"A TRANSFORMATIONAL AGENDA FOR THE DIGITAL AGE"

DIGITALEUROPE's Vision 2020

DIGITALEUROPE


“THE WORLD IS AT A TURNING POINT. SO IS EUROPE.
THESE ARE NO ORDINARY TIMES.
WHAT EUROPE NEEDS IS A TRANSFORMATIONAL AGENDA.”
José Manuel Barroso, President of the European Commission,
‘A Vision for EU 2020’ October 2009

About DIGITALEUROPE

DIGITALEUROPE is the voice of the European digital economy including information and communication technologies and consumer electronics. DIGITALEUROPE is dedicated to improving the business environment for the European digital technology industry and to promoting our sector's contribution to economic growth and social progress in the European Union.

DIGITALEUROPE ensures industry participation in the development and implementation of EU policies DIGITALEUROPE's members include 60 global corporations and 40 national trade associations from across Europe. In total, 10,000 companies employing two million citizens and generating €1 trillion in revenues. Our website provides further information on our recent news and activities: http://www.digitaleurope.org

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ABOUT This White Paper

DIGITALEUROPE's purpose in producing this White Paper is to draw together a wide range of expert opinion. Bringing together research and analysis from many different sources DIGITALEUROPE provides a new and compelling action plan to ensure a successful and competitive future for Europe in the 'Digital Age'. Wherever possible, we have provided references for the assertions we make. As a research-based White Paper, DIGITALEUROPE aims to provide European policymakers with essential tools and information about Europe's digital future and what it requires to compete in a globalised world.

This White Paper proceeds in two parts.

Part I comprising Chapters 1, 2 and 3 shows why the realisation of President Barroso's EU Vision 2020 will depend first and foremost on harnessing the full transformational power of digital technologies.

Part II comprising Chapters 4 and the Recommendations sets out specific actions for a Digital Agenda to drive growth and economic prosperity in Europe.

(Please note that we refer repeatedly both to "digital technologies" and "ICT" in what follows. "ICT" derives from Information and Communications Technologies, and is the common acronym used as shorthand to identify the industry sectors based on these technologies, which are today almost exclusively digital technologies).

PREFACE ▸▸ A TRANSFORMATIONAL AGENDA FOR THE 'DIGITAL AGE'

The member companies and associations of DIGITALEUROPE entirely share President Barroso's sense of urgency and agree with his call for a transformational agenda. The direction set and policies adopted over the next few years will largely determine Europe's place in the world for decades to come. Moreover, we support his assertion:

> "We already have several of the ingredients in the different strategies and instruments the EU has developed in recent years. But each of these was developed separately: they do not offer a holistic view of the kind of society we want to build for the future. We need to revise the current Lisbon Strategy to fit the post 2010 period, turning it into a strategy for convergence and coordination to deliver on this integrated vision of EU 2020."

José Manuel Barroso,
President of the European Commission

President Barroso's call for contributions to the elaboration of this transformational agenda and integrated strategy must not and will not go unheeded. Many influential organisations and voices will no doubt bring welcome thinking and experience to this effort. Members of DIGITALEUROPE gladly accept our responsibility to respond to the President's initiative; the "turning point" he refers to *embraces* the foundational elements on which a fully inclusive European society, operating in a digitally driven age, must be built.

In this new age, digital technology has already become *the defining transformational force*. The "holistic view" that President Barroso calls for, starts with this understanding: we are living in a moment of time that is akin to the 15th century 'Gutenberg moment' which powered the Renaissance; the 18th century 'steam-power moment' that triggered the first Industrial Revolution; and the 19th century 'electric-power moment' that marked the start of our current Industrial Revolution. Like those transformational technologies, digital technologies have rapidly become the central new drivers of productivity growth, innovation and the diffusion of knowledge on a global scale.

We are only at the beginning. In the Digital Age, the development and broadening application of powerful digital technologies will accelerate the pace of economic and social transformation across Europe and around the world. Those who embrace digital technologies as the central transformational force of this new age will prosper. Those who do not will fade from relevance. Europe has fallen behind our own 'Lisbon Objectives' precisely because we have not yet given the digital revolution the central place it demands in our strategy. Provided we do so, Europe can, in the words of President Barroso, "exploit its full potential as the leading force for progress in a challenging world".

> “The European Commission will develop a European Digital Agenda to tackle the main obstacles to a genuine Digital Single Market, promote investment in high-speed Internet and avert an unacceptable digital divide.”
>
> *José Manuel Barroso, President of the European Commission, ‘A Vision for EU 2020’ October 2009*

The Digital Age does not threaten Europe. On the contrary, it offers infinite opportunities to exploit and leverage our strengths in new and productive ways – and thereby maintain the economic foundation that supports our social model as our population ages.

Europe possesses enormous creative energy and talent as well as deep commitment to human rights, individual dignity, the rule of law and democratic government. We have world-leading industries, companies and technologies throughout our industrial fabric. We have made great strides in creating a home market on a continental scale. European enterprises and civil societies are deeply engaged in emerging economies and societies around the world.

We are ready to lead the world in the transformation to a low-emission, resource-efficient economy largely enabled by digital technologies. Being the largest global trading block and the world’s number-one exporter, it is in Europe’s vital interest to advance international trade talks in order to achieve free, balanced, open and fair trade as a driver of productivity, innovation, improved competitiveness and job creation, especially in the area of ICT and other technologies with energy-saving potential.

As part of his 2020 Vision, President Barroso confirms: “The next *(sīc)* European Commission will develop a European Digital Agenda (accompanied by a targeted legislative programme) to tackle the main obstacles to a genuine Digital Single Market, promote investment in high-speed Internet and avert an unacceptable digital divide.”

The members of DIGITALEUROPE applaud President Barroso’s point of digital departure. This White Paper joins him in his announced purpose, and expands on his key tenets. The Digital Agenda is about strengthening all of Europe’s industry through the application of digital technologies. It is first and foremost about the pervasive uptake and innovative use of our products and services throughout the economy and society – coupled with the pervasive spread of digital skills. Though our own growth and innovation are indispensable for Europe’s future, DIGITALEUROPE members stand ready to partner with European policymakers to build our digital future.

EXECUTIVE SUMMARY ▸▸ chapter one

"THE TRANSFORMATIONAL POWER OF DIGITAL TECHNOLOGIES"

The Europe 2020 strategy is rightly focused on competitiveness as the essential condition for economic growth and job-creation in the global 21st century economy.

Competitiveness depends on permanent productivity growth and permanent innovation in products, services, business processes and business models. The priority of any Europe 2020 policy objective should therefore reflect its contribution to both.

Europe must urgently close its current productivity gap with major competitors, notably the US and Japan but also now India and China. Due to our ageing population, we have no choice. As the European Commission stresses in its *2009 Ageing Report:* "Within a decade, labour productivity will become the main determinant of [Europe's] future economic growth."

As this report shows, a wide range of evidence demonstrates beyond doubt that the application of digital technologies has already become the primary 'up-stream' transformational power driving both productivity growth, innovation and job creation in every market and social service sector of the European (and global) economy. This is just the beginning, as the transformational power of digital technologies is itself expanding rapidly.

The building blocks necessary to deliver the transformational, productivity-enhancing power of digital technologies must therefore lie at the heart of the Europe 2020 strategy. Digitally driven economic and social transformation is in turn vital for the preservation of Europe's social model and leveraging our potential for climate change leadership.

Important demographic shifts are under way inspite of a stable total population forecast to 2060. The reduction from four to two working-age people (15-64 years) for every senior citizen (over 65 years) must be accommodated. To sustain our social model, Europe must raise employment rates and productivity, reform pension, health and long-term care systems. Only digitally driven transformation can deliver these outcomes. Exploiting the 'silver economy' as Europe ages will also increasingly rely on the enabling power of digital technologies.

Digital technologies are changing the very nature of the climate-change challenge – helping scientists understand the problems, supporting sector-specific innovations, creating new industries and business opportunities in the fast-growing green economy, empowering organisations and individuals to reduce their carbon footprints and developing awareness and encourage debate that will establish and maintain Europe's leadership position through to 2020 and beyond.

"THE TRANSFORMATIONAL POWER OF DIGITAL TECHNOLOGIES" – SECTOR EXAMPLES

Digital technologies will increasingly drive productivity, sustainable growth, innovation and employment throughout the European economy in a myriad of ways. These are best demonstrated at the disaggregated levels of industry sectors, individual organisations and individual empowerment. European trends, case examples and success factors from six sectors help to create a wider vision of productive, innovative digital Europe by 2020.

- **Energy:** Europe's three long-term energy policy objectives – greater energy independence, reduced greenhouse-gas emissions and a competitive, continental scale Single Market – are squarely predicated on the power of digital technologies to transform, starting with our grid infrastructures and extending to consumer control over consumption.
- **Manufacturing/Automotive:** The transformation in all manufacturing sectors to customer-driven innovation based on the sustainable use of resources and integrated manufacturing cycles will depend on the pervasive penetration and use of digital technologies.
- **Transportation and logistics (T&L):** Transport and logistics companies are evolving from forwarding and warehouse-managing companies to highly industrialised, ICT-driven supply-chain providers. Services based on a mobile 'Internet of Things' hold particular strategic important for the sector, as do digital solutions for traffic congestion, emissions reduction and intermodal transport.
- **Small-and medium-sized enterprises:** Entrepreneurial activity represents 99% of an estimated 23 million enterprises in Europe, providing two thirds of private sector jobs (75 million), and more importantly around 80% of new jobs created over the past five years. Enterprises need access to digital tools on-demand, which will help eliminate distance, assist in delivery of services on-demand, virtual organisations and enhance networked innovation.
- **Healthcare:** The traditional healthcare delivery model, built around dealing with acute episodes, will no longer be sustainable as European society ages. Harnessing the transformational power of digital technologies is the key for moving to a "continuum of care", while improving quality and productivity, as the practice and delivery of care continues to evolve.

- **Individual empowerment:** Democratic societies will embrace and respond to the collective and individual voices of their people as they express themselves via digital platforms. Individual empowerment is at the core of the transformational power of digital technologies throughout our economy and society. As the power of digital technologies grows, so will individual empowerment.

"THE FUTURE OF THE ICT SECTOR IN EUROPE"

Europe must be both host and home to a dynamic ICT sector that is tightly interwoven with the manufacturing, environmental, cultural, and political fabric. Home-grown ICT is indispensable and nothing less than central to this newborn Digital Age.

No region of the world can maintain its economic strength solely on the basis of imported digital competencies, products and services. Indigenous skills, innovation, products and services are essential for growth and prosperity. No region of the world will be able to maintain the ICT sector needed if that sector is not a leading source of jobs and growth and a leader in global markets.

ICT is today a large growing sector of Europe's industrial, technological and employment base. Comparison with other leading regions shows that we must and can do much better. In particular, we have to focus on enhancing our performance and establishing leadership in these high-growth sectors. This means Europe's relative weakness in ICT hardware manufacturing need not prove fatal, provided we maintain our strengths and performance in the higher-value roles in the high-growth sectors – these three sectors are where our future lies:

Next Generation Networks & Mobile Broadband: A vast global market for Mobile Broadband lies ahead, an area in which existing European leadership must be carefully nurtured and exploited as we face the fierce competition set to arrive from low-cost new entrants, particularly Asia.

Software: The innovation necessary to create economic growth, drive societal change and address environmental challenges relies on ICT, at the heart of which is software. But software is undergoing major changes as it moves from being used and perceived as a product to a service. This paradigm shift challenges all current market players and offers huge opportunities for Europe's software industry. This is a new world, with new rules, and Europe must compete.

Future Internet: Many, if not most of these software-driven opportunities will arise from the continuous development of the Internet as the primary communications infrastructure of the Digital Age. Key in this respect will be the 'Internet of Things' and the 'Internet of Services'. Exploiting the limitless opportunities created by the 'Future Internet of Things and Services' will become the central growth engine in all knowledge-based societies.

“A vast global market for Mobile Broadband lies ahead...”

“BUILDING BLOCKS FOR THE FUTURE”

Achieving the digital vision for Europe set out in the previous chapters demands a concerted effort, starting now, to put in place seven essential building blocks.

- **Digital Infrastructure/Next-Generation Networks**
- **Future Internet/Next-Generation Services**
- **Digital Single Market**
- **ICT Research & Development**
- **e-Skills**
- **Online Trust & Security**
- **Trade Policy**

- **Digital Infrastructure/Next-Generation Networks:** The winners in the digital world of tomorrow will be those with access everywhere which will allow 1) huge volumes of data transmitted at very high speeds in both directions 2) through wired, wireless or satellite connection. These capabilities will trigger an explosion of new and exciting network-based interactive digital services – sometimes referred to as ‘The Cloud’. Europe is strongly positioned for digital infrastructure, but we must stay at the leading-edge of technology development and implementation to provide ‘ubiquitous participation’.
- **Future Internet/Next-Generation Services:** ‘The Future Internet’ will drive innovation in almost all industries and will shape the future of the service-based economy. The emerging web-based industries will provide tremendous opportunities for growth and job creation. The US is currently leading the development of Next-Generation Internet services, while other regions and countries such as Korea and China are catching up quickly. Europe must ensure that it joins the leaders for both the development and uptake of Next-Generation Internet services. The disruptive technologies of the ‘Internet of Things and Services’ represent a vast opportunity for Europe provided we take the lead.

- **Digital Single Market:** Now is the time to make the creation of a Digital Single Market a central priority of Europe's Digital Agenda & Vision 2020. Europe has successfully dismantled cross-border barriers to trade in most physical goods and many services. But online channels for internal trade in the very same goods and services may run into severe internal market fragmentation due to diverse national regulation of on-line activity.

  Barriers/issues include: diverging copyright licensing; copyright levy systems unfit for the digital age; differing data protection rules; different consumer-protection regimes; contrasting interpretations of intermediary liability; technology neutral standards; lack of radio-spectrum harmonisation; lack of effective payment systems to facilitate cross-border transactions and a lack of Europe-wide organised recycling schemes to support large-scale operations.

- **ICT Research & Development:** A renewed and concerted effort across Europe is needed to secure productive, leading edge ICT research and development, competitive at the global level.
- **e-Skills:** We need to both grow our ICT sector and drive the development of individuals with the necessary understanding and skills at all levels of the value chain. At present the outlook is alarming. To exploit the opportunities of the Digital Age, we must change the trend.
- **Online Trust & Security:** A trusted and safe online environment is a prerequisite for the further development of Europe's digital economy and Digital Single Market. As reliance on the Internet grows, so do concerns about its security and safety for all categories of users – private individuals (including children), business and governments. The foreseeable explosion in digital services will reinforce demand for robust and secure networks, including a framework for secure online payments.
- **Trade Policy:** To be successful and competitive on the global stage, the European digital technology industry needs to take advantage of the opportunities offered by international trade. ICT products often comprise hundreds of components that come from a variety of countries and suppliers. Those products can and should be sold to customers world-wide. To ensure international access to innovation, the highest quality, the lowest prices and the largest market, there is a need for a liberal trade environment.

RECOMMENDATIONS To Achieve the Digital Vision for Europe

DIGITALEUROPE trusts that this White Paper demonstrates why the actions set out below need to lie at the heart of Europe's digital transformation. This transformation represents the foundation of a sustainable and competitive economy and a successful Digital Agenda for Europe.

Paving the way for the ICT sector to fulfil this role requires incorporating ICT into EU and national policies regarding growth, employment and SMEs support. DIGITALEUROPE would like to present the following recommendations for consideration by the new European Commission, the European Parliament and Member States.

1. Foster ICT Infrastructure

Europe's objective must be to establish global leadership in ICT infrastructure by 2015 by delivering close to 100% broadband coverage, giving at least 2Mbps service to the user, including at least 30% fibre-based infrastructure.

Quick Wins: 2010-2011

- Establish an investment-friendly framework for Next-Generation Networks (NGN) that inter alia:
  - Ensures legal certainty;
  - promotes investments;
  - respects technology-neutrality, leaving technology choices to service providers, investors and consumers, and;
  - benefits from non-discriminatory access for civil works implementation and facilitates access to ducts, thereby lowering the investment threshold substantially.
- Agree on a European Broadband Deployment Pact with Member States, using EU Regional funds, State and Private Investment.
- Establish a high-level EU task force with industry experts to develop a future ICT infrastructure strategy.
- Facilitate the use of the so-called Digital Dividend for new mobile broadband services through a harmonised and technology-neutral pan-European approach, giving economies of scale and avoiding the detrimental cross-border interference issues, while not interfering with existing Digital TV/HDTV reception. Access to low frequency bands, with their propagation characteristics supporting wide-area coverage, is crucial to facilitate rural broadband coverage using mobile technologies, allowing in particular access to all expected Internet services.
- Accelerate Member States' allocation and assignment of other spectrum bands suitable for broadband wireless technologies, in particular in 2.3 to 2.6 GHz bands.
- Continue to encourage appropriate public-sector investment, Public-Private Partnerships and tax incentive schemes for the roll-out of broadband.
- Transition Member States e-Government networks and services to IPv6.
- Proactively launch initiatives to address e-Skills shortages at university level and lifelong-education opportunities.

Mid-term Measures (2015):

- In its Europe 2020 strategy the EU has set itself a 2013 target of achieving full broadband coverage and a 2020 target of achieving at least 30Mbps for all and 100Mbps for 50% or more of European households. Digital Europe applauds that target.
- 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.

2. A Digital Single Market

Leveraging Europe's digital strengths into global competitiveness, economic wealth and sustainable jobs requires the creation of a European Digital Single Market, where business can be conducted online as easily as via traditional channels. The Digital Single Market will require greater harmonisation across policy areas to eliminate existing obstacles to the provision of pan-European online commerce and services. DIGITALEUROPE therefore urges the EU to take a horizontal approach to policymaking to eliminate multiple barriers:

Quick Wins: 2010-2011

- Rapid adoption of the proposed Directive on Consumer Rights to remedy market fragmentation.[1]
- Strong enforcement of EU rules, notably the e-Commerce Directive, especially regarding liability of intermediaries.
- Expand the annual Internal Market Scoreboard to focus on the Digital Single Market, notably incorporating the Digital Indicators currently being developed by the Spanish Presidency and the OECD.[2]
- Complete the EU Patent and improve the Patent Litigation System to reduce costs, enhance legal certainty and maintain state-of-the-art proceedings and decisions.
- Enhance the current system of ICT standardisation in Europe to allow for the recognition and adoption of standards that have been developed in global standardisation consortia; ICT standards in relation to EU policies must be neutral in terms of technology, vendors and the underlying business models.

Mid-term Measures (2015):

- Improve the attractiveness and ease of the digital content across the Digital Single Market.
- Phase out private-copy levy systems though legislation.
- Harmonise the use of spectrum to deliver more choice of device brands/models and economies of scale.
- Make inexpensive and secure payment-systems available to Internet users across Europe.
- Approve recast of the WEEE Directive to harmonise registration and reporting while minimising the administrative costs relating to compliance with the Directive.[3]

1 European Commission, Proposal for a Directive on Consumer Rights http://ec.europa.eu/consumers/rights/docs/COMM_PDF_COM_2008_0614_F_EN_PROPOSITION_DE_DIRECTIVE.pdf | 2 *Spanish Proposal for a Digital Europe: The Granada Strategy*, February 24th 2010, http://www.laquadrature.net/files/Granada_Strategy-For_a_digital_Europe.pdf | 3 Proposal for a Directive of the European Parliament and of the Council on Waste Electrical and Electronic Equipment (WEEE), http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0810:FIN:EN:PDF

> “Europe must establish a leadership role in Next-Generation Internet applications and services. Regulatory reforms must include improved Intellectual Property Protection with regard to patents, copyright and the promotion of IPR in green technology.”

3. Foster ICT R&D

Europe must become the most attractive region for ICT Research and Innovation through a combination of increased funding at EU and national levels, and the introduction of regulatory reforms to eliminate fragmentation. At the very least, Europe should achieve its objective of R&D expenditure of no less than 3% of EU GDP by 2015 at the latest. While this condition is necessary, it is not sufficient: more attention should be paid to the transition of R&D into commercial products and services. Europe must establish a leadership role in next-generation Internet applications and services. Regulatory reforms must include improved Intellectual Property Protection with regard to patents, copyright and the promotion of IPR in green technology.

Quick Wins: 2010-2011

- Prepare the European Commission the FP8 to succeed FP7 as of 2013 at an expanded scale and encourage Member States to increase their efforts as well.
- Leverage the momentum of the EIT-ICT-KIC to actively support the Build-In innovation process, and establish links in the same domain, e.g. the PPP on the ‘Future Internet’, the JTIs ARTEMIS and ENIAC, the European Technology Platforms on ICT domain, the ICT clusters.
- Focus the European Investment Bank on innovation where market failures are apparent.
- Focus the European Investment Fund on establishing pan-European funds, 1) partner with corporate investors in thematic funds 2) support tech transfer 3) encourage new Public-Private Partnerships.
- Rapid implementation of the Public-Private Partnerships (PPP) Communication.
- Refer to the JTI Sherpas Group for modifying the legal and administrative arrangements for existing and future JTIs as major PPPs in European research.

Mid-term Measures (2015):

- The European Commission should encourage the introduction of EU-wide tax incentives to increase private R&D to widen the impact and guarantee a level playing field. Develop an EU-wide ICT research and development strategy that includes tax incentives.
- Ensure EU-wide implementation by Member States of the concept of pre-commercial procurement to promote market penetration of new technologies.
- Devote a considerable portion of the EU Structural Funds to fostering the deployment of innovative ICT solutions. DG REGIO and Member State partners should interface with ICT-sector leaders better to understand the ICT potential to deliver cohesion policy for the digital age.
- Significantly increase the allocation of EIB and EIF resources to venture capital investments with private partners to provide for the lacking critical mass of venture capital in Europe.
- The new financial perspectives should prioritise sectors based on growth and jobs.

4. Promote e-Skills as Skills for the 21st Century

With an 85% correlation between e-Skills and competitiveness, Europe must move rapidly to improve the skills of its children, teachers, administrations and elderly citizens. Europe must set ambitious goals for 2015 including halving the digital literacy and competence gaps and guaranteeing that all primary and secondary schools have high-speed Internet connections. By 2012 the EU should ensure all primary and secondary school students receive training about the risks and safe use of the Internet. All adults of working age should have access to e-Skills training.

Quick Wins: 2010-2011

- Member State awareness campaigns – run by public-private partnerships – which highlight the career opportunities available to those studying maths, science or technology. Such campaigns should also highlight the EU e-Skills shortages, expand the range of activities and reach of the first EU e-Skills Week into a multi-year programme.[4]
- Provide all primary and secondary schools with high-speed Internet connections by 2015, and train all students to use the Internet in a responsible and secure manner.
- Extracurricular activities such as visits to laboratories, open days at companies and visits by researchers should be reoriented to future career choice with emphasis on EU's globally competitive sectors.
- Expand internship opportunities to give students an orientation towards "marketable knowledge" at two key points: 10-12 years old and 16-17 years old, when teenagers decide on their career orientation and choice of studies.
- Promote transformative education via Public-Private Partnerships that experiment with learning methods including e-Learning.
- Incorporate technology for all teaching and training, sophisticated assessment, participatory methods and engagement of students both in and outside the classroom.

Mid-term Measures (2015):

- Statistical work on ICT skills shortages should be carried out to pinpoint the specific skill gaps. Develop Annual Eurobarometer reports, mapping employer perceptions with regard to the e-Skills needed in the next three to five years.
- Introduce incentives for teachers both to update their own ICT training and to modernise their teaching methods so as to mainstream digital teaching/learning. Introduce a certification system for teachers, attesting their ICT skills in association with the European Schoolnet (EUN).[5]
- Set up and fund the European Commission inter-school maths and science competitions across Europe to promote excellence.
- Launch an initiative to use EU structural funds to improve ICT training, particularly in key areas such as green IT, 'Cloud' computing and trust and security.

4 European e-Skills Week 2010 is organised by DIGITALEUROPE and the EUN and funded by the European Commission, DG Industry and Enterprise. See http://eskills-week.ec.europa.eu. | 5 http://www.eun.org/web/guest/about/thisiseun

5. Reinforce Trust and Security on the Net

Quick Wins: 2010-2011

- Increase stakeholder awareness of existing industry measures being taken in the area of trust, privacy and data protection and initiate stakeholder dialogue.[6]
- Launch at both EU and Member State level awareness campaigns – run by public/private partnerships – to highlight the importance of privacy and security in the broader context of digital literacy.

6 Response to European Commission Consultation on the Legal Framework for the fundamental right to protection of personal data, http://www.digitaleurope.org/index.php?id=1070&id_article=393

Mid-term Measures (2015)

- Harmonise national rules on privacy and data protection, streamline administrative procedures and gear towards an ex-post assessment as opposed to ex-ante control.
- Review the legal framework on data protection so that:
  - National rules are harmonised and administrative procedures streamlined. This will improve predictability and strengthen the Digital Single Market. Divergent implementation of EU data-protection law should be avoided. Co-operation on an international level is needed to create a favourable and consistent regulatory environment. Any future follow-up to the review should take into account that the technology-neutral character is the cornerstone of the Data Protection Directive and, therefore, must be maintained.
  - Enforcement becomes effective and harm based, focusing primarily on adverse effects to the privacy or the fundamental rights of European citizens.
  - Rules governing international transfers of personal data should be streamlined into one European system, in a global context to reflect the global nature of the Internet. A privacy governance model based on accountability could help achieve this.
- Improve security through:
  - The establishment of a European Public-Private Partnership for the resilience of critical-information infrastructures, thereby facilitating the exchange of best practice in dealing with critical infrastructure failures, including natural disasters; enabling partners to focus strategically on a proactive approach to improving the resilience of critical-information infrastructures.
  - Support and continue public-private dialogue in the area of security and trust in general.
  - Transformation of ENISA into a permanent European Commission agency. ENISA would also be well placed to facilitate the establishment and operation of the public-private partnership described above.
  - Foster public-private co-operation to combat cyber crime.

6. e-Health

Quick Wins: 2010-2011

- Enable global standardisation and interoperability for technical, security and semantic aspects. Health Industry groups working in health IT standardisation should be able to contribute to the European formal standardisation processes.
- Standardise ID management/ access control to enable better use of safe and secure personalisation of services.

Mid-term Measures (2015)

- Introducing Mobility to Healthcare:
  - European frameworks that facilitate sharing of best practice in the area of improved patient treatment through the application of ICT.
  - Pilot projects and funding schemes supporting the introduction of real time access to information in the area of healthcare.
- Ensure that funding and reimbursement systems allow for remote-service provision, both in country and cross-border.
- 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.
- Emergency response:
  - Seamless cross-border co-operation for emergency response capabilities are essential. A prerequisite in this field is an effective and pre-arranged utilisation of the terrestrial radio-frequency spectrum.

7. Energy

Quick Wins: 2010-2011

- Encourage Member States to develop national road maps for the use of ICT to improve energy efficiency and reduce emissions across the economy and society.
- Support the development of appropriate incentives to encourage the uptake of energy-efficient technologies and sustainable procurement practices e.g. develop and promote Public-Private Partnerships in energy efficiency; develop innovative funding instruments such as co-investment funding for more smart/intelligent cities; and produce guidelines for public authorities on the deployment of sustainable ICT.
- Promote the use of Internet Protocol (IP) as the core networking open standard for Smart Grids.
- Encourage Member States to lead by example, demonstrating the sustainable use of ICT across all levels of government, i.e. building management, travel reduction, flexible working etc.
- Allow utilities implementing Smart Grids to receive CO_2 certificates under the EU ETS.

Mid-term Measures (2015)

- Identify and target research and regional funding to support the diffusion of low-carbon enabling technologies. Increase R&D funding and fiscal stimulus for environmental research Smart Grids. Encourage Member States to increase tax incentives for energy efficient products and deployment, including Smart Grids.
- Promote a policy framework for acceleration of Smart Grid deployment in Europe, addressing in particular regulatory issues and standards.
- Expand the availability of broadband to support tele-working, tele- and video-conferencing and dematerialisation across a range of practices and services.
- Use ICTs as information channels to drive more energy-efficient behaviour in homes and business.
- Drive harmonisation of energy regulations globally.

> “Europe should strive to establish an integrated, IT-enabled transportation network that enables multimodality, transparency and cost savings.”

8. Transport and Logistics

By 2015, the EU should realise its target of a 10% reduction in CO_2 emissions in transport and logistics through the effective use of ICT. In addition, Europe should strive to establish an integrated, IT-enabled transportation network that enables multimodality, transparency and cost savings.

Quick Wins: 2010-2011

- The European Commission should consolidate outcomes from existing initiatives (such as Trans-European Network Transport (TEN-T), European Satellite System (Galileo), and Intelligent Transport System (ITS), with the view to establish a road map for an integrated transportation network.
- In the context of the public-private partnership for the ‘Future Internet’, a work stream for the T&L industry should be defined and implemented.

Mid-term Measures (2015):

- The European Commission should invest in ICT research through lighthouse projects, particularly in the field of seamless transportation and logistics operations across multiple-service providers along the whole supply chain.
- IT-supported sustainability in T&L, including monitoring and calculation of energy consumption, greenhouse emissions and carbon footprint at different levels should be implemented.
- The European Commission should support the harmonisation, standardisation and interoperability of information, processes and technologies among a global network of T&L service providers.

9. e-Government

The effective usage of ICT can significantly reduce costs and enhance the quality of public services. The EU should strive to establish global leadership in e-Government by 2015. Targets could include all public services available online across the EU, the uptake increased by 50% of online public services by business and citizens, and the EU should have a fully functioning internal market for e-Government services.

Quick Wins: 2010-2011

- Ensure the effective implementation of the EU Services Directive to reduce administrative burden and as a reference case for future cross-border e-Government services.[7]
- Adopt a new EU e-Government Action Plan that sets clear priorities up to 2015. Define a set of common Key Performance Indicators (KPIs) to measure progress including indicators related to the availability and use of e-Government services; measure their broader economic and societal impact (public, value, social inclusion, reduction of administrative burden, sustainability, etc.).[8]
- The creation of an EU-wide common framework for e-Identification by 2015.

Mid-term Measures (2015)

- Promote structural reforms in public administrations that are essential to reap the full benefits of ICT: implementation of e-Government projects; promoting the use of innovative technologies and service provisioning models such as service-oriented architecture, business intelligence technology, shared service centres and 'Cloud' computing in public services; to this end the CIP-ICT-PSP should be extended.
- Foster e-Skills of employees that are needed for the effective implementation of e-Government projects.
- Take decisive steps to establish a truly functioning internal market for e-Government applications by harmonising national regulations and adopting European standards, whereas the EIF 2.0 should provide the necessary guidance. The creation of an EU-wide common framework for eIdentification by 2015.
- Ensure that procurement rules in Member States are fair and in line with the EU Transparency Directive. In particular, procurement policies of public authorities must be neutral in terms of technology, vendors and the underlying business models.
- Identify areas in which there is a proven need for cross-border e-Government services; these services should be defined in close co-operation with consumers ICT industry as well as business users and consumers.
- Promote the use of Web 2.0 technologies towards greater citizen participation in policymaking and in defining public services.
- Ensure data privacy and security through the wider use of privacy-enhancing technologies (PETs) and by conducting voluntary privacy-impact assessments (PIAs) prior to the introduction of new services, especially in a Web 2.0 environment.
- Promote the use of innovative technologies and service-provisioning models such as service-oriented architecture, business intelligence technology, shared service centres and 'Cloud' computing in public services; to this end the CIP-ICT-PSP should be extended. Promote structural reforms in public administrations that are essential to reap the full benefits of ICT.

7 *Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market*, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006L0123:EN:NOT | 8 *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - i2010 eGovernment Action Plan - Accelerating eGovernment in Europe for the Benefit of All*, http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2006&nu_doc=173

10. Trade Policy

Quick Wins: 2010-2011

- Services should be maintained as a priority alongside Non-Agricultural Market Access (NAMA) and agriculture in EU trade negotiations at World Trade Organization (WTO) level, not only in the context of current Doha negotiations but also in any future negotiations, giving due attention to different ICT sectors.
- WTO-NAMA negotiations should be advanced and concluded regarding both tariff and non-tariff barriers (NTBs) in the ICT/electronics sector. Negotiators should pay careful attention to the electronic sectoral negotiations in the context of the Doha Round and also attempt to minimise administrative burdens for our sector via the establishment of a permanent platform to address NTB matters.
- The WTO ITA (Information Technology Agreement) should continue to be implemented and expanded in terms of product and geographic scope. A 'smart and quick' update mechanism providing for the removal and prevention of non-tariff barriers is required. This will enable all citizens to continue to have access to the best products at the lowest possible costs.[9]
- Ensure all markets comply with their obligations under the WTO TRIPS Agreement.[10]
- When the EU negotiates any bilateral or regional agreements, the ICT/CE and telecoms services sector should be prioritised as a key enabler for competition and growth in all economic areas.
- The European Commission should resist third-country ICT policies, for example standards mandating non-market terms, non-transparent subsidies and procurement preferences intended to promote domestic industry, to the extent that they prevent level playing field, effective and fair competition and market participation by European ICT providers.
- Ensure that all markets respect the internationally agreed guidelines for export credits, avoiding unfair competition in EU and third-country markets.
- Major EU trading partners still operate restrictive public-procurement practices favouring locally developed innovation products. These practices discriminate against EU suppliers and should be contested before they are turned into policies. In the absence of bilateral agreements and while endorsing trade liberalisation policies, the EU should consider tabling reciprocal targeted restrictions at the negotiating tables on access to the EU procurement markets, to encourage our partners to offer reciprocal market openings and a level playing field in this domain.

Mid-term Measures (2015)

- The Basic Telecom Agreement of the GATS should be further implemented and updated. The system of trade rules needs to continue to promote legal certainty and security for services and investment and to ensure the elimination of barriers to ICT growth so that countries can benefit from what the sector offers.[11]
- The information society representation should be strengthened among the EU delegations across the world to promote our interests abroad. Both WTO commitments and FTAs are welcome tools in this context. The ICT industry is keen to share its know-how with European Commission delegates in the respective markets of the world, as many ICT companies have local representations that can provide first-hand information concerning local market-access conditions and regulatory issues.

11. Governance

Europe's Digital Agenda needs to be driven through a governance structure established and managed by the European Commission. This governance structure should:

- Ensure a horizontal approach within the European Commission, spanning the full breadth of the Digital Agenda.
- Ensure that Member States take ownership of the goals of the Digital Agenda via individual targets that collectively meet European targets.
- Feature a new, comprehensive set of Key Performance Indicators (KPIs) to measure progress and performance against other global players, covering not just broadband penetration and other direct digital KPIs but also the penetration and transformational effect of digital uptake in key economic and social sectors.
- Include an annual European Digital Agenda Summit that brings together political decision-makers from the European Institutions and Member States as well as executives from industry and civil society and which should serve as the focal point and reporting venue for the governance system.

Without such a structure, Europe's Digital Agenda will continue to comprise a wide range of disconnected and unfocused initiatives, many valuable and productive in their own right, but unable to generate economic and social transformation on the scale necessary for Europe to thrive in the Digital Age.

9 *Ministerial Declaration on trade in information technology products, Singapore, 13 December 1996*, http://www.wto.org/english/docs_e/legal_e/itadec_e.pdf | 10 *Uruguay Round Agreement: Trips Part I — General Provisions and Basic Principles*, http://www.wto.org/english/docs_e/legal_e/27-trips_03_e.htm | 11 http://www.wto.org/english/tratop_e/serv_e/s_negs_e.htm

chapter one

"THE TRANSFORMATIONAL POWER OF DIGITAL TECHNOLOGIES"

"ICT will change the world in this century like electricity changed the world 100 years ago. The world of only a few billion communication subscriptions will become a world of 50 billion connected devices...We are just at the beginning of a huge change."

Johan Bergendahl, Chief Marketing Officer, Ericsson

Overview

President Barroso's Vision EU 2020 is rightly focused on "competitiveness" as the essential condition for economic growth and job creation in the global economy of the 21st century.[12] But competitiveness in EU strategy has come to span a policy agenda so broad that it lacks strategic clarity and thus priority. Now is the time to adopt a Digital Agenda that serves the current and future needs of business and European society, and secures Europe's future economic competitiveness in an increasingly digitally driven world.

DIGITALEUROPE believes that competitiveness is best understood to depend on two underlying conditions – permanent and sustainable productivity growth and permanent innovation in products, services, business processes and business models. The priority of any EU 2020 policy objective should therefore reflect its contribution to both.

The wide range of evidence cited in this White Paper demonstrates beyond doubt that the application of digital technologies has already become the primary 'up-stream' transformational power driving both productivity growth and innovation in every market and social service sector of the European (and global) economy. In the wake of the recent economic crisis, research has likewise begun to capture both the short and longer-term growth and employment-creating potential – direct and indirect – of investment in digital-communications infrastructure

But this is just the beginning. The transformational power of digital technologies is itself vastly expanding, largely through the relentless growth of computing, transmission and data-management capacities and the exponential network effects that this growth creates. The next-generation Internet and new technologies such as 'Cloud' computing will provide a wealth of new applications and services.

The evidence of digital cause and socio-economic effect proves the role of digital technologies, and their transformational power. The Digital Agenda must be at the heart of EU 2020 Strategy. The task is urgent. The stakes – most importantly the sustainability of Europe's social model and our climate change leadership – are literally incalculable.

12 "We need a fresh approach to industrial policy, supporting industry, putting the emphasis on sustainability, innovation and the human skills needed to keep EU industry competitive in world markets." http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1272

Digital Technologies Drive Productivity Growth and Innovation

"ICT is universally regarded as a critical component of innovation. It is essential to productivity growth and to the provision of goods and services. It is the underpinning platform for many new infrastructures."

Gabrielle Gauthey,
Senior VP Public Affairs Worldwide Alcatel-Lucent

In the words of Nobel Economics Laureate Paul Krugman: "In the long run, productivity is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker."[13] The European Commission agrees, asserting in its *2009 Ageing Report*: "Within a decade, labour productivity will become the main determinant of (Europe's) future economic growth."[14]

Following decades of strong performance, Europe's productivity growth has fallen since 1995, leading to a productivity gap with both the US and Japan. Furthermore, productivity growth in major emerging economies is today much higher than within Europe. If Europe is to sustain our economic strength and all that depends upon it we must overcome our productivity gap with the rest of the world. This demands returning to higher productivity growth rates compared with other major economies.

Average Annual Growth Rates, EU-15 and United States, 1950-2006

		Growth In:		
		GDP	GDP per capita	GDP per hour worked
1973-1995	EU-15	2.0	1.7	2.4
	US	2.8	1.8	1.2
1995-2006	EU-15	2.3	2.1	1.5
	US	3.2	2.2	2.3

Source: The Productivity Gap between Europe and the United States, Trends and Causes; Bart van Ark, Mary O'Mahony, and Marcel P.Timmer.

Comparison of Labour Productivity (2008)

	GDP/ Hour (US$)	As a % of US	GDP/ Capita (US$)	As a % of US
United States	54.9	100%	46,622	100%
Canada	43.1	78.5%	39,242	84%
Japan	38.2	69.7%	34,209	73%
EU-15*	47.4	86.3%	34,302	74%
EU-27**	41.1	74.9%	30,815	66%

Source: Total Economy Database on Output and Labor Productivity, The Conference Board * referring to membership of the European Union until 30 April 2004 ** referring to all members of the European Union including Bulgaria and Romania

Table 3.3: Labor Productivity Growth (GDP per persons, annual average and percent)

	Brazil	Russia	India	China
1987-1995	.2%	-6.8%	3.8%	6.2%
1995-2008	1.0%	4.3%	4.7%	7.7%

Source: Total Economy Database on Output and Labor Productivity, The Conference Board

13 Paul Krugman, *The Age of Diminished Expectations: US Economic Policy in the 1980s*, MIT Press, Cambridge, 1992. | 14 European Commission, *The 2009 Ageing Report*, http://ec.europa.eu/economy_finance/publications/publication_summary14911_en.htm

A growing body of research leaves no doubt that the "digital intensity" of an economy is increasingly correlated with productivity improvements.

- A 2009 study prepared for the European Union illustrates that: "ICT penetration is correlated with Total Factor Productivity (TFP) growth, a key source of long-term growth."[15]
- Groundbreaking research into ICT impacts on the productivity of business enterprises conducted by 13 Member State statistical offices concluded in 2009 that: "Differential gains in productivity in more intensive ICT-using industries have been an important part of the US productivity advantage over the decade to 2004."[16]
- Other recent research supports these findings.[17]

All such research recognises the interactions through which digital technologies actually drive productivity improvements – beyond simple efficiency gains – are powerful and complex. There is widespread agreement that network effects – the ability of organisations and individuals to participate real-time in much more widespread and diverse internal and external value chains – are a major factor.

Recent research likewise leaves little doubt that much of the productivity growth powered by digital technologies is due to the vast opportunity they create to innovate in virtually all dimensions of economic life. Moreover, the previously cited 2009 research by 13 Member-State statistical offices confirms the mutually reinforcing effect of network effects and innovation, finding:[18]

- "A strong link between use of high-speed Internet connections by employees (in IT-using firms) and the ability to innovate using ideas from outside the firm and outside the customer-supplier chain."
- "Network effects in knowledge management, in the effectiveness with which firms are able to convert knowledge into new products and services, and in the speed with which they are able to communicate them. ICT intensive industries in Europe show the same tendency seen in the US for successful firms that are quicker to replicate market-share and winning innovations across production and distribution networks."

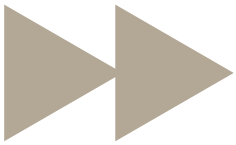
Beyond enabling innovation in the processes, products and services of existing industries, the world's rapidly evolving digital infrastructure – most notably the capabilities built into and on the Internet – create the foundation for entirely new service industries able to drive productivity growth in their customer sectors. Today's search engines are a prime example – but only the beginning of our ability to acquire and analyse information through the Internet.

At the same time, all commentators agree that while the uptake of digital tools has become the essential triggering factor for both productivity improvement and innovation, it may not in itself be sufficient. The 13 Member State study observes that "this may depend for example on a region's regulatory structures, political environment, and the flexibility and openness of its business culture".[19] At an industry-level, (it) may depend on labour and organisational structures. And all ICT efforts will depend greatly on the ability to recruit and train skilled ICT workers — such as computer scientists and engineers. Another study suggests "that more intensive ICT-using industries make the fastest progress in catching up to the best practice 'productivity frontier' in economies where there is more labour flexibility".[20]

The message is clear: Europe needs to establish the right framework conditions to foster the uptake and effective use of ICT throughout the economy in order to reap the full potential of ICT for future productivity growth and innovation. Today, such conditioning factors vary widely across Europe. All stakeholders, at all levels, will therefore need to participate in the elaboration and implementation of Europe's Digital Agenda to ensure that it delivers the productivity and economic growth we must achieve.

The prize is worth the effort. As former European Information Society Commissioner Viviane Reding has pointed out: "ICT contributed to forty per cent of overall productivity growth in the economy for the ten years up to 2004."[21] If Europe utilised the potential of new technologies to the same extent as the US, up to 60% of GDP growth could be derived from ICT.[22]

15 *The Impact of ICT on Employment*, Professor Michael Burda PhD, December 2, 2009. | **16** Mark Franklin et al., *ICT impact assessment by linking data*, Economic & Labour Market Review / Vol 3 / No 10 / October 2009, UK Office for National Statistics. http://econpapers.repec.org/article/palecolmr/v_3a3_3ay_3a2009_3ai_3a10_3ap_3a18-27.htm | **17** Other findings of particular note: • A 2002 Conference Board report, *Changing Gear Productivity, ICT and Services Industries: Europe and the United States*, concluded that "(European productivity) differences with the U.S. go beyond differences in the diffusion of new technologies. Nonetheless, technological diffusion is a big part of the story. There is diffusion of ICT in Europe, but at a slower pace than in the U.S. in particular during the second half of the 1990s." http://www.conference-board.org/economics/workingpapers.cfm?pdf=E-0009-02-WP • A 2006 report, *i2010 High Level Group Report 2006/2007* (April 20 2006), found that ICT contributed to around half of European productivity gains in the second part of the 1990s through the first half of the present decade. http://ec.europa.eu/information_society/eeurope/i2010/docs/high_level_group/work_programme.pdf • A 2008 study, *ICT, Innovation, and Economic Growth in Transition Economies* (InfoDev, prepared by ECORYS Nederland B.V. in collaboration with TNO and IDEA, 2007) of ICT growth in transition countries showed that ICT plays an important role in facilitating modernisation and economic performance. http://www.infodev.org/en/Document.553.html • A 2009 study, *Mobile Broadband for the Masses* (McKinsey & Company, February, 2009) found a positive correlation exists between a country's readiness in terms of ICT and its economic competitiveness. The study finds that broadband can have extensive benefits for emerging markets. http://www.mckinsey.com/clientservice/telecommunications/mobile_broadband.asp • A 2005 study, *Productivity: Information Technology and the American Growth Resurgence* (Dale W. Jorgenson, Mun S. Ho, Kevin Stiroh MIT Press, 2005), showed industries that use or produce ICT have played a disproportionately positive role in American growth since 1995. http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=10717 | **18** UK Office for National Statistics, *Op. cit.* | **19** *Ibid.* | **20** Mark Franklin, Peter Stam and Tony Clayton, *ICT impact assessment by linking data across sources and countries*, Office for National Statistics http://epp.eurostat.ec.europa.eu/portal/page/portal/ver-1/information_society/methodology/ICT_IMPACTS_Summary_Report.pdf | **21** Viviane Reding, *Internet of the Future: Europe must be a key player.* Future of the Internet initiative of the Lisbon Council, Speech, Brussels 2 February, 2009. Viviane Reding, *ICT Research and Telecoms: Europe's Opportunity to Lead Global Competition.* Speech, European Policy Centre Brussels, 3 October, 2008 | **22** Viviane Reding, *Growth and ICT: An Opportunity for Greece*, Open Forum for Competitiveness and Growth, Speech Athens, 5 December, 2008.



Digital Infrastructure Investment Drives Economic Growth and Job Creation

"The long-term competitiveness of Europe will be greatly enhanced through investment in areas like broadband compared to other physical infrastructures."

Heikki Norta
SVP Corporate Strategy, Nokia

In the wake of the current global economic turbulence, Europe needs to stimulate both short- and longer-term growth and job creation. Recent studies from a range of different countries confirm both the short- and long-term growth and job-creating power of digital infrastructure investment, not just from the construction of the infrastructure itself but also from the immediate, strong and durable "multiplier" effects of enhanced digital capability throughout the economy, especially for small businesses.

- A 2009 World Economic Forum report found that such infrastructure stimulates "both upstream (i.e. ICT sector) capacities (R&D, product design, applications development) and downstream services (logistics, e-Health, 'Smart Grids', etc) thereby acting as a multiplier for economic growth."[23]
- A 2009 study by Micus Management Consulting on behalf of the European Commission found that greater broadband network adoption in the European Union would, in a base-case scenario, create more than one million jobs between 2006 and 2015 and contribute to €849 billion in economic activity.[24]
- For Germany alone, a 2010-2020 scenario of aggressive broadband and ultra-broadband coverage at a cost of around €37 billion, would generate €170 billion in direct and indirect GDP, and create an estimated 968,000 jobs.[25]

23 World Economic Forum (Davos) 2009 report, *ICT for Economic Growth: A Dynamic Ecosystem Driving the Global Recovery*. http://www.weforum.org/pdf/ict/ICT%20for%20Growth.pdf | 24 *The Impact of Broadband on Growth and Productivity: A Study on Behalf of the European Commission*, Micus Management Consulting, 2009. Note that this projection corresponds to a constant adoption rate equal to European average over 2004-2006. http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/broadband_impact_2008.pdf | 25 Drs. Katz *et al. The Impact of Broadband on Jobs and the German Economy*, June 2009. http://www.enter.ie.edu/cms/en/documento/7092/1

- A 2009 study by McKinsey found that raising broadband penetration levels in the less mature Central and Eastern European markets could result in €60-80 billion in additional GDP and 900,000 to 1.3 million additional jobs.[26]
- In April 2009, the Information Technology and Innovation Foundation (ITIF) found that £15 billion invested in the UK's ICT infrastructure (broadband networks, intelligent transportation systems, and smart power grids) would create approximately 700,000 UK jobs, more than half of which would come from small businesses.[27]
- In January 2009, from an investment of $30 billion split evenly between broadband, health and smart-power grid infrastructures, ITIF projected the creation in the US of 949,000 jobs – more than 500,000 in small business. Such investment was found to "(1) contribute to significant immediate direct and indirect job growth in our economy; (2) create a 'network effect' throughout the economy that, in some cases, doubles the number of directly created jobs; and (3) provide a foundation for longer term benefits, including government cost savings, economy-wide productivity, and improved quality of life for Americans".[28]

It is important to note that these projections are all (with the exception of part of the German study) still predicated on investment in the current generation of digital technologies and broadband capacities. So-called Next-Generation Networks and digital tools will over the next decade enhance the multiplier effect.

Digital technologies to sustain our social model:

The growing power of digital technologies to drive productivity growth, innovation and employment assumes its full significance in the context of Europe's ageing population. The challenges and opportunities inherent in this demographic reality will become ever more sharply defined and evident over the coming decade.

It is not news that Europe is ageing. In its most recent (2009) Ageing Report the European Commission projects: "Low birth rates, rising life expectancy and continuing inflow of migrants can be expected to result in an almost unchanged, but much older, total EU population by 2060, meaning that the EU would move from having four working-age people (aged 15-64) for every person aged over 65 to a ratio of only two-to-one."[29]

The Commission goes on to state the obvious: "With decreasing labour supply, productivity will have to be the source of future economic growth. A prudent assumption is that Member States' labour productivity growth would converge to a long-term historical average in the EU of 1.75%, close to that recorded in the US over the very long term. As a result, the annual potential GDP growth rate would decline significantly. A shrinking working-age population will act as a drag on growth and on per-capita income." The OECD has estimated that European GNP per capita will be 18% lower in 2050 than it would be with a constant dependency ratio.[30]

It is self-evident that our ability to sustain our social model will depend on our ability to significantly outperform these projections, which means raising our long-term average productivity growth well around the European Commission's assumption of 1.75%.

Almost a decade ago, EU Member States adopted a clear three-part strategy for confronting these demographic realities:[31]

1. Reducing debt at a fast pace;
2. Raising employment rates and productivity;
3. Reforming pension, healthcare and long-term care systems.

The recent crisis-driven increase in public debt makes the first objective more difficult, which in turn makes the other two more urgent. Digital technologies will be vital to realising both.

26 McKinsey & Company, *Op. cit.* | **27** Jonathan Liebenau *et al. The UK's Digital Road to Recovery*, The Information Technology and Innovation Foundation, April 2009. http://www.itsa.org/itsa/files/pdf/digitalrecovery.pdf | **28** Robert D. Atkinson *et al. The Digital Road to Recovery: A Stimulus Plan to Create Jobs, Boost Productivity and Revitalize America* http://www.itif.org/files/roadtorecovery.pdf | **29** European Commission, *op. cit.* | **30** *Trends in Immigration and Economic Consequences*, OECD 2001. http://www.oecd.org/dataoecd/44/45/2086160.pdf | **31** Presidency Conclusions, point 47, Stockholm European Council 23-24 March 2001, http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.%20ann-r1.en1.html

Raising Employment Rates and Productivity – The Digital Dimension

Achieving both will be vital to maintaining per-capita output levels. The power of digital technologies to drive productivity growth has already been stressed. But they will also prove instrumental in raising European employment rates.

The European Commission reports: "Almost all Member States have tightened the eligibility requirements for receiving a public pension, notably by lifting the retirement age and restricting access to early retirement schemes. While the employment rates of older workers have been rising in recent years, there is still much room for further progress. Only around 50% of people in the EU are still in employment by the age of 60."[32] At the same time, the Commission expects for the EU as a whole, the labour market participation rate (those of working age actually working) will increase from 70.5% in 2007 to 74% in 2060, but employment is nevertheless projected to shrink by around 19 million people.

Clearly, in a scenario of unchanged total population, the goal must be to increase the labour-market participation rate well beyond 74%, and thereby limit Europe's workforce shrinkage as far as possible, to less than 19 million. Efforts must therefore focus on exploiting the significant potential of increasing the employment rate of the over 60s as statutory retirement ages rise (which also decreases the number of older dependents and their cost to the state). At the same time, the focus must remain on increasing the employment rate of younger Europeans – particularly those at risk of exclusion. Recent research confirms that access to even-more powerful digital networks and tools, together with the skills to use them, will be instrumental in these efforts:

An October 2009 report commissioned by the UK Champion for Digital Inclusion stated: "10.2 million adults (21% of the UK population) have never accessed the Internet, including 4 million adults (9%), who are both digitally and socially excluded. The spread of digital skills and online employment tools can significantly increase employment and earning power, particularly among disadvantaged and older job-seekers."[33]

Raising the employment rate also means helping more job-seekers find work. Digital tools and platforms already provide access to much wider job markets and greatly improve the chances of a job-seeker finding work.[34]

32 European Commission, *Op. cit.* | 33 *The Economic Case for Digital Inclusion*, PriceWaterhouseCoopers, October 2009. http://raceonline2012.org/node/18 | 34 For a useful discussion of the current state of on-line job-hunting, see Dr. Katharine Hansen, *The Long, Slow Death March of Job Boards – and What Will Replace Them: A Quintessential Careers Annual Report 2009*: http://www.quintcareers.com/job-board_death_march.html


“We have barely begun
to exploit the potential
of digital technologies...”

Reforming Pension, Healthcare and Long-term Care Systems – The Digital Dimension

In its 2009 ageing report, the European Commission states: "In the fields of pensions, healthcare and long-term care, [it] will continue to support Member States in their effort to improve the efficiency and effectiveness of social spending."[35]

Improving the efficiency and effectiveness of healthcare in particular will trigger a virtuous circle of age-related benefits. Again, in the words of the European Commission: "A population in better health will be able to work longer as it grows older, allowing higher productivity and labour participation. Additionally, it will need less healthcare, ultimately resulting in decreased pressure on public finances. Increasing the healthy life expectancy will be a crucial factor in attracting more people into employment and retaining them on the labour market."[36]

We have barely begun to exploit the potential of digital technologies to improve the productivity and quality of healthcare. A recent joint study by the EU and the OECD found: "The diffusion of ICT in the healthcare system to date has been limited in comparison with that in other sectors of the economy in OECD countries.[37] Moreover, adoption in healthcare has not diffused evenly through the healthcare market. Currently, the most mature ICT applications are in the financial and administrative domains. Digital reporting of laboratory and radiology results is also well established in many countries. In comparison, adoption of applications aimed at improving the quality and timeliness of patient care has been slow."[38]

The Silver Economy – Digitally Enabled Opportunities in Ageing

The ageing of Europe does not just present difficulties to overcome, as the European Commission recognises: "Societies in which people live longer also offer opportunities for developing new products and services. The growth potential in these future markets is large and, as living longer is not a phenomenon confined to Europe, the solutions, products and services developed can be exported to third countries, opening new markets there."[39]

Exploiting these opportunities will increasingly rely on the enabling power of digital technologies, as can be seen for example from new product and service initiatives adopted within the recently established Silver Economy Network of European Regions.[40]

35 European Commission, *Op. cit.* | 36 *Ibid.* | 37 *Achieving Better Value for Money in Healthcare*, OECD Health Policy Studies, 2009. http://browse.oecdbookshop.org/oecd/pdfs/browseit/8109171E.PDF | 38 We return to this issue in Chapter 2
39 European Commission, *Op. cit.* | 40 2010 Silver Economy Summit May 13-14, 2010 World Trade & Convention Centre Halifax, Nova Scotia. http://www.silvereconomy-europe.org/

Digital Technologies Drive Europe's Climate-Change Leadership

"Climate change is the area where ICT is part of the solution – a sector where ICT can really do its best."

Timo Ali-Vehmas,
Nokia VP Compatibility & Industry Collaboration

Europe has the potential to re-establish itself as the leader in the global effort to combat climate change. The practical ability of economic operators and individuals to reduce emissions and increase overall resource efficiency will increasingly depend on the transformational power of digital technologies – particularly their growing power to capture, process and react to real-world, real-time data.

In a March 2009 Communication on mobilising ICT to facilitate the transition to an energy efficient, low-carbon economy, the European Commission stressed: "[ICTs] are known for their broader, economy-wide capacity for energy-saving and for their potential to effect rapid and profound change across every facet of society, government and industry."[41] The European Commission noted the production and use of ICT equipment itself as being responsible for around 2% of Europe's carbon emissions, but that by 2020 ICTs are expected to drive emissions reductions of up to 15% of the remaining 98%, as well as cost savings. This enabling role will include:

- ***Helping scientists monitor and measure climate change:*** At the most fundamental level, digital technologies such as satellite Earth Observation (EO) are helping society understand the carbon-emissions problem. This role is large and growing. As an example, global telecommunications systems generate real-time exchanges of meteorological data and other information between international and national centres.[42]
- ***Allowing individuals and businesses to manage their own energy consumption:*** Recent studies have shown digital monitoring and management of resources can reduce energy consumption in buildings by 17% and reduce carbon emissions in transport logistics by up to 27%.[43]
- ***Replace commuting with collaboration tools:*** Tools such as tele-presence, online meeting, web-conferencing and video-conferencing have the potential to drastically reduce the amount of GHG-emitting travel – including daily commuting – required for social and business purposes.[44]
- ***Smart power:*** Smart energy grids have the potential to reduce carbon emissions on a grand scale.[45] The EU is aiming for a 20% increase in energy efficiency by 2020. ICT-based innovations provide one of the most cost-effective means to reach this target.
- ***Smart mobility:*** Through both smart vehicle propulsion technologies and smart transport and goods-handling logistics, ICT will bring enormous reductions in carbon emissions.[46]

41 European Commission, *Communication from the European Commission on mobilising Information and Communication Technologies to facilitate the transition to an energy-efficient, low-carbon economy*, COM: (2009) 111 final. http://ec.europa.eu/information_society/activities/sustainable_growth/docs/com_2009_111/com2009-111-en.pdf | 42 *ICTs and Climate Change*, ITU-T Technology Watch Report #3, ITU, December 2007. http://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000030002PDFE.pdf | 43 European Commission, *Op. cit.* | 44 *Smart 2020: Enabling the Low Carbon Economy in the Information Age*, Global e-Sustainability Initiative (GeSI). http://www.smart2020.org/ | 45 European Commission, *Op. Cit.* | 46 *Ibid.*: "Through a host of efficiencies in transport and storage, smart logistics in Europe could deliver fuel, electricity and heating savings of 225 MtCO2e. The global emissions savings from smart logistics in 2020 would reach 1.52 GtCO2e, with energy savings worth □280 billion."

- ***Sustainable energy innovation:*** Digital capabilities underlie the development, commercialisation and operation of major new renewable energy sources. For example, offshore wind farms are controlled remotely with digital solutions that can detect and repair problems from remote locations.[47] Smart-Grid technology is likewise enabling better management of solar technologies.[48]

In sum, digital technologies are changing the very nature of the climate-change challenge – helping scientists understand the problem, supporting sector-specific innovations, creating new industries and business opportunities in the fast-growing green economy, empowering organisations and individuals to reduce their carbon footprints and creating the awareness and debate that will reinforce Europe's leadership position up to 2020 and beyond.

47 EICTA, *High Tech, Low Carbon*, April 2008. http://www.digitaleurope.org/web/news/telecharger.php?iddoc=762 | **48** *Smart Roads, Smart Bridges, Smart Grids*, Wall Street Journal, February 17, 2009

chapter two

"THE TRANSFORMATIONAL POWER OF DIGITAL TECHNOLOGIES:" SECTOR AND CASE EXAMPLES

"A unified Internet strategy in Europe would have a more powerful effect on business than improving roads and train networks."

Pascal Brosset, Head Corporate Strategy, SAP

Overview

Chapter one of this White Paper demonstrates that the transformational power of digital technologies will increasingly drive productivity, sustainable growth, innovation and employment throughout the European economy. The myriad ways in which digital technologies actually do so are best illustrated at the disaggregated levels of industry sector, individual organisation and individual empowerment.

The five sector commentaries and case examples presented in this chapter have been selected because each helps create a practical vision of the magnitude of the transformational power and potential of digital technologies in its sector. Together, they help create a wider vision of a productive, innovative digital Europe in 2020.

Manufacturing

The importance of manufacturing for Europe: Manufacturing industries remain the driving force of Europe's economy. Upwards of 70% of total EU GDP and employment are estimated to depend on our manufacturing base. This base covers more than 25 industrial sectors, dominated by SMEs, accounting for 42% of European value-added and providing more than 30 million jobs representing 18% of EU-27 employment.[49] But these sectors also underpin much greater economic activity. Each job in manufacturing is linked to two jobs in services, many in SMEs.

Services alone cannot ensure our future economic strength. We must maintain world-leading manufacturing enterprises at the core of the European economy.[50] Doing so will depend on their ability to compete in global markets against lower-cost competitors based on the strength of their superior quality and added-value. Ensuring market competitiveness increasingly depends on the leading-edge digital technologies that the lynch pin of competitive advantage.

49 European Commission i2020 Mid-Term Report | 50 http://www.manufuture.org/index.html

The future of European manufacturing: In 2004, a broad cross-section of stakeholders set out the following vision of the future of European manufacturing, based on its transformation from a resource-intensive to an innovative, knowledge-intensive sector:[51]

> "In order to avoid competition based purely on production cost, European industry needs increasingly to concentrate its capabilities on high added-value products and technologies – a broadened service range that fulfils worldwide customer requirements in terms of product satisfaction and meeting environmental and social expectations. Increasing the knowledge content of manufacturing will lead to more economical use of materials and energy.
>
> A broader definition of the term 'manufacturing' will encompass an integrated system that includes the whole cycle of creation, production, distribution and end-of-life treatment of goods and product/services – realising a customer/user-driven innovation system. The current, typically linear, approach to research, development, design, construction and assembly will be replaced by simultaneous activity in all areas to satisfy global demand and shorten time-to-market."

The importance of ICT: The authors recognise that the transformation to customer-driven innovation – based on the sustainable use of resources and integrated manufacturing cycles – will depend in all manufacturing sectors on the pervasive use of digital technologies. These play a key role not only in reducing costs but, more importantly, as a tool to effectively leverage and implement current trends such as, distributed and just-in-time manufacturing, on a global scale.

Indeed, it is the very prospect of their ever-growing capacity and power that – explicitly or implicitly – underlies the vision itself, as two current projects in the European automotive sector demonstrate:[52]

- *Build-to-Order:* A European project consortium of automakers and suppliers has worked together over the past five years to map the industry's future, starting from the premise: "The only way to ensure the economic survival of organisations, establishments and employees in the European automotive industry is to escape, in the long run, the competitive pressure from cheap labour countries."[53]

  From this point of departure, the consortium addressed the conceptual and practical aspects of the delivery to the customer of a bespoke product no more than five days after placing the order, a radical leap from the 'stock push' and mass-production thinking of the past century, to a stockless 'Build-to-Order' (BTO) production strategy. This requires the reinvention of the complete automotive value stream from material producers to end-consumers of cars, through a cost-optimised system delivering what the customer really wants without delay.

  The project has concentrated on future scenarios for new flexible planning and execution processes, new supply-network organisation structures, and new supporting technologies in the year 2015, in order to reach the five-day target. In an independent article reviewing progress toward the BTO vision, three academic experts offer the following assessment of its digital dimension:[54]

  > "The emphasis of all future developments within the ICT systems of the automotive industry will be on collaboration, seamless information flow, and monitoring. New [ICT] technologies will allow the [BTO] processes to become a reality. [The project consortium] considers ICT as a major enabler of new logistics concepts within a flexible production network. This is allied with new forms of functional co-operation between companies involved along the value chain. The flexibility needed in supply networks can only be attained [through] a new level of collaboration in the supply network."

51 *ManuFuture A Vision for 2020*, Report of the High Level Group, November 2004. http://www.manufuture.org/documents/manufuture_vision_en[1].pdf | 52 More than 2.2 million people are employed directly in the manufacture of motor vehicles and components, almost 7% of all manufacturing employment and 1% of total employment in the EU27. Directly and indirectly the automotive sector supports more than 12 million European jobs. http://www.acea.be/index.php/news/news_detail/economic_turmoil_hits_vehicle_makers_hard/ | 53 http://www.iilpt.org/public/index.html/document_view | 54 Gareth Stone *et al. Transformation of the European auto industry: the future of lean, Stone, Parry, Graves*; The Capco Institute Journal of Financial Transformation. http://www.capco.com/files/pdf/66/02_FACTORY/01_Transformation%20of%20the%20European%20auto%20industry%20the%20future%20of%20Lean%20(Opinion).pdf

The Connected Car: The Connected Car concept is based on potential new services and business models enabled by ultra-high bandwidth, always-on network connectivity, 'Cloud' computing and 'Cloud' storage and value-added network-based capabilities such as content management, location-based services, presence, identity, security, billing and innovative in-vehicle hardware and software systems.[55] In effect, the vehicle becomes an entirely new mobile platform for a whole new class of vehicle-centric and travel-centric applications and services, including remote maintenance (such as vehicle software and application upgrades), safety and mechanical diagnostics and enhanced navigation, including detailed traffic and weather information. The combination of the intelligent network, the smart vehicle and common developer tools opens up an entirely new value chain.

Success factors for Europe: The transformation of Europe's manufacturing base through the application of digital technologies will depend on:

- ICT skills: Although 55% of Europe's ICT professionals are today employed outside the ICT sector, European manufacturers nevertheless face an acute shortage of the advanced management and technical IT skills necessary to transform their operations. Reliance only on outside ICT vendors will not be sufficient. This is an absolute barrier to the future competitiveness of European manufacturing, particularly compared with the growing ICT skills pool available in emerging manufacturing powers in Asia.
- ICT platforms allowing heterogeneous systems to communicate with each other wherever located and throughout the value chain.
- Leading-edge R&D and innovation in sector-specific embedded ICT (primarily software), requiring close collaboration between ICT technology suppliers and users.
- Workforce flexibility based on new skills and roles.

55 http://www.ngconnect.org/ecosystem/connected-car.htm

> "In 2008 T&L was the biggest single sector in the EU economy, generating 950 billion euro in direct revenues and representing around 7% of European GDP. The 21st century economy will rely increasingly on an extended and more tailored supply chain."

Transportation and Logistics

Importance for Europe: Transportation and Logistics industries (T&L) – those that manage the transport and handling of physical goods (and people) are the 'lifeblood' of the European economy.[56] Levels of growth in transport and levels of economic growth are strongly associated. The sector employs almost 8 million people – around 5% of the total European workforce.[57] In 2008 T&L was the biggest single sector in the EU economy, generating €950 billion in direct revenues and representing around 7% of European GDP.[58] The 21st century economy will rely increasingly on an extended and more tailored supply chain. These services are a vital link in the value chain, especially for the European manufacturing and retail industries. Current customer-driven supply chain integration scenarios in manufacturing sectors (like Build-to-Order in the automotive sector) are unthinkable without highly orchestrated logistics support for the handling and just-in-time delivery of component parts and finished goods.

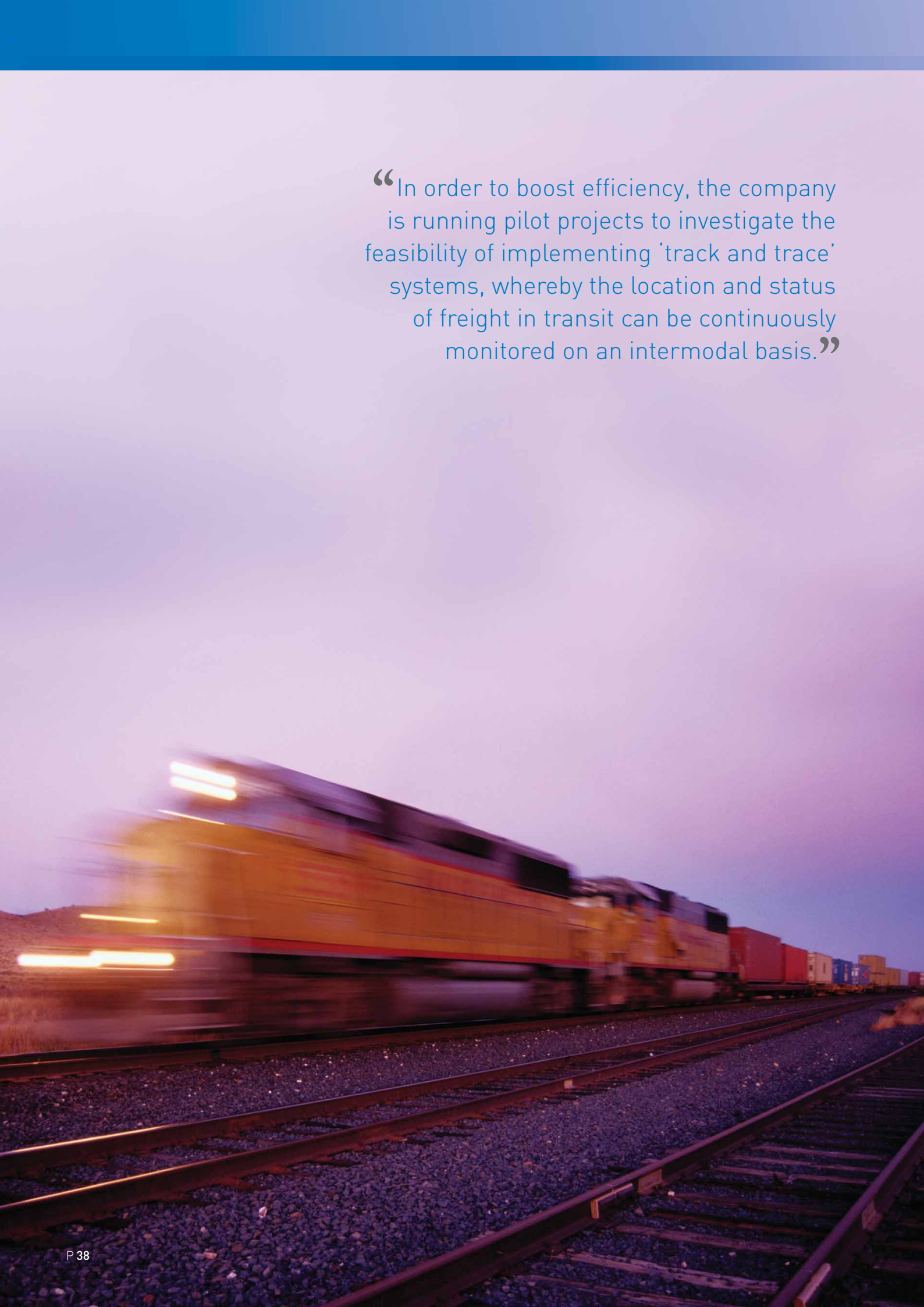
The future of European transportation and logistics: In response to the growing value of and demand for such T&L services, PriceWaterHouseCoopers report "T&L companies looking to build a durable business must continuously increase their own added-value".[59] One way is to fill the current gap in their ability both to provide global coverage with proven and robust systems and processes, and to use more functional and flexible technology enhancing the supply chain's transparency. At the same time, the sector faces significant challenges, most notably: growing pressure to reduce the environmental impact of its activities and its 30% share of total energy consumption across the EU; increasing congestion and ageing transportation infrastructures; an ageing workforce.[60]

Importance of ICT: As T&L business models change in response to these opportunities and challenges, many companies are evolving from forwarding and warehouse managing companies to highly industrialised, ICT driven supply chain providers.[61] The development of services based on a mobile 'Internet of Things' holds particular strategic importance for the sector, as do digital solutions for traffic congestion, emissions reduction, and intermodal transport systems and infrastructure. The following case studies illustrate how digital technologies already underpin the competitiveness of 2 of Europe's global T&L leaders.

- *SmartTruck:* Deutsche Post DHL, one of the world's leading logistics group, develops intelligent delivery vehicles which optimise tour planning and vehicle usage. The 'SmartTruck' project relies on radio-frequency identification (RFID), geo and telematics data, a dynamic tour planning and optimisation system, plus navigation and communication technologies. Initial results from a pilot project in Berlin reveal that the 'SmartTruck' can make more deliveries while driving fewer kilometres due to a combination of factors: the routes are significantly shorter (10% to 15%); fuel usage and CO_2 emissions have been reduced by 10% to 15%, and the number of stops per hour increased by 8% to 9%. Consequently, DHL Express customers also receive better service. Moreover, since parcels are fitted with RFID labels, senders and recipients can track their shipments, receiving an SMS some 30 minutes before a specific delivery with precise details on arrival time.

56 "The T&L industry sector comprises a wide range of service providers, covering all modes of transport – air, road, rail, sea – as well as related services such as warehousing, handling, stevedoring, and finally value added services like packaging, labelling, assembling etc. In addition to these 'physical' services, T&L includes all sorts of planning, organisational and management services in the area of transportation and logistics. Over recent years, we have seen a trend to consolidation, resulting in larger, integrated groups operating in more than one of the T&L sub-sectors. As a result, the limits between the T&L sub-sectors become more and more indistinct." PriceWaterhouseCoopers, http://www.pwc.com/gx/en/transportation-logistics/index.jhtml | 57 European Monitoring Centre on Change. http://www.eurofound.europa.eu/emcc/content/source/eu08008a.htm?p1=emcc_dossier&p2=null | 58 *The Top 100 of Logistics 2008/2009*, Klaus and Kille, ed. DVV Media Group. http://www.bw-invest.de/eng/index_eng_4994.aspx, *A Sustainable Future for Transport*, European Commission 2009. http://ec.europa.eu/transport/strategies/2009_future_of_transport_en.htm | 59 PriceWaterhouse Coopers, *Op. cit.* | 60 European Monitoring Centre on Change, *Op. cit.* | 61 PriceWaterhouseCoopers, *Op. cit.*

“In order to boost efficiency, the company is running pilot projects to investigate the feasibility of implementing ‘track and trace’ systems, whereby the location and status of freight in transit can be continuously monitored on an intermodal basis.”



- *Netherlands-based Samskip:* This is one of Europe's largest container transport companies, transporting goods by land, sea and air. In response to growing traffic congestion on the roads, Samskip has begun – for shorter intra-European journeys – to switch some of its freight traffic to short sea trips. It is also seeking to shift more of its traffic to railways, in light of the rising price of oil. In order to boost efficiency, the company is running pilot projects to investigate the feasibility of implementing 'track and trace' systems, whereby the location and status of freight in transit can be continuously monitored on an intermodal basis.[62]

Success factors for Europe: A 21st century T&L industry will require significant investment in ICT by all players in the value chain. It also requires adapted EU policy and regulatory conditions that support the accelerating integration of the sector within the EU internal market and beyond, and its growing reliance on ICT solutions.

In December 2008, the European Commission adopted, as part of the Green Transport Initiative, an Action Plan for the Deployment of Intelligent Transport Systems in Europe and an accompanying Proposal for a Directive laying down the framework for the deployment of Intelligent Transport Systems (ITS) in the field of road transport and interfaces with other transport modes. The European Commission proposed specific measures aimed to accelerate the deployment of ITC with the aim of improving energy efficiency in transport systems. Similar efforts are under way elsewhere in the world.[63] This is a good start, but much more can and must be done.

62 European Monitoring Centre on Change, *Op. cit.* | 63 See for example the forward-looking Intelligent Transport Systems programme of the U.S. government: http://www.its.dot.gov/index.htm

Energy

Importance for Europe: Beyond the self-evident importance of secure and affordable energy throughout the economy and society, Europe's energy sector itself constitutes a major piece of our industrial base. Eurostat's latest figures estimate that the EU-27's roughly 22,000 energy-sector enterprises employed more than 1.2 million people, around 3% of the total industrial workforce, and generated value-added of €180 billion – 9% of the total for all industry.[64] Moreover, Europe's energy sector has been a source of strong growth and competitive performance: between 2000 and 2006, labour productivity increased by 57% (and is higher today than for European industry as a whole), while the total number of energy enterprises increased by 52%.

The future of European Energy: Europe's three strategic long-term energy policy objectives are clear: 1) greater energy independence, 2) reduced greenhouse-gas emissions, and 3) a competitive, continental-scale Single Market for energy. This scenario carries with it major transformational challenges for European energy enterprises.

Most importantly, and as President Barroso recognises in his 2020 vision, all three now depend primarily on the transformation of Europe's gas and electricity grids into continental scale Smart Grids. The transformation of the electricity grid is critical.[65] Only with a more decentralised 'smart' electricity grid can 1) indigenous renewable power from decentralised generation sites be connected and its intermittency managed, 2) consumers manage their consumption and also eventually become producers, and 3) a continental-scale grid itself be managed.

Importance of ICT: Here again, Europe's strategic vision is squarely predicated on the power of digital technologies to transform, starting with our grid infrastructures but extending to consumer control over their consumption. As the following case demonstrates, transformational smart-power grid implementation projects are beginning to proliferate across Europe, bringing together transmission system operators, power-generation industries, consumers and ICT players.

- *MEREGIO (Minimum Emissions Region)* is a smart-grid project to cut energy consumption and minimise CO_2 emissions by integrating an entire power grid system – generation, distribution and consumption – into a single, interactive real-time network. The project is currently under development for pilot deployment in the Karlsruhe-Stuttgart region of southern Germany, one of the most densely populated areas of the country and widely considered Europe's biggest manufacturing and high-tech hub.

  The objective of the project is to create an optimised and sustainable power network that reduces CO_2 emissions to as close to zero as is technically feasible – a so-called Minimum Emissions Region (MEREGIO).

  The solution will integrate clean energy generated by solar panels, wind turbines, fuel cells and other sources of distributed generation and provide the grid operator with real-time information about the entire power network in terms of supply and consumer demand. This will enable the operator to predict power flow, adapt rapidly to changing situations, send price signals to the consumer to encourage demand or restrain it if there is risk of a bottleneck and create a regional energy market that incorporates end customers.

  Consumers will be able to monitor their energy consumption and CO_2 footprint, respond to price signals and adapt consumption according to price and availability, and sell surplus power from their own generators to the grid when price conditions are most favourable.

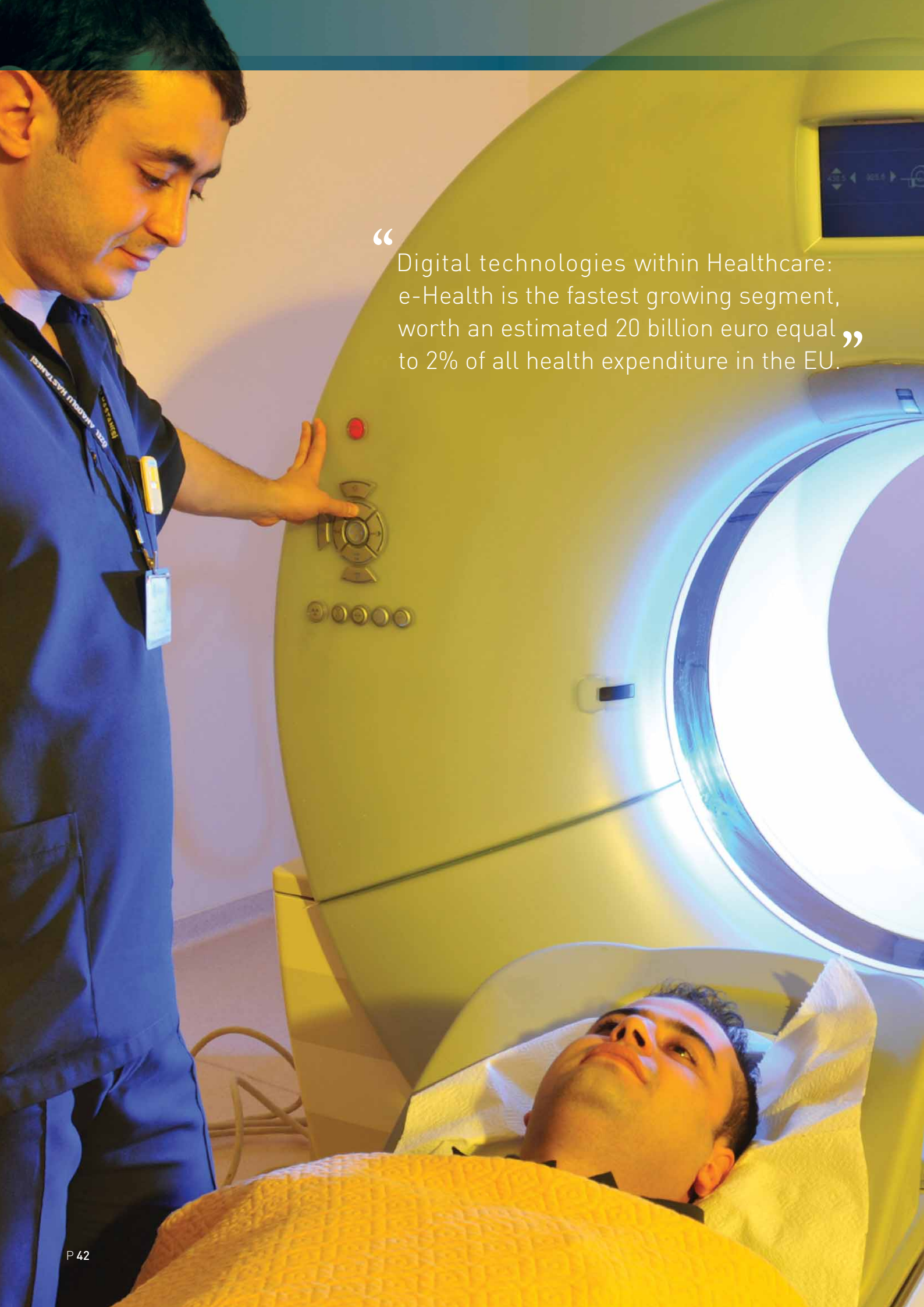
Success factors for Europe: Promising projects such as MERIGIO demonstrate the enormous transformational power of ICT in the energy sector. However, moving to large-scale Smart Grids and the widespread use of smart metering in Europe will be a major challenge. Utilities, the ICT industry and users remain reluctant to invest in hardware and services due to lack of European implementation of global standards. Operators of energy networks often lack incentives to significantly increase their IT spending for the development of smart grids. At the same time, many end users are simply not aware of the extent to which modern technologies can help to reduce the energy bill.

On the other hand, Europe has every opportunity to lead the world in Smart-Grid development. *As Business Week* recently reported, Italy has become, in less than a decade, "the surprising world leader in the development of a smarter electrical grid. Some 85% of Italian homes are now outfitted with smart meters – the highest percentage in the world and more such devices than exist in the whole of US utilities worldwide, such as San Francisco's PG&E (PCG) and Florida's FPL Group (FPL), are eager to learn how (Italy) pulled off its smart-meter revolution."[66]

Satellites enable the management of renewable-energy sources: Renewable-energy sources are the key to the pursuit of a sustainable society. However, such energy sources often exist in very remote areas where fixed broadband infrastructure is non-existent. In such areas, wireless technologies, like terrestrial-based mobile broadband or satellite systems, are needed to provide the necessary links. One example is the Italian corporation GSE that is using 5,000 satellite terminals provided by Astra to provide the intelligent links to supervise and manage such renewable-energy sources.

64 http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-09-072/EN/KS-SF-09-072-EN.PDF | 65 *One of the next great European projects is to give Europe a new European super-grid for electricity and gas*, Barroso, Op. cit. | 66 http://www.businessweek.com/globalbiz/content/nov2009/gb20091116_319929.htm

"Digital technologies have the power to transform grid infrastructures and enable consumers to control their consumption."



“Digital technologies within Healthcare: e-Health is the fastest growing segment, worth an estimated 20 billion euro equal to 2% of all health expenditure in the EU.”

Healthcare

Importance for Europe: The economic importance for Europe of a healthy population – and more particularly a healthy ageing population – has already been touched upon. Spending on healthcare in Europe currently represents 9% of its GDP, and estimates suggest that it could reach 16% by 2020 among OECD countries.[67] Healthcare is extensive and complex and is, by some estimates, the largest single employment sector in Europe, accounting for 10% of Europe's workforce. This share could triple by 2020.[68]

Within this sector, e-Health is the fastest growing segment, worth an estimated €20 billion equal to 2% of all health expenditure in the EU.[69] As such it was recognised as a pillar for European prosperity in the 2006 report, *Creating an Innovative Europe*.[70]

The future of European healthcare: In an important November 2009 joint EU/OECD working paper entitled *Achieving Better Value for Money in Healthcare*, the authors stress: "Healthcare systems are coming under pressure due to rising expectations for high-quality care in a period of population ageing and rapid technological change."[71] They conclude that the most important future challenge for the sector is to improve the quality of care while also improving productivity even as the practice of medicine itself continues to evolve:

> "The practice of medicine has changed fundamentally over time. The delivery of care has gradually shifted from individual practitioners to complex, multi-faceted institutions employing a variety of medical and non-medical professionals. Thus, much of care delivery is no longer under the sole control of physicians, let alone one single physician. In light of these changes in medical practice, healthcare systems almost everywhere are now facing new problems in monitoring healthcare processes and outcomes."

Closely linked to the dual challenge of higher quality healthcare and higher productivity is the effort to deliver primary healthcare beyond hospital walls. The multiple economic and health benefits of such decentralisations strategies are apparent.

Importance of ICT: The EU/OECD report goes on to paint a compelling picture of the importance of ICT for improving the quality of healthcare as the practice of medicine evolves:

> "This evolution [sic] has generated awareness about the need for a more comprehensive and integrated systems approach to collecting health information. The diffusion of ICT in the healthcare system to date has been limited in comparison with that in other sectors of the economy in OECD countries. Moreover, adoption in healthcare has not diffused evenly through the healthcare market. Currently, the most mature ICT applications are in the financial and administrative domains. Digital reporting of laboratory and radiology results is also well established in many countries. In comparison, adoption of applications aimed at improving the quality and timeliness of patient care has been slow."

Adoption of information and communications technologies is a critical step for improving healthcare quality. Automated data collection and processing can provide rich data in an accessible form that can facilitate benchmarking and be used to identify quality-improvement opportunities. A variety of success stories suggest that, when coupled with organisational changes and system re-engineering, measurement-based performance management programmes, investment in information technology and the use of clinical guidelines can make a difference."

67 European Commission e-Health Taskforce report 2007, in preparation for the Lead Market Initiative: *Accelerating the Development of the e-Health Market in Europe*, as quoted by COCIR White Paper, *Towards a sustainable healthcare model*. http://www.cocir.org/uploads/documents/-34-cocir_wp_on_sustainable_hc_-_released_on_19_nov._2008.pdf, Price Waterhouse Coopers, *HealthCast 2020: Creating a Sustainable Future*, as quoted by COCIR, *Op. cit.* | 68 *Ibid.* | 69 A presentation on the EU e-Health Agenda, Illias Iakovidis, ICT for Health Unit, DG INFSO to the health Conference, "Overcoming the challenges to e-Health," 17 June 2009 organised by Linklaters. | 70 Report of the Independent Expert Group on R&D and Innovation chaired by Esko Aho, http://www.eua.be/eua/jsp/en/upload/060119Aho_report_final.1151581421179.pdf | 71 *Achieving Better Value for Money in Healthcare*, OECD Health Policy Studies, 2009. http://browse.oecdbookshop.org/oecd/pdfs/browseit/8109171E.PDF

> “Adoption of information and communications technologies is a critical step for improving healthcare quality. Automated data collection and processing can provide rich data in an accessible form that can facilitate benchmarking and be used to identify quality-improvement opportunities.”

Today’s phenomenal array of communication possibilities offers 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.

Remote monitoring and consultation, implantable and wearable biosensors and on-line networks for peer support provide new care-delivery models that allow stretched human and financial resources to scale to provide care and support for older people in their own homes that is 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 following projects demonstrate the power in practice of this digital vision for improved European healthcare:

- *The Health-e-Child Platform* consortium is in its final year (from mid-2009) of work towards giving clinicians a comprehensive view of a child’s health by vertically integrating biomedical data, information and knowledge that spans the entire spectrum from imaging to genetic to clinical and epidemiological data. Utilising the enabling power of digital technologies, the consortium has developed a biomedical information platform that supports sophisticated and robust search, optimisation and matching techniques for heterogeneous information. Based on digital networks and tools, work is concluding in the integration of innovative predictive disease models, complex data visualisation and knowledge-discovery applications, with the ultimate goal of supporting clinical decision-making in cardiology, rheumatology and neuro-oncology.[72]

  The consortium is made up of 15 partners from eight Member States. The project brings together four major European paediatric hospitals, NECKER Enfants Malades in Paris, Ospedale Pediatrico Bambino Gesù in Rome, Istituto Giannina Gaslini in Genoa, and Great Ormond Street Hospital in London. Several other European universities and research centres also contribute to the unique blend of inter-disciplinary expertise in information-based medical technology.

72 http://www.health-e-child.org/

- *Extending e-Health to rural areas:* Under a co-operation agreement between the General Council Alpes Maritimes, the Nice Faculty of Medicine and Alcatel Alenia Space, a 19-company consortium has successfully brought digital healthcare to the region of the Alpes Maritimes in southeast France. A difficult geography involving four valleys where access is often difficult especially in the winter when landslides and snow regularly block roads, coupled with an ageing population and isolated medical professionals, meant that e-Health provided the sole option for maintaining high-quality healthcare in the region. Based on two-way satellite broadband technology, the project provides tele-consultations in psychiatry and gerontology, tele-expertise and tele-diagnosis in radiology, dermatology and cardiology, while using digital imaging and communications (DICOM) also permits diabetic eye examinations and echographies.[73]
- *Personal healthcare systems for chronic disease sufferers:* To help reduce hospital admissions with a view to cutting costs while providing high-quality healthcare, NHS Lothian has pioneered the largest tele-health system in Scotland, with 400 patients with long-term conditions set to benefit from the tele-health personal healthcare system. The state-of-the-art high-tech system allows people with chronic conditions, such as Chronic Obstructive Pulmonary Disease (COPD), to monitor their own conditions on a daily basis at home. The system uses touch-screen technology and offers the patient a range of health tests including blood pressure, breathing, weight and blood glucose and oxygen levels, which can be carried out at home. It also provides wireless connections to medical devices such as peak flow meters and weight scales. Experience with similar-sized trials in other countries has shown a 30% reduction in hospital admissions of the patients participating in the trial.[74]

Success factors for Europe: Harnessing the transformational power of digital technologies is without question the key to transforming the underlying paradigm of European healthcare. The traditional healthcare delivery model, built around dealing with acute episodes, will no longer be sustainable as European society ages. We must move to a paradigm built on a "continuum of care", enabled by digital systems and services, achieving greater location independence in service delivery and greater personal control in service consumption. This demands a widespread commitment by all stakeholders to five priority objectives:[75]

1. Focus on disease prevention
2. Encourage best-practice patient-focused processes
3. Leverage digital technology
4. Speed up the adoption of new medical methods and technologies
5. Implement value-based outcome-focused reimbursement systems

73 http://www4.alcatel-lucent.com/sustainable/fracture/fracture3.htm;jsessionid=02FRPV4N4XCYFLAWFRUE1C3MCYWGI3GC | 74 http://www.nhslothian.scot.nhs.uk/news/mediaroom/news_release/09_02_23_tele-Health.asp | 75 Proposed by the European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR): http://www.cocir.org/uploads/documents/-34-cocir_wp_on_sustainable_hc_-_released_on_19_nov._2008.pdf

> “If Europe is to prosper SMEs must successfully adopt advanced Information and Communication Technologies.”

Small-and Medium-Sized Enterprises

Importance for Europe: Micro-, Small-and medium-sized enterprises – those with less than two hundred and fifty employees - represent 99% of an estimated 23 million enterprises in the EU and provide around 75 million jobs, representing two-thirds of private sector jobs, including 80% of new jobs created in the EU over the past five years.[76] SMEs contribute up to 80% of employment in some industrial sectors, such as textiles, construction and furniture.[77]

The future of European SMEs: In the view of the European Commission: “Globalisation is both an opportunity and a threat for Europe’s SMEs, whose capacity to operate on an international level will determine their long-term competitiveness. Yet, the vast majority of European SMEs continue to limit their operations to their own country. According to a report from the European Observatory of SMEs, only 8% of SMEs export, only 12% of the inputs of an average SME are purchased abroad and only 5% of companies obtain income from foreign business partnerships.”[78]

The importance of ICT: Again according to the European Commission: “If Europe is to prosper SMEs must successfully adopt advanced Information and Communication Technologies.”[79] While the specific digital strategies and tools adopted by an SME will typically reflect the trends specific to its industry sector and market irrespective of size, four specific benefits of these tools will become increasingly important to growing numbers of SMEs in all sectors of activity:

- *The ‘Cloud’:* Access to digital tools and services on demand via the Internet will be vital to their accelerated up-take by SMEs without the financial or human resources to develop and operate them in-house.
- *Eliminating distance:* Arguably most important in view of the globalisation challenge, e-Commerce capabilities will increasingly eliminate the barrier of distance, allowing SMEs to trade throughout Europe’s single market – and indeed the world – without having to expand a physical network of offices or shops.[80]
- *Virtual organisation:* Increasingly, SMEs will need to participate in business networks with other large and small enterprises – often at distance, including customers – to deliver a final product to their markets, each one responsible for a piece of the value chain. To be effective, they will need to share information concerning orders, business processes and progress of work. Digital technologies will enable SMEs to collaborate through such virtual organisations to compete or collaborate with much larger, internally integrated firms.[81]
- *Networked innovation:* It will become easier for highly specialised firms requiring complementary technologies or skills for innovation to locate and work with partners, regardless of where they are geographically situated around the world.

76 *The Future of EU Competitiveness: from Economic Recovery to Sustainable Growth*, HMG, June 2009. http://www.berr.gov.uk/files/file51732.pdf | 77 International Finance Corporation: Micro, Small, and Medium Enterprises: A Collection of Published Data (MS Excel file, 17 May 2005). http://www.ifc.org/ifcext/sme.nsf/Content/Resources | 78 European Commission, http://ec.europa.eu/enterprise/e_i/news/article_7001_en.htm | 79 http://ec.europa.eu/information_society/tl/ecowor/smes/index_en.htm | 80 *Ibid.* | 81 http://cordis.europa.eu/ictresults/index.cfm?section=news&tpl=article&BrowsingType=Features&ID=57257

The following cases demonstrate the transformational power and potential of ICT uptake by European SMEs.

- *European Commission research programmes for SMEs:* These are a rich and varied source of case studies in the transformational power available to European SMEs through networking and collaboration enabled by digital technologies, as well as though product and service innovation based on innovative uses of digital technology.[82]

  A representative example is LEAPFROG (Leadership for European Apparel Production From Research along Original Guidelines): LEAPFROG is a joint research and innovation initiative of the European textile and clothing industry aiming at a technology breakthrough in the clothing industry. It brings together a critical mass of European textile and clothing companies – for the most part SMEs – and research centres to develop and implement new ways of optimal fabric preparation for clothing production, automated garment manufacture, virtual garment prototyping, supply-chain integration and mass customisation. The ultimate goal of LEAPFROG is to achieve a step change in productivity and competitiveness of Europe's clothing sector and to decrease its dependence on the labour cost factor.

- *Andreas Andresen A/S:* This is a Danish market leader in the transport of temperature-controlled goods and logistics solutions. Founded in 1916, the company has grown enormously in recent years, notably in response to the growth of its clients in the food production and supermarket retail sectors. The transformation from a small, local company to a global operator has been a challenge. Crucial to Andreas Andresen's transformation has been extensive investment in new ICT technology better to protect cargo, plan routes, communicate with customers and drivers throughout its system, and manage corporate financial affairs.[83]

Success factors for Europe: Ensuring the competitiveness of European SMEs will require much wider access throughout the EU to 'Cloud'-based digital tools and services delivered over Next-Generation Networks. It will likewise require wider development of the awareness, understanding and skills required to stay abreast and take advantage of the continuous appearance of new digital tools and services, as well as much wider participation in innovation networks such as those highlighted above.

82 A compendium can be found at http://ec.europa.eu/research/sme-techweb/index_en.cfm?pg=publications-archive | 83 European monitoring Centre on Change, *Op. Cit.*

Individual Empowerment

The importance for Europe: As President Barroso reminds us, Europe's socio-economic model is founded on individual freedoms, democracy, rule of law, and respect for human rights and the dignity of the individual. This model functions to the extent that individuals have the power to exploit their individual freedoms and the understanding to respect their societal obligations.

- *The future of individual empowerment:* Individual empowerment is at the core of the transformational power of digital technologies throughout our economy and society. Therefore it demands focus in this White Paper. As the power of digital technologies themselves grows, so will individual empowerment. Democratic societies will embrace and respond to the collective and individual voices of their people as they express themselves through and on digital platforms.
- *The role of ICT:* 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.[84] Public sector organisations have also begun to give citizens the chance to comment, paragraph by paragraph, on government documents, such as the beta version of the UK's Power of Information Taskforce report.

The individual empowerment conveyed by digital technologies can be used for good or ill. As the following case study reported by the UK government shows, the outcome can be shaped through the specific purpose and design of their use – in this case, to change young lives for the better: [85]

- *NotSchool.net* provides learning opportunities in the UK for young people excluded from mainstream education. After starting as a research project, a pilot commissioned by the Department for Children, Schools and Families in 2000 was extended as a national project. Via the Internet it offers alternative education provision for young people who cannot cope with traditional schooling, home schooling or other specialist units. To date 5,000 young people have benefited from NotSchool.net. The following outcomes have been achieved:
  - Pupils have been shifted out of a model of dependency and non-achievement: of the beneficiaries in 2004/2005, 50% found places at college or in other further education, 26% found college related employment such as modern apprenticeships and 18% entered fulltime employment
  - Formal accreditation: Of the 916 beneficiaries active over the period 1.4.2004 to 31.3.2005, more than 96% obtained an accredited Part B certificate equivalent to GCSE grades D to G or higher (Level 1), and more than 50% achieved grades of A to C equivalent (Level 2) and roughly 8% the equivalent of A level (Level 13)
  - During this time, 1.7% of beneficiaries dropped out and 3.6% did not reach Part B Level Certificate standards (national recognised qualification)
  - Applying the assumptions for lifetime earnings used by the Home Access Programme, the lifetime economic benefit from the children who gained Level 2 and Level 13 qualifications through the Notschool.net project would be around £61 million.

The government report concludes specific conditions are required for Notschool.net to be a success; the most important being an interest in learning and a supportive home environment. Digital inclusion has the potential knock-on positive benefit of increasing the proportion of children who are currently excluded from school, successfully attaining formal qualifications.

84 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. | 85 PriceWaterhouseCoopers, *Op. cit.*

> “...individuals have the power to exploit their individual freedoms and the understanding to respect their societal obligations.”

Success factors for Europe: The next step towards democratic renewal 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 been started 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.

Public-Private Partnerships (PPPs) will be a key tool in achieving the reduction of digital exclusion and promotion of individual digital empowerment

chapter three

"THE FUTURE OF THE ICT SECTOR IN EUROPE"

The Indispensable Sector

"We need to create an understanding in Europe of the relationship between ICT and prosperity. Europe will either advance with ICT or suffer enormously. ICT is moving from being one billion computers around the world and just a couple of billion phones to fifteen billion devices in a couple of years."

Gordon Graylish
Vice President Intel

Chapters one and two of this White Paper illustrate why Europe's future wellbeing depends on harnessing the exploding transformational power of digital technologies, products and services throughout industry and society. It is essential to recognise, however, that this vision can only be realised if Europe is itself both home and host to a dynamic, growing, leading-edge ICT sector that is tightly interwoven into our wider economic fabric.

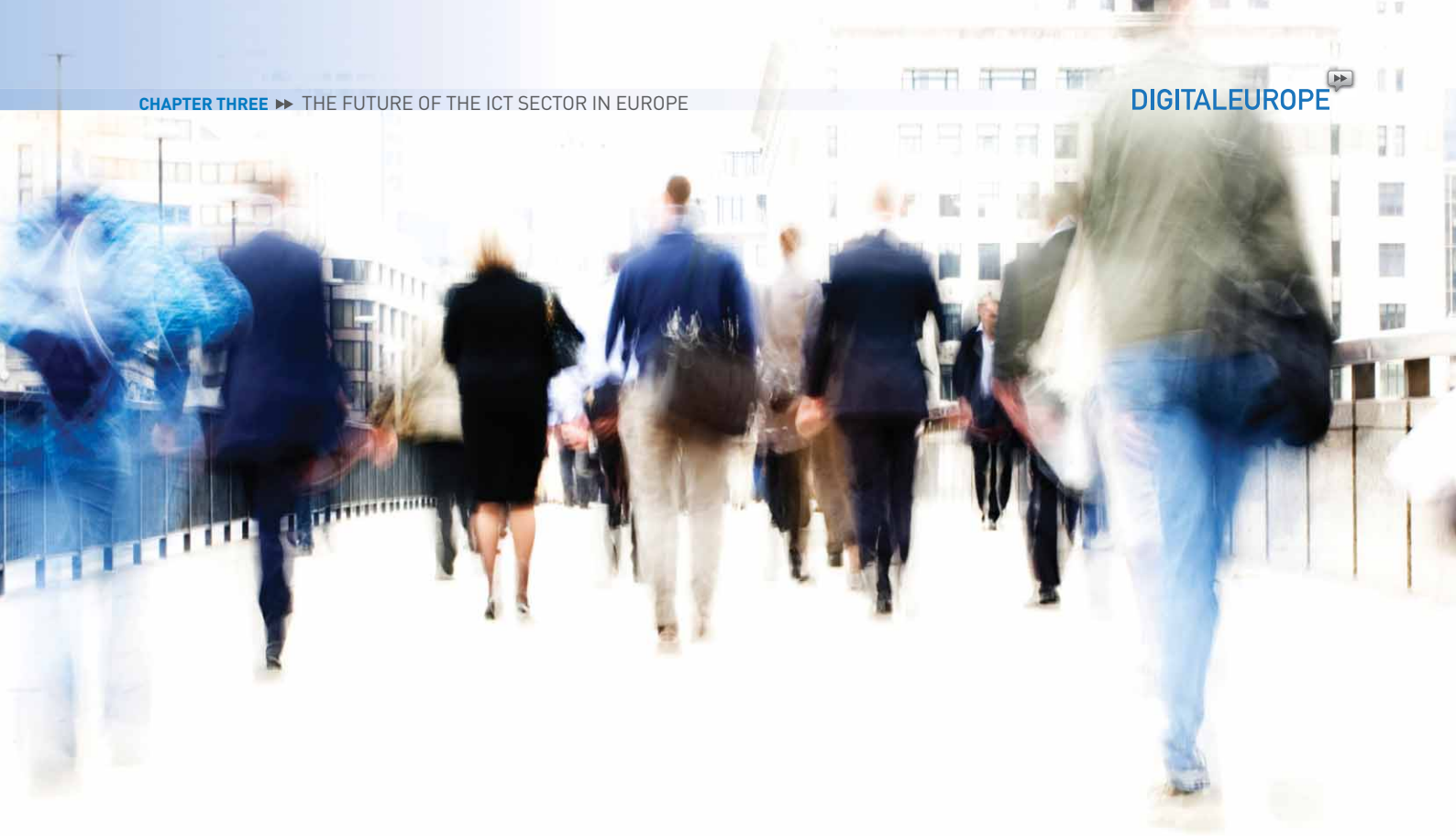
Indeed, the indispensability of home-grown ICT is nothing less than the central meaning – and hard reality – of this newborn digital age. No region of the world will be able to maintain its economic strength solely on the basis of imported digital skills, innovation, products and services. And, by the same token, no region of the world will be able to maintain the ICT sector it needs if that sector is not also a leading source of jobs and growth, and a leader in global markets.[86]

European ICT Today

Europe's ICT sector continues to grow and innovate:

- Currently, there are an estimated 680,000 enterprises across the EU 27 involved principally in ICT manufacturing and service industries with roughly 6 million[87] people directly employed (and 12 million total[88]), and total value-added approaching €500 billion.[89] The sector itself represents 4.5% of European GDP and an estimated 6% if the value-added of ICT in other sectors is also taken into account.[90]
- The outlook for the sector remains upbeat – despite the economic downturn in 2009, Forrester Consulting forecasts a 7% growth rate for the sector in 2010 and continued strong growth beyond.[91]
- According to the OECD, the digital technology industry shows the highest rates of value-added growth in the European Union.[92] Further proof of ICT's importance to Europe comes from the October 2009 report by the International Data Corporation (IDC) which revealed that in 2009 ICT-related activities will have generated €265 billion in tax revenues across the EU and European enterprises will have spent some €305 billion on ICT.[93]
- ICT now accounts for one third of all EU employment in business research, almost one fifth of the total of business and government R&D expenditure, and more than one fifth of all EU patents.[94]

86 It goes without saying that this includes foreign investments into Europe's ICT industry including investments by businesses which are not headquartered in the EU. | 87 *Information Society Research & Innovation: an evaluation of the Sixth Framework Programme*, led by Esko Aho, May 2008 http://ec.europa.eu/dgs/information_society/evaluation/data/pdf/fp6_ict_expost/ist-fp6_panel_report.pdf | 88 Forrester Consulting, unpublished research for DIGITALEUROPE, 2009 | 89 Esko Aho, *Op. cit.* | 90 *Strategy for ICT R&D and Innovation in Europe: Raising the Game*, European Commission March 2009: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0116:FIN:EN:PDF | 91 Forrester Consulting, *Op. cit.* | 92 OECD Key ICT indicators, as reported by Forrester Consulting, *Op. cit.* | 93 *Aid to Recovery: the Economic Impact of IT, Software and the Microsoft Ecosystem on the Economy*, IDC October 2009. http://download.microsoft.com/download/D/3/3/D3346D96-DBBC-4AC0-B3EF-60BFDA205470/2009_OCT_Global_White_Paper_IDC_2009_Study.pdf | 94 European Commission, *Op. cit.*, quoting the OECD 2003 report *ICT and Economic Growth*. http://www.labs-associados.org/docs/OCDE_TIC.PDF



- *The Economist* Intelligence Unit's third annual ICT Industry Competitiveness Index released in December 2009 compares the IT industry environments of 66 countries to determine the extent to which they support the competitiveness of the IT sector, and finds that: "EU countries are well-positioned to leverage the IT sector for long-term growth. Five of the top 10 countries on the index are EU Member States with northern European countries, including Finland (2), Sweden (3), Netherlands (5), and the UK (6), placing particularly well. Of the 24 EU countries included in the index, all but four are ranked in the top half."[95]

But while these figures confirm that ICT is a large and growing piece of Europe's industrial, technological and employment base, a recent EU report comparing Europe with other leaders sends a clear message – we can and must do much better.[96]

- ICT's relative weight in the economy remains smaller in Europe than elsewhere in the OECD, especially compared with Korea and Japan – mostly due to Europe's weakness in ICT manufacturing.
- Europe represents one third of a global market for ICT worth an estimated €2,000 billion and growing at 4% per year. But our ICT sector takes only 23% of the total global value-added.
- The EU ICT sector invests less in R&D as a function of its size than its main competitors. This is because nearly all R&D growth in the EU ICT sector takes place in the computer services and software sub-sector, again reflecting weakness in ICT manufacturing.
- The USA spends twice as much as does the EU on ICT R&D. Indeed company data suggests that among the biggest total R&D spenders, the entire advantage of the USA is due to the ICT sector alone.

In a 2009 Communication, the European Commission observes that Europe has relatively few world-recognised ICT poles of excellence, attracting students, researchers and private investments is difficult, adding: "California alone attracts twice as much venture capital as the whole of Europe."[97] In 2008, the OECD reported that in 2005 total US investment in venture capital in high-tech sectors was around three times the level invested in the EU.[98]

95 *Resilience amid turmoil: Benchmarking IT industry competitiveness 2009*, available at www.bsa.org/globalindex | 96 *2009 Report on ICT in R&D in the European Union*, JRC. http://ftp.jrc.es/EURdoc/JRC49951.pdf | 97 *JRC, Op. cit., quoting Global Venture Capital Insights and Trends 2008*, E&Y. http://www.ey.com/Publication/vwLUAssets/IPOs_Global_venture_capitals_trends_report_2009/$FILE/IPOs_Global_venture_capitals_and_trends_report_2009.pdf | 98 *OECD Science, Technology and Industry: Outlook 2008*. http://www.oecd.org/document/36/0,3343,en_2649_34273_41546660_1_1_1_1,00.html

European ICT 2020

"By structuring ICT applications differently, you can cut energy consumption in large scale ICT infrastructure by fifty per cent."

Jim Hagemann Snabe
Co-CEO, Member of the Executive Board
SAP

Europe has produced world leaders in important segments of the ICT industry, especially in telecommunications and telecommunications equipment manufacturing, embedded and enterprise software, and consumer products. At the same time, the global ICT industry continues to evolve away from hardware manufacturing as the dominant source of added-value towards the dominance of design, software, systems integration and roll-out and customer services.

Today, the manufacture of ICT hardware often makes the smallest contribution to value-added and is increasingly sub-contracted by ICT vendors to low-cost suppliers, often – though not always – operating from Asian or other emerging economies. This trend means that Europe's relative weakness in ICT hardware manufacturing need not prove fatal to the future dynamism and global positioning of our ICT industry, provided we maintain our strengths and performance in the higher-value roles in the high-growth sectors – which may include manufacturing in highly innovative product segments. Viewed in this light, we need to focus particularly on the following priority sectors:

- ***Next-Generation networks and Mobile Broadband communications:***

  "Broadband is reaching more and more people. By 2015, five billion people will be connected, with well more than half enjoying broadband access. The Internet will be the predominant source for communicating and sharing information."

  Bosco Novak, Head of Customer Operations and Member of the Board, Nokia Siemens Networks.

  A vast global market for mobile broadband lies ahead, an area in which clear European leadership today needs to be carefully nurtured and exploited as we go forward in order to cope with the fierce competition to come from lower-cost new entrants, particularly from Asia.

European industry took the lead in mobile communication with the global success of GSM. The evolution from GSM to 3G (UMTS) and 4G technologies bringing broadband capabilities to the mobile arena has over the past few years surpassed even the most optimistic forecasts. With Internet-based connectivity set to reach much broader classes of devices with vast numbers of applications, there is no doubt mobile broadband will be the connectivity of choice for tens of billions of connected devices.[99]

On the other hand, this trend will also touch emergency services users. Enhanced broadband capabilities will empower public-protection organisations to exchange mission-critical data and video communications in a more timely and effectively manner. To support these new communications needs, emergency services will require additional dedicated spectrum to be made available to enable them to deploy the latest technologies to meet their evolving operational requirements.

Europe's network operators and systems suppliers are today world leaders in the technological development and provision of ever-increasing fixed network capacity and performance. We must maintain this leadership position over the next decade as Europe and the world move beyond today's broadband networks into ultra-high capacity "symmetrical" (i.e. two-way) Next-Generation Networks. 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 to enjoy the applications of tomorrow.

99 Already today substitution of fixed DSL lines with mobile broadband (e.g. based on HSPA 7.2 Mbps) is happening in the market. It will only have trouble satisfying demand for extreme bandwidth (e.g. for multiple HDTV streams). Already today 4G systems are being commercially deployed with 10 times the data rates compared with today's HSPA, with 100 times possible in the future(Ericsson and Nokia Siemens Networks estimates). However also existing HSPA systems are experiencing some evolution and could support in future data rates up to about 100 Mbps.

- ***Software:*** Commenting on a December 2009 survey, then European Information Society Commissioner Viviane Reding noted: "The dynamism of the software sector in Europe remains a uniquely strong driver for creating highly qualified jobs and R&D investments are continuing to rise."[100] Indeed, the following findings from a recent report of experts from the software industry make clear that Europe still has all to play for in the software market, but is punching below its weight:[101]

  "Software is everywhere today, yet its instrumental role in the modern digital economy is often overlooked. With market revenues of more than €200 billion in Europe and growth rates of between 6% and 8%, software is the largest and the fastest growing segment of the ICT market. Furthermore, software is embedded within the majority of products we use today and a key enabler for innovation, growth, and employment in almost all sectors of the economy. Software has become the nerve centre of all modern societies.

  Although there have been signs of consolidation over recent years, the industry remains highly fragmented. Despite excellent skills and research and development, European companies rarely become global leaders. Their small size makes it difficult for European software SMEs to grow fast enough in an increasingly globalised market, to operate internationally, or to create business relationships in other Member States.

  At the same time, the software market worldwide is undergoing massive change. Customers' expectations of software are changing. A proliferation of software-based devices and infrastructures is emerging, creating new opportunities for software. Technological developments – such as service-oriented architectures (SOA) and software-as-a-service (SaaS) – are revolutionising the way software is produced, applied and consumed. And, for the longer term, new concepts are emerging around the 'Future Internet' where software will be an essential pillar.

  The innovation necessary to create economic growth, drive societal change and address environmental challenges relies on ICT, at the heart of which is software. A new market paradigm is emerging – Software 2.0 – where the competitive environment and market dynamics are totally different. The Software 2.0 paradigm challenges all current market players and offers huge opportunities for Europe's software industry. This is a new world, with new rules and Europe must innovate to compete.

  In the Software 2.0 world, software will be developed, delivered and consumed in discrete chunks (known as services) designed to meet users' specific and highly personalised needs. Liberated from the PC and mainstream IT systems, software-based services will be accessible across a multitude of devices and appliances in a whole variety of settings. The Software 2.0 marketplace will comprise a rich blend of service offerings according to a spectrum of licensing terms and pricing models – some free, some subscription, some pay-per-use, some advertising-led. Furthermore, users will be a key part of the market ecosystem, acting both as consumers and co-producers.

  The 'Future Internet and the Software 2.0' market paradigm are intimately bound together. Software will drive the next generation of the Internet as it grows to occupy an ever-more central position in our society and economy."

The growing importance of software and the structural changes within the sector provides challenges, but also tremendous new business opportunities for European software vendors.

100 http://www.truffle100.com | 101 Software 2.0: Rebooting Europe's Software Industry, report of an industry expert group on a European software strategy, April 2009. http://www.cepis.org/index.jsp?p=636&n=639&a=1496

> "The world market for technologies, products, and applications related to the 'Future Internet of Things' is forecast to increase from 1.35 billion euro in 2009 to more than 7.76 billion euro by 2012, with average annual growths rates of almost 50%."

- ***'Future Internet':*** Many if not most of these software-driven opportunities will arise from the continuous development of the Internet as the primary communications infrastructure of the Digital Age. Key in this respect will be the 'Internet of Things' and the 'Internet of Services'.
  - 'The Internet of Things' combines the power of ubiquitous networking connectivity with modern sensor technologies such as radio frequency identification (RFID) to give inanimate objects as well as people a unique Internet address. Information concerning the identity, location, and condition of objects can thus be made available through the Internet anytime and anywhere. Moreover, objects acquire the ability to communicate with each other and therefore can become active participants in global business processes. The 'Internet of Things' will lead to tremendous efficiency gains in many industries, particularly when they are combined with the "Internet of Services". According to industry experts, RFID technologies could lead to efficiency enhancements of 40% in the luxury goods industry or even 100% in the food sector.
  - 'The Internet of Services' is expanding rapidly, thanks to a flexible and standardised service-oriented software architecture (SOA) that facilitates the combination of a vast range of software applications into interoperable services. The Internet of Services also increasingly features semantic tools and technologies that understand the meaning of information and facilitate the accessibility of content (video, audio, print). Data from various sources and different formats can thus be easily combined and processed, creating limitless opportunity for new, innovative Web-based services

Exploiting the limitless opportunity created by the 'Future Internet of Things and Services' will become the central growth engine in all knowledge-based societies, especially for start-ups and SMEs in all sectors that will continue to provide the overwhelming majority of European jobs. Moreover, 'Future Internet'-based services developed in Europe can be easily exported through the Internet to global markets.

The disruptive technologies of the 'Internet of Things and Services' will create tremendous opportunities for Europe's ICT sector itself. For example:

- The world market for technologies, products, and applications related to the 'Future Internet of Things' is forecast to increase from €1.35 billion in 2009 to more than €7.76 billion by 2012, with average annual growths rates of almost 50%.[102]
- Gartner predicts that the worldwide market for Software as a Service (SaaS, or the 'Cloud') – only one dimension of the 'Future Internet' and still in its infancy – will have already grown from €4.25 billion in 2006 to €13.02 billion by 2011.
- And of course as previously noted the underlying network infrastructures and data centres provide huge opportunities.

Here again, Europe has no choice. We must play a leading role in all dimensions of the global development of the 'Future Internet of Things and Services'.

102 *Toward a European Strategy for the 'Future Internet'*, SAP, 2009: http://www1.sap.com/community/showdetail.epx?ItemID=16580

chapter four

“BUILDING BLOCKS FOR THE FUTURE”

Achieving the digital vision for Europe set out in the previous chapters demands a concerted effort, starting now, to put in place seven essential building blocks.

- **Digital Infrastructure/Next-Generation Networks**
- **Future Internet/Next-Generation Services**
- **Digital Single Market**
- **ICT Research & Development**
- **e-Skills**
- **Online Trust & Security**
- **Trade Policy**

The industries represented by DIGITALEUROPE are committed to the leadership role incumbent on us in each of these areas. Success will likewise necessarily depend on a robust supporting public policy framework for each and partnership with many other stakeholders.

Building Block 1: Digital Infrastructure/ Next-Generation Networks:

“Availability of broadband can be best compared with the physical road infrastructures developed in the nineteenth century that triggered economic growth and prosperity. It is almost like providing a public good and it is the duty of public authorities to ensure the availability of such public goods.”

Professor Dr. Dres h.c. Arnold Picot
Institute for Information Organisation and Management, Munich School of Management,
Ludwig-Maximilians-Universitat Munich

The winners in the digital world of tomorrow will be those with access to so-called Next-Generation Networks (NGNs). The four defining features of NGNs will be: 1) the ability to transmit vastly greater volumes at much higher speeds 2) symmetry – the ability to do so in both directions 3) mobility – the ability to do so through wireless transmission 4) improved quality of service – lower levels of latency, packet loss, network oversubscription and service continuity. Together, these capabilities will trigger an explosion of new and much more powerful network-based interactive digital services – often referred to as the ‘Cloud’. Europe is strongly positioned for NGN leadership, but we must stay vigilant in order to secure our place at the leading-edge of NGN technology and roll-out.

Our essential Next-Generation networks objective must be ubiquitous participation, particularly as the 'digital divide' increasingly becomes a 'speed divide'. Fibre optics is currently the technology of choice to deliver Next-Generation high-volume, high-speed, symmetrical transmission and access. However, one technology must not dominate our vision and expectations of NGNs, which will need to be built on the technologies best-suited to the specific geographic features and market characteristics of any coverage area. Fibre optics, advanced upgraded cable, mobile access and satellite multicast in particular will all have important roles to play in Next-Generation network development.

The next stage of pervasive digital interaction will require network symmetry, for example allowing residential consumers to increasingly behave like businesses in terms of data flow – uploading as much as downloading from the net. With a total population of around 500 million, the EU today can boast no more than 2 million subscribers across the EU with access to high-speed, symmetrical fibre-based networks.[103] Fibre-to-the-home did grow by 40% between July 2008 and July 2009, but at the moment represents just 1.75% of total lines in Europe.[104] Europe's leading broadband technology, DSL (Digital Subscriber Line) with some 94 million lines, is not symmetrical.

By way of comparison, Japan, with a population of one hundred and twenty eight million, has made the development of a fibre-based network a key priority. Today, more than 10 million Japanese subscribers have fibre access. Across Asia, there are perhaps 30 million subscribers, and in the US roughly 8 million benefit from fibre broadband.

Rolling out ubiquitous NGN networks across Europe will require major investment – an estimated €300 billion. The private sector will have to play the major role in urban areas, with public authorities playing the fundamental, albeit supplementary, role in the rural areas.[105] While this may seem a daunting number, it needs to be seen in the context of the historic moment we are living. All research shows that the risk lies in missing this opportunity:

- On the demand side, it is clear that Europeans will migrate to enhanced network performance where available.
- A 2008 study for the European Commission estimated that faster broadband deployment in Europe could create one million jobs and growth of up to €850 billion by 2015.[106]
- It is estimated that the Internet has generated $300 billion in economic activity in the US, and now employs 1.2 million people in jobs that did not exist two decades ago.[107] Even now, for every dollar invested in broadband (fixed and wireless), the US economy is expected to see a tenfold return.[108]
- Another study reveals that in developed countries an increase of broadband access of ten subscribers per 100 inhabitants corresponds to a 1.2% increase in per capital GDP growth.[109]

103 Forrester Consulting, *Op. cit.* | 104 *Broadband Access in the EU: Situation at 1 July 2009*, European Commission. http://ec.europa.eu/information_society/eeurope/i2010/docs/interinstitutional/cocom_broadband_july09.pdf | 105 World Economic Forum, *Op. cit.* | 106 Micus Management Consulting, *Op. cit.* | 107 Interactive Advertising Board and Harvard Business School, June 2009. | 108 World Economic Forum, *Op. cit.*, quoting the US Congress Committee on Appropriations, *The American Recovery and Reinvestment Act of 2009*, January 2009. | 109 World Economic Forum, *Op. cit.*, quoting *Economic Impacts of Broadband, Information and Communications for Development 2009*, World Bank. http://siteresources.worldbank.org/INTMOLDOVA/Resources/IC4D2009_Overview_en.pdf

The next generation of the Internet will create a wealth of new services and applications. The 'Future Internet' will drive innovation in almost all industries and will shape the future of the services economy. The emerging web-based industries will provide tremendous opportunities for growths and job creation. The US is currently leading the development of Next-Generation Internet services. Other regions and countries such as Korea and China are catching up quickly. Europe must ensure it joins the leaders for both the development and uptake of Next-Generation Internet services.

Building Block 2: the 'Future Internet' and Next-Generation Services:

The 'Future Internet' will become one of the major growth engines in all knowledge-based societies. It will be a business opportunity, especially for start-ups and SMEs, and will lead to the creation of highly qualified jobs, especially in the services sector. As services comprise two-thirds of European GDP, it is clear that Europe can only sustain economic growth and prosperity by developing strong Next-Generation Services industries.

Internet services are mushrooming, fuelled by the emergence of what is known as the 'open innovation model' and 'Cloud' computing. 'Cloud' computing radically reduces market-entry barriers for service providers, especially SMEs. Europe should take action to push forward R&D in this area and, more importantly, make it possible to set up and utilise EU/global 'Cloud' infrastructure that complies with EU privacy regulations.

The next generation of services will enable Europe to reap the benefits of the 'Future Internet' in many areas, including Smart Grids, climate control, transport and logistics and e-Health. In all these instances Next-Generation Services will provide new ways of service provisioning based on RFID, digital sensors and sensor networks for collecting real or near real time data, positioning systems (GALILEO), actuators, special hardware and equipment.

The disruptive technologies of the 'Internet of Things and Services' represent a vast opportunity for Europe, provided we take the lead. The world market for the 'Internet of Things' with its sensors and other related technologies, components and applications systems alone will increase significantly from $2 billion to more than $11.5 billion in 2012, with average annual growths rates of almost 50%.[110] Gartner predicts that markets for the 'Internet of Services' will grow from €11 billion to €25 billion in 2011.

We have a unique window of opportunity for Europe's technology base and expertise to lead in the definition of the 'Future Internet' that can result in a leading position for commercialising new innovative applications and services. To exploit this opportunity, Europe has to join forces on all levels including Member State co-operation on research agendas and collaboration for test bed infrastructure. DIGITALEUROPE welcomes the recently released European Communication on a Public-Private Partnership (PPP) for the 'Future Internet' in order to focus European R&D in this area.[111] In addition, the EU should strive to establish a fully functioning internal market for Next-Generation Internet services.

110 *Global Extended Internet Forecast 2006-2012*, Forrester Research 2006. http://www.forrester.com/rb/search/results.jsp?SortType=Date&nb=1&dAg=10000&N=133001+70155+11820 | **111** *European Commission, A public-private partnership on the 'Future Internet'*. http://ec.europa.eu/information_society/activities/foi/library/fi-communication_en.pdf

Building Block 3: The Digital Single Market

"We are not yet leveraging Europe's full potential. The size of our market and the sophistication of our consumers and companies offer great opportunities for growth. But we can only bring our full power to bear and compete better with others when we start to remove all the remaining regulatory barriers that still exist in Europe today."

Reinhard Clemens
CEO T-Systems

The creation of a Digital Single Market must be a central priority of Europe's Digital Agenda and Europe 2020 Strategy. In the '1992 Single Market' push, success depended on strong leadership from the EU institutions, identification of the obstacles to cross-border trade including a specific deadline for their elimination and effective collaboration across areas of competence and responsibility within the EU institutions and between EU institutions and Member States. The situation is not different for the Digital Single Market.

The European Union has an opportunity to emerge from the current recession more productive, innovative, competitive and knowledge-driven than before. In order to grasp this opportunity, Europe needs to build a Digital Single Market which fully leverages Europe's digital strengths into sustainable jobs, economic wealth and global competitiveness. In such a continental-scale Digital Single Market, business can be conducted online between buyers, sellers and partners anywhere as easily as it can be done through traditional channels.

Indeed, while Europe has successfully dismantled cross-border barriers to trade in most physical goods and many services, online channels for internal trade in the very same goods and services may run into severe internal market fragmentation arising from diverse national regulation of online activity. Consumers are thus deprived of greater choice and Europe-wide comparison shopping for the lowest price, while retailers are denied highly cost-effective access to Europe's 27 countries and 480 million consumers.

The situation is particularly prejudicial for SMEs, the "engine of the European economy".[112] The prejudice is even more acute for creators of new digital products and services which by definition can only be promoted, sold and distributed online. A recent study found that such opportunity costs are not theoretical:[113]

- Due to barriers to e-Commerce, while 150 million EU citizens – a third of our population – shops over the Internet, only 7% of these online shoppers cross their national borders.
- Only 21% of online retailers sell in other Member States, and only 20% of trade across borders is in services although the service sector represents 70% of EU value-added.
- 60% of cross-border purchases are blocked; in the case of computer and electronic equipment, the failure rate reaches 80%.[114] Only Austria and Spain have success rates slightly above 50%, while Romania, Bulgaria, Latvia and Belgium have the worst record of purchasing failures.

112 Multiple references, notably Cordis: http://74.125.77.132/search?q=cache:t6J58LL0i1sJ:ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/enet/fpp-2nd-contributionknet_en.pdf+The+situation+is+particularly+prejudicial+for+SMEs,+the+%E2%80%9Cengine+of+the+European+economy.%E2%80%9D&cd=3&hl=en&ct=clnk | 113 Adriaan Dierx and Fabienne Ilzkovitz, *The Single Market as a Tool to Improve Growth and Adjustment in The European Economy*, 2008. http://www.uaces.org/pdf/papers/0801/2008_Dierx_Ilzkovitz.pdf | 114 European Commission, *Report on cross-border e-commerce in the EU*, 2009. http://ec.europa.eu/consumers/strategy/docs/com_staff_wp2009_en.pdf *Final report of the Content Online Report*, May 2009 http://ec.europa.eu/avpolicy/docs/other_actions/col_platform_report.pdf

Our continuing political neglect of this situation is arresting – even as European buyers and sellers have moved online in ever greater numbers over the past decade, we seem to have forgotten that opening the Single Market for conventional commerce through the late 1980's produced an additional 2.2% of GDP and 2.75 million more jobs between 1992 and 2006.[115] The same commitment to creating a continental-scale home market was fundamental to the global success of European mobile technology when 20 years ago Europe introduced a single GSM standard for mobile telephony buttressed by deregulation of the telecom sector. In contrast, over the past 10 years, Europe has conspicuously and systematically failed to address the obstacles fragmenting our digital markets.

- European digital innovators must deal with cyber frontiers that prevent them from providing a single pan-European service to all 27 Member States.[116]
- The EU Services Directive in particular fails to breakdown such barriers because it excludes the "country of origin principle", meaning that providers of digital products and services still have to deal with 27 different sets of national legislation.

GSM is often cited as a success story for European companies in the global mobile telephony market – the GSM Directive, the Single Market including common standards and telecoms liberalisation allowed European companies in network infrastructure, mobile handsets and mobile network operations to grow to scale in the 'home' market before going global. This was specific to the circumstances of the time and the market. For web-based technology, almost all prominent and large-scale success stories are from the US, with European industry building on the innovative impetus coming from the US-based companies. We believe this is, in part, because of the scale that the large domestic US market has offered these players. Internet entrepreneurs in the EU face tremendous hurdles in crossing borders and in getting to scale. By remaining sub-scale they cannot compete with larger players and rarely grow beyond their domestic markets.

Another example of successful decision-making at the European level is in the area of public safety. In 1996, European decisions produced a harmonised allocation of public safety spectrum, resulting in the widespread adoption of Europe-wide public-safety communications systems. For more than a decade, these decisions have been an unqualified success. Emergency services require additional spectrum to enable them to use the latest technologies to aid their work.

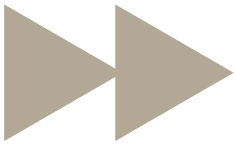
DIGITALEUROPE welcomes President Barroso's focus on the need to build a genuine Digital Single Market in his 'Political Guidelines for the next European Commission' transmitted to the European Parliament in September 2009, and to see the need for a Digital Single Market included in the 2009 Visby Declaration of the Swedish Presidency of the European Union.[117] The building of a Digital Single Market requires European Union's leaders to pursue a sustained harmonisation drive across a number of areas impacting online commerce and service provision. A horizontal approach to policymaking will be required to make progress across a number of apparently unrelated areas to eliminate barriers to a Digital Single Market.

115 Adriaan Dierx and Fabienne Ilzkovitz, *Op. cit.* | **116** DIGITALEUROPE's contribution to the European Commission's consultation on the future EU 2020 Strategy: http://www.digitaleurope.org/index.php?id=36&id_article=409 | **117** Barroso, *Op. cit.*, http://www.se2009.eu/polopoly_fs/1.22793!menu/standard/file/conclusions%20visby.pdf

> “Bureaucratic ex-ante compliance procedures should be phased out in favour of more flexible, risk-based processes that are more complementary to new information models and business processes.”

To complete the Digital Single Market the European Union must address a series of barriers including diverging national management of copyright licensing; inconsistent, opaque and subjective private copy levy systems unfit for the digital age; differing data privacy rules; different consumer protection regimes; contrasting interpretations of intermediary liability; delay of updating of ICT standardisation policy; lack of radio spectrum usage harmonisation; inefficient payment systems to facilitate cross-border transactions; lack of EU-wide organised recycling schemes to support large-scale operations.

- ***Copyright:***
  Access to legal digital content must be made easier and more attractive across a Digital Single Market. To this end, the highest priority of digital copyright policy should be to: 1) Foster a climate conducive to the development of a vibrant and thriving market for the distribution of legitimate digital content through business initiatives aimed at providing consumers with the choice to access legal and authorised commercial content on line and where 2) All players can operate in a level playing field 3) Consumers are duly informed, 4) Is supportive of Europe’s unique cultural wealth and diversity, 5) Is equally intolerant of unauthorised copying.
- ***Consumer Rights legislation***
  DIGITALEUROPE supports the European Commission’s proposed Directive on Consumer Rights as a remedy to this situation. In particular, DIGITALEUROPE members believe the ‘maximum harmonisation’ approach is critical.
- ***Intermediary Liability***
  It is imperative that the rules in the e-Commerce Directive governing the liability of intermediaries are implemented and applied consistently throughout the European Union. Differing legal interpretations of the liability regime create a ‘chilling’ effect on the desire of Internet players to operate in certain countries and potentially, in the whole EU. This is even more critical in the online world where players can establish themselves while serving many markets.



- ***Radio Spectrum***
  Wireless broadband is a critical part of the modern information society. Consumers will benefit from harmonised and technology neutral spectrum usage across the European Union. For producers economies of scale will result in lower device and infrastructure prices that can be passed onto consumers. In addition, spectrum harmonisation supports roaming across different countries. To improve the protection of citizens' lives, health and valuables, harmonised spectrum will ensure highly reliable mobile broadband services in the area of public security can be accessed on a pan-European basis.

- ***Standardisation***
  The EU needs an ICT standardisation system which allows for the recognition and adoption of standards that have been developed in global standardisation consortia. Any use of ICT standards in relation to EU policies must be neutral in terms of technology, vendors and the underlying business models.

- ***Privacy and Data Protection***
  National rules should be harmonised and administrative procedures should be streamlined and more geared towards an ex-post assessment as opposed to ex-ante to better serve a Digital Single Market. Bureaucratic ex-ante compliance procedures should be phased out in favour of more flexible, risk-based processes that are more complementary to new information models and business processes. Consistent enforcement should be harm based, focusing primarily on adverse effects on the privacy or the fundamental rights of European citizens, and on moving towards a more outcome-based system, rather than merely focusing on inputs. Rules governing the international transfers of personal data should be simplified and streamlined into one European system, in a global context to reflect the global nature of Internet. In addition, for international data transfer, the well established US-European Union Safe Harbour scheme must be maintained or improved to remove administrative burdens. A privacy governance model based on accountability could help achieve this.

- ***Payment Systems***

  Inexpensive and secure payment systems must be made available to Internet users across Europe in order that they can profit from online goods and services. Payment systems need to be common to merchants in different EU countries in order that cross-border commerce functions as smoothly as possible.

- ***WEEE Recycling Schemes***
  The European Commission Communication on Cross-Border Business to Consumer e-commerce pointed out that nationally administered recycling schemes (established by the WEEE Directive) can prohibit online cross-border sales of electrical and electronic products. The WEEE Recast proposal seeks to harmonise elements of the systems, notably registration and reporting while maintaining and improving proportionate distribution of responsibilities.

Building Block 4: ICT Research & Development

"Europe needs to evolve to create a new class of innovators."

Jonathan Legh-Smith
Head of Strategic Research
BT

Only permanent, productive, leading-edge European ICT research and development on a scale comparable to other global leaders can ensure the future growth and global competitive strength of Europe's ICT industries. It will take a renewed and concerted effort across Europe to reach this benchmark.

The EU presently accounts for a quarter of worldwide private-sector ICT R&D spending, a third of all R&D employment and a fifth of all patents. Private and public sector ICT R&D exceeds €40 billion each year in the EU, and growth in R&D investment among EU ICT companies is currently higher than that of non-EU companies despite the economic crisis.[118] Nevertheless, this represents only half what the US spends each year.[119]

Europe's relatively lower level of R&D investment is due in part to the continued fragmentation of the market for digital goods and services, resulting in sluggish development of high-growth SMEs. It is also due to the fragmentation of European ICT R&D itself, despite pioneering efforts such as the EU's Joint Technology Initiatives (JTIs) under the Seventh Framework Programme for R&D (FP7). This results in duplication of effort, lack of critical mass, difficulties in addressing common challenges jointly and, in the end, sub-optimal returns on R&D investments.[120]

Other consequences of Europe's relative R&D weakness are a growing deficit in fully qualified ICT R&D skills – resulting in several hundred thousand unfilled posts, and relatively few world-recognised ICT poles of excellence that attract top-class talent.[121] A concentration of such talent is the magnet that draws R&D investment: California alone attracts twice as much venture capital as the whole of Europe.[122]

While governmental spending accounts for only one third of Europe's total, it nevertheless plays a crucial role through its support of basic and applied research that is high-risk and far from commercialisation.[123] Here again, Europe lags behind the US: in terms of government Research and Development as a percentage of GDP, EU levels are 85% of the US expenditure for the EU-15 while the EU-10 represents only 47% of the US level. At Member-State level the picture is varied.[124]

European public support is set to grow in the coming years, notably because annual commitments to collaborative ICT R&D will increase from €1.1 billion in 2010 to €1.7bn in 2013 under the Seventh Framework Programme for R&D (FP7). At the same time the EU has invited Member States to match this budget increase in their national programmes by re-orienting some existing public resources and by seeking new ways of securing public and private funds.[125]

We are on the right track, but have yet to adopt a firm benchmark objective, strategy and programme that will close Europe's R&D gap with the US and other leading ICT centres.

One of the key tools for closing the gap with the US involves a concerted effort to improve the EU's framework for intellectual property protection, notably with regard to a unified litigation regime for European patents coupled with a unitary EU patent. However, these should not be goals in their own right, or represent merely a politically expedient solution, but must bring significant improvements over the system in place today. Also, steps should be taken to facilitate SME access to Intellectual Property Rights (IPR) protection, to review the territorial copyright framework in Europe, ensure appropriate enforcement of IPR in global markets, and promote IPR in green technology.

118 *Citizens' summary: EU research & innovation strategy for digital technologies*, European Commission 2009. http://ec.europa.eu/information_society/tl/research/key_docs/documents/citizens_summary_en_final_march09.pdf, *The EU Industrial R&D Investment Scoreboard 2009*, JRC. http://ftp.jrc.es/EURdoc/JRC54920.pdf | **119** *Ibid.* | **120** European Commission, *Strategy for ICT R&D and Innovation in Europe: Raising the Game*, March 2009: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0116:FIN:EN:PDF | **121** *Ibid.* | **122** Ibid. | **123** For example, nanotechnology may become for the 21st century what steel was for the early 20th, but commercialisation is very far away. 52% of European nanotechnology research is publicly financed with the private sector providing 43%, and venture capital the remaining 5%. *The Atlantic Century: Benchmarking EU and US Innovation & Competitiveness*, European-American Business Council 2009. http://www.itif.org/index.php?id=226 | **124** *Ibid.* Sweden leads, spending 17% more than the US (as a percentage of GDP) and France spends 5% more. The UK and Spain stand at 75% below the US level. | **125** European Commission, Op. cit. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0116:FIN:EN:PDF

> "To remain competitive, not only does Europe have to increase the supply of digital skills, but we have to ratchet-up their level."

Building Block 5: e-Skills

"In today's market and business environment it has become virtually impossible to make a career and ensure personal wealth without a decent level of IT skills."

Erik van der Meijden
CEO Getronics

e-Skills drive global competitiveness.[126] INSEAD estimates that the correlation between digital skills and global competitiveness is already at 85%[127] The message is clear: Europe's ability to both expand our ICT sector and drive the penetration of digital technologies throughout industry and society will depend fundamentally on the availability of individuals with the necessary understanding and skills at all levels of the value chain. In view of this objective, the outlook is alarming. To exploit the opportunities of the digital age, we must change the trend.

Europe continues to suffer from a chronic shortage in digital skills in all sectors, but especially in key sectors such as software and computer industries.[128]

Recent studies forecast that the EU labour market will face a shortage of up to 384,000 ICT practitioners by 2015 out of an anticipated total of between 4.95 and 5.26 million ICT practitioners, up from the current level of 4.7 million. Depending on the specific occupation, this gap will represent between 1.7% and 13% of the total demand.[129]

Moreover, in addressing digital competitiveness, Europe tends to focus on the digital technologies themselves. Yet, due to the global ubiquity of these technologies, digital products and services and their corresponding employment are essentially the same anywhere in the world.[130] As a result, global competition extends not only to products and services, but to the jobs themselves – many of which can be performed anywhere by skilled individuals, thanks again to digital networks and tools.

To remain competitive, not only does Europe have to increase the supply of digital skills, but we have to ratchet-up their level.[131] (There are even concerns that the iPod generation, which is now entering the workforce, and which reveals great agility with digital gadgets, may not necessarily understand how to work with these technologies and how to apply them to business situations.) In Europe today, only 14% of existing jobs do not require digital skills. By 2015 a full 90% of all jobs in Europe will require some set of ICT skills, whatever the industry or service sector.[132]

Europe's weaknesses extend to the three types of e-Skills needed for a competitive and inclusive society: 1) literacy and basic ICT skills including maths and science 2) occupational skills required for the job market and which are developed in school, but increasingly on the job 3) global knowledge economy talents which are less tangible, but involve leading teams, anticipating change and which are critical for innovation.

126 *Who cares? Who dares?* – prepared for the European Business Summit by INSEAD with the support of Microsoft, Shell and the Federation d'Entreprises Belges (FEB). http://www.insead.edu/discover_insead/docs/WhocaresWhodares.pdf
127 *Ibid.* | 128 The Council of European Professional Informatics Society (CEPIS) estimates that Europe could face shortages of up to 70,000 ICT practitioners in 2010. http://www.cepis.org/ | 129 *After the crisis, the e-Skills gap is looming in Europe*, empirica and IDC, e-Skills Monitor 3 December 2009. http://www.eskills-monitor.eu/2009-12/after-the-crisis-the-e-skills-gap-is-looming-in-europe/ | 130 The need for digital skills now extends to all sectors and all levels of employment: white collar jobs are already performed primarily on computers and portable devices, and workers in retail and logistics use mobile devices for tracking inventory and shipments | 131 European Commission, *e-Skills for the 21st Century: Fostering Competitiveness, Growth and Jobs*, 2007. http://ec.europa.eu/enterprise/sectors/ict/files/comm_pdf_com_2007_0496_f_en_acte_en.pdf | 132 *Post Crisis: e-Skills are needed to Drive Europe's Innovation Society*, IDC 2009. http://pressmedia.microsoft.at/GetDocument.ashx?ID=fdd9d70e-96eb-4f00-8b7f-fc10e1d3fb7f

Although Europe fares better than many of its competitors with regard to basic and occupational skills, it excels in none of the three types of skills required. INSEAD ranks Europe with a B for basic skills, B- for occupation skills and C for GKE talents.[133] There is no reason why Europe as a whole cannot excel. Currently, Finland, Denmark and Sweden have the top three rankings.

While working-life training will be an essential part of the solution, it is the education system itself that holds the key. Europe's education systems – from primary to university level – are in need of a systematic transformation better to integrate digital literacy into the curriculum. Such a transformation will require close collaboration between education and business, an understanding of the need for fundamental reforms, and significantly more investment. On average, Europe spends around half as much as a percentage of GDP on higher education as the US and Japan.[134]

A recent *Economist* Intelligence Unit study identified the best-performing countries in developing the right ICT talent as the US, Singapore, the UK, Ireland and South Korea. The EIU suggests that the key to these countries' success lies in them having vigorously expanded enrolment in higher education, including science and engineering. They also maintain world-class universities or technology institutes, and their institutions have started to train technologists with business and management skills, not just technical skills.[135]

More broadly, the individual and societal benefits of equipping everyone with digital skills have been widely confirmed, yet some 48% of the European population remains digitally excluded.[136] This figure masks a North/South, divide where the Nordic countries and the Netherlands boast an Internet penetration rate of more than 80%, whereas countries such as Greece and Portugal hover around 40%. The digital exclusion rate rises to 60% for people living with a disability and to 62% for those over the age of 65.[137] 51% of those with just a basic secondary education are digitally excluded. In the UK alone, the potential economic benefit of bringing everyone online is an estimated £22 billion.[138]

More than two years ago, a European Commission Communication set out the strategy and identified all the necessary steps that we must take to overcome our digital skills crisis.[139] We know what we have to do. Now we have to do it.

133 *Who cares? Who dares? Op. cit.* | 134 *Ibid.* | 135 *How technology sectors grow, Benchmarking IT industry competitiveness 2008*, Economist Intelligence Unit. http://www.eiu.com/site_info.asp?info_name=bsa_tech_2008&page=noads&rf=0
136 http://www.internetworldstats.com/stats4.htm | 137 Ibid. | 138 Champion for Digital Inclusion, PriceWaterhouseCoopers 2009. | 139 European Commission, *e-Skills for the 21st Century: Fostering Competitiveness, Growth and Jobs*, 2007. http://ec.europa.eu/enterprise/sectors/ict/files/comm_pdf_com_2007_0496_f_en_acte_en.pdf

Building Block 6: Trust & Security

"Security concerns are probably the biggest obstacles for consumers and businesses to move ahead with the adoption of new ICT driven solutions before customers will use these new offerings, they will have to be convinced that these new ways of interaction and data sharing are secure and trustworthy."

Thomas Spretizer
VP T-Systems International GmbH

A trusted and safe online environment is a prerequisite for the further development of Europe's digital economy and Digital Single Market. Privacy and security are essential elements of trust and governance that are part of the foundation of a pro-growth regulatory framework. These elements of trust are horizontal factors that cut across sectors and applications. New business models and technologies need to be understood and trusted by commercial operations and consumer users. There is a need to understand how personal data may be used and secured as essential elements of trust. Risk-based frameworks that focus on governance and accountability should be appropriately considered when implementing new technologies and business models.

As reliance on the Internet grows, so does the importance of security and safety for all categories of users – private individuals, businesses and governments. The foreseeable explosion in digital services will reinforce demands for robust and secure networks, including a framework for secure online payments.

Internet usage has risen steadily over recent years, with the number of subscribers and types of uses expanding. Despite these positive developments, some users and communities are still slow in adopting new technologies and many in the user community have concerns about privacy and security online.

In some cases, enhanced trust may result from experience and familiarity. A May 2009 Eurobarometer Survey found daily Internet users were found to be significantly more confident than those who use the 'Net less often (62% vs. 48%)[140] and those with an educational degree more at ease than those with only a basic education (64% vs. 48%). These findings suggest that overcoming consumers' security concerns requires not just more secure systems, but also investment in digital literacy – which also opens access to a wider range of digital benefits.

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. Without a continued concerted action to secure and communicate the protections and rights for online service users (and the clear link between digital participation and individual prosperity), consumer scepticism could delay the broader implementation of innovative Internet-based services such as digital health, which rely on the use of a wide range of confidential personal data. It could also limit the adoption of e-Government public services such as online tax filing or license applications. While based on existing technologies and business models, the broader diffusion of 'Cloud' computing could be hampered if companies and individuals are confused by the technologies and uses of information or are not familiar with new providers of those services. Trust is a factor of reputation and brand; and much as in the early days of the Internet, consumers will need to be comfortable with assessing these factors when considering providers of 'Cloud' and related services.

Optimising the data protection regime in the EU is integral to user rights being better protected in the online environment, and users becoming more confident when employing online services. The implementation of the EU Data Protection Directive in the Member States' data-protection laws in the EU should be further harmonised, some of the administrative burdens should be removed, and existing legislation in this field should be better implemented and communicated to Internet users.

140 *Ibid.*

At the same time, it is imperative that network and information security in Europe continues to be strengthened and networks become more resilient against threats, whether these are brought on by natural disasters or cyber attacks. We therefore support President Barroso's announcement that the incoming European Commission will propose "a major initiative to boost network security".

A major digital catastrophe – for example physical damage to critical digital networks (e.g. following the earthquake in Italy where satellites quickly re-established broadband connectivity), a large scale cross-border cyber attack (e.g. in Estonia in 2007) or an instance of massive fraud resulting in consumer harm – would have a negative impact on consumers' trust in the Internet if it is not properly handled – whereas their mass migration to online commerce will be instrumental in the digital transformation of the European and world economies.[141] Although natural disasters cannot be avoided and cyber attacks can hardly be prevented, well-established business-recovery systems and co-ordinated emergency services will be able temporarily to replace the damaged infrastructure in a short time-frame. We therefore believe that dialogue and partnership among all key stakeholders – primarily between industry and public authorities – is crucial to tackling these challenges to network and information security. 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. They 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.

From the social point of view, many benefits will be gained from the wireless broadband technologies in the areas of public protection and disaster relief, which encompass for instance the usage of wireless technologies that is essential to the day-by-day work of public safety agencies, widespread disaster response and localised emergency notification and response.

141 *A Green Knowledge society*, Swedish Presidency of the EU 2009. http://www.se2009.eu/en/meetings_news/2009/9/14/the_report_a_green_knowledge_society_is_delivered_to_the_minister_for_communications

Building Block 7: Trade Policy

"Free trade must be a tool to generate prosperity, stability and development. When supported by the right rules and institutions, free trade delivers win-win outcomes. When part of a wider set of measures, it is a potent lever promoting European values abroad, like sustainable development and human rights. In addition, the openness of our own market fosters innovation and creativity at home and is the best way to ensure, thanks to our weight in global trade, similar openness abroad."

Karel De Gucht
Parliamentary hearing
12 January 2010

The European digital technology industry needs to be able to rely on favourable, reliable and sustainable trade conditions in the global digital economy. The EU should be strongly committed to free, balanced, open and fair trade as a driver of productivity, innovation, job creation, improved competitiveness and service quality.

In order to be successful and competitive on the global stage, the European digital technology industry needs to be able to take best advantage of the opportunities offered by international trade.

ICT products are often made up of hundreds of components that come from a variety of countries and suppliers. Those products can and should be sold to customers world-wide. To ensure international access to innovation, the highest quality, the lowest cost prices and the largest market, there is a need for a liberal trade environment.

No product development or supply chain is in a steady state – all, rather, are in constant evolution. Products and services are constantly renewed and improved. Due to competition and relative free-market conditions, there is a continuous opportunity for European companies to improve themselves, to become a supplier of choice, to learn, to innovate, to be part of global supply chains and to sell their products and services worldwide at competitive conditions. All of this requires outward oriented businesses and liberal market access.

However, with the lack of achievement in the international trade talks (Doha Round) under the World Trade Organization (WTO), there is a growing risk of the creation of fragmented trade requirements in bilateral agreements. This should be avoided, e.g. by the use of internationally accepted standards. A key priority for Europe should be to finish the Round quickly, to restore confidence in the WTO as an important player in trade. Then it is instrumental to set out a post-Doha agenda permitting the WTO to play a central role in further liberalisation of trade.

But also within Europe there is need for improvement. The current system of resolving customs disputes is cumbersome, non-transparent and time consuming. There is therefore a need for ensuring simple, timely and transparent customs decisions that can apply throughout the European Union and be used by all economic operators equally.

The world is facing increased levels of international organised crime, terrorist attacks and other public-security issues. Consequently, the need to pay continuous attention to public-security issues is indisputable. Both customs controls and the actions carried out by the economic operators play an important role in achieving security in the supply chain. Given the importance of tackling public security issues, an improved and more equitable partnership between government agencies and economic operators is essential if the right balance is to be achieved.

The Next-Generation Digital Economy presents massive opportunities for the EU in terms of growth and employment, productivity gains, competitiveness as well as the reduction of carbon emissions.

With the above in mind the following trade objectives should be pursued:

External market:

- Zero tariffs and zero non-tariff barriers, worldwide in a sustainable multilateral, rules-based trading system affording maximum access to markets with the minimum of barriers.
- Ensure the use of internationally accepted standards and standard data sets in bilateral arrangements, both in the context of trade agreements and international supply chain security, as they would also be applied in multilateral arrangements.
- An internationally agreed road map and a target date for the expansion of the Information Technology Agreement. The Information Technology Agreement needs to be expanded in terms of product and geographic scope, include a smart and quick update mechanism and provide for the removal and prevention of non-tariff barriers.

Internal market:

- Alignment of national standards with international standards.
- Creation of a European Customs Tribunal to replace the current system of Binding Tariff Information (BTI) and customs disputes having to go through national customs administrations and courts.
- Continuation and improvement of government and industry partnerships to ensure the implementation of necessary protections and the creation of a secure environment.

RECOMMENDATIONS TO ACHIEVE THE DIGITAL VISION FOR EUROPE

DIGITALEUROPE trusts that this White Paper demonstrates why the actions set out below need to lie at the heart of Europe's digital transformation. This transformation represents the foundation of a sustainable and competitive economy and a successful Digital Agenda for Europe.

Paving the way for the ICT sector to fulfil this role requires incorporating ICT into EU and national policies regarding growth, employment and SMEs support. DIGITALEUROPE would like to present the following recommendations for consideration by the new European Commission, the European Parliament and Member States.

1. Foster ICT Infrastructure

Europe's objective must be to establish global leadership in ICT infrastructure by 2015 by delivering close to 100% broadband coverage, giving at least 2Mbps service to the user, including at least 30% fibre-based infrastructure.

Quick Wins: 2010-2011

- Establish an investment-friendly framework for Next-Generation Networks (NGN) that inter alia:
  - Ensures legal certainty;
  - promotes investments;
  - respects technology-neutrality, leaving technology choices to service providers, investors and consumers, and;
  - benefits from non-discriminatory access for civil works implementation and facilitates access to ducts, thereby lowering the investment threshold substantially.
- Agree on a European Broadband Deployment Pact with Member States, using EU Regional funds, State and Private Investment.
- Establish a high-level EU task force with industry experts to develop a future ICT infrastructure strategy.
- Facilitate the use of the so-called Digital Dividend for new mobile broadband services through a harmonised and technology-neutral pan-European approach, giving economies of scale and avoiding the detrimental cross-border interference issues, while not interfering with existing Digital TV/HDTV reception. Access to low frequency bands, with their propagation characteristics supporting wide-area coverage, is crucial to facilitate rural broadband coverage using mobile technologies, allowing in particular access to all expected Internet services.
- Accelerate Member States' allocation and assignment of other spectrum bands suitable for broadband wireless technologies, in particular in 2.3 to 2.6 GHz bands.
- Continue to encourage appropriate public-sector investment, Public-Private Partnerships and tax incentive schemes for the roll-out of broadband.
- Transfer Member States' e-Government networks and services to IPv6.
- Proactively launch initiatives to address e-Skills shortages at university-level and lifelong-education opportunities.

Mid-term Measures (2015):

- In its Europe 2020 strategy the EU has set itself a 2013 target of achieving full broadband coverage and a 2020 target of achieving at least 30Mbps for all and 100Mbps for 50% or more of European households. Digital Europe applauds that target.
- 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.

2. A Digital Single Market

Leveraging Europe's digital strengths into global competitiveness, economic wealth and sustainable jobs requires the creation of a European Digital Single Market; where business can be conducted online as easily as through traditional channels. The Digital Single Market will require greater harmonisation across policy areas to eliminate existing obstacles to the provision of pan-European online commerce and services. DIGITALEUROPE therefore urges the EU to take a horizontal approach to policymaking to eliminate multiple barriers:

Quick Wins: 2010-2011

- Rapid adoption of the proposed Directive on Consumer Rights to remedy market fragmentation.[142]
- Strong enforcement of EU rules, notably the e-Commerce Directive especially regarding liability of intermediaries.
- Expand the annual Internal Market Scoreboard to focus on the Digital Single Market, notably incorporating the Digital Indicators currently being developed by the Spanish Presidency and the OECD.[143]
- Complete the EU Patent and improve Patent Litigation System to reduce costs, enhance legal certainty and maintain state-of-the-art proceedings and decisions.
- Enhance the current system of ICT standardisation in Europe to allow for the recognition and adoption of standards that have been developed in global standardisation consortia; ICT standards in relation to EU policies must be neutral in terms of technology, vendors and the underlying business models.

Mid-term Measures (2015):

- Improve the attractiveness and ease of the digital content across the Digital Single Market.
- Phase out private-copy levy systems though legislation.
- Harmonise the use of spectrum to deliver more choice of device brands/models and economies of scale.
- Make inexpensive and secure payment systems available to Internet users across Europe.
- Approve recast of the WEEE Directive to harmonise registration and reporting while minimising the administrative costs relating to compliance with the Directive.[144]

142 See supra note 1 | 143 See supra note 2 | 144 See supra note 3

> “Europe must establish a leadership role in Next-Generation Internet applications and services.”

3. Foster ICT R&D

Europe must become the most attractive region for ICT Research and Innovation through a combination of increased funding at EU and national levels, and the introduction of regulatory reforms to eliminate fragmentation. At the very least, Europe should achieve its objective of R&D expenditure of no less than 3% of EU GDP by 2015 at the latest. While this condition is necessary, it is not sufficient: more attention should be paid to the transition of R&D into commercial products and services. Europe must establish a leadership role in Next-Generation Internet applications and services. Regulatory reforms must include improved Intellectual Property protection with regard to patents, copyright and the promotion of IPR in green technology.

Quick Wins: 2010-2011

- The European Commission should ensure that the FP8 succeeds FP7 as of 2013 on an expanded scale and also encourage Member States to increase their efforts.
- Leverage the momentum of the EIT-ICT-KIC to actively support the build-in innovation process, and establish links in the same domain, e.g. the PPP on the ‘Future Internet’, the JTIs ARTEMIS and ENIAC, the European Technology Platforms on ICT domain, the ICT clusters.
- Focus the European Investment Bank on innovation where market failures are apparent.
- Focus the European Investment Fund to establish pan-European funds, 1) partner with corporate investors in thematic funds 2) support tech transfer 3) encourage new Public-Private Partnerships.
- Rapid implementation of the Public-Private Partnerships (PPP) Communication.
- Refer to the JTI Sherpas Group for modifying the legal and administrative arrangements for existing and future JTIs as major PPPs in European research.

Mid-term Measures (2015):

- The European Commission should encourage the introduction of EU-wide tax incentives to increase private R&D to widen the impact and guarantee a level playing field ,and develop an EU-wide ICT research and development strategy, which includes tax incentives.
- Ensure EU wide implementation by Member States of the concept of pre-commercial procurement to promote market penetration of new technologies.
- Devote a considerable portion of the EU Structural Funds to fostering the deployment of innovative ICT solutions. DG REGIO and Member State partners should interface with ICT sector leaders better to understand the ICT potential to deliver cohesion policy for the digital age.
- Significantly increase the allocation of EIB and EIF resources to venture-capital investments with private partners to provide for the lacking critical mass of venture capital in Europe.
- The new financial perspectives should prioritise sectors based on growth and jobs.

4. Promote e-Skills as Skills for the 21st Century

With an 85% correlation between e-Skills and competitiveness, Europe must move rapidly to improve the skills of its children, teachers, administrations and elderly citizens. Europe must set ambitious goals for 2015 including halving the digital literacy and competence gaps and guaranteeing that all primary and secondary schools have high-speed Internet connections. By 2012, the EU should ensure that all primary and secondary school students receive training about the risks and safe use of the Internet. All adults of working age should have access to e-Skills training.

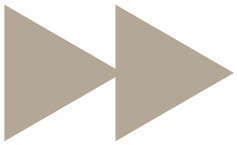
Quick Wins: 2010-2011

- Member State awareness campaigns – run by Public-Private Partnerships – that highlight the career opportunities available to those studying maths, science or technology. Such campaigns should also highlight the EU e-Skills shortage, expand the range of activities and reach of the first EU e-Skills Week into a multi-year programme.[145]
- Provide all primary and secondary schools with high-speed Internet connections by 2015, and train all students to use the Internet in a responsible and secure manner.
- Extra-curricular activities such as visits to laboratories, open days at companies and visits by researchers should be reoriented to future career choices with an emphasis on the EU's globally competitive sectors.
- Expand internship opportunities to give students an orientation towards "marketable knowledge" at two key ages, i.e. at 10-12 years old and 16-17 years old, when teenagers decide on their career orientation and choice of studies.
- Promote transformative education via Public-Private Partnerships that experiment with learning methods including e-Learning.
- Incorporate technology for all teaching and training, sophisticated assessment, participatory methods and engagement of students both in and outside the classroom.

Mid-term Measures (2015):

- Statistical work on ICT skills shortages should be carried out to pinpoint the specific skill gaps. Develop Annual Eurobarometer reports, mapping employer perceptions with regard to the e-Skills needed in the next three to five years.
- Introduce incentives for teachers both to update their own ICT training and to modernise their teaching methods so as to mainstream digital teaching/learning. Introduce a certification for teachers attesting their ICT skills in association with the European Schoolnet (EUN).[146]
- Set up and fund the European Commission inter-school maths and science competitions across Europe to promote excellence.
- Launch an initiative to use the EU structural funds to improve ICT training particularly in key areas such as green IT, 'Cloud' computing and trust and security.

145 See supra note 4 | 146 See supra note 5



5. Reinforce Trust and Security on the Net

Quick Wins: 2010-2011

- Increase stakeholder awareness of existing industry measures being taken in the area of trust, privacy and data protection and initiate stakeholder dialogue.[147]
- Launch at EU and Member State level awareness campaigns – run by Public-Private Partnerships – to highlight the importance of privacy and security in the broader context of digital literacy.

Mid-term Measures (2015)

- Harmonise national privacy and data-protection rules, streamline administrative procedures and gear towards an ex-post assessment as opposed to ex-ante control.
- Review the legal framework on data protection so that:
  - National rules are harmonised and administrative procedures streamlined. This will improve predictability and strengthen the Digital Single Market. Divergent implementation of EU data protection law should be avoided. Co-operation on an international level is needed to create a favourable and consistent regulatory environment. Any future follow-up to the review should take into account that the technology neutral character is the cornerstone of the Data Protection Directive and, therefore, must be maintained.
  - Enforcement becomes effective and harm based, focusing primarily on adverse effects to the privacy or fundamental rights of European citizens.
  - Rules governing international transfers of personal data should be streamlined into one European system, in a global context to reflect the global nature of the Internet. A privacy governance model based on accountability could help achieve this.
- Improve security through:
  - The establishment of a European Public-Private Partnership for the resilience of critical information infrastructures, which will facilitate the exchange of best practice in dealing with critical-infrastructure failures, including natural disasters; enabling partners to focus strategically on a proactive approach to improving the resilience of critical information infrastructures.
  - The support and continue public-private dialogue in the area of security and trust in general.
  - The transformation of ENISA into a permanent European Commission agency. ENISA would also be well-placed to facilitate the establishment and operation of the public-private partnership described above.
  - Fostering public-private co-operation to combat cyber crime.

147 See supra note 6

6. e-Health

Quick Wins: 2010-2011

- Enable global standardisation and interoperability for technical, security and semantic aspects. Health Industry groups working in health IT standardisation should be able to contribute to the European formal standardisation processes.
- Standardise ID management/access control to enable better use of safe and secure personalisation of services.

Mid-term Measures (2015)

- Introducing mobility to healthcare:
  - European frameworks that facilitate sharing of best practice in the area of improved patient treatment through the application of ICT.
  - Pilot projects and funding schemes supporting the introduction of real time access to information in the area of healthcare.
- Ensure that funding and reimbursement systems allow for remote service provision, both in country and cross-border.
- 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.
- Emergency response:
  - Seamless cross-border co-operation for emergency response capabilities are essential. A prerequisite in this field is an effective and pre-arranged utilisation of the terrestrial radio-frequency spectrum.

“Health Industry groups working in health IT standardisation should be able to contribute to the European formal standardisation processes.”

7. Energy

Quick Wins: 2010-2011

- Encourage Member States to develop national road maps for the use of ICT to improve energy efficiency and reduce emissions across the economy and society.
- Support the development of appropriate incentives to encourage the uptake of energy efficient technologies and sustainable procurement practices e.g. develop and promote Public-Private Partnerships in energy efficiency; develop innovative funding instruments such as co-investment funding for more smart/intelligent cities; and produce guidelines for public authorities on the deployment of sustainable ICT.
- Promote the use of Internet Protocol (IP) as the core networking open standard for Smart Grids.
- Encourage Member States to lead by example, demonstrating the sustainable use of ICT across all levels of government, i.e. building management, travel reduction, flexible working etc.
- Allow utilities implementing Smart Grids to receive CO_2 certificates under the EU ETS.

Mid-term Measures (2015)

- Identify and target research and regional funding to support the diffusion of low carbon enabling technologies. Increase R&D funding and fiscal stimulus for environmental research Smart Grids. Encourage Member States to increase tax incentives for energy efficient products and deployment, including Smart Grids.
- Promote a policy framework for acceleration of Smart Grid deployment in Europe, addressing in particular regulatory issues and standards.
- Expand the availability of broadband to support tele-working, tele- and videoconferencing and dematerialisation across a range of practices and services.
- Use ICTs as information channels to drive more energy efficient behaviour in homes and business.
- Drive harmonisation of energy regulations globally.

8. Transport and Logistics

By 2015, the EU should achieve a 10% reduction in CO_2 emissions in transport and logistics through the effective use of ICT. In addition, Europe should strive to establish an integrated, IT-enabled transportation network that enables multimodality, transparency and cost savings.

Quick Wins: 2010-2011

- The European Commission should consolidate outcomes from existing initiatives (such as Trans-European Network Transport (TEN-T), European Satellite System (Galileo), and Intelligent Transport System (ITS)), with the view to establish a road map for an integrated transportation network.
- In the context of the public-private partnership for the 'Future Internet', a work stream for the T&L industry should be defined and implemented.

Mid-term Measures (2015):

- The European Commission should invest in ICT research through lighthouse projects, particularly in the field of seamless transportation and logistics operations across multiple service providers along the whole supply chain.
- IT-supported sustainability in T&L, including monitoring and calculation of energy consumption, greenhouse emissions and carbon footprint at different levels should be implemented.
- The European Commission should support the harmonisation, standardisation and interoperability of information, processes and technologies among a global network of T&L service providers.

> “The EU should strive to establish global leadership in e-Government by 2015.”

9. e-Government

The effective usage of ICT can significantly reduce costs and enhance the quality of public services. The EU should strive to establish global leadership in e-Government by 2015. Targets could include all public services available online across the EU, the uptake increased by 50% of online public services by business and citizen, and the EU should have a fully functioning internal market for e-Government services.

Quick Wins: 2010-2011

- Ensure the effective implementation of the EU Services Directive to reduce administrative burden and as a reference case for future cross-border e-Government services.[148]
- Adopt a new EU e-Government Action Plan that sets clear priorities until 2015. Define a set of common Key Performance Indicators (KPIs) to measure progress including indicators related to the availability and use of e-Government services; measure their broader economic and societal impact (public, value, social inclusion, reduction of administrative burden, sustainability, etc.).[149]
- The creation of an EU-wide common framework for e-Identification by 2015.

Mid-term Measures (2015)

- Promote structural reforms in public administrations that are essential to reap the full benefits of ICT: implementation of eGoverment projects; promoting the use of innovative technologies and service provisioning models such as Service-oriented Architecture, business intelligence technology, shared service centres and ‘Cloud’ computing in public services; to this end the CIP ICT PSP should be extended.
- Foster e-Skills of employees that are needed for the effective implementation of e-Government projects.
- Take decisive steps to establish a truly functioning internal market for e-Government applications by harmonising national regulations and adopting European standards, whereas the EIF 2.0 should provide the necessary guidance. The creation of an EU-wide common framework for eIdentification by 2015.
- Ensure that procurement rules in Member States are fair and in line with the EU Transparency Directive. In particular, procurement policies of public authorities must be neutral in terms of technology, vendors and the underlying business models.
- Identify areas in which there is a proven need for cross-border e-Government services; these services should be defined in close co-operation with consumers ICT industry as well as business users and consumers.
- Promote the use of Web 2.0 technologies towards greater citizen participation in policymaking and in defining public services.
- Ensure data privacy and security through wider use of privacy enhancing technologies (PETs) and by conducting voluntary privacy impact assessments (PIAs) prior to the introduction of new services, especially in a Web 2.0 environment.
- Promote the use of innovative technologies and service provisioning models such as service-oriented architecture, business intelligence technology, shared service centres and ‘Cloud’ computing in public services; to this end the CIP-ICT-PSP should be extended. Promote structural reforms in public administrations that are essential to reap the full benefits of ICT.

148 See supra note 7 | 149 See supra note 8

10. Trade Policy

Quick Wins: 2010-2011

- Services should be maintained a priority alongside Non-Agricultural Market Access (NAMA) and agriculture in EU trade negotiations at World Trade Organization (WTO) level, not only in the context of current Doha negotiations but also in any future negotiations, giving due attention to different ICT sectors.
- WTO NAMA negotiations should be advanced and concluded regarding both tariff and non-tariff barriers (NTBs) in the ICT/electronics sector. Negotiators should pay careful attention to the electronic sectoral negotiations in the context of the Doha Round and also attempt to minimise administrative burdens for our sector via the establishment of a permanent platform to address NTB matters.
- The WTO ITA (Information Technology Agreement) should continue to be implemented and expanded in terms of product and geographic scope. A 'smart and quick' update mechanism providing for the removal and prevention of non-tariff barriers is required. This will enable all citizens to continue to have access to the best products at the lowest possible costs.[150]
- Ensure all markets comply with their obligations under the WTO TRIPS Agreement.[151]
- When the EU negotiates any bilateral or regional agreements, the ICT/ CE and telecoms services sector should be prioritised as a key enabler for competition and growth in all economic areas.
- The European Commission should resist third-country ICT policies, for example standards mandating non-market terms, non-transparent subsidies and procurement preferences intended to promote domestic industry, to the extent that they prevent level playing field, effective and fair competition and market participation by European ICT providers.
- Ensure that all markets respect the internationally agreed guidelines for export credits, avoiding unfair competition in EU and third country markets.
- Major EU trading partners still operate restrictive public procurement practices favouring locally developed innovation products. These practices discriminate against EU suppliers and should be contested before they are turned into policies. In the absence of bilateral agreements, and while endorsing trade liberalisation policies the EU should consider tabling reciprocal targeted restrictions at the negotiating tables on access to the EU procurement markets, to encourage our partners to offer reciprocal market openings and a level playing field in this domain.

Mid-term Measures (2015)

- The Basic Telecom Agreement of the GATS should be further implemented and updated. The system of trade rules needs to continue to promote legal certainty and security for services and investment and to ensure the elimination of barriers to ICT growth so that countries can benefit from what the sector offers.[152]
- The information society representation should be strengthened amongst the EU delegations across the world to promote our interests abroad. Both WTO commitments and FTAs are welcome tools in this context. The ICT industry is keen to share its know-how with the European Commission delegates in the respective markets of the world, as many ICT companies have local representations that can provide first-hand information about local market access conditions and regulatory issues.

150 See supra note 9 | 151 See supra note 10 | 152 See supra note 11

11. Governance

Europe's Digital Agenda needs to be driven through a governance structure established and managed by the European Commission. This governance structure should:

- Ensure a horizontal approach within the European Commission, spanning the full breadth of the Digital Agenda.
- Ensure that Member States take ownership of the goals of the Digital Agenda via individual targets that collectively meet European targets.
- Feature a new, comprehensive set of Key Performance Indicators (KPIs) to measure progress and performance against other global players, covering not just broadband penetration and other direct digital KPIs but also the penetration and transformational effect of digital uptake in key economic and social sectors.
- Include an annual European Digital Agenda Summit that brings together political decision-makers from the European Institutions and Member States as well as executives from industry and civil society and which should serve as the focal point and reporting venue for the governance system.

Without such a structure, Europe's Digital Agenda will continue to comprise a wide range of disconnected and unfocused initiatives, many of which are valuable and productive in their own right, but which are unable to generate economic and social transformation on the scale necessary for Europe to thrive in the Digital Age.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