

Understanding ICT innovation in the digital economy

The Information Society Unit, in collaboration with the IPTS Knowledge for Growth Unit, recently completed the exploratory project *“Rethinking Innovation and Industrial policies in the EU and the US: ICT and high-tech industries and the EU-US productivity, innovation and R&D gaps.”*

This project documented the existence of innovation gaps between the EU and its main competitors in specific ICT sub-sectors: web services, industrial robotics, and display technologies. The project also looked more closely at how public policies can trigger innovation. In particular, it focused on the US “Small Business Innovation Research” (SBIR), the “Defense Advanced Research Projects Agency” (DARPA) and the Advanced Technology Program (ATP). The project also explored why there are fewer European firms leading innovation in the new ICT sectors than there are US firms.

This article summarises the different policy options to improve EU innovativeness. These options have emerged from 3 specific studies launched under the project, with special emphasis on policies directed at ICT industries.

First, *“Comparing Innovation Performance in the EU and the USA – Lessons from Three ICT Sub-Sectors”* documented the existence of innovation gaps between the EU and its main competitors in specific ICT sub-sectors: web services, industrial robotics and display technologies.

The analysis showed that the innovation gap between the EU and the US is not simply a case of the EU lagging behind the USA. Instead, a more nuanced picture emerges in which firms in different countries have strengths in different sub-sectors and in different parts of the value chain.

The study identified different factors of success and concluded that there is a combination of several policy interventions that could improve Europe’s innovative performance:

- Successful innovation depends on excellence in education and strong and active links between knowledge generation, knowledge

exchange and knowledge exploitation (i.e. between universities and firms). From the US experience, it is clear that Stanford University has had a tremendous impact on the emergence of high-tech companies in Silicon Valley, from Hewlett Packard all the way to Google.

- To increase the return on these policies, it is necessary to create an innovation friendly environment: low administrative costs, tolerance towards business failure, a friendly business climate, and a large and integrated market (including venture capital). The Amazon case shows the importance of the business environment, the existence of a single market and the efficiency of services.
- The public sector can provide important financial (e.g. SBIR type instruments, which was crucial in the case of iRobot) and non-financial support. As regards the latter, cluster-generating policies – usually a lengthy process- have been shown in several case studies to be important as well.

The second study, *“The Development of U.S. Policies Directed at Stimulating Innovation and Entrepreneurship”* explored how U.S. federal institutions fund and influence innovation in the knowledge economy context and if any agencies or particular policies could be replicated in a European context. This study analysed how three key US agencies have advanced innovation in the US: the Small Business Innovative Research programme (SBIR), the Advanced Technology Program (ATP) and the Defense Advanced Research Program Agency (DARPA).

This study also explored why and how R&D does not necessarily lead to innovation. By focusing on the individual inventor or entrepreneur, the study explored how ideas must pass through a “knowledge filter” in order to become successful innovations in a process which is not linear and not always successful. In this context, the importance of public policies was underlined, including public-private partnerships and non-profit organizations, in enhancing entrepreneurship. For example, the study

claims that the impact of public policy on innovation can extend beyond firms and can help university scientists and other knowledge workers to reach the decision to commercialize their research by starting a new firm and entering into entrepreneurship.

The main example of US innovation policy analysed in this study is the Small Business Innovation Research (SBIR) programme. The SBIR was created to provide early stage funding to very innovative ideas and enable firms to cross the “valley of death”, or the financing constraints typically confronting new and young firms, especially in knowledge-based and high technology industries.

US policies which could conceivably be replicated in the European context were also identified. Most notably, the study suggests that replicating an SBIR-type institution or programme, as envisaged in Horizon 2020, and focusing on encouraging European universities to produce innovations may help considerably to transform European ideas into innovations under the correct conditions.

The third study *“Lessons from ICT Innovative Industries: Three Experts’ Positions on Financing, IPR and Industrial Ecosystems”* asks why there are fewer European firms leading innovation in the new ICT sectors. Three experts from the Breughel Institute provided their specific understanding of emerging innovative ICT markets and what role government policy could play by analysing three main factors: limited access to financing, failing intellectual property aspects, and failures in ICT ecosystems. In-depth case studies were used from the seven reports of the JRC-IPTS COMPLETE project, covering the following technologies:

- WEB 2.0,
- Online and mobile videogames software,
- Displays: OLEDs and E-paper,
- RFID (Radio Frequency Identification): Item Level Tagging and Public Transportation,
- Automotive Embedded Software,
- Semiconductor design,

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- Robotics: applications to safety and adoption by SMEs.

Factors commonly cited in the policy debate to explain the differences in dynamic structure between the US and the EU are, for example, a greater willingness on the part of the US financial markets to fund projects in new sectors, the more fragmented nature of Europe's product markets, the lower exit and re-entry costs for US firms, or greater mobility in the US labour market. Nonetheless, part of the story is also linked to EU's innovation ecosystem. For example, while Europe is best positioned among network operators and equipment providers, it is still only weakly represented in the area of Internet platform providers. These technology platforms are becoming crucial elements in the competition between companies and even nations.

The experts in this study also recommended that policy interventions should be implemented as part of a "policy mix". Their main recommendations are:

- Government intervention should address any market failure on the "funding escalator", covering the whole cycle from the very early stage of shaping ideas, testing and prototyping these ideas, to early commercialization and larger-scale deployment of innovative projects. Different policy tools should be available at each stage, for instance, policies promoting business angel groups, public grants for pre-competitive R&D for highly innovative projects, public procurement-based innovation contracts, public support for private early stage investment, and government-backed lending. In particular, the EU should use public

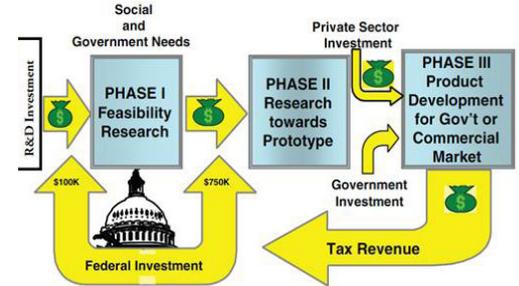
procurement as an instrument for nurturing early-stage innovations more often in those sectors where public actors can act as pivotal users. For new ICT markets, there are many examples where the public sector could have an important early user role: e-government, e-health, and e-education are good examples for the Web 2.0 market, or public transport for RFID.

- To reduce the cost of IPR protection for young firms, a patent fee discount structure should be introduced for young small firms, as it has been in the US and Japan. Finalisation of implementation of the single EU patent should be the highest priority.
- The choice of when and which regulations or standards interventions to use should be carefully evaluated ex-ante as regards their longer-term impact on the development of new markets. They should allow new innovators to continue to compete. They should also be designed with a global perspective, enabling European firms to build first-mover advantages and leadership in world markets.
- Policy makers should monitor emerging innovative markets closely and regularly evaluate the mix of policy instruments. This monitoring capacity should also include a strong prospective angle.

The main lessons that emerged from this exploratory project will contribute to the activities of the IS Unit on ICT innovation, in particular a new project on European innovation policies for the digital shift of the

The Structure of the SBIR Program.

Source: Adapted from Wessner, C.W., 2008, *An Assessment of the SBIR Program*, The National Academies Press, p.23.



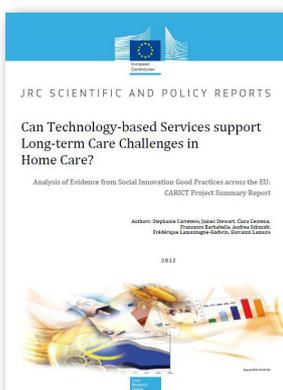
economy and society, which the IS Unit will conduct for and with DG CONNECT.

More information and project publications are available on the [project webpage](#), i.e. the final reports of the above mentioned studies:

- [Comparing Innovation Performance in the EU and the USA: Lessons from Three ICT Sub-Sectors](#). Simon Forge, Colin Blackman, Itzhak Goldberg, and Federico Biagi, JRC Technical Report 25961 EN, May 2013
- [The Development of U.S. Policies Directed at Stimulating Innovation and Entrepreneurship](#), David Audretsch and Taylor Aldridge. Editors: Federico Biagi, Itzhak Goldberg, and Paul Desruelle JRC Technical Report, 2013 (forthcoming)
- [Lessons from ICT Innovative Industries: Three Experts' Positions on Financing, IPR and Industrial Ecosystems](#). Reinhilde Veugelers, Bruno van Pottelsberghe, Nicolas Véron. Editor: Marc Bogdanowicz, JRC Technical Report 25562 EN, Nov. 2012

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Report on ICT-based services for informal carers



In January 2013, JRC-IPTS published the report "Can Technology-based Services support Long-term Care Challenges in Home Care? Analysis of Evidence from Social Innovation Good Practices across the EU: CARICT Project Summary Report."

This report contributes with data that show the benefits of using technologies to support informal carers and recommend policy actions to develop, replicate and transfer them. The research has contributed to EU policies such as the Digital Agenda for Europe, the European Innovation Partnership on Healthy and Active Ageing, the Employment Package and the Social Investment Package

These findings were obtained through the CARICT study ('ICT for caregivers and other social actors: enhancing the sustainability of long-term care and social support'), which was co-financed by DG CNECT and JRC-IPTS of the European Commission, and carried out in 2011.

To read the complete report, please [click here](#). Contact: [Stephanie Carretero Gomez](#), [Clara Centeno](#)