. Declared interest has remained stable at around 60% of the adult population of the UK over the last 30 years and looks set to continue.[14] Membership of single issue and non-governmental organisations has also increased over the last decades. Politicians need to solve how to engage the population and make them feel involved with the political process.

2.5.2 Solutions

Public sector transformation

In order to achieve more personalised services which meet the needs of citizens, governments need to foster innovative practice and encourage a broader array of providers to meet diverse needs. Information technology can help improve both back and front offices. On-line services should become more integrated such that a citizen only has to provide information once for it to be replicated across government/ the public sector. Technology can also be better used to speed up the service, e.g. through on-line self assessment. In the back office, efficiencies can be made in system redesign, procurement and transactional funding. The Cabinet Office in the UK has estimated savings of €1.6 billion by implementing shared services in HR and financial services in the public sector.[15]

The most radical and important transformation, however, is the recognition that the user can be the catalyst, rather than the public administration. A useful example is www.data.gov which opens up US government data for the public and enables the development of new services.

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[12] Niemi and Weisberg, 'Controversies in Voting Behavior'
[13] Luther, Mueller-Rommel 'Political Parties in the New Europe'
[14] Ipsos Mori (2007) Political Trends in Britain 1997-2007 and what they mean for the future, quoted in Reaching Britain's Potential (2008)
[15] Transformational Government, Cabinet Office (2007), quoted in Reaching Britain's Potential (2008)

Democratic renewal

The internet is proving an essential element in the process of democratic renewal. Civic participation is being enabled through tools such as blogs, vlogs and discussion forums. There are lots of tools that the public sector can use to enable citizens to input ideas and suggestions (the sort of functionality offered by sites such as www.uservoice.com and many others). Public sector organisations have also started to give citizens the chance to comment paragraph by paragraph on government documents, such as the beta version of the UK Power of Information Taskforce report. The next step, however, is to develop tools that involve citizens in the difficult task of determining priorities and making trade-offs. These tools will need to go beyond mere textual input and find ways to aggregate citizen opinions as part of a structured debate. Some work has started to be done in this area but much remains to be done and it should be a research priority. However, any research must be linked to real-life experiments using different approaches, since the issue is not primarily about the technological challenge of creating the right tool; rather it is about creating a tool that people genuinely want to use and which generates useful outputs. Governments should also once again examine the possibility of internet voting, as trialed in Switzerland, the UK and Estonia. While the security issue remains an important barrier to address, it is an important method to capture the younger generation, who continue to be the less engaged than generations above them.

2.5.3 Policy Recommendations

- Public services should recognise and adapt towards greater personalisation and use technology to drive this goal.
- Back office systems should be redesigned towards greater efficiency and sharing of services.
- Government data should be opened for use and development of new services by private citizens.
- Tools for aggregating public opinions as part of the structured debate for determining priorities and trade-offs in policy formation should be a research priority.

2.6 Security

2.6.1 Challenges

There are a broad range of security issues which are important to our society, from security of energy supply, through crime, policing and border control. While much progress has been made, crime and terrorism remain major concerns in the public consciousness.

The internet has brought about a communication revolution but it also serves as a route to commit fraud, theft, extortion and other illegal activity. Moreover, as the internet has become increasingly central to our economy and society, a commensurate need to protect it has arisen. Cyber-attacks and cyber-warfare has become increasingly sophisticated, as evidenced by the Estonia distributed denial of service attacks (DDOS) in 2007. Should the network be vulnerable to natural disaster, the growth of the internet ecosystem means sectors as diverse as energy and financial services would be under threat. According to the U.S. Cyber Consequences Unit, cutting off telecoms and the internet would shut down 60% of the economy. This figure is only likely to increase as the internet is fully exploited and we move towards the Internet of Things in the coming years.

Network security has been characterised by intense innovation, in a game of leap frog between those protecting networks, information and consumers on the one hand, and the criminals and other ill-intentioned actors on the other hand.

2.6.2 Solutions

A general approach based on dialogue and partnership with all key stakeholders and specifically the private sector should be pursued in order to protect the network infrastructure. The market's dynamics and flexibility place it in the best position to provide the necessary pace of innovation to respond to evolving attacks. Many strong public-private partnerships already exist in the Member States, bringing together service providers, government security personnel and relevant vendors, and are the basic building block for network and information security in the EU. EU-level initiatives (such as the soon to be established EP3R) should support these structures and encourage their development in all Member States. The EU should help them to coordinate with each other where relevant but should not create alternative structures that draw resources away from them. The appropriate model here is a federated one bringing together national Critical Information Protection organisation representatives.

While technology measures are important for maintaining the resiliency of information infrastructures, appropriate operational measures such as training of personnel and careful contingency planning are as well crucial for helping to prevent security attacks and ensuring a rapid recovery of compromised systems. Cisco CCNA Security, a new course made available through our Networking Academy in July 2009, provides an additional skill set for students who want to enhance their basic networking expertise to qualify for networking security jobs.

For policing and border control, various technologies are becoming available to assist them with their work. For example, imaging methods, technologies and analysis will improve efforts to detect crime and support anti-terrorism. This may impact the methods of working for the police, as more crime data is available from their surveillance equipment and those of the general public, who will also have better information-sharing technology.

2.6.3 Policy recommendations

- An innovation-based approach to security is more appropriate than a regulatory-based approach. Regulation will always be two versions behind the latest technical and process innovation, and hampers the ability of defenders to be able to act and react to protect networks and consumers.
- Network security regimes should be based around multi-stakeholder partnerships and voluntary sharing of information and best practice.
- Europe could help co-ordinate a federated approach to critical information infrastructure protection (CIIP) initiatives. The international dimension should always be kept in mind – it is important not to develop competing regional based approaches to CIIP which do not reflect the global nature of the threats.

2.7 Sustainable green development

2.7.1 Challenges

Greenhouse gas concentrations in the atmosphere are rising rapidly due to emissions from human activities, resulting in an increase in the risks of serious climate related impacts. Concentrations need to be stabilised through a cut in annual global emissions of at least 80 per cent compared with today, in a cost-effective way[16]. Such a turnaround is both technologically and economically feasible, but would likely require annual global emissions to reach a peak by 2015 and start to decline rapidly thereafter. A delay of even five years in reversing annual emissions will significantly increase greenhouse gas concentrations[17]. The costs of reducing emissions roughly double for every ten years delay in taking action[18]. This is because a rising stock of greenhouse gases requires ever greater reductions to attain a given temperature stabilisation target.

2.7.2 Solutions

The challenge of significantly reducing emissions while maintaining economic growth requires a dramatic shift in technologies that determine carbon intensity of the economy. With much of the technology to achieve large-scale emissions cuts available today, urgent policies are required for large-scale demonstration and deployment of key technologies. Policies are also required to bring near-commercial technologies to market.

The recent GeSI/Climate Group study, Smart 2020, points to the scale of the opportunity for ICT-enabled solutions to drive efficiency across the economy, with the potential to deliver emission savings of 15% - 7.8 GtCO2e - of global BAU emissions in 2020[19]. Cisco has demonstrated the effectiveness of connected smart technologies in monitoring emissions and improving efficiency.

ICT has the potential to improve the efficiency of electricity generation and use, enabling the transformation of the electricity grids by providing an end-to-end, secure communications fabric to help utilities companies optimise power supply and demand. Efforts to reduce emissions through increasing the share of renewable electricity and decentralised generation, —solar and wind plants, plug-in hybrid electric vehicles (PHEVs), active home-energy management, and grid monitoring—will require a new

[16] This assessment is based on the latest scientific evidence which indicates that the stabilisation of atmospheric concentrations of greenhouse gases at no higher than 450 parts per million of carbon-dioxide-equivalent by around 2150 to make it more likely than not that the world avoids global average temperature rising by more than two Celsius degrees compared with pre-industrial levels. See, IPCC 2007, …2008

[17] Rising above 500 parts per million of carbon–dioxide-equivalent, raising the risks of severe impacts while also making it substantially more costly and difficult to reach stabilisation at 450 parts per million.

[18] Stern Review on the Economics of Climate Change, Cambridge University Press, 2007

[19] Climate Group/Global eSustainability Initiative (GeSI), Smart 2020: Enabling the low carbon economy in the information age, 2008.

level of intelligence and communication in the grid to coordinate and control all the systems that will be attached to it, a Smart Grid.[20]

As EU 2020 recognises, "*the development of smart, upgraded transport and energy infrastructures contributes to multiple objectives including decarbonisation, transport safety, energy security, and the competitiveness of our network economy"*

ICT provides better integrated transport facilities and reduces the need to travel by allowing workers to use more convenient locations. In addition, by providing real-time monitoring of water movements, mountain ice melt and land use productivity, as well as by connecting local communities to government institutions, ICT can enhance adaptive capacities and improve disaster prevention and responsiveness.

The capital expenditure required to decarbonise and adapt the global economy will have to be mobilised jointly by the public and private sectors. According to the UNFCCC, 86% of climate investment is expected to come from private actors[21]. Its deployment will require a range of public policy measures including carbon markets and taxes, regulations and standards, as well as financial support mechanisms to mobilise private capital.

For the first time in human history, the majority of people live in urban areas. The resource demands on cities continue to increase dramatically. Energy consumption, demands on utilities and civil infrastructure, as well as personal consumption through travel, work, and socialisation result in cities being overwhelmingly the largest contributor to greenhouse gas emissions.

Cities are also centers of innovation, economic growth, social transformation, healthcare, and education—and most are taking a proactive approach to address the urban sustainability challenge. National policies towards climate change have been varied in focus, commitment and priority. However, at the city level, there are many actions that are proving numerous, effective and are making a difference. Local authorities have set up tangible targets, and developed innovative visions and strategies to act purposefully. Public-private partnerships at the city and regional levels will be essential to reach our goal of a low-carbon society.

Cisco's Connected Urban Development (CUD) programme is a leading example of a successful public-private partnership between cities and the private sector. CUD was launched in partnership with the cities of San Francisco, Amsterdam, and Seoul in 2006. In 2008, four new European cities joined the programme: Birmingham, Hamburg, Lisbon and Madrid. Traditional approaches to reducing carbon emissions have consisted of using less energy, other forms of energy, and capturing and storing carbon. CUD takes a different approach by changing how cities deliver services to residents, how residents

[20] Smart Grid: Transforming the electricity system to meet future demand and reduce greenhouse gas emissions. Cisco White paper: http://iwe.cisco.com/iwe/c/document_library/get_file?p_l_id=26387&folderId=26603&name=DLFE-10520.pdf

[21] UNFCCC 2007, "Investment and Financial Flows to Address Climate Change"

work, how traffic flow is managed, how public transportation operates, and how real estate resources are used and managed.

2.7.3 Policy recommendations

- Implement a legally binding treaty with a global cap on greenhouse gas (GHG) emissions and an international GHG offset trading scheme, built on existing regional efforts.
- Allow utilities implementing smart grids to receive CO2 certificates under cap and trade systems
- Increase tax incentives for energy efficient products and deployment, including smart grids.
- Increase R&D funding and fiscal stimulus for environmental research and smart grids.
- Promote a policy framework for acceleration of smart grid deployment in Europe, addressing in particular regulatory issues and standards.
- Promote the use of Internet Protocol (IP) as the core networking open standard for the Smart Grid.
- Renew the global institutional framework in the medium term, with the flexibility capable of drawing all parties into a single common process in order to develop and distribute emissions targets, establish carbon trading, support technological collaboration, monitor and verify reductions and resolve disputes.
- Member States should identify and encourage green public-private partnerships in pioneer cities.
- Public information, education and communication are necessary to support individual behaviour change and to reinforce the political consensus for action, utilising well integrated ICT networks.

Two innovative solutions in Cisco's Connected Urban Development Programme

1. Urban EcoMap is an Internet-based tool that enables cities around the world to provide smarter climate change information for their citizens. For the first time, Urban EcoMap gives every person the ability to see the collective results of individual climate change actions, while also motivating people to make responsible environmental choices and creating competition among neighborhoods to reduce their carbon footprint. Urban EcoMap provides information on carbon emissions from transportation, energy and waste among neighborhoods, organised by postal codes.

2. The Lisbon intelligent buildings and smart grids pilot intends to showcase how technology can improve global energy efficiency simultaneously in both the buildings and energy networks. Implemented in three secondary schools, the key features are: a) smart and efficient energy management through integrated, IP-based, real-time energy monitoring and management; b) Local energy production and connection to the electricity grid via bidirectional, IP-based communication; c) Participation and awareness of the school population, using Web 2.0 tools for consumption visibility and testing/evaluation of the pilot.

3 Recommendations for the process and assessment of the EU 2020 Strategy

3.1 EU 2020 as a collaborative and open process

> *"Innovation is driven by creative collaboration as much as by competition; it is something you do with people rather than to them"*
> Charles Leadbeater

Building on our comments in the section on democratic renewal, Europe needs to develop new ways to harness collaborative networks of innovation and practice and apply its energy and experience to lift the performance of the policy process. EU 2020 must capture Europe's imagination – otherwise it will be quietly ignored. Its development process must promote:

- The full involvement of civic society
- Platforms to mobilise public creativity by using the radical potential of web 2.0 and social networks to develop public ideas
- Collaborative spaces to exchanging ideas, best practices and pan-European collaboration
- Use of the full potential of network technologies to increase effective working, faster learning and international collaboration

3.2 EU 2020 should embrace new metrics

Although the measurement of EU 2020 is critical, there is no reference to potential objectives in the consultation document. This opens the debate as to which kind of indicators Europe should adopt to measure its success. In his paper on 'Large Scale Innovation Metrics', John Kao wrote:

"When reviewing various existing approaches to metrics, there seems to be a bias (whether good or bad) towards measuring inputs and outputs. Particularly for nation-wide metrics, it may be easier for policy makers to justify their innovation efforts by counting expenditures rather than the actual results of their efforts. [….] Metrics for service innovation are particularly important because much of the large scale innovation that is required today relates to a next generation of citizen-relevant services in such areas as health and wellness, education and support for a sustainable lifestyle."

We need to debate and define a new set of indicators, which would provide opportunity to measure how Europe is performing in areas like ageing and care, urban sustainability and climate change, chronic disease and economic recovery.

4. Conclusion

The renewal of the EU's overarching strategy at the time at which we are emerging from economic crisis is a unique opportunity to set a new paradigm in Europe; social and economic development can reinforce one another and address the major challenges and opportunities for our society. Drawing on the discussion above, three key themes emerge for reaching this lofty goal:

The network as the platform to address social needs and create new sources of growth. Wherever and whatever we look at the digital age, the network is at the heart of it. Next generation broadband will drive a new wave of innovation, productivity, economic growth and jobs. A new richness in public services, education and entertainment will emanate from the network. Everything from an active, independent ageing population, to a reinvigorated democracy will be inspired by it. Likewise, smart grids will be at the core of our energy security and climate change solutions, and will make homes and buildings more productive and economical.

Personalisation and mobility through remote collaboration. As the demand grows for personalisation in public, and private, services, it is the utilisation of ICT tools which will enable it to be met. Remote health services are facilitating health and care in the home or in the community. Video and other collaboration tools are giving us the mobility to change the way we work and learn. It heightens our ability to work with others regardless of their geography and this collaboration will lead to new innovation and productivity.

Public and private sectors working together. Many of the societal challenges facing us today can only be tackled if business joins with public administration to address it. Whether it be green cities fighting climate change, securing our critical infrastructure against attack or developing a new form of social innovation, neither actor can act alone.

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