IS NEWS

**HIGHLIGHTS
EVENTS
PUBLICATIONS**

Editor's Note

Digital Agenda for Europe 2010-2020

I write this introduction on my return from Brussels and the first Digital Agenda Assembly that opened "the agenda" to contributions from everyone working towards a sustainable digital society. The event covered a very broad range of topics in twenty-four workshops and plenaries and I came away with our own socio-economic research efforts placed into a clear context and perspective. If you are reading this newsletter and you are not yet engaged in some way with the Digital Agenda initiative, then I encourage you to get involved in the on-line discussions and follow the tweets.

We are now setting our work programme for 2012. In preparation, we held discussions with our primary policy customers in Directorate Generals Information Society & Media and Education & Culture. The main objective of these discussions was to ensure that our research foci for 2012 were aligned to their policy priorities as well as to the needs of the EU2020 Flagships where we were able to make a contribution. Naturally, a considerable proportion of our work is targeted to the Digital Agenda Europe, but we also provide inputs to several other flagship initiatives and concurrent policy revisions.

I am therefore very pleased to announce that we are starting a new research activity to specify and quantify the Digital Economy. This is exciting but we also recognise that it will be tough and challenging work. The output of this research will feature in future

issues of this newsletter. Please contact us if you would like to get involved at the grass roots of this research activity. We will soon be announcing Digital Economy workshops and seminars.

This newsletter includes a summary of the findings of the EUROBAROMETER survey that was carried out at the end of last year. It was highlighted in a joint press release from Directorate Generals INFSO, JUST and JRC that coincided with the first day of the Digital Agenda Assembly on 16 June.

We also report on the conference we hosted in Brussels on "The Asian Rise in ICT R&D" that (naturally) attracted a strong participation from outside the EU. Another four pages are dedicated to learning, skilling, and creativity in schools and our work on profiling digital competences. These are important issues we all have to come to terms with for ourselves, our children and for the future digital society. So please take some time to take a look at the work we have been doing.

Finally, we close this issue with a round-up of publications, recent and upcoming events. But as always the details are important, so I invite you to visit the website and download the full publications and reports.

David Broster
Head of the Information Society Unit

**European Commission
Joint Research Centre (JRC)
Institute for Prospective Technological Studies (IPTS)**

Inside this issue:

Publications

Events

Asian rise in ICT R&D: Looking for evidence

International Conference organized by JRC-IPTS, European Commission

16 – 17 February 2011, Brussels

Highlights from the conference

The Information Society Unit at JRC-IPTS has been investigating the Information and Communication Technologies (ICT) sector and its R&D in Asia for several years as part of its research for the PREDICT project. The 2011 PREDICT report (see article on page 4-5) offers a country-level approach to ICT R&D internationalisation by analysing the ICT industry in China and India, the two largest emerging economies. The conference was organised to disseminate the results of this on-going research and also as a working tool for a report on ICT in BRIC countries.

At the Conference, the most recent information on the Asian ICT scene was discussed in order to raise questions rather than find answers, and to reflect on the EU position and policies as regards Asia as a whole, and India and China in particular [Japan was deliberately left out of the Conference programme for reasons of timing]. The following questions were raised and supported by experts' presentations:

- How is the ICT industry and its R&D activities developing in selected Asian countries?
- What are prospects for the future?
- Regional ICT production and trade: what are the main ICT-related relationships between the countries? Is there a regional dynamic?
- What are the existing or potential strategies for EU and US ICT companies? How willing are they to collaborate with Asian partners? What are the most visible signs of success?… and failure? What are

the future hopes, threats and opportunities?

- What are the existing or potential policies at national or European level that could offer support to ICT companies?

Impressive growth in China and India

China and India are among the fastest growing economies in the world. China's GDP has achieved more rapid growth than most other countries. On a purchasing power parity (PPP) basis, China is the second largest in the world after the US, representing about 41.56% of the total for the EU27 (PPP: World Bank, 2009). India is the eleventh largest economy by nominal GDP and the fourth largest by purchasing power parity, having achieved an impressive growth rate over the last two decades.

The Chinese and Indian ICT sectors are certainly representative of the massive changes in their industries and economies. China has become the world's largest producer of ICT products (exports of ICT increased fourfold between 2004 and 2008 though many of the exports are re-exports from other Asian countries). Manufacturing dominates China's ICT industry. ICT research is a priority in China and most of its R&D labs are for ICT. China-based R&D increasingly adds value, and is not just cost-oriented. By 2009, there were more than 1,200 foreign R&D centres in China. The Indian ICT sector is growing in all domains, but is predominantly driven by software

services. Here growth is driven by services – a real "service revolution" with unusual innovations.

China is the world's largest mobile market: last month, the number of subscribers reached 853 million. India is the second-largest market. These two countries are the fastest growing mobile markets in the world. Indian telecom operators introduced a major business innovation: the budget telecom model or "bottom of the pyramid" (BOP) model. Mobile rates are the lowest in the world. Speakers at the Conference explained that big numbers require big solutions: hi-tech / low-cost.

In both countries, several electronics firms have become global players: Huawei Technologies, Lenovo, and ZTE in China and Tata, Wipro and Infosys in India. Tencent, Aidu and Alibaba.com (all Chinese companies) now rank now 4th, 6th and 12th among the top fifteen publicly-trading global internet companies (by market value, as of 2010). However, these success stories may be misleading in China as very few Chinese corporations are among the main R&D investors (there are scarcely a dozen Chinese corporations among the top 1,000 worldwide). Among these 1,000 top corporations, Chinese and Indian firms account for 1% of R&D expenditures (EU firms account for 32%, US firms for 40%).

Taiwan shows an interesting shift from end-product manufacture (computers and related equipment) to component manufacture and now forms an ICT hub in the global value chain. The iPhone is a good example of this, and shows how Taiwan has become a facilitator for Chinese manufacturing. This model is very different from the vertically integrated model found in South Korea and China.

Highlights from the conference

This impressive growth in Asia is translated into R&D expenditures and output (China's invention output overtook that of both the EU and the US, and comprised more than 44% of all Asian patent applications in 2007). Speakers at the Conference agreed that innovative capability in Asia has grown, and that the dynamics in terms of catching up with developing countries are strong. However, they also agreed that there is still a gap and that there are local differences. These countries are still at the early stages. China is closing the gap with EU 27 quicker, but India is still lagging behind. Korea, Taiwan and Singapore are above the OECD average for R&D gross expenditure (% GDP).

EU companies are active in Asia

Telenor serves 200 million subscribers, half of them in Asia, and has been present in this region for over 15 years. Telefonica entered an alliance with a Chinese operator five years ago and signed a strategic alliance with China Unicom early 2011. This has allowed the European operator to reach an installed customer base of 590 million (this grows by a further 60 million each semester), which brings considerable purchasing power to their newly created joint procurement unit.

Together with China Mobile, the Nokia Siemens Network has created in their Chinese labs one standard for the next mobile generation (TD-LTE: TD-SCDMA), which could reach 30% of the world market. China will therefore become more important as a source of technology.

Policies

Some speakers were surprised by the lack of strategy coordination between EU Member States and described it as "embarrassing". US companies seem to fare much better (the US dominates in term of collaboration) and the US Chamber of Commerce, backed by the US Administration, is very proactive.

The view from the EU semi-conductor industry is that the EU needs a long-term strategy. Some Asian countries, like China, are learning a lot very quickly from abroad. Speakers questioned whether the EU was learning from China in the same way. They agreed that there is a need to learn from others, to find new forms of competition and cooperation and to create a level playing field for all players. From an EU standpoint, trade barriers still need to be addressed.

From an operational point of view, it seems that Europe lacks a broad strategic approach to its relations (competition, cooperation, co-invention) with these two emerging economies. Many speakers said that this weakness appears to result from the fragmentation of European Member State strategies, and from poor strategic intelligence about the Asian rise. The implementation of coordination at European level also seems insufficient.

Link to Conference webpage.

Contact: Jean-Paul Simon

Our latest Reports on Asia:

♦ Trends in Public and Private Investments in ICT R&D in India (2011). P. Malik, P. Vigneswara Ilavarasan. JRC Technical Note

♦ Trends in Public and Private Investments in ICT R&D in Taiwan (2011). Dr. Shin-Horng Chen, Dr. Pei-Chang Wen, Dr. Meng-chun Liu. JRC Technical Note

♦ East Asian Growth. Broadband: Lessons from Asia (2011). M. Fransman; Editors: M. Bogdanowicz, A. Bianchi. JRC Technical Note

♦ East Asian Growth: Chinese R&D Sourcing and Patenting Behaviour in ICT (2011). V. Long, S. Laestadius; Editors: M. Bogdanowicz, A. Bianchi. JRC Technical Note

♦ East Asian Growth: Policy Lessons from Bangalore, India (2011). J. Vang, C. Chaminade; Editors: M. Bogdanowicz, A. Bianchi. JRC Technical Note

♦ The Evolving ICT Industry in Asia and the Implications for Europe (2011). M. Fransman; Editor: M. Bogdanowicz. JRC Technical Note

The 2011 Report on R&D in ICT in the European Union

The recently published "2011 Report on R&D in ICT in the European Union" provides an analysis of EU ICT R&D investment and performance, and also looks at the increasing internationalisation of ICT R&D. This is the fourth report of a series published annually and it covers data up to 2008 (2007 for patents). This year's edition therefore covers the period of ICT sector growth up to the beginning of the recent financial and economic crisis. The report presents the results of the PREDICT project ("Prospective insights in ICT R&D") carried out by the IS Unit of JRC-IPTS and jointly financed by JRC-IPTS and DG Information Society and Media. PREDICT's multiannual analysis allows us to confirm the consistency of the data over time and it offers a wide view of the major ICT R&D trends across those years (2002 – 2008).

The 2011 PREDICT report covers the following topics:

⇒   The EU ICT sector in a global perspective,

⇒   The ICT sector in the EU Member States,

⇒   Impact of the economic crisis on the ICT sector,

⇒   The world top-R&D investing companies from the ICT sector –A company-level analysis,

⇒   Performance of ICT R&D: Patenting in ICT,

⇒   Internationalisation of ICT R&D.

The detailed and comprehensive analyses contained in PREDICT reports are of particular relevance to policy makers since the ICT industry and ICT-enabled innovation in non-ICT industries and services make an increasingly important contribution to the economic growth of advanced economies. The ICT sector is highlighted in the Europe 2020 Strategy particularly in its *Digital Agenda for Europe*, 'flagship initiative' and R&D and innovation support is highlighted in the *Innovation Union* flagship. The ICT sector is a significant contributor to Europe's ambition to achieve the target of investing 3% of GDP in R&D – a target which has been reiterated in Europe 2020. These characteristics have provided the rationale for the PREDICT research work, as gaining a deeper understanding of the dynamics of research in the ICT industrial sector can provide important policy insights and options.

In summary, the major trends observed in this year's report are the following:

●   The structure of the EU ICT sector is more and more oriented towards ICT services. The ICT service share continues to grow as compared with ICT manufacturing, driven by the Computer Services and Software ICT sub-sector, and helped in part by declining relative prices of ICT manufactured products.

●   The 2008-2009 financial crisis had a strong impact on the ICT sector worldwide. However, the negative effects appeared to have waned by the end of 2010, though recovery dynamics differed across ICT sub-sectors.

●   Although European ICT companies make substantial and increasing R&D investments, the EU is still lagging behind its main competitors, especially the US, in this regard. This lag seems to be largely due to the smaller number of large European ICT companies, rather than to a lower R&D intensity of individual EU companies: it can be observed that per ICT sub-sector, large EU companies have similar R&D intensities to those of their US competitors (measured as R&D investments/net sales).

●   In 2007, the number of ICT patent priority applications worldwide by inventors from the EU was significantly below those by inventors from Japan, Korea, China or the US. Applications by inventors from Germany, France and the UK accounted together for 80% of all applications by EU-based inventors; with Germany-based inventors alone generating half the total ICT applications for the EU.

●   Although ICT R&D is still predominantly "local" (i.e., performed in the same world region as the region where company headquarters are located), the EU and the US are also important locations for foreign ICT R&D investment. International cooperation in R&D is, however, evolving from a dominant EU-US relation to global networking. Since the early 2000s, the share of foreign ICT inventions owned by US firms and invented in Asia has increased. US firms also own significantly more foreign ICT inventions than EU firms do, and US firms, as an aggregate, appear therefore to be better able than EU firms to take advantage of the process of internationalisation of ICT inventive activity.
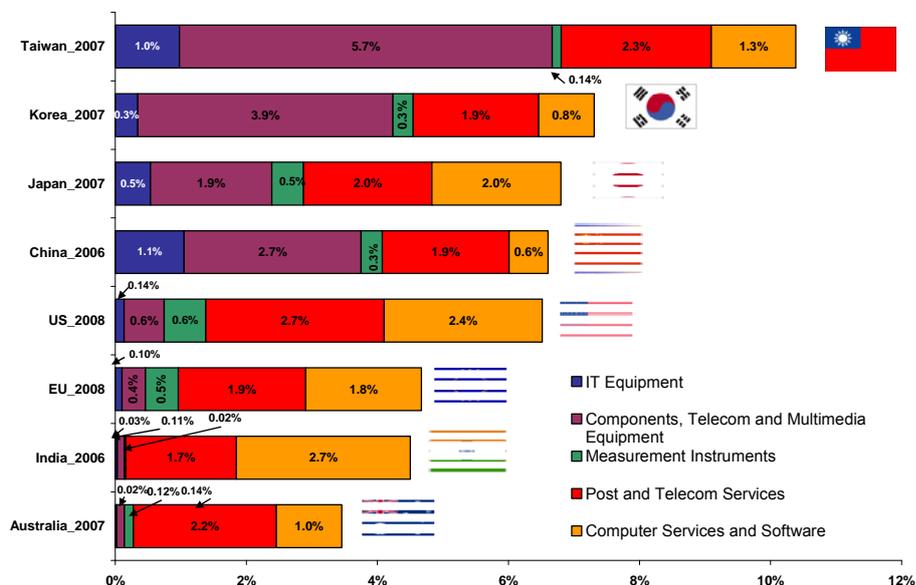

Definition of the ICT sector

The **ICT sector includes** five NACE* classes, also called sub-sectors:

♦   Three **ICT manufacturing sub-sectors** (IT Equipment; IT Components, Telecom and Multimedia Equipment; and Measurement Instruments)

♦   Two **ICT services sub-sectors** (Telecom Services, and Computer Services and Software). Where indicated, the Telecom Services sub-sector also includes Postal Services

* NACE – Nomenclature générale des Activites économiques dans les Communautés Européennes

As an example of the report's analyses, the figure shows the economic weight of the ICT sector and its sub-sectors in several major economies of the world. It illustrates the strong orientation of the EU ICT sector towards ICT services. It is also striking that the structure of the ICT sector is fairly similar in the EU and the US, but very different from what it is in Japan, Korea or Taiwan. These Asian countries have a comparatively much bigger ICT manufacturing sector. Japan's share of ICT manufacturing relative to GDP is three times bigger than the EU's, and China, Korea and Taiwan all have a share in GDP of ICT manufacturing higher than Japan's. One also notes that the relative economic weight of the ICT sector in the EU is significantly smaller than it is in the US, China, Japan, Korea and Taiwan.

Economic weight of the ICT sector and its sub-sectors, % of sector's value added in GDP, 2008 or latest data available

Source: JRC-IPTS based on data from EUROSTAT, OECD, EU KLEMS and from IPTS reports on trends in public and private investments in ICT R&D in China, India and Taiwan.

This year, for the first time, some of the main themes of the PREDICT report have been complemented by a series of further reports. These provide more detailed analyses on R&D investment by top ICT R&D companies worldwide, on performance of ICT R&D analysed through ICT patenting, and on internationalisation of ICT R&D. All reports and more information are available on the PREDICT project webpage.

Contact: Paul Desruelle

SAVE THE DATE!

International Conference "Global ICT industry: changing landscape? - The future of European ICT R&D"

Brussels, 19-20 October 2011

Main purposes of the conference

⇒   Identify and debate trends in the changing global ICT and ICT R&D landscape
⇒   Debate their impact on the EU ICT industry and consequences for research and innovation location and modes
⇒   Discuss implications for ICT R&D and innovation policies in Europe

In particular, the conference will address the following topics:
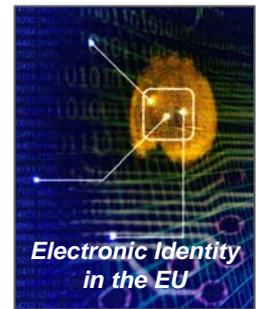
- Characteristics and trends in global redistribution of the ICT industry:
  - The emergence of a radically new internet/media/telecom ecosystem
  - The increasing role and importance of e-services
  - The importance of ICT manufacturing for Europe's growth
- What are the drivers for these changes, trends and the possible future scenarios?
- How do the EU ICT sector and EU companies position themselves in this new landscape and prepare for the future?
- What challenges and opportunities these raise and offer for European ICT R&D and innovation, for the localisation of ICT R&D and for international ICT R&D and innovation collaboration?
- What are current and future policy options at European level to address those challenges and opportunities?

The conference will bring together industry representatives, ICT R&D and innovation analysts, and policy makers, coming from Europe, the USA and Asia.

More information and access to registration on the conference webpage.

Eurobarometer survey on "Attitudes on Data Protection and Electronic Identity in the European Union"

Electronic Identity in the EU

In the framework of the Digital Agenda Assembly, which took place in Brussels on 16-17 June, the European Commission released the Special Eurobarometer survey (n 359) on "Attitudes on Data Protection and Electronic Identity in the European Union", which is the largest survey ever conducted on citizens' behaviour and attitudes concerning identity management, data protection and privacy.

The main findings of this Eurobarometer survey highlight that:

Europeans share data online, benefiting from eCommerce and Social Networking Sites

The survey shows that 60% of Europeans who use the internet (40% of all EU citizens) shop or sell things online and use social networking sites. Three out of four Europeans accept that revealing personal data is part of everyday life: they disclose personal data, including biographical information (almost 90%), social information (almost 50%) and sensitive information (almost 10%) on Social Networking Sites and when shopping or selling online. But they are also worried about how companies – including search engines and social networks – use their information.

Europeans share data online, benefiting from eCommerce and Social Networking Sites

Privacy concerns remain

The report revealed that 70% of Europeans are concerned about how companies use their personal data and they think that they have only partial, if any, control of it. 74% would like to give their specific consent before their data is collected and processed on the Internet. The report also highlighted that 62% of people in the European Union give the minimum required information so as to protect their identity, and that 75% would like to be able to delete personal information online whenever they want to – the so-called 'right to be forgotten'.

People trust public authorities

When it comes to protecting personal information, people have greater trust in public authorities – such as hospitals (78%), governments (70%) and EU institutions (55%) – than in private companies such as shops (39%), Internet providers (32%) and online services (22%). There is also strong support for EU action: 90% would like to have the same data protection rights across Europe. In general, people trust health and medical institutions more but are split over whether banks, Governments or the EU institutions are to be trusted or not; certainly companies (shops, telcos and ISPs) are trusted less. However, people (currently about 5%) use non-trusted private companies to share their most sensitive personal data (medical information); probably because there is no comparable public institution offer.

Awareness of the risks alone is not enough to limit identity theft and data loss in Europe

Personal experience of identity theft and data loss is very low in Europe, affecting only 2% of EU27 population. For the sake of comparison, identity theft only affected about 3.5% of US residents in 2010. Identity theft and data loss largely affect managers and other office workers and their families (7%); people with customer cards are more likely to report incidents of identity theft and data loss (6%). The reverse is true for holders of national identity cards (4%), for a range of reasons. But public sensitivity to identity theft and data loss is high, as more than half the population is aware of the issue via multiple sources. People are more likely to use low-tech techniques to protect themselves from abuse which are, in fact, not very successful. Even when awareness is higher, incidence of eID theft is also high. Efforts to instill a national technical culture, along with the provision of mature online protection tools, could inhibit identity theft and data loss.

The JRC was instrumental in forging cooperation that led to the survey's success

This Special Eurobarometer survey was commissioned by the Directorate-Generals Justice (JUST) and Information Society and Media (INFSO) and the Joint Research Centre (JRC). The JRC used a robust scientific methodology to define and design the survey, which was instrumental in forging cooperation between the above-mentioned policy DG's and the survey specialist "TNS opinion & Social" and led to the survey's success. At the JRC-IPTS, the coordination and analysis work was successfully driven and carried out by Margherita Bacigalupo, Wainer Lusoli and Ioannis Maghiros.

Contact: Ioannis Maghiros

Shaping Open Governance in the future Digital Europe

The JRC-IPTS contributed to the Lift-off toward Open Government Conference organised by the Belgian Presidency of the EU Council in Brussels between 14-16 December 2010. The conference was attended by about 850 participants representing the public sector, industry and civil society organizations. The speakers included the EU President Mr Van Rompuy, Commissioners Kroes and Šefčovič and the Belgian Minister for Economics and Administrative Simplification, Mr van Quickenborne, the CIO of the US Government Vivek Kundra and the CEOs of various ICT players. Mr Broster, Head of the Information Society Unit at JRC-IPTS, acted as main Rapporteur of the Conference, supported by Mr Misuraca and Ms Bacigalupo, Scientific Officers at IPTS. In his speech, Mr Broster summarised the main messages of the whole conference and his talk was welcomed for the added value its high-level analysis brought. His analysis of the evolution of the eGovernment discourse based on the comparison of the 5 Ministerial Declarations covering the past decade was particularly appreciated by the audience. The Conference report has been edited by IPTS and published in a Special Issue 'The Openness of Government' of the European Journal of ePractice.

During the Conference, the JRC-IPTS Scientific and Technical Report Envisioning Digital Europe 2030: Scenarios for ICT in Future Governance and Policy Modelling was also disseminated. This Report presents the results of a systematic analysis of societal, policy and research trends in the governance and policy modelling domain in Europe. It further illustrates the scenario design framework, analysing current and future challenges in ICT for governance and policy modelling, and identifies the key impact dimensions to be considered. It then presents the scenarios developed for 2030, and includes a storyboard for each scenario which illustrates the prospective opportunities and risks identified in each case. The scenarios developed are internally consistent views of what the

Conclusions and Closing:
David Broster, Head of Information Society Unit JRC-IPTS

European governance and policy-making system could have become by 2030 and what the resulting implications for citizens, business and public services would be. Finally, the report draws conclusions and proposes a shared vision for Digital Europe 2030, offering also a summary of the main elements to be considered for the future development of the research roadmap on ICT for governance and policy modelling.

This report is the result of research conducted by JRC-IPTS as part of the CROSSROAD Project – A Participative Roadmap on ICT research on Electronic Governance and Policy Modelling. The CROSSROAD Project is a European Commission FP7 Support Action, the overall goal of which has been to drive the identification of emerging technologies, new governance models and novel application scenarios in the field of governance and policy modelling, leading to the structuring of future research agenda, fully embraced by research and practice communities. In summary, CROSSROAD identified and characterized the key research challenges in the field of ICT for governance and policy modelling and outlined a participative roadmap for future research. The project started at the beginning of 2010 and received the 'best project of the month' award from the European Commission's Directorate General for Information Society and Media in December 2010. After a successful review in February 2011, the CROSSROAD project is now officially concluded, but all documents, findings and results are available on its Website, www.crossroad-eu.net, and most important, its community is still very much alive.

JRC-IPTS is also disseminating results of the CROSSROAD project through publications and presentations at scientific and policy events. For example, building on the CROSSROAD scenarios, the JRC-IPTS presented a paper on Foresight and Policy modelling on ICT for Governance: Exploring the Next Frontiers (Misuraca, G. et al., 2011) at the 4th International Seville Conference on Future-Oriented Technology Analysis (FTA 2011) on 12-13 May 2011. The Conference focused on the need and potential of FTA to address disruptive transformations in response to grand societal challenges.

Contact: Gianluca Misuraca

Assessing emerging ICT-enabled governance models in EU cities

On 31 January 2011 the JRC-IPTS organised an **Expert Workshop on assessing emerging ICT-enabled governance models in EU cities: exploring policy and research challenges**. The workshop was organised within the context of the 'Exploratory Research on emerging ICT-enabled governance models in EU cities' (EXPGOV) project, which is being conducted by JRC-IPTS in collaboration with EUROCITIES, and aims to deepen the understanding of the interplay between ICTs and governance processes at city level in the EU by providing evidence of the changes that ICTs are introducing to city governance models.

During 2010, the EXPGOV project developed a proposal for a framework to assess the main dimensions of ICT-enabled governance models at city level through conceptual work, desk research and consultation with representatives of cities and other experts. It also carried out an online survey and four case studies at city level in order to understand the effects of changes driven by ICTs and analyse their implications on specific policy domains. A cross-case assessment and analysis of the key drivers of changes and their consequences for ICT-enabled governance and the implications for the policy domains under investigation are currently being researched. The results will be presented in the project's Final Report, which will include policy recommendations and possible research directions in the area of ICT-enabled governance in EU.

The Workshop was attended by 30 participants from 15 different countries, including researchers, practitioners and policy makers interested in the topic of ICT for governance at city level, as well as European Commission representatives. The main objectives of the Workshop were: to present and validate the main findings of the exploratory research "EXPGOV"; to discuss with experts the research and policy implications deriving from the research; and to define key research and policy challenges ahead and possible actions.

The EXPGOV Project is conducted in collaboration with EUROCITIES, and on 1 February 2011, JRC-IPTS participated in the Annual Meeting of the Knowledge Society Forum of EUROCITIES in Brussels to present the main results of the exploratory research, contributing as well to the discussion about possible future cooperation in the area of ICT for governance and ICT for inclusion. More information on the EXPGOV webpage.   Contact: Gianluca Misuraca

The Future of Learning: Final Report in the Pipeline

The "Future of Learning" study, launched by JRC-IPTS in 2009 on behalf of the Directorate General for Education and Culture, is drawing to a close and the final report is being prepared for publication. This project employed a series of structured stakeholder consultations, involving experts, policy makers and teachers, to envisage how and what European citizens will learn in 2020-2030.

Key Findings

The overall vision is that personalisation, collaboration and informal learning will be the core of learning processes and pathways in the future. These terms are not new in education and training but will have to become the central guiding principle for organising learning and teaching in the future. The central learning paradigm will be characterised by lifelong and 'life-wide' learning.

ICT will play an important role in facilitating lifelong and life-wide learning opportunities, as a range of sophisticated and adaptive learning tools and programmes will be available which will make it easy for people to upgrade their skills and pro-actively drive their professional careers. For continuing professional development and learning aimed at re-skilling and up-skilling, there is a trend towards shorter-term, targeted and flexible learning modules; strategies that tap the tacit knowledge of a team and supporting intergenerational learning

Overview of future lifelong learning strategies: this graph was part of the Best Conference Poster Award of the 2011 Seville Conference on Future-Oriented Technology Analysis
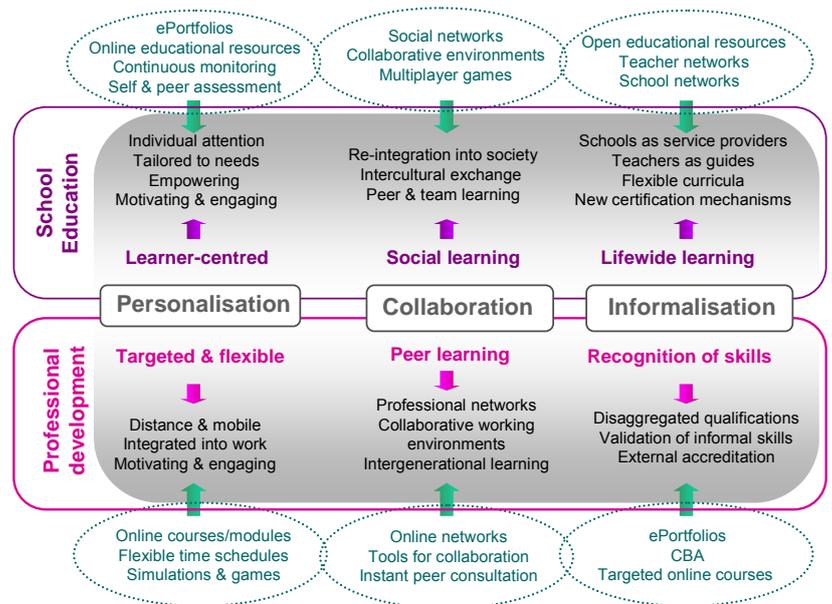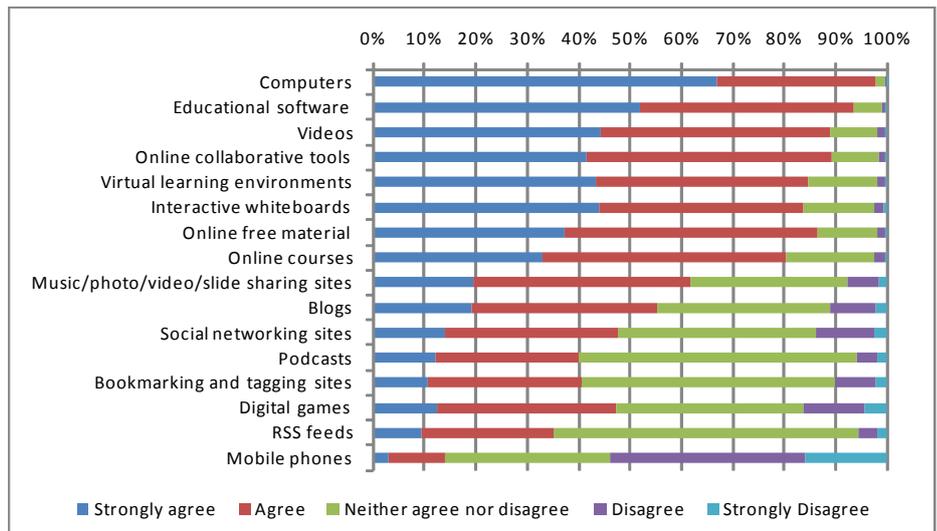
and mechanisms that better support the validation and recognition of informally-acquired skills.

Initial education and training will need to react more effectively and promptly to changing job requirements and societal trends. It must develop and implement new formats and strategies for learning if it is to continue to offer relevant, effective and high quality learning experiences. With the evolution of ICT, personalised learning and individual mentoring will become a reality and there will be a variety of resources and tools supporting learning pathways and experiences which are motivating and engaging, but also efficient, relevant and challenging. However, pedagogies, teaching strategies, curricula, and assessment and validation mechanisms will need to be revised to allow these changes to take place.

More information on the project webpage.

Contact: Christine Redecker, Yves Punie

If you look for creativity in schools, can you find it?

The report "Creative Learning and Innovative Teaching: Final Report on the Study on Creativity and Innovation in Education in the EU Member States" provides a snapshot of creativity and innovation in education in schools in EU27. It argues that creativity, in the educational context, should be conceptualized as a transversal and cross-curricular skill, which can be fostered or inhibited. The report proposes five major areas where effort and improvement is needed to enable more creative learning and innovative teaching, namely: curricula, pedagogy and assessment, teacher training, ICT and digital media, and educational culture and leadership.

Teachers who took part in this study had highly positive views about the importance of creativity and innovation in education, claiming that creativity could be applied to every domain of knowledge (98%) and to every school subject (96%). The majority of teachers claimed to encourage learning activities which are likely to allow students to be creative. Despite these claims, conventional ways of teaching such as teacher-centred methods still prevail in the majority of schools in EU27.

The terms *creativity* is relatively frequently mentioned in school curricula in many European countries, whereas the term *innovation* hardly occurs at all. The term *creativity* is most prominent in the curricula of Northern Ireland (1.78), Estonia (1.65) and Scotland (1.25) and the least found in the Netherlands, Poland (both at 0.04) and Wallonia-Belgium (0.07) [These figures represent the per mil percentage of occurrence of the terms, i.e. how often the terms occur per thousand curricula words]. Reference to the terms however, is not a guarantee that creative practices actually occur. At the same time, many teachers who took part in the survey and several education experts interviewed for this study feel that the curricula in their countries do not sufficiently encourage creativity and innovation, mainly because they are not clear how creativity should be defined and how it should be treated in learning and assessment. Assessment and teacher training come up throughout the study as major issues which could act as both enablers and barriers for creative learning and innovative teaching.

Summary of the appreciation of different ICT tools by European teachers

This study also highlights the potential of Information Communications Technology (ICT) in enabling innovative and creative school environments. While teachers in the EU27 use ICT for their teaching resources, they do not fully exploit these technologies for creative learning and innovative teaching in the classroom. Furthermore, despite the increase in the numbers of computers in schools, the survey results show that hands-on access for pupils remains relatively low. In addition, few of the teachers surveyed recognized the potential benefits for learning of interactive and collaborative technologies and generally underestimate the potential of digital games and mobile phones for educational purposes.

Throughout this report, it was argued that educational actors have the power to unlock the creative and innovative potential of the young. However, they require substantial support, especially in terms of training, revision of curricula and assessment, and institutional change. There is a growing need for action at both national and European levels to bring about the changes required for an open and innovative European educational culture that unlocks the creative and innovative potential of its future generations.

IPTS will present a paper on Educational change through technologies at the EC-TEL 2011 Conference (European Conference on Technology Enhanced Learning) which will take place in Palermo (Italy) from 20 to 23 September 2011.

More information on the project webpage.

Contact: Romina Cachia, Anusca Ferrari Yves Punie

Background:

This is the final report of the project: 'Creativity and Innovation in Education and Training in the EU27 (ICEAC)' carried out by the Institute for Prospective Technological Studies (IPTS) under an Administrative Arrangement with the Directorate General for Education and Culture of the European Commission. Results are based on a literature review, a survey with teachers, an analysis of curricula and good practices, stakeholder and expert interviews, and two workshops with experts in the field.

ICT for Learning and Skilling

IPTS research on ICT for learning and skilling is looking at the contribution of ICT to developing innovative education and training practices that meet the requirements and needs of the digital society and economy, today and in the future.

ICT for learning the host country's language by adult migrants

The use of ICT by adult migrants for learning the host country language (or second language, L2) is a topic which crosses three policy areas at EU level: immigration and integration policy; information society policy; and education and training policies. All three areas are currently being addressed by flagship initiatives of the Europe 2020 Strategy. Moreover, it is widely recognised that second language acquisition by adult migrants is a crucial factor for socio-economic and cultural integration. IPTS is currently finalising two reports on the use of ICT for learning the host country's language by adult migrants. The first one is a policy report which reviews the current challenges of L2 provision and provides examples where ICT has been implemented to bypass or solve these challenges. The second is an in-depth analysis of the current ICT use for L2 acquisition by adult migrants in the Netherlands and Sweden.

More information on the Inclusion webpage. Contact: Anusca Ferrari

The use of ICT for the assessment of key competences

Assessment is a crucial part of the learning process and the acquisition of key competences but most current assessment methods have a strong emphasis on [only] knowledge and do not sufficiently capture transversal skills or the attitude dimension of key competences, though these are regarded as increasingly important for 21st century learning. In addition, while the use of ICT is playing an increasingly important role in education and training practices, its potential has not been fully exploited for assessment.
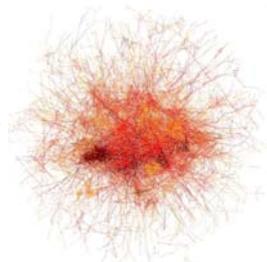
IPTS is therefore looking at how ICT can support the modernisation of schools and education and training practices by exploring assessment strategies that adequately capture all the dimensions of key competences for the 21st century, for all learners.

The study "**The Use of ICT for the Assessment of Key Competences (COMPASS)**" is expected to contribute to a European Commission Thematic Working Group on the Assessment of Key Competences, and to the preparation of a Policy Handbook on this topic by the end of 2011. Acquiring key competences is a priority for European and Member State policies, as argued in the Europe 2020 flagships "Digital Agenda", "New Skills and Jobs", "Youth on the Move" and "Innovation Union".

More information on the project webpage.
Contact: Christine Redecker, Yves Punie

How can social learning networks support teachers' professional development?

The IS Unit is currently participating as a project partner in the "**Teachers' Lifelong Learning Network (TeLLNet)**" project, which aims to understand how social learning networks can support teachers' competence building through visualisation, social network analysis (SNA), prospective scenario building exercises and a number of complimentary methods. The research focuses on identifying drivers and barriers for lifelong professional development of networked teachers, mechanisms for disseminating practices and innovations within and across networks, and implementing new peer-learning approaches within a Europe-wide networking platform for teachers.

As part of this project, IPTS in collaboration with European Schoolnet recently conducted two workshops with teachers during the annual eTwinning Conference, which took place in Budapest from 31 March to 2 April. Currently, more than 86,000 teachers belong to the eTwinning network. For these workshops, six typologies of eTwinning personas were created and then explored with teachers (see presentations).

A workshop took place at the IPTS premises on 6-7 June 2011 to explore what teacher collaboration networks will be like in 2025 with various experts from education, foresight and information systems technology networks.

More information on the project website.
Contact: Romina Cachia

CARICT: Supporting home caregivers for the elderly with ICTs

A major policy challenge in the European Union is the need to ensure quality Long-Term Care (LTC) for the increasing numbers of frail and dependent older citizens. Even with the promotion of 'Independent Living', much of the burden of care is taken by people in the informal caregiving setting – family, volunteers and family-employed care assistants. Information and Communication Technologies (ICTs) are being used on a small scale across Europe to support caregivers to older people, and when well designed with appropriate support and training, these could be widely adopted and play an important role in improving care in an economically, socially and politically sustainable way. IPTS and the European Commission's Directorate General for Information Society and Media (INFSO) have funded a study led by the European Centre for Social Welfare Policy and Research in Vienna to gather more systematic evidence on how ICT-based services can help informal caregivers to better engage with the people they care for, enabling better results in terms of quality of life of the caregiver (e.g. better work-family balance), effectiveness of care given (e.g. better care provided) and its efficiency (potential cost savings in the LTC system).

More information on the Inclusion webpage. Contact: James Stewart

Digital literacy, skills and inclusion

Digital skills were recognised as a key competence for lifelong learning in a Recommendation of the European Parliament and Council in 2006. Digital competence was then defined as "the confident and critical use of Information Society Technology (IST) for work, leisure and communication". More recent policy documents confirm the fact that digital competence is seen as a priority for European and Member State policies. In particular, the Digital Agenda for Europe (DAE) of the Europe 2020 strategy highlights the need to educate all European citizens to use ICT and digital media for employability, learning, creating, and participating in society. The IS Unit at IPTS is currently contributing to this policy context with three initiatives:
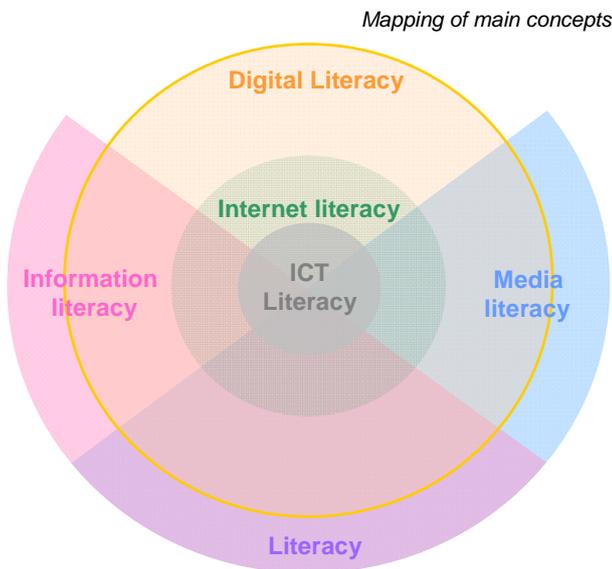
A study on digital competence: identification and Europe-wide validation of its key components for all levels of learners (DIGCOMP)

This study aims to identify the key components of digital competence (DC) in terms of the knowledge, skills and attitudes citizens need to be digitally competent. Through desk research and multiple stakeholder consultations, the study will:

1. identify the competence area and sub-competences related to DC/literacy;
2. develop a DC conceptual framework which takes into account the needs of all target groups;
3. propose a roadmap for the possible use and revision of the conceptual framework.

More information on the project webpage.

Contact: Anusca Ferrari

Mapping of main concepts

A report on digital competences for social actors and intermediaries

This report describes the presentations and discussions that took place in a thematic workshop jointly organised by the Directorate General for Information Society and Media and JRC-IPTS in the framework of the ePractice community. Discussions on how ICT-based solutions (training, resources, tools) could be used to train intermediaries in digital competences and to support them in their jobs focused on three aspects of their work:

1. providing care and assistance to groups at risk (notably dependent people like the elderly or the disabled);
2. raising levels of education, learning, skilling and/or employability of groups at risk (notably migrants, young people, the unemployed and the low educated);
3. managing and operating social initiatives.

Eight policy options were identified and debated.

Contact: Gabriel Rissola

Youth at risk of exclusion: can ICT-based initiatives effectively support their socio-economic inclusion and how?

The IS Unit has finalized a research project which was contracted to the Tavistock Institute (UK). This project mapped and analysed for the first time the characteristics and impact of ICT-based initiatives which aim to use ICT as a tool for the inclusion of young people at risk of exclusion through their reintegration into educational paths, into society and/or employment. The research has covered 60 initiatives operating in United Kingdom, Spain and the Netherlands and at European level. The aims of the study were:

1) to provide key stakeholders working in the field of youth, ICTs and exclusion with evidence-based knowledge about the socio-economic benefits that the use of ICT through well designed initiatives can bring to young people who are disadvantaged or at risk of exclusion, and to the intermediaries working with them;

2) to identify the contextual factors influencing and the conditions for achieving these benefits.

The literature review on the **socio-economic impact of ICT uses by young people at risk** highlights two opposing positions. The 'optimistic' view suggests that key outcomes are the development of self-esteem, confidence and team working abilities, social networking and communication, technical skills and digital literacy, creativity, active citizenship, learning-to-learn skills, learning performance, re-engagement in education and training and insertion into employment. The negative view highlights a widening of the digital divide between 'at risk' and 'mainstream' young people, increased online risks and risk of social isolation.

Although the literature review showed that an evidence base for socio-economic impact has yet to be fully developed, the initiatives survey showed that there is evidence of 'potential impacts', mainly on supporting the re-entry of youth at risk into learning and employment. **The analysis of successful initiatives** using ICTs to support young people at risk shows that 'success' is highly dependent on contextual factors and on the use of ICT tools consistently and adequately for the strategies and groups targeted in the initiative. Furthermore, the most 'successful' initiatives are those that adopt a 'Learning for inclusion' approach, i.e., that focus on learning as a catalyst to break the cycle of social exclusion. They do this by supporting personal development and active citizenship, with a strong involvement of trainers as intermediaries, and by emphasising on the use of multi-media, interactive games, video and audio applications and immersive environments as supporting tools to implement inclusion strategies.

The project reports will be available in the coming month on the Inclusion webpage. Contact: Clara Centeno

Other Publications in 2010-11

ICT Industry Analysis

- Software Patents and Firms` Strategic Behaviour in the EU: Some Empirical Insights (2011). G. De Prato, F. Rentocchini. In: De Liso Nicola and leoncini Riccardo, editor. Internationalisation, Technological Change and the Theory of the Firm. Abingdon (United Kingdom): Routledge; p. 141-160.

- Competition and Innovation: ICT- and non-ICT-enabled Product and Process Innovations (2010). D. Nepelski. Munich Personal RePEc Archive; p. 26239 (1-37).

- FDI Spillovers in the Czech Republic: Takeovers versus Greenfields (2010). J. Stancik. In: Keereman, Filip; Szekely, Istvan, editors. Five Years of an Enlarged EU: A Positive Sum Game. Springer; p. 33-54.

- Born Digital, Grown Digital - The videogame World is a Hyperactive Phenomenon (2010). G. De Prato, C. Feijoo, J. Simon. Intermedia 38 (5); p. 22-27.

Learning & Skills

- Imagining Future Learning: Mapping Major Changes to Education and Training in 2025 (2010). S. Stoyanov, B. Hoogveld, P. Kirschner. eLearning Papers; p. 9-23.

- Creative Learning and Innovative Teaching: Final Report on the Study on Creativity and Innovation in Education in the EU Member States (2010). R. Cachia, A. Ferrari, A. Ala-Mutka, Y. Punie.

Inclusion & Cultural Diversity

- Under the Radar: The Contribution of Civil Society and Third Sector Organisations to eInclusion (2011). A. Haché; Editor: C. Centeno

- Migrants, Ethnic Minorities and ICT: Inventory of Good Practice in Europe that promote ICT for socio-economic integration in culturally diverse contexts (2011). Bridge-IT Network

- Language Learning by Adult Migrants: Policy Challenges and ICT Responses - POLICY REPORT (2011). S. Kluzer, A. Ferrari, C. Centeno.

- ICT for the Social and Economic Integration of Migrants into Europe (2011). C. Codagnone, S. Kluzer.

- RESEARCH AND POLICY BRIEF ON ICT FOR INCLUSION OF YOUTH AT RISK: Using ICT to Reengage and Foster the Socio-economic Inclusion of Youth at Risk of Social Exclusion, Marginalized Young People and Intermediaries Working with them (2010). A. Haché, J. Dekelver, L. Montandon, J. Playfoot, M. Aagaard, S. Stadler Elmer.

Digital Living & Identity

- Future Trends in the Regulation of Personal Identity and Legal Personification in the Context of Ambient Intelligence Environments: The Right to Multiple Identities and the Rise of the 'AIvatars' (2011). N.N.G. de Andrade. In S. Muller, S. Zouridis, M. Frishman and L. Kistemaker, editors. The Law of the Future and the Future of Law. Torkel Opsahl Academic EPublisher, ISBN 978-82-93081-27-2, pp.567-585.

- Understanding the Economics of Electronic Identity: Theoretical Approaches and Case Studies (2010). A. Hoikkanen, M. Bacigalupo, W. Lusoli, I. Maghiros, S. Nikolov. In Conference Proceedings: E. de Leeuw, S. Fischer-Hübner, L. Fritsch, editors. Policies and Research in Identity Management, ISBN: 978-3-642-17302-8, ISSN: 1868-4238. Vol. 343. Springer; p. 41-58.

- Adaptive Foresight in the Creative Content Industries: Anticipating Value Chain Transformations and Need for Policy Action (2010). F. Abadie, M. Friedewald, K. Weber. Science and Public Policy 37 (1); p. 19-30.

Economic Aspects of eHealth

- Assessing the Impact of Integrated Personal Health and Care Services: the Need for Modelling (2011). C. Codagnone, I. Maghiros, D. Broster, F. Lupiañez, M. Lluch

- A composite index for the benchmarking of eHealth Deployment in European acute Hospitals. Distilling reality in manageable form for evidence based policy (2011). C. Codagnone, F. Lupiañez-Villanueva.

- Nudging lifestyles for better health outcomes: crowdsourced data and persuasive technologies for behavioural change (2011). C. Codagnone, F. Lupiañez-Villanueva.

- The Integration of Information and Communication Technology into Nursing (2011). Lupiañez Villanueva F, Hardey M, Torrent J, Ficapal P. INTERNATIONAL JOURNAL OF MEDICAL INFORMATICS 80 (2); p. 133-140.

- Strategic Intelligence Monitor on Personal Health Systems (SIMPHS): Report on Typology/Segmentation of the PHS Market (2011). F. Abadie, C. Codagnone, M. van Lieshout, C. Pascu, P. Baum, A. Hoikkanen, J.-A. Valverde, I. Maghiros.

eGovernance

- Reputation-based Governance (2011). L. Picci. Stanford (United States): Stanford University Press.

- Lifting off towards Open Government: a report from the EU Belgian Presidency Conference (2011). D. Broster, G. Misuraca, M. Bacigalupo. Journal of ePractice (Vol.12) Special Issue on: "The Openness of Government".

- Interoperability challenges for ICT-enabled governance: a conceptual framework from Pan-European experiences (2011). G. Misuraca, G. Alfano, G. Viscusi. Journal of Theoretical and Applied Electronic Commerce Research, Special Issue on E-government interoperability, enterprise architecture and strategies.

⇒ **21-22 June 2011: Expert workshop on "ICT based solutions for cargivers: Assessing their impact on the sustainability of long-term care in an ageing Europe (Brussels)**
In the context of IPTS research activities to support policy in the areas of Long Term Care, and ICT for social inclusion, a study has been commissioned aimed at providing evidence and policy options for in these fields. The main purpose of the workshop was to discuss the Impact Assessment Methodology that the main contractor, the European Centre for Social Welfare Policy and Research, supported by their expert research network, have developed in the context of the project and to collect feed-back from a group of leading experts from practice, academia and policy making with relevant experience to the topic of ICT and/or informal care for dependent (older) persons. Contact: James Stewart

⇒ **16-17 June 2011: Digital Agenda Assembly (Brussels)**
This major event attended by more than one thousand participants was organised by the European Commission's Directorate General for Information Society and Media to mobilise Digital Agenda for Europe's stakeholders and practitioners. In Workshop 20. Digital literacy and e-Inclusion JRC-IPTS made a presentation on the digital competences of social actors and intermediaries and co-moderated two breakout working groups. More information on the DAA website. Contact: Gabriel Rissola

⇒ **13-14 June 2011: 3rd Annual Patent analysis workshop: "The Output of R&D activities: Harnessing the Power of Patents Data" (Seville)**
The workshop aimed at improving the understanding of the patent system, focusing on empirical analysis, methodology, and the use of the PATSTAT database. The speakers provided world-leading contributions from complementary standpoints: the Academia, the EPO, the US patent trademark and patent office (USPTO), national Patent Offices, the OECD, and the European Commission. Contact: Giuditta De Prato

⇒ **31 May 2011: Expert workshop on "The economics of Media and content industry (MCI). Approaches, case study, economic effect of the digital transition" (Seville)**
The workshop explored how the changing structure of media and content industries and their markets can be tackled. It participates to the JRC-IPTS and the European Commission's efforts to find an adequate way to deal with the digital economy and tried offering a multifaceted approach to assess the digital transition in the MCI, to point at what can be derived from such different theoretical approaches and what they already yielded (see workshop webpage). Contact: Jean-Paul Simon

⇒ **20-21 May 2011: 4th International Conference on Information Law (ICIL) (Thessaloniki)**
This year the conference was devoted to the theme "Values and Freedoms in Modern Information Law and Ethics" and hosted paper presentations on information law and information ethics. IPTS presented the papers entitled: "Identity Management Systems and the Principle of Multiple Identities" and "Ambient Intelligence and data protection. Challenges and opportunities after the Lisbon Treaty." More information on the conference website. Contact: Norberto Andrade, Shara Monteleone

⇒ **12-13 May 2011: 4th International Seville Conference on Future-Oriented Technology Analysis (FTA 2011) (Seville)**
The Conference focussed on the need and potential of FTA to address disruptive transformations in response to grand societal challenges. IPTS presented two papers: 1) "Law and the Future. The Role of Future-Oriented Technology Analysis (FTA) in Law - The cases of legal research, legislative drafting and law enforcement" and 2) "Foresight and Policy modelling on ICT for Governance: Exploring the Next Frontiers". More information on the conference website. Contact: Norberto Andrade, Gianluca Misuraca

⇒ **10-12 May 2011: International Forum on Educational Technologies: New ways of learning and educational innovation with ICT (Sao Paolo)**
This forum was part of Interdidática, a yearly exhibition on ICT in education attended by circa 1500 teachers, researchers, eLearning practitioners and educational policymakers from Brazil. IPTS participated with a presentation on "Educational transformation in a digital world: Challenges for the future of learning in Europe" and presented the six challenges to the future of education (multi-cultural classrooms, early school leaving, fostering talent, labour market re-integration, re-skilling, transition from higher education to work; under the headings of inclusion, participation, engagement). More information on the conference webpage. Contact: Yves Punie

⇒ **11-12 April 2011: ICTNET 2nd Workshop: "ICT Intangibles and Innovation" (London)**
This workshop was the second of a series on the economic impact of ICT, organised by ICTNET and funded by the European Commission. The goal was to bring together leading researchers in the economics of information and communication technologies (ICT) in order to discuss recent scientific contributions and outstanding policy challenges. Particular emphasis were placed on ICT, R&D and intangibles and ICT-enabled innovation. JRC-IPTS presented its paper on "The global ICT R&D network". More information on the conference webpage. Contact: Daniel Nepelski

⇒ **25-27 January 2011: 4th International Conference on Computers, Privacy and Data Protection (CPDP): "European Data Protection: In Good Health?" (Brussels)**
The CPDP is one of Europe's most important forums for academics, practitioners, policymakers and activists in the field of privacy and data protection. At the 2011 edition IPTS presented the paper entitled: "Towards a European eID regulatory framework: the legal gaps, barriers and challenges of constructing a legal framework for the protection and management of electronic identities." More information on the conference webpage. Contact: Norberto Andrade

⇒ **1-2 December 2010: Expert Workshop on "The Paradoxes of ICTs and Social Inclusion: Do ICTs increase Opportunities for Young People at Risk?" (Brussels)**
As part of IPTS' e-Inclusion research activities, this workshop presented and discussed the state of the art on the topic of youth at risk and ICTs. IPTS presented the first results of the studies on the topic, developed by Arcola Research and the Tavistock Institute. The focus of the first day of the workshop was on the discussion of the policy context and several studies on youth, youth at risk and ICTs. On the second day the characteristics and impact assessment strategies of ICT-based policies and initiatives for inclusion of young people were discussed. Contact: Esteve Sanz

Upcoming events

Date	Place	Title	Contact*
21 September 2011	Nicosia, Cyprus	Workshop: "Electronic Identity for Europe"	Norberto Andrade
29-30 September 2011	Brussels, Belgium	Telecentre-Europe Annual Summit	Gabriel Rissola
5 October 2011	Johannesburg, South Africa	The ICT landscape in BRICS countries: lessons from emerging economies (R&D, innovation and trade)	Jean-Paul Simon
13-14 October 2011	Seville, Spain	Expert Workshop: Exploring the Future of Enterprise Search 2011	Stavri Nikolov
19-20 October 2011	Brussels, Belgium	International Conference "Global ICT R&D expenditures: changing patterns of investments?"	Paul Desruelle
November 2011 (date tbd)	Brussels, Belgium	Expert workshop on "ICT based solutions for cargivers: Assessing their impact on the sustainability of long-term care in an ageing Europe"	James Stewart
November 2011 (date tbd)	Seville, Spain	Expert workshop on Digital Games for Inclusion	Gianluca Misuraca

* E-mail addresses are formed as follows: name.surname@ec.europa.eu

For more and updated information on our upcoming & past events, please have a look at the Events section of the IS website.

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