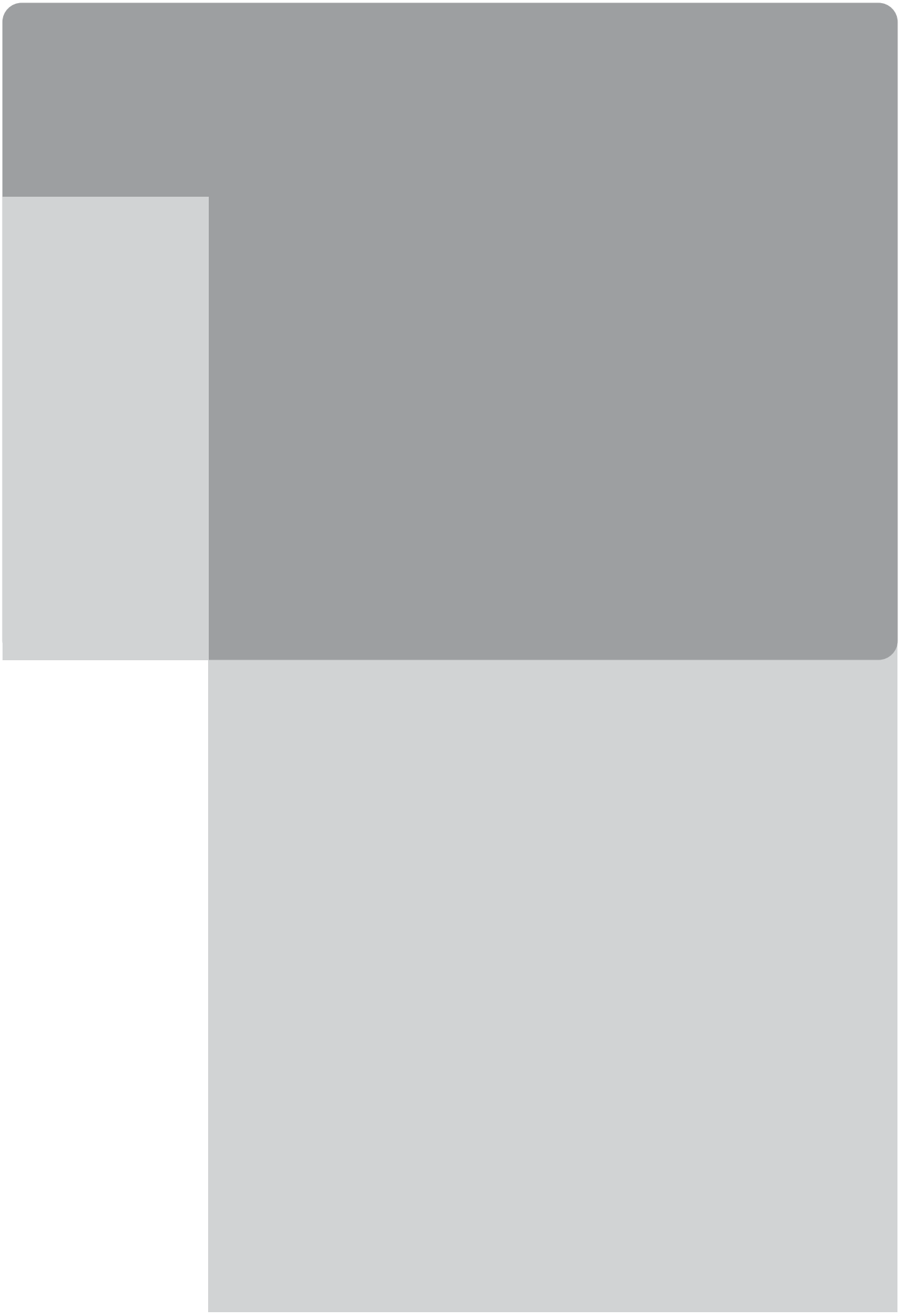

NEW ICT SECTORS: PLATFORMS FOR EUROPEAN GROWTH?

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fragmented intellectual property regimes, lack of access to risk capital and strong ICT clusters with pooled labour markets, and too few advanced early (public) users and complementary industries.

with 70 percent of its firms being old leading innovators. When comparing within layers, EU firms are not less R&D intensive. In fact, they are typically more R&D intensive. The overall lower EU ICT R&D intensity is due to the greater weight of

weakly present. Europe's struggling R&D position in the ICT eco-system is therefore clearly related to the sectoral and age composition of its firms, and its failure to create new ICT firms and redirect towards new ICT sectors.

With fewer European companies operating in the sectors from which most new value creation originates, the question is if they will be able to capture value from the new and follow-up generations of innovation or as providers of applications and equipment to the platforms of leading firms. This will depend on the contestability and the compatibility of the platforms.

BARRIERS TO THE DEVELOPMENT OF NEW ICT SECTORS IN EUROPE: EVIDENCE FROM FLY

Why is it that Europe has failed to redirect its innovation performance towards new ICT growth sectors, which offer the greatest opportunities for growth? Which forces most impede the development of firms in new ICT sectors? And how systemic is this lack of readjustment capacity in the EU, meaning it is likely to be repeated in future? To answer these questions we provide an in-depth analysis of some specific new emerging ICT technologies and sectors.

The FLY cases

For a selection of in-depth studies, we draw on the FLY report[2], which covers the following ICT sectors:

- Web 2.0
- Online and mobile gaming software
- Automotive embedded software

2. The selection of the sectors was done by the European Commission's Institute for Prospective Technological Studies (IPTS) for the project *Further lessons from ICT innovative industries*, known as FLY, which was carried out by Bruegel. The FLY project expanded on the sector discussions from the IPTS COMPLETE project (http://is.jrc.ec.europa.eu/pages/ISG/COMPLETE.html). This Policy Contribution summarises the main insights. The interested reader is referred to the full report for more detailed insights (Veugelers, van Pottelsberghe and Véron, 2012).

3. A web 2.0 site allows users to interact and collaborate. Users co-create content in a virtual community, in contrast to Web 1.0 websites, where users are limited to the passive viewing of content that was created for them.

commercial firms), the potential impact (value added) has been slow to develop and the EU is lagging both on the supply and the demand sides. Digital ecosystems – whether at home for mobile devices, entertainment systems and home appliances, or in business where mobile devices are combined with virtualised and cloud computing – are meshed and brought together through platforms and software applications such as Google's Android, Microsoft's Embedded CE or Samsung's AllShare. The outlines of this landscape of digital convergence are still emerging.

Platforms and standards in the FLY cases

Standards and platforms are concerns in many of the new ICT markets considered. Web 2.0, video games and automotive embedded systems are the clearest cases. Some examples are listed below. Semiconductor IP, robotics, the RFID segment and the e-paper market also have potential for generating one or more technology platforms.

Examples of platforms or potential platforms:

- Video games: Sony PlayStation platforms, Microsoft X-Box, Apple iPhone, Android

Analysing the social costs and benefits from standards and platforms for the FLY cases yields a mixed picture. The lack of technical standards does not help to reduce the high level of uncertainty that pertains in the early-stage of development of markets. This high level of uncertainty impedes access to finance, markets and suppliers. Establishing standards would thus help market development. However, given the high level of uncertainty about what the best standards would be, a premature picking of the standard can impede the development of new higher quality standards and their follow-up innovations. The problems of lock-in and settling on the wrong standards can be substantial, as path-dependencies in these network markets are particularly strong. Standardisation will also make entry by lower-cost producers easier and the consequent commoditisation will shift value away from first movers.

As mentioned, with the exception of the AUTOSAR consortium in the Automotive Embedded Software market, standards are typically developed *de facto* through a bottom-up approach. Competition in the market for customers and developers determines which standards and platforms are successful. Therefore the ability to obtain a dominant position or greater market penetration is what in the end will determine which framework becomes a *de facto* standard.

Major players aim for platform leadership to capture value, building around them a network of suppliers, developers and users. In none of the FLY cases, particularly in the early-stage ones, has a dominant leader so far been established, although an oligopoly of major players is emerging. US companies are particularly well represented in this set of potential leaders, while European firms are poorly placed. The AUTOSAR consortium is an exception because the European firms involved in it are in a stronger position compared to other emerging platforms in this market. Nevertheless, in the infotainment segment of automotive embedded software, there is a US-led battle

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Europe is an impediment for commercialisation identified in all FLY studies; this contrasts with the US. In particular, language borders hinder the development of some sectors in Europe, such as web 2.0 or the E-paper industry. At the same time, Europe's cultural differe16(qtcontrast neealsTJT(ovell f83 Tw23 ideTap2 (betwe n the sciene16(qtcoy htyoung momentnicTJ,0

Science, research and skills links

For players in new emerging technologies, which are often built on insights from frontier research (or are even spin-offs from public research), a well functioning interface between the science system and the corporate sector is particularly important.

In all of the FLY cases, R&D and innovation capacity was identified as important for market success. There is however no evidence in these cases that Europe's public R&D infrastructure would be inadequate, compared to the US. The conclusion that more public R&D would be needed in order to enhance European competitiveness in ICT is therefore questionable, particularly for web 2.0 technologies. The problems for market development are typically identified elsewhere.

Nonetheless, access to knowledge is important, particularly when defined more specifically as not only access to science and basic R&D but as access to "skills to bring ideas to market". From this perspective, Europe has some deficiencies to tackle. First, there are skill gaps in some specific areas (eg in infotainment software for automotive embedded software, software project management, etc). Second and more generally across all FLY cases, there is evidence that Europe lacks entrepreneurial skills to move new research results into start-up business development.

Innovation partnerships in the form of large R&D consortia, such as the Framework Programme projects funded by the European Commission, may have helped to create momentum for developments in established technologies and industry, but have not been found to be particularly helpful for small-scale and young innovators in new emerging ICT sectors.

Public-private links

The importance for new ICT markets of a smooth interface between the public sector and private

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sector innovators is demonstrated through the long-standing and continued importance of the US federal government as an early user (see Box 1).

Public procurement is also identified in some of the FLY sectors as perhaps the most important instrument for European policy to support the development of new ICT markets. The role of innovative procurement is particularly important for RFID (eg in public transportation scheduling). For web 2.0 technologies, public procurement (for e-government) is also considered to have the potential to kick-start markets.

The fragmentation of the EU public sector is, in all of these cases, identified as a significant barrier to the development of a compact procurement policy at an integrated European scale.

Access to finance

Financial constraints – both external and internal – are a major barrier to the development and growth of new innovation-based ICT markets. The private venture capital market is best equipped to fund projects, especially for highly innovative and radical growth projects with high levels of